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Memo from Ann Burroughs for Kay Greeley, Landscape Tree Consultant regarding 05-CUP-006 and -05-OTP-032 – Sunbelt Enterprises. June 1, 2009.

Kay J. Greeley

Memo

To: Valerie Darbouze, City of Agoura Hills

From: Ann Burroughs for Kay Greeley, Landscape and Oak Tree Consultant

Date: June 1, 2009

Re: 05-CUP-006 and 05-OTP-032 – Sunbelt Enterprises

As requested, we reviewed the following documents submitted with respect to the subject entitlement request:

- Planting and Canopy Coverage Plans prepared by Edward E. Gripp, Landscape Architect, dated April 10, 2009
- Photometric Plan, prepared by The Wren Group, dated October 4, 2005 revised April 7, 2009

There is one (1) mature *Quercus lobata* (Valley Oak) on the property, and a total of eleven (11) additional native oaks, including four (4) *Quercus agrifolia* (Coast Live Oaks) and seven (7) Valley Oaks, located on three adjacent properties. The applicant proposes to construct two medical office buildings on the site, located at 29541 and 29555 Canwood Street. The site is presently unimproved.

Construction of the project as proposed would involve minor construction encroachment within the protected zone of Oak Tree Number 2, the on-site Valley Oak. The eleven off-site oaks, two of which partially overhang this site, would not be impacted. Although some minor discrepancies exist among the Oak Tree Location Map, Landscape and other Plans, our estimate for the impacts as proposed is approximately two percent (2%) of the protected zone of Oak Tree Number 2. It is our opinion that the tree could recover from this potential minor root disturbance and could safely remain in place as long as the work is performed carefully. However, due to the inconsistencies among the current plans, the Grading Plan should be reviewed by us during the plan check process to ensure there is no significant increase to the anticipated minor encroachment.

Our recommended conditions of approval for the project as proposed are as follows:

Oak Trees

1. The driplines and protected zones of all oak trees shall be consistent on all project plans including the Oak Tree Location Map, and Grading, Architectural, Electrical, Landscape and Canopy Coverage Plans. The City Landscape and Oak Tree Consultant shall review the Grading Plan submittals during the plan check process to assess any potential increase to the encroachment into the protected zone of Oak Tree Number 2.
2. The applicant is permitted to encroach within the protected zone Oak Tree Number 2 in order to complete the approved site development program.
3. No activities are permitted within the protected zone of the remaining eleven (11) oak trees. They are to be preserved in place with no impacts.
4. Prior to the start of any work or mobilization at the site, Oak Trees Number 1, 2 and 9 shall be fenced at the edge of the protected zone or at the approved work limits, in accordance with Article IX, Appendix A, Section V.C.1.1. The City Oak Tree Consultant shall approve the fencing locations.

5. The applicant shall provide a minimum of forty-eight (48) hours notice to the City Oak Tree Consultant prior to the start of approved work within the protected zone of an oak tree.
6. No grading, scarifying or other soil disturbance shall be permitted within the portion of the protected zone of any oak tree not directly impacted by the project construction.
7. No vehicles, equipment, materials, spoil or other items shall be used or placed within the protected zone of any oak tree at any time, except as specifically required to complete the approved work.
8. All approved work performed within the protected zone of an oak tree shall be accomplished with hand tools only. All such work must be performed under the direct observation of the applicant's oak tree consultant unless otherwise approved by the City Oak Tree Consultant.
9. Prior to occupancy, each oak tree shall be mulched throughout the dripline with three inches (3") of approved organic matter.
10. Any fertilization of the tree should be based on actual soil tests from the site. Fertilization is generally not necessary unless serious deficiencies are evident in the leaves.
11. Within ten (10) calendar days of the completion of work and prior to removal of the protective fencing, the applicant shall contact the City Oak Tree Consultant to perform a final inspection. The applicant shall proceed with any remedial measures the City Oak Tree Consultant deems necessary to protect or preserve the health of the subject oak trees at that time.
12. No pruning of live wood shall be permitted unless specifically authorized by the City Oak Tree Consultant. Any authorized pruning shall be performed by a qualified arborist under the direct supervision of the applicant's oak tree consultant. Pruning operations shall be consistent with The Pruning Standards of the Western Chapter of the International Society of Arboriculture.
13. No irrigation or planting shall be installed within the dripline of any existing or new oak tree unless specifically approved by the City Oak Tree Consultant.
14. No herbicides shall be used within one hundred feet (100') of the dripline of any oak tree unless the program is first reviewed and endorsed by the City Oak Tree Consultant.
15. The project oak tree consultant shall submit certification letters for all work completed within the protected zone of any oak tree within ten (10) working days of the completion of said work. The letters shall describe all work performed, methods utilized, monitoring performed and shall state whether such work was completed in accordance with the above conditions of approval.

Landscaping

16. The landscape plan shall substantially conform to the plan prepared by Edward E. Gripp Landscape Architect, dated April 10, 2009.
17. Proposed tree wells and planters shall be consistent on all plans including the Oak Tree Location Map, and the Grading, Architectural, Electrical, Landscape and Canopy Coverage Plans.
18. Prior to the approval of building permits, the applicant shall submit three (3) sets of landscape plans meeting the following requirements:
    a. A California-licensed landscape architect shall prepare, stamp and sign the plans.
    b. All plans shall be legible and clearly drawn.
    c. Plans shall not exceed thirty inches (30") by forty-two inches (42") in size. Plans shall be a minimum of twenty-two inches (22") by thirty-six inches (36") in size.
    d. A true north arrow and plan scale shall be noted. The scale shall be no smaller than one inch equals twenty feet (1"=20'), unless approved by the City Landscape Consultant.
    e. A title block shall be provided, indicating the names, addresses and telephone numbers of the applicant and landscape architect.
    f. The project identification number shall be shown on each sheet.

g. The plans shall accurately and clearly depict the following existing and proposed features:
    - Landscape trees, shrubs, ground cover and any other landscaping materials
    - Property lines
    - Streets, street names, right-of-ways, easements, driveways, walkways, bicycle paths, and any other paved areas
    - Buildings and structures
    - Parking areas, including lighting, striping and wheel stops
    - General contour lines
    - Grading areas, including tops and toes of slopes
    - Utilities, including street lighting and fire hydrants
    - Natural features, including watercourses, rock outcroppings

h. The Planting Plan shall indicate the botanical name and size of each plant.

19. Plant symbols shall depict the size of the plants at maturity. Tree spacing shall be designed to allow for optimum growth of each tree species.
20. The final plans shall not include any palm species.
21. Parking lot planters shall have a minimum width of six feet (6') when parking abuts one side.
22. All parking lot finger planters shall be at least eight feet (8') wide and spaced no more than ten (10) stalls apart.
23. All other planters within the site shall have a minimum width of four feet (4').
24. Plant container sizes and/or spacing shall be provided. Minimum sizes shall be acceptable to the City Landscape Consultant and the Director.
25. The landscape plan shall include at least two (2) twenty-four inch (24") box size oak trees.
26. The landscape plan shall provide a vine pocket at the foot of the wall at the northwest end of the uppermost parking lot.
27. The landscape plans shall prominently display the following notes:
    a. All plant material shall conform to the most recent edition of ANSI Z60.1 - American Standard for Nursery Stock.
    b. All trees shall also conform to the California Department of Forestry and Fire Protection "Standards for Purchasing Container-Grown Landscape Trees".
    c. Prior to scheduling an inspection of the landscape installation with the City, the applicant's landscape architect shall certify in writing that the installation is in conformance with the approved landscape plans.
28. Proposed light standard locations shall be depicted on the planting plan. As proposed, significant conflicts exist between proposed tree locations and proposed light standards. All conflicts between light standard and tree locations shall be resolved to the satisfaction of the City Landscape Consultant prior to finalization of the plans.
29. The Irrigation Plan shall be provided separate from but utilizing the same format as the Planting Plan.
30. The irrigation design shall provide adequate coverage and sufficient water for the continued healthy growth of all proposed plantings with a minimum of waste and over spray on adjoining areas.

31. The Irrigation Plan shall be concise and accurate and shall include the manufacturer, model, size, demand, radius, and location of the following, as appropriate:
    a. Design and static pressures
    b. Point of connection
    c. Backflow protection
    d. Valves, piping, controllers, heads, quick couplers
    e. Gallon requirements for each valve
32. Three (3) copies of details and specifications shall be provided, addressing but not limited to, planting, soil preparation, tree staking, guying, installation details, and post installation maintenance.
33. One copy of each of the following approved plans shall be submitted with the initial landscape plan check:
    - Site Plan
    - Elevations
    - Grading Plan
    - Conditions Of Approval
34. A complete Landscape Documentation package is required at the time of initial plan check submittal, prepared in accordance with Article IX, Section 9658.6 – Water Efficient Landscaping, contained in the Zoning Code.
35. A minimum of twenty percent (20%) of the total lot shall be landscaped.
36. A minimum of fifteen percent (15%) of the parking lot, including driveways and aisles, shall be landscaped, distributed evenly throughout the parking lot.
37. Shade trees shall be provided such that fifty percent (50%) of the parking lot, including parking spaces, driveways and aisles, shall by covered by tree canopies within fifteen (15) years after installation.
38. In accordance with the Freeway Corridor Overlay District, the final plant palette and arrangement along the outer borders of the project shall reflect a naturalistic and native theme, emphasizing native oak trees.
39. All plant material shall be considered compatible with Sunset Zone 18.
40. Landscape plants must not be considered invasive, negatively impacting the adjacent natural areas. Lists of exotic material can be obtained from the California Native Plant Society and/or the California Exotic Pest Plant Council.
41. All landscaping shall be irrigated and maintained in perpetuity in accordance with the approved Landscape Plan.
42. Poor landscape practices such as topping, hedging and "lollipopping" shall not be permitted and may require that plant materials be replaced with like size materials at the discretion of the City Landscape consultant.
43. The landscape plan must be approved prior to issuance of building permits. Concurrent approval is required of a Fuel Modification Plan by the Los Angeles County Fire Department.

Please contact me should further information be required.

Appendix 2 Air Quality
Updated Air Quality Impact Study Canwood Street Offices Project. Rincon Consultants. October 23, 2008.

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October 23, 2008
Project No. 06-60021

Pam Coppedge
Sunbelt Properties
1801 Solar Drive, Suite 250
Oxnard, CA 93030

UPDATED AIR QUALITY IMPACT STUDY
Canwood Street Offices Project
Agoura Hills, California

Dear Ms. Coppedge:

Rincon Consultants, Inc. is pleased to submit the attached Updated Air Quality Impact Study for a 25,200 square foot medical office building proposed in the City of Agoura Hills. The purpose of this update is to provide an updated analysis based on minor changes that have been made to the proposed project and to recalculate project-related air pollutant emissions using the California Air Resources Board's (CARB) most recent air quality modeling program (URBEMIS 2007, version 9.2.4). Additionally, a Global Climate change section has been added to disclose project-level greenhouse gas emissions.

The impact analysis indicates that temporary construction emissions generated during construction of the proposed project would not exceed SCAQMD significance thresholds nor would they exceed Localized Significance Thresholds (LSTs). Therefore, temporary air quality impacts would be less than significant. Long-term operational impacts associated with development of the proposed project would not exceed SCAQMD thresholds or CAPCOA suggested thresholds for greenhouse gas emission. Project development would not result in significant CO "hotspot" impacts, nor would it be inconsistent with the AQMP. Thus, the project's long-term operational impacts would be less than significant without mitigation. If you have any questions regarding these studies or if we can provide you with other environmental consulting services, please feel free to contact us.

Sincerely,

RINCON CONSULTANTS, INC.

Joe Power, AICP
Principal

Sean Wazlaw
Associate Environmental Planner

This report is an analysis of the potential air quality impacts of a 25,200 square foot medical-office development project proposed on 3.24 acres in the City of Agoura Hills, Los Angeles County, California. The report has been prepared by Rincon Consultants, Inc. under contract to Sunbelt Enterprises for use by the City of Agoura Hills, Planning and Community Development Department in preparation of environmental analyses pursuant to the California Environmental Quality Act (CEQA). This report analyzes both temporary impacts relating to construction activity and possible long-term impacts associated with development of the medical office buildings. The analyses herein are based on a Preliminary Grading Study titled Sunbelt Corporate Center II, dated April 18, 2008, that was prepared by Holmes Enterprises Inc. The analysis also includes a Global Climate Change Section which discloses project-level greenhouse gas emissions (GHGs).

PROJECT DESCRIPTION

The proposed project involves the development of 25,200 square feet of medical office use and associated infrastructure on 3.24 acres. The project site is located at 29541 and 29555 Canwood Street in the City of Agoura Hills. The project site is located approximately halfway between Reyes Adobe Road and Kanan Road on the north side of US 101. Based on the traffic study prepared for this project, approximately 910 average daily trips would be generated. The site is currently undeveloped and project development would not involve any demolition. The project site trends upward from elevation 870 feet on the southern end of the parcel to elevation 940 feet on the northern end of the parcel.

Project access is proposed along a single drive, which would be constructed from Canwood Street, extending northerly for approximately 960 feet. Two two-story office buildings are proposed along the west side of the access road with parking lots distributed on the north and south sides of each of the office buildings.

The majority of the project site would be graded with the exception of a small portion at the northern edge of the site. Project grading activities would involve 8,428 cubic yards (CY) of cut and 13,274 CY of fill, resulting in a net import of 4,846 CY of fill.

SUMMARY OF FINDINGS

Both construction and operation of the proposed project would generate air pollutant emissions. The project site is within the South Coast Air Basin, which is a non-attainment area for ozone and fine particulate matter (PM_{10}); therefore, projects that increase these air pollutant emissions within the region have the potential to create significant air quality impacts. Construction emissions would not exceed South Coast Air Quality Management District (SCAQMD) significance thresholds nor would the exceed Localized Significance Threshold (LST) for particulate matter < 10 microns (PM_{10}) without mitigation. Therefore, the project's temporary construction impacts would be less than significant.

Emissions associated with long-term operation of the project would not exceed the SCAQMD thresholds for any criteria pollutant. Project development would not result in significant CO "hotspot" impacts, nor would it be inconsistent with the AQMP. Therefore, the project's long-term operational impacts to local and regional air quality would be less than significant.

The proposed project would add approximately 5,219 metric tons of Carbon Dioxide Equivalent (CDE) to the environment each year, with the majority of these coming from existing automobiles visiting the project site. The project's greenhouse gas contribution represents approximately 0.0000086% of the State of California's annual CDE generation.

AIR QUALITY ANALYSIS

Climate and Meteorology

The semi-permanent high-pressure system west of the Pacific coast strongly influences California's weather. It creates sunny skies throughout the summer and influences the pathway and occurrence of low-pressure weather systems that bring rainfall to the area during October through April. As a result, wintertime temperatures in Agoura Hills are generally mild, while summers are warm and dry. During the day, the predominant wind direction is from the west and southwest, and at night, wind direction is from the north. These predominant wind patterns are occasionally broken during the winter by storms coming from the north and northwest and by episodic Santa Ana winds. Santa Ana winds are strong northerly to northeasterly winds that originate from high-pressure areas centered over the desert of the Great Basin. These winds are usually warm, very dry, and often full of dust. They are particularly strong in the mountain passes and at the mouths of canyons.

Daytime summer temperatures in the area average from the high 70s to mid 90s. Nighttime low temperatures during the summer are typically in the high 50s to low 60s, while the winter high temperature tends to be in the 60s. Winter low temperatures are in the 40s. Annual average rainfall in Agoura Hills ranges from about 14 to 16 inches, nearly all of which occurs between October and April.

Air Pollution Regulation

Air Quality. Federal and state standards have been established for six criteria pollutants, including ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulates less than 10 and 2.5 microns in diameter (PM_{10} and $PM_{2.5}$), and lead (Pb). California has also set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. Table 1 lists the current federal and state standards for criteria pollutants.

The local air quality management agency is required to monitor air pollutant levels to assure that the air quality standards are met and, in the event they are not, to develop strategies to meet these standards. Depending on whether the standards are met or exceeded, the local air basin is classified as being in "attainment" or "non-attainment." The South Coast Air Basin (Basin), in which the project site is located, is a non-attainment area for both the federal and state standards for ozone and particulate matter. The basin is also classified as a non-attainment area for the federal standard of carbon monoxide. However, the basin is in attainment for the state and federal standards for nitrogen dioxide, and the state standards of carbon monoxide. The Basin exceeded the federal CO standard once in 2002. Added to a perfect record in 2001 (no exceedances), this fulfills the compliance requirement of no more than one day exceeding the standard in two consecutive years.

Table 1
Current Federal and State Ambient Air Quality Standards

Pollutant	Federal Standard	California Standard
Ozone	0.075 ppm (8-hr avg)	0.09 ppm (1-hr avg) 0.07 ppm (8-hr avg)
Carbon Monoxide	9.0 ppm (8-hr avg) 35.0 ppm (1-hr avg)	9.0 ppm (8-hr avg) 20.0 ppm (1-hr avg)
Nitrogen Dioxide	0.053 ppm (annual avg)	0.18 ppm (1-hr avg)
Sulfur Dioxide	0.03 ppm (annual avg) 0.14 ppm (24-hr avg) 0.5 ppm (3-hr avg)	0.04 ppm (24-hr avg) 0.25 ppm (1-hr avg)
Lead	1.5 $\mu g/m^3$ (annual avg)	1.5 $\mu g/m^3$ (30-day avg)
Particulate Matter (PM_{10})	150 $\mu g/m^3$ (24-hr avg)	20 $\mu g/m^3$ (annual avg) 50 $\mu g/m^3$ (24-hr avg)
Particulate Matter ($PM_{2.5}$)	15 $\mu g/m^3$ (annual avg) 35 $\mu g/m^3$ (24-hr avg)	12 $\mu g/m^3$ (annual avg)

ppm= parts per million
$\mu g/m^3$ = micrograms per cubic meter
Source: California Air Resources Board, http://www.arb.ca.gov/research/aaqs/aaqs2.pdf, April 1, 2008.

Non-attainment status within the SCAB is a result of several factors, primarily the naturally adverse meteorological conditions that limit the dispersion and diffusion of pollutants (surface and subsidence inversions), the limited capacity of the local airshed to eliminate pollutants from the air, and the number, type, and density of emission sources within the South Coast Air Basin. The potential health effects of pollutants for which the South Coast Air Basin is in nonattainment are described below.

Ozone. Ozone is produced by a photochemical reaction (triggered by sunlight) between nitrogen oxides (NO_x) and reactive organic gases (ROG). [1] Nitrogen oxides are formed during the combustion of fuels, while reactive organic gases are formed during combustion and

[1] Organic compound precursors of ozone are routinely described by a number of variations of three terms: hydrocarbons (HC), organic gases (OG), and organic compounds (OC). These terms are often modified by adjectives such as total, reactive, or volatile, and result in a rather confusing array of acronyms: HC, THC (total hydrocarbons), RHC (reactive hydrocarbons), TOG (total organic gases), ROG (reactive organic gases), TOC (total organic compounds), ROC (reactive organic compounds), and VOC (volatile organic compounds). While most of these differ in some significant way from a chemical perspective, from an air quality perspective two groups are important: non-photochemically reactive in the lower atmosphere, or photochemically reactive in the lower atmosphere (HC, RHC, ROG, ROC, and VOC). SCAQMD uses the term VOC, while the URBEMIS program uses ROG. For the purposes of this analysis, these two terms are used as equivalents.

evaporation of organic solvents. Because ozone requires sunlight to form, it is formed primarily between the months of April and October. Ozone is a pungent, colorless toxic gas with direct health effects on humans including respiratory and eye irritation and possible changes in lung functions. Groups most sensitive to ozone include children, the elderly, persons with respiratory disorders, and people who exercise strenuously outdoors.

Suspended Particulates. Atmospheric particulate matter is comprised of finely divided solids and liquids such as dust, soot, aerosols, fumes, and mists. The particulates of primary concern are fine particulate matter less than 10 or 2.5 microns in diameter (PM_{10} and $PM_{2.5}$). These small particles have the greatest likelihood of being inhaled deep into the lungs. Short- and long-term exposure to PM has been associated with increased mortality and cardiopulmonary disease in a number of epidemiological studies. Major man-made sources of PM_{10} are agricultural operations, industrial processes, combustion of fossil fuels, construction, demolition operations, and entrainment of road dust into the atmosphere. Natural sources include wind blown dust, wildfire smoke, and sea spray salt. The finer $PM_{2.5}$ particles are derived from combustion processes, and are secondary pollutants formed by chemical processes in the atmosphere.

Carbon Monoxide (CO). CO is a colorless, odorless, poisonous gas that is only found in high concentrations very near its source. The major local source of CO is automobile traffic with elevated concentrations usually only found near areas of high traffic volumes and congestion. The adverse effect of CO on human health is a function of its affinity for hemoglobin in the blood. At high concentrations, CO reduces the amount of oxygen in the blood, causing heart difficulties in people with chronic diseases, reduced lung capacity, and impaired mental abilities.

Greenhouse Gas (GHG). Governor Schwarzenegger issued Executive Order S-3-05 in 2005 that established statewide GHG emissions reduction targets. S-3-05 provides that by 2010, emissions shall be reduced to 2000 levels; by 2020, emissions shall be reduced to 1990 levels; and by 2050, emissions shall be reduced to 80 percent of 1990 levels (CalEPA 2006a). Additionally, Governor Schwarzenegger signed AB 32, the "California Global Warming Solutions Act of 2006," into law in the fall of 2006. AB 32 requires the California Air Resources Board (ARB) to adopt regulations by January 1, 2008 to require reporting and verification of statewide GHG emissions. ARB is to produce a plan by January 1, 2009 to indicate how emission reductions will be achieved from significant GHG sources via regulations, market mechanisms and other actions. In addition, this law requires ARB to adopt regulations by January 1, 2010 to implement the early action GHG emission reduction measures that can be implemented before the adoption of those recommended by the 2009 plan. The bill requires achievement by 2020 of a statewide GHG emissions limit equivalent to 1990 emissions (essentially a 25% reduction below 2005 emission levels; same requirement as under S-3-05), and the adoption of rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emissions reductions.

Local Air Quality

The SCAQMD monitors air pollutant concentrations throughout the basin at various monitoring stations. The SCAQMD has divided the basin among 38 separate monitoring stations. The nearest SCAQMD monitoring station lies 13 miles away in Reseda in the San Fernando Valley; however, the Ventura County Air Pollution Control District (APCD) monitoring station located in Thousand Oaks is closer at eight miles to the west. The air quality data gathered at the Thousand Oaks site more accurately reflects the pollutant concentrations present in Agoura Hills because both are in inter-mountain valleys north of the Santa Monica Mountains. Table 2 on the following page summarizes exceedances of the federal and/or state standards for ozone, PM_{10} and NO_x at the Thousand Oaks station.

Table 2 indicates that locally, the federal standards for ozone and PM_{10} have been met the last three years; however, the state standard for ozone and PM_{10} was exceeded at the Thousand Oaks monitoring station during the past three years. Nitrogen dioxide and $PM_{2.5}$ have not been exceeded at the state or federal level during the past three years.

Since the project is located within the Los Angeles County jurisdiction of the SCAQMD, ambient air quality data from the Reseda and Burbank monitoring stations in the San Fernando Valley are included in this analysis as well. Reseda is the closest location with a monitoring station; however, the Reseda Station does not monitor particulate matter, so the Burbank station was used to obtain this information. Summaries of this information are presented in Table 3. As illustrated, federal and state standards for ozone are regularly exceeded in the San Fernando Valley, as is the state standard for PM_{10}.

Sensitive Receptors

Sensitive receptors most likely to be affected by air quality impacts associated with project construction include multifamily residences located approximately 230 feet west of the project site, and single family residences located approximately 230 feet north of the project site. Lindero Canyon Middle School is located approximately one mile northwest of the project site. Additionally, Yerba Buena Elementary School, Sumac Elementary School and Agoura High School are also all located within 1.3 miles of the project site. Air pollutant emissions associated with long-term use of the site are not location specific, but rather are a contribution to the airshed as a whole and the location of specific sensitive receptors is not relevant unless the project contributes substantially to carbon monoxide concentrations at locally congested intersections. In this instance, sensitive receptors would be pedestrians in the vicinity of the intersection, whose presence would be represented by sidewalks and/or bus stops.

Table 2
Ambient Air Quality Data for Thousand Oaks, Ventura County

Pollutant[1]	**2005**	**2006**	**2007**
Ozone, ppm - Worst Hour	0.109	0.096	0.112
Number of days of State exceedances (>0.09 ppm)	2	2	2
Number of days of Federal exceedances (>0.12 ppm)	0	0	0
Ozone, ppm – Maximum 8-Hour (8-hr avg)	0.082	0.082	0.101
Number of days of Federal exceedances (>0.08 ppm)	0	0	2
Carbon Monoxide, ppm - Worst 8 Hours	-	-	-
Number of days of State/Federal exceedances (>9.0 ppm)	-	-	-
Nitrogen Dioxide, ppm - Worst Hour	0.063*	0.055*	0.064*
Number of days of State exceedances (>0.25 ppm)	0*	0*	0*
Particulate Matter <10 microns, $\mu g/m^3$ Worst 24 Hours	76.0*	56.9*	118.5*
Number of samples of State exceedances (>50 $\mu g/m^3$)	1*	1*	4*
Number of samples of Federal exceedances (>150 $\mu g/m^3$)	0*	0*	0*
Particulate Matter <2.5 microns, $\mu g/m^3$ Worst 24 Hours	27.8	28.4	31.5
Number of samples of Federal exceedances (>65 $\mu g/m^3$)	0	0	0

Source: California Air Resources Board, Air Quality Data Statistics, 2005-2007.
www.arb.ca.gov/adam/welcome.html

Data from the Thousand Oaks monitoring station except as indicated.
** Data from Simi Valley monitoring station; Thousand Oaks station data not available.*
- Insufficient or no data to determine a value
[1] SO_2 is not monitored in the Thousand Oaks area

Table 3
Ambient Air Quality Data for the San Fernando Valley, Los Angeles County

Pollutant	2005	2006	2007
[a]Ozone, ppm - Worst Hour	0.138	0.158	0.129
Number of days of State exceedances (>0.09 ppm)	30	34	21
Number of days of Federal exceedances (>0.12 ppm)	2	6	1
[a]Ozone, ppm – Maximum 8-Hour (8-hr avg)	0.113	0.109	0.105
Number of days of Federal exceedances (>0.08 ppm)	12	17	28
[a]Carbon Monoxide, ppm - Worst 8 Hours	3.46	3.48	2.76
Number of days of State/Federal exceedances (>9.0 ppm)	0	0	0
[a]Nitrogen Dioxide, ppm - Worst Hour	0.086	0.073	0.081
Number of days of State exceedances (>0.25 ppm)	0	0	0
[b]Particulate Matter <10 microns, $\mu g/m^3$ Worst 24 Hours	92.0	71.0	109.0
Number of samples of State exceedances (>50 $\mu g/m^3$)	5	10	5
Number of samples of Federal exceedances (>150 $\mu g/m^3$)	0	0	0
[a]Particulate Matter <2.5 microns, $\mu g/m^3$ Worst 24 Hours	39.5	44.0	43.3
Number of samples of Federal exceedances (>65 $\mu g/m^3$)	0	0	0

Source: California Air Resources Board, Air Quality Data Statistics, 2005-2007.
/www.arb.ca.gov/adam/welcome.html
[a]*Reseda Monitoring Station*
[b]*Burbank Monitoring Station*

Impact Analysis

Methodology and Significance Thresholds. Emissions estimates for the proposed project were calculated using URBEMIS 2007 version 9.2.4, which was developed by the ARB to evaluate construction emissions, operational emissions and trip emissions associated with new development. The modeling results are included as an attachment at the end of this report. The SCAQMD defines a project's impact as significant and adverse when a project individually or cumulatively:

- *Interferes with progress towards the attainment of the ozone standard by releasing emissions which equal or exceed the established long term quantitative thresholds for pollutants; or*
- *Causes an exceedance of a state or federal ambient air quality standard for any criteria pollutant (as determined by modeling).*

Table 4 lists the significance thresholds recommended by the SCAQMD for projects within the SCAB. Localized significance thresholds (LSTs; Table 5) were established by the SCAQMD in response to the Governing Board's Environmental Justice Enhancement Initiative (1-4), which was prepared to update the SCAQMD's CEQA Air Quality Handbook.

The LSTs were devised in response to public concern regarding exposure of individuals to criteria pollutants in local communities. The LSTs represent the maximum emissions from a project that will not cause or contribute to an air quality exceedance of the most stringent applicable federal or state ambient air quality standard at the nearest sensitive receptor, taking into consideration ambient concentrations in each source receptor area (SRA), project size, distance to the sensitive receptor, etc. However, the LSTs only apply to emissions within a fixed stationary location, including idling emissions during both project construction and operation, and LSTs have only been developed for NO_x, CO, PM_{10} and PM_5 pollutants. Furthermore, LSTs are only applicable for project areas up to 5 acres in size, with air pollutant dispersion modeling recommended for activity within larger areas. Additionally, it should be noted that LSTs are not applicable to mobile sources such as cars on a roadway. As such, LSTs

Table 4
SCAQMD Air Quality Significance Thresholds

Mass Daily Thresholds	
Pollutant	**Operation Thresholds**
NO_x	55 lbs/day
ROC	55 lbs/day
PM_{10}	150 lbs/day
$PM_{2.5}$	55 lbs/day
SO_x	150 lbs/day
CO	550 lbs/day
Lead	3 lbs/day
Toxic Air Contaminants (TACs) and Odor Thresholds	
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Hazard Index ≥ 1.0 (project increment) Hazard Index ≥ 3.0 (facility-wide)
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402
Ambient Air Quality for Criteria Pollutants [a]	
NO_2 1-hour average annual average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.25 ppm (state) 0.053 ppm (federal)
PM_{10} 24-hour average annual geometric average annual arithmetic mean	10.4 $\mu g/m^3$ (recommended for construction) [b] & 2.5 $\mu g/m^3$ (operation) 1.0 $\mu g/m^3$ 20 $\mu g/m^3$

Table 4
SCAQMD Air Quality Significance Thresholds

PM2.5 24-hour average	10.4 µg/m^3 (recommended for construction) [b] & 2.5 µg/m^3 (operation)
Sulfate 24-hour average	1 ug/m^3
CO 1-hour average 8-hour average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 20 ppm (state) 9.0 ppm (state/federal)

Source: SCAQMD, CEQA handbook (SCAQMD, 1993), http://www.aqmd.gov/ceqa/hdbk.html accessed March 12, 2007
[a] Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, unless otherwise stated.
[b] Ambient air quality threshold based on SCAQMD Rule 403.

KEY: Lbs/day = pounds per day ppm = parts per million ug/m^3 = microgram per cubic meter ≥ greater than or equal to

Table 5
SCAQMD LSTs for Construction in SRA-6

Pollutant	Allowable emissions (lbs/day) as a function of receptor distance from a two acre site boundary				
	82 Feet	164 Feet	328 Feet	656 Feet	1,640 Feet
	lbs/day				
Gradual conversion of NO_x to NO_2	147	143	156	187	263
CO	633	887	1,497	2,629	4,460
PM_{10}	6	17	33	66	162
$PM_{2.5}$	4	5	9	21	84

Source: http://www.aqmd.gov/ceqa/handbook/LST/LST.html#Appendix%20C; July 2008.
With Links to: 1) SRA/City Table; and 2) Appendix C - Mass Rate LST Look-up Tables

for operational emissions would not apply to the proposed project as the majority of emissions would be generated by cars on the roadways. Table 5 includes LSTs for construction for projects of two acres in size in Source Receptor Area 6 (SRA-6), which is designated by the SCAQMD as the west San Fernando Valley, including the city of Agoura Hills.

Because the project site is three acres and the SCAQMD only includes Mass Rate Look Up Tables for project sites that are one, two, and five acres in size, Table 5 includes LSTs for a project site that is two acres (one acre less than the project site). If project emissions exceed any of the two-acre LST thresholds, linear interpolation would be utilized to determine the three-acre threshold, to which the project emissions would then be compared (per direction from SCAQMD staff, James Koizumi, August 2006).

As previously indicated, construction and operational emissions associated with the proposed 25,200 square foot medical office development were calculated using the URBEMIS 2007 v. 9.2.4 computer program (see Attachment for modeling results). Trip generation rates were applied based on default values offered in the URBEMIS model, but were verified as consistent with those indicated in the traffic report that was prepared for this project (Traffic Impact Study, Sunbelt Enterprises Medical Office Development Agoura Hills Project No. 05-CUP-006, February 2006). The estimate of operational emissions includes both emissions from vehicle trips (910 average daily trips) and from electricity and natural gas consumption.

The Global Climate Change analysis is based on the guidance from the California Air Pollution Control Officers Association (CAPCOA) in their *CEQA and Climate Change* white paper (January 2008) and the OPR in their Technical Advisory, entitled *CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act Review* (June 19, 2008). The OPR Technological Advisory provides the overarching structure of climate change discussions, while the CAPCOA document provides the technological methodologies to assess GHG emissions.

The greenhouse gas estimates were provided for the operational phase, which include direct[2] and indirect[3] emissions for stationary and mobile sources. Mobile sources are the main cause of emissions and are attributable to vehicular transportation. Emissions from all of these sources are estimated using URBEMIS 2007 v.9.2.4 and then adjusted based on their global warming potential (gwp) and guidance from the above mentioned documents. Construction-generated GHG emissions were also estimated; however, construction-generated GHG emissions are a one time occurrence and do not contribute to the daily operational GHG emissions scenario.

Construction Impacts. Project construction would generate temporary air pollutant emissions. These impacts are associated with fugitive dust (PM_{10} and $PM_{2.5}$) and exhaust emissions from heavy construction vehicles, in addition to ROG that would be released during the drying phase upon application of architectural coatings. Construction would generally consist of site preparation (grading) and erection of the proposed office buildings.

The site preparation phase would involve the greatest amount of heavy equipment and the greatest generation of fugitive dust. Project development would involve 8,428 cubic yards (CY) of cut and 13,274 CY of fill, resulting in a net import of 4,846 CY of fill. The applicant proposes to purchase fill from the closest construction development requiring disposal of cut. For the purposes of modeling a realistic maximum daily emissions scenario analysis, it was presumed that imported fill would be obtained from a development within a 10 mile radius. For the purposes of analysis, it was presumed that the project would require 2 months of grading and 9 months of building construction. Table 6 summarizes the maximum daily air pollutant

[2] Direct emission are those emissions which are created onsite by the project itself. For the proposed project, direct emissions would include emissions generated by the building's heating system and air conditioning system as well as emissions generated by landscaping activities or other maintenance activities.

[3] The main source of indirect emissions generated by the proposed project would be emissions generated by vehicular transportation to and from the project site. Electricity used to operate the proposed building would be another source of indirect emissions as the electricity would be generated at an offsite power plant.

emissions that would be generated by construction activity and compares these emissions to SCAQMD significance thresholds. Table 7 compares total emissions to applicable LSTs.

Construction emissions would not exceed SCAQMD daily thresholds or LSTs for ROG, NO_x, CO, PM_{10} or $PM_{2.5}$; therefore, construction-related impacts relating to these pollutants would be less than significant.

Table 6
Estimated Maximum Daily Construction Emissions
(in pounds)

Emission Source	ROG	NO_x	CO	PM_{10}	$PM_{2.5}$
Phase I Site Grading	3.52	30.27	15.65	40.16	9.46
Phase II Building Construction	15.06	21.63	15.86	1.65	1.51
Phase III Paving and Architectural Coating	13.77	12.09	9.06	1.05	0.96
Maximum lbs/day	**15.06**	**30.27**	**15.86**	**40.16**	**9.46**
SCAQMD Daily Thresholds	***75***	***100***	***550***	***150***	***55***
Exceed Significance Threshold?	***No***	***No***	***No***	***No***	***No***

Notes: All calculations were made using URBEMIS 2007 v.9.2.4. See the Attachment for calculations. Site Grading and Building Construction totals include worker trips, construction vehicle emissions and fugitive dust.

**indicates exceedance of a threshold.*

Table 7
Total On-Site Construction Criteria Pollutant
Emissions for Localized Significance Thresholds

	CO	NO_x	PM_{10}	$PM_{2.5}$
Site Preparation	33.1	77.4	6.3	3.9
Grading	20.9	48.1	4.4	2.6
Building	14.4	34.9	1.9	1.8
Arch Coating and Paving	19.5	40.0	2.8	2.6
Localized Significance Threshold*	*887*	*143*	*17*	*5*
Exceed Significance Threshold?	**No**	**No**	**No**	**No**

Source: SCAQMD's Sample Construction Scenarios spreadsheet for LST analysis (Appendix C – 3 Acre Site Sample). See the Attachment for calculations.
**LSTs are for a two-acre project site in SRA-6 at a distance of 164 feet from the site boundary.*
Please consult http://www.aqmd.gov/ceqa/handbook/LST/LST.html for the Methodology Paper for applicable LSTs.

CO Hot Spots. Long-term operational impacts would also be significant if project-generated traffic were to cause a significant impact at a local intersection that would result in CO concentrations above the state or federal standards. Areas with high vehicle density, such as congested intersections, have the potential to create high concentrations of CO. These areas are known as CO "hot spots." A project's localized air quality impact is considered significant if CO emissions create a hot spot where either the California one-hour standard of 20 ppm or the federal and state eight-hour standard of 9.0 ppm is exceeded. This typically occurs at intersections having level of service E or F. The 2007 SCAQMD summary card, which provides data on current conditions, states the maximum CO one-hour concentration for SRA-6 (west San Fernando Valley) as 4.0 ppm, and the maximum eight-hour concentration as 2.8 ppm. These are the ambient CO concentrations, to which the project would contribute. These ambient concentrations are well below the 20 ppm one-hour standard and 9.0 ppm eight-hour standard.

According to the Caltrans *Transportation Project-Level Carbon Monoxide Protocol* (1997), a detailed CO screening analysis should be conducted when project-generated traffic worsens a signalized intersection to from LOS A, B, C or D to E or F. The traffic report that was prepared for the proposed project analyzed six intersections currently operating at LOS B-E during the AM and PM peak hours. The traffic report concluded that project impacts were not significant per City criteria. Analysis of future conditions included improvements to the roadway network at the Kanan Road – U.S. 101 interchange. Cumulative development, including 22 projects as approved by the City, were included in the future traffic generation scenario. The traffic report concluded that the project would have significant cumulative impacts at the Kanan-U.S. 101 northbound off ramp during the AM peak hour, and at the Reyes Adobe – Canwood intersection during the PM peak hour (project contributions = 2% at both of these intersections). Both of these intersections would operate at LOS D under cumulative conditions and under cumulative + project conditions. It is noted that other intersections included in the analysis would operate at LOS E and F; however, project contributions to these intersections are not significant ($\leq$ 1%). Thus, project-generated traffic would not significantly affect an intersection operating at E or F, nor would it cause a decrease in LOS from D to E or E to F. Therefore, based on the recommendations contained in the Caltrans *Transportation Project-Level Carbon Monoxide Protocol* (1997), no further CO analysis would be required. In addition, as noted above, ambient CO concentrations in SRA-6 are well below state and federal standards and the project's contribution of CO emissions to ambient CO concentrations in SRA-6 would be less than significant. Therefore, the project's effect on CO concentrations is considered less than significant.

Long-Term Regional Impacts. Table 8 summarizes projected maximum daily emissions associated with operation of the proposed 25,200 square foot medical office development. Overall emissions would not exceed SCAQMD thresholds for any criteria pollutant. Consequently, the project's regional air quality impacts would not be significant. In addition, the project would not contribute to the housing stock and would thus not generate population; therefore, the project would not contribute to exceedance of the population forecasts in the AQMP and would not be considered inconsistent with the AQMP.

On-Site Impacts. The project is proposed in an area that contains a mix of urban and rural uses adjacent to Highway 101. Surrounding uses include predominantly commercial and residential uses. Development of the proposed 25,200 square foot medical office project would not expose sensitive receptors to known substantial local pollutant concentrations beyond that typical of the region as a whole (which as noted above is in non-attainment). Thus, the impact with respect to exposure of new receptors to substantial pollutants is considered adverse, but less than significant from a CEQA standpoint.

Table 8
Projected Operational Emissions
(pounds per day)

Emission Source	ROG	NO_x	CO	PM_{10}	$PM_{2.5}$
Vehicles	6.50	9.63	84.17	14.40	2.80
Electricity and Natural Gas Consumption, Landscaping, Consumer Products	0.28	0.19	1.69	0.01	0.01
Total	**6.78**	**9.82**	**85.86**	**14.41**	**2.81**
SCAQMD Thresholds	*55*	*55*	*550*	*150*	*55*

See Attachment for URBEMIS 2007 v.9.2.4 model output.

Global Climate Change. As discussed in the methodology, project-level operational emissions were studied based on contributions for both stationary and mobile emissions sources. Temporary construction-generated emissions were also quantified.

Temporary Construction Emissions. Based on the maximum daily CO_2 emissions generated by construction of the proposed project (see attached URBEMIS modeling results), construction of the proposed project would generate an estimated 350 tons of CO_2 during construction. Unlike the operational emissions that would occur over the life of the project, construction emissions are temporary and are associated with the vehicles that will be used to grade the site and construct the project. Once the project is built, emissions would occur from operational sources such as natural gas, electricity, landscaping equipment and vehicle trips.

Operational Indirect and Stationary Direct Emissions[4]. The generation of electricity through combustion of fossil fuels typically yields carbon dioxide, and to a smaller extent nitrous oxide and methane. Annual electricity emissions were calculated using the California Climate Action Registry General Reporting Protocol's spreadsheet model titled Greenhouse Gas Emission Worksheet: Operational Emissions, which is included as an attachment. The spreadsheet model uses emission factors based on the mix of fossil-fueled generation plants, hydroelectric power generation, nuclear power generation and alternative energy sources associated with the regional grid. Table 9 shows the estimated operational emissions of GHGs from the proposed office development. As noted above, some portion of the energy demand represents a

[4] For explanation of indirect and direct emissions, please refer to footnotes 2 and 3 on page 11.

diversion of emissions from other locations, so the emissions shown do not necessarily represent an increase over statewide or global emissions.

Transportation Emissions. Mobile source GHG emissions were estimated using the California Climate Action Registry General Reporting Protocol's spreadsheet model titled Greenhouse Gas Emissions Worksheet: Mobile Emissions, which is included as an attachment. The spreadsheet model uses the average daily trips estimate from the project traffic report and the total vehicle miles traveled estimated in URBEMIS 2007 (v. 9.2.4). The URBEMIS 2007 model estimates that approximately 8,336 daily VMT are associated with the project. Table 10 shows the estimated mobile emissions of GHGs based on this VMT.

Table 9
Estimated Annual Operational Emissions of GHG from Project

Emission Source	**Annual Emissions**	
	Emissions	**CDE**
Carbon Dioxide (CO_2)[1]	1072.52 short tons	973 metric tons
Methane (CH_4) [2]	0.0013 metric tons	0.0 metric tons
Nitrous Oxide (N_20) [2]	0.0007 metric tons	0.2 metric tons
Project Total		**973 metric tons**

Source: California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.0, April 2008, page 30-35.
[1] Includes indirect energy from electrical and area source emissions from natural gas and heating.
See Appendix for GHG emission factor assumptions.

Table 10
Estimated Annual Mobile Emissions
of Greenhouse Gases from Project

Emission Source	**Annual Emissions**	
	Emissions	**CDE**
Carbon Dioxide (CO_2)[1]	4,169.6 tons (short, US)	3,783 metric tons
Methane (CH_4) [2]	1.3 metric tons	27 metric tons
Nitrous Oxide (N_2O) [2]	1.4 metric tons	436 metric tons
Project Total		**4,246 metric tons**

Source:
[1] Mobile Emissions from URBEMIS 2007 (version 9.2.4).
[2] California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.0, April 2008, page 30-35.
See Appendix B for GHG emission factor assumptions.

Combined Stationary and Mobile Source Emissions. Table 11 combines the operational and mobile GHG emissions associated with the proposed project, which total approximately 5,219 metric tons per year in CDE units. This total represents roughly 0.0000086% of California's total 2004 emissions of 492 million metric tons CDE (California Energy Commission, 2006). These emissions projections indicate the majority of the project GHG emissions are associated with vehicular travel (77%). Please note that as discussed above, the mobile emissions accounted for in Table 10 are, in part, a redirection of existing travel to other locations, and so are not new or increased emissions but are instead already a part of the total California GHG emissions.

Table 11
Combined Annual Emissions of Greenhouse Gases

Emission Source	Annual Emissions
Operational	973 metric tons CO_2e
Mobile	4,246 metric tons CO_2e
Project Total	**5,219 metric tons CO_2e**

Sources: *Operational Emissions from URBEMIS 2007 (version 9.2.4).*
California Climate Action Registry General Reporting Protocol,
Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.0, April 2008.

GHG Cumulative Significance. As discussed above under *Methodology*, CAPCOA (January 2008) provided several approaches to consider potential cumulative significance of projects with respect to GHGs. A zero threshold approach can be considered based on the concept that climate change is a global phenomenon in that all GHG emissions generated throughout the earth contribute to it, and not controlling small source emissions would potentially neglect a major portion of the GHG inventory. However, the *CEQA Guidelines* (Section 15130) also recognize that there may be a point where a project's contribution, although above zero, would not be a <u>considerable contribution</u> to the cumulative impact. Therefore, a threshold of greater than zero is considered more appropriate in this air quality analysis. Table 12 shows CAPCOA's suggested thresholds for GHG emissions.

Based on CAPCOA suggested thresholds in Table 12, the proposed project's contribution of about 5,219 metric tons CDE/year would exceed the 900-ton Quantitative Threshold, but would not exceed the other four thresholds. Therefore, because the proposed project would exceed one of the five numeric thresholds under the non-zero threshold approach, the project's contribution to a cumulative impact with regards to GHG emissions would not be cumulatively considerable. It should be noted that CAPCOA created the 900-ton Quantitative Threshold so that office projects over 35,000 square feet (sf) would be considered cumulatively considerable. CAPCOA estimated that office projects that measure 30,000 sf would generate approximately 800 metric tons CDE annually. Therefore, based on CAPCOA's estimates for office projects larger than the proposed project, the proposed 25,200 office project would not be expected to exceed the 900-ton

Quantitative Threshold[5] (CAPCOA, 2008). Furthermore, the proposed project would be infill development and would place a source of employment closer to places of residential uses, public transportation, city services, etc., thereby reducing vehicle miles traveled, which is the primary source of residential and commercial GHG emissions. In addition, as discussed above, the project would not result in operational emissions that exceed SCAQMD thresholds.

Table 12
CAPCOA Suggested Thresholds for Greenhouse Gases

Quantitative (900 tons)	~900 tons CDE/year
Quantitative CARB Reporting Threshold/Cap and Trade	Report: 25,000 tons CDE/year Cap and Trade: 10,000 tons CDE/year
Quantitative Regulated Inventory Capture	~40,000 - 50,000 tons CDE/year
Qualitative Unit-Based Threshold	Commercial space > 50,000 sf*
Statewide, Regional or Areawide (CEQA Guidelines 15206(b)).	Office Space > 250,000 sf

**sf = square feet*
Sources: California Air Pollution Control Officers Association (CAPCOA), CEQA & Climate Change, January 2008.

GHG emissions reduction strategies were prepared by CalEPA's Climate Action Team (CAT) established by Executive Order S-3-05. The CAT strategies are recommended to reduce GHG emissions at a statewide level to meet the goals of the Executive Order S-3-05 (http://www.climatechange.ca.gov). Table 13 illustrates that the proposed project would be consistent with the GHG reduction strategies set forth by the 2006 CAT Report. Therefore, the project's contribution to cumulative GHG emissions and climate change would not be cumulatively considerable.

[5] According to CAPCOA's *CEQA and Climate Change*, "the GHG emissions associated with 50 single-family residential units and 30,000 square feet of office were estimated and were found to be 900 metric tons and 800 metric tons, respectively. Given the variance on individual projects, a single threshold of 900 metric tons was selected for residential and office projects."

Table 13
Project Consistency with 2006 CAT Report
Greenhouse Gas Emission Reduction Strategies

Strategy	Project Consistency
California Air Resources Board	
Vehicle Climate Change Standards AB 143 (Pavley) required the state to develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of climate change emissions emitted by passenger vehicles and light duty trucks. Regulations were adopted by the ARB I September 2004.	**Consistent** The vehicles that travel to and from the project site on public roadways would be in compliance with ARB vehicle standards that are in effect at the time of vehicle purchase.
Diesel Anti-Idling In July 2004, the ARB adopted a measure to limit diesel-fueled commercial motor vehicle idling	**Consistent** Current state law restricts diesel truck idling to five minutes or less. Diesel trucks operating from, and making deliveries to the project site, are subject to this state-wide law.
Hydrofluorocarbon Reduction 1) Ban retail sale of HFC in small cans. 2) Require that only low GWP refrigerants be used in new vehicular systems. 3) Adopt specifications for new commercial refrigeration. 4) Add refrigerant leak-tightness to the pass criteria for vehicular inspection and maintenance programs. 5) Enforce federal ban on releasing HFCs.	**Consistent** This strategy applies to consumer products. All applicable products would comply with the regulations that are in effect at the time of manufacture.
Alternative Fuels: Biodiesel Blends ARB would develop regulations to require the use of 1 to 4 percent biodiesel displacement of California diesel fuel.	**Consistent** The ARB is in the process of developing regulations which would increase the use of biodiesel for transportation uses. Currently, it is unknown when such regulations would be implemented; however, it is expected that upon implementation of such a regulation that would require increase biodiesel blends, the diesel fuel used vehicles that travel to and from the project site would be correspondingly displaced by biodiesel.
Alternative Fuels: Ethanol Increased use of E-85 fuel.	**Consistent** As data becomes available on the impacts of fuel specifications on the current and future vehicle fleets, the ARB will review and update motor vehicle fuel specifications as appropriate. In reviewing the specifications, the ARB will consider the emissions performance, fuel supply consequences, potential greenhouse gas reduction benefits, and cost issues surrounding E85, for gasoline by January 31, 2007, and for diesel by December 31, 2008. Future tenants of the project could purchase flex-fuel vehicles and utilize this fuel, once it is commercially available in the region and local vicinity.
Heavy-Duty Vehicle Emission Reduction Measures Increased efficiency in the design of heavy duty vehicles and an education program for the heavy-duty vehicle sector.	**Consistent** The heavy-duty vehicles that travel to and from the project site on public roadways would be subject to all applicable ARB efficiency standards that are in effect at the time of vehicle manufacture.

Table 13
Project Consistency with 2006 CAT Report
Greenhouse Gas Emission Reduction Strategies

Strategy	Project Consistency
Achieving 50% Statewide Recycling Goal Achieving the State's 50% waste reduction mandate as established by the Integrated Waste Management Act of 1989, (AB 939, Sher, Chapter 1095, Statutes of 1989), will reduce climate change emissions, associated with energy intensive material extraction and production, as well as methane emission from landfills. A diversion rate of 48% has been achieved on a statewide basis. Therefore, a 2% additional reduction is needed.	**Consistent** The City has completed a comprehensive waste reduction and recycling plan in compliance with State Law AB 939, which requires every city in California to reduce the waste it sends to landfills by 50% by the year 2000. Currently, the City requires that at least 50% of all solid waste, including construction/demolition waste, be diverted from landfills. As of 2007, the City was recycling 55% of its solid waste, thereby exceeding the standards established by AB 939. The City continues to implement programs to increase the diversion rate (Louis Celaya, Assistant to the City Manager, City of Agoura Hills).
Zero Waste – High Recycling Efforts to exceed the 50% goal would allow for additional reductions in climate change emissions	**Consistent** As discussed above, currently, the City requires that at least 50% of all solid waste, including construction/demolition waste, be diverted from landfills. As of 2007, the City was recycling 55% of its solid waste, thereby exceeding the standards established by AB 939. The City continues to implement programs to increase the diversion rate (Louis Celaya, Assistant to the City Manager, City of Agoura Hills).
Department of Forestry	
Urban Forestry A new statewide goal of planning 5 million trees in urban areas by 2020 would be achieved through the expansion of local urban forestry programs.	**Consistent** The landscaping proposed for the project would include new trees at the site.
Department of Water Resources	
Water Use Efficiency Approximately 19 percent of all electricity, 30 percent of all natural gas, and 88 million gallons of diesel are used to convey, treat, distribute and use water and wastewater. Increasing the efficiency of water transport and reducing water use would reduce greenhouse gas emissions.	**Consistent** The proposed project would be required to comply with Part 2, Division 8 of the City's Municipal Code which requires onsite landscaping to implement water conservation measures.
Energy Commission (CEC)	
Building Energy Efficiency Standards in Place and in Progress Public Resources Code 25402 authorizes the CEC to adopt and periodically update its building energy efficiency standards (that apply to newly constructed buildings and alterations to existing buildings).	**Consistent** The project would be required to meet the standards of Title 24 that are in effect at the time of development.
Appliance Energy Efficiency Standards in Place and in Progress Public Resources Code 25402 authorizes the Energy Commission to adopt and periodically update its appliance energy efficiency standards (that apply to devices and equipment using energy that are sold or offered for sale in California).	**Consistent** Under State law, appliances that are purchased for the project – both pre- and post-development – would be consistent with energy efficiency standards that are in effect at the time of manufacture.

Table 13
Project Consistency with 2006 CAT Report
Greenhouse Gas Emission Reduction Strategies

Strategy	Project Consistency
Business, Transportation and Housing	
Measures to Improve Transportation Energy Efficiency Builds on current efforts to provide a framework for expanded and new initiatives including incentives, tools and information that advance cleaner transportation and reduce climate change emissions.	**Consistent** The project would be infill development in close proximity to existing commercial and residential development.
Smart Land Use and Intelligent Transportation Systems (ITS) Smart land use strategies encourage jobs/housing proximity, promote transit-oriented development, and encourage high-density residential/commercial development along transit corridors.	**Consistent** The project site would be in close proximity to residential development and other commercial development. The Los Angeles County Metro Bus #161 make regular stops near the US 101/Kanan Road intersection.

Recommended Mitigation Measures. Emissions generated by construction and operation of the proposed project would not exceed SCAQMD significance thresholds or CAPCOA suggested thresholds for GHGs, and the proposed project would be consistent with GHG reduction strategies set forth by the 2006 CAT Report. Nonetheless, the following mitigation measures would be required to meet SCAQMD Rule 403 requirements for minimizing emissions for dust generating activities.

AQ-1 **Dust Minimization.** Pursuant to Rule 403 of the SCAQMD, the following dust minimizing measures shall be implemented.

a) The simultaneous disturbance of the site shall be minimized to the extent feasible.
b) The project proponent shall comply with all applicable SCAQMD Rules and Regulations, including Rule 403 insuring the clean up of construction-related dirt on approach routes to the site. Rule 403 prohibits the release of fugitive dust emissions from any active operation, open storage pile or disturbed surface area visible beyond the property line of the emission source. Particulate matter on public roadways is also prohibited.
c) The project proponent shall comply with all SCAQMD established minimum requirements for construction activities to reduce fugitive dust and PM-10 and PM-2.5 emissions.
d) Adequate watering techniques shall be employed to mitigate the impact of construction-related dust particulates. Portions of the site that are undergoing surface earth moving operations shall be watered such that a crust will be formed on the ground surface, and then watered again at the end of each day. Site watering shall be performed as necessary to adequately mitigate blowing dust.
e) Any vegetative cover to be utilized onsite shall be planted as soon as possible to reduce the disturbed area subject to wind erosion. Irrigation systems required for these plants shall be installed as soon as possible to maintain

good ground cover and to minimize wind erosion of the soil.

f) Any construction access roads (other than temporary access roads) shall be paved as soon as possible and cleaned up after each work day. The maximum vehicle speed on unpaved roads shall be 15 mph.
g) Grading operations shall be suspended during first stage ozone episodes or when winds exceed 25 mph. A high wind response plan shall be formulated for enhanced dust control if winds are forecast to exceed 25 mph in any upcoming 24-hour period.
h) Any construction equipment using direct internal combustion engines shall use a diesel fuel with a maximum of 0.05 percent sulfur and a four-degree retard.
i) Construction operations affecting off-site roadways shall be scheduled by implementing traffic hours and shall minimize obstruction of through traffic lanes.
j) The engines of idling trucks or heavy equipment shall be turned off if the expected duration of idling exceeds five (5) minutes.
k) On-site heavy equipment used during grading and construction shall be equipped with diesel particulate filters unless it is demonstrated that such equipment is not available or its use is not cost-competitive.
l) All haul trucks leaving or entering the site shall be covered or have at least two feet of freeboard.
m) Any on-site stockpiles of debris, dirt or other dusty material shall be covered or watered three times daily.
n) Any site access points within 30 minutes of any visible dirt deposition on any public roadway shall be swept or washed.

Although project construction-generated NO_x emissions would not exceed SCAQMD thresholds or LSTs, project construction would contribute to generation of NO_x emissions, which incrementally contribute to the formation of ozone, a pollutant for which the region is in a state of non-attainment. Thus, it is recommended that the project incorporate the control measures listed in Measure AQ-2 to reduce NO_x emissions to the greatest extent feasible.

AQ-2 NO_x Control Measures. The following should be incorporated during project construction:

- When feasible, electricity from temporary power poles on site shall be utilized rather than temporary diesel or gasoline generators;
- When feasible, on site mobile equipment shall be fueled by methanol or natural gas (to replace diesel-fueled equipment), or, propane or butane (to replace gasoline-fueled equipment);
- Equipment engines shall be maintained in good condition and in proper tune as per manufacturer's specifications;
- Lengthen construction periods during the smog season so as to minimize the number of vehicles and equipment operating simultaneously; and

- Use new technologies to control ozone precursor emissions as they become available.

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Attachments: URBEMIS 2007 v.9.2.4 Modeling Results; SCAQMD's Sample Construction Scenario spreadsheet for LST analysis (Appendix C – 3 Acre Site Sample); Greenhouse gas emissions worksheets

7/23/2008 3:54:18 PM

Urbemis 2007 Version 9.2.4

Summary Report for Summer Emissions (Pounds/Day)

File Name:

Project Name: Sunbelt Medical Office Project

Project Location: Los Angeles County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2009 TOTALS (lbs/day unmitigated)	3.52	30.27	15.65	0.01	38.66	1.50	40.16	8.08	1.38	9.46	2,828.13
2010 TOTALS (lbs/day unmitigated)	15.06	21.63	15.86	0.01	0.02	1.63	1.65	0.01	1.50	1.51	2,369.00

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.28	0.19	1.69	0.00	0.01	0.01	204.41

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	6.50	9.63	84.17	0.09	14.40	2.80	8,551.06

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SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	6.78	9.82	85.86	0.09	14.41	2.81	8,755.47

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Construction Unmitigated Emissions (Pounds/Day)

File Name:

Project Name: Sunbelt Medical Office Project

Project Location: Los Angeles County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Unmitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Time Slice 4/20/2009-6/19/2009 Active Days: 45	3.52	**30.27**	15.65	**0.01**	**38.66**	1.50	**40.16**	**8.08**	1.38	**9.46**	**2,828.13**
Mass Grading 04/20/2009-06/20/2009	3.52	30.27	15.65	0.01	38.66	1.50	40.16	8.08	1.38	9.46	2,828.13
Mass Grading Dust	0.00	0.00	0.00	0.00	38.64	0.00	38.64	8.07	0.00	8.07	0.00
Mass Grading Off Road Diesel	3.18	26.46	12.98	0.00	0.00	1.33	1.33	0.00	1.23	1.23	2,247.32
Mass Grading On Road Diesel	0.30	3.75	1.51	0.00	0.02	0.16	0.18	0.00	0.15	0.15	456.43
Mass Grading Worker Trips	0.04	0.07	1.16	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.39
Time Slice 6/22/2009-7/3/2009 Active Days: 10	2.22	18.97	9.48	0.00	0.01	0.93	0.94	0.00	0.86	0.86	1,839.02
Trenching 06/22/2009-07/03/2009	2.22	18.97	9.48	0.00	0.01	0.93	0.94	0.00	0.86	0.86	1,839.02
Trenching Off Road Diesel	2.18	18.90	8.32	0.00	0.00	0.93	0.93	0.00	0.86	0.86	1,714.64
Trenching Worker Trips	0.04	0.07	1.16	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.39
Time Slice 7/6/2009-12/31/2009 Active Days: 129	1.39	10.20	7.06	0.00	0.01	0.65	0.66	0.00	0.60	0.60	1,145.62
Building 07/06/2009-01/15/2010	1.39	10.20	7.06	0.00	0.01	0.65	0.66	0.00	0.60	0.60	1,145.62
Building Off Road Diesel	1.30	9.79	4.94	0.00	0.00	0.63	0.63	0.00	0.58	0.58	893.39
Building Vendor Trips	0.03	0.30	0.25	0.00	0.00	0.01	0.02	0.00	0.01	0.01	51.62
Building Worker Trips	0.06	0.11	1.87	0.00	0.01	0.01	0.01	0.00	0.00	0.01	200.61

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Time Slice 1/1/2010-1/14/2010 Active Days: 10	1.29	9.55	6.80	0.00	0.01	0.59	0.60	0.00	0.55	0.55	1,145.55
Building 07/06/2009-01/15/2010	1.29	9.55	6.80	0.00	0.01	0.59	0.60	0.00	0.55	0.55	1,145.55
Building Off Road Diesel	1.21	9.16	4.81	0.00	0.00	0.58	0.58	0.00	0.53	0.53	893.39
Building Vendor Trips	0.03	0.28	0.23	0.00	0.00	0.01	0.01	0.00	0.01	0.01	51.62
Building Worker Trips	0.06	0.10	1.75	0.00	0.01	0.01	0.01	0.00	0.00	0.01	200.54
Time Slice 1/15/2010-1/15/2010 Active Days: 1	**15.06**	21.63	**15.86**	0.01	0.02	**1.63**	1.65	0.01	**1.50**	1.51	2,369.00
Asphalt 01/15/2010-03/20/2010	2.03	12.08	8.91	0.00	0.01	1.04	1.05	0.00	0.95	0.96	1,206.42
Paving Off-Gas	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.95	11.89	6.98	0.00	0.00	1.03	1.03	0.00	0.94	0.94	979.23
Paving On Road Diesel	0.01	0.07	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.59
Paving Worker Trips	0.06	0.11	1.90	0.00	0.01	0.01	0.02	0.00	0.00	0.01	217.60
Building 07/06/2009-01/15/2010	1.29	9.55	6.80	0.00	0.01	0.59	0.60	0.00	0.55	0.55	1,145.55
Building Off Road Diesel	1.21	9.16	4.81	0.00	0.00	0.58	0.58	0.00	0.53	0.53	893.39
Building Vendor Trips	0.03	0.28	0.23	0.00	0.00	0.01	0.01	0.00	0.01	0.01	51.62
Building Worker Trips	0.06	0.10	1.75	0.00	0.01	0.01	0.01	0.00	0.00	0.01	200.54
Coating 01/15/2010-03/20/2010	11.74	0.01	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.03
Architectural Coating	11.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.01	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.03
Time Slice 1/18/2010-3/19/2010 Active Days: 45	13.77	12.09	9.06	0.00	0.01	1.04	1.05	0.00	0.95	0.96	1,223.45
Asphalt 01/15/2010-03/20/2010	2.03	12.08	8.91	0.00	0.01	1.04	1.05	0.00	0.95	0.96	1,206.42
Paving Off-Gas	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.95	11.89	6.98	0.00	0.00	1.03	1.03	0.00	0.94	0.94	979.23
Paving On Road Diesel	0.01	0.07	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.59
Paving Worker Trips	0.06	0.11	1.90	0.00	0.01	0.01	0.02	0.00	0.00	0.01	217.60
Coating 01/15/2010-03/20/2010	11.74	0.01	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.03
Architectural Coating	11.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.01	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.03

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Phase Assumptions

Phase: Mass Grading 4/20/2009 - 6/20/2009 - Default Mass Site Grading/Excavation Description

Total Acres Disturbed: 3.24

Maximum Daily Acreage Disturbed: 0.3

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 302 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

On Road Truck Travel (VMT): 107.69

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 6/22/2009 - 7/3/2009 - Default Trenching Description

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Paving 1/15/2010 - 3/20/2010 - Default Paving Description

Acres to be Paved: 0.29

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 7/6/2009 - 1/15/2010 - Default Building Construction Description

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Architectural Coating 1/15/2010 - 3/20/2010 - Default Architectural Coating Description

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Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Area Source Unmitigated Emissions (Pounds/Day)

File Name:

Project Name: Sunbelt Medical Office Project

Project Location: Los Angeles County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

AREA SOURCE EMISSION ESTIMATES (Summer Pounds Per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.01	0.17	0.14	0.00	0.00	0.00	201.60
Hearth - No Summer Emissions							
Landscape	0.12	0.02	1.55	0.00	0.01	0.01	2.81
Consumer Products	0.00						
Architectural Coatings	0.15						
TOTALS (lbs/day, unmitigated)	0.28	0.19	1.69	0.00	0.01	0.01	204.41

Area Source Changes to Defaults

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Operational Unmitigated Emissions (Pounds/Day)

File Name: C:\Documents and Settings\swazlaw\Application Data\Urbemis\Version9a\Projects\Sunbelt.urb924

Project Name: Sunbelt Medical Office Project

Project Location: Los Angeles County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Summer Pounds Per Day, Unmitigated)

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Medical office building	6.50	9.63	84.17	0.09	14.40	2.80	8,551.06
TOTALS (lbs/day, unmitigated)	6.50	9.63	84.17	0.09	14.40	2.80	8,551.06

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2010 Temperature (F): 80 Season: Summer

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Medical office building		36.13	1000 sq ft	25.20	910.48	8,335.86
					910.48	8,335.86

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	53.6	1.1	98.7	0.2
Light Truck < 3750 lbs	6.8	2.9	94.2	2.9

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Truck 3751-5750 lbs	22.8	0.4	99.6	0.0
Med Truck 5751-8500 lbs	10.0	1.0	99.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	1.5	0.0	86.7	13.3
Lite-Heavy Truck 10,001-14,000 lbs	0.5	0.0	60.0	40.0
Med-Heavy Truck 14,001-33,000 lbs	0.9	0.0	22.2	77.8
Heavy-Heavy Truck 33,001-60,000 lbs	0.5	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	2.3	69.6	30.4	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	0.8	0.0	87.5	12.5

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9
Rural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
Trip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Medical office building				7.0	3.5	89.5

Summary of Three Acre Site Example Results By Phase

Total On-Site

	CO	NOx	PM10	PM2.5
Demolition	0.0	0.0	0.0	0.0
Site Preparation	33.1	77.4	6.3	3.9
Grading	20.9	48.1	4.4	2.6
Building	14.4	34.9	1.9	1.8
Arch Coating and Paving	19.5	40.0	2.8	2.6
Localized Significance Threshold*	887	143	17	5
Exceed Significance?	NO	NO	NO	NO

* For illustration purposes only, this analysis is based on the most stringent LSTs. Please consult App. C of the Methodology Paper for applicable LSTs.

Summary of Three Acre Site Example Results By Phase and Equipment

Demolition of Existing 0 Square Foot Structure

Vehicle Description	No. of Vehicle	Hours	Trips	Length	CO	NOx	PM10	PM2.5
Concrete/Industrial Saws	0	0.0			0.00	0.00	0.00	0.00
Rubber Tired Dozers	0	0.0			0.00	0.00	0.00	0.00
Tractors/Loaders/Backhoes	0	0.0			0.00	0.00	0.00	0.00
Haul Trucks			0	0.1	0.00	0.00	0.000	0.000
Total Onsite Emissions					**0.0**	**0.0**	**0.0**	**0.0**
Localized Significance Threshold*					**887**	**143**	**17**	**5**
Exceed Significance?					**NO**	**NO**	**NO**	**NO**

Site Preparation

Vehicle Description	No. of Vehicle	Hours	Trips	Length	CO	NOx	PM10	PM2.5
Scrapers	2	8.0			24.40	54.39	2.97	2.29
Graders	1	7.0			4.70	12.04	1.25	0.70
Tractors/Loaders/Backhoes	1	4.0			1.66	3.32	1.69	0.54
Haul Trucks			10	0.1	0.03	0.09	0.005	0.004
Water Trucks			3	26.8	2.33	7.59	0.37	0.340
Total Onsite Emissions					**33.1**	**77.4**	**6.3**	**3.9**
Localized Significance Threshold*					**887**	**143**	**17**	**5**
Exceed Significance?					**NO**	**NO**	**NO**	**NO**

Grading

Vehicle Description	No. of Vehicle	Hours	Trips	Length	CO	NOx	PM10	PM2.5
Graders	1	8.0			5.37	13.76	1.49	1.14
Scrapers	1	8.0			12.20	27.19	1.02	0.72
Tractors/Loaders/Backhoes	1	7.0			2.90	5.81	1.86	0.71
Haul Trucks			5	0.1	0.01	0.05	0.0023	0.002
Water Trucks			3	4.5	0.39	1.27	0.06	0.06
Total Onsite Emissions					**20.9**	**48.1**	**4.4**	**2.6**
Localized Significance Threshold*					**887**	**143**	**17**	**5**
Exceed Significance?					**NO**	**NO**	**NO**	**NO**

Building of 124,000 Square Foot Structure

Vehicle Description	No. of Vehicle	Hours	Trips	Length	CO	NOx	PM10	PM2.5
Forklifts	2	7.0			3.49	9.00	0.48	0.45
Cranes	1	8.0			5.09	13.56	0.60	0.56
Tractors/Loaders/Backhoes	1	6.0			2.49	4.98	0.38	0.35
Generator Sets	1	8.0			2.84	5.80	0.36	0.33
Electric Welders	3	8.0			N/A	N/A	N/A	N/A
Haul Trucks			30	0.1	0.09	0.28	0.014	0.013
Water Trucks			3	4.5	0.39	1.27	0.06	0.06
Total Onsite Emissions					**14.4**	**34.9**	**1.9**	**1.8**
Localized Significance Threshold*					**887**	**143**	**17**	**5**
Exceed Significance?					**NO**	**NO**	**NO**	**NO**

* Illustration purpose showing the most stringent LSTs. Please consult App. C of the Methodology Paper for applicable LSTs.

Summary of Three Acre Site Example Results By Phase and Equipment

Architectural Coating and Asphalt Paving of Parking Lot

Vehicle Description	No. of Vehicle	Hours	Trips	Length	CO	NOx	PM10	PM2.5
Pavers	1	8.0			4.80	9.03	0.64	0.59
Paving Equipment	1	8.0			3.75	8.27	0.57	0.52
Rollers	2	8.0			7.07	14.52	1.01	0.93
Cement and Mortar Mixers	1	3.0			0.14	0.21	0.01	0.01
Tractors/Loaders/Backhoes	1	8.0			3.31	6.64	0.51	0.47
Haul Trucks			9	0.1	0.03	0.08	0.004	0.004
Water Trucks			3	4.5	0.39	1.27	0.06	0.06
Total Onsite Emissions					**19.5**	**40.0**	**2.8**	**2.6**
Localized Significance Threshold*					**887**	**143**	**17**	**5**
Exceed Significance?					**NO**	**NO**	**NO**	**NO**

* For illustration purposes only, this analysis is based on the most stringent LSTs. Please consult App. C of the Methodology Pap

Greenhouse Gas Emission Worksheet

Operational Emissions

Canwood Street Offices Project

Electricity Generation *	**(kWH)**		**Project units**	**Project Usage**
Commercial consumption	16,750	per KSF	25	418,750
Residential Consumption	7,000	per unit	0	0
			Total	**418,750**

* Generation Factor Source: CAPCOA, January 2008. CEQA and Climate Change.

Total Project Annual KWh:	**418,750**	kWH/year
Project Annual MWh:	**419**	MWH/year

Emission Factors:

CO2 *	804.54	lbs/MWh/year
CH4 **	0.0067	lbs/MWh/year
N2O **	0.0037	lbs/MWh/year

Total Annual Operational Emissions (metric tons) =
(Electricity Use (kWh) x EF)/ 2,204.62 lbs/metric ton

Conversion to Carbon Dioxide Equivalency (CO2e) Units based on Global Warming Potential (GWP)

CH4	21	GWP
N2O	310	GWP

1 ton (short, US) = 0.90718474 metric ton.

Annual Operational Emissions:

	Total Emissions		**Total CO2e Units**	
CO2 emissions, electricity:	168.4506	tons	**152.8**	metric tons CO2e
CO2 emissions***:	904.0700	tons	**820.2**	metric tons CO2e
CH4 emissions.	0.0013	metric tons	**0.0**	metric tons CO2e
N2O emissions:	0.0007	metric tons	**0.2**	metric tons CO2e
		Project Total	***973***	***metric tons CO2e***

References

* Table C.1: EPA eGRID CO2 Electricity Emission Factors by Subregion (Year 2000)
** Table C.2: Methane and Nitrous Oxide Electricity Emission Factors by State and Region (Average years 2001-1003)
*** URBEMIS Annual Emissions output for Area Source emissions; includes natural gas combustion for heating.

Sources: California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 2.2, March 2007. Third Assessment Report, 2001, U.S. Environmental Protection Agency, U.S. Greeenhouse Gas Emissions and Sinks, 1990-2000 (April 2002).

Greenhouse Gas Emission Worksheet

Mobile Emissions Canwood Street Offices Project

From URBEMIS 2007 Vehicle Fleet Mix Output:

Daily Vehicle Miles Traveled (VMT): 8,336 (Net: Proposed - Existing)

Annual VMT: 3,042,640

Vehicle Type	Percent Type	CH4 Emission Factor (g/mile)*	CH4 Emission (g/mile)	N2O Emission Factor (g/mile)*	N2O Emission (g/mile)
Light Auto	53.6%	0.4	0.2144	0.4	0.2144
Light Truck < 3750 lbs	6.8%	0.5	0.034	0.6	0.0408
Light Truck 3751-5750 lbs	22.8%	0.5	0.114	0.6	0.1368
Med Truck 5751-8500 lbs	10.0%	0.5	0.05	0.6	0.06
Lite-Heavy Truck 8501-10,000 lbs	1.5%	0.12	0.0018	0.2	0.003
Lite-Heavy Truck 10,001-14,000 lbs	0.5%	0.12	0.0006	0.2	0.001
Med-Heavy Truck 14,001-33,000 lbs	0.9%	0.12	0.00108	0.2	0.0018
Heavy-Heavy Truck 33,001-60,000 lbs	0.5%	0.12	0.0006	0.2	0.001
Other Bus	0.1%	0.5	0.0005	0.6	0.0006
Urban Bus	0.1%	0.5	0.0005	0.6	0.0006
Motorcycle	2.3%	0.09	0.00207	0.01	0.00023
School Bus	0.1%	0.5	0.0005	0.6	0.0006
Motor Home	0.8%	0.12	0.00096	0.2	0.0016
Total			**0.42101**		**0.46243**

* from Table C.4: Methane and Nitrous Oxide Emission Factors for Mobile Sources by Vehicle and Fuel Type (g/mile).
Assume Model year 2000-present, gasoline fueled.
Source: California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 2.2, March 2007.

Total Emissions (metric tons) =
Emission Factor by Vehicle Mix (g/mi) x Annual VMT(mi) x 0.000001 metric tons/g

Conversion to Carbon Dioxide Equivalency (CO2e) Units based on Global Warming Potential (GWP)

CH4 23 GWP
N2O 296 GWP
1 ton (short, US) = 0.90718474 metric ton.

Annual Mobile Emissions:

	Total Emissions		**Total CO2e units**	
CO2 Emissions* :	**4169.6**	tons CO2	**3,783**	metric tons CO2e
CH4 Emissions:	**1.3**	metric tons CH4	**27**	metric tons CO2e
N20 Emissions:	**1.4**	metric tons N2O	**436**	metric tons CO2e
		Project Total:	***4,246***	***metric tons CO2e***

* From URBEMIS 2007 results for mobile sources

Appendix 3 Archaeology

Phase I Archaeological Study for 29515 Canwood Street City of Agoura Hills, County of Los Angeles, California. Historical, Environmental, Archaeological, Research Team, Robert J. Wlodarski, Principal Investigator. April 2004.

A Phase 1 Archaeological Study
For 29515 Canwood Street
City of Agoura Hills, County of Los Angeles, California

05-CUP-006

Prepared for

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Sunbelt Enterprises
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Prepared by

Robert J. Wlodarski
Principal Investigator
M.A./RPA and CCPH Certified
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April, 2004

Summary of Findings

At the request of, Bonnie Mooney of Sunbelt Enterprises, Oxnard, California, A Phase 1 Archaeological Study was prepared in support of an environmental document for proposed development at development 29515 Canwood Street, City of Agoura Hills, County of Los Angeles, California. This document is intended to assist the client in achieving compliance with the California Environmental Quality Act (CEQA) and the Planning Department of the City of Agoura Hills, County of Los Angeles, guidelines, policies and procedures pertaining to the completion of cultural resource investigations. The scope of work consisted of:

1. Performing a records search at the South Central Coastal Information Center, California State University, Fullerton.
2. Conducting an on-foot surface reconnaissance of the entire project area.
3. Preparing a report summarizing the results of the records search and field phases.

The undeveloped lot lies north of the Pacific Ocean, south of Simi Valley, east of San Ventura, and west of Burbank within the City of Agoura Hills, County of Los Angeles, California (Figure 1). More specifically, the parcel is located on the Thousand Oaks, California 7.5 minute USGS Map (1981) within Township 1 North, Range 18 West, in an unsectioned portion of Rancho Las Virgenes (Figure 2). The property lies north of the 101 Freeway, to the west of Medea Creek/Kanan-Dume Road. The lot lies on the north side of Canwood Street, and is bordered on the east by an existing Medical Building at 29525 Canwood Street and on the north and west by undeveloped land (Figure 3). Figure 4 illustrates a proposed site plan for the parcel that includes two-story office buildings, parking, and associated landscaping features.

Soils on the property belong to the ***Cropley Series,*** which are very deep, well drained soils developed on nearly level to moderately sloping alluvial fans and valley floors in alluvium from mixed materials. They are characterized by dark gray, fine textured, angular blocky, neutral surface layers, with grayish brown, fine textured, massive, moderately alkaline and calcareous subsoils, over grayish brown moderately fine textured, massive, strongly calcareous substrata; and ***Gilroy Series***, which are moderately deep to deep, well-drained residual soils developed on gently rolling to steep uplands on basic igneous rock. They are characterized by dark grayish brown, medium to moderately fine textured , granular, slightly acid surface soils, brown moderately fine textured angular blocky, medium acid subsoils resting on fractured basalt and volcanic breccia at 22-40 inches (U.S. Department of Agriculture 1967: 65, 71).

A records search performed on April 8, 2004 by archaeologist Wayne Bonner, at the South Central Coastal Information Center, California State University, Fullerton, indicated that within a 1/2 mile radius of the project area:

- Twelve prehistoric archaeological resources: CA-LAN-320; -321; -432; -462; -671; -776; -842; -970; -971; -1024; -1069; and, -1236.
- No historic archaeological resources were identified.
- Twenty-five prior investigations have been conducted (Atlantis Scientific 1977; Barkley and Cannon 1982; Brock and Van Horn 1980; Brown 1981; Chace 1979; D'Altroy 1976; Greenwood 1976; Hatheway & McKenna 1989a,b; Kirkish 1978; Leach 1980; Maki & Carbone 1996; Padon 1979; Rosen 1979; Rosen and Clewlow 1975; Scientific Resource Surveys, Inc. 1979; Singer 1979a,b; Singer and Atwood 1988, 1989; Tartaglia 1977; Van Horn 1985; Webb and Romani 1982; and, Wlodarski 1996, 2003).
- No California Points of Historical Interest are listed (1973).
- No California Inventory of Historic Places are present (1976).
- No National Register of Historic Places properties are identified (2003 with updates).
- No California State Historic Landmarks are recorded (1990).
- Additional information was obtained from: The Geography Department Map Reference Center, California State University Northridge; data on file with the Los Angeles County Archives Project (Guide to the Historical Records of Los Angeles County); and, the City of Los Angeles, Bureau of Engineering, as follows:
  - Township-Range Plat Map Surveys by, Henry Washington (1853), Henry Hancock (1854), J.E. Terrell (1861), G.H. Thompson (1870), J.R. Glover (1895) and M.E. Reilly (1895);
  - 1853-Plat of the Rancho Las Virgenes (claimant: Maria Antonio Mechado);
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  - 1876-Plat of the Rancho Las Virgenes (surveyed by John Goldsworthy);

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- Map of the County of Los Angeles, California (Stevenson-1881 and Rowan-1888);
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- Camulos 15 minute USGS Topographic Map (1903 edition - surveyed in 1893, 1900-1901);
- Triunfo Pass 15 minute USGS Topographic Map (surveyed in 1921 and 1943);
- Dry Canyon 15 minute USGS Topographic Map (1932 edition - surveyed in 1925 and 1929).

An on-foot field inspection of the project area was performed by the author with the aid of survey archaeologist, Dan Larson on April 11, 2004. The following field observations were made during the field reconnaissance phase:

- The lot is bounded on the south by Canwood Street.
- An existing medical building borders the lot on the east (29525 Canwood Street)
- Undeveloped land occurs to the north and west of the project parcel.
- The lot slopes from north-to-south with a minor seasonal drainage roughly bisecting the parcel
- The lot is dominated by non-native grasses and shrubs with mustard, thistle, rye grass.
- Ground surface visibility was good-to-very-good throughout.
- Several eucalyptus trees and a couple of oak trees dot the otherwise disturbed, grass-covered landscape.
- Ground surface disturbances including disking and weed abatement activities have occurred in the past as evidenced by the lack of native vegetation.
- There is extensive gopher disturbance, and minor, modern trash and dumping found primarily in the southern portion of the parcel.

All exposed surface terrain and fortuitous exposures such as rodent burrows, cuts, excavated holes, and landscaped or cleared areas were thoroughly inspected for signs of cultural resource remains. Selected photographs taken of the property appear as Plate 1, while additional photographs are on file with the author.

The results yielded no evidence of prehistoric or historic archaeological resources within the property boundaries. Any proposed improvements or modifications within the project area as illustrated in Figures 2-4, will have no adverse impacts on known cultural resources. No additional hindrances affected the results of this survey and no conditions are placed on the project based on the results of this study.

The nature of a walkover can only confidently assess the potential for encountering surface cultural resource remains; therefore, customary caution is advised in developing within the project area. Should unanticipated cultural resource remains be encountered during land modification activities, work must cease. At this point, the City of Agoura Hills Planning Department or other appropriate lead agency shall be contacted immediately to determine appropriate measures to mitigate adverse impacts to the discovered resources. Cultural resource remains may include artifacts, shell, bone, features, altered soils, foundations, trash pits and privies, etc.

If human remains are discovered, then the procedures described in Section 7050.5 of the California Health and Safety Code shall be followed. These procedures require notification of the County Coroner. If the County Coroner determines that the discovered remains are those of Native American ancestry, then the Native American Heritage Commission must be notified by telephone within 24 hours. Sections 5097.94 and 5097.98 of the Public Resources Code describe the procedures to be followed after the notification of the Native American Heritage Commission.

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I. Introduction

1.1 Purpose and Scope of the Project

At the request of, Bonnie Mooney of Sunbelt Enterprises, Oxnard, California, A Phase 1 Archaeological Study was prepared in support of an environmental document for proposed development at development 29515 Canwood Street, City of Agoura Hills, County of Los Angeles, California. This document is intended to assist the client in achieving compliance with the California Environmental Quality Act (CEQA) and the Planning Department of the City of Agoura Hills, County of Los Angeles, guidelines, policies and procedures pertaining to the completion of cultural resource investigations. The scope of work consisted of:

1. Performing a records search at the South Central Coastal Information Center, California State University, Fullerton.
2. Conducting an on-foot surface reconnaissance of the entire project area.
3. Preparing a report summarizing the results of the records search and field phases.

1.2 Location and Description of the Project

The undeveloped lot lies north of the Pacific Ocean, south of Simi Valley, east of Ventura, and west of Burbank within the City of Agoura Hills, County of Los Angeles, California (Figure 1). More specifically, the parcel is located on the Thousand Oaks, California 7.5 minute USGS Map (1981) within Township 1 North, Range 18 West, in an unsectioned portion of Rancho Las Virgenes (Figure 2). The property lies north of the 101 Freeway, to the west of Kanan-Dume Road. The lot lies on the north side of Canwood Street, and is bordered on the east by an existing Medical Building at 29525 Canwood Street and on the north and west by undeveloped land (Figure 3). Figure 4 illustrates a proposed site plan for the parcel that includes two-story office buildings, parking, and associated landscaping features.

II. Environmental Information

2.1 Geology

The property lies within the Santa Monica Mountains, which is part of the Transverse Range geologic province. This mountain range is composed almost entirely of sedimentary and volcanic formations. The general topography consists of rolling hills, seasonal drainages, and narrow to moderately broad valleys, interspersed with sage/chaparral and oak-woodland plant communities. The major stratigraphic units in the area, include: Upper Miocene Marine Sedimentary Rocks consisting of interbedded sandstone, shale, siltstone and conglomerate; and, Miocene Volcanic Rocks, consisting of agglomerate, flow breccias, flows, tuffs, and volcanic materials (State of California, 1969).

2.2 Soils

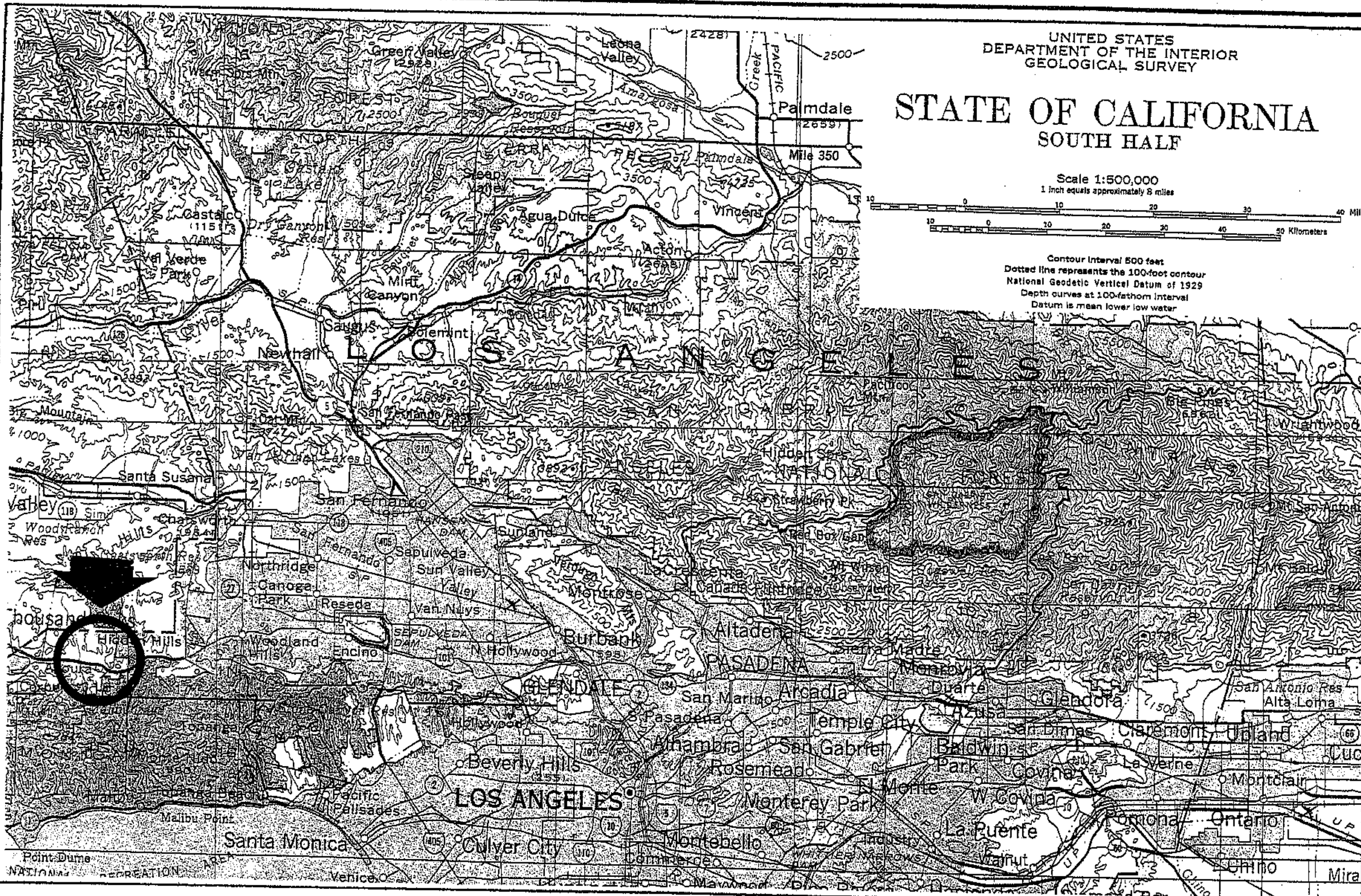
Soils on the property belong to the ***Cropley Series,*** which are very deep, well drained soils developed on nearly level to moderately sloping alluvial fans and valley floors in alluvium from mixed materials. They are characterized by dark gray, fine textured, angular blocky, neutral surface layers, with grayish brown, fine textured, massive, moderately alkaline and calcareous subsoils, over grayish brown moderately fine textured, massive, strongly calcareous substrata; and ***Gilroy Series***, which are moderately deep to deep, well-drained residual soils developed on gently rolling to steep uplands on basic igneous rock. They are characterized by dark grayish brown, medium to moderately fine textured , granular, slightly acid surface soils, brown moderately fine textured angular blocky, medium acid subsoils resting on fractured basalt and volcanic breccia at 22-40 inches (U.S. Department of Agriculture 1967: 65, 71).

2.3 Climate

The region, which is classified as Mediterranean warm, lies between the dry climate of the Mojave Desert, and the humid mesothermal climate of the Pacific Coast. It is characterized by warm, dry summers, and mild, moderately wet winters. Temperatures range from about 100 degrees in July and August, to the low 30s in January. Snowfall is rare and rainfall occurs normally between November and April.

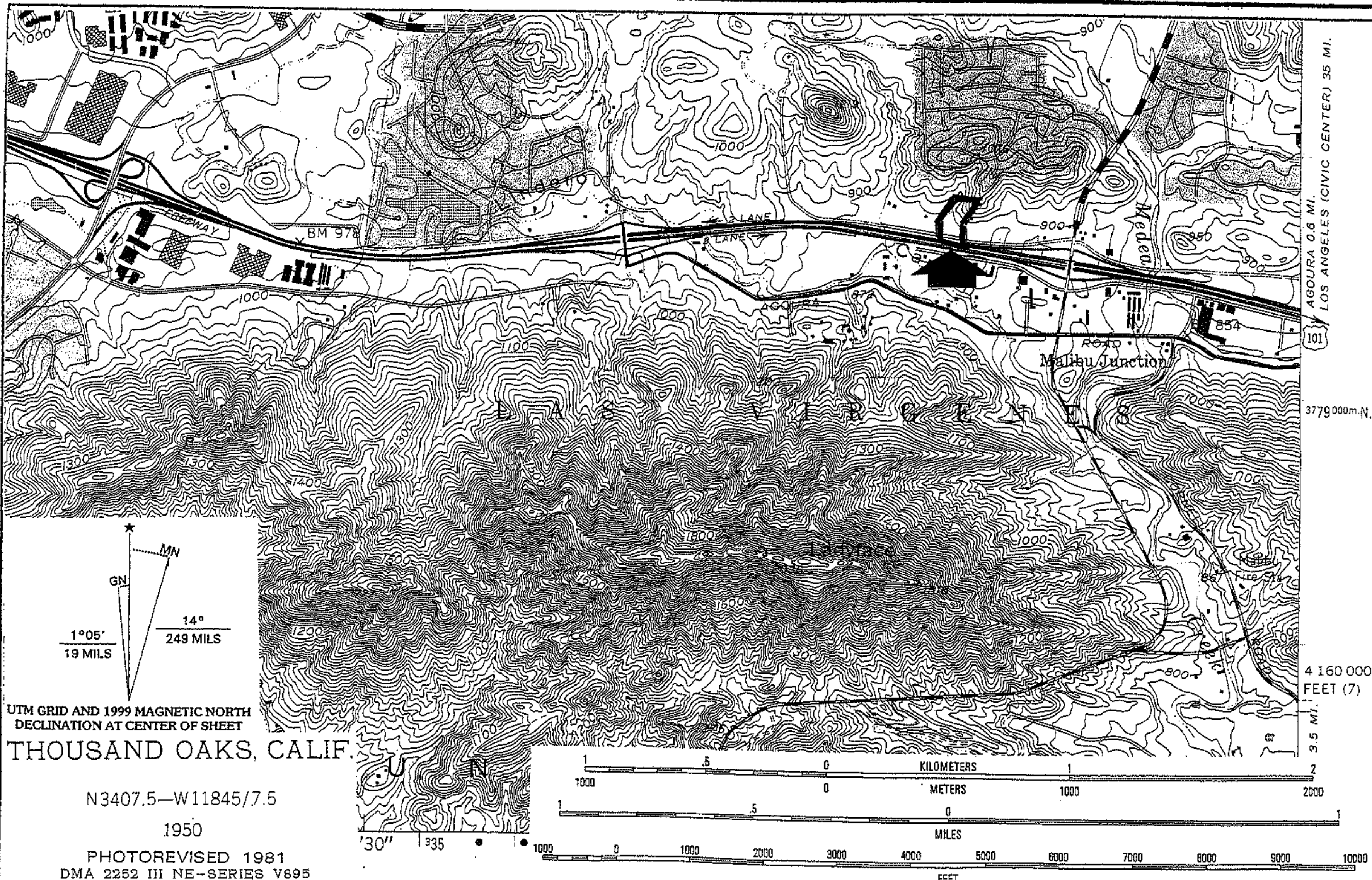
2.4 Flora and Wildlife

The region supports several major plant communities including: Oak Woodland, Riparian, and Sage/ Chaparral with species of sycamore, willow, alder and mulefat, white, black and coastal sage, buckwheat, poison oak, lemonadeberry, chamise, yucca, scrub oak, laurel sumac, toyon, and open grassland. Regional wildlife consists of seasonal populations of quail, rabbit, rodents, deer, lizards, snakes and numerous species of birds. Combined with coastal resources less that 10 miles away, the region provided an extensive resource base for prehistoric populations.



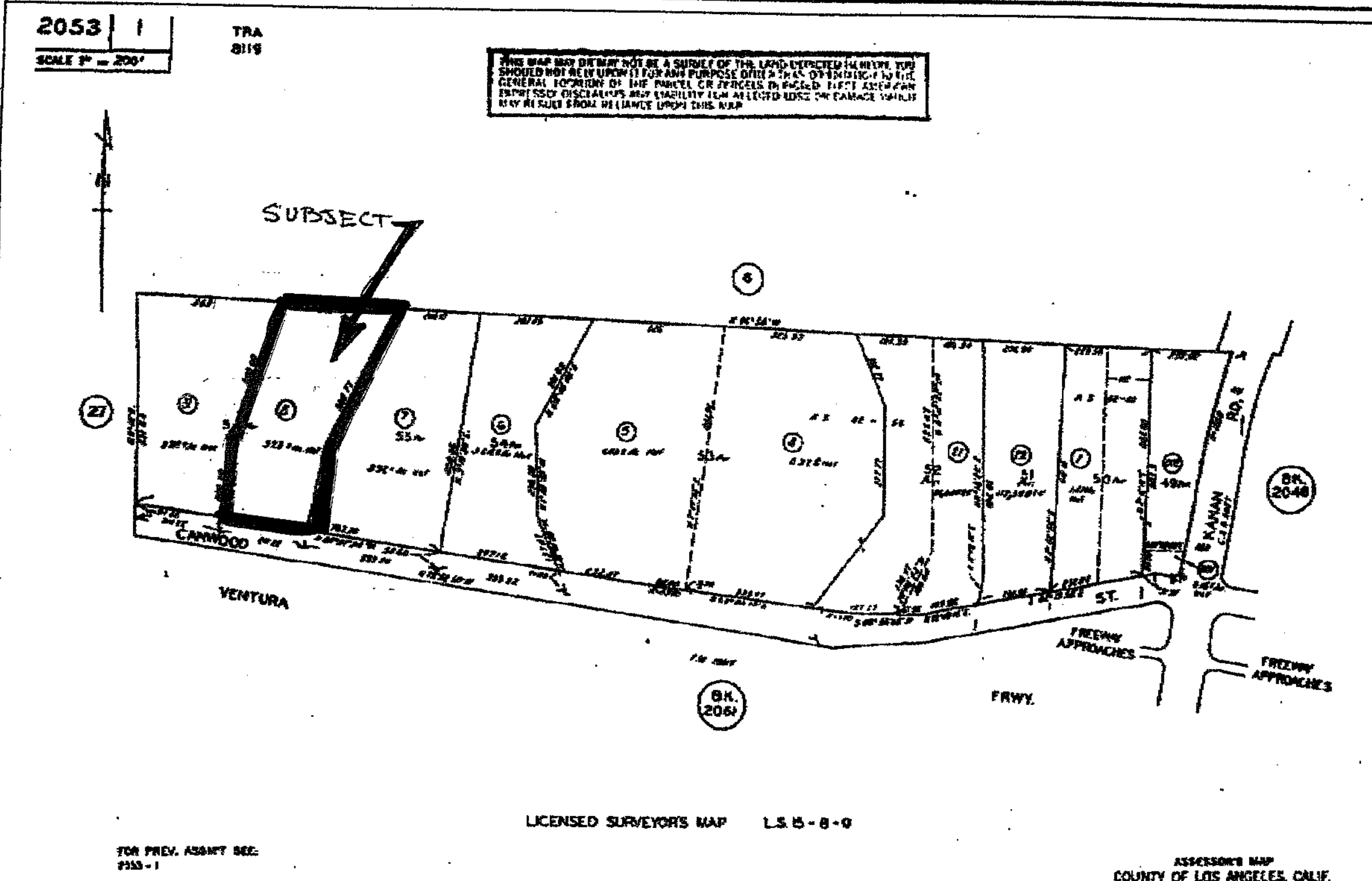
Vicinity Map

Figure 1



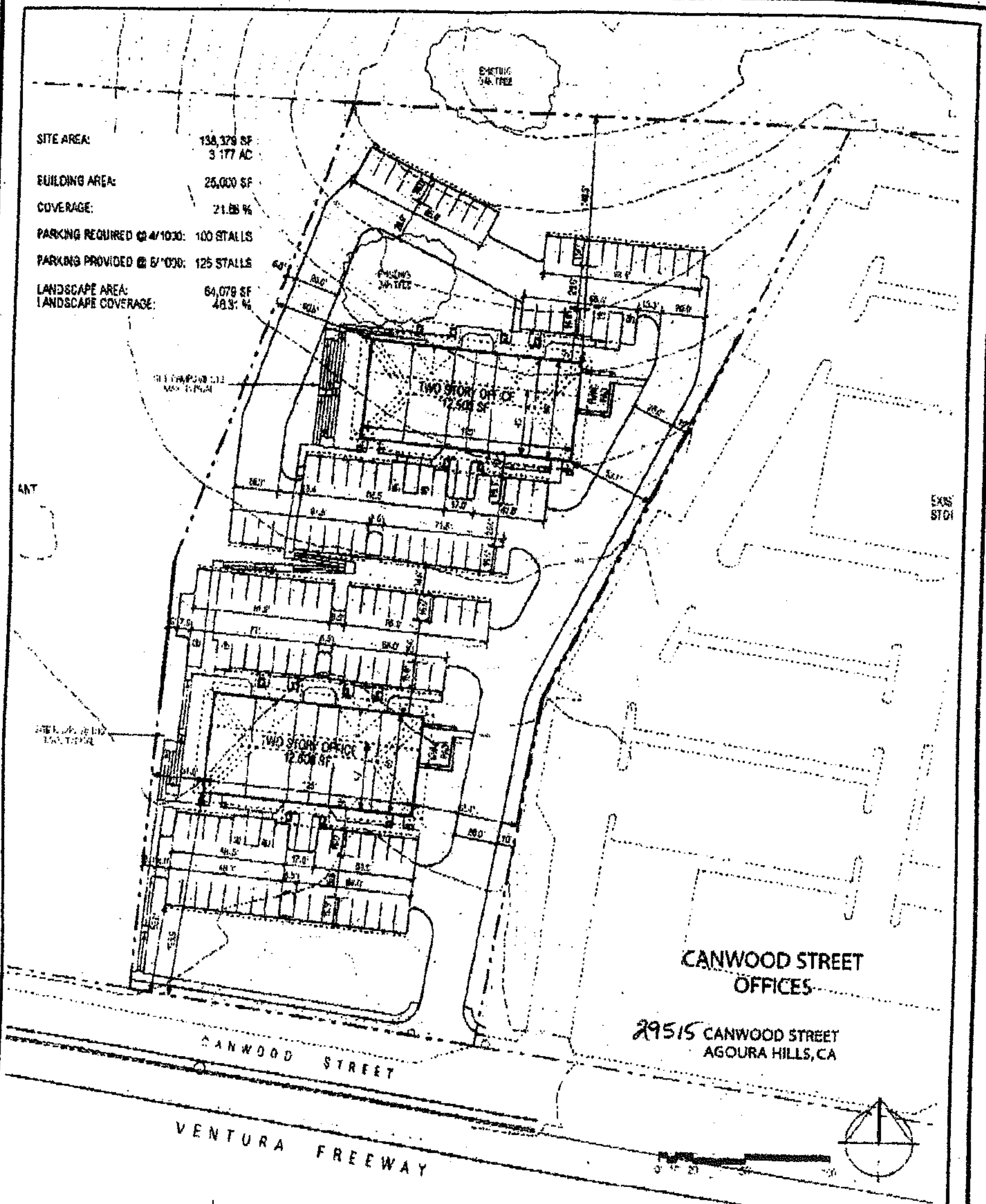
Location of the Survey

Figure 2



Location of the Project Area
On The Assessors Parcel Map

Figure 3



Proposed Project Site Plan

Figure 4

III. Cultural Overview

3.1 Prehistory/Protohistory

At Spanish Contact, the region was occupied by the Chumash, a diverse population living in settlements along the California coast from Malibu Creek to the southeast, Estero Bay in the north, including the islands of San Miguel, Santa Rosa, and Santa Cruz, and as far as Tejon Pass, Lake Casitas and the Cuyama River inland (Kroeber 1925, Landberg 1965, Grant 1978, Santa Barbara Museum of Natural History 1986, 1991, Miller 1988 and Gibson 1991).

Chumash society became more complex over the last 9,000 years (Wallace 1955 and Warren 1968). Warren revised Wallace's scheme to include regional variants and traditions enhanced by radiocarbon dates. King (1982) proposed sequences based on changes in ornaments, beads and other artifacts. After A.D. 1000, changes in bead types suggest the development of a highly developed economic system that was observed by early Spanish explorers. Following the 1542 Cabrillo voyage, many small Chumash settlements were abandoned and some of the largest historic towns were founded. This change in population distribution is attributed to growth in importance of trade centers and the development of more integrated political confederations. The Chumash economic system enabled them to make efficient use of diverse environments within their territory.

Acorns and seeds were traded between island, mainland, and interior populations who lacked marine resources traded with coastal populations for fish and other seafood. Most religious ceremonies had their roots in the Early Period when objects similar to those used historically were placed in mortuary associations or owned by religious leaders. Other sources include: Leonard 1971; Hudson et al. (1977); Clewlow 1978a,b; Hudson & Underhay (1978), Clewlow and Whitley 1979; Hudson (1979), Hudson and Blackburn (1979-87); Whitley and Drews 1979; Carrico and Wlodarski (1983); Dillon & Boxt (1989); and, C. King (1994).

3.2 Ethnographic Information

The Spanish viewed the Chumash as unique among California Indians due to their knowledge of the sea, canoe building expertise, ceremonial organization, their interest in acquiring and displaying possessions, willingness to work, and their extensive trade networks. The protohistoric Chumash maintained the most complex bead money system documented in the world (King 1982). Information obtained from Schumacher & Bowers in 1877-1878; Rogers in the 1920s; Harrington in the 1930s; and Woodward and Van Valkenburgh in the late 1920s and 1930s, suggests that the Chumash were divided into political provinces, with each containing a capital where villages now exist. Based on C. King (1975), and Applegate (1974, 1975), numerous placenames exist in the region:

Alqilko'wi	"white of the eye" - Village in Little Sycamore Canyon.
Hipuk	"elbow" - Village in Triunfo Canyon, inland from Malibu
Huwam	Village at Rancho El Escorpion, at the west end of the San Fernando Valley
Kats'ikinhin	"pine tree" - Village on Las Virgenes Creek, inland from Malibu
Kasaqtikat	"the obstacle" - Undiscovered location near Mugu
Lalimanuh	A village on Calleguas Creek, northeast of Pt. Mugu
Lisiqishi	Village at Arroyo Sequit, west or Point Dume
Lohostohni	Village at Trancas Canyon, west of Point Dume
Luulapin	The name for Point Mugu
Muwu	"beach" - A village at the mouth of Mugu Lagoon
S'ap tuhuy	"house of the rain" - Village on Potrero Creek, inland from Malibu
S'apwi	"house of the deer" - Village on Conejo Creek, near Thousand Oaks.
Satwiwa	"bluff"? - Village on Rancho Guadalasca, north of Mugu.
Seq'is	"beachworm" - Now Arroyo Sequit.
Shalikuwewech	"it is piled up" - Place north of Point Mugu.
Shuwalahsho	"sycamore" - Village in Big Sycamore Canyon.
Ta'lopop	A village on Las Virgenes Creek.

3.3 History

From Spanish contact (voyages of Cabrillo in 1542 and Vizcaino in 1602), through the Mexican and American Periods, land use patterns changed little in the Santa Monica Mountains. The Portola-Crespi Expedition of 1769 passed through Calabasas and Agoura while returning to San Diego. Juan Bautista de Anza (1773-1775/1776) helped establish the Franciscan missions and Spanish settlements in the region, and opened the door to future development of the region. A branch of the El Camino Real passed through Calabasas and Agoura after leaving the San Fernando Valley, a route that was frequently traveled by Native American, soldier, explorer and civilians. Today, the Ventura Freeway (Highway 101) follows the former alignment of the El Camino Real.

By the 1840's and 50's, cattlemen, sheepherders, squatters and ranch owners were acquiring portions of former Mexican land grants in the region. Legendary landowners such as Miguel Leonis the co-owner (along with his wife Espiritu), of Rancho El Escorpion to the north of the project area, Domingo Carrillo and Nemisio Dominguez of Rancho Las Virgenes, and Matthew Keller of Rancho Topango Malibu Sequit, owned much of region. To the west, Don Pedro Alacantara Sepulveda built an adobe (which still stands, and is under the jurisdiction of the State Park system) for his wife Maria Magdalena Soledad Dominguez circa 1853. Under the direction of King Philip of Spain, Rancho Las Virgenes, Rancho El Paraje de Las Virgines, or El Rancho de Nuestra Senora La Reina de Las Virgenes as it was first called, was granted to Miguel Ortega. It was one of the smallest of all the California grants, consisting of only 17,760 acres. Later, under the United States flag, the grant was filed under the ownership of Dona Maria Antonia Machado del Reyes. Her heirs, Jose Reyes and Maria Altgracia Reyes de Vejar, built a home of adobe, "The Reyes Adobe", close to a natural spring near Strawberry Peak, and it was last owned by Jacinta Reyes.

According to the City of Agoura Hills website (www.ci.agoura-hills.ca.us), Don Pedro (Pierre) Agoure came to California when he was 17 in 1871. He was a shepherd and swashbuckler. The son of a French farmer, he adopted the style of the Spanish, tacked a "Don" to his name and used the name Pierre. By the early 1900s Agoura was used as a stage stop, having one of the wells used to provide water for travelers located where Agoura and Cornell Roads meet. Travelers enjoyed Ladyface Mountain which, was a Chumash lookout. Folklore has it that Ladyface was named because of the profile resembled a lady lying on her back and searching the heavens for the return of her lover. During 1924, Ira and Leon Colody purchased the George Lewis Ranch in what is now known as Old Agoura. This land was known as Independence Acres. Shortly thereafter, this area became known as "Picture City" and was used for many backdrops for motion pictures. In 1928 the Postal Department selected the name of Agoure and chose to change the last letter "e" to an "a" for ease of pronunciation. During 1955, the first water started flowing into the Las Virgenes area, and in 1959 the Las Virgenes Municipal Water District was formed. During the late 1960s the Hillrise, Liberty Canyon and Lake Lindero housing tracts were begun. During the 1970's, schools and shopping centers were constructed. During 1982, the residents of the City of Agoura Hills voted in favor of cityhood by a 68% majority. Agoura Hills became the 83rd City in Los Angeles County. Today large portions of land in the region are protected by the Santa Monica Mountains National Recreation Area for the enjoyment of all.

IV. Background Research Synthesis

A records search performed on April 8, 2004 by archaeologist Wayne Bonner, at the South Central Coastal Information Center, California State University, Fullerton, indicated that within a 1/2 mile radius of the project area:

- Twelve prehistoric archaeological resources: CA-LAN-320; -321; -432; -462; -671; -776; -842; -970; -971; -1024; -1069; and, -1236.
- No historic archaeological resources were identified.
- Twenty-five prior investigations have been conducted (Atlantis Scientific 1977; Barkley and Cannon 1982; Brock and Van Horn 1980; Brown 1981; Chace 1979; D'Altroy 1976; Greenwood 1976; Hatheway & McKenna 1989a,b; Kirkish 1978; Leach 1980; Maki & Carbone 1996; Padon 1979; Rosen 1979; Rosen and Clewlow 1975; Scientific Resource Surveys, Inc. 1979; Singer 1979a,b; Singer and Atwood 1988, 1989; Tartaglia 1977; Van Horn 1985; Webb and Romani 1982; and, Wlodarski 1996, 2003).
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- No National Register of Historic Places properties are identified.
- No California State Historic Landmarks are recorded.

Additional information was obtained from: The Geography Department Map Reference Center, California State University Northridge; data on file with the Los Angeles County Archives Project (Guide to the Historical Records of Los Angeles County); and, the City of Los Angeles, Bureau of Engineering, as follows:

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- Map of Private Grants and Public Lands Adjacent to Los Angeles and San Diego (Clinton Day - 1869);
- 1853-Plat of the Rancho Las Virgenes (claimant: Maria Antonio Mechado);

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V. Field Reconnaissance Program

5.1 Methodology

A field reconnaissance which entails the inspection of all land surfaces that can reasonably be expected to contain cultural resource remains without major modification of the land surface was performed for the lot on April 11, 2004.

5.2 Crew

Principal Investigator, Ro bert W lodarski, has: A, B.A. in History and Anthropology; M.A. in Anthropology from California State University Northridge (CSUN); 31 years of experience in California archaeology with over 770 projects completed to date; certification in field archaeology and archival research by the Register of Professional Archaeologists [RPA], and; is registered as a California historian by the California Committee for the Promotion of History [CCPH]; and D an L arson has a B.A. in Anthropology from CSUN, with 35 years of professional experience in California archaeology, and meets the qualifications for certification in field archaeology by the Register of Professional Archaeologists [RPA]; and, Wayne Bonner with over 35 years of experience in southern California archaeology, and certified in field archaeology by the Register of Professional Archaeologists [RPA].

5.3 Results

The following field observations were made during the field reconnaissance phase:

- The lot is bounded on the south by Canwood Street.
- An existing medical building borders the lot on the east (29525 Canwood Street)
- Undeveloped land occurs to the north and west of the project parcel.
- The lot slopes from north-to-south with a minor seasonal drainage roughly bisecting the parcel
- The lot is dominated by non-native grasses and shrubs with mustard, thistle, rye grass.
- Ground surface visibility was good-to-very-good throughout.
- Several eucalyptus trees and a couple of oak trees dot the otherwise disturbed, grass-covered landscape.
- Ground surface disturbances including disking and weed abatement activities have occurred in the past as evidenced by the lack of native vegetation.
- There is extensive gopher disturbance, and minor, modern trash and dumping found primarily in the southern portion of the parcel.

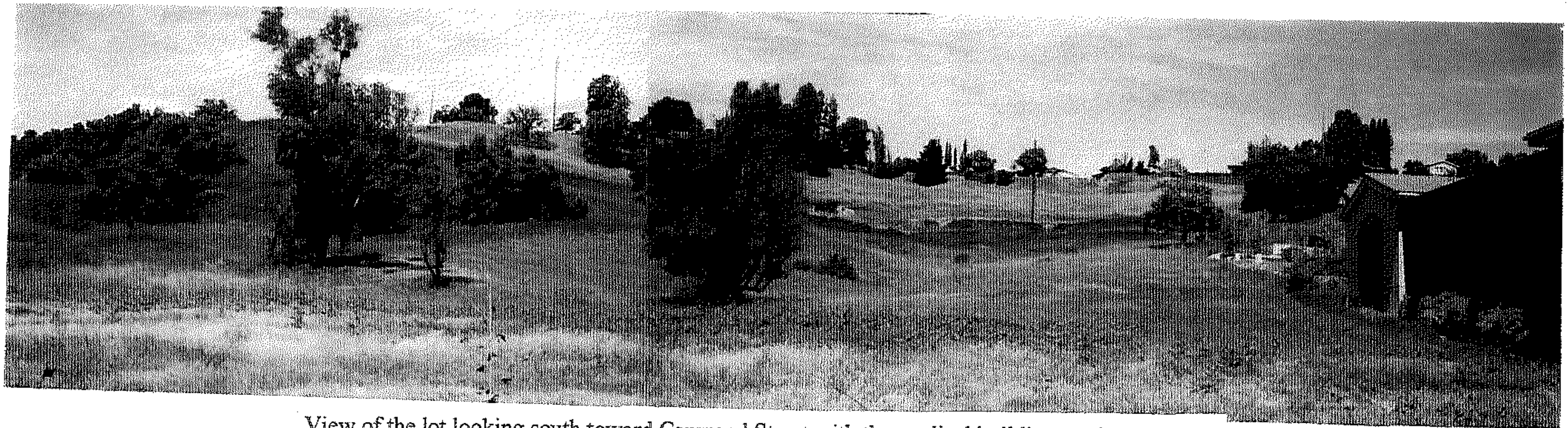
All exposed surface terrain and fortuitous exposures such as rodent burrows, cuts, excavated holes, and landscaped or cleared areas were thoroughly inspected for signs of cultural resource remains. Selected photographs taken of the property appear as Plate 1, while additional photographs are on file with the author. The results yielded no evidence of prehistoric or historic archaeological resources within the property boundaries.

5.4 Recommendations

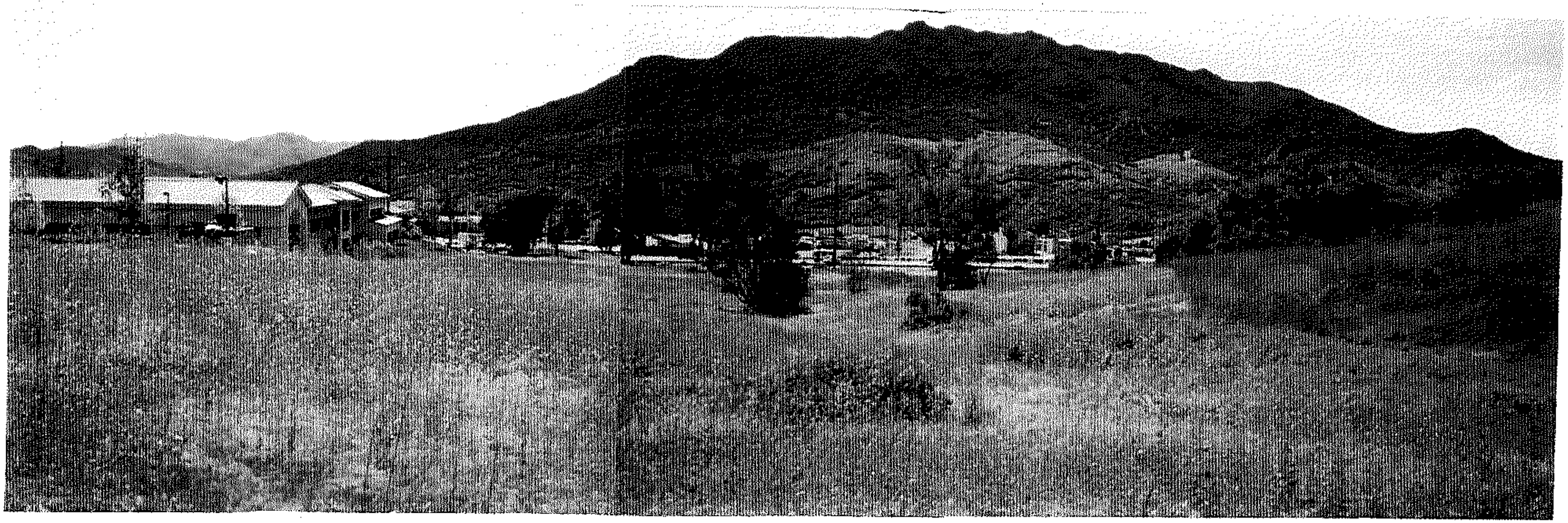
Any proposed improvements or modifications within the project area as illustrated in Figures 2-4, will have no adverse impacts on known cultural resources. No additional hindrances affected the results of this survey and no conditions are placed on the project based on the results of this study.

The nature of a walkover can only confidently assess the potential for encountering surface cultural resource remains; therefore, customary caution is advised in developing within the project area. Should unanticipated cultural resource

Plate 1: Selected Views of the Project Area



View of the lot looking south toward Canwood Street with the medical building on the left (east)



View of the lot looking north from Canwood Street with the medical building on the right (east) remains be encountered during land modification activities, work must cease. At this point, the City of Agoura Hills Planning Department or other appropriate lead agency shall be contacted immediately to determine appropriate measures to mitigate adverse impacts to the discovered resources. Cultural resource remains may include artifacts, shell, bone, features, altered soils, foundations, trash pits and privies, etc.

If human remains are discovered, then the procedures described in Section 7050.5 of the California Health and Safety Code shall be followed. These procedures require notification of the County Coroner. If the County Coroner determines that the discovered remains are those of Native American ancestry, then the Native American Heritage Commission must be notified by telephone within 24 hours. Sections 5097.94 and 5097.98 of the Public Resources Code describe the procedures to be followed after the notification of the Native American Heritage Commission.

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Appendix 4 Geology

4A

Geotechnical Engineering and Geologic Study, (Planning Case No. 05-CUP-006 & 05-OTP-32/GDI No. 05.00103.0136) Proposed Two Office Buildings, 29515 Canwood Street, Agoura Hills, California. Advanced Geotechnical Services, Inc. May 14, 2004. (Note: two plates provided as independent files)

advanced geotechnical services, inc.

May 14, 2004
Client Number 3315
Report Number 6583

Ms. Bonnie Mooney
Sunbelt Enterprises
1801 Solar Drive, Suite 250
Oxnard, CA 93030

Geotechnical Engineering and Geologic Study
Proposed Two Office Buildings
29515 Canwood Street
Agoura Hills, California

In accordance with our proposal dated April 8, 2004, and your authorization dated April 9, 2004, Advanced Geotechnical Services, Inc., has prepared this geotechnical engineering and geologic study report for the proposed two office buildings at the subject site. This report presents the results of our data research, subsurface exploration, laboratory testing, and our professional opinions regarding the geotechnical engineering factors that may affect the proposed development.

Based on the results of our geotechnical study, it is our opinion that the site is suitable for construction of the proposed improvements, provided recommendations of this report are properly incorporated in the design and implemented during construction.

This opportunity to be of service is sincerely appreciated. This report should be read from cover to cover to understand its limitations and to avoid taking a recommendation out-of-context. If you have any questions or if we may be of any further assistance, please do not hesitate to call. We look forward to being of continued service.

Respectfully submitted,
Advanced Geotechnical Services, Inc.

Kenneth J. Palos, President
Mary Beth Kile, CEG 1844, Principal Engineering Geologist
Don Villafana, RCE 37354, Principal Engineer
Dan Daneshfar, Staff Engineer

REGISTERED GEOLOGIST MARY BETH KILE No. 1844 CERTIFIED ENGINEERING GEOLOGIST STATE OF CALIFORNIA

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Enclosure: Report Number 6583

cc: (7) Addressee (1) File Copy

advanced geotechnical services, inc.

GEOTECHNICAL ENGINEERING AND GEOLOGIC STUDY

Proposed Two Office Buildings
29515 Canwood Street
Agoura Hills, California

Report to
Sunbelt Enterprises
Oxnard, California

May 18, 2004
Client Number 3315
Report Number 6583

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List of Plates, Figures, and Appendices

Introduction

This geotechnical engineering and geologic study report has been prepared for the proposed two office buildings at the subject site. The purposes of this study, in addition to evaluating the seismicity of the site, are to (1) identify on-site soil conditions that may affect the proposed project, and (2) provide geotechnical recommendations for site preparation, temporary excavations, foundation design, slabs-on-grade, retaining wall design, pavement design, and drainage recommendations. This report presents the findings of our data review, subsurface exploration, laboratory testing, engineering analyses and evaluations, and our conclusions and recommendations.

Figures referenced in this report follow the main text. Appendices, which include logs, laboratory test results, and seismicity study, are attached following the main report. The citations of references used in this study and mentioned within this report are included in Appendix D.

Site Description and Proposed Development

The subject site is located at 29515 Canwood Street in the city of Agoura Hills, in the County of Los Angeles, California. The property generally slopes from north to south with slope gradients ranging from 4:1 (horizontal to vertical) to 1.5:1. The property is currently vacant, and the majority is covered with low grasses and a few trees. An existing oak tree will remain in place.

The proposed development includes two commercial two-story structures, and four parking areas (approximate elevations of 874, 890, 898, and 920 feet) that are separated by a 14-foot high 2:1 (horizontal:vertical) gradient fill slope (lower building area) with a low retaining wall located midway on the slope or by a 16-foot high cut slope (upper building area) with a low retaining wall located midway. A 2:1 gradient cut slope with a 3-foot retaining wall located at the top of the proposed cut, and a 5-foot high retaining wall planned at the toe of the slope is proposed along the northern boundary of the northern most parking area. Building loads were not available at the time of this study, but this report is based on maximum wall loads of 3 kips per foot and maximum column loads of 50 kips. The remaining portion of the site will be paved for driveways, landscaped, or covered with concrete flatwork.

Site grading is expected to consist of a typical cut and fill operation to establish grade for the building pads, parking areas, and site drainage. Retaining walls are planned up to 5 feet in height. All cut and fill slopes are also planned to be constructed at 2:1 gradients. Permanent cuts are expected to be up to 18 feet below existing grade, and fill depths are expected to be up to 12 feet above existing grade.

Scope of Services

This geotechnical engineering study included:

a. Site observation and review of geotechnical and geologic data of the general study area. A site location map is shown in Figure 1.

b. Preparation of a Geologic Map (Plate 1) and Geologic Cross-Section A-A' (Plate 2) to illustrate subsurface conditions immediately beneath the property. These illustrations are based upon the preliminary grading plan prepared by Holmes Enterprises, at a scale of 1" = 30'. This base map was provided to our office for use in this study, and we make no representations regarding the accuracy of this base map.

c. Excavating, sampling, and logging of 5-bucket auger borings to a maximum depth of 24 feet for foundation evaluation. Test borings were located in the field using a tape measure and approximate reference points. Thus, the actual test pit locations may deviate slightly from the locations on Plate 1. The logs are included in Appendix A, along with a general description of the field operations.

d. Laboratory testing of selected samples to determine the engineering properties of on-site soils. The results of laboratory testing are presented in Appendix B and on the boring logs in Appendix A. Soil samples will be *discarded* 30 days after the date of this report, unless this office receives a specific request and fee to retain the samples for a longer period of time.

e. Research of historical earthquake events and determination of seismic parameters for potential on-site ground motion.

f. Engineering analysis of the data and information obtained from our field study, laboratory testing, and literature review.

g. Development of geotechnical recommendations for site preparation and grading, and geotechnical design criteria for building foundations, slab-on-grade construction, underground utility trenches, temporary excavations, retaining walls, pavement section, and drainage.

h. Preparation of this report summarizing our findings, conclusions, and recommendations regarding the geotechnical aspects of the project site.

The scope of this geotechnical study did not include environmental issues.

Geologic Setting

Geologic conditions beneath the subject property have been interpreted and characterized based upon our review of published and unpublished references, a limited site reconnaissance, and our subsurface exploration. Our interpretations involve projections of data and require that subsurface conditions are reasonably constant between points of exposure. Work should continue under the review of an engineering geologist to insure that geologic conditions different from those described below are recognized and evaluated as soon as possible. Certain subsurface conditions, such as groundwater levels and the consistency of near-surface soils, will vary with the seasons.

The subject property is located within the southwestern portion of the Transverse Ranges Geomorphic province of California. The Transverse Ranges consist of generally east-west trending mountains and valleys, which contrast with the overall north-northwest structural trend elsewhere in the state. The anomalous structure of the Transverse Ranges is attributed to the effects of compressive deformation (crustal shortening), generated by north-south convergence along the *big bend* of the San Andreas fault (Yerkes, 1987) north of the San Gabriel Mountains and the motion of the Pacific Plate. The valleys and mountains of the Transverse Ranges are typically bounded by a series of east-west trending, generally north dipping reverse faults with left-lateral, oblique movement.

The site is located in the southeast portion of the Thousand Oaks Quadrangle on the north side of the Santa Monica Mountains. The Santa Monica Mountains are a series of uplifts extending about 120 miles west from Elysian Park in Los Angeles to San Miguel Island reaching a maximum height of over 3000 feet above sea level. The Santa Monica Mountains are made up of locally highly folded and faulted marine sedimentary rocks ranging in age from Cretaceous to Pleistocene with a granitic and metamorphic basement of Mesozoic age. The majority of rocks are Cenozoic, especially Miocene, in age and include mainly marine sediments and mafic and intermediate volcanic deposits. These volcanic deposits reach their greatest thicknesses in the western Santa Monica Mountains and are known collectively as the Conejo Volcanics. They are primarily basaltic, andesitic, and diabasic flows, sills, and dikes (Dibblee, 1992).

The site area is located in a series of gently rolling hills with interspersed alluvial lowlands extending along the north edge of the base of the Santa Monica Mountains. Dibblee (1992) maps the bedrock beneath the study site as Miocene Age Upper Topanga Formation. Bedrock in the vicinity of the site is mapped as having over-turned moderately to steeply north-dipping bedding.

Earth Materials and Subsurface Conditions

Artificial Fill (Af)
Artificial fill soils are located at the south end of the property and are associated with old access roads crossing the site, and the existing Canwood Street. It is anticipated that these soils are limited in thickness (on the order of 4 to 5 feet) based on the topographic expression shown on the Geologic Map, Plate 1. Based on site observation, these materials are composed of silty sand and sandy clay with minor wood, metal and glass debris. These fill soils are in a loose or soft condition.

Colluvium (Qcol)
Colluvium was encountered during our site exploration ranged in depth from 2 to 6 feet. Sediments consist of relatively moist brown silty sand and sandy to silty clay with a density of loose to medium dense for the sand fraction, and a consistency of firm to very stiff for the finer-grained fractions. This material is considered unsuitable for the support of certified fill or structural loads.

Alluvium (Qal)
Alluvial materials are located in the small drainage located at the south side of the property adjacent to Canwood Street. Based on site observation of the exposed material, these soils are composed of silty sand, sandy silt and sandy to silty clay. These materials are porous and have a density for the sand size fraction of loose to medium dense and a consistency of the fine-grained fraction of soft to firm.

Bedrock – Topanga Formation (Ttuc)
The artificial fill, colluvium, and alluvium soils are underlain by bedrock assigned to the Miocene Age Upper Topanga Formation. The Upper Topanga Formation is a marine clastic sedimentary unit composed of claystone, siltstone, and minor sandstone. Bedrock encountered in the exploratory test borings excavated for this study consisted of olive-brown and gray siltstone and claystone interbedded with yellowish-brown fine-grained sandstone with gravel. Bedding is thinly laminated, and well-developed in the finer-grained lithosomes. Bedrock commonly contains thin gypsum stringers and iron oxidation staining along bedding planes and joint surfaces, and is slightly weathered and relatively hard within the boring hole excavations.

Geologic Structure
The upper Topanga Formation is shown by Dibblee (1993) to be steeply dipping towards the north with very tight folding and overturned bedding in places. Bedding dips ranged from 28 degrees to more common angles of 45 to 79 degrees towards the north.

Cross-section A-A' shows the north dipping bedding in relationship to the existing and proposed grades.

Faulting
No faults where observed within the borehole excavations nor has there been any mapped by others as being located on-site.

Soil/Bedrock Parameters
Compaction curves were developed in this study for 2 soil samples. The maximum dry densities and optimum moistures are tabulated below.

Test Pit	Depth, Feet	Soil Description	Maximum Dry Density, pcf	Optimum Moisture Content, %
B-2	2.5	LIGHT BROWN CLAY W/SAND	106.0	16.0
B-4	9.0	BROWN CLAYSTONE	105.0	18.0

The undrained shear strengths of cohesive soil samples were estimated with a hand penetrometer. Direct shear testing was used to measure the peak and ultimate shear strength of bedrock and proposed fill materials in terms of a cohesion and friction angle. Direct shear test was performed on 2 remolded samples to evaluate the shear strength properties of fill materials compacted to 90% relative compaction. The ultimate cohesion and the ultimate friction angle are tabulated below.

Test Pit	Depth, Feet	Soil Description	Ultimate Friction Angle, Degrees	Ultimate Cohesion, psf
B-1	20	DARK BROWN CLAYSTONE (Ttuc) (UNDISTURBED)	30	1004
B-2	2.5	LIGHT BROWN CLAY (Qcol) (REMOLDED)	30	160
B-4	9.0	DARK OLIVE-BROWN CLAYSTONE (Ttuc) (REMOLDED)	35	260

Consolidation tests were performed on samples remolded to a relative compaction of 90%. The purpose of performing consolidation tests is to determine the compressibility characteristics and to determine if the soils would experience hydroconsolidation, which is a decrease in volume (collapse) when subjected to water at a constant load or swell (expand) when exposed to water at a constant load. The consolidation test results showed a slight tendency to hydroconsolidate. The potential for hydroconsolidation tends to increase with a decrease in degree of saturation, a decrease in dry density, and an increase in fine content for sands to silty sands (clay content less than about 10%). The potential for hydroconsolidation is usually nil when the degree of saturation exceeds about 60%, but as the degree of saturation decreases below 60%, the potential for hydroconsolidation may increase. The degree of saturation of the fill ranged from 65% to 93%, with an average of 79%.

The remolded samples and one of the undisturbed samples of the consolidation tests showed a tendency to swell under a pressure of 2000 psf. The potential of the soil to swell or expand increases with an increase in soil density, a decrease in initial moisture content (low percent saturation), an increase in clay content, and an increase in the activity of the clay content. Expansive soils change in volume (shrink or swell) due to changes in the soil moisture content. In addition to swell potential of the soil, the amount of volume change depends on (1) the availability of water, (2) the restraining pressure, and (3) time. The expansion index, the initial moisture content, the initial dry density, and the final moisture content for each specimen used to perform the expansion index test are given below.

Test Pit	Depth, Ft	Soil Description	Initial Moisture Content, %	Final Moisture Content, %	Initial Dry Density, pcf	Expansion Index
B-2	1-4	LIGHT BROWN CLAY W/SAND	14.8	33.8	95.3	108

To provide a basis for preliminary design purposes, one sample of the surficial soil was analyzed for soluble sulfate (EPA 300.0) and chloride (EPA 300.0) concentrations, pH (EPA 4045B), and resistivity (EPA 120.1), in accordance to the test methods shown in parenthesis. This analysis assist in the evaluation of whether the site soil may have a deleterious effect on underground metallic materials (pipes and reinforced concrete structures), and on concrete foundations. The results of these tests are summarized below. Sulfate and chloride concentrations are expressed in parts per million (ppm) on a dry weight basis.

Boring	Depth, Ft	Description	pH	Chloride, ppm	Sulfate, ppm	Resistivity, ohm-cm
B-2	1-4	LIGHT BROWN CLAY W/SAND	7.1	35.0	25.6	15151

The measured soil's soluble sulfate concentration of 25.6 ppm indicates that the concrete's sulphate exposure will be negligible, according to UBC Table 19-A-3. Resistivity was measured at 15,151 ohm-cm, which is considered to have a low corrosion potential to burned metallic material.

A representative soil sample (B-2 at a depth of 1 - 4 feet) collected during our field exploration was tested for *R*-value in accordance with Department of Transportation, California Test Method No. 301. The tested soil sample had an *R*-value of 15.

Groundwater

Water seepage was observed at depths of 10 to 15 feet within fractured bedrock in borings B-2 through B-5. Groundwater was not encountered within Boring B-1 to a depth of 24 feet. Groundwater elevations are dependent on seasonal precipitation, irrigation, land use, climatic conditions, among other factors, and as a result fluctuate. Therefore, water levels at the time of construction and during the life of the facility may vary from the observations or conditions at the time of our field exploration.

Overview

For a detailed description of the subsurface conditions encountered in the exploratory borings, refer to the Boring Logs presented in Appendix A.

Faulting and Seismicity

Faulting

The State of California passed the Alquist-Priolo Earthquake Fault Zoning Act in 1972 to mitigate the potential hazard of surface rupture from active faults for structures designed for human occupancy. Active faults are those, which have exhibited movement within the last 11,000 years. Property located within a Regulatory Earthquake Fault Zone requires a geologic fault investigation to demonstrate that the proposed buildings will not be built over the trace of an active fault. The subject site is not located within an Earthquake Fault Zone.

The closest State of California Earthquake Fault Zone to the site is Malibu Coast Fault. Based on the results of the seismic analysis presented in Appendix C using the computer program EQFAULT, and referenced herein, the Malibu Coast Fault zone is located about 7.0 miles from the site. Other active faults mapped within 12 miles of the site are the Anacapa-Dume, Santa Monica, and Simi-Santa Rosa Fault Zones. No active or potentially active faults are mapped as underlying or trending toward the site itself.

Seismicity Study

Earthquakes are characterized by magnitude, which is a quantitative measure of the strength of the earthquake based on strain energy released during the earthquake. The magnitude is independent of the site in question. The intensity of an earthquake at a given site, however, is affected by the magnitude, the distance between the site and the hypocenter (focus, the location on the fault at depth where the energy is released), and the geologic conditions between the site and the hypocenter. Intensity, which is often measured by the Mercalli scale, generally increases with increasing magnitude and decreases with increasing distance from the hypocenter. Intensity is also usually greater in areas underlain by unconsolidated material than areas underlain by bedrock.

The development of seismic input parameters for structural design requires knowledge of the faults surrounding the site, the magnitude of earthquakes that each fault can generate, and the attenuation or magnification of ground acceleration that may occur at a given site if an earthquake occurs along a particular fault. Research of historical earthquake events that have occurred in the general study area and both a deterministic and probability evaluation of seismic parameters for potential on-site ground motion consideration can be readily performed today with computer databases and associated software. For this study, we used the computer programs EQFAULT and UBCSEIS (Blake, 2000a, and 2000b) with the fault models based on California Division of Mines and Geology's fault-database (Blake, 1998a). The locations of these fault zones, defined in the computer database are each represented by a single surface and do not necessarily coincide with the zones shown on the State of California Earthquake Fault Zone maps, where the fault zones may include a main trace and several splays. For purposes of seismic risk, as defined by ground acceleration, the computer database is considered adequate. The State of California fault zone maps and other geologic maps were used as indicated above to evaluate if faults might traverse a given site. Brief descriptions of each of these programs used to evaluate seismic risk are included in Appendix C. To estimate ground acceleration at the site, we used the Bozorgnia, Campbell and Niazi (1999) acceleration-attenuation relations. The results of EQFAULT study is presented in Appendix C. A summary of the pertinent information contained in Appendix C is given below.

The seismicity study indicated that no known active or potentially active faults pass through the site. The site, however, as all of the Southern California area, is located in a seismically active region and will experience slight to very intense ground shaking as the result of movement along various active faults in the region. The most significant fault system near the site is the Malibu Coast fault.

The Uniform Building Code (UBC) is often followed in seismic structural design. The UBC requirements are based on ground motions with a 10% exceedance in 50 years, which corresponds to a return period of 475 years. The site computed peak ground acceleration for a 50-year exposure and 10% exceedance is about 0.42g.

Seismic Design Criteria

Knowledge of the nature of faulting in California has been greatly enhanced during the last 25 years. Seismology, however, is a relatively new science and standard procedures for predicting site specific ground accelerations have not yet been widely accepted, and neither the time, location, nor magnitude of an earthquake can be accurately predicted at this time.

If the structural design is based on UBC dynamic lateral-force procedures, we recommend that a horizontal ground acceleration given earlier for the computed peak acceleration corresponding to a 50-year exposure and 10% exceedance be used with the normalized response spectrum for a soil type S_c. Structural design based on the UBC (1997 Uniform Building Code) static force procedure calls for the following seismic parameters.

Seismic Zone Factor, Z	Soil Profile Type	Seismic Source Type	Near-Source Factor, N_a	Near-Source Factor, N_v
0.4	S_C	B	1.0	1.0

Conformance to the above criteria for seismic excitation does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur if a maximum level earthquake occurs. The primary goal of seismic design is to protect life and not to avoid all damage, since such design may be economically prohibitive.

Earthquake Effects
The intensity of ground shaking during an earthquake can result in a number of phenomena classified as ground failure, which include ground rupture due to faulting, landslides, seiches, tsunamis, liquefaction, lurching, and seismically induced settlement. Descriptions of each of these phenomenon and an assessment of each, as it affects the proposed site, are included in the following paragraphs.

Shallow Ground Rupture
Ground surface rupture occurs when movement along a fault is sufficient to cause a gap or rupture where the upper edge of the fault zone intersects that earth surface. Where associated with reverse faults, such ruptures rarely occur as single breaks or confined to a narrow zone. More commonly, ground rupture associated with reverse faulting is characterized by relatively short segments of faulting that occur over a broad area of the upper plate. In some cases, particularly in unconsolidated alluvial sediments, *ground ruptures* can develop from a number of causes not necessarily related directly to surface rupture of the causative fault. The secondary processes may include ground shaking, seismic settlement, landslides, and liquefaction.

Since there are no known active or potentially active faults passing through the site, the potential of on-site ground rupture or cracking due to shaking from local seismic events is not considered a significant hazard, although it is a possibility at any site. The potential for ground rupture due to other causes is discussed below.

Landsliding
Landslides are slope failures that occur where the horizontal seismic forces act to induce soil failure. The site is located on the State of California Seismic Hazards Map in an area not considered to be susceptible to hazards associated with earthquake-induced landslides (CDMG, 2000).

Ground Lurching
Ground lurching is defined as earthquake motion at right angles to a cliff or bluff, or more commonly to a stream bank or artificial embankment, that results in yielding of material in the direction in which it is unsupported. The initial effect is to produce a series of more or less parallel cracks separating the ground into rough blocks. These cracks are generally parallel with the top of the slope or embankment. The topography of the site does not lend itself to this type of lurching.

Lurching is also sometimes used to describe undulating surface waves in the soil that have some similarities to ground oscillation mentioned below in the section on *Liquefaction*, but generally occurs in soft, saturated, fine-grained soils during seismic excitation. When this phenomena occurs adjacent to bodies of water, lurching can continue for a short time after the seismic shaking stops. The soil conditions at this site are not typical of those associated with lurching, and we do not consider this type of lurching to be a risk at this site.

Seiches and Tsunamis
Seiches are an oscillation of the surface of an inland body of water that varies in period from a few minutes to several hours. Seismic excitations can induce such oscillations. Tsunamis are large sea waves produced by submarine earthquakes or volcanic eruptions. Since the site is not located close to an inland body of water and is

at an elevation sufficiently above sea level to be outside the zone of a tsunami runup, the risk of these two hazards is not pertinent to this site.

A Description of Liquefaction

The shear strength of soils is governed by effective stresses, which are equal to the total stresses minus the pore water pressures. In saturated, cohesionless soils, such as sands, pore water pressures tend to increase with cyclic loading, such as that caused by earthquakes. Liquefaction describes a phenomena in which cyclic stresses produced by ground shaking induce excess pore water pressures in cohesionless soils about equal to the total stresses, resulting in near zero shear strength in the soil when the soil behaves as a viscous fluid. Liquefied soils may thereby acquire a high degree of mobility leading to damaging deformations. Liquefaction susceptibility under a given earthquake is related to the gradation and relative density characteristics of the soil, the in-situ stresses prior to ground motion, and the depth to the water table, as well as other factors.

As a general rule, a site is susceptible to liquefaction if it meets the following four conditions:

a. A potential to be affected by seismic activity.

b. Cohesionless are present on site. These soils typically classify as sand (SP) and (SW), silt (ML), silty sand (SM), and sandy silt (ML). Fine-grained soils, however, with less than 15% of clay sized particles, with liquid limits less than 35, and moisture contents greater than 90% of the liquid limit may be susceptible to severe strength loss.

c. Groundwater exists within 50 feet of the ground surface or a likelihood that groundwater will rise to within 50 feet of the ground surface. This includes a perched water table of significant extent.

d. Soil relative densities less than about 70%.

Liquefaction related or liquefaction-induced phenomena include *lateral spreading*, *ground oscillation*, *flow failure*, *reduction of bearing strength*, *ground fissuring*, and *sand boils*. *Lateral spreading* is the lateral movement of stiff, surficial blocks of sediments as a result of a subsurface layer liquefying. The lateral movements can cause ground fissures or extensional, open cracks at the surface as the blocks move toward a slope face, such as a stream bank or in the direction of a gentle slope. When the shaking stops, these isolated blocks of sediments come to rest in a place different from their original location and may be tilted.

Ground oscillation occurs when liquefaction occurs at depth but the slopes are too gentle to permit lateral displacement. In this case, individual blocks may separate and oscillate on a liquefied layer. Sand boils and fissures are often associated with this phenomenon.

Flow failure, a more catastrophic mode of ground failure than either lateral spreading or ground oscillation, involves large masses of liquefied sediment or blocks of intact material riding on a liquefied layer moving at high speeds over large distances. Generally flow failures are associated with ground slopes steeper than those associated with either lateral spreading or ground oscillation.

Bearing strength decreases with a decrease in effective stress. *Loss of bearing strength* occurs when the effective stresses are reduced due to the cyclic loading caused by an earthquake. Even if the soil does not liquefy, the bearing of the soil may be reduced below its value either prior to or after the earthquake. If the bearing strength is sufficiently reduced, structures supported on the sediments can settle, tilt, or even float upward in the case of lightly loaded structures such as gas pipelines.

Ground fissuring and *sand boils* are surface manifestations associated with liquefaction and lateral spreading, ground oscillation, and flow failure. As apparent from the above descriptions, the likelihood of ground fissures developing is high when lateral spreading, ground oscillations, and flow failure occur. Sand boils occur when the high pore water pressures are relieved by drainage to the surface along weak spots that may have been created by fissuring. As the water flows to the surface it can carry sediments, and if the pore water pressures are high enough create a gusher (sand boil) at the point of exit.

Evaluation of Liquefaction Potential

The State of California Seismic Hazards Map (Thousand Oaks Quadrangle, 2000) shows the site is *not* located in an area considered to be susceptible to hazards associated with liquefaction. The subject site is located within an area, which has shallow bedrock. Since all colluvium, undocumented artificial fill, and alluvium soils will be removed and replaced with compacted fill soil, the potential for liquefaction is negligible.

Settlement Due to Seismic Shaking

Granular soils, in particular, are susceptible to settlement during seismic shaking, whether the soils liquefy or not. Site processing, involving removal and recompaction of any shallow on-site soils that are loose and subject to seismically induced settlement, should effectively limit the potential for seismically induced settlement in these materials. Bedrock left in place is generally dense and hard, and is not considered to be at risk for seismically induced settlement.

Conclusions and Recommendations

Conclusions and Design Requirements

Based on the findings of our data review, subsurface exploration, laboratory testing, field testing, and engineering analysis, and within the scope of this study, the proposed development is feasible from a geotechnical engineering viewpoint, provided the recommendations in this report are incorporated into the building plans and implemented during construction. The following paragraphs discuss conditions that should be anticipated and provides specific mitigation during the design and construction phase of improvements.

Slope Setback

When located next to a descending 3(H):1(V) slope or steeper, the base of the foundation should be a minimum of 5 feet or one-third the slope height from the face of slope, whichever is greater, but need not exceed 40 feet from the face of slope. Examples of foundation ***setback requirements*** are included in Figure 2.

All future buildings must be located such that the minimum horizontal distance from the edge of the structure to the toe of any adjacent ascending slope is at least one-half the overall height of the slope. The minimum required distance is 5 feet; the maximum required distance is 20 feet.

Foundation Type

Conventional shallow spread footings with proper site preparation can be used for foundation support. Footings should be supported on compacted fill of relatively uniform thickness. Foundations for each structure should be totally founded in structural fill with a uniform thickness and a minimum thickness of 3 feet below the footings. Retaining walls and garden walls can be supported on conventional wall footings.

Plan Review

At this time, Advanced Geotechnical Services, Inc., has *not* been provided with a detailed plan of the proposed grading. When these plans become available, they should be reviewed by our office prior to submittal to regulatory agencies for approval. Additional analysis may be required at that time depending on specific details of the proposed grading. Approval by this office will be indicated by manual signature and date once our recommendations have been incorporated into the design or shown as notes on the plan.

Transition Building Pads
Both building pads have a cut and fill line crossing the footprint of the proposed building. Portions of the pad (cut and shallow fill areas) will need to be undercut and reconstructed with engineered fill to provide relatively uniform foundation support. Foundations including elevator shafts should be underlain by a minimum of 3 feet of engineered fill.

Removal Depths/ Expansion Potential
Our exploration indicated that the strength and compressibility of the soils and fill above bedrock are variable, based on visual observations and on measured moisture and dry density variations. In our opinion, these near-surface soils are not suitable in their present condition for the support of structures, without the potential for detrimental foundation movements occurring. Furthermore, the soils are highly expansive. Therefore, to mitigate these geotechnical hazards of the surficial soils, the upper soils will require removal and recompaction prior to construction of the improvements. Recommendations for minimum removal depths are given below in the section *Site Preparation.*

Groundwater
Groundwater seeps may possibly occur along the colluvium / bedrock contact and or in some of the bedrock cuts. If this condition occurs during grading operations it should be brought to our immediate attention so appropriate remedial measure can be implemented. Remedial structures may include the currently planned backdrains along the fill slope keyways heals. Additional french drains in the keyway for the fill slope located between parking areas elevations 889 and 898 feet may be necessary, and is to be determined in the field during grading.

Exploratory Excavations
The locations and dimensions of excavations completed during site exploration should be noted relative to the future grading/building plans. Although boring backfill was tamped during placement, these materials are essentially uncompacted. Removal and recompaction of these materials will be required for improvements over these excavations.

Faults/Seismicity
Although no known active faults traverse through the subject site, like most of Southern California, the site lies within a seismically active area. Earthquake resistant structural design is recommended. Designing structures to be earthquake-proof is generally considered to be impractical, especially for private projects, due to cost limitations. Significant damage to structures may be unavoidable during large earthquakes. Structural design based on the 1997 UBC (Uniform Building Code) static-force procedure calls for the seismic parameters given previously in the section *Seismic Design Criteria.* These minimum code values are intended to protect life and may not provide an acceptable level of protection against significant cosmetic damage and serious economic loss. A significantly higher than code lateral design parameter (Z coefficient) would be necessary to further reduce potential economic loss during a major seismic event. Structural engineers, however, often regard higher than code values as impractical for use in structural design. The structural engineer and project owner must decide what level of risk is acceptable and to assign appropriate seismic values for use in structural design.

The site is not considered to be susceptible to liquefaction or seismically induced settlement, as mentioned previously. The risk of damage to the proposed structures, however, due to a large earthquake cannot be totally eliminated, and obtaining appropriate insurance as a mitigation measure is strongly recommended.

Settlement/Hydroconsolidation
In addition to the movement due to seismic shaking, foundation movement will result from (1) the anticipated live and dead loads of the structure (2) the settlement of the fill, and (3) swell or hydroconsolidation if moisture changes occur within the supporting soils. Settlement is expected to be less than one inch for a 24-inch-wide wall footing with the anticipated live and dead loads and designed in accordance with the recommendations in this report. Additional foundation movements due to the weight of any fill or to fill swell (expansion) is expected to be negligible if the recommendations in this report are followed. With the removal and recompaction requirements, the new fill is not considered at risk for hydroconsolidation. The amount of differential movement, including seismically induced, between columns or adjacent footings due to the above causes and with mitigation measures included herein is expected to be less than 0.75 inches.

Cut Slopes
Cut-slopes are proposed at a gradient of 2(H):1(V) and to a maximum height of about 18 feet. These slopes are expected to expose minor amounts of colluvium over bedrock of the Upper Topanga Formation. Bedrock bedding is oriented favorably with respect to the proposed cut slope. This slope is considered acceptable as designed, provided any colluvium encountered on the slope is removed and recompacted.

Fill Slopes
Fill slopes are proposed at slope gradients of 2(H):1(V), to a maximum anticipated height of less than 14 feet. The slopes should perform well as designed, provided that our recommendations are followed. The proposed fill slope must be founded on a keyway of bedrock. The keyway should be a minimum of 15 feet in width, dipped into the hill, and be at least 5 feet beyond the proposed toe of slope. The proposed slope located between pad elevations of 875 and 889 is a fill over cut slope. Anticipated removal depths to competent bedrock materials will alter this slope into a fill slope condition. The keyway for this slope should be constructed as described above.

Additional comments for construction of fill slopes are contained in the section *Site Preparation.*

Drainage
All surface runoff must be carefully controlled and must remain a crucial element of site maintenance. Proper drainage and irrigation are important to reduce the potential for damaging ground/foundation movements due to hydroconsolidation and soil expansion or shrinkage. Final grading shall provide a positive drainage away from footings in compliance with the local jurisdiction's grading requirements or a minimum gradient of 3%, whichever is greater, for a distance of at least 6 feet away from the structure for soil covered areas to reduce the risk of water ponding adjacent to the foundation. For areas abutting the structure covered with concrete for a distance of at least 6 feet away from the structure, a minimum gradient of 0.5% is acceptable. All pad drainage shall be collected and diverted away from proposed buildings in non-erosive devices. Gutters and roof drains should be provided, properly maintained, and discharge directly into glue-joined, watertight subsurface piping. A drainage system consisting of area drains, catch basins, and connecting lines should be provided to capture landscape/hardscape sheet flow discharge water. All drainage piping should be watertight and discharge directly to the street or storm drain.

In the case of building walls retaining landscaping areas, a water proofing system should be used on the wall and joints, and a Miradrain drainage panel, or similar, should be placed over the water proofing. A perforated subdrain pipe of schedule 40 or better should be installed at the base of the wall below the floor slab and drained to the storm drain or curb. *Accordion* type pipe is not acceptable.

All underground plumbing fixtures should be absolutely leak free. As part of the maintenance program, utility lines should be checked for leaks for early detection of water infiltrating the soils that could cause detrimental soil movements. Detected leaks should be promptly repaired. Proper drainage shall also be provided away from the building footings during construction. This is especially important when construction takes place during the rainy season.

Seepage of surface irrigation water or the spread of extensive root systems into the subgrade of footings, slabs, or pavements can cause differential movements and consequent distress in these structural elements. Trees and large shrubbery should not be planted so that roots grow under foundations and flatwork when they reach maturity. Landscaping planters immediately adjacent to structures or paved areas should not be used due to the potential for surface irrigation water to infiltrate either the foundation's subgrade or the pavement's subgrade and base course. Either drains to collect and transmit excess irrigation water to drainage structures, or impervious, above-grade or below-grade planter boxes with solid bottoms and a drainage pipe away from the structure should be used for plantings adjacent to structures. Where landscaping is planned adjacent to pavements, either a cut-off wall should be provided along the edge of the pavement or slab that extends at least 12 inches below the subgrade soil or the area should be lined with a ten-mil (or thicker) plastic moisture barrier. The walls of the moisture barrier should be near vertical and the area should be marked with warning tape to reduce the likelihood of the lining being torn by future digging. Seams of the moisture barrier should be overlapped and sealed. Where pipes extend through the vapor barrier, the barrier should be sealed to the pipes. Tears or punctures in the moisture barrier should be completely repaired prior to placement of concrete. Landscaping should be planned with consideration for these potential problems.

Drainage systems should be well maintained, and care should be taken to not over or under irrigate the site. Landscape watering should be held to a minimum while maintaining a uniformly moist condition without allowing the soil to dry out. During extreme hot and dry periods, adequate watering may be necessary to keep soil from separating or pulling back from the foundations. Cracks in paved surfaces should be sealed to limit infiltration of surface waters.

Corrosion Protection

Corrosion of concrete due to sulfate attack is anticipated when the concentration of sulfates is in excess of 1000 ppm in the near-surface soils. Concrete specifications should conform, as a minimum, to UBC requirements (Section 19, Table 19-A-4) for concrete exposed to sulfate. Since the measured sulfate concentrations exceed 1000 ppm, sulfate resistant concrete should be used.

If piping or concrete are placed in contact with deeper soils or structural fill using deeper soils, additional tests should be performed also to evaluate their corrosion potential. A detailed study of soil corrosivity was beyond the scope of this study. A corrosion engineer can be consulted to provide a more detailed evaluation of corrosion potential, including the corrosion potential of soils to metal objects and to other potential sources, such as stray currents and groundwater.

Additional Recommendations

The following additional geotechnical recommendations for site preparation, foundation and retaining wall design, and slabs-on-grade should be incorporated into final design and construction practice. All such work and design should be in conformance with local governmental regulations or the recommendations contained herein, whichever is more restrictive.

Site Preparation

Based on available information, we understand that the cuts of up to 18 feet, and fills of up to 14 feet are proposed. Building pads should be prepared so that each structure is totally founded in structural fill with a relatively uniform thickness. General guidelines are presented below to provide a basis for quality control during site grading. We recommend that all structural fills be placed and compacted with engineering control under continuous observation and testing by the Geotechnical Engineer and in accordance with the following requirements.

a. Remove all brush, vegetation, loose soil, and other deleterious materials prior to fill placement. The general depth of stripping should be sufficiently deep to remove the root systems and organic topsoils. A careful search shall be made for subsurface trash, abandoned masonry, and other debris during grading. All such materials, which are not acceptable fill material, shall be removed prior to fill placement. The removal of trees and large shrubs should include complete removal of their root structures.

b. In areas of proposed development, all fill, colluvium, and alluvial soils should be removed to competent bedrock materials, and placed where proposed as compact fill material. Portions of the upper most and lower most parking lots have a cut/fill transition. All colluvium along this transition line should be removed to competent bedrock material and replaced with compacted fill soils to planned grades.

c. The exposed bottom of removal areas should be scarified, mixed, and moisture conditioned to a minimum depth of 8 inches. This thickness of scarification is included in the thickness of removal and recompaction mentioned above, unless the bottom is unstable and requires stabilization as discussed below. The scarified soil should be moisture conditioned to at least 3% but no more than 5% above optimum and compacted to a minimum 90% of the laboratory maximum dry density as determined by ASTM D1557 for soils with more than 15% fines and a minimum relative compaction of 95% for soils with 15% or less fines. Additional lifts should not be placed until the present lift has been tested and shown to meet the compaction requirements.

d. To reduce the risk of differential foundation movements, we recommend that all footings be supported structural fill where the thickness of structural fill beneath the footings and slab area each be relatively uniform.

e. The removals can be limited to the proposed building, pavement, and fill areas but should extend a distance not less than 10 feet outside the slab-on-grade areas or fill limits, and 5 feet outside pavement areas, except in situations where a physical constraint, such as a property line or adjacent structure, would prevent such removals from being made. Removal limits for footings of buildings or accessory structures (e.g., garden walls) need only extend beyond the hardscape footprint a distance equal to the removal depth below the footing. A careful search shall be made for deeper loose soil spots during grading operations. If encountered, these loose spots should be properly removed to the firm underlying soil and properly backfilled and compacted as directed by a representative of the Project Geotechnical Engineer. If the excavation to remove existing subsurface structures, pipelines, and loose fill soils extends below the minimum recommended depth of over-excavation, we recommend that all subsurface structures, utility lines, and uncontrolled fill extending below the over-excavation depth be removed to expose undisturbed, native soils across the entire building pad.

f. The lateral limits and the depths of the removals should be shown by the Civil Engineer on the grading plans.

g. All fill materials should be placed in controlled, horizontal layers not exceeding 6 to 8 inches thick and moisture conditioned to at least 3% but no more than 5% above optimum. Fill materials with more than 15% fines should be compacted to a minimum 90% of the laboratory maximum dry density, as determined by ASTM D1557, and fill materials with

15% or less fines should be compacted to a minimum relative compaction of 95%. If either the moisture content or relative compaction does not meet these criteria, the Contractor should rework the fill until it does meet the criteria. If the fill materials pump (flex) under the weight of construction equipment, difficulties in obtaining the required minimum compaction may be experienced. Therefore, if soil pumping occurs, it may be necessary to control the moisture content to a closer tolerance (e.g., 3 to 4% above optimum).

h. If construction delays or the weather result in the surface of the fill drying, the surface should be scarified and moisture conditioned before the next layer of fill is added. Each new layer of fill should be placed on a rough surface so planes of weakness are not created in the fill.

i. The soils beneath slabs and footings, however, should be moisture conditioned to at least 4 but no more than 5 percent above optimum moisture content to a depth of 36 inches below the lowest adjacent, final grade. During foundation construction, including any concrete flatwork, construction sequences should be scheduled to reduce the time interval between subgrade preparation and concrete placement to avoid drying and cracking of the subgrade or the surface should be covered or periodically wetted to prevent drying and cracking.

j. Subgrade for the support of pavement sections should be moisture conditioned, as required, to obtain a moisture content at least 3% but no more than 4% above optimum, and recompacted to at least 95% of the maximum dry density to a depth of at least 12 inches.

k. The excavated site soils, cleaned of deleterious material, can be re-used for fill. Rock larger than 6 inches should not be buried or placed in compacted fill. Rock fragments less than 6 inches may be used provided the fragments are not be placed in concentrated pockets or within 3 feet of final grade, and a sufficient percentage of finer grained material surrounds and infiltrates the rock voids. Furthermore, the placement of any rock must be under the continuous observation of the Geotechnical Engineer.

l. Each layer of fill under the building area within the upper 48 inches of the finished pad grade should be of similar composition to provide a relatively uniform expansion index beneath the building. Selective grading should be performed to either place the more expansive soils in the deeper portion of the fill or to mix the more expansive soils with less expansive soils.

m. Representative samples of material to be used as compacted fill should be analyzed in the laboratory by the Geotechnical Engineer to determine the physical properties of the materials. If any materials other than that previously tested is encountered during grading, the appropriate analysis of this material should be conducted by the Geotechnical Engineer as soon as practicable. The Geotechnical Engineer or their representative prior to placement should approve any soil imported from off-site sources. Imported material should preferably have less than 15% by weight passing the number 200 sieve, a maximum plasticity index of 10, and a liquid limit less than 25.

n. Proposed fill slopes must be founded on a keyway of competent bedrock approved by the Geotechnical Engineer. The keyway shall be a minimum of 15 feet in width, dipped into the hill, and be at least 5 feet beyond the proposed toe of slope, unless a property line is within the five feet. The fill slope should be benched into the existing slope. Figure 3 shows keyway, benching, and drainage details.

o. Fill slopes shall be constructed by placing fill soil a sufficient distance beyond the proposed finished slope to allow compaction equipment to operate at the outer surface limits of the final slope surface. The excess fill shall be cut back to finished grade.

p. The grading contractor has the ultimate responsibility to achieve uniform compaction in accordance with the geotechnical report and grading specifications.

q. All grading work shall be observed and tested by the Project Geotechnical Engineer or their representative to confirm proper site preparation, excavation, scarification, compaction of on-site soil, selection of satisfactory fill materials, and placement and compaction of fill. All removal areas and footing excavations shall be observed by the representative of the Project Geotechnical Engineer before any fill or steel is placed. A half-size set of approved plans should be provided to the Project Geotechnical Engineer prior to site grading, and a full-size set of signed and approved plans should be available on-site for review.

Utility Trench Backfill

The on-site soils are suitable for backfill of utility trenches from one foot above the top of the pipe to the surface, provided the material is free of organic matter and deleterious substances. The natural soils should provide a firm foundation for site utilities, but any soft or unstable material encountered at pipe invert should be removed and replaced with an adequate bedding material.

The site Civil Engineer in accordance with manufacturer's requirements should specify the type of bedding materials. If the on-site soils are not compatible with the pipe manufacturer's requirements, suitable nonexpansive, granular soils may need to be imported for bedding or shading of utilities. Jetting of bedding materials should not be permitted unless appropriate drainage is provided and the bedding has a sand equivalent greater than 50.

Trench backfill should be placed in 8-inch lifts, moisture conditioned to at least 2% but no more than 5% above the optimum moisture content, and compacted to at least 90% of the maximum density as determined by ASTM D1557, with the exception of the one foot below subgrade in areas to be paved, which should be compacted to 95% of the maximum dry density. If the contractor can demonstrate minimum compaction requirements can be achieved with thicker lifts, the acceptable lift thickness may be increased. Jetting of trench backfill is not acceptable to compact the backfill.

In areas where utility trenches pass through an existing pavement, the trench width at the surface shall be enlarged a minimum of 6 inches on each side to provide bearing on undisturbed material for the new base and paving section to match the existing section.

Major underground utilities shall not cross beneath buildings unless specifically approved by the Project Civil Engineer and respective utility company. If approved, trenches crossing building areas shall be backfilled with a select gravelly sand compacted to 95% relative compaction and at a moisture content at least 2% but no more than 4% above optimum moisture.

Temporary Excavations

Temporary excavations of 5 feet or less in height in on-site soils may not require any special shoring. Vertical excavations more than 5 feet deep, if necessary, will, however, require conventional shoring per CAL/OSHA Regulations, or the excavation may be laid back with a 1(H):1(V) gradient. Excavations should not be allowed to become soaked with water or to dry out. Surcharge loads should not be permitted within a horizontal distance equal to the height of the excavation from the top of the excavation, unless the excavation is properly shored.

Excavations that might extend below an imaginary plane inclined at 45 degrees below the edge of an existing foundation should be properly shored to maintain foundation support of the existing structure.

Shallow Foundations
The following foundation recommendations may be used for structures supported by shallow footings, subject to the guidelines mentioned earlier in the section *Site Preparation* and the settlement criterion given earlier.

a. Exterior footings should have a minimum embedment depth of 27 inches, and interior footings should have a minimum embedment depth of 24 inches. These depths are below the lowest adjacent, final grade. Where located adjacent to utility trenches, footings should extend below a one-to-one plane projected upward from the inside bottom of the trench.

b. When located next to a descending 3(H):1(V) slope or steeper, the base of the footing should be a minimum of 5 feet or one-third the slope height from the face of slope, whichever is greater, but need not exceed 40 feet from the face of slope. Examples of foundation ***setback requirements*** are included in Figure 2.

c. Continuous footings should have a minimum width of 18 inches. Isolated or spread footings should have a minimum width of 18 inches. Due to the expansive nature of the soils, we recommend that footings meet the minimum requirements, but be no wider than required by the allowable bearing pressures given below.

d. An allowable gross vertical soil bearing pressure of 2000 psf, including dead and live loads, may be used for footings founded on compacted fill at the minimum required embedment depths, provided the footing width equals or exceeds the recommended minimum. This allowable bearing value includes a safety factor of 3 or more.

e. The bearing capacity can be increased by one-third when considering short duration wind or seismic loads.

f. Footings should be reinforced. Structural details of the footings, such as footing thickness, concrete strength, and amount of reinforcement, should be established by your structural engineer and, as a minimum, be in accordance with requirements of an expansion index category of high (91-130). If the soil type encountered during grading differs from the specimen tested during this study, expansion index tests should be performed at the time of grading to confirm the conditions on which these recommendations are based.

g. For design, resistance to lateral loads can be assumed to be provided by friction along the base of the foundation and by passive earth pressures on the side of the footing. An allowable friction coefficient of 0.35 may be used with the vertical dead loads, and an allowable lateral passive pressure of 200 psf per foot of depth, with a maximum of 2000 psf, can be utilized for the sides of footings poured against recompacted soil to resist lateral loads. These allowable values can be increased by a factor of 1.5 to convert from allowable to ultimate values.

h. Prior to placing concrete in the footing excavations, an observation should be made by the representative of the Project Geotechnical Engineer to confirm that the footing excavations are free of loose and disturbed soils and are embedded in the recommended earth materials.

Slab-On-Grade

If earthwork operations are conducted such that the construction sequence is not continuous or if construction operations disturb the surface soils, we recommend that the exposed subgrade to support concrete slabs be tested to verify adequate compaction and moisture conditions. If adequate compaction and moisture conditions are not demonstrated, the disturbed subgrade should be over-excavated, scarified, and recompacted in accordance with the guidelines in *Site Preparation.*

We recommend that concrete slabs be reinforced. The structural details, such as (1) slab thickness, (2) concrete strength, (3) type, amount, and placement of reinforcing, (4) structural connection between slab and footings, and (5) joint spacing, should be established by your structural engineer and, as a minimum, be in accordance with the requirements of an expansion index category of high (91-130). The perimeter edge of exterior concrete slabs should be extended a minimum of 8 inches below the bottom of the slab and have a minimum width of 6 inches due to the expansive nature of the soils.

We recommend that a ten-mil (or thicker) plastic vapor barrier be used under floor slabs in moisture sensitive areas. The placement of the vapor barrier should be selected by either your civil engineer or structural engineer giving consideration to the factors discussed in ASTM E1643. In those areas where a moisture barrier is not used, a 4-inch thick sand layer should be placed beneath the slab. The sand should be classified as a *clean sand* (with less than 5% fines in accordance with ASTM D2488). Seams of the vapor barrier should be overlapped and sealed. Where pipes extend through the vapor barrier, the barrier should be sealed to the pipes. Tears or punctures in the moisture barrier should be completely repaired prior to placement of concrete.

Due to the lightly loaded areas of exterior walkways and patio areas, even soils with low expansion characteristics can lift such flatwork. This lifting will likely vary over the area covered by the flatwork, causing differential slab movements that could result in either a safety hazard or outwardly opening doors hanging up on elevated walkways that abut the structure. Therefore, we recommend that exterior walkways and patio areas abutting the structure where doors open outward with little vertical clearance be doweled into the structure at entrances and at joints to prevent differential movement of such flatwork due to soil expansion.

Cracking of concrete flatwork can occur and is relatively common. Reinforcement and crack control joints are intended to reduce the risk of concrete slab cracking. If cracks develop in concrete slabs during construction (for example, due to shrinkage), your structural engineer should evaluate the integrity of the slab. Also, concrete slabs are generally not perfectly level, but they should be within tolerances included in the project specifications.

Tile flooring can crack, reflecting cracks in the underlying concrete slab. Therefore, if tile flooring is used, the slab designer should consider additional steel reinforcement, above minimum requirements, in the design of concrete slab-on-grade where tile will be installed. Furthermore, the tile installer should consider installation methods, such as using a vinyl crack isolation membrane between the tile and concrete slab, to reduce the potential for tile cracking.

Retaining Wall Design Criteria

Foundations for retaining walls can be designed in accordance with the sections, *Site Preparation* and *Shallow Foundations*.

The earth pressure behind any buried wall depends on the allowable wall movement, type of backfill materials, backfill slopes, wall inclination, surcharges, any hydrostatic pressures, and compaction effort. The following equivalent fluid pressures are recommended for vertical walls with no hydrostatic pressure, no surcharge, no seismic effects, and a backfill slope with a gradient less (flatter) than 5(H):1(V).

Wall Movement	Equivalent Fluid Unit Weight, pcf			
	Clean Sand or Gravel Backfill (GW, GP, SW, SP)	Silty Gravel Backfill (GM, GM-GP, SM-SP)	Clayey Sand, Clayey Gravel Backfill (SC, SG)	Silts, Clays, Silty Fine Sand Backfill (CL, ML, SM)
Free to Deflect	30	40	45	65
Restrained	45	60	70	90

In areas where the backslopes are steeper than 5(H):1(V), the equivalent unit weights in the above table should be increased by 13 pcf for gradients of 2(H):1(V) and 30 pcf for gradients of 1.5(H):1(V).

The above values are applicable for backfill placed between the wall stem and an imaginary plane rising at a 45-degree angle from below the edge (heel) of the wall footing. If the on-site soil is used as backfill within this zone, the equivalent fluid unit weight associated with a soil classification of CL should be used.

The surcharging effect of anticipated adjacent loads on the wall backfill due to traffic, footings, or other loads, should be included in the wall design. The magnitude of lateral load due to surcharging depends on the magnitude of the surcharge, the size of the surcharge loaded area, the distance of the surcharge from the wall, and the restraint of the wall. We can provide assistance in evaluating the effects of surcharge loading and seismic loading, if desired, once details are known and provided.

Except for the upper two feet, the soil immediately adjacent to backfilled retaining walls should be free-draining filter material (such as Caltrans Class 2 permeable material) with a minimum horizontal distance of two feet. Weep holes and/or drainpipes, as appropriate, should be installed at the base of these walls. In lieu of filter material, crushed stone protected from clogging with the use of synthetic fabric between the natural soil and the gravel may be used. Subdrain pipe material should consist of a minimum 4-inch-diameter perforated PVC pipe meeting ASTM D2729 or better. *Accordion* or similar type pipe is not acceptable for subdrain pipe. The top two feet should be backfilled with less permeable compacted fill to reduce infiltration. A concrete-lined V-shaped drainage swale should be constructed behind retaining walls with ascending backslopes to intercept runoff and debris. Figure 4 shows typical drainage details for retaining walls. Waterproofing exterior retaining walls should be considered to mitigate the potential for efflorescence on the face of the walls.

During grading and backfilling operations adjacent to any wall, heavy equipment should not be allowed to operate within 5 feet laterally of the wall or within a lateral distance equal to the wall height, whichever is greater, to avoid developing excessive lateral pressures. Within this zone, only hand-operated equipment should be used to compact the backfill soils.

The retaining wall backfill should be benched into the backcut where the backcut is sloped less than (flatter) 0.75(H):1.0(V).

Decking that caps a retaining wall should be provided with a flexible joint to allow for the normal 1 to 2% deflection of the retaining wall. Decking that does not cap a retaining wall should not be tied to the wall. The spacing between the wall and deck will require periodic caulking to prevent water intrusion into the retaining wall backfill.

Pavement Structural Section

All areas to be paved should be graded in accordance with the general recommendation for site grading as described in the section *Site Preparation.* Prior to placing base or subbase materials, the subgrade should be scarified to a depth of at least 12 inches, moisture conditioned as required to obtain a moisture content of at least 2% but no more than 4% above optimum, and recompacted to at least 95% of the maximum dry density, if test results show that these moisture and compaction requirements do not exist just prior to placing base or subbase materials. The subgrade should be proof-rolled to check for soft spots.

Structural section calculations were performed for asphalt concrete pavement design for a range in traffic indices. Selection of the appropriate traffic index to use should be made by your Civil Engineer based on their knowledge of traffic flow and loadings, but typically a TI of 4.5 is associated with average residential streets, a TI of 5 is associated with parking lots with no more than one commercial truck or bus per day and with residential collector streets, a TI of 6 is associated with major primary collectors providing traffic movement between minor collectors and major arterials, and a TI of 6.5 is associated with driveways with no more than four commercial trucks or buses per day.

The structural sections for asphalt concrete pavement were computed in general accordance with the Caltrans method (**California Department of Transportation Highway Design Manual, Fourth Edition, Updated February 13, 1995**). The results of the analyses, using an *R*-value of 15, are summarized below:

Traffic Index	Thickness, Inches	
	Asphalt Concrete	Aggregate Base
4.5	3.0	6.6
5.0	3.0	9.0
6.0	3.0	12.6
6.5	3.6	13.2

The base material should extend beneath curbs and gutters. Compaction tests will be required for the recommended asphalt concrete and aggregate base. A minimum relative compaction of 95 percent is required for the asphalt concrete, aggregate base, and upper 12 inches of subgrade soils. The aggregate base should have a minimum *R*-value of 78 and meet Caltrans Class II specifications. Asphalt should not be placed if the base is pumping. The recommendations in the section *Drainage* should be strictly adhered to due to the highly expansive characteristics of the soils.

Considering the higher pavement stresses in trash enclosure loading zones or other areas subject to extensive wheel turning, we recommend that a concrete pavement section be used in these areas. The pavement section in this case should consist of a 4-inch thick Caltrans Class 2 base layer, a 6-inch thick, reinforced concrete layer with the concrete having a minimum 28-day compressive strength of 3000 psi. The minimum amount of reinforcement should consist of #4 bars at 18-inch spacing each way and suspended in the middle of the slab with chairs or other approved devices.

Actual pavement subgrade materials may differ from those tested for this study due to unanticipated grading, soil variability, or soil import. Therefore, tests may need to be performed on the actual subgrade materials to confirm the *R*-values used to compute the above structural sections.

Pavement section design assumes that proper maintenance practices, such as sealing and repair of localized areas of distress, are employed throughout the design life of the pavement. Since the on-site soils are highly expansive, proper drainage and irrigation control will be critical to the successful performance of the pavement. Even so, it is likely that the pavement will experience distress due to the expansive soils, but periodic repairs may be more cost-effective than replacing the expansive soils with non-expansive soils.

Observations and Testing

Prior to the start of site preparation and/or construction, we recommend that a meeting be held with the contractor to discuss the project. We recommend that Advanced Geotechnical Services, Inc., be retained to perform the following tasks prior to and/or during construction.

a. Review grading, foundation, and drainage plans to verify that the recommendations contained in this report have been properly interpreted and are incorporated into the project specifications. If we are not accorded the opportunity to review these documents, we can take no responsibility for misinterpretation of our conclusions and recommendations.

b. Observe and advise during all grading activities, including site preparation, foundation and retaining wall excavation, and placement of fill, to confirm that suitable fill soils are placed upon competent material and to allow design changes if subsurface conditions differ from those anticipated prior to the start of construction.

c. Observe the installation of all drainage devices.

d. Test all fill placed for engineering purposes to confirm that suitable fill materials are used and properly compacted.

Limits and Liability

All building sites are subject to elements of risk that cannot be wholly identified and/or entirely eliminated. Building sites are subject to many detrimental geotechnical hazards, including but not limited to the effects of water infiltration, erosion, concentrated drainage, total settlement, differential settlement, expansive soil movement, seismic shaking, fault rupture, landsliding, and slope creep. The risks from these hazards can be reduced by employing subsurface exploration, laboratory testing, analyses, and experienced geotechnical judgment. Many geotechnical hazards, however, are highly dependent on the property owner properly maintaining the site, drainage facilities, and slope and by correcting any deficiencies found during occupancy of the property. Even with a thorough subsurface exploration and testing program, significant variability between test locations and between sample intervals may exist. Ultimately, geotechnical recommendations are based on the experience and judgment of the geotechnical professionals in evaluating the available data from site observations, subsurface exploration, and laboratory tests. Latent defects can be concealed by earth materials, deposition, geologic history, and existing improvements. If such defects are present, they are beyond the evaluation of the geotechnical professionals. No warranty, expressed or implied, is made or intended in connection with this report, by furnishing of this report, or by any other oral or written statement. Owners and developers are responsible for retaining appropriate design professionals and qualified contractors in developing their property and for properly maintaining the property. Retaining the services of a geotechnical consultant should not be construed to relieve the owner, developer, or contractors of their responsibilities or liabilities.

The analysis and recommendations submitted in this report are based in part on our subsurface exploration, laboratory testing, site observations, and provided data on geology and the proposed site development. Our descriptions and the boring logs may show distinctions between fill and native soils, between native (e.g., alluvium, colluvium, slopewash) and bedrock formation, and between soil type (e.g., sands and silty sands). Such distinctions were based on geologic information, grading plans when available, intermittent recovered soil/bedrock samples, and judgment. Delineations between these categories of materials may not be perfect and may be subject to change as more information becomes available. For example, judgments may be clouded when recovered samples are intermittent and small in comparison to the volume of soil under study, and macrostructure that would aid the identification process are not as apparent as they would be when the borehole is geologically downhole logged by entering the excavation. When the age of the fill is old, the difference between the structure of the fill and native may be less pronounced, or the degree of bedrock formation weathering sometimes makes it difficult to distinguish between overlying alluvium, colluvium, or slopewash and bedrock formation. In general, our recommendations are based more on the properties of the materials than on the category of the material type such as fill, alluvium, colluvium, slopewash, or bedrock formation. Furthermore, the actual stratigraphy may be more variable than shown on the logs.

This report is not intended for use as a bid document. Any person using this report for bidding or construction purposes should perform such independent investigation as they deem necessary to satisfy themselves as to the surface and subsurface conditions to be encountered. The nature and extent of variations in subsurface conditions may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

Although this report may comment or discuss construction techniques or procedures for the design engineer's guidance, this report should not be interpreted to prescribe or dictate construction procedures or to relieve the contractor in any way of their responsibility for the construction.

Please be aware that the contract fee for our services to prepare this report does not include additional work that may be required, such as grading observation and testing, footing observations, plan review, or responses to governmental (regulatory) plan reviews associated with you obtaining a building permit. Where additional services are requested or required, you will be billed for any equipment costs and on an hourly basis for consultation or analysis.

The geotechnical engineer's actual scope of work during construction is very limited and does not assume the day-to-day physical direction of the work, minute examination of the elements, or responsibility for the safety of the contractor's workers. Our scope of services during construction consists of taking soil tests and making visual observations, sometimes on only an intermittent basis, relating to earthwork or foundation excavations for the project. We do not guarantee the contractor's performance, but rather look for general conformance to the intent of the plans and geotechnical report. Any discrepancy noted by us regarding earthwork or foundations will be referred to the owner, project engineer, architect, or contractor for action.

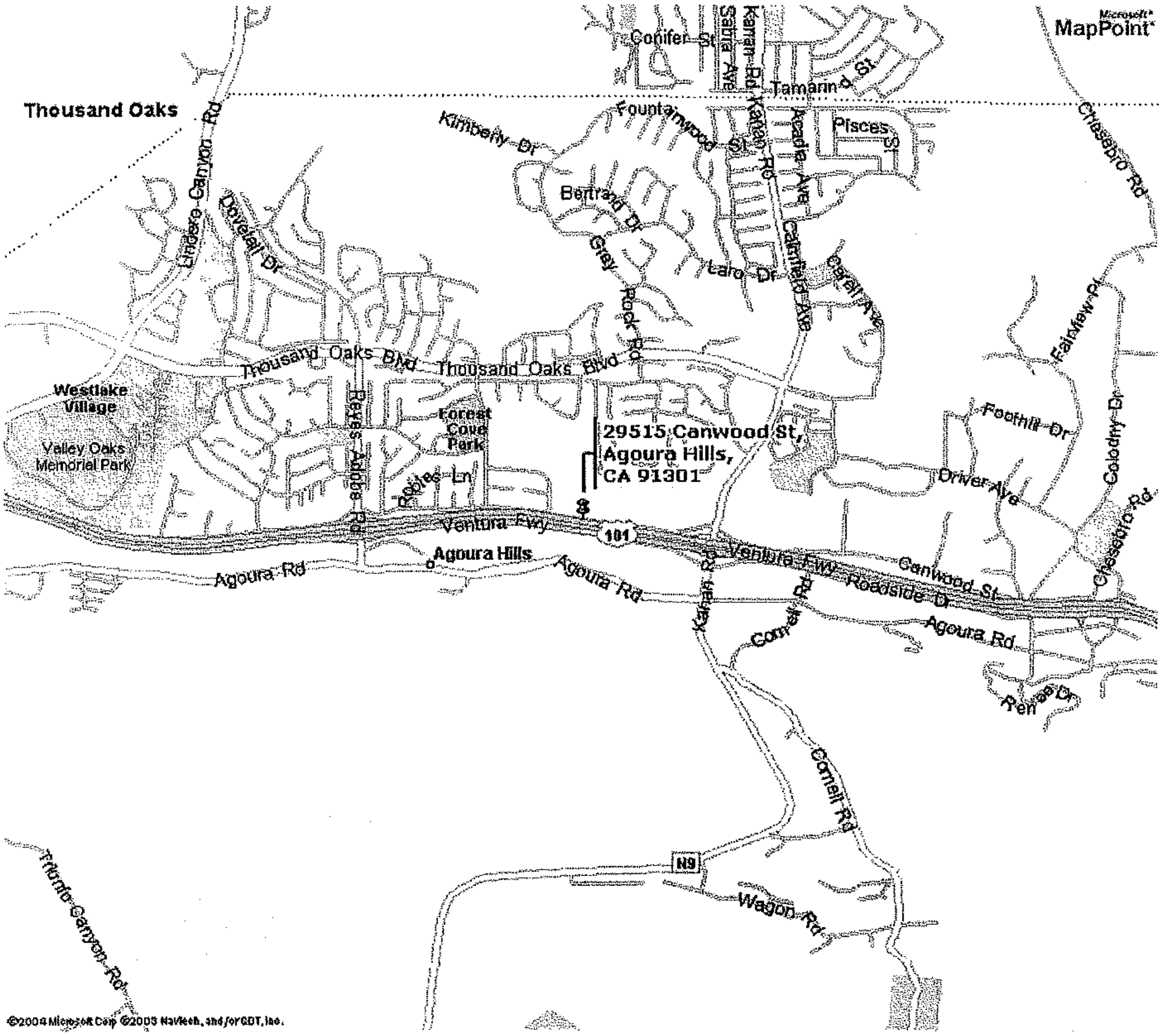
This report is issued with the understanding that it is the responsibility of the Owner, or of their representative, to ensure that the information and recommendations contained herein are called to the attention of the Architect and Engineers for the project and incorporated into the plan and that the necessary steps are taken to see that the Contractor carry out such recommendations in the field. Advanced Geotechnical Services, Inc., has prepared this report for the exclusive use of the Client and authorized agents, and this report should not be considered transferable. We do recommend, however, that the report be given to future property owners for the sole purpose of disclosing the report findings.

Findings of this report are valid as of the date of issuance. Changes in conditions of a property may occur with the passage of time whether attributable to natural processes or works of man on this or adjacent properties. Furthermore, changes in applicable or appropriate standards occur due, for example, to legislation and broadening of knowledge. Accordingly, findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to our review and remains valid for a maximum period of one year, unless we issue a written opinion of its continued applicability thereafter.

In the event that any changes in the nature and design (including structural loadings different from those anticipated), or other improvements are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

This report may be subject to review by controlling agencies, and any modifications they deem necessary should be made a part thereof, subject to our technical acceptance of such modifications. All submissions of this report should be in its entirety. Under no circumstances should this report be summarized and synthesized to be quoted out of context for any purpose.

Test findings and statements of professional opinion do not constitute a guarantee or warranty, and no warranties, either expressed or implied, are made as to the professional advice provided under the terms of this agreement. We have strived, however, to provide our services in accordance with generally accepted geotechnical engineering practices in this community at this time.



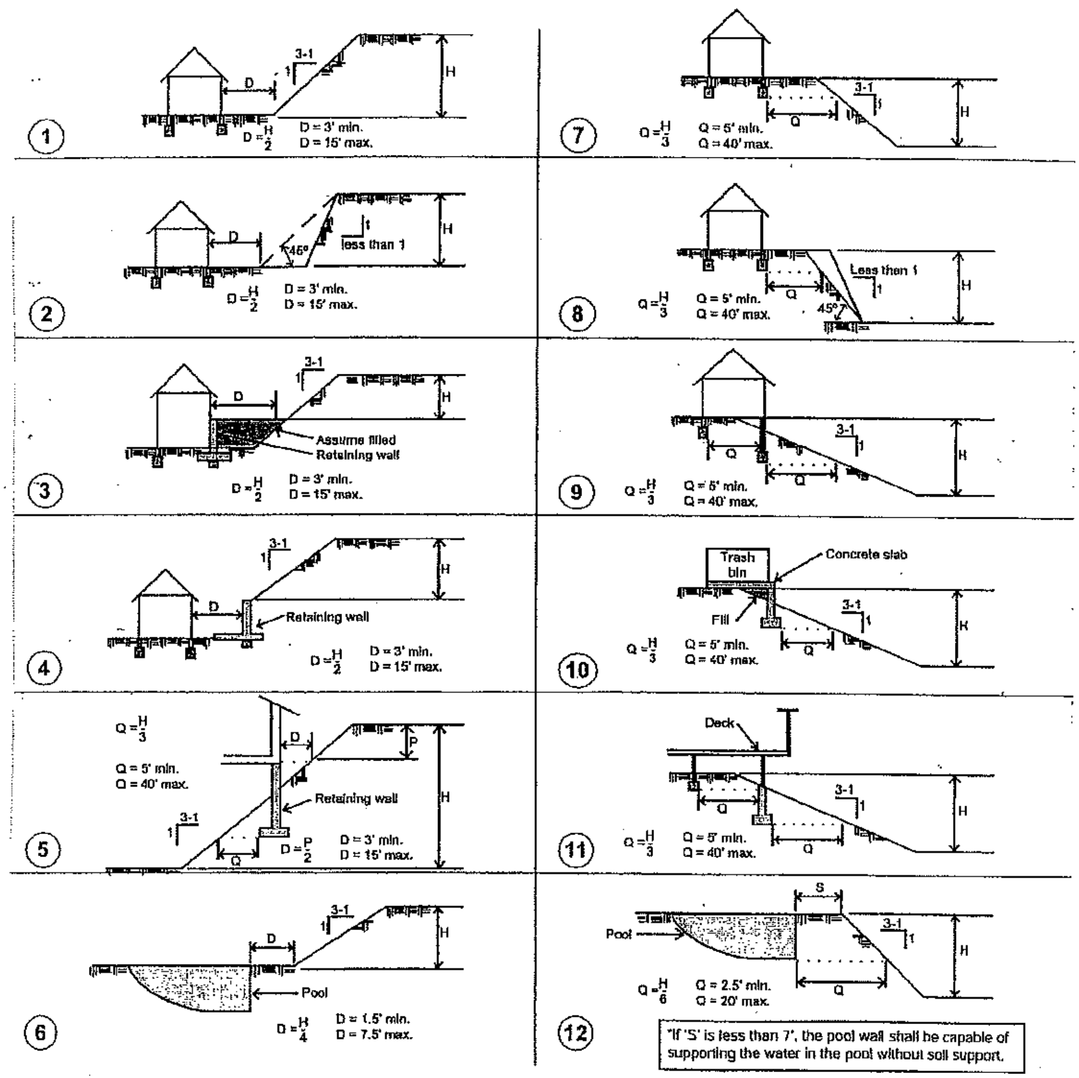
Site Location Map

29515 Canwood Street, Agoura Hills, CA

Client Number	3315	
Report Number	6583	Figure 1

FOUNDATIONS ON OR ADJACENT TO SLOPES:

The placement of building and structures on or adjacent to slopes steeper than 3 horizontal to 1 vertical shall be in accordance with the following illustrations. The provisions are intended to provide protection for the building from slope drainage, erosion and mudflow, loose slope debris, shallow slope failures, and foundation movement.



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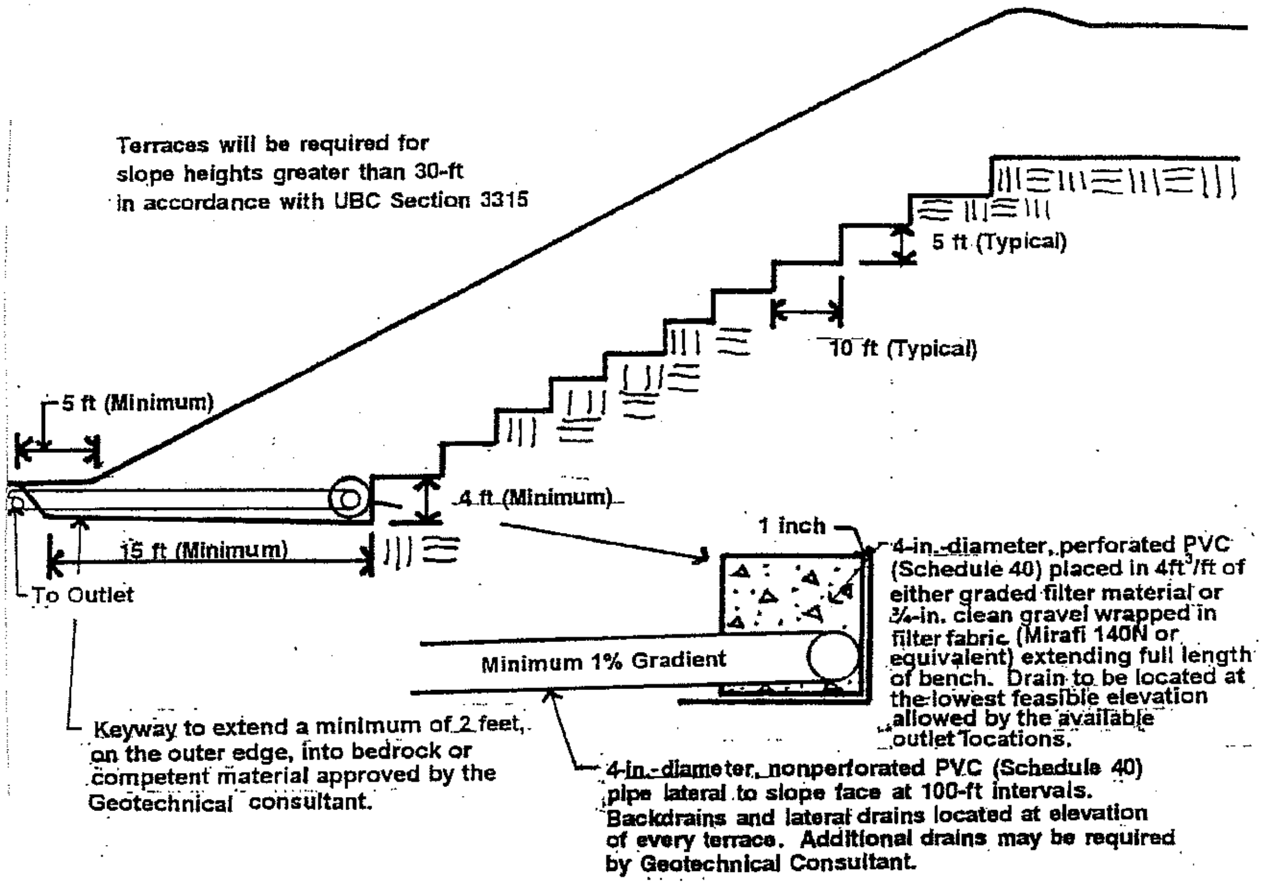
Slope Setbacks

Based on Uniform Building Code 1997 Edition Section 1806.5

Client Number	**3315**	
Report Number	**6583**	**Figure** 2



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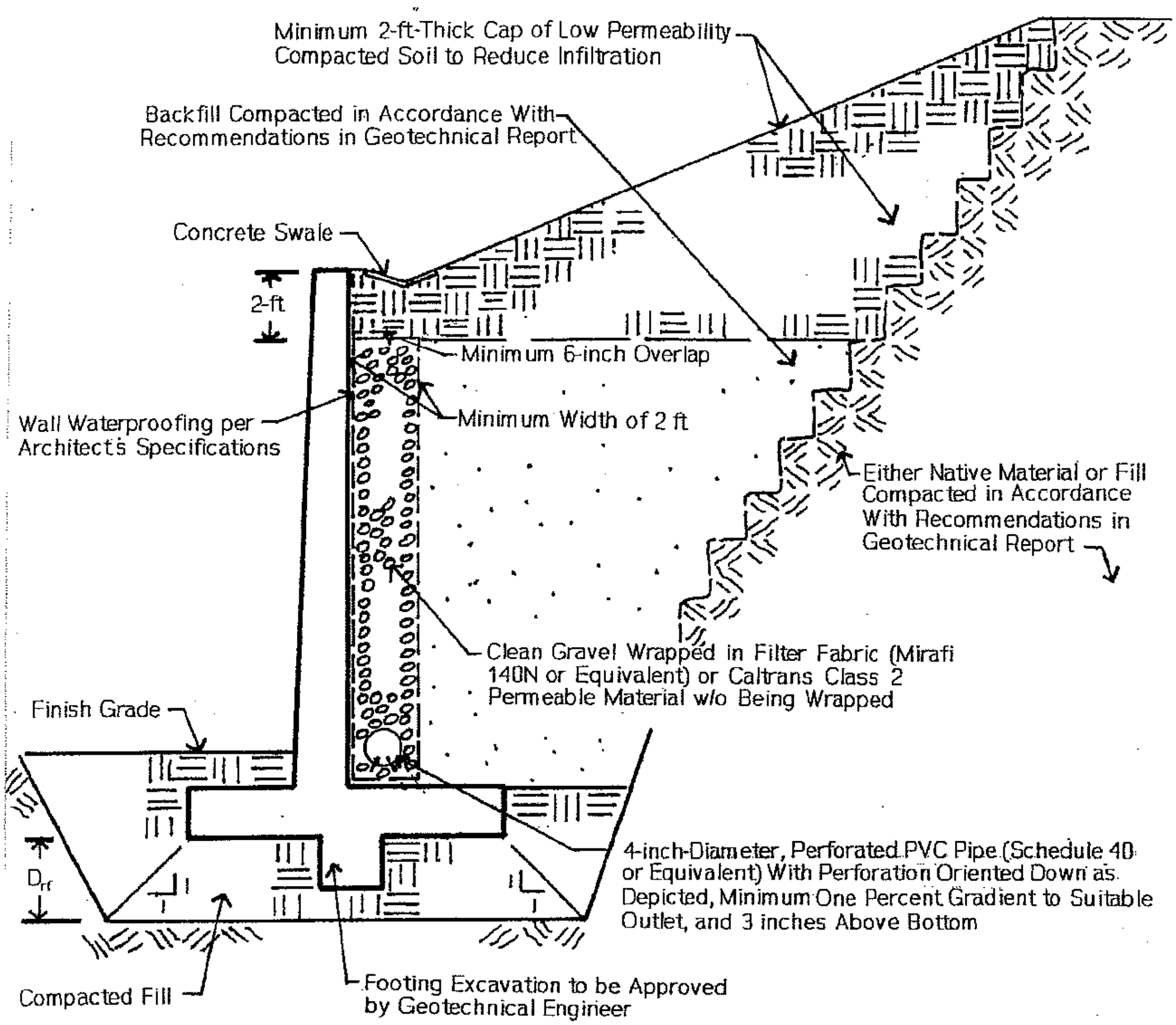
Keyway, Benching, and Drainage Details

Client Number	3315		
Report Number	6583	Figure	3



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Typical Retaining Wall Drainage Detail

Client Number	**3315**		
Report Number	**6583**	**Figure**	**4**

Appendix A

Field Exploration and Boring Logs

Appendix A
Field Exploration and Boring Logs

The field exploration included a site reconnaissance and subsurface exploration. During the site reconnaissance, the surface site conditions were noted, and the approximate locations of any exploration points were determined. The following descriptions of exploration methods are generic and may include methods not used on this project. Reference to the boring logs can be made to determine which methods are applicable to this project, and any differences between what is described below and actually occurred is described on the boring logs or in the main body of the report.

The test borings were advanced by either hand digging, digging with a backhoe, or drilling. In the case of drilling, a truck-mounted rotary drilling rig with a hollow-stem auger or bucket was used to advance the borings. When we expect to encounter shallow groundwater, a wet rotary drilling operation will be used. The method actually used is noted on the boring logs. For geologic studies when the need for visual examination of the bedding and other stratigraphic features is needed along with engineering data, the larger bucket augers are used to allow a geologist to enter the excavation for visually logging the hole. A prefix B is used to designate a boring made with a drilling rig. When hand dug, the boring numbers have a prefix HB. When a backhoe was used, prefixes TP (test pit) or T (trench) are used. The difference between a trench and test pit being the length of the exploration; a trench being a long narrow exploration, most commonly used for fault studies. In each case, the soils were logged by technical personnel from our office and visually classified in the field in general accordance with the Unified Soil Classification system. The field descriptions have been modified as appropriate to reflect laboratory results.

Relatively undisturbed samples of the subsurface materials were obtained at appropriate intervals in the borings using a steel drive sampler (2.5-inches inside diameter, 3-inches outside diameter) lined with brass, one-inch high sample rings with a diameter of 2.4 inches. This is referred to as a modified California sampler. The boring may be advanced by drilling with a hollow-stem auger or with a wet rotary operation. If below the groundwater, the hollow-stem is filled with water or drilling mud to counteract the fluid pressure of the groundwater. The sampler was usually driven into the bottom of the borehole with successive drops of a 140-pound safety hammer connected to the sampler with either A or AW rod and falling 30 inches. An automatic hammer is usually used when drilling with a CME dill rig, and a Safe-T-Driver is used when drilling with a Mobile drill rig. When above the groundwater level, a downhole Safe-T-Driver is usually used. Studies have shown that hammer efficiencies of the automatic hammer is over 90% (Goble Rausche Likins and Associates, 1998; Riggs, Schmidt, and Rassieur, 1983; Riggs, Mathes, and Rassieur, 1984) while that of the Safe-T-Driver is about 70% (Kovacs, Evans, and Griffith, 1975; Kovacs, Griffith, and Evans, 1978), based on impact velocities. When a bucket auger is used to advance the boring, the driving weights change with depth, depending on the weight characteristics of the telescoping kelley bar, but the height of fall is usually 18 inches. Sampler driving resistance, expressed as blows per six inches of penetration, is presented on the boring logs at the respective sampling depths. When the borings or trenches are excavated with a backhoe, the sampler is pushed into the soil with the force of the backhoe. A hand sampler is used when the borings or trenches are advanced by hand digging or in some cases when a backhoe is used to make the excavation. This hand sampler is similar to the conventional California sampler, but lighter weight. An approximately 8-pound hammer falling about 18 inches is used to drive the hand sampler about 6 inches into the bottom of the exploration. The type of sampler used is noted on the boring logs. In some cases the hammer weight and falling distance deviate from those given above. The actual conditions are shown on the boring logs and supersede the values given above.

Ring samples were retained in close-fitting, moisture tight containers for transport to our laboratory for testing. Bulk samples, which were collected from cuttings, were placed in bags and transported to our laboratory for testing.

When noted on the boring logs, standard penetration test (SPT) samples were obtained using either a 20-inch or a 32-inch long split-barrel sampler with a 2-inch outside diameter and a 1.375-inch inside diameter when liners are used (1.5-inch inside diameter without liners). Unless noted otherwise, liners are usually used. This sampler is driven into the soil with successive drops of a 140-pound, safety hammer falling 30 inches. The blows are recorded for each 6 inches of penetration for a total penetration of 18 or 24 inches. The sum of the number of blows for the last 12 inches of an 18-inch penetration or the middle 12 inches of a 24-inch penetration is referred to as the *N* value.

Elevations of the ground surface, if shown on the logs, were determined at the boring locations using a topographic map or determined by using a temporary bench mark shown on the site plan.

Logs, which are presented on Plates at the end of this Appendix, include a description and classification of each stratum, sample locations, blow counts, groundwater conditions encountered during drilling, results from selected types of laboratory tests, and drilling information. Keys to soil and bedrock symbols and terms are included on Plates A-1 and A-2.

Each boring or trench, unless noted otherwise, was backfilled with cuttings at the completion of the logging and sampling. The backfill, however, may settle with time, and it is the responsibility of our client to ensure that such settlement does not become a liability.

On some projects, cone penetrometer tests (CPT) are performed, primarily to provide a basis for evaluating liquefaction potential. Cone penetrometer tests are performed with a truck-mounted cone, by advancing a 10-cm^2 cone with a conical tip into the soil at a rate of 2 cm/sec. The tip resistance and frictional resistance along a sleeve above the tip are measured and recorded. Both a tabulated and graphical presentation of the results are included in this appendix if CPT were performed on this project.

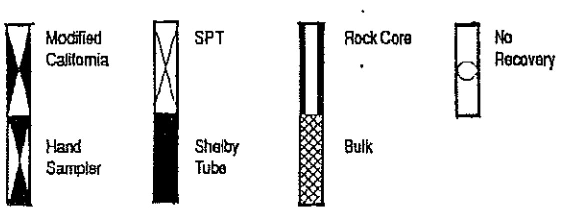
Key to Soil Symbols and Terms

Major Divisions			USCS Group Symbols	Typical Names
Coarse-Grained Soils (More than half of material is larger than No. 200 sieve)	Gravels (More than half of coarse fraction is larger than No. 4 sieve)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		Gravels with fines (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand, clay mixtures
	Sands (More than half of coarse fraction is smaller than No. 4 sieve)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sand, little or no fines
			SP	Poorly graded sands, gravelly sands little or no fines
		Sands and fines (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
Fine-Grained Soils (More than half of material is smaller than No. 200 sieve)	Silts and Clays Liquid Limit < 50		ML	Silts and very fine sands, rock-flour, silty or clayey fine sands, or clayey silts with slight plasticity
			CL	Inorganic clays of low or medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays Liquid Limit > 50		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
	Highly Organic Soils		Pt	Peat and other highly organic soils

Legend of Laboratory Tests

G - Grain Size	C - Consolidation	PP - Pocket Penetrometer
A - Atterberg Limits	DS - Direct Shear	CH - Chemical
P - Compaction	U - Unconfined	
S - Swell/Expansion	T - Triaxial	

Sampler Type



Terms used in this report for describing soils according to their texture or grain size distributions are generally in accordance with the Unified Soil Classification System.

Terms Describing Density and Consistency

Coarse Grained soils (major portion retained on No. 200 sieve) include (1) clean gravels, (2) silty or clayey gravels, and (3) silty, clayey, or gravelly sands. Relative density is related to SPT blow count corrected for overburden pressure or drive energy.

Density		SPT *N* Value Blows/Ft	Relative Density %
Very Loose	vl	0 to 4	0 to 15
Loose	l	4 to 10	15 to 35
Medium Dense	md	10 to 30	35 to 65
Dense	d	30 to 50	65 to 85
Very Dense	vd	> 50	85 to 100

Fine Grained soils (major portions passing No. 200 sieve) include (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shear strength as indicated by penetrometer readings, direct shear, or SPT blow count.

Consistency	Shear Strength, ksf	SPT *N* Value
Very Soft	< 0.25	0 to 2
Soft	0.25 to 0.50	2 to 4
Firm	0.50 to 1.00	4 to 8
Stiff	1.00 to 2.00	8 to 16
Very Stiff	2.00 to 4.00	16 to 32
Hard	> 4.00	> 32

Terms Characterizing Soil Structure

Slickensided	Having inclined planes of weakness that are slick and glossy in appearance.
Fissured	Containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical.
Laminated	Composed of thin layers of varying color and texture.
Interbedded	Composed of alternate layers of different soil types.
Calcareous	Containing appreciable quantities of calcium carbonate.
Well Graded	Having wide range in grain sizes and substantial amounts of intermediate particle sizes.
Poorly Graded	Predominately one grain size, or having a range of grain sizes with some intermediate sizes missing.
Porous	Having visibly apparent void spaces through which water, air, or light may pass.

Soil Moisture

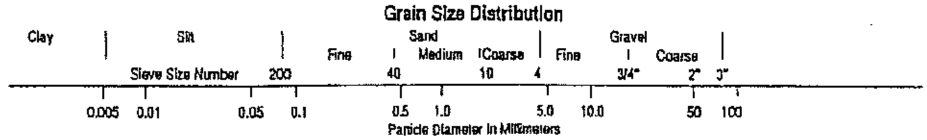
From low to high, the moisture content is indicated by:

Dry	D
Slightly Moist	Sl M
Moist (near optimum for compaction)	M
Very Moist	V M
Wet	W

Size Proportions

Designation	Percent by Weight
Trace	< 5
Few	5 to 10
Little	15 to 25
Some	30 to 45

Grain Size Distribution



Degree of Weathering

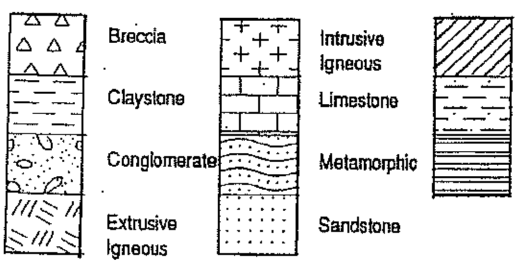
Diagnostic Feature

Descriptive Term	Discoloration Extent	Fracture Condition	Surface Characteristics	Original Texture	Grain Boundary Condition
Unweathered	None	Closed or discolored	Unchanged	Preserved	Tight
Slightly Weathered	Less 20% of fracture spacing on both sides of fracture	Discolored, may contain thin filling	Partial discoloration	Preserved	Tight
Moderately Weathered	Greater than 20% of fracture spacing on both sides of fracture	Discolored, may contain thick filling, cemented rock	Partial to complete discoloration, not friable except poorly cemented rocks	Preserved	Partial Opening
Highly Weathered	Throughout		Friable and possibly pitted	Mainly Preserved	Partial Separation
Completely Weathered	Throughout		Resembles a soil	Partly Preserved	Complete Separation

Discontinuity Spacing

Description for Structural Feature: Bedding, Foliation, or Flow Banding	Spacing		Description for Joints, Faults, or Other Fractures
Very Thickly (Bedded, Foliated, or Banded)	More than 2 m	More than 6 ft	Very Widely (Fractured or Jointed)
Thickly	60 cm to 2 m	2 to 6 ft	Widely
Moderately	20 to 60 cm	8 to 24 in.	Medium
Thinly	60 to 200 mm	2.5 to 8 in.	Closely
Very Thinly	20 to 60 mm	0.75 to 2.5 in.	Very Closely
Description for Microstructural Features: Bedding, Foliation, or Cleavage			
Intensely (Laminated, Foliated, or Cleaved)	6 to 20 mm	0.25 to 0.75 in.	Extremely Close
Very Intensely	< 6 mm	< 0.25 in.	

Graphic Symbols - Bedrock



Rock Hardness

Classification	Field Test
Very Weak	Can be dug by hand and crushed with fingers.
Weak	Friable, can be gouged deeply with a knife and will crumble readily under light hammer blows.
Moderately Strong	Can be peeled with a knife. Material crumbles under firm blows with the sharp end of a geologic pick.
Strong	Cannot be scaped or peeled with a knife point. Hand held specimen breaks with firm blows of the pick.
Very Strong	Difficult to scratch with knife point. Cannot break hand held specimen.

Separation of Fracture Walls

Description	Separation of Walls, mm
Closed	0
Very Narrow	0 to 0.1
Narrow	0.1 to 1.0
Wide	1.0 to 5.0
Very Wide	> 5.0

Fracture Filling

Description	Definition
Clean	No fracture filling material
Stained	Discoloration of rock only. No recognizable filling material.
Filled	Fracture filled with recognizable filling material.

Surface Roughness

Description	Classification
Smooth	Appears smooth and is essentially smooth to the touch. May be slickensided.
Slightly Rough	Asperities on the fracture surfaces are visible and can be distinctly felt.
Medium Rough	Asperites are clearly visible and fracture surface feels abrasive to the touch.
Rough	Large angular asperites can be seen. Some ridge and high-side angle steps evident.
Very Rough	Near vertical steps and ridges occur on the fracture surface.

Where slickensides are observed, the direction of the slickensides should be recorded after the standard discontinuity surface description.

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Boring Log B-1

Sheet 1 of 1

Project: SUNBELT ENTERPRISES Client No.: 3315 Date Drilled: 4/15/04

Comment:

Drilling Company/Driller: Roy Brothers Equipment: Bucket Auger

Driving Weight (lbs): Average Drop (in.): Hole Diameter (in.): 24"

Elevation: ft Depth to Water: ft After: hrs on: Logged By: ASG

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
0				**COLUVIUM (Qal):** Brown fine Silty SAND w/ gravel and cobbles, dry to slightly moist					
2				**UPPER TOPANGE FORMATION (Ttuc):** Dark olive SHALE/CLAYSTONE, thinly laminated w/ yellowish grey fine SANDSTONE, orange iron oxide along bedding partings, moist, hard	@ 3' B N68E 55NW				
4					@ 4' B N80E 55NW				
5	X	5				114.1	12.6		
6					@ 6' J N80W 27NW				
7					@ 7' B N87W 70NE				
10	X	7				117.3	10.5		
13					@ 13' B N71E 66NW				
15	X	8				117.6	11.6		
18				@ 18': 0.6" thick brown to dark brown SILTSTONE bed	@ 18' B N70E 60NW				
18				Dark olive SHALE/CLAYSTONE, thinly laminated, orange iron oxide along bedding partings, moist, hard					
20	X	6				109.8	14.0		
24				TOTAL DEPTH 24.0 FT. NO GROUND WATER ENCOUNTERED BACKFILLED 4/15/04					

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Boring Log B-2

Sheet 1 of 1

Project SUNBELT ENTERPRISES Client No. 3315 Date Drilled 4/15/04

Comment

Drilling Company/Driller Roy Brothers Equipment Bucket Auger

Driving Weight (lbs) Average Drop (in.) Hole Diameter (in.) 24"

Elevation ft Depth to Water ft After hrs on Logged By ASG

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	#200, %	Other Tests
				COLUVIUM (Qal): Orangish brown fine Sandy CLAY, firm, slightly moist to moist					E.I. = 108 R = 15
				UPPER TOPANGA FORMATION (Ttuc): Orangish brown Clayey SANDSTONE w/ gravel, orange iron oxide staining, hard, slightly moist to moist					
5		5				110.8	17.7		
				Tanish orange SANDSTONE with gravel, hard, slightly moist					
10		8		@ 10': 1" thick redish orange CLAYSTONE	@ 10' B N65E 28NW	99.8	23.9		
				Dark olive SHALE/CLAYSTONE, moist, hard @ 13' water seepage from closely spaced fractures of 0.10" to 0.50" apart					
15		7				110.8	12.9		
				TOTAL DEPTH 17.5 FT. WATER SEEPAGE @ 13', FILLED 3.5 FT. OF BORING HOLE IN 10 MINUTES BACKFILLED 4/15/04					
20									
25									

advanced geotechnical services, inc.

Boring Log B-3

Sheet 1 of 1

Project: SUNBELT ENTERPRISES | Client No: 3315 | Date Drilled: 4/15/04

Comment:

Drilling Company/Driller: Roy Brothers | Equipment: Bucket Auger

Driving Weight (lbs): | Average Drop (in.): | Hole Diameter (in.): 24"

Elevation ___ ft | Depth to Water ___ ft After ___ hrs on ___ | Logged By: ASG

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.					
0				**COLUVIUM (Qal):** Orangish brown Silty CLAY, moist, firm to very firm					
2				**UPPER TOPANGA FORMANTION (Ttuc):** Dark olive SHALE/CLAYSTONE, thinly laminated w/ rootlets and 1/8" calcium carbonate sills, moist, hard	@ 2' B N85E 45NW				
5		3				104.4	17.8		
9					@ 9' B N88E 55NW				
10		3				105.0	17.7		
13				Dark olive SHALE/CLAYSTONE, moist, very hard					
14				▽ @ 14' minor water seepage along closely spaced fractures 0.10" to 0.50" apart	@ 14' B N85E 59NW				
15		6				109.1	16.0		
18					@ 18' B N85E 62NW				
20				TOTAL DEPTH 20.0 FT. WATER SEEPAGE @ 14 FT. BACKFILLED 4/15/04					
25									

advanced geotechnical services, inc.

Boring Log B-4

Sheet 1 of 1

Project SUNBELT ENTERPRISES Client No. 3315 Date Drilled 4/15/04

Comment

Drilling Company/Driller Roy Brothers Equipment Bucket Auger

Driving Weight (lbs) Average Drop (in.) Hole Diameter (in.) 24"

Elevation ft Depth to Water ft After hrs on Logged By ASG

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				COLUVIUM (Qal): Brown fine Sandy CLAY, moist, firm to very firm					
				Tanish brown fine Sandy CLAY, blocky texture, moist, very firm					
				UPPER TOPANGA FORMATION (Ttuc): Dark olive SHALE/CLAYSTONE w/ iron oxide, thinly laminated, moist, hard					
5		6				109.6	16.0		
					@ 8' B N85E 79NW				
10				∇ @ 10' water seepage along 0.10" to 0.50" spaced fractures					
				TOTAL DEPTH 12.0 FT. WATER SEEPAGE @ 10 FILLED BORE HOLE BOTTOM 2 FT. IN 5 MINUTES BACKFILLED 4/15/04					
15									
20									
25									

advanced geotechnical services, inc.

Boring Log B-5

Sheet 1 of 1

- Project: SUNBELT ENTERPRISES
- Client No.: 3315
- Date Drilled: 4/15/04
- Comment:
- Drilling Company/Driller: Roy Brothers
- Equipment: Bucket Auger
- Driving Weight (lbs):
- Average Drop (in.):
- Hole Diameter (in.): 24"
- Elevation: ft
- Depth to Water: ft After hrs on
- Logged By: ASG

Description of Material

This log, which is part of the report prepared by Advanced Geotechnical Services, Inc. for the named project, should be read together with that report for complete interpretation. This summary applies only at this boring location and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Depth, ft	Sample	Blows/6"	Graphic Symbol	Description of Material	Attitudes	Dry Unit Weight, pcf	Moisture Content, %	-#200, %	Other Tests
				COLUVIUM (Qal): Brown fine Sandy CLAY w/ calcium carbonate along root pores and veins, moist, firm to very firm					
				Orangish brown CLAY w/ calcium carbonate along root pores and veins, firm, moist					
5		2				95.3	23.9		
				UPPER TOPANGA FORMANTION (Ttuc): Orangish brown SILTSTONE/CLAYSTONE, thinly laminaged with iron oxide stains along shale partings, moist, hard					
				Brown to tanish brown fine SANDSTONE, slightly moist, hard					
10		5		Dark olive SHALE/CLAYSTONE w/ slight sand, slightly moist, hard	@ 10' B N80E 48NW	109.3	16.9		
				▽ @ 12' and 15' minor water seepage long fractures spaced 0.10" to 0.50" apart					
15		6			@15' B N75E 50W	117.3	12.4		
				TOTAL DEPTH 18.0 FT. WATER SEEPAGE @ 12 FT. & 15 FT. BACKFILLED 4/15/04					
20									
25									

Appendix B

Laboratory Testing

Appendix B
Laboratory Testing

A laboratory test program is designed for each project to evaluate the physical and mechanical properties of the soil and bedrock materials encountered at the site during our field exploration program. Laboratory tests were conducted on representative samples for the purpose of classification and determining their properties for use in analyses and evaluations. The most common laboratory tests include moisture-density, Atterberg limits, grain-size analyses (sieve and hydrometer analyses), sand equivalent, direct shear, consolidation, compaction, expansion index, and *R*-values. The following descriptions of test methods are generic and may include methods not used on this project. Reference to the boring logs and test results on Plates attached to this appendix will show which tests were performed for this project.

Classification Tests

Classification testing is performed to identify differences in material behavior and to correlate the results with shear strength and volume change characteristics of the materials. Classification testing includes unit weight (e.g., dry density), moisture content, Atterberg limits, grain size analyses (sieve and hydrometer), and sand equivalent.

Moisture-Density Test

Site soils were classified in the laboratory in accordance with the Unified Soil Classification System. Moisture contents are performed in general accordance with ASTM Test Designation D2216-98. The dry density of selected driven ring samples was obtained by trimming the end of the sample to obtain a smooth, flat face. The trimmed sample was measured to obtain volume and wet weight, extruded, and visually classified. The samples were dried in an oven maintained at approximately 110 degrees Celsius. After drying, each sample was weighed, and the moisture content and dry density were calculated. Field moisture contents and dry unit weights were determined for the ring samples obtained in the field. Field moisture contents and dry unit weights are shown on the boring logs in Appendix A.

Atterberg Limits

Atterberg Limits were performed in general accordance with ASTM Test Designation D4318-00. If this test was performed, the results are presented on the boring logs in Appendix A.

Sieve Analysis

Sieve analysis tests were conducted on the on-site soils in general accordance with sieve analysis test procedure from ASTM Test Designation D-422-63 (98). This method covers the quantitative determination of the distribution of particle sizes in soils. If this test was performed, the results are presented on Plates attached to this appendix.

Hydrometer Test

Hydrometer tests were performed in general accordance with ASTM Test Designation D422-63 (98). If this test was performed, the results are presented on Plates attached to this appendix.

Sand Equivalent

Sand equivalent is the ratio of sand-size particles to clay-size particles, expressed as a percent. Sand equivalent tests were performed in general accordance with ASTM Test Designation D2419-95. When these tests are performed, the results are included on the boring logs in Appendix.

Shear Tests
Direct shear tests were performed in general accordance with ASTM D3080-98 to determine the shear strength parameters of undisturbed on-site soils or remolded soil specimens. The samples are usually tested in an artificially saturated condition. This is accomplished by soaking the specimens in a confined container for a period of one or 2 days, depending on the permeability of the material. The specimen, 1-inch high and 2.4-inch-diameter, is placed in the shear device, and a vertical stress is applied to the specimen. The specimen is allowed to reach an equilibrium state (swell or consolidate). The specimen is then sheared under a constant rate of deformation. The rate of deformation for a slow test, sufficiently slow to allow drainage, is selected from computed or measured consolidation rates to allow full drainage (full dissipation of any tendency for pore water pressure changes) during shear. The process usually is repeated for 3 specimens, each under different vertical stresses. The results from the 3 tests are plotted on a diagram of shear stress and normal (vertical) stress at failure, and linear approximations are drawn of the failure curves to determine the angle of internal friction and cohesion.

Residual shear resistance is obtained by cycling the specimen between deformations of about 7% of the specimen diameter until an equilibrium shear stress is reached.

If this test was performed, the results are presented on Plates attached to this appendix.

Consolidation Test
Consolidation tests were performed in general accordance with ASTM D2435-96 on selected samples to evaluate the load-deformation characteristics of the soils. The tests were performed primarily on material that would be most susceptible to consolidation under anticipated foundation loading. The soil specimen, contained in a 2.4-inch-diameter, 1.0-inch-high sampling ring, is placed in a loading frame under a seating pressure of 0.1 ksf. Vertical loads are applied to the samples in several geometric increments, and the resulting deformations were recorded at selected time intervals. When the pressure reaches a preselected effective overburden pressure (often 2 ksf) and the specimen has consolidated under that pressure, the laboratory technician adds water to the test cell and records the vertical movement. After the specimen reaches equilibrium with the addition of water, the technician continues the loading process, usually up to a pressure of about 8 ksf. The specimen is then unloaded in increments, and the test is dismantled. The results of the test are presented in terms of percent volume change versus applied vertical stress. If this test was performed, the results are presented on Plates attached to this appendix.

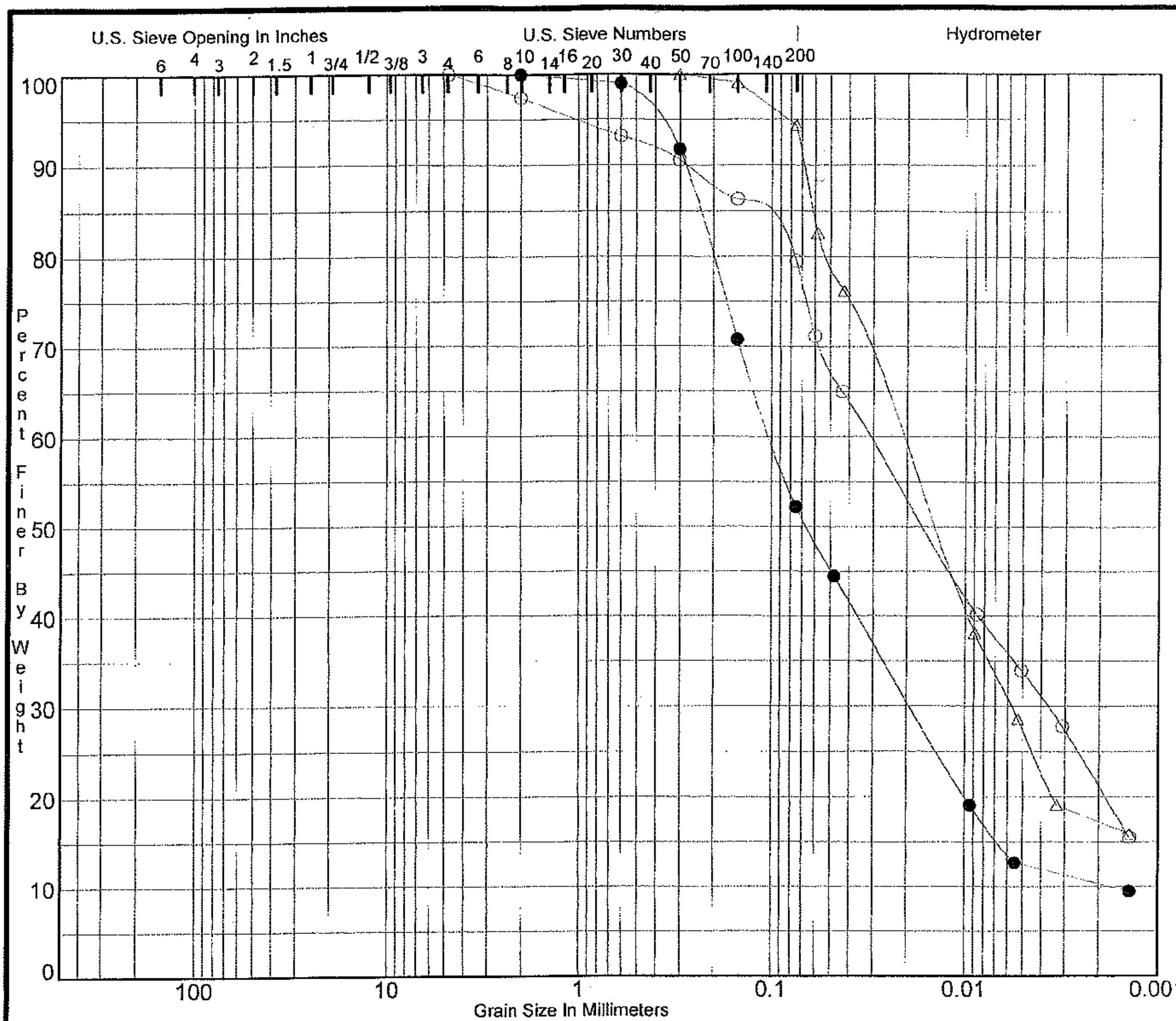
Compaction Test
Compaction tests provide information on the relationship between moisture content and dry density of the soil compacted in a given manner. The maximum density is obtained for a given compaction effort at an optimum moisture content. Specifications for earthwork are in terms of the unit weight (or dry density) expressed as a percentage of the maximum density, and the moisture content compared to the optimum moisture content. Compaction tests were performed in general accordance with ASTM Test Designation D1557-00 to determine the maximum dry densities and optimum moisture contents of the on-site soils. If this test was performed, the results are presented on Plates attached to this appendix.

Expansion Index Test
The expansion index test provides an assessment of the potential for expansion or heave that could be detrimental to foundation or slab performance. Expansion Index tests are performed on shallow on-site soils in general accordance with expansion test procedures in ASTM D4829-95. In this test, a specimen is compacted at a degree of saturation between 45 and 55 percent in a 4.01-inch-diameter, 1.0-inch-high ring. The specimen is subjected to a seating pressure of 144 psf, water is added to the test cell, and swell is monitored until the expansion stops.

The volume of swell is converted to an expansion index. Any test results are summarized on the boring logs in Appendix A.

_R_-Value Test
R-Value tests are performed on shallow on-site soils for use in pavement design. These tests were performed in general accordance with either ASTM D2844-01 California Test Method 301. If this test were performed, the results are summarized on the boring logs in Appendix A.

Sample Remolding
In some cases remolded samples are used when performing direct shear tests and consolidation tests. Samples are remolded to a specified moisture and density by compacting the soil in a 2.42-inch-diameter sample ring. The specified moisture content is either at optimum or a few percentage points above optimum. The specified dry density is usually at a relative compaction of 90%. The required moisture is added to and mixed with dry soil, providing a homogeneous mixture. A 2.42-inch-diameter ring is placed in a 6-inch-diameter compaction mold, and soil is placed in the mold to above the ring. The soil is then compacted with a 5.5-pound hammer with a free-fall drop of 12 inches. The sample is trimmed, and the dry density is determined. If the dry density deviates more than about one pound per cubic foot from the specified dry density, the process is repeated with the number of blows altered to better achieve the specified dry density.



Cobbles	Gravel		Sand			Silt Or Clay
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
○	**B-2**	**2.5**	**Light brown CLAY with sand**						
●	**B-2**	**10.0**	**Yellowish brown sandy silty CLAYSTONE**					**2.05**	**57.7**
△	**B-2**	**15.0**	**Very dark gray CLAYSTONE**						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
○	**B-2**	**2.5**	**4.75**	**0.03**	**0.004**		**0.0**	**20.5**	**45.7**	**33.8**
●	**B-2**	**10.0**	**2.00**	**0.10**	**0.019**	**0.0017**	**0.0**	**47.7**	**39.8**	**12.5**
△	**B-2**	**15.0**	**0.30**	**0.02**	**0.006**		**0.0**	**5.7**	**66.9**	**27.4**

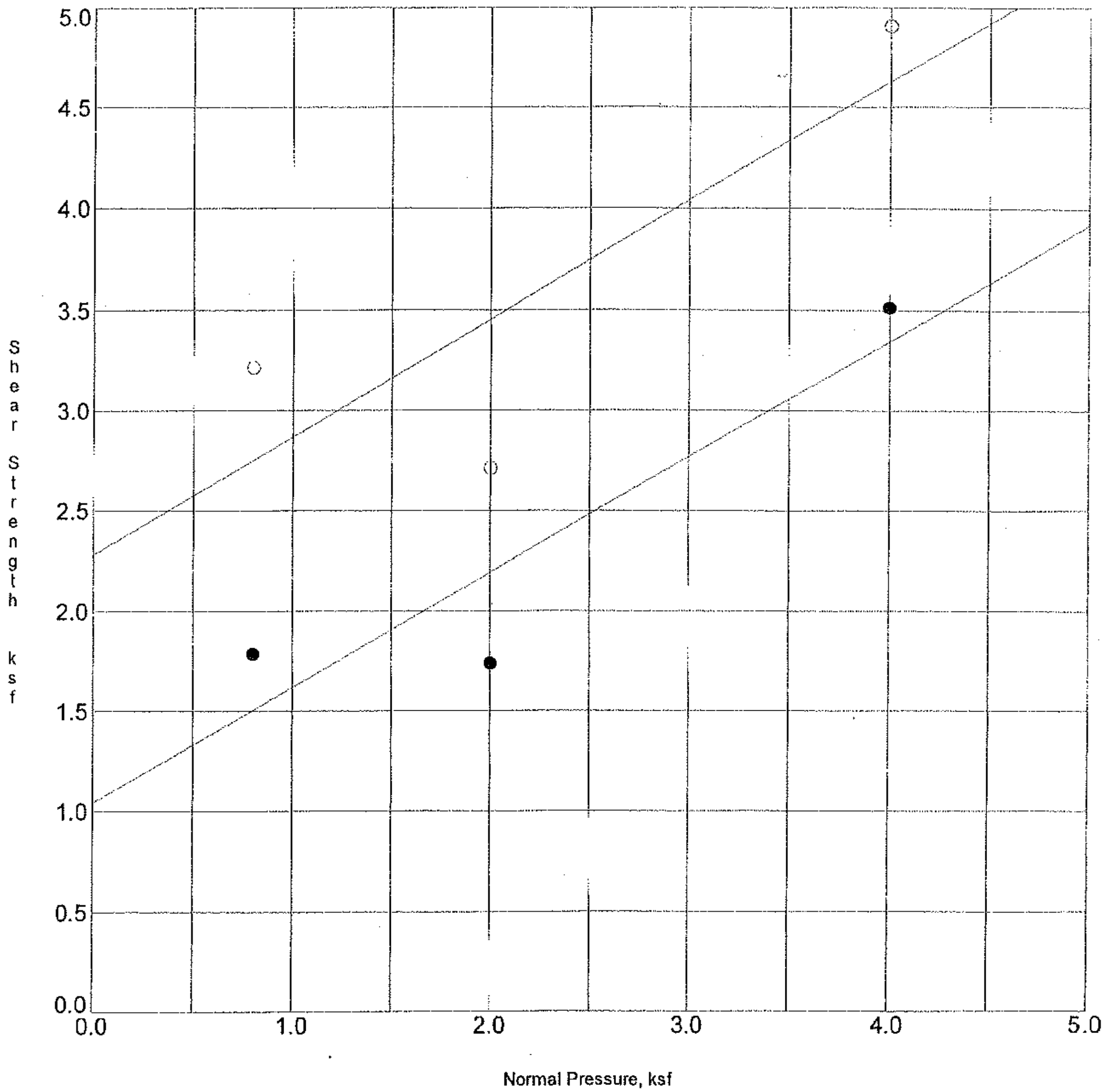
Project **SUNBELT ENTERPRISES - 29515 Canwood St., AGH**

Client No. **3315**
Date **5/21/04**

Gradation Curves

Advanced Geotechnical Services, Inc.

Plate B- 1



○ - Peak Shear ● - Ultimate Shear - Residual Shear

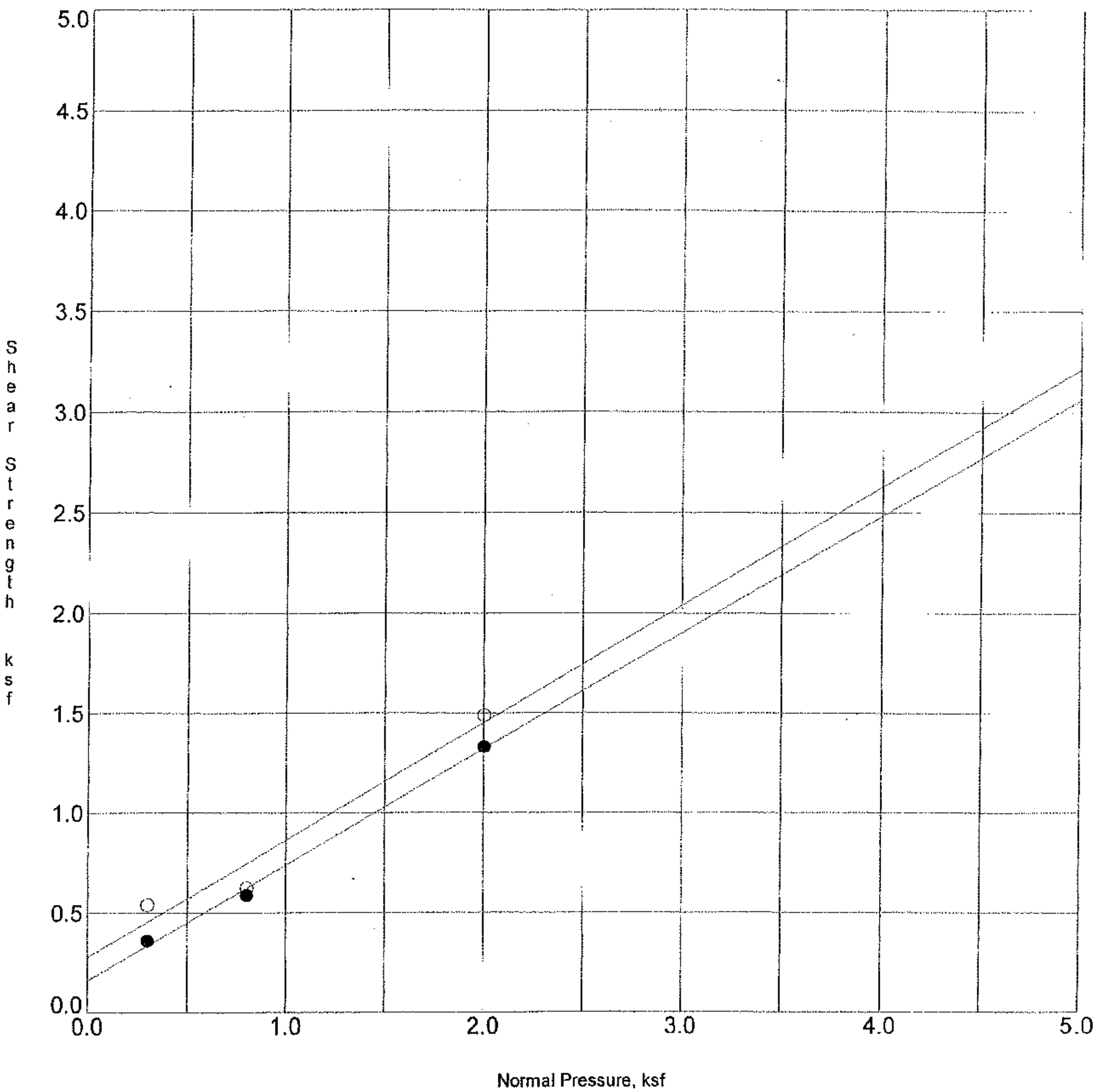
	Specimen Identification		Classification	DD	MC%	c, ksf	phi
○	B-1	20.0	Dark brown CLAYSTONE	106.7	17.1	2.28	30
●	B-1	20.0		106.7	20.2	1.04	30

Project	SUNBELT ENTERPRISES - 29515 Canwood St., AGH	Client No.	3315
		Date	5/21/04

Shear Test Diagram

Advanced Geotechnical Services, Inc.

Plate B- 2



○ - Peak Shear ● - Ultimate Shear - Residual Shear

	Specimen Identification		Classification	DD	MC%	c, ksf	phi
○	B-2	2.5	Light brown CLAY with sand	94.9	18.6	0.28	30
●	B-2	2.5	(Remolded)	94.9	25.6	0.16	30

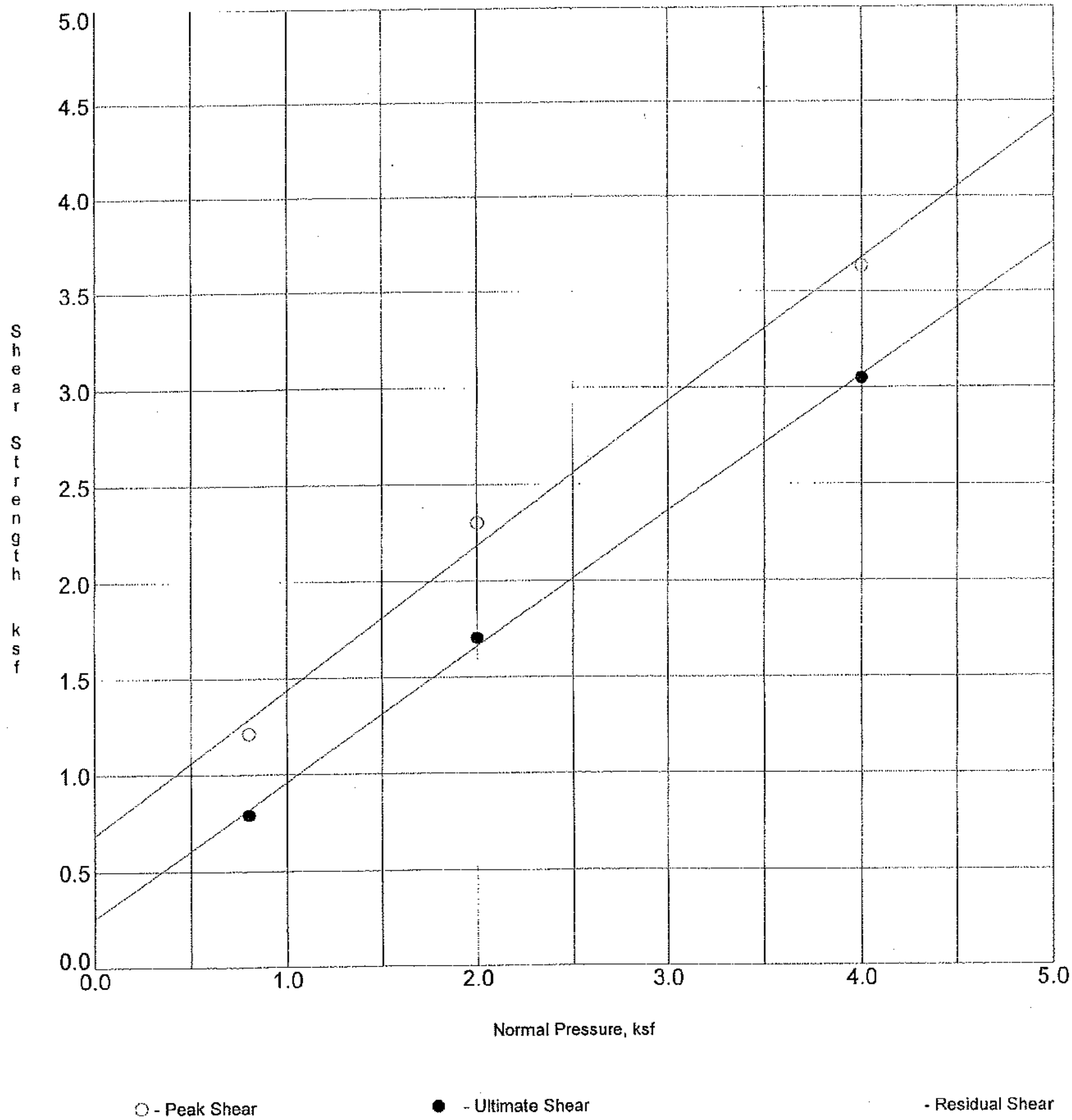
Project SUNBELT ENTERPRISES - 29515 Canwood St., AGH

Client No. 3315
Date 5/21/04

Shear Test Diagram

Advanced Geotechnical Services, Inc.

Plate B- 3



	Specimen Identification		Classification	DD	MC%	c, ksf	phi
○	B-4	9.0	Dark olive brown CLAYSTONE	93.5	21.2	0.69	37
●	B-4	9.0	(Remolded)	93.5	24.2	0.26	35

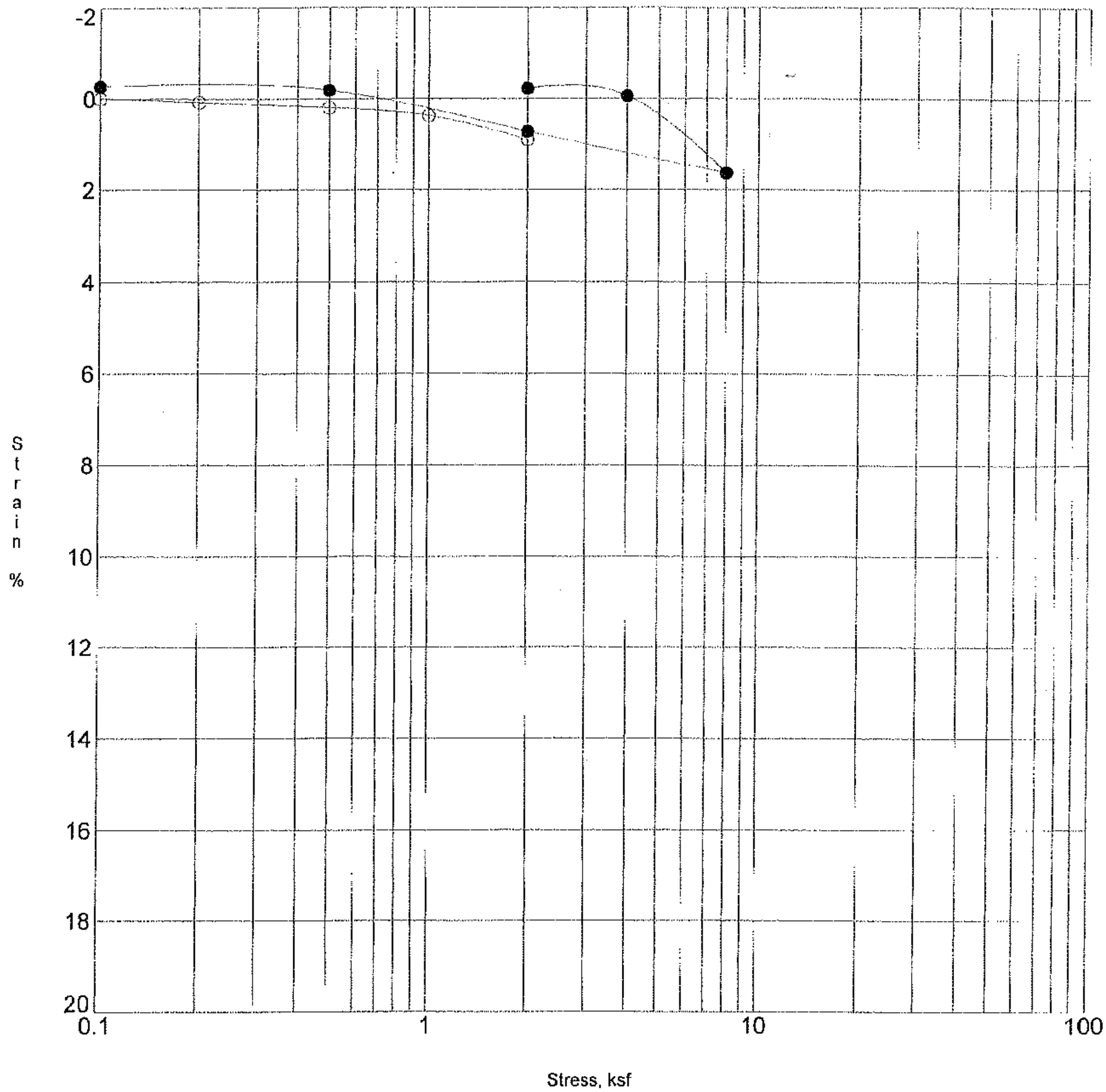
Project **SUNBELT ENTERPRISES - 29515 Canwood St., AGH**

Client No. 3315
Date 5/21/04

Shear Test Diagram

Advanced Geotechnical Services, Inc.

Plate B- 4



Open Symbol At Field Moisture, Solid Symbol After Submersion in Water

	Specimen Identification		Classification	DD	MC%
○	**B-2**	**2.5**	**Light brown CLAY with sand**	**98.5**	**14.3**
●	**B-2**	**2.5**	**(Remolded)**	**98.2**	**24.4**

Project **SUNBELT ENTERPRISES - 29515 Canwood St., AGH**

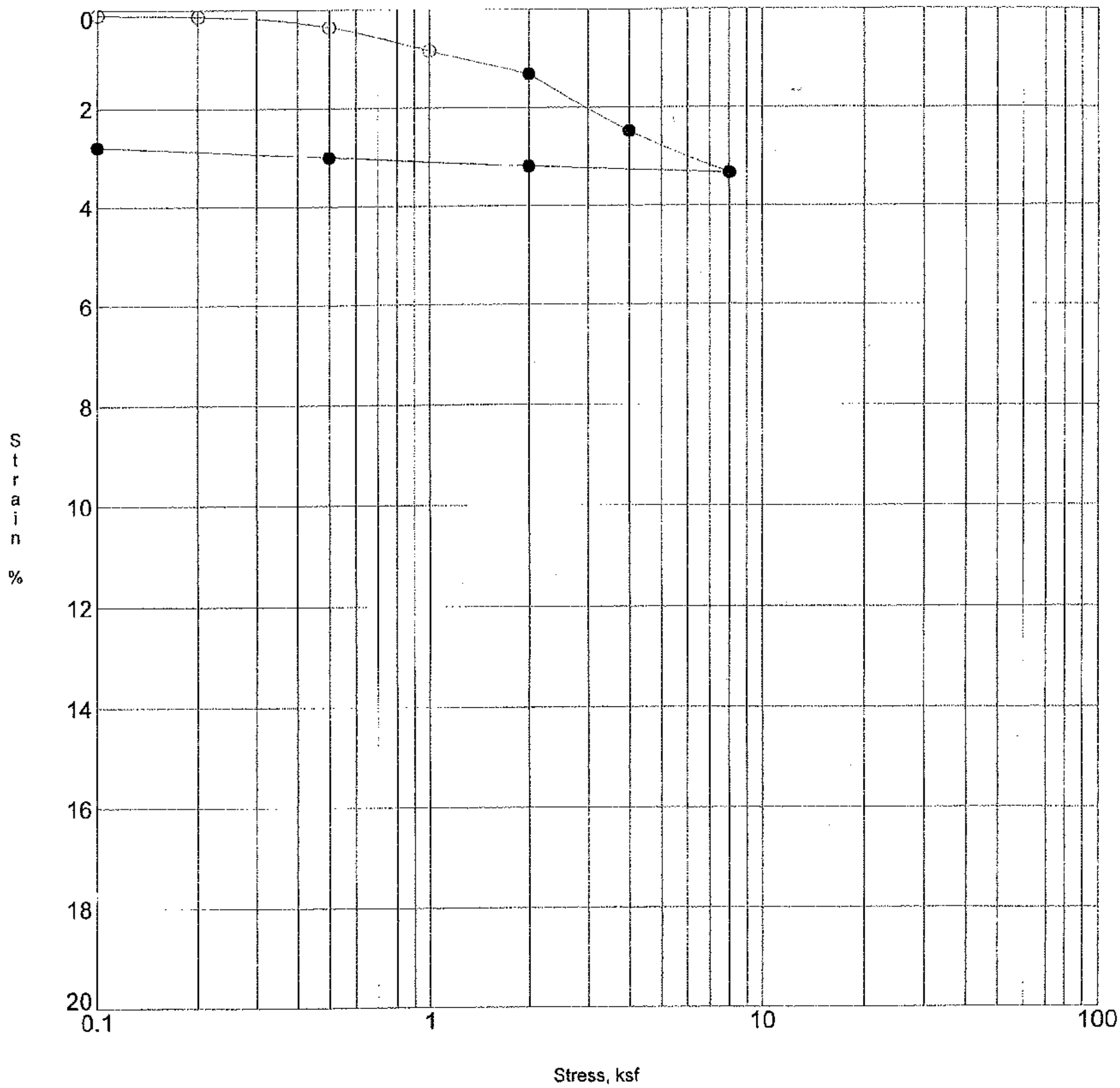
Client No. **3315**

Date **5/21/04**

Consolidation Test

Advanced Geotechnical Services, Inc.

Plate B- 5



Open Symbol At Field Moisture, Solid Symbol After Submersion in Water

Specimen Identification			Classification	DD	MC%
○	B-4	9.0	Dark olive brown CLAYSTONE	95.2	19.1
●	B-4	9.0	(Remolded)	97.9	22.6

Project SUNBELT ENTERPRISES - 29515 Canwood St., AGH

Client No. 3315
Date 5/21/04

Consolidation Test

Advanced Geotechnical Services, Inc.

Plate B- 6

Job No. 3315 Date 5/21/04

Project SUNBELT ENTERPRISES - 29515 Canwood St., AGH

Source of Material: B-4 9.0

Description of Material: Dark olive brown CLAYSTONE

Test Method: 1557A

Test Results

Maximum Dry Density: 105.0 pcf

Optimum Water Content: 18.0 %

Atterberg Limits

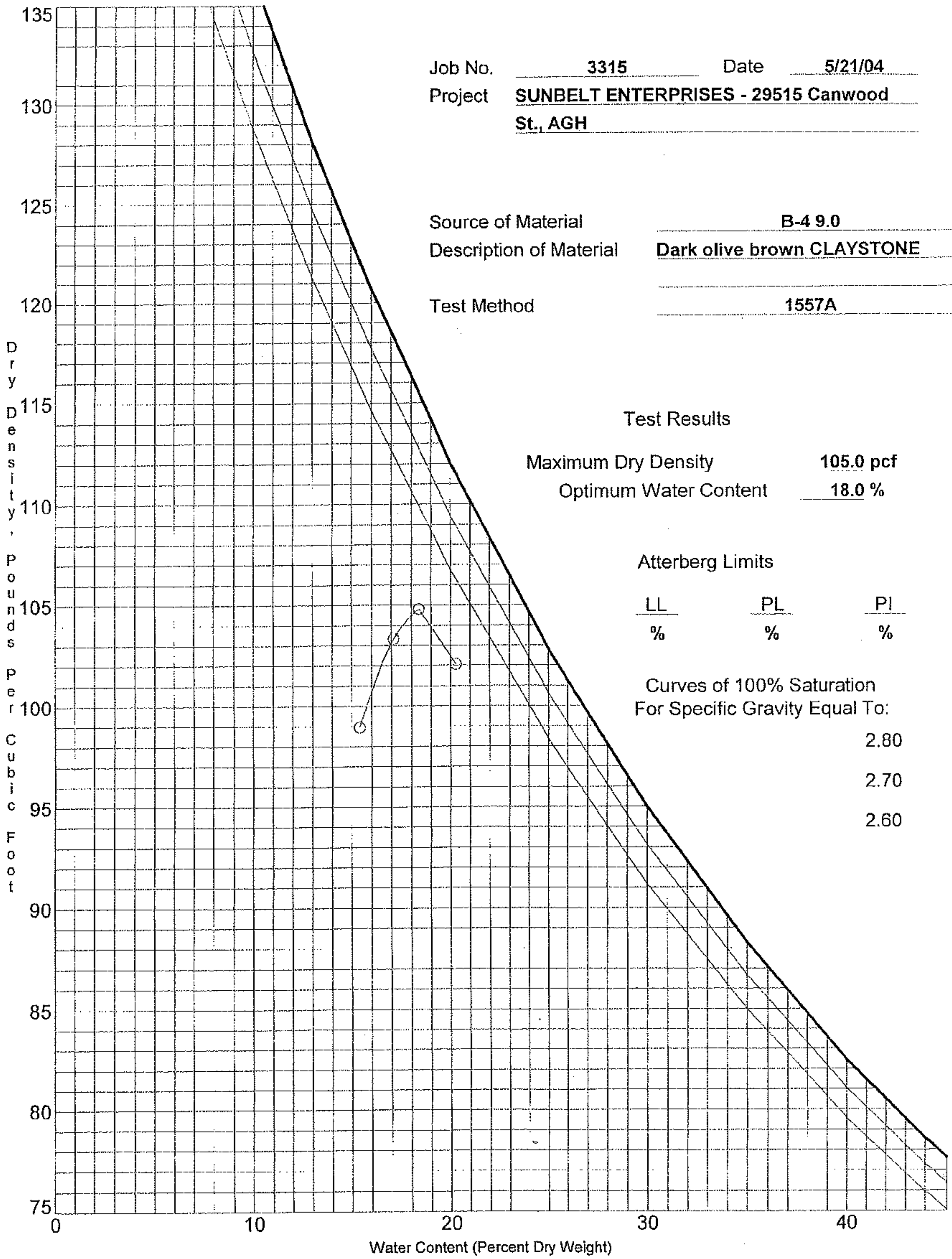
LL	PL	PI
%	%	%

Curves of 100% Saturation
For Specific Gravity Equal To:

2.80

2.70

2.60



Moisture-Density Relationship

Advanced Geotechnical Services, Inc.

Plate B- 7

Job No. 3315 Date 5/21/04

Project SUNBELT ENTERPRISES - 29515 Canwood St., AGH

Source of Material B-4 9.0

Description of Material Dark olive brown CLAYSTONE

Test Method 1557A

Test Results

Maximum Dry Density 105.0 pcf

Optimum Water Content 18.0 %

Atterberg Limits

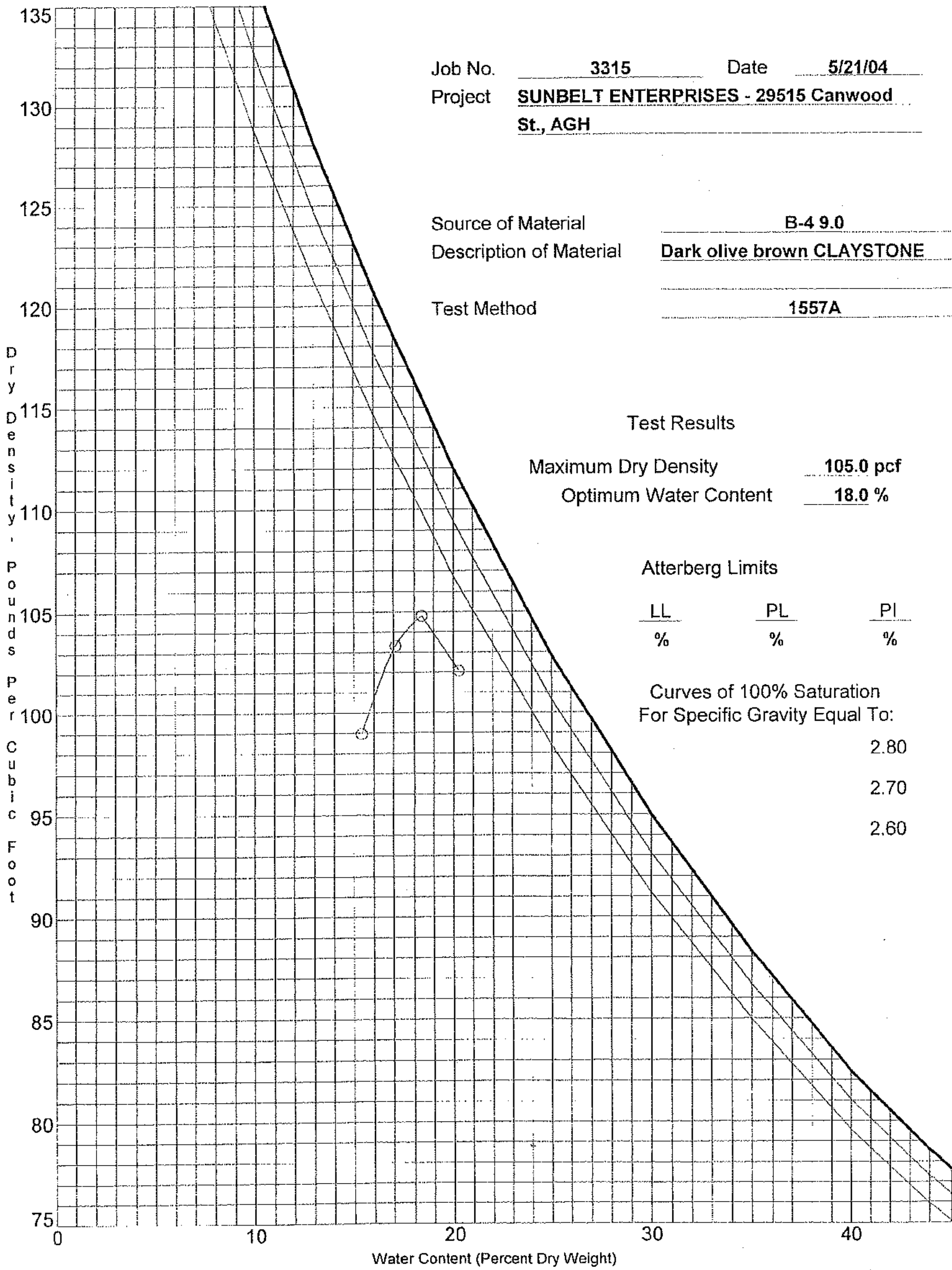
LL	PL	PI
%	%	%

Curves of 100% Saturation
For Specific Gravity Equal To:

2.80

2.70

2.60



Moisture-Density Relationship

Advanced Geotechnical Services, Inc.

Plate B- 8

Appendix C

Seismicity Study

Seismicity Study

An evaluation of the seismicity of the site was made using a computer database of faults and related seismic data. Each of these programs is briefly described below, and the output is included in this appendix.

UBCSEIS
The program UBCSEIS (Blake, 1998b) evaluates the seismic parameters for the 1997 Uniform Building Code. The International Conference of Building Officials (ICBO) released *Maps of Known Active Fault Near-Surface Zones in California and Adjacent Portions of Nevada* to be used with the 1997 Uniform Building Code. The faults in this document differ slightly from the faults in the California Division of Mines and Geology fault database. For our analysis with UBCSEIS, we have used a fault data file similar to those in the ICBO map book. For analyses with EQFAULT, EQSEARCH, and FRISKSP, we have used the CDMG fault database.

EQFAULT
The program EQFAULT (Blake, 2000b) estimates the peak horizontal ground acceleration at a specified site using a database of digitized California faults and specified attenuation relationships. *Maximum credible* earthquakes are assigned to each fault. If a fault is found within a user-selected radius, the closest distance between the site and digitized fault is computed and then the specified attenuation relationship is used to compute the peak ground acceleration or the repeatable high ground acceleration (RGHA). Modified Mercalli intensities are also computed for the site for each fault. The output consist of a map showing the locations of the faults, a plot of the computed accelerations as a function of the distance to the fault, a plot of the earthquake magnitudes and distances to the faults, and a tabulation of the magnitude, acceleration, and site intensities for the maximum credible event for each fault as well as the distance between the fault and the site. The results of EQFAULT are a deterministic analysis of the seismicity of the site.

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*                       *
*     E Q F A U L T     *
*                       *
*     Version 3.00      *
*                       *
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DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 3315

DATE: 05-17-2004

JOB NAME: Sunbelt

CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: CDMGFLTE.DAT

SITE COORDINATES:
SITE LATITUDE: 34.1478
SITE LONGITUDE: 118.7686

SEARCH RADIUS: 50 mi

ATTENUATION RELATION: 12) Bozorgnia Campbell Niazi (1999) Hor.-Soft Rock-Cor.
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: cdist
SCOND: 1
Basement Depth: 5.00 km Campbell SSR: 1 Campbell SHR: 0
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: CDMGFLTE.DAT

MINIMUM DEPTH VALUE (km): 3.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
MALIBU COAST	7.0(11.2)	6.7	0.367	IX
ANACAPA-DUME	8.5(13.7)	7.3	0.424	X
SIMI-SANTA ROSA	10.7(17.2)	6.7	0.255	IX
SANTA MONICA	11.5(18.5)	6.6	0.224	IX
NORTHRIDGE (E. Oak Ridge)	14.0(22.6)	6.9	0.225	IX
OAK RIDGE (Onshore)	15.3(24.6)	6.9	0.206	VIII
SANTA SUSANA	15.8(25.5)	6.6	0.164	VIII
PALOS VERDES	17.3(27.8)	7.1	0.147	VIII
HOLSER	18.3(29.4)	6.5	0.133	VIII
SAN CAYETANO	19.3(31.1)	6.8	0.153	VIII
HOLLYWOOD	20.6(33.2)	6.4	0.110	VII
SIERRA MADRE (San Fernando)	20.9(33.6)	6.7	0.132	VIII
VERDUGO	23.1(37.1)	6.7	0.120	VII
SAN GABRIEL	23.4(37.6)	7.0	0.102	VII
NEWPORT-INGLEWOOD (L.A.Basin)	24.0(38.7)	6.9	0.093	VII
VENTURA - PITAS POINT	25.7(41.3)	6.8	0.115	VII
COMPTON THRUST	27.7(44.6)	6.8	0.107	VII
OAK RIDGE(Blind Thrust Offshore)	27.8(44.8)	6.9	0.114	VII
CHANNEL IS. THRUST (Eastern)	29.1(46.8)	7.4	0.153	VIII
SIERRA MADRE	29.1(46.9)	7.0	0.115	VII
MONTALVO-OAK RIDGE TREND	30.0(48.3)	6.6	0.086	VII
SANTA YNEZ (East)	30.8(49.6)	7.0	0.077	VII
RAYMOND	31.3(50.3)	6.5	0.076	VII
ELYSIAN PARK THRUST	32.8(52.8)	6.7	0.084	VII
M.RIDGE-ARROYO PARIDA-SANTA ANA	32.9(52.9)	6.7	0.083	VII
RED MOUNTAIN	35.2(56.7)	6.8	0.082	VII
SAN ANDREAS - Carrizo	41.0(66.0)	7.2	0.066	VI
SAN ANDREAS - 1857 Rupture	41.0(66.0)	7.8	0.101	VII
SAN ANDREAS - Mojave	41.0(66.0)	7.1	0.061	VI
CLAMSHELL-SAWPIT	41.2(66.3)	6.5	0.057	VI
SANTA CRUZ ISLAND	44.1(71.0)	6.8	0.065	VI
WHITTIER	44.4(71.4)	6.8	0.046	VI
BIG PINE	46.9(75.5)	6.7	0.041	V
GARLOCK (West)	47.9(77.1)	7.1	0.052	VI
PLEITO THRUST	49.2(79.1)	7.2	0.077	VII

-END OF SEARCH- 35 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE MALIBU COAST FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 7.0 MILES (11.2 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.4243 g

```
***********************
*                     *
*   U B C S E I S     *
*                     *
*   Version  1.00     *
*                     *
***********************
```

COMPUTATION OF 1997
UNIFORM BUILDING CODE
SEISMIC DESIGN PARAMETERS

JOB NUMBER: 3315 DATE: 05-17-2004

JOB NAME: Sunbelt

FAULT-DATA-FILE NAME: CDMGUBCR.DAT

SITE COORDINATES:
SITE LATITUDE: 34.1478
SITE LONGITUDE: 118.7686

UBC SEISMIC ZONE: 0.4

UBC SOIL PROFILE TYPE: SC

NEAREST TYPE A FAULT:
NAME: SAN ANDREAS - 1857 Rupture
DISTANCE: 65.9 km

NEAREST TYPE B FAULT:
NAME: MALIBU COAST
DISTANCE: 8.9 km

NEAREST TYPE C FAULT:
NAME:
DISTANCE: 99999.0 km

SELECTED UBC SEISMIC COEFFICIENTS:
Na: 1.0
Nv: 1.0
Ca: 0.40
Cv: 0.58
Ts: 0.585
To: 0.117

```
*******************************************************************
* CAUTION:  The digitized data points used to model faults are    *
*           limited in number and have been digitized from small- *
*           scale maps (e.g., 1:750,000 scale).  Consequently,    *
*           the estimated fault-site-distances may be in error by *
*           several kilometers.  Therefore, it is important that  *
*           the distances be carefully checked for accuracy and   *
*           adjusted as needed, before they are used in design.   *
*******************************************************************
```

SUMMARY OF FAULT PARAMETERS

Page 1

ABBREVIATED FAULT NAME	APPROX. DISTANCE (km)	SOURCE TYPE (A,B,C)	MAX. MAG. (Mw)	SLIP RATE (mm/yr)	FAULT TYPE (SS,DS,BT)

MALIBU COAST	8.9	B	6.7	0.30	DS
ANACAPA-DUME	9.4	B	7.3	3.00	DS
SIMI-SANTA ROSA	15.8	B	6.7	1.00	DS
SANTA MONICA	16.5	B	6.6	1.00	DS
OAK RIDGE (Onshore)	22.4	B	6.9	4.00	DS
SANTA SUSANA	23.2	B	6.6	5.00	DS
HOLSER	27.7	B	6.5	0.40	DS
PALOS VERDES	27.7	B	7.1	3.00	SS
SAN CAYETANO	29.1	B	6.8	6.00	DS
SIERRA MADRE (San Fernando)	31.7	B	6.7	2.00	DS
HOLLYWOOD	31.8	B	6.5	1.00	DS
VERDUGO	34.4	B	6.7	0.50	DS
NEWPORT-INGLEWOOD (L.A.Basin)	37.1	B	6.9	1.00	SS
SAN GABRIEL	37.4	B	7.0	1.00	SS
VENTURA - PITAS POINT	40.7	B	6.8	1.00	DS
SIERRA MADRE (Central)	45.7	B	7.0	3.00	DS
SANTA YNEZ (East)	48.6	B	7.0	2.00	SS
RAYMOND	50.0	B	6.5	0.50	DS
M.RIDGE-ARROYO PARIDA-SANTA ANA	51.2	B	6.7	0.40	DS
RED MOUNTAIN	54.9	B	6.8	2.00	DS
SAN ANDREAS - 1857 Rupture	65.9	A	7.8	34.00	SS
CLAMSHELL-SAWPIT	66.2	B	6.5	0.50	DS
SANTA CRUZ ISLAND	70.9	B	6.8	1.00	DS
ELSINORE-WHITTIER	71.4	B	6.8	2.50	SS
BIG PINE	75.4	B	6.7	0.80	SS
GARLOCK (West)	77.0	A	7.1	6.00	SS
PLEITO THRUST	78.9	B	6.8	2.00	DS
SAN JOSE	81.0	B	6.5	0.50	DS
SANTA YNEZ (West)	88.0	B	6.9	2.00	SS
CUCAMONGA	91.7	A	7.0	5.00	DS
CHINO-CENTRAL AVE. (Elsinore)	91.7	B	6.7	1.00	DS
NEWPORT-INGLEWOOD (Offshore)	100.0	B	6.9	1.50	SS
WHITE WOLF	102.7	B	7.2	2.00	DS
SANTA ROSA ISLAND	105.6	B	6.9	1.00	DS
ELSINORE-GLEN IVY	109.1	B	6.8	5.00	SS
SAN ANDREAS - Southern	115.6	A	7.4	24.00	SS
SAN JACINTO-SAN BERNARDINO	116.5	B	6.7	12.00	SS
CLEGHORN	121.4	B	6.5	3.00	SS
CORONADO BANK	124.7	B	7.4	3.00	SS
LOS ALAMOS-W. BASELINE	130.8	B	6.8	0.70	DS
NORTH FRONTAL FAULT ZONE (West)	138.0	B	7.0	1.00	DS
SAN JACINTO-SAN JACINTO VALLEY	141.7	B	6.9	12.00	SS
ELSINORE-TEMECULA	142.3	B	6.8	5.00	SS
GARLOCK (East)	143.9	A	7.3	7.00	SS
LIONS HEAD	148.1	B	6.6	0.02	DS
HELENDALE - S. LOCKHARDT	149.5	B	7.1	0.60	SS

SUMMARY OF FAULT PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROX. DISTANCE (km)	SOURCE TYPE (A,B,C)	MAX. MAG. (Mw)	SLIP RATE (mm/yr)	FAULT TYPE (SS,DS,BT)
LENWOOD-LOCKHART-OLD WOMAN SPRGS	151.0	B	7.3	0.60	SS
SAN LUIS RANGE (S. Margin)	156.1	B	7.0	0.20	DS
SAN JUAN	156.2	B	7.0	1.00	SS
CASMALIA (Orcutt Frontal Fault)	165.3	B	6.5	0.25	DS
ROSE CANYON	167.6	B	6.9	1.50	SS
So. SIERRA NEVADA	170.1	B	7.1	0.10	DS
GRAVEL HILLS - HARPER LAKE	172.7	B	6.9	0.60	SS
SAN JACINTO-ANZA	176.3	A	7.2	12.00	SS
NORTH FRONTAL FAULT ZONE (East)	180.8	B	6.7	0.50	DS
ELSINORE-JULIAN	182.9	A	7.1	5.00	SS
LOS OSOS	185.6	B	6.8	0.50	DS

BLACKWATER	186.9	B	6.9	0.60	SS
PINTO MOUNTAIN	188.5	B	7.0	2.50	SS
LANDERS	190.8	B	7.3	0.60	SS
LITTLE LAKE	192.2	B	6.7	0.70	SS
HOSGRI	194.0	B	7.3	2.50	SS
CALICO - HIDALGO	194.3	B	7.1	0.60	SS
JOHNSON VALLEY (Northern)	196.2	B	6.7	0.60	SS
RINCONADA	205.6	B	7.3	1.00	SS
EMERSON So. - COPPER MTN.	209.7	B	6.9	0.60	SS
TANK CANYON	216.7	B	6.5	1.00	DS
BURNT MTN.	217.5	B	6.5	0.60	SS
EUREKA PEAK	218.5	B	6.5	0.60	SS
SAN JACINTO-COYOTE CREEK	221.8	B	6.8	4.00	SS
PISGAH-BULLION MTN.-MESQUITE LK	222.9	B	7.1	0.60	SS
EARTHQUAKE VALLEY	228.1	B	6.5	2.00	SS
PANAMINT VALLEY	233.1	B	7.2	2.50	SS
OWL LAKE	237.9	B	6.5	2.00	SS
OWENS VALLEY	238.3	B	7.6	1.50	SS
ELSINORE-COYOTE MOUNTAIN	257.6	B	6.8	4.00	SS
SAN JACINTO - BORREGO	259.3	B	6.6	4.00	SS
SAN ANDREAS (Creeping)	264.0	B	5.0	34.00	SS
INDEPENDENCE	269.0	B	6.9	0.20	DS
DEATH VALLEY (South)	270.1	B	6.9	4.00	SS
DEATH VALLEY (Graben)	278.7	B	6.9	4.00	DS
HUNTER MTN. - SALINE VALLEY	286.3	B	7.0	2.50	SS
SUPERSTITION MTN. (San Jacinto)	291.7	B	6.6	5.00	SS
BRAWLEY SEISMIC ZONE	295.5	B	6.5	25.00	SS
ELMORE RANCH	295.6	B	6.6	1.00	SS
SUPERSTITION HILLS (San Jacinto)	297.7	B	6.6	4.00	SS
ELSINORE-LAGUNA SALADA	309.2	B	7.0	3.50	SS
BIRCH CREEK	317.0	B	6.5	0.70	DS
DEATH VALLEY (Northern)	318.4	A	7.2	5.00	SS
IMPERIAL	324.7	A	7.0	20.00	SS
WHITE MOUNTAINS	326.8	B	7.1	1.00	SS
ROUND VALLEY (E. of S.N.Mtns.)	344.9	B	6.8	1.00	DS

SUMMARY OF FAULT PARAMETERS

Page 3

ABBREVIATED FAULT NAME	APPROX. DISTANCE (km)	SOURCE TYPE (A,B,C)	MAX. MAG. (Mw)	SLIP RATE (mm/yr)	FAULT TYPE (SS,DS,BT)
DEEP SPRINGS	349.0	B	6.6	0.80	DS
ORTIGALITA	350.6	B	6.9	1.00	SS
CALAVERAS (So.of Calaveras Res)	353.6	B	6.2	15.00	SS
MONTEREY BAY - TULARCITOS	354.0	B	7.1	0.50	DS
PALO COLORADO - SUR	354.4	B	7.0	3.00	SS
FISH SLOUGH	358.4	B	6.6	0.20	DS
DEATH VALLEY (N. of Cucamongo)	366.2	A	7.0	5.00	SS
QUIEN SABE	367.3	B	6.5	1.00	SS
HILTON CREEK	368.5	B	6.7	2.50	DS
ZAYANTE-VERGELES	384.7	B	6.8	0.10	SS
HARTLEY SPRINGS	388.6	B	6.6	0.50	DS
SAN ANDREAS (1906)	389.9	A	7.9	24.00	SS
SARGENT	390.5	B	6.8	3.00	SS
MONO LAKE	422.2	B	6.6	2.50	DS
SAN GREGORIO	428.8	A	7.3	5.00	SS
MONTE VISTA - SHANNON	440.0	B	6.5	0.40	DS
HAYWARD (SE Extension)	441.1	B	6.5	3.00	SS
GREENVILLE	442.6	B	6.9	2.00	SS
ROBINSON CREEK	451.6	B	6.5	0.50	DS
CALAVERAS (No.of Calaveras Res)	461.1	B	6.8	6.00	SS
HAYWARD (Total Length)	461.1	A	7.1	9.00	SS
ANTELOPE VALLEY	489.4	B	6.7	0.80	DS

CONCORD - GREEN VALLEY	509.9	B	6.9	6.00	SS
GENOA	511.1	B	6.9	1.00	DS
RODGERS CREEK	547.7	A	7.0	9.00	SS
WEST NAPA	549.4	B	6.5	1.00	SS
POINT REYES	564.0	B	6.8	0.30	DS
HUNTING CREEK - BERRYESSA	573.4	B	6.9	6.00	SS
MAACAMA (South)	610.6	B	6.9	9.00	SS
COLLAYOMI	628.4	B	6.5	0.60	SS
BARTLETT SPRINGS	633.5	A	7.1	6.00	SS
MAACAMA (Central)	651.8	A	7.1	9.00	SS
MAACAMA (North)	711.8	A	7.1	9.00	SS
ROUND VALLEY (N. S.F.Bay)	720.0	B	6.8	6.00	SS
BATTLE CREEK	755.5	B	6.5	0.50	DS
LAKE MOUNTAIN	778.0	B	6.7	6.00	SS
GARBERVILLE-BRICELAND	793.9	B	6.9	9.00	SS
MENDOCINO FAULT ZONE	848.4	A	7.4	35.00	DS
LITTLE SALMON (Onshore)	857.4	A	7.0	5.00	DS
CASCADIA SUBDUCTION ZONE	860.8	A	8.3	35.00	DS
MAD RIVER	861.7	B	7.1	0.70	DS
McKINLEYVILLE	871.8	B	7.0	0.60	DS
FICKLE HILL	873.5	B	6.9	0.60	DS
TRINIDAD	873.7	B	7.3	2.50	DS
TABLE BLUFF	877.5	B	7.0	0.60	DS
LITTLE SALMON (Offshore)	891.0	B	7.1	1.00	DS

SUMMARY OF FAULT PARAMETERS

Page 4

ABBREVIATED FAULT NAME	APPROX. DISTANCE (km)	SOURCE TYPE (A,B,C)	MAX. MAG. (Mw)	SLIP RATE (mm/yr)	FAULT TYPE (SS,DS,BT)
BIG LAGOON - BALD MTN.FLT.ZONE	910.9	B	7.3	0.50	DS

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Appendix D

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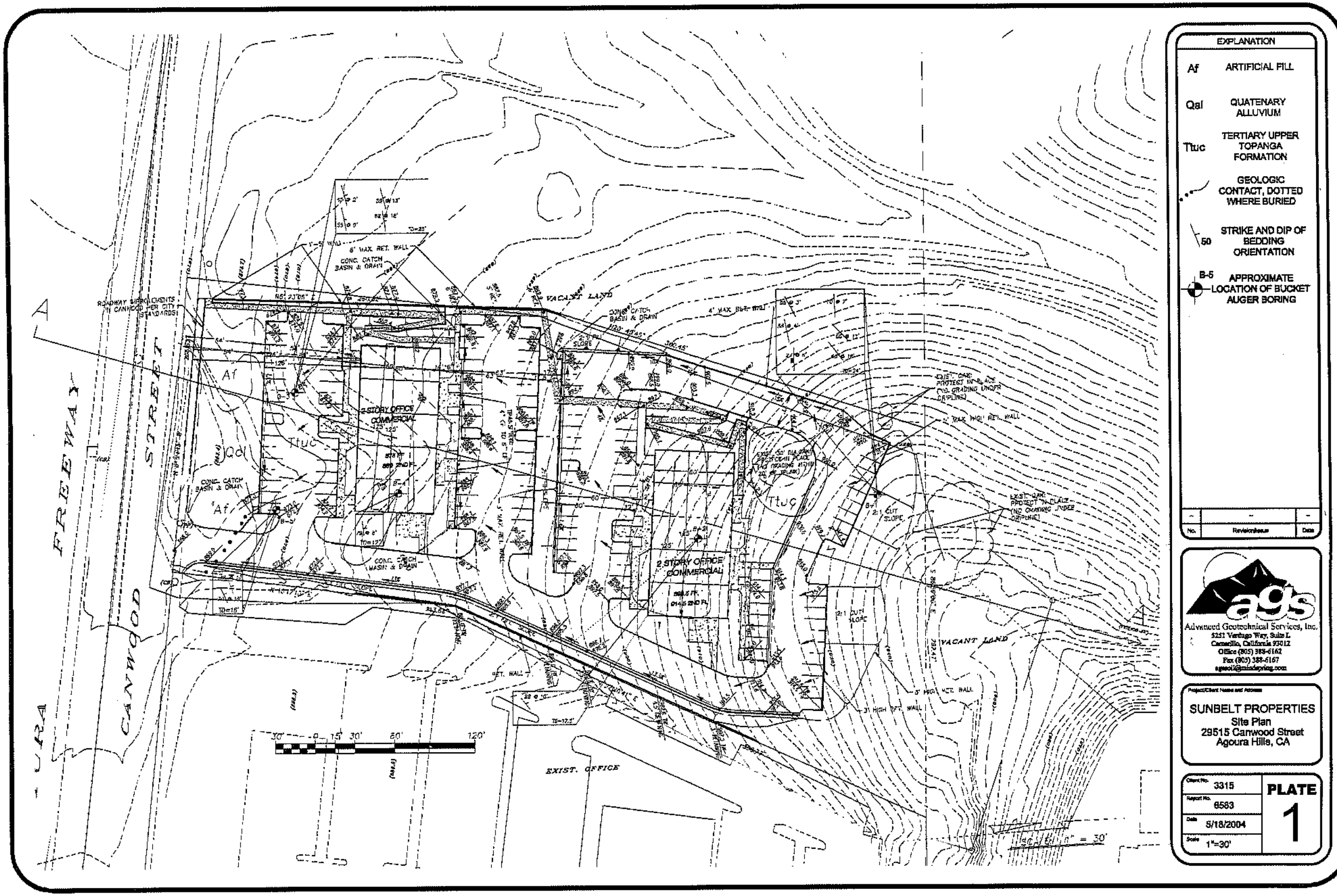
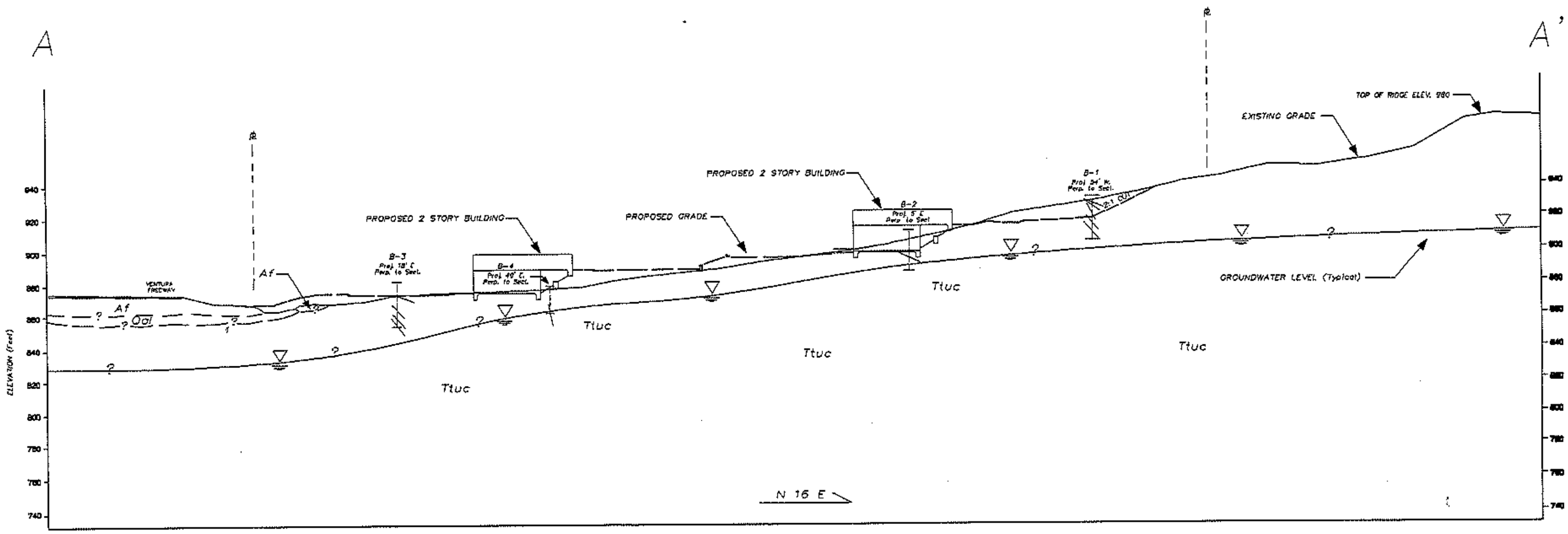


EXPLANATION
Af ARTIFICIAL FILL
Qal QUATENARY ALLUVIUM
Ttuc TERTIARY UPPER TOPANGA FORMATION
GEOLOGIC CONTACT, DOTTED WHERE BURIED
50 STRIKE AND DIP OF BEDDING ORIENTATION
B-5 APPROXIMATE LOCATION OF BUCKET AUGER BORING
Advanced Geotechnical Services, Inc.
SUNBELT PROPERTIES
Site Plan
29515 Canwood Street
Agoura Hills, CA
3315
6563
5/18/2004
1"=30'
PLATE
1
FREEWAY
CANWOOD STREET
VACANT LAND
2 STORY OFFICE COMMERCIAL
2 STORY OFFICE COMMERCIAL
EXIST. OFFICE
CONC. CATCH BASIN & DRAIN
6' MAX. RET. WALL
2:1 CUT SLOPE
Af
Qal
Ttuc
A



SUNBELT PROPERTIES
Cross Section A-A'
29515 Canwood Street
Agoura Hills, CA

Advanced Geotechnical Services, Inc.
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Camarillo, California 93012
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Client No.	3315
Report No.	6583
Date	5/18/2004
Scale	1"=30'

PLATE 2

4B

Addendum 1 Geotechnical Engineering and Geologic Study, (Planning Case No. 05-CUP-006 & 05-OTP-32/GDI No. 05.00103.0136) Proposed Two Office Buildings, 29515 Canwood Street, Agoura Hills, California. Advanced Geotechnical Services, Inc. (Revised February 15, 2005)

advanced geotechnical services, inc.

February 11, 2005
Client Number 3315
Report Number 6909
REVISED 2/15/2005

Ms. Bonnie Mooney
Sunbelt Enterprises
1801 Solar Drive, Suite 250
Oxnard, CA 93030

Addendum I
Geotechnical Engineering and Geologic Study
Proposed Two Office Buildings
29515 Canwood Street, Agoura Hills, California

At the request of the Structural Engineer, we are providing this addendum report with regards to the induced lateral surcharge pressures as a result of the building load and lateral loads as a result of design seismic event on the proposed 12-foot retaining wall at the subject project. This report supplements our **Geotechnical Engineering and Geologic Study** report dated May 14, 2004 (Report No. 6853), and unless noted otherwise all recommendations in that report are still applicable.

We understand that a uniform building load of about 125 psf will be acting next to the wall. Based on our calculations, the wall will be subjected to an induced lateral surcharge pressure of about 28 psf. We also understand that the proposed retaining wall will be designed as a restrained retaining wall. For lateral pressure during a seismic event on a restrained retaining wall, Wood (1973) recommends computing lateral earth forces per unit length of wall from:

$$P_{ae} = k_h \gamma H^2$$

Where k_h is 0.27 (a seismic acceleration that was equal to 65% of the peak acceleration of 0.41) and γ = 125 pcf. This corresponds to an equivalent fluid pressure of 34 psf.

This opportunity to be of service is sincerely appreciated. If you have any questions or if we may be of any further assistance, please do not hesitate to call. We look forward to being of continued service.

Respectfully submitted,
Advanced Geotechnical Services, Inc.

Kenneth J. Palos
President

Don Villafana, RCE 37354
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
DONALD E. VILLAFANA
No 37354
EXP. 6-06
CIVIL
STATE OF CALIFORNIA

Dan Daneshfar
Staff Engineer

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4C
Response I, Geotechnical Engineering and Geologic Study, Proposed Two Office Buildings, 29515 Canwood Street, Agoura Hills, California. Report No. 7268. Advanced Geotechnical Services, Inc. March 3, 2006.

March 3, 2006
Client Number 3315
Report Number 7268

Ms. Bonnie Mooney
Sunbelt Enterprises
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Oxnard, CA 93030

Response I
Geotechnical Engineering and Geologic Study
City of Agoura Hill – Geotechnical Review Sheet
[Planning Case No. 05-CUP-006 & 05-OTP-32 / GDI No. 05.00103.0136)
Proposed Two Office Buildings
29515 Canwood Street, Agoura Hills, California

In accordance with your authorization, Advanced Geotechnical Services, Inc., has prepared this letter report to respond to the City of Agoura Hills geotechnical review sheet comments on the subject property by GeoDynamics, Inc., dated November 11, 2005 (Planning Case No. 05-CUP-006 & 05-OTP-32 / GDI No. 05.00103.0136). This letter report supplements our **Geotechnical Engineering and Geologic Study** report dated May 14, 2004 (Report No. 6583). In preparing our responses, we have reviewed the comments and responded accordingly.

In an effort to facilitate the review process, each review comment is restated and followed by our response. A copy of the review sheet is included in Appendix A. The citations of any references cited in our responses are included in Appendix B, and figures that summarize information contained in the responses are included in Appendix C.

Planning / Feasibility Comments
Comment 1
Review Comment
The report is over one year old. The consultant should provide a geotechnical update report. The update report should discuss and address any changes in existing geotechnical conditions or proposed development at the site, relative to the above referenced report (AGS 2004). Additional geotechnical recommendations should be provided as necessary.

Response
As stated in the introduction, this letter report supplements our Geotechnical Engineering and Geologic Study report dated May 14, 2004 (Report No. 6583) and unless noted otherwise all recommendations in that report are still applicable.

We have visited the site to observe the conditions of the site as compared to the conditions at the time of our original study, reviewed the site plan and proposed construction to determine if the proposed project was in conformance with the scope of our original study, and evaluated the effects of any changes on the recommendations in our report.

An updated *Site Plan* showing the boring locations is included as Plate 1.

Since the time of our field study, the site has remained unchanged. The foundation loads are within the range anticipated in our Geotechnical Engineering and Geologic Study (Report No. 6583).

Based on our site visit and review of the site plan and building loads, the original geotechnical and geologic study (Report No. 6583) is still applicable.

Comment 2
Review Comment
The consultant should clarify the transition from the upper parking area to the buildings shown on Cross-Section A-A'. The section indicates that a 2(h):1(v) gradient slope, located underneath the buildings will be used for the elevation transition. However, the preliminary grading plan does not show such transition slopes. Hence, retaining walls may be needed. If retaining walls are used between the upper parking area and the lower building floor, the retaining walls will be approximately 15 ft (±) high, possibly restrained, and possibly subject to lateral surcharge loads. If that is the case, the consultant should provide specific geotechnical recommendations for high retaining walls. Recommendations for earth pressure during seismic loading should also be provided. Mitigation recommendations should be provided as necessary.

Response
The transition from the upper parking area to the buildings as shown on the *Cross-Section A-A'* in our report dated May 14, 2004 (Report No. 6583) were assumed at the time of the report. A *revised Cross-Section A-A'* is included as Plate 2. Based on the grading plans, retaining walls approximately 14 feet tall will be required for the southern structure, and retaining walls approximately 16 feet tall will be required for the northern structure.

On-site soils should *not* be used for backfill for retaining walls with heights greater than 10 feet. Soils with a classification of clean sand, gravel, or silty gravel should be used for retaining walls greater than 10 feet.

The surcharging effect of anticipated adjacent loads on the wall backfill due to traffic, footings, or other loads, should be included in the wall design. The magnitude of lateral load due to surcharging depends on the magnitude of the surcharge, the size of the surcharge loaded area, the distance of the surcharge from the wall, and the restraint of the wall. We can provide assistance in evaluating the effects of surcharge loading, if desired, once details are known and provided.

Retaining walls 10 feet or higher, such as the retaining walls on the north side of the lower levels of both structures, should be designed for seismic loading. A wedge analysis using the Mononobe-Okabe approach was used to generate the lateral seismic force acting on the retaining wall. This method is for walls free to deflect and analyzes a wedge of soil behind the wall subject to both gravity and seismic forces. For reinforced, cantilever type walls the equivalent acceleration was found by Fragaszy and Clough (1980) to be about 70% of the peak ground acceleration when using the Mononobe-Okabe analysis. This is in general agreement with the recommendation of 65% given by Seed and Whitman (1970). In our analyses, we used a seismic acceleration that was equal to 65% of the peak acceleration. The maximum ground acceleration for this site is 0.43g with a 50-year exposure and 10% exceedance (see Figure 1).

As an approximation to the Mononobe-Okabe method in granular soils, the lateral force per unit length of wall acting on a retaining wall can be equated to

$$P_{ae} = 0.5K_a\gamma H^2 + 0.5(0.75k_h)\gamma H^2 \quad (1)$$

where K_a is an earth pressure coefficient, γ is the soil unit weight, H is the wall height, and k_h is the seismic coefficient, which in our case is 0.28. The first term relates to the static earth pressure, and the second term relates to the additional lateral load caused by the seismic event. The resultant of the static component is located 0.67H from the top, and the dynamic component is located 0.4H from the top of wall. For a granular backfill, $K_a = 0.24$, $\gamma = 125$ pcf. These values result in the lateral force per unit length of wall being equal to $15H^2 + 13.1H^2$.

As mentioned above, Equation 1 is for walls that are free to deflect. In the case of restrained walls, such as that associated with the building, larger forces and pressure would result. For restrained walls, the peak ground acceleration should be used (Kavazanjian, Matasovic, Hadj-Hamou, and Sabatina, 1997), resulting in the lateral force per unit length of wall being equal to $15H^2 + 20.2H^2$.

Experimental results vary, but typically the resultant lateral force during dynamic excitation has been found to be between about the third to two-thirds point, measured from the bottom of the wall. We recommend that a uniform distribution be taken, locating the resultant force at the mid point.

Report Review Comments
Comment 1
Review Comment
On page 11 under "Drainage", the consultant recommends that, "In the case of the building walls retaining landscaping areas, a waterproofing system should be used on the wall and joint..." Considering the high expansion potential of on-site materials, the consultant should justify allowing building walls against landscape areas. Mitigation measures should be recommended as necessary.

Response
As mentioned in our Response to Comment 2 above the retaining wall backfill shall be composed of a free-draining material, to prevent the retention of moisture adjacent to the structure walls. Such material should be placed in a wedge with a minimum 1-foot-wide base and a maximum 1:1 gradient back slope. Use of a coarse-grained, free-draining material should reduce the effects of the expansive on-site soils, see Figure 2.

In addition to the recommended waterproofing system on page 12 under the same "Drainage" section [Reference Geotechnical Engineering and Geologic Study (2004)], we also recommended the following: "Landscaping planters immediately adjacent to structures or paved areas should not be used due to the potential for surface irrigation water to infiltrate either the foundation's subgrade or the pavement's subgrade and base course. Either drains to collect and transmit excess irrigation water to drainage structures, or impervious, above-grade or below-grade planter boxes with solid bottoms and a drainage pipe away from the structure should be used for plantings adjacent to structures. Where landscaping is planned adjacent to pavements, either a cut-off wall should be provided along the edge of the pavement or slab that extends at least 12 inches below the subgrade soil or the area should be lined with a ten-mil (or thicker) plastic moisture barrier. The walls of the moisture barrier should be near vertical and the area should be marked with warning tape to reduce the likelihood of the lining being torn by future digging. Seams of the moisture barrier should be overlapped and sealed. Where pipes extend through the vapor barrier, the barrier should be sealed to the pipes. Tears or punctures in the moisture barrier should be completely repaired prior to placement of concrete. Landscaping should be planned with consideration for these potential problems."

Also, on page 18 under *Retaining Wall Design Criteria* section [Reference Geotechnical Engineering and Geologic Study (2004)], we also recommend "*the soil immediately adjacent to backfilled retaining walls should be free-draining filter material (such as Caltrans Class 2 permeable material) with a minimum horizontal distance of two feet*", see Figure 2.

Comment 2
Review Comment
Although the specific setbacks proposed appear to be in compliance, the generic setback recommendations provided on Page 9, 16 and Figure 2 do not appear to comply with the City of Agoura Hills Building Code. The consultant should revise setback recommendations to comply with the City of Agoura Hills Building Code requirements.

Response
When located next to a descending 3(H):1(V) slope or steeper, the base of the foundation should be a minimum of 5 feet or one-half the slope height from the face of slope, whichever is greater, but need not exceed 40 feet from the face of slope. Examples of foundation *setback requirements* have been revised and are included in Figure 3.

Comment 3
Review Comment
The consultant provides recommendations for the active pressure to be used in the design of retaining walls for various types of backfill materials. The consultant should provide final recommendations to be used in the design of retaining walls prior to approval of development plans.

Response
As stated in our report on page 18 [Reference Geotechnical Engineering and Geologic Study (2004)], "*If the on-site soil is used as backfill within this zone, the equivalent fluid unit weight associated with a soil classification of CL should be used.*" The following equivalent fluid pressures are recommended for vertical walls 10 feet or less in height, with no hydrostatic pressure, no surcharge, no seismic effects, and a backfill slope with a gradient less (flatter) than 5(H):1(V). For free to deflect conditions use 65 pcf, for restrained conditions use 90 pcf. In areas where the backslopes are steeper than 5(H):1(V), the equivalent unit weights in the above table should be increased by 13 pcf for gradients of 2(H):1(V) and 30 pcf for gradients of 1.5(H):1(V).

Comment 4

Review Comment

There appears to be a significant potential for groundwater at or near foundation depth, particularly near the north edge of the northern building. Increased precipitation, the introduction of irrigation water, or water from plumbing failures is likely to increase the potential for groundwater at foundation or even slab elevations. The consultant should consider whether additional groundwater protection (i.e. subdrains, drainage galleries/blanket, etc.) is appropriate beneath the building foundations.

Response

It should be noted that based on our field exploration, the groundwater level at the site occurs at depths of 2 to 3 feet below the proposed grade of the northern structure. Depending on the time of construction, groundwater table may or may not be encountered for the temporary excavation. In the event the groundwater is encountered, the groundwater should be lowered at least 3 feet below the bottom of excavation using a dewatering system. It is recommended that AGS, Inc., be allowed to regularly inspect the temporary excavation as work progress in order to monitor earth strain and *verify* that conditions assumed for design remain unchanged. The design of the dewatering system is the responsibility of the contractor.

A drainage system should be provided under concrete slabs supported on soil. The drainage system should consist of a minimum 12-inch-thick layer of permeable gravel (such as Caltrans Permeable Material), which should be sloped to carry water to perforated pipes, or an equivalent systems approved by AGS, Inc. The pipes should carry flow by gravity to a proper disposal outlet. The pipes should be installed with the perforations down and should be wrapped with geotextile filter fabric, such as Mirafi 140 or equivalent.

Comment 5

Review Comment

The consultant should clarify the following apparent discrepancies:

- *When projected perpendicular to the section, Boring B-1 should plot about 160 feet from the south edge of the northern building. On Cross Section A-A', Boring B-1 is plotted about 144 feet from the south edge of the northern building.*

- *When projected perpendicular to the section, Boring B-2 should plot about 40 feet from the south edge of the northern building. On Cross Section A-A', Boring B-2 is plotted about 33 feet from the south edge of the northern building.*

- *The log for Boring B-2 indicates the boring was drilled to a depth of 17.5 feet. This boring is shown 25 feet deep on Cross Section A-A'.*

- *Boring B-2 is plotted about five feet above the surface of the existing profile on Cross Section A-A'. The reason for this is not clear from the map and indicated projection.*

- *At the location of Boring B-2, groundwater was encountered at a depth of 13 feet below the ground surface. On Cross Section A-A' groundwater is indicated at 15 feet below the surface and at 21 feet in Boring B-2.*

- *When projected perpendicular to the section, Boring B-3 should plot about 54 feet from the south edge of the southern building. On Cross Section A-A', Boring B-3 is plotted about 45 feet from the south edge of the southern building.*

- *The log for Boring B-3 indicates the boring was drilled to a depth of 20 feet. This boring is shown 27 feet deep on Cross Section A-A'.*

- *Boring B-3 is plotted about eight feet above the surface of the existing profile on Cross Section A-A'. The reason for this is not clear from the map and indicated projection.*

- *Groundwater is noted on the log for Boring B-3 at a depth of 14 feet. The groundwater surface is indicated approximately 10 feet below the bottom of B-3 on Cross Section A-A'.*

- *When projected perpendicular to the section, Boring B-4 should plot about 42 feet from the south edge of the southern building. On Cross Section A-A', Boring B-4 is plotted about 47 feet from the south edge of the southern building.*

- *The log for Boring B-4 indicates the boring was drilled to a depth of 12 feet. This boring is shown 16 feet deep on Cross Section A-A'.*

- *First groundwater is noted on the log for Boring B-4 at a depth of 10 feet. The groundwater surface is indicated at a depth of approximately 12 feet below the surface and 14 feet below the top of Boring 4 on Cross Section A-A'*

Response

A new *Cross-Section A-A'* based on the most current grading plan has been prepared and included as Plate 2. The above referenced discrepancies have been addressed with this new cross-section. With regards to the discrepancy of the groundwater levels as shown on the boring logs and the original *Cross-Section A-A'*, due to the projection of the borings onto the cross-section, and variations in the topography, the data regarding the groundwater levels was depicted as interpretations based on the ground surface at *Cross-Section A-A'*. On the new *Cross-Section A-A'*, the groundwater levels have been depicted accurately in each boring, and the interpretation line has been adjusted accordingly.

Plan-Check Comments

Remarks 1 through 9

We acknowledge receipt of these nine plan-check comments, which need to be addressed by another individual with regards to plan submittal procedures and or specific notations to be added to the plans as required by the City of Agoura Hills. Upon the completion of said plans, AGS, Inc., acknowledges that our Engineer and Geologist will *review* said plan, and once they are found to be in compliance with the recommendations as provided in our original Geotechnical Engineering and Geologic Study report dated May 14, 2004, our Addendum I report revise-dated February 11, 2005, and in addition to the responses to the report review comments as provided in this letter, said plans will then be wet-stamped and wet-signed.

Limits and Liability

The analysis and recommendations submitted in this letter are based in part on our report for the project (Report Nos. 6583 and 3315, dated May 14, 2004 and February 15, 2005, respectively), and the limitation and liability section in that report applies to this letter. We have strived to provide our services in accordance with generally accepted geotechnical engineering practices in this community at this time, but we make *no* warranty, either express or implied.

Closing

We appreciate the opportunity to be of service. If we can be of further assistance or answer any questions, please do not hesitate to call. We are looking forward to being of continued service as this project moves to the final construction phase.

Respectfully submitted,
Advanced Geotechnical Services, Inc.

Kenneth J. Palin
President

Don Villafana, RCE 373..
Principal Engineer

Jacob Lukiewski, EIT 117669
Staff Engineer

Mike Leary, CEG 1510
Consulting Engineering Geologist

Brett [illegible], PG 7368
Professional Geologist

Enclosures:
Appendix A – *Review Comments*
Appendix B – *References*
Appendix C – *Supporting Information*
Plates and Figures

cc: (6) Addressee (1) File

Appendix A

Review Comments

Date: November 11, 2005
GDI #: 05.00103.0195

CITY OF AGOURA HILLS - GEOTECHNICAL REVIEW SHEET

To:	Valerie Darbouze
Project Location:	29541 & 29515 Canwood Street, Agoura Hills, California.
Planning Case #:	05-CUP-006 & 05-OTP-032 (Sunbelt Enterprises)
Building & Safety #:	None
Geotechnical Report:	Advanced Geotechnical Services, Inc. (2004), "Geotechnical Engineering and Geologic Study, Proposed Two Office Buildings, 29515 Canwood Street, Agoura Hills, California," Report Number 6583, dated May 14, 2004.
Plans:	The Warren Group Inc., (2005), "Architectural and Site Development Plans, Sheets SD-1, A-2, A-2.1, A-2.2, A-2.3, A-3, A-3.1, and A-3.2" Various Scales, dated October 4, 2005.
	Holmes Enterprises (2005), "Preliminary Grading Plan, Canwood Street Offices, Canwood Street, Agoura Hills, California." Scale: 1"=2-', dated October 5, 2005.
Previous Reviews:	None

FINDINGS

Planning/Feasibility Issues	Geotechnical Report
☐ Acceptable as Presented	☐ Acceptable as Presented
☒ Response Required	☒ Response Required

REMARKS

Advanced Geotechnical Services, Inc. (AGS; consultant) prepared a "Geotechnical Engineering and Geologic Study" for the proposed two office buildings at the site located at 29541 & 29515 Canwood Street, Agoura Hills, California. The proposed development includes the construction of two 2-story office buildings, parking areas, access roads, retaining walls, cut and fill slopes and landscaping.

The City of Agoura Hills – Planning Department reviewed the referenced report from a geotechnical perspective for compliance with applicable codes, guidelines, and standards of practice. GeoDynamics, Inc. (GDI) performed the geotechnical review on behalf of the City.

Based upon a review of the submitted reports and plans, the consultant should adequately respond to the following comments prior to consideration by the Planning Commission of approval of Case No05-CUP-006 & 05-OTP-032. The Consultant should respond to the following Report Review Comments prior to Building Plan Approval. Plan-Check comments should be addressed in Building & Safety Plan Check, and a separate geotechnical submittal is not required for plan-check comments.

Planning/Feasibility Comments

1. The report is over one year old. The consultant should provide a geotechnical update report. The update report should discuss and address any changes in existing geotechnical conditions or proposed development at the site, relative to the above referenced report (AGS 2004). Additional geotechnical recommendations should be provided as necessary.

2. The consultant should clarify the transition from the upper parking area to the buildings shown on Cross-Section A-A'. The section indicates that a 2(h):1(v) gradient slope, located underneath the

buildings will be used for the elevation transition. However, the preliminary grading plan does not show such transition slopes. Hence, retaining walls may be needed. If retaining walls are used between the upper parking area and the lower building floor, the retaining walls will be approximately 15 ft (±) high, possibly restrained, and possibly subject to lateral surcharge loads. If that is the case, the consultant should provide specific geotechnical recommendations for high retaining walls. Recommendations for earth pressure during seismic loading should also be provided. Mitigation recommendations should be provided as necessary.

Report Review Comments

1. On page 11 under "Drainage", the consultant recommends that, "In the case of the building walls retaining landscaping areas, a waterproofing system should be used on the wall and joints..." Considering the high expansion potential of on-site materials, the consultant should justify allowing building walls against landscape areas. Mitigation measures should be recommended as necessary.

2. Although the specific setbacks proposed appear to be in compliance, the generic setback recommendations provided on Page 9, 16 and Figure 2 do not appear to comply with the City of Agoura Hills Building Code. The consultant should revise setback recommendations to comply with the City of Agoura Hills Building Code requirements.

3. The consultant provides recommendations for the active pressure to be used in the design of retaining walls for various types of backfill materials. The consultant should provide final recommendations to be used in the design of retaining walls prior to approval of development plans.

4. There appears to be a significant potential for groundwater at or near foundation depth, particularly near the north edge of the northern building. Increased precipitation, the introduction of irrigation water, or water from plumbing failures are likely to increase the potential for groundwater at foundation, or even slab elevations. The consultant should consider whether additional groundwater protection (i. e. subdrains, drainage galleries/blankets, etc.) is appropriate beneath the building foundations.

5. The consultant should clarify the following apparent discrepancies:

   - When projected perpendicular to the section, Boring B-1 should plot about 160 feet from the south edge of the northern building. On Cross Section A-A', Boring B-1 is plotted about 144 feet from the south edge of the northern building.
   - When projected perpendicular to the section, Boring B-2 should plot about 40 feet from the south edge of the northern building. On Cross Section A-A', Boring B-2 is plotted about 33 feet from the south edge of the northern building.

     The log for Boring B-2 indicates the boring was drilled to a depth of 17.5 feet. This boring is shown 25 feet deep on Cross Section A-A'.
   - Boring B-2 is plotted about five feet above the surface of the existing profile on Cross Section A-A'. The reason for this is not clear from the map and indicated projection.
   - At the location of Boring B-2, groundwater was encountered at a depth of 13 feet below the ground surface. On Cross-Section A-A' groundwater is indicated at 15 feet below the surface and at 21 feet in Boring B-2.
   - When projected perpendicular to the section, Boring B-3 should plot about 54 feet from the south edge of the southern building. On Cross Section A-A', Boring B-3 is plotted about 45 feet from the south edge of the southern building.
   - The log for Boring B-3 indicates the boring was drilled to a depth of 20 feet. This boring is shown 27 feet deep on Cross Section A-A'.
   - Boring B-3 is plotted about eight feet above the surface of the existing profile on Cross Section A-A'. The reason for this is not clear from the map and indicated projection.
   - Groundwater is noted on the log for Boring B-3 at a depth of 14 feet. The groundwater surface is indicated approximately 10 feet below the bottom of B-3 on Cross Section A-A'.
   - When projected perpendicular to the section, Boring B-4 should plot about 42 feet from the south edge of the southern building. On Cross Section A-A', Boring B-4 is plotted about 47 feet from the south edge of the southern building.

- The log for Boring B-4 indicates the boring was drilled to a depth of 12 feet. This boring is shown 16 feet deep on Cross Section A-A'.
- First groundwater is noted on the log for Boring B-4 at a depth of 10 feet. The groundwater surface is indicated at a depth of approximately 12 feet below the surface and 14 feet below the top of Boring 4 on Cross Section A-A'.

<u>Plan-Check Comments</u>

1. The name, address, and phone number of the Consultant and a list of all the applicable geotechnical reports shall be included on the building/grading plans.
2. The grading plan should include the limits and depths of overexcavation of the building pad and flatwork areas as recommended by the Consultant.
3. The following note must appear on the grading and foundation plans: "*Tests shall be performed prior to pouring footings and slabs to determine the expansion index of the supporting soils, and foundation and slab plans should be reviewed by the Geotechnical Consultant and revised, if necessary, accordingly.*"
4. The following note must appear on the grading and foundation plans: "*Excavations shall be made in compliance with CAL/OSHA Regulations.*"
5. The following note must appear on the foundation plans: "*All foundation excavations must be observed and approved, in writing, by the Project Geotechnical Consultant prior to placement of reinforcing steel.*"
6. Foundation plans and foundation details shall clearly depict the embedment material and minimum depth of embedment for the foundations.
7. Drainage plans depicting all surface and subsurface non-erosive drainage devices, flow lines, and catch basins shall be included on the building plans.
8. Final grading, drainage, and foundation plans shall be reviewed, signed, and wet stamped by the consultant.
9. Provide a note on the grading and foundation plans that states: "*An as-built report shall be submitted to the City for review. This report prepared by the Geotechnical Consultant must include the results of all compaction tests as well as a map depicting the limits of fill, locations of all density tests, outline and elevations of all removal bottoms, keyway locations and bottom elevations, locations of all subdrains and flow line elevations, and location and elevation of all retaining wall backdrains and outlets. Geologic conditions exposed during grading must be depicted on an as-built geologic map.*"

If you have any questions regarding this review letter, please contact GeoDynamics, Inc. at (805) 496-1222.

Respectfully Submitted,

GeoDynamics, INC.

Ali Abdel-Haq
Geotechnical Engineering Reviewer
GE 2308 (exp. 12/31/05)

Christopher J. Sexton
Engineering Geologic Reviewer
CEG 1441 (exp. 11/30/06)

Appendix B

References

References

The following list includes the citations of references referred to in this report.

Advanced Geotechnical Services, Inc., (2004), **Geotechnical Engineering and Geologic Study**, *Proposed Two Office Buildings*, 29515 Canwood Street, Agoura Hills, California, Client No. 3315, Report No. 6583, May 18, 2004.

Advanced Geotechnical Services, Inc., (2005), **Addendum I, Geotechnical Engineering and Geologic Study**, *Proposed Two Office Buildings*, 29515 Canwood Street, Agoura Hills, California, Client No. 3315, Report No. 6909, *revised* February 15, 2005.

Fragaszy, R. J. and Clough, G. W., (1980), Discussion to *Seismic Behavior of Gravity Retaining Walls* by Richards, R., Jr. and Elms, D. G., **Journal Geotechnical Engineering Division**, ASCE, Vol. 106, No. GT6, pp. 734-735.

Kavazanjian, E, Jr., Matasovic, N., Hadj-Hamou, T., and Sabatina, P. J. (1997), **Design Guidance: Geotechnical Earthquake Engineering for Highways, Volume I – Design Principles**, Geotechnical Engineering Circular No. 3, Publication FHWA-SA-97-076.

Seed, H. B., and Whitman, R. V., (1970), *Design of Earth Retaining Structures for Dynamic Loads*, **Proceedings, ASCE Specialty Conference on Lateral Stresses**, Cornell University, Ithica, NY, pp. 103-147.

Appendix C

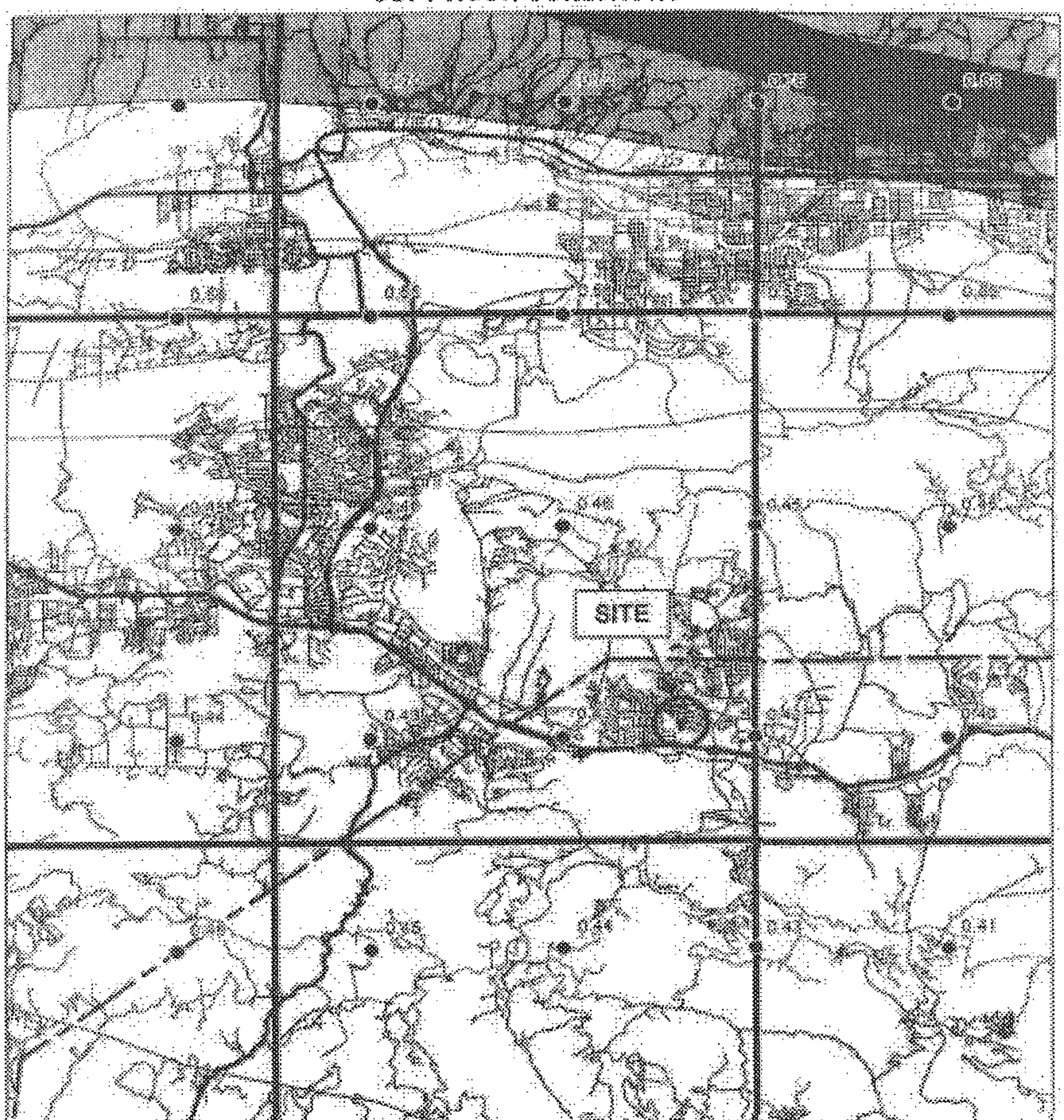
Supporting Information

THOUSAND OAKS 7.5 MINUTE QUADRANGLE AND PORTIONS OF ADJACENT QUADRANGLES

10% EXCEEDANCE IN 50 YEARS PEAK GROUND ACCELERATION (g)

1998

SOFT ROCK CONDITIONS

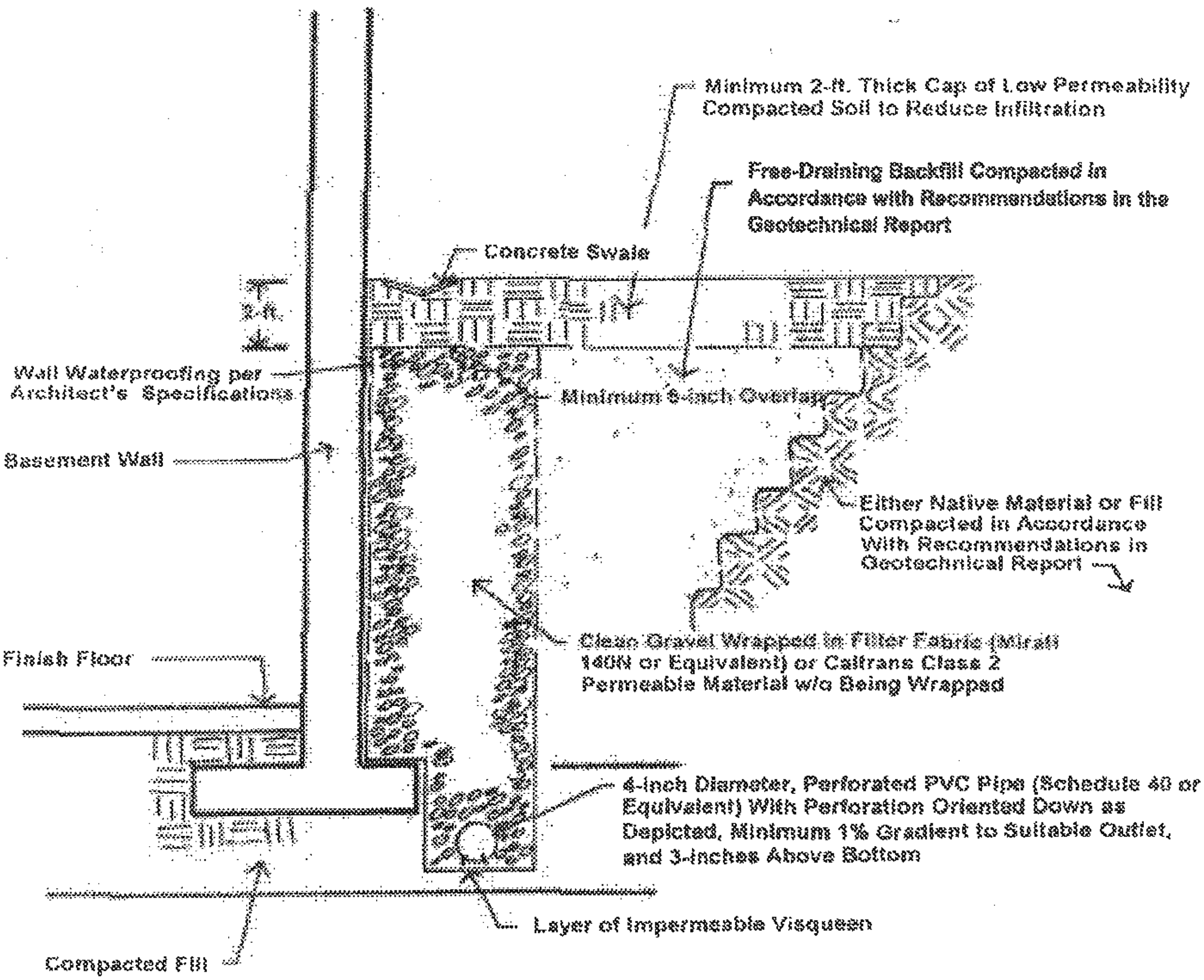


0 2.5 5
Kilometers

Department of Conservation
Division of Mines and Geology

Figure 3.2

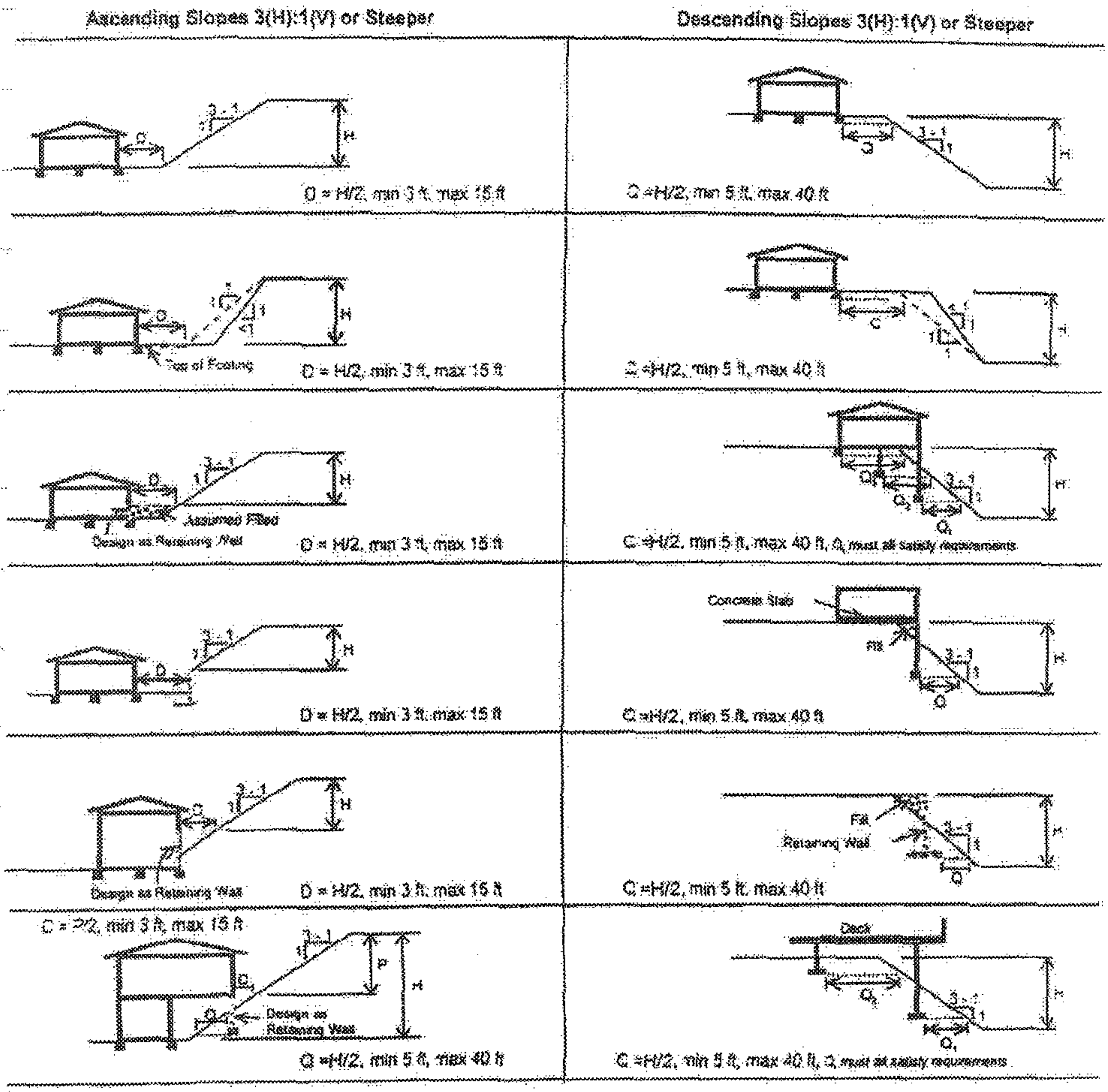
ags	**Advanced Geotechnical Services, Inc.**	**SUNBELT - 29515 Canwood St, Agoura Hills**
		Client No. 3315 / **Figure 1**



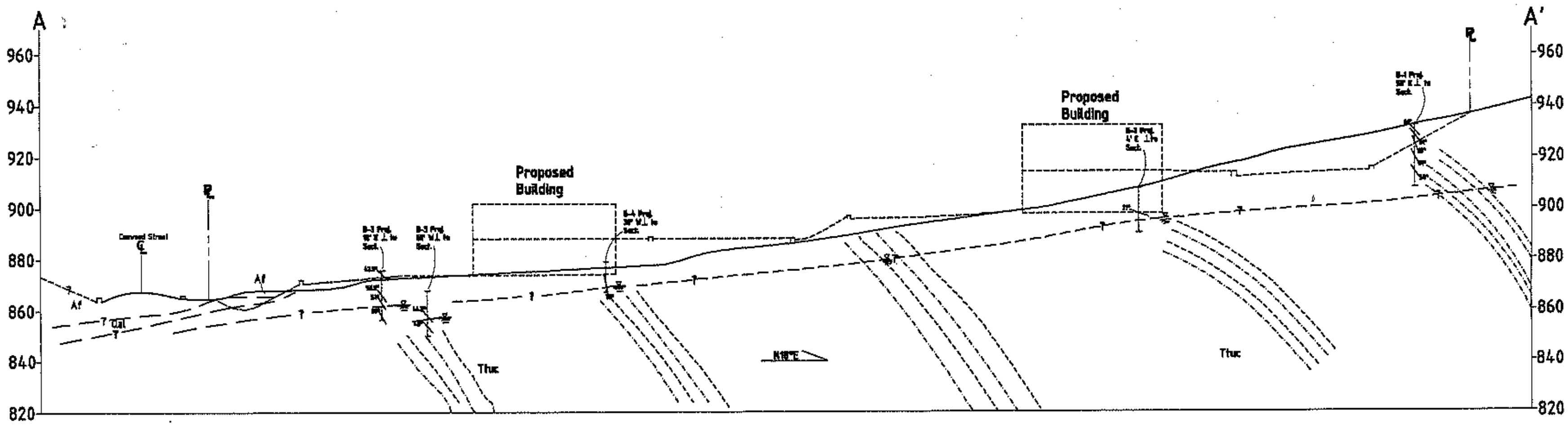
Typical Retaining Wall Drainage Detail

Advanced Geotechnical Services, Inc.	SUNBELT - 29515 Canwood St, Agoura Hills	
	Client No. 3315	Figure 2

Examples of Slope Setbacks Based On UBC 1806.4



ags	Advanced Geotechnical Services, Inc.	SUNBELT - 29515 Canwood St, Agoura Hills	
		Client No. 3315	Figure 3



advanced geotechnical services, inc.

5251 Verdugo Way, Suite L
Camarillo, California 93012
Office (805) 388-6162
Fax (805) 388-6167

Project/Client Name and Address

GP NO:

APN:

Client No. 3315	PLATE 2
Report No. 7268	
Date 3/2/06	
Scale 1"=20'	

4D
Response II, Geotechnical Engineering and Geologic Study, Proposed Two Office Buildings, 29541 and 29515 Canwood Street, Agoura Hills, California. Report No. 7268. Advanced Geotechnical Services, Inc. October 10, 2006.

FILE ORIGINAL

advanced geotechnical services, inc.

October 10, 2006
Client Number 3315
Report Number 7592

Ms. Bonnie Mooney
Sunbelt Enterprises
1801 Solar Drive, Suite 250
Oxnard, CA 93030

Response II
Geotechnical Engineering and Geologic Study
City of Agoura Hill – Geotechnical Review Sheet Dated August 23, 2006
(Planning Case No. 05-CUP-006 & 05-OTP-32 / GDI No. 05.00103.0136)
Proposed Two Office Buildings
29541 and 29515 Canwood Street, Agoura Hills, California

In accordance with your authorization, Advanced Geotechnical Services, Inc., has prepared this letter report to respond to the City of Agoura Hills geotechnical review sheet comments on the subject property by GeoDynamics, Inc., dated August 23, 2006 (Planning Case No. 05-CUP-006 & 05-OTP-32 / GDI No. 05.00103.0136). This letter report supplements our **Geotechnical Engineering and Geologic Study** report dated May 14, 2004 (Report No. 6583), and our **Response I** report dated March 3, 2006 (Report No. 7268). In preparing our responses, we have reviewed the comments and responded accordingly.

In an effort to facilitate the review process, each review comment is restated and followed by our response. A copy of the review sheet is included in Appendix A. Figures that summarize information contained in the responses are included in Appendix B.

Report Review Comments

Comment 1

Review Comment

The consultant recommends for design of restrained retaining wall under seismic loading conditions a component of static pressure that corresponds to walls that can deflect (i.e.: the $15H^2$ component). The consultant should utilize a component of static earth pressure that corresponds to restrained retaining walls. Mitigation measures should be recommended as necessary.

Response

The case of restrained walls was been re-evaluated resulting in the lateral force per unit length of wall being equal to $19.5H^2 + 20.2H^2$. We recommend that a uniform distribution be taken, locating the resultant force at the mid point for both the static component and dynamic component.

Comment 2

Review Comment

The consultant recommends placing a blanket drain underneath the floor slab. Groundwater encountered during the field investigation indicates the water level is very close to the floor in certain areas. The consultant should discuss and evaluate the benefit of placing the subdrain at or even below *the fill/bedrock contact, or placing a French drain around the building to mitigate the potential for saturating fill underlying the buildings.*

Response

The location of the recommended drainage system should be provided along the bedrock/fill contact in lieu of the previously recommended location under concrete slabs. An intercept drain installed beyond a 1:1 projection from the bottom of the exterior footing on the upslope side of the excavation may be used to control seepage of groundwater as shown in Figure 1, *Typical Intercept Drain Detail*, if necessary.

Plan-Check Comments

Comments 1 through 9

We acknowledge receipt of these nine plan-check comments, which need to be addressed by another individual with regards to plan submittal procedures and or specific notations to be added to the plans as required by the City of Agoura Hills. Upon the completion of said plans, AGS, Inc., acknowledges that our Engineer and Geologist will *review* said plan, and once they are found to be in compliance with the recommendations as provided in our original **Geotechnical Engineering and Geologic Study** report dated May 14, 2004, our **Addendum I** report revise-dated February 11, 2005, our **Response I** report dated March 3, 2006, and in addition to the responses to the report review comments as provided in this letter, said plans will then be wet-stamped and wet-signed.

Limits and Liability

The analysis and recommendations submitted in this letter are based in part on our report for the project (Report Nos. 6583, 6909, and 7268, dated May 14, 2004, February 15, 2005, and March 3, 2006 respectively), and the limitation and liability section in these reports apply to this letter. We have strived to provide our services in accordance with generally accepted geotechnical engineering practices in this community at this time, but we make *no* warranty, either express or implied.

Closing

We appreciate the opportunity to be of service. If we can be of further assistance, or answer any questions, please do *not* hesitate to call. We are looking forward to being of continued service as this project moves to the final construction phase.

Respectfully submitted,

Advanced Geotechnical Services, Inc.

REGISTERED PROFESSIONAL ENGINEER
DONALD E. VILLAFANA
C 37354
EXP. 09/2006
CIVIL
STATE OF CALIFORNIA

Kenneth J. Palos, President

Don Villafana, RCE 37354, Principal Engineer

Jacob Lukiewski, EIT 117669, Staff Engineer

Mike Leary, CEG 1519, Consulting Engineering Geologist

Brett Wanner, PG 7968, Professional Geologist

PROFESSIONAL GEOLOGIST
BRETT T. M. WANNER
No. 7968
STATE OF CALIFORNIA

Enclosures: Appendix A – *Review Comments* Appendix B – *Supporting Information*

cc: (6) Addressee (2) File

Appendix A

Review Comments

GeoDynamics, Inc.

Applied Earth Sciences
[illegible]

Date: August 23, 2006
GDI #: 05.00103.0138

CITY OF AGOURA HILLS - GEOTECHNICAL REVIEW SWEET

To:	Valerie Darbouze
Project Location:	29641 & 29515 Canwood Street, Agoura Hills, California
Planning Case #:	05-CUP-006 & 05-OTP-032 (Sunbelt Enterprises)
Building & Safety #:	None
Geotechnical Report:	Advanced Geotechnical Services, Inc. (2006), "Response I, Geotechnical Engineering and Geologic Study, (Planning Case No. 05-CUP-006 & 05-OTP-32/ GDI No. 05.00103.0138), Proposed Two Office Buildings, 29515 Canwood Street, Agoura Hills, California," Report Number 7268, dated March 3, 2006. Advanced Geotechnical Services, Inc. (2004), "Geotechnical Engineering and Geologic Study, Proposed Two Office Buildings, 29515 Canwood Street, Agoura Hills, California," Report Number 8563, dated May 14, 2004.
Plans:	The Warren Group Inc., (2005), "Architectural and Site Development Plans, Sheets SD-1, A-2, A-2.1, A-2.2, A-2.3, A-3, A-3.1, and A-3.2" Various Scales, dated October 4, 2005. Holmes Enterprises (2005), "Preliminary Grading Plan, Canwood Street Offices, Canwood Street, Agoura Hills, California," Scale: 1"=20', dated October 5, 2005.
Previous Reviews:	November 11, 2005

FINDINGS

Planning/Feasibility Issues	Geotechnical Report
☒ Acceptable as Presented	☐ Acceptable as Presented
☐ Response Required	☒ Response Required

REMARKS

Advanced Geotechnical Services, Inc. (AGS, consultant) provided a response to the City of Agoura Hills review letter dated November 11, 2005 regarding the proposed two office buildings at the site located at 29641 & 29515 Canwood Street, Agoura Hills, California. The proposed development includes the construction of two 2-story office buildings, parking areas, access roads, retaining walls, cut and fill slopes and landscaping.

The City of Agoura Hills – Planning Department reviewed the referenced report from a geotechnical perspective for compliance with applicable codes, guidelines, and standards of practice. GeoDynamics, Inc. (GDI) performed the geotechnical review on behalf of the City. Based upon the City's review, the referenced reports are acceptable as presented with regard to planning and feasibility issues. We recommend the Planning Commission consider approval of Case No. 05-CUP-006 & 05-OTP-032 from a geotechnical perspective. The consultant, however, should respond to the following report review comments prior to Building Plan Check approval. Plan-Check comments should be addressed in Building & Safety Plan Check, and a separate geotechnical submittal is not required for plan-check comments.

Report Review Comments

1. The consultant recommends for design of restrained retaining wall under seismic loading conditions a component of static pressure that corresponds to walls that can deflect (i.e.: the 1H component). The consultant should **utilize** a component of static earth pressure that corresponds to restrained retaining walls. Mitigation measures should be recommended as necessary.

2. The consultant recommends placing a blanket drain underneath the floor slab. Groundwater encountered during the field investigation indicates the water level is very close to the floor in certain areas. The consultant should discuss and evaluate the benefit of placing the subdrain at or even below the fill/bedrock contact, **or** placing a french drain around the building to mitigate **the** potential for saturating fill underlying the buildings.

Plan-Check Comments

1. The name, address, and phone number of the Consultant and a list of all the applicable geotechnical reports shall be included on the building/grading plans.

2. The grading plan should include the limits and depths of overexcavation of the building pad and flatwork areas as recommended by the Consultant.

3. The following note must appear on the grading and foundation plans: '*Tests shall be performed prior to pouring footings and slabs to determine the expansion index of the supporting soils, and foundation and slab plans should be reviewed by the Geotechnical Consultant and revised, if necessary, accordingly.*"

4. The following note must appear on the grading and foundation plans: "*Excavations shall be made in compliance with CAL/OSHA Regulations.*"

5. The following note must appear on the foundation plans: "*All foundation excavations must be observed and approved, in writing, by the Project Geotechnical Consultant prior to placement of reinforcing steel.*'

6. Foundation plans and foundation details shall clearly depict the embedment material and minimum depth of embedment for the foundations.

7. Drainage plans depicting **all** surface and subsurface non-erosive drainage devices, flow lines, and catch basins shall be included on the building plans.

8. Final grading, drainage, and foundation plans shall be reviewed, signed, and wet stamped by the consultant.

9. Provide a note on the grading and foundation plans that states: "*An as-built report shall be submitted to the City for review. This report prepared by the Geotechnical Consultant must include the results of all compaction tests as well as a map depicting **the** limits of fill, locations of all density tests, outline and elevations of all removal bottoms, keyway locations and bottom elevations, locations of all subdrains and flow line elevations, and location and elevation of all retaining wall backdrains and outlets. Geologic conditions exposed during grading must be depicted on an as-built geologic map.*"

If you have any questions regarding this review letter, please contact GeoDynamics, Inc. at (805) 498-**1222.**

Respectfully Submitted,

GeoDynamics, INC.

Ali Abdel-Haq
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GE 2308 (exp. **12/31/05)**

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