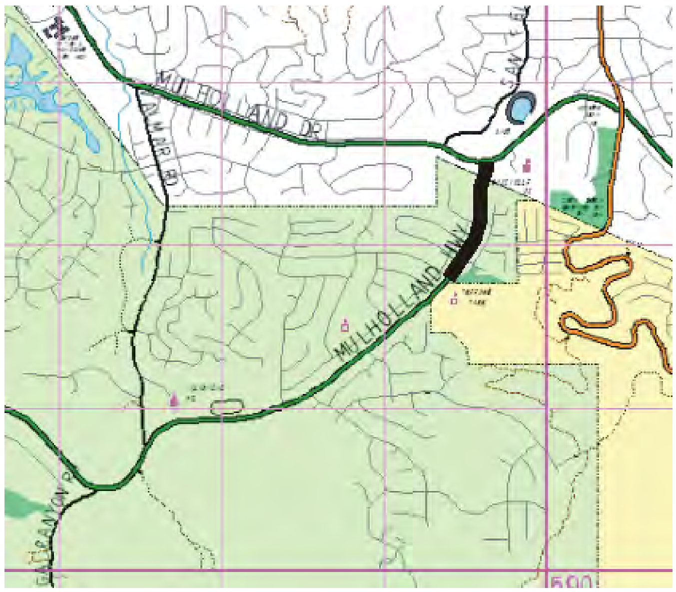
Initial Study/Mitigated Negative Declaration for the Mulholland Highway Scenic Corridor Operations Improvement Project, Phase III



Prepared for:

CITY of CALABASAS

Prepared by:

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354-B Warwick Avenue
Oakland, CA 94610

February 5, 2014

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STAGE OF CEQA DOCUMENT DEVELOPMENT

▢ **Administrative Draft.** This CEQA document is in preparation by Stetler & McHugh EHS Consulting LLC for the City of Calabasas.

▢ **Public Document.** This completed CEQA document has been filed by the City of Calabasas at the State Clearinghouse on February 7, 2014 and is being circulated for an agency and public review period. This review period began on February 7, 2014 and closes at 5:00pm on March 9, 2014. An electronic version of the Notice of Intent (NOI) and the complete CEQA document are available for review on the City of Calabasas Internet Web Pages at: www.cityofcalabasas.com

Addition methods of viewing the NOI, along with instructions for submitting written comments are provided on Page 5of this document.

▢ **Final CEQA Document.** This Final CEQA document contains the changes made by the City of Calabasas following consideration of comments received during the public and agency review period. The changes are displayed in strike-out text for deletions and underlined text for insertions. The CEQA administrative record supporting this document is on file, and available for review, at the City of Calabasas City Hall located at 100 Civic Center Way, Calabasas, California.

INTRODUCTION

This Initial Study/Mitigated Negative Declaration (IS/MND[1]) describes the environmental impact analysis conducted for the proposed project. This document was prepared by Stetler & McHugh EHS Consulting LLC (SMEHS) for the City of Calabasas utilizing information gathered from a number of sources including research and field review of the proposed project area and consultation with environmental planners and other experts on staff at other public agencies. Pursuant to Section 21082.1 of the California Environmental Quality Act (CEQA), the Lead Agency, City of Calabasas, has prepared, reviewed, and analyzed the IS/MND and declares that the statements made in this document reflect the City's independent judgment as Lead Agency pursuant to CEQA. The City of Calabasas further finds that the proposed project, which

[1] A list and definition of the acronyms and symbols used in this CEQA document is presented on pages 69-70..

includes revised activities and mitigation measures designed to minimize environmental impacts, will not result in significant adverse effects on the environment.

REGULATORY GUIDANCE

This IS/MND has been prepared to evaluate potential environmental effects which could result following approval and implementation of the proposed project. This document has been prepared in accordance with current CEQA Statutes (Public Resources Code [PRC] §21000 *et seq*.) and current CEQA Guidelines (California Code of Regulations [CCR] §15000 *et seq*.).

An Initial Study (IS) is prepared by a lead agency to determine if a project may have a significant effect on the environment (14 CCR § 15063[a]), and thus, to determine the appropriate environmental document. In accordance with CEQA Guidelines §15070, a "public agency shall prepare … a proposed negative declaration or mitigated negative declaration … when: (a) The Initial Study shows that there is no substantial evidence … that the project may have a significant impact upon the environment, or (b) The Initial Study identifies potentially significant effects but revisions to the project plans or proposal are agreed to by the applicant and such revisions will reduce potentially significant effects to a less-than-significant level." In this circumstance, the lead agency prepares a written statement describing its reasons for concluding that the proposed project will not have a significant effect on the environment and, therefore, does not require the preparation of an Environmental Impact Report (EIR). This IS/MND conforms to these requirements and to the content requirements of CEQA Guidelines Section 15071.

PURPOSE OF THE INITIAL STUDY

The City of Calabasas is the primary authority for carrying out the proposed project and is the lead agency under CEQA. The purpose of this IS/MND is to present to the public and reviewing agencies the environmental consequences of implementing the proposed project and describe the adjustments made to the project to avoid significant environmental effects or reduce them to a less-than-significant level. This disclosure document is being made available to the public, and reviewing agencies, for review and comment. The IS/MND is being circulated for public and agency review and comment for a review period of 30 days as indicated on the ***Notice of Intent to Adopt a Mitigated Negative Declaration*** (NOI). Refer to the NOI for dates of the 30-day public review period for this project. The information below discusses the publication and posting of the NOI for this project.

The requirements for providing an NOI are found in CEQA Guidelines §15072. These guidelines require the City of Calabasas to notify the general public by utilizing at least one of the following three procedures:

- Publication in a newspaper of general circulation in the area affected by the proposed project,
- Posting the NOI on and off site in the area where the project is to be located, or
- Direct mailing to the owners and occupants of property contiguous to the project.

The City of Calabasas has elected to utilize the first two of the three notification options. An electronic version of the NOI was published in ***The Acorn*** (newspaper) on February 13, 2014. It appeared in the Legal Notices Section within the Classified Section. The NOI was posted at five prominent locations on and off site in the area where the project is located for the entire public review period. The four locations where the NOI was posted during the public review period are:

1. City of Calabasas City Hall, 100 Civic Center Way
2. Calabasas Tennis and Swim Center, 23400 Park Sorrento
3. De Anza Park, 3701 Lost Hills Rd
4. Agoura Hills/Calabasas Community Center, 27040 Malibu Hills Rd
5. Gelsons Market, 22277 Mulholland Hwy

A complete copy of this CEQA document was made available for review by any member of the public requesting to see it at Locations #1above. An electronic version of the NOI and the CEQA document were made available for review for the entire public review period through their posting on the City of Calabasas's Internet Web Pages at: http://www.cityofcalabasas.com/departments/planning-division.html

If submitted prior to the close of public comment, views and comments are welcomed from reviewing agencies or any member of the public on how the proposed project may affect the environment. Written comments must be postmarked or submitted on or prior to the date the public review period will close (as indicated on the NOI) for the City of Calabasas's consideration. Written comments may also be submitted via email (using the email address which appears below) but comments sent via email must also be received on or prior to the close of the 30-day public comment period. Comments should be addressed to:

Marc Seferian, P.E., T.E.
Senior Civil Engineer
City of Calabasas
100 Civic Center Way
Calabasas, CA 91302
Phone: 818-324-1688
Email: mseferian@cityofcalabasas.com

After comments are received from the public and reviewing agencies, the City of Calabasas will consider those comments and may (1) adopt the Mitigated Negative Declaration and approve the proposed project; (2) undertake additional environmental studies; or (3) abandon the project.

Project Description and Environmental Setting

PROJECT LOCATION

The proposed project is located in Los Angeles County within the communities of Calabasas and the City of Los Angeles. The Mulholland Highway Scenic Corridor Operations Improvement Project, Phase III, as detailed in the Mulholland Highway Master Plan, includes commercial and retail land uses on the north side of Mulholland Highway and suburban residential properties and undeveloped land on the south side. The Zone 2 project area on Mulholland Highway begins in the City of Los Angeles at the Mulholland Drive intersection and continues north through the City of Calabasas, ending at the intersection of Mulholland Highway and Paul Revere Drive.

BACKGROUND AND NEED FOR PROJECT

Zone 2 of the Mulholland Highway corridor includes commercial and retail land uses on the north side and suburban residential properties and undeveloped land on the south side. Mulholland Highway begins in the City of Los Angeles at the Mulholland Drive intersection. Several roadway improvements have been implemented in this zone. However, many of the facilities are marginal and lack continuity. The Mulholland Drive intersection has successfully been treated as a gateway to the City. The numerous closely-spaced driveways and street intersections, as well as interruptions in pedestrian sidewalks, have created safety issues.

PROJECT OBJECTIVES

The purpose of the project is to improve traffic flow along Mulholland Highway and to address the need for a drop-off turnout accommodating the Alice C. Stelle Middle School. Additionally, the project will improve pedestrian and bicyclist safety and enhance the existing streetscape in order to create a more pedestrian friendly environment along Mulholland Highway.

PROJECT START DATE

The City of Calabasas anticipates the project will begin in the Summer of 2014.

PROJECT DESCRIPTION

Vehicular Facilities

Zone 2 consists of one to two travel lanes, in each direction, raised landscaped median islands, and curb and gutter throughout. Although existing and future traffic volumes on this roadway could be accommodated by the current roadway configurations, modifications to the roadway will improve vehicle and pedestrian/bicycle safety. The Gelson's Shopping Center east driveway will remain a right-in, right-out only facility. Extending the existing median to the west will also prevent illegal left-turning vehicles currently using this driveway. Overall, this area needs to complete the existing network of transportation facilities and introduce a landscaping scheme that will help soften the streetscape and be consistent with the rest of the corridor.

Proposed improvements include the following:

- 12-foot travel lanes on Mulholland Highway, in each direction, from Paul Revere Drive to Freedom Drive
- One 12-foot travel lane, westbound, from Freedom Drive to Mulholland Drive
- Two 12-foot travel lane, eastbound, from Freedom Drive to Mulholland Drive
- Curb and gutter, both sides
- 8-foot to 10-foot raised landscape median with intersection breaks

Bicycle and Pedestrian Facilities

Bike lanes, planting strips, and sidewalks are proposed to be improved and continuous throughout Zone 2 on both sides of the Highway. The roadway improvements west of the intersection of Mulholland Drive will allow for an additional travel lane, a wider bike lane to meet Caltrans standards, and a sidewalk. An extended sidewalk to Mulholland Drive will provide improved pedestrian access to Louisville High School in the City of Los Angeles. Landscaping in the planting strips on both sides of the roadway will help detract from the unattractive presence of the expansive paved sections of the widened roadway, surface parking lots, and retaining walls.

Proposed improvements include the following:

- 5-foot bike lanes, both sides
- 4-foot to 12-foot planting strip, north side
- 5-foot to 10-foot concrete sidewalk from Paul Revere Drive to Mulholland Way, both sides

Intersection Treatments

Left-turn and right-turn storage lanes at all intersections and most driveways are recommended to facilitate the safety of vehicular turning movements. Median landscaping will be designed to provide adequate sight distance at all intersections.

Striping and signing improvements are recommended in the vicinity of the commercial driveways in an attempt to improve ingress and egress to and from the shopping center. Some driveway intersections will have restricted turning movements to provide for greater safety.

Proposed improvements include the following:

Paul Revere Drive Intersection

- Installation of a “count-down” pedestrian signal
- 150-foot left-turn lane, westbound, with an additional 150-feet of 2-way, left turn lane storage area
- 150-foot right-turn lane, westbound

Parched Drive Intersection

- 100-foot left-turn lane, westbound
- 50-foot right-turn lane, eastbound

Freedom Drive Intersection

- Installation of a “smart” crosswalk across Mulholland Highway, west side

- 100-foot left-turn lane, eastbound
- 100-foot left-turn lane, westbound

Gas Station driveway Intersection

- 30-foot left-turn lane, eastbound

Gelson's Shopping Center west driveway Intersection

- 250-foot 2-way left-turn lane from gas station driveway to Gelson's Shopping Center driveway, westbound

Mulholland Drive Intersection

- 175-foot left-turn storage lane, westbound
- 175-foot right-turn storage lane, eastbound (Mulholland Highway approach)

The intersection of Mulholland Highway and Mulholland Drive is within the City of Los Angeles limits. Improvements at this location will be coordinated between the City of Calabasas and the City of Los Angeles Department of Transportation (LADOT).

Roadway and Utility Improvements

Special Right-of-Way Considerations

Most of the proposed improvements will occur within the existing right-of-way, with one exception: a retaining wall adjacent to Parcel 2173-001-011 & 012 at 4245 Balcony Drive at the eastern end of Zone 2. The conditions of approval of the parcel map require the landowner's cooperation to build a retaining wall and revegetate the cut slopes.

Slopes and Retaining Wall

The additional amount of paved roadway needed to create a three-lane section with bicycle and pedestrian facilities to Mulholland Drive requires a significant amount of grading.

Retaining Wall

The retaining wall requires the construction of a tiered concrete masonry retaining wall. The maximum wall height will be 6 feet with terraces sloped at a 10:1 ratio. The wall material and landscaping will reduce any negative visual impact of the retaining wall.

Roadway Improvements and Curb Realignment

The most restrictive area of this project is the segment immediately west of Mulholland Drive where steep embankments and limited right-of-way constrain roadway improvements opportunities. Standards were established by City Staff for the minimum desirable widths of all roadway facilities in this section, and they include the following:

- 4-foot sidewalk, north side; 5-foot sidewalk, south side
- 5-foot planting strip, north side
- 5-foot bike lanes (including gutter) in both directions
- Three 11-foot travel lanes, two westbound, one eastbound

The retaining wall design allows for approximately 17-foot of additional useable right-of-way. These facilities can be accommodated with the proposed retaining wall design.

Landscaping Improvements

View Characteristics

Landscaping improvements in Zone 2 will be formal in design, dense and layered with multiple plant species and varieties. The natural conditions along the slope bank at the southeast end of the zone will be enhanced with native planting and revegetated to its natural state following the roadway improvements in order to provide an attractive visual softening of the highway. Trees will grow into substantial canopies, providing shade, shadow, and greenery to this automobile-dominated segment of the highway. Due to the roadway width in the zone, these tree canopies should not impede long-range views. New landscaping is intended to accentuate and frame mountain views, and new shrub planting shall be arranged in an informal mosaic pattern.

Landscaping Elements

The commercial retail center of Zone 2 is one of most active and developed areas of the project. The landscape character in this area will focus on a manicured, classical, and ornamental plant palette to reinforce the strong architectural features of the Gelson's shopping center and integrate the various uses in the area. Strong site lines created by repetitive plantings will emphasize the existing natural landscape. Color will be spread liberally throughout this zone. Fine texture and refinement will replace the native plantings along the rest of the corridor.

The median planting will complement and provide a welcome backdrop to the stone citywide entry monument.

Plant species will be consistent with or compliment the plants used in the City of Los Angeles pocket park at the intersection of Mulholland Drive.

Retaining Wall and Hillside Vegetation

If not properly landscaped, irrigated, and maintained, the engineered cut slopes could result in a scarring of the natural hillside. An essential design parameter will be to use wall materials that are natural in appearance, and indicative of the local environment. Planting should also complement the Santa Monica Mountain Mediterranean climate.

The hillside improvements in Zone 2 will consist of decorative, natural tone block walls, and generous planting. Revegetation of the cut slope on the Rumph parcel will use indigenous plants, which will be integrated into the more formalized landscape at the street level. Retaining wall design shall consider cost, but compatible and attractive material is essential to the Plan's beautification efforts.

MAPS AND PHOTOGRAPHS OF PROJECT AREA

**All photos were retrieved from Google Maps between September and December 2013*

Figure 1. Aerial photo illustrating the project location: Mulholland Highway from Paul Revere Drive to Mulholland Drive.

Figure 2. Current conditions: Location for retaining wall on Mulholland Highway adjacent to Parcel 2173-001-011 & 012 at 4245 Balcony Drive, looking East.

Figure 3. Current conditions: Location for retaining wall on Mulholland Highway adjacent to Parcel 2173-001-011 & 012 at 4245 Balcony Drive, looking North.

Figure 4. Current conditions: Location for retaining wall on Mulholland Highway adjacent to Parcel 2173-001-011 & 012 at 4245 Balcony Drive, looking South-East.

Figure 5. Current conditions: Commercial Retail Center (Gelson's Shopping Center) at Mulholland Highway at Mulholland Drive Looking South.

Figure 6. Current Conditions: Aerial of Mulholland Highway from Mulholland Drive to Freedom Drive.

Figure 7. Current Conditions: Aerial of Mulholland Hwy at Paul Revere Drive.

Figure 8. Current Conditions: Mulholland at Paul Revere Drive – Middle School Turn-out Location.

Figure 9. Current Conditions: Aerial of Mulholland Highway at Parched Drive.

Figure 10. Current Conditions - Aerial of Mulholland Highway at Freedom Drive.

Conclusion of the Mitigated Negative Declaration

ENVIRONMENTAL PERMITS

The proposed project may require the following environmental permits and agency coordination. The City of Calabasas may be required to comply with the following State and local regulations:

- Oak Tree Permit, as per the City's Oak Tree Ordinance (Calabasas Municipal Code § 17.26.070), for hillside/slop construction.
- Local Storm Water Pollution Prevention Plan/Wet Weather Erosion Control Plan ("SWPPP/WWECP").
- City of Los Angeles B-Permit for the retaining wall design and sidewalk improvements extending into the City of Los Angles right-of-way.
- Submittal of plans to Los Angeles Department of Transportation (LADOT) for determination of the traffic lane requirements.
- Pre-application meeting with the Los Angeles Permits section if any catch basin relocation will be conducted as part of the project.

SUMMARY OF FINDINGS

The analysis in the initial study, below, shows that this project would not result in any impacts to the environment in the following environmental impact areas:

- Aesthetics
- Agriculture and Forest Resources
- Land Use and Planning
- Mineral Resources
- Population and Housing
- Public Services
- Recreation
- Transportation
- Utilities and Service Systems

Additionally, one or more less than significant impacts to the environmental would occur in the following environmental impact areas:

- Air Quality
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology / Water Quality
- Noise

Finally, one or more impacts of less than significant with mitigation would occur in the following environmental impact areas:

- Biological Resources
- Cultural Resources
- Mandatory Findings of Significance

For those environmental impact areas requiring mitigation to achieve less than significant environmental impact status, the following is a list of mitigation measures to be implemented to reduce the environmental impacts of the proposed project to less than significant levels.

MITIGATION MEASURES

The following mitigation measures will be implemented by the City of Calabasas to avoid or minimize environmental impacts. Implementation of these measures will reduce the environmental impacts of the proposed project to a less than significant level.

Mitigation Measure #1: Biological Resources – Oak Tree Removal

In accordance with Calabasas Municipal Code §17.26.707, an oak tree removal permit must be obtained for oak trees located on the hillside/slope construction.

Mitigation Measure #2: Cultural Resources

Prior to issuance of a grading permit, the City of Calabasas shall retain a certified archaeologist to implement the monitoring program. The certified archaeologist shall attend the pre-grading meeting with the contractors to explain and coordinate the requirements of the monitoring program. During the grading of previously undisturbed soil, the archaeological monitor shall be on-site, as determined by the consulting archaeologist, to perform inspections of the excavations. Isolates and clearly non-significant deposits will be minimally documented in the field so the monitored grading can proceed.

In the event that previously unidentified cultural resources are discovered, the archaeologist shall have the authority to divert or temporarily halt ground disturbance operation in the area of discovery to allow for the evaluation of potentially significant cultural resources. The archaeologist shall contact the lead agency at the time of discovery. The archaeologist, in consultation with the lead agency, shall determine the significance of the discovered resources. The lead agency must concur with the evaluation before construction activities will be allowed to resume in the affected area. For significant cultural resources, a Research Design and Data Recovery Program to mitigate impacts shall be prepared by the consulting archaeologist and approved by the lead agency before being carried out using professional archaeological methods. If any human bones are discovered, the county coroner and lead agency shall be contacted. In the event that the remains are determined to be of Native American origin, the most likely descendant, as identified by the NAHC, shall be contacted in order to determine proper treatment and disposition of the remains.

Before construction activities are allowed to resume in the affected area, the artifacts shall be recovered and features recorded using professional archaeological methods. The archaeological monitor(s) shall determine the amount of material to be recovered for an adequate artifact sample for analysis. All cultural material collected during the grading monitoring program shall be processed and curated according to the current professional repository standards. The collections and associated records shall be transferred, including title, to an appropriate curation facility, to be accompanied by payment of the fees necessary for permanent curation.

A report documenting the field and analysis results and interpreting the artifact and research data within the research context shall be completed and submitted to the satisfaction of the lead agency prior to the issuance of any building permits. The report will include DPR Primary and Archaeological Site Forms.

2. INITIAL STUDY/ENVIRONMENTAL CHECKLIST

The analysis in this document assumes that, unless otherwise stated, the project will be designed, constructed, and operated according to all applicable laws, regulations, ordinances, and formally adopted City standards (e.g., City of Calabasas Municipal Code). Construction will follow uniform practices established by the Southern California chapter of the American Public works Association as specifically adapted by the City of Calabasas.

PROJECT DESCRIPTION AND BACKGROUND

Project Title:	Mulholland Highway Scenic Corridor Operations Improvement Project, Phase III
Lead agency name and address:	City of Calabasas, 100 Civic Center Way 91302
Contact person and phone number:	Marc Seferian, 8181-224-1688
Project Location:	Mulholland Hwy between Paul Revere Drive and Mulholland Drive
Project sponsor's name and address:	City of Calabasas, 100 Civic Center Way 91302
Zoning:	Residential, Single-Family; Commercial – Mixed Use.
Description of project: (Describe the whole action involved, including but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation.)	The purpose of the project is to improve traffic flow along Mulholland Highway and to address the need for a drop-off turnout accommodating the Alice C. Stelle Middle School. Additionally, the project will improve pedestrian and bicyclist safety and enhance the existing streetscape in order to create a more pedestrian friendly environment along Mulholland Highway.
Surrounding land uses and setting; briefly describe the project's surroundings:	Residential, Single-Family; Commercial – Mixed Use.
Other public agencies whose approval is required (e.g. permits, financial approval, or participation agreements):	City of Los Angeles, County of Los Angeles

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below will be potentially affected by this project.*

☐	Aesthetics	☐	Agriculture and Forestry	☐	Air Quality
☐	Biological Resources	☐	Cultural Resources	☐	Geology/Soils
☐	Greenhouse Gas Emissions	☐	Hazards and Hazardous Materials	☐	Hydrology/Water Quality
☐	Land Use/Planning	☐	Mineral Resources	☐	Noise
☐	Population/Housing	☐	Public Services	☐	Recreation
☐	Transportation/Traffic	☐	Utilities/Service Systems	☐	Mandatory Findings of Significance

* The environmental factors with checked boxes are those that would be potentially affected by the project, involving at least one impact that is identified as a "Potentially Significant Impact" in the checklist analysis.

DETERMINATION

On the basis of this initial evaluation:

☐	I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
☒	I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
☐	I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
☐	I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
☐	I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required

Signature:	**Date:**
Printed Name: Robert Yalda	**For:**

DETERMINATION

On the basis of this initial evaluation:

☐	I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
☒	I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
☐	I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
☐	I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
☐	I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required

Signature: Robert Yalda	**Date:** 1/4/2014
Printed Name: Robert Yalda	**For:**

CEQA ENVIRONMENTAL CHECKLIST

This checklist identifies physical, biological, social and economic factors that might be affected by the proposed project. In many cases, background studies performed in connection with the projects indicate no impacts. A NO IMPACT answer in the last column reflects this determination. Where there is a need for clarifying discussion, the discussion is included either following the applicable section of the checklist or is within the body of the environmental document itself. The words "significant" and "significance" used throughout the following checklist are related to CEQA, not NEPA, impacts. The questions in this form are intended to encourage the thoughtful assessment of impacts and do not represent thresholds of significance.

ANALYSIS OF POTENTIAL ENVIRONMENTAL IMPACTS

I. AESTHETICS

I. AESTHETICS: Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☒
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

a) Have a substantial adverse effect on a scenic vista?

A scenic vista generally provides focal views of objects, settings, or features of visual interest or panoramic views of large geographic areas of scenic quality, primarily from a given vantage point. A significant impact may occur if the proposed project introduces incompatible visual elements within a field of view containing a scenic vista or substantially alters a view of a scenic vista.

No scenic vistas exist on or near the project site. In addition, the proposed project is a road improvement project, and no structures or other elements that may obstruct scenic vistas are planned. Accordingly, no impact on scenic vistas will occur as a result of the proposed project.

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

A significant impact may occur where scenic resources within a state scenic highway would be damaged or removed by the proposed project.

Based on a review of the California Scenic Highway Mapping System, there are no designated California Scenic Highways located on or within the vicinity of the proposed project. Therefore, no impact on state-designated scenic highways will occur.

The site is located within a scenic corridor (SC) overlay zone as it can be seen from the Mulholland Highway, a City-designated scenic corridor (City of Calabasas General Plan FEIR, 1995). Although the Mulholland Highway improvement project area is designated as a scenic corridor, the parcels immediately adjacent to both sides of the roadway are developed with existing commercial retail, educational, and suburban residential uses.

Accordingly, the proposed improvements will have no impact to scenic resources within a state scenic highway.

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

A significant impact may occur if the proposed project introduces incompatible visual elements to the project site or visual elements that would be incompatible with the character of the area surrounding the project site.

One of the project's primary purposes is to beautify the roadway segment and the small natural slope area near the northern boundary of the project in conformance with the goals established in the Mulholland Highway Master Plan for Capital Improvements. The plan includes the following text describing the beautification program:

> "Landscaping improvements in Zone 2 will be formal in design, [with] dense and layered with multiple plant species and varieties. The natural conditions along the slope bank at the southeast end of the zone will be enhanced with native planting and revegetated to its natural state following the roadway improvements in order to provide an attractive visual softening of the highway. Large trees will grow into substantial canopies, providing shade, shadow, and greenery to this automobile-dominated segment of the highway. Due to the roadway width in the zone, these large tree canopies should not impede long-range views. New landscaping is intended to accentuate and frame mountain views, and new shrub planting shall be arranged in an informal mosaic pattern."

The plans prepared for the proposed project include a significant streetscape landscaping component, which establishes an aesthetic environment consistent with the beautification goal stated above. In this regard, no impact will result.

The proposed project will require grading and the construction of retaining walls along a portion of a natural slope along the east side of Mulholland Highway near its intersection with Mulholland Drive. These improvements could negatively impact the existing visual character of the project area, if significant landscaping and natural building materials were not proposed as part of the proposed grading. The grading and retaining walls will be concentrated along the lower portions of the slope, near street level, in order to accommodate the proposed sidewalk extension and the proposed slope landscaping. The retaining walls will be constructed out of natural materials and will be further screened by the proposed landscaping. The existing oak trees will also be retained within this portion of the improvement. Therefore, the project will have a less than significant impact on scenic resources. .

d) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

A significant impact may occur if the proposed project introduces a new source of light or glare that would be incompatible with the areas surrounding the project site or pose a safety hazard, especially to motorists using adjacent streets.

Overhead utilities and light fixtures already exist along the Mulholland Highway project area. The existing lighting is provided by 30-foot high pole standards with a cobra head style luminary. The resulting light levels exceed those established by Los Angeles County. As a result, the proposed roadway improvements do not include modification to the existing light standards and therefore will not create new sources of light. The proposed roadway improvements will also not create new sources of glare, as they will only involve the construction of non-reflective improvements, such as concrete walkways, roadway striping, landscaping, and retaining walls. The project will have no impact on light and glare.

II. AGRICULTURE AND FORESTRY

II. Agriculture and Forestry	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997, as updated) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of forest land (as defined in Public Resources Code §12220(g)), timberland (as defined by Public Resources Code §4526), or timberland zoned Timberland Production (as defined by Government Code §51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒

II. Agriculture and Forestry	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
e) Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

A significant impact may occur if the proposed project were to result in the conversion of state-designated agricultural land from agricultural use to another non-agricultural use.

The proposed project involves improvements to an existing roadway. With the exception of natural slopes present along a small portion of the roadway segment, the entire project area has been paved over. No agricultural resources are present and therefore no impact will occur. .

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

A significant impact may occur if the proposed project were to result in the conversion of land zoned for agricultural use or included under a Williamson Act contract from agricultural use to another non-agricultural use.

The proposed project involves improvements to an existing roadway. With the exception of natural slopes present along a small portion of the roadway segment, the entire project area has been paved over. No agricultural resources are present and therefore no impact will occur. .

c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland, to non-agricultural use?

A significant impact may occur if a project results in the conversion of farmland to a non-agricultural use.

The proposed project involves improvements to an existing roadway. With the exception of natural slopes present along a small portion of the roadway segment, the entire project area has been paved over. No agricultural resources are present and therefore no impact will occur. .

d) Would the project result in the loss of forest land or conversion of forest land to non-forest use?

The proposed project involves improvements to an existing roadway. With the exception of natural slopes present along a small portion of the roadway segment, the entire project area has been paved over. No forest land is present and therefore no impact will occur.

e) Would the project involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?

The proposed project involves improvements to an existing roadway. With the exception of natural slopes present along a small portion of the roadway segment, the entire project area has been paved over. No agricultural or forest land is present and therefore no impact will occur.

III. AIR QUALITY

III. Air Quality. Will the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	☐	☐	☐	☒
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒

a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

A significant impact may occur if the project is not consistent with the applicable Air Quality Management Plan (AQMP) or in some way represents a substantial hindrance to employing the policies or obtaining the goals of the plan. The proposed project is located within the jurisdiction of the South Coast Air Quality Management District (SCAQMD).

Long-term emissions associated with future development in Calabasas in accordance with the 2030 General Plan are those associated with vehicle trips and stationary sources (electricity and natural gas). The proposed project will not directly or indirectly result in the development of additional mobile or stationary sources of air emissions. The net effect of the roadway improvements will be to reduce vehicle congestion along the Mulholland Highway corridor by modifying the existing roadway geometry and by constructing additional pedestrian, bicycle, and transit improvements designed to increase the use of non-motorized forms of transportation and to decrease the use of the private automobile. Furthermore, the project will beautify the area through the installation of additional streetscape landscaping. The landscaping design will be natural in appearance and will blend with the natural environment. This is consistent with the 2007 Air Quality Management Plan and the City of Calabasas' 2030 General Plan. .

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

The Basin is a non-attainment area for O_3, PM_{10}, and $PM_{2.5}$. In determining attainment and maintenance of air quality standards, SCAQMD has established thresholds of significance for these and other criteria pollutants. A significant impact would occur if the project resulted in substantial emissions during construction or operation that would exceed the established thresholds.

The project will not violate air quality standards, as only temporary air emissions will be generated during construction. Projects with the amounts of earthwork and paving associated with this project do not violate these thresholds. Standard roadway construction equipment will emit Ozone pre-cursors. NOx and CO will be emitted by the operation of construction equipment, while fugitive dust (PM_{10}) will be emitted by activities that disturb the soil, such as grading and excavation, road construction and building construction. To ensure that these emissions will not exceed emission standards developed by the South Coast Air Quality Management District (SCAQMD), the project will need to comply with rules 402 and 403, which require that air pollutant emissions not be a nuisance off-site and reduce the ambient entrainment of fugitive dust. Rule 403 includes best available control measures for all construction activity, disturbed surface areas, unpaved roads, open storage piles, demolition, and other various construction activities. Adherence to applicable SCAQMD Rules 402 and 403 will reduce potential construction-related impacts to a less than significant level.

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?

A significant impact may occur if the proposed project, when viewed together with the effects of other projects, would result in a considerable net increase of a criteria pollutant for which the region exceeds air quality standards. The Basin is designated as a non-attainment area for O_3, PM_{10}, and $PM_{2.5.}$

The City of Calabasas is located within the South Coast Air Basin, which is classified as a nonattainment area for federal and state standards for ozone, PM_{10}, and $PM_{2.5}$. As stated above, the proposed roadway improvements will improve vehicle flow along the Mulholland Highway corridor and increase the use of non-motorized transit and mass transit services. Therefore, the project will contribute to a reduction in ozone emissions. Particulate matter emissions will primarily be experienced during project construction. Compliance with applicable SCAQMD rules for construction activities (such as Rule 402 and 403) will ensure that construction related particulate emissions will be less than significant. Project related air pollutant emissions will not be significant.

d) Expose sensitive receptors to substantial pollutant concentrations?

A significant impact may occur if construction or operation of the proposed project generated pollutant concentrations to a degree that would significantly affect sensitive receptors. Land uses considered to be sensitive receptors include long-term health care facilities, rehabilitation centers, convalescent centers, retirement homes, residences, schools, playgrounds, child care centers, and athletic facilities.

Completion of the proposed roadway improvements will require the operation of construction equipment adjacent to residential neighborhoods. While these activities could emit pollutants and odors that could impact adjacent commercial and residential uses, compliance with the standard construction best practices mentioned above will ensure that impacts will remain less than significant. As noted above, construction projects with this type of scope, do not violate any substantial pollutant concentration thresholds. The City of Calabasas will be the agency enforcing compliance with the required best management practices to ensure that construction activities will not adversely impact adjacent uses.

e) Create objectionable odors affecting a substantial number of people?

A significant impact may occur if construction or operation of the proposed project would result in the generation of odors that would be detectable in adjacent areas.

Completion of the proposed roadway improvements will require the operation of construction equipment adjacent to residential neighborhoods. While these activities could emit pollutants and odors that could impact adjacent commercial and residential uses, compliance with the standard construction best practices mentioned above will ensure that impacts will remain less than significant. The City of Calabasas will be the agency enforcing compliance with the required best management practices to ensure that construction activities will not adversely impact adjacent uses.

IV. BIOLOGICAL RESOURCES

IV. Biological Resources. Will the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☐	☒
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☒	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

A significant impact may occur if the proposed project would remove or modify habitat for any species identified or designated as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulation or by the state or federal regulatory agencies cited.

The project area includes the existing Mulholland Highway roadway segment, its intersection with local neighborhood streets, and a small natural slope area near the intersection of Mulholland Highway and Mulholland Drive. Overall, the project area will not impact any biological resources under the jurisdiction of the US Fish and Wildlife Service, Army Corps of Engineers, Regional Water Quality Control Board, and Department of Fish and Game. According to the 2030 General Plan EIR (2008), the project area is not located within an area designated as a wildlife movement corridor or an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other locally approved habitat conservation plan.

The existing Mulholland Highway road segment and the neighborhood street intersections do not contain any native vegetation and thus completion of the proposed roadway improvements within the existing pavement areas will have no impact on biological resources. No further study of biological resources is required within the areas of existing pavement.

The project will involve grading of a portion of the existing natural slope in order to create sufficient space for the construction of a concrete walk, roadway landscaping, and roadway striping. A preliminary survey of the natural slope area identified the presence of remnant California sagebrush habitat and the presence of native oak trees on this hillside landform that extends north, on the east side of Mulholland Highway, to its intersection with Mulholland Drive. The remnant coastal sage scrub was interspersed with non-native plant species and surrounded by ornamental landscaping located within the adjacent rear yards of homes located along Balcony Drive. Project grading will be limited to the western portions of this natural slope, thereby minimizing the impact on any native biological habitat. The planting of native vegetation as part of the roadway improvement program will adequately offset any impacts to on-site native vegetation resulting from the proposed slope grading. Impacts to biological resources will therefore be less than significant. Compliance with the City's Municipal Code provisions and/or General Plan policies pertaining to the protection native biological resources will likely be sufficient.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or US Fish and Wildlife Service?

A significant impact may occur if riparian habitat or any other identified sensitive natural community were to be adversely modified.

The project area includes the existing Mulholland Highway roadway segment, its intersection with local neighborhood streets, and a small natural slope area near the intersection of Mulholland Highway and Mulholland Drive. Overall, the project area will not impact any biological resources under the jurisdiction of the US Fish and Wildlife Service, Army Corps of Engineers, Regional Water Quality Control Board, and Department of Fish and Game. According to the 2030 General Plan EIR (2008), the project area is not located within an area designated as a wildlife movement corridor or an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other locally approved habitat conservation plan.

The existing Mulholland Highway road segment and the neighborhood street intersections do not contain any native vegetation and thus completion of the proposed roadway improvements within the existing pavement areas will have no impact on biological resources. No further study of biological resources is required within the areas of existing pavement.

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c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

A significant impact may occur if wetlands that are protected under federal regulation, as defined by Section 404 of the Clean Water Act, would be modified or removed.

According to a review of the U.S. Fish and Wildlife Service Wetlands Online Mapper, no wetlands, as defined by Section 404 of the Clean Water Act, exist on or in the immediate vicinity of the project site. Therefore, no impacts related to wetlands will occur.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

A significant impact may occur if the proposed project interferes or removes access to a migratory wildlife corridor or impedes the use of native wildlife nursery sites.

The project area includes the existing Mulholland Highway roadway segment, its intersection with local neighborhood streets, and a small natural slope area near the intersection of Mulholland Highway and Mulholland Drive. Overall, the project area will not impact any biological resources under the jurisdiction of the US Fish and Wildlife Service, Army Corps of Engineers, Regional Water Quality Control Board, and Department of Fish and Game. According to the 2030 General Plan EIR (2008), the project area is not located within an area designated as a wildlife movement corridor or an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other locally approved habitat conservation plan.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

A significant impact may occur if the proposed project would cause an impact that was inconsistent with local regulations pertaining to biological resources, including protected trees.

One oak tree is proposed for removal, and it is identified as having extensive trunk rot. Therefore, direct project impacts will be less than significant. Given the presence of native oak trees within and adjacent to the project area, a formal oak tree report may be required prior to issuance of a grading and/ or building permit in order to comply with the City's Oak Tree Ordinance. The City's Oak Tree Preservation and Protection Guidelines per §17.26.070 of the Calabasas Municipal Code requires the preservation of all healthy oak trees unless compelling reasons justify the removal of such trees. Under these guidelines, a "permit to alter" or a "permit to remove" shall be obtained if impacts to oak trees are expected. With or without preparation of an oak tree report, the planting of trees as part of the proposed roadway landscaping will adequately offset the removal or impact to any on-site oak trees as a result of project grading.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

A significant impact may occur if the proposed project were inconsistent with mapping or policies in any conservation plans of the types cited. No habitat conservation plans are applicable to the project corridor. Accordingly, the proposed project will not conflict with any local, regional, or state habitat conservation plan. Therefore, no impact will occur.

The project area includes the existing Mulholland Highway roadway segment, its intersection with local neighborhood streets, and a small natural slope area near the intersection of Mulholland Highway and Mulholland Drive. Overall, the project area will not impact any biological resources under the jurisdiction of the US Fish and Wildlife Service, Army Corps of Engineers, Regional Water Quality Control Board, and Department of Fish and Game. According to the 2030 General Plan EIR (2008), the project area is not located within an area designated as a wildlife movement corridor or an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other locally approved habitat conservation plan.

V. CULTURAL RESOURCES

V. Cultural Resources. Will the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	☐	☒	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	☐	☒	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

A cultural resources records search and field survey was conducted for the slope grading portion of the project (Site LAN-246) located on Mulholland Highway at Mulholland Drive. The study was conducted by Garcia and Associates staff in October 2013, and included the following: records searches at the South Central Coastal Information Center of the California Historic Resource Inventory System, the Natural History Museum of Los Angeles County, and the University of California Museum of Paleontology; archival research of maps and documents; coordination with the Native American Heritage Commission and interested Native American groups and individuals; and an intensive pedestrian survey of the project's Area of Potential Effect (APE).

An extended Cultural Resources Phase I study was conducted by Brian F. Smith and Associates, Inc. in January 2014 to identify cultural resources occurring within the project's slope grading portion (Site LAN-246) to determine, if possible, site type and function, context of the deposit, and chronological placement of each cultural resource identified; and to place each cultural resource identified within a regional perspective.

a) Cause a substantial adverse change in the significance of a **historical** resource as defined in California Code of Regulations Section 15064.5?

A significant impact would occur if the project caused a substantial adverse change to a historical resource through demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the historical resource would be materially impaired.

No subsurface cultural materials were identified as a result of the archaeological testing program at the recorded location of Site LAN-246. For Site LAN-246, the impacts from the construction and improvements to Mulholland Highway, the surrounding housing developments, vandalism, general erosion, and the lack of subsurface prehistoric deposits identify the portion of the site recorded within the APE as not significant or important in accordance with the significance criteria thresholds provided in CEQA.

As part of the current project design, the recorded location of Site LAN-246 will be directly impacted by the proposed project. Impacts to this site will not be significant because the portion of the site recorded within the project APE does not meet the significance criteria listed in CEQA. Additionally relevant to the non-significant evaluation of the site are the development impacts that have removed any remnants of the site in its entirety. Therefore, direct impacts to Site LAN-246 will not be considered adverse given the evaluation of the portion of the site within the APE as not significant.

However, given the prior disturbance within the project APE that might mask archaeological deposits and the moderate frequency of archaeological deposits in and around the proposed project, there is a potential that buried archaeological deposits may be present within the property. Therefore, it is recommended that the project proceed with the implementation of a cultural resources monitoring program during grading of the project.

b) Cause a substantial adverse change in the significance of an **archaeological** resource pursuant to California Code of Regulations Section 15064.5?

A significant impact would occur if the project causes a substantial adverse change to an archaeological resource through demolition, construction, conversion, rehabilitation, relocation, or alteration.

No subsurface cultural materials were identified as a result of the archaeological testing program at the recorded location of Site LAN-246. For Site LAN-246, the impacts from the construction and improvements to Mulholland Highway, the surrounding housing developments, vandalism, general erosion, and the lack of subsurface prehistoric deposits identify the portion of the site recorded within the APE as not significant or important in accordance with the significance criteria thresholds provided in CEQA.

As part of the current project design, the recorded location of Site LAN-246 will be directly impacted by the proposed project. Impacts to this site will not be significant because the portion of the site recorded within the project APE does not meet the significance criteria listed in CEQA. Additionally relevant to the non-significant evaluation of the site are the development impacts that have removed any remnants of the site in its entirety. Therefore, direct impacts to Site LAN-246 will not be considered adverse given the evaluation of the portion of the site within the APE as not significant.

However, given the prior disturbance within the project APE that might mask archaeological deposits and the moderate frequency of archaeological deposits in and around the proposed project, there is a potential that buried archaeological deposits may be present within the property. Therefore, it is recommended that the project proceed with the implementation of a cultural resources monitoring program during grading of the project.

c) Directly or indirectly destroy a unique **paleontological** resource or site or unique geologic feature?

A significant impact may occur if grading or excavation activities associated with the proposed project would disturb paleontological resources or geologic features that exist within the project site.

No subsurface cultural materials were identified as a result of the archaeological testing program at the recorded location of Site LAN-246. For Site LAN-246, the impacts from the construction and improvements to Mulholland Highway, the surrounding housing developments, vandalism, general erosion, and the lack of subsurface prehistoric deposits identify the portion of the site recorded within the APE as not significant or important in accordance with the significance criteria thresholds provided in CEQA.

As part of the current project design, the recorded location of Site LAN-246 will be directly impacted by the proposed project. Impacts to this site will not be significant because the portion of the site recorded within the project APE does not meet the significance criteria listed in CEQA. Additionally relevant to the non-significant evaluation of the site are the development impacts that have removed any remnants of the site in its entirety. Therefore, direct impacts to Site LAN-246 will not be considered adverse given the evaluation of the portion of the site within the APE as not significant.

However, given the prior disturbance within the project APE that might mask archaeological deposits and the moderate frequency of archaeological deposits in and around the proposed project, there is a potential that buried archaeological deposits may be present within the property. Therefore, it is recommended that the project proceed with the implementation of a cultural resources monitoring program during grading of the project.

d) Disturb any **human remains**, including those interred outside of formal cemeteries?

A significant impact may occur if grading or excavation activities associated with the proposed project would disturb previously interred human remains.

No subsurface cultural materials were identified as a result of the archaeological testing program at the recorded location of Site LAN-246. For Site LAN-246, the impacts from the construction and improvements to Mulholland Highway, the surrounding housing developments, vandalism, general erosion, and the lack of subsurface prehistoric deposits identify the portion of the site recorded within the APE as not significant or important in accordance with the significance criteria thresholds provided in CEQA.

As part of the current project design, the recorded location of Site LAN-246 will be directly impacted by the proposed project. Impacts to this site will not be significant because the portion of the site recorded within the project APE does not meet the significance criteria listed in CEQA. Additionally relevant to the non-significant evaluation of the site are the development impacts that have removed any remnants of the site in its entirety. Therefore, direct impacts to Site LAN-246 will not be considered adverse given the evaluation of the portion of the site within the APE as not significant.

However, given the prior disturbance within the project APE that might mask archaeological deposits and the moderate frequency of archaeological deposits in and around the proposed project, there is a potential that buried archaeological deposits may be present within the property. Therefore, it is recommended that the project proceed with the implementation of a cultural resources monitoring program during grading of the project.

VI. GEOLOGY AND SOILS

VI. Geology and Soils. Will the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to California Geological Survey Special Publication 42.)	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☐	☒
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
iv) Landslides?	☐	☐	☒	☐

VI. Geology and Soils. Will the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that will become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☐	☒
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994, as updated), creating substantial risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to California Geological Survey Special Publication 42.)

A significant impact may occur if the proposed project resulted in or exposed people to adverse effects involving fault rupture, such as from placement of structures or infrastructure within a state-designated Alquist-Priolo Earthquake Fault Zone or other designated fault zone.

The project site is relatively flat, with the overwhelming majority of the project site consisting of existing pavement, concrete sidewalks, and landscaping constructed as part of Mulholland Highway. Construction of the proposed roadway improvements within the existing pavement areas will not expose persons to substantial adverse effects resulting from seismic ground shaking, liquefaction, landslides, erosion, expansive soils, or wastewater disposal systems.

ii) Strong seismic ground shaking?

A significant impact may occur if the proposed project results in or exposes people to adverse effects involving strong ground shaking from fault rupture or seismic hazards.

The project site is relatively flat, with the overwhelming majority of the project site consisting of existing pavement, concrete sidewalks, and landscaping constructed as part of Mulholland Highway. Construction of the proposed roadway improvements within the existing pavement areas will not expose persons to substantial adverse effects resulting from seismic ground shaking, liquefaction, landslides, erosion, expansive soils, or wastewater disposal systems.

iii) Seismic-related ground failure, including liquefaction?

A significant impact may occur if the project were to result in or expose people to adverse effects involving seismic-related ground failure from liquefaction and other geologic hazards.

Liquefaction is a form of earthquake-induced ground failure that occurs primarily in relatively shallow, loose, granular, water-saturated soils.

The project site is relatively flat, with the overwhelming majority of the project site consisting of existing pavement, concrete sidewalks, and landscaping constructed as part of Mulholland Highway. Construction of the proposed roadway improvements within the existing pavement areas will not expose persons to substantial adverse effects resulting from seismic ground shaking, liquefaction, landslides, erosion, expansive soils, or wastewater disposal systems. No further study of the existing pavement areas is required.

iv) Landslides?

A significant impact may occur if the project results in or exposes people to adverse effects involving landslides.

The project site is relatively flat, with the overwhelming majority of the project site consisting of existing pavement, concrete sidewalks, and landscaping constructed as part of Mulholland Highway. Construction of the proposed roadway improvements within the existing pavement areas will not expose persons to substantial adverse effects resulting from seismic ground shaking, liquefaction, landslides, erosion, expansive soils, or wastewater disposal systems. No further study of the existing pavement areas is required.

The proposed project will also require the grading of an existing natural slope near the intersection of Mulholland Highway and Mulholland Drive. Existing residential uses are currently located on this hillside landform and therefore caution should be exercised during slope grading to ensure that the stability of the landform will not in any way compromise the structural integrity of the existing residential dwellings, especially during a seismic event. Compliance with applicable California Building Code (CBC) and City of Calabasas Municipal Code requirements related to slope grading will ensure that the proposed slope grading will not impact the structural stability of the adjacent residential dwellings. Impacts related to slope grading will be less than significant.

b) Would the project result in substantial soil erosion or the loss of topsoil?

A significant impact may occur if the proposed project exposes large areas to the erosional effects of wind or water for a prolonged period of time.

The project site is relatively flat, with the overwhelming majority of the project site consisting of existing pavement, concrete sidewalks, and landscaping constructed as part of Mulholland Highway. Construction of the proposed roadway improvements within the existing pavement areas will not expose persons to substantial adverse effects resulting from seismic ground shaking, liquefaction, landslides, erosion, expansive soils, or wastewater disposal systems

The proposed project will also require the grading of an existing natural slope near the intersection of Mulholland Highway and Mulholland Drive. Existing residential uses are currently located on this hillside landform and therefore caution should be exercised during slope grading to ensure that the stability of the landform will not in any way compromise the structural integrity of the existing residential dwellings, especially during a seismic event. Compliance with applicable California Building Code (CBC) and City of Calabasas Municipal Code requirements related to slope grading will ensure that the proposed slope grading will not impact the structural stability of the adjacent residential dwellings. Impacts related to slope grading will be less than significant.

c) Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?

The project site is relatively flat, with the overwhelming majority of the project site consisting of existing pavement, concrete sidewalks, and landscaping constructed as part of Mulholland Highway. Construction of the proposed roadway improvements within the existing pavement areas will not expose persons to substantial adverse effects resulting from seismic ground shaking, liquefaction, landslides, erosion, expansive soils, or wastewater disposal systems.

The proposed project will also require the grading of an existing natural slope near the intersection of Mulholland Highway and Mulholland Drive. Existing residential uses are currently located on this hillside landform and therefore caution should be exercised during slope grading to ensure that the stability of the landform will not in any way compromise the structural integrity of the existing residential dwellings, especially during a seismic event. Compliance with applicable California Building Code (CBC) and City of Calabasas Municipal Code requirements related to slope grading will ensure that the proposed slope grading will not impact the structural stability of the adjacent residential dwellings. Impacts related to slope grading will be less than significant.

d) Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994, as updated), creating substantial risks to life or property?

A significant impact may occur if the proposed project is built upon expansive soils without proper site preparation or design features to provide adequate foundations for project buildings, thereby posing a hazard to life and property.

The project site is relatively flat, with the overwhelming majority of the project site consisting of existing pavement, concrete sidewalks, and landscaping constructed as part of Mulholland Highway. Construction of the proposed roadway improvements within the existing pavement areas will not expose persons to substantial adverse effects resulting from seismic ground shaking, liquefaction, landslides, erosion, expansive soils, or wastewater disposal systems.

The proposed project will also require the grading of an existing natural slope near the intersection of Mulholland Highway and Mulholland Drive. Existing residential uses are currently located on this hillside landform and therefore caution should be exercised during slope grading to ensure that the stability of the landform will not in any way compromise the structural integrity of the existing residential dwellings, especially during a seismic event. Compliance with applicable California Building Code (CBC) and City of Calabasas Municipal Code requirements related to slope grading will ensure that the proposed slope grading will not impact the structural stability of the adjacent residential dwellings. Impacts related to slope grading will be less than significant.

e) Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

A significant impact may occur if the proposed project is built on soils that are incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems and such a system is proposed.

The project site is relatively flat, with the overwhelming majority of the project site consisting of existing pavement, concrete sidewalks, and landscaping constructed as part of Mulholland Highway. Construction of the proposed roadway improvements within the existing pavement areas will not expose persons to substantial adverse effects resulting from seismic ground shaking, liquefaction, landslides, erosion, expansive soils, or wastewater disposal systems.

VII. GREENHOUSE GAS EMISSIONS

VII. Greenhouse Gas Emissions. Will the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☒

a) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

As discussed above in Section III, Air Quality, the use of construction equipment during grading and construction will temporarily emit oxides of nitrogen, which contribute to the formation of greenhouse gasses. However, the quantity of pollutants emitted will not exceed thresholds established by the South Coast Air Quality Management District and thus impacts will be less than significant. Moreover, the project's temporary construction emissions will contribute to the formation of an insignificant quantity of greenhouse gasses. Overall, the project's potential to reduce vehicle congestion and its potential to increase non-motorized forms of transportation and transit usage along Mulholland Highway will have a beneficial impact with respect to greenhouse gas emissions.

b) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

As discussed above in Section III, Air Quality, the use of construction equipment during grading and construction will temporarily emit oxides of nitrogen, which contribute to the formation of greenhouse gasses. However, the quantity of pollutants emitted will not exceed thresholds established by the South Coast Air Quality Management District and thus impacts will be less than significant. Moreover, the project's temporary construction emissions will contribute to the formation of an insignificant quantity of greenhouse gasses. Overall, the project's potential to reduce vehicle congestion and its potential to increase non-motorized forms of transportation and transit usage along Mulholland Highway will have a beneficial impact with respect to greenhouse gas emissions. .

VIII. HAZARDS AND HAZARDOUS MATERIALS

VIII. Hazards and Hazardous Materials. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☒
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and/or accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☒
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, will it create a significant hazard to the public or the environment?	☐	☐	☒	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, Would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, Would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

a) Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

A significant impact may occur if the proposed project involves the use or disposal of hazardous materials as part of its routine operations and has the potential to generate toxic or otherwise hazardous emissions.

Areas where users of hazardous materials are located are confined primarily to commercial areas. Any developed property has the potential for soil contamination due to operation of motor vehicles and use of solvents, pesticides and other materials that could have been spilled over the years. Within the existing Mulholland Highway roadway corridor, the use of standard construction best management practices will ensure that any hazardous materials present on the roadway surface will be effectively contained during construction and thus will not in any way impair surface or groundwater quality.

The proposed project involves street improvements and not the routine transport, use, or disposal of hazardous materials or the generation of toxic or hazardous emissions. No impact will result.

b) Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and/or accident conditions involving the release of hazardous materials into the environment?

A significant impact may occur if the proposed project uses substantial amounts of hazardous materials as part of routine operations, which could pose a hazard under accident or upset conditions.

Areas where users of hazardous materials are located are confined primarily to commercial areas. Any developed property has the potential for soil contamination due to operation of motor vehicles and use of solvents, pesticides and other materials that could have been spilled over the years. Within the existing Mulholland Highway roadway corridor, the use of standard construction best management practices will ensure that any hazardous materials present on the roadway surface will be effectively contained during construction and thus will not in any way impair surface or groundwater quality.

The proposed project involves street improvements and not the routine transport, use, or disposal of hazardous materials or the generation of toxic or hazardous emissions. No impact will result.

c) Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

A significant impact may occur if the proposed project is located within 0.25 mile of an existing or proposed school site and projected to release toxic emissions that pose a hazard beyond regulatory thresholds.

Generally speaking, the risk of significant contamination requiring remedial action within the land uses adjacent to the roadway is considered low throughout the project area. The land uses with the highest potential to contain hazardous materials are the Shell gas station located at the corner of Freedom Drive and Mulholland Highway, and the various commercial uses located within the Gelson's Shopping Center, not within 0.25 miles of Alice C. Stelle Middle School. No impact will result.

d) Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would it create a significant hazard to the public or the environment?

A significant impact may occur if the proposed project site contains hazardous materials that would create a significant hazard to the public or the environment. California Government Code Section 65962.5 requires state agencies to compile lists of hazardous waste disposal facilities, unauthorized releases from underground storage tanks, contaminated drinking water wells, and solid waste facilities from which there is known hazardous waste and submit such information to the Secretary for Environmental Protection on at least an annual basis.

Generally speaking, the risk of significant contamination requiring remedial action within the land uses adjacent to the roadway is considered low throughout the project area. The land uses with the highest potential to contain hazardous materials are the Shell gas station located at the corner of Freedom Drive and Mulholland Highway, and the various commercial uses located within the Gelson's Shopping Center. The proposed roadway construction activities are confined within the existing road right-of-way and thus are not likely to physically impact operations at the Shell Station or Gelson's Shopping Center, nor will excavation be conducted in the surrounding areas to an extent expected to breach contaminated groundwater or disturb any soil contamination. Therefore, the risk of exposing any on-site hazardous materials is considered low.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

A significant impact may occur if the proposed project site is located within a public airport land use plan area or within 2 miles of a public airport and would create a safety hazard.

The project site is not in the vicinity of a public or private airport. No impact will occur.

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

A significant impact may occur if the proposed project is located within the vicinity of a private airstrip and creates a safety hazard for people in the project area.

The proposed project is not located within the vicinity of a private airstrip; therefore, no impact will occur.

g) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

A significant impact may occur if the proposed project were to interfere with roadway operations occurring in conjunction with an emergency response plan or emergency evacuation plan or generate enough traffic to create traffic congestion that would interfere with the execution of such a plan.

Construction of the improvements envisioned as part the Mulholland Highway Improvements has the potential to temporarily limit access to the existing commercial and residential uses as well as the AC. Stelle Middle School. Although significant access restrictions are not anticipated to the extent that they will limit emergency access or interfere with an adopted emergency response plan, a construction staging plan should be reviewed and approved prior to the commencement of construction activities to ensure that proper access to all existing uses is maintained throughout construction. No impact will occur.

h) Would the project expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

A significant impact may occur if the proposed project is located in or adjacent to a wildland area and places persons or structures at risk in the event of a fire.

The project site is in an area subject to wildland fire, but the proposed roadway improvements will not increase exposure to wildland fire hazards. No impact will occur.

IX. HYDROLOGY AND WATER QUALITY

IX. Hydrology and Water Quality. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there will be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells will drop to a level that will not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which will result in substantial on- or off-site erosion or siltation?	☐	☐	☐	☒
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in on- or off-site flooding?	☐	☐	☐	☒
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒
f) Otherwise substantially degrade water quality?	☐	☐	☐	☒
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j) Result in inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

a) Would the project violate any water quality standards or waste discharge requirements?

A significant impact may occur if the proposed project discharges water that does not meet the water quality standards set by agencies that regulate surface water quality and water discharge into stormwater drainage systems.

The majority of the project area is currently paved. Paved surfaces accumulate pollutants such as deposits of oil, grease, and other vehicle fluids and hydrocarbons. Traces of heavy metals deposited on streets and parking areas from auto operation and/ or fall out of airborne contaminants are common urban surface water pollutants. During storm events, these pollutants will be transported by runoff into storm drain systems and ultimately into the regional watershed.

This project will reduce paved areas, thus decrease the paved surfaces that have accumulated pollutants.

The proposed improvements to Mulholland Highway will not facilitate the generation of additional vehicles, as they are primarily designed to more efficiently convey traffic and provide improved pedestrian and bicycle improvements and landscaping.

Moreover, the project is not associated with any changes to the existing land uses.
Nevertheless, runoff coming in contact with construction areas could introduce urban pollutants into the watershed.

In accordance with Section 8.28 of the Calabasas Municipal Code, "no person shall cause any illicit discharge to enter the municipal storm water system unless such discharge:

(1) Consists of non-storm water that is authorized by an NPDES point source permit obtained from the Regional Board, provided that the discharger is in full compliance with all requirements of the permit or waiver and other applicable laws or regulation;
(2) Is associated with firefighting activities or exempted by the Regional Board; or
(3) Is deemed by the city engineer or designee to be necessary to public health, safety or welfare."

Pursuant to Section 8.28 of the Municipal Code, the project will be required to implement Best Management Practices (BMPs) that reduce water quality impacts, including erosion and siltation, to the maximum extent practicable. Pursuant to Section 8.28.125, "All persons engaged in construction activity within the city shall implement best management practices to avoid, to the maximum extent practicable, the discharge of pollutants to the MS4, in accordance with the city's grading permit requirements. Prior to issuance of a grading permit, the project engineer will be required to submit a Local Storm Water Pollution Prevention Plan/Wet Weather Erosion Control Plan ("SWPPP/WWECP") setting forth appropriate construction site BMPs and maintenance schedules and setting forth the rationale used for selecting or rejecting BMPs and certified in accordance with the municipal NPDES Permit."

Construction plans have identified applicable BMPs, including, but not limited to those detailed in the California Stormwater Best Management Practices Handbook, July 2011.

As discussed above, potential water quality impacts could occur during construction of the project and after project completion. With implementation of the standard requirements discussed above, water quality impacts from runoff during temporary construction activities and long-term operational activities will be less than significant.

b) Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?

A project would normally have a significant impact on groundwater supplies if it were to result in a demonstrable and sustained reduction in groundwater recharge capacity or change the potable water levels enough to reduce the ability of a water utility to use the groundwater basin for public water supplies or the storage of imported water, reduce the yields of adjacent wells or well fields, or adversely change the rate or direction of groundwater flow.

The proposed project will not adversely affect groundwater recharge as the City of Calabasas does not contain any groundwater recharge areas (City of Calabasas 2030 General Plan FEIR). No impacts to groundwater recharge will result. .

c) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial on- or off-site erosion or siltation?

A significant impact may occur if the proposed project results in a substantial alteration of drainage patterns and a substantial increase in erosion or siltation during construction or operation of the project.

Upon completion of the proposed project, the amount of impervious surfaces on the project site will be reduced compared to existing conditions. The existing drainage system will also be improved and additional landscaping will be installed. Therefore, upon completion of the project, pollutant loads and the total runoff volume of runoff from the project site will be reduced. In addition, the site will be required to meet NPDES requirements, which will reduce the amount of pollutants in runoff from the site. Therefore, impacts will be less than significant.

d) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in on- or off-site flooding?

A significant impact may occur if the proposed project results in increased runoff volumes during construction or operation and flooding conditions that affect the project site or nearby properties.

As indicated in Checklist Response 8c, above, the majority of the project area is currently paved. No streams or river courses are located on or immediately adjacent to the project site. During grading and excavation, erosion control measures will be in place to minimize erosion of the exposed soils. Runoff from the proposed project will be directed toward existing or newly constructed storm drains.

Upon completion of the proposed project, the amount of impervious surfaces on the project site will be reduced compared to existing conditions. The existing drainage system will also be improved and additional landscaping will be installed. Therefore, upon completion of the project, pollutant loads and the total runoff volume of runoff from the project site will be reduced. In addition, the site will be required to meet NPDES requirements, which will reduce the amount of pollutants in runoff from the site. Therefore, impacts will be less than significant.

e) Would the project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

A significant impact may occur if the volume of the stormwater runoff were to increase to a level that exceeds the capacity of the storm drain system serving the project site. A significant impact may also occur if the proposed project would substantially increase the probability that polluted runoff would reach the storm drain system.

During construction of the project, grading activities will be subject to implementation of standard erosion control BMPs, as described above under item 8(a). The project design will be required to meet all TMDLs applicable to the area to ensure the site will not exceed targets adopted by the EPA or NPDES general construction permit. In addition, the project will result in the decrease of paved areas that accumulate pollutants, thereby decreasing runoff from contaminated paved areas. Therefore, no impacts will result.

f) Would the project otherwise substantially degrade water quality?

A significant impact may occur if a project includes potential sources of water pollutants with the potential to substantially degrade water quality.

The proposed project will neither create nor contribute to water quality degradation. Project construction will comply with LABOE construction specifications, which require contractors to take measures to prevent the pollution of channels, storm drains, and bodies of water during construction. As such, implementation of the proposed project will not create any new impacts related to water quality beyond those that already exist. Therefore, no impact related to water quality will occur.

g) Would the project place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

A significant impact may occur if the proposed project is located within a 100-year flood zone.

The project area is fully improved and includes a formal drainage system. The project area is not located within a 100-year flood hazard area (FEMA, Zone D, Map Number 06037C1288F, September 2008). Calabasas is not in the dam inundation area for any major stream or river in the region. Therefore, no impact from flood hazards will result.

h) Would the project place within a 100-year flood hazard area structures that would impede or redirect flood flows?

A significant impact may occur if the proposed project is located within a 100-year flood zone and would impede or redirect flood flows.

As indicated in Checklist Response 9(g), above, the project area is fully improved and includes a formal drainage system. The project area is not located within a 100-year flood hazard area (FEMA, Zone D, Map Number 06037C1288F, September 2008). Calabasas is not in the dam inundation area for any major stream or river in the region. Therefore, no impact from flood hazards will result.

i) Would the project expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?

A significant impact may occur if the proposed project is located in a flood-prone area, including floods caused by the failure of a dam or levee.

As indicated in Checklist Response 9(g) and (h), above, the project area is fully improved and includes a formal drainage system. The project area is not located within a 100-year flood hazard area (FEMA, Zone D, Map Number 06037C1288F, September 2008). Calabasas is not in the dam inundation area for any major stream or river in the region. Therefore, no impact from flood hazards will result.

j) Would the project result in inundation by seiche, tsunami, or mudflow?

A significant impact may occur if the proposed project is located in an area with inundation potential due to seiche, tsunami, or mudflow.

The project site is not in a tsunami hazard area due to the distance of the project site to the Pacific Ocean. There are no nearby enclosed water bodies where a seiche could form. The proposed project is located in a relatively flat area and, thus, not an area that is subject to mudflow. Therefore, no impact will occur.

X. LAND USE AND PLANNING

X. Land Use and Planning. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

a) Would the project physically divide an established community?

A significant impact may occur if the proposed project is sufficiently large enough or otherwise configured in such a way so as to create a physical barrier within an established community.

Currently, the project site is fully developed as Mulholland Highway. The proposed improvements will occur within the existing Mulholland Highway right-of-way and generally consist of the construction of vehicle travel lane improvements and striping, pedestrian/bicycle improvements, and roadway landscaping. No roads or access points will be closed or obstructed as part of the project. Therefore, the project will not physically divide an established community and no impact will occur.

b) Would the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

A significant impact may occur if the proposed project is inconsistent with general plan designations or zoning currently applicable to the proposed project site and causes adverse environmental effects, which the general plan and zoning ordinance are designed to avoid or mitigate.

The project area and the proposed roadway improvements are part of the Mulholland Highway Master Plan for Capital Improvements. The proposed improvements are intended to implement the stated vision of this master plan. Therefore, no impact will result.

c) Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?

A significant impact may occur if the proposed project conflicts with a habitat conservation plan or natural community conservation plan adopted for the area surrounding the project location.

The paved surfaces associated with Mulholland Highway encompass the overwhelming majority of the project area. Although a small portion of the project area requires the grading of natural slopes, these areas contain limited biological habitat and thus are not part of an applicable conservation plan or natural community conservation plan. No impact will result.

XI. MINERAL RESOURCES

XI. Mineral Resources. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

a) Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

A significant impact may occur if the proposed project is located in an area that is used or available for extraction of a regionally important mineral resource, converts an existing or potential regionally important mineral extraction use to another use, or affects access to a site used or potentially available for regionally important mineral resource extraction.

The City of Calabasas lies mainly on sedimentary rock, which is typically not associated with aggregate resources. A 1994 report by the California Geological Survey designated areas in the western portion of Calabasas as Mineral Resource Zone (MRZ) I, indicating that no significant mineral deposits are present. The California Surface Mining and Reclamation Act (SMARA) of 1975 does not require local governments to protect land designated as MRZ 1. The remainder of the City, including the project site, is designated MRZ 3, indicating that the significance of mineral resources could not be evaluated from available data (City of Calabasas 2030 General Plan). The proposed project will modify a small area of sedimentary rock as a result of the proposed slope grading. However, this area is not of local, regional, or statewide importance with respect to mineral resources. No impacts to mineral resources will result.

b) Would the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

A significant impact may occur if a project is located in an area that is used or available for extraction of a locally important mineral resource, as delineated on a local general plan, specific plan, or other land use plan.

The City of Calabasas lies mainly on sedimentary rock, which is typically not associated with aggregate resources. A 1994 report by the California Geological Survey designated areas in the western portion of Calabasas as Mineral Resource Zone (MRZ) I, indicating that no significant mineral deposits are present. The California Surface Mining and Reclamation Act (SMARA) of 1975 does not require local governments to protect land designated as MRZ 1. The remainder of the City, including the project site, is designated MRZ 3, indicating that the significance of mineral resources could not be evaluated from available data (City of Calabasas 2030 General Plan). The proposed project will modify a small area of sedimentary rock as a result of the proposed slope grading. However, this area is not of local, regional, or statewide importance with respect to mineral resources. No impacts to mineral resources will result.

XII. NOISE

XII. Noise. Would the project result in:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or in other applicable local, state, or federal standards?	☐	☐	☒	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, will the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, will the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

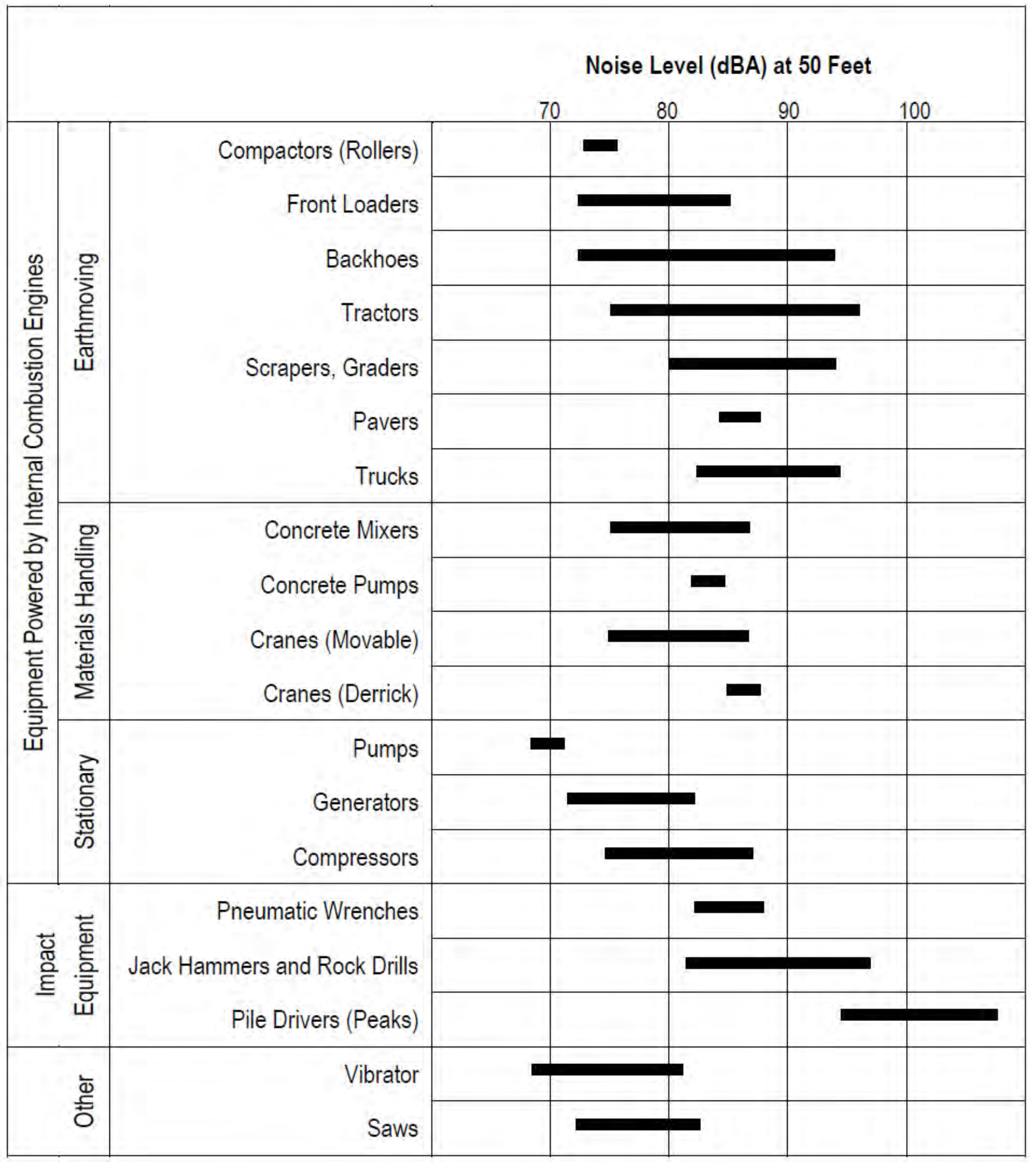
a) Would the project create exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or in other applicable local, state, or federal standards?

A significant impact may occur if the proposed project generates noise levels that exceed the standards for ambient noise, as established by the general plan and municipal code, and/or exposes persons or sensitive uses to increased noise levels. Noise-sensitive uses may include residences, transient lodging, schools, libraries, churches, hospitals, nursing homes, auditoriums, concert halls, amphitheaters, playgrounds, and parks.

For the proposed project, very little heavy equipment will be required since minimal demolition or earth-moving is necessary. Except for milling of the existing pavement surface and trucking activities to deliver materials, powered equipment will on the low end of the generation scale.

The table below shows the range of noise emissions for various pieces of construction equipment. Noise from the type of equipment needed for this project will drop to a 65 dBA exterior/45 dBA interior noise level by about 200 feet from the source. This estimate assumes a clear line-of-sight from the source to the receiver. Variations in terrain elevation or existing perimeter walls will act as noise barriers that may interrupt equipment noise propagation. Construction noise impacts are, therefore, somewhat less than that predicted under idealized input.conditions.

Typical Construction Equipment
Noise Generation Levels



Source: EPA PB 206717, Environmental Protection Agency, December 31, 1971, "Noise from Construction Equipment and Operations."

The City has not adopted any specific standards relating to construction noise. According to the City of Calabasas Municipal Code, permissible hours of construction are between the hours of 7 a.m. to 4 p.m. Monday through Friday. No work is permitted on Saturdays or Sundays and Federal Holidays. These hours are included as conditions on any project construction permits and these limits will serve to minimize any adverse construction noise impact potential. Less than significant impact is expected to occur.

b) Would the project create exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

A significant impact may occur if the project results in or exposes people to excessive groundborne vibration or groundborne noise levels during construction or operation. This will include excessive groundborne vibration or noise that causes structural damage or displaces objects in nearby buildings.

Heavy equipment associated with project construction could generate groundborne vibration as indicated in the table below:

	Approximate Vibration Levels (VdB)*			
Equipment	**25 feet**	**50 feet**	**100 feet**	**185 feet**
Pile Driver	93	87	81	75
Large Bulldozer	87	81	75	69
Loaded Truck	86	80	74	68
Jackhammer	79	73	67	61
Small Bulldozer	58	52	46	40

However, these effects will be temporary and short-term in nature. The project will not include any elements or machinery/equipment on a routine basis that will result in long-term groundborne vibration or noise.

The on-site construction equipment that will create the maximum potential vibration is a loaded truck. The stated vibration source level in the FTA Handbook for such equipment is 80 VdB at 50 feet from the source. The nearest home foundations are 50 feet or more from the roadway centerline. There are no equipment sources capable of creating any structural damage.

As such, the impacts are considered less than significant.

c) Would the project create a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

A significant impact may occur if the proposed project were to result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the proposed project.

Noise levels in the project vicinity are dominated by vehicular traffic along Mulholland Highway. These noise levels will continue after implementation of the proposed project. The project is not growth-inducing and will not generate additional traffic. Therefore, no increase in ambient noise levels post-construction will occur. No impact will result.

d) Would the project create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

A significant impact may occur if the proposed project were to result in a substantial temporary or periodic increase in ambient noise levels above existing ambient noise levels without the proposed project.

Refer to discussion under Checklist Responses 12a and 12c, above. The proposed project will not substantially increase ambient noise levels in the project vicinity over existing conditions. Less than significant impact is expected to occur.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

A significant impact may occur if the project is located within an airport land use plan or within 2 miles of a public airport and people residing or working in the project area would be exposed to excessive noise levels.

The proposed project site is not located within an airport land use plan or within 2 miles of a public airport. Therefore, no impact will occur.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

A significant impact may occur if the project is located in the vicinity of a private airstrip and people residing or working in the project area would be exposed to excessive noise levels.

The proposed project is not located within the vicinity of a private airstrip. Therefore, no impact will occur.

XIII. POPULATION AND HOUSING

XIII. Population and Housing. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing homes, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

a) Would the project induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

A significant impact may occur if the proposed project induces substantial population growth in an area, either directly or indirectly.

The proposed project involves the construction of roadway improvements along Mulholland Highway. The project does not include the development of any residential or commercial uses and will not displace any existing housing or residents. Therefore, the proposed project will have no impact on population and housing.

b) Would the project displace substantial numbers of existing homes, necessitating the construction of replacement housing elsewhere?

A significant impact may occur if the proposed project would result in the displacement of existing housing units, necessitating construction of replacement housing elsewhere.

The proposed project involves the construction of roadway improvements along Mulholland Highway. The project does not include the development of any residential or commercial uses and will not displace any existing housing or residents. Therefore, the proposed project will have no impact on population and housing. .

c) Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

A significant impact may occur if the proposed project results in the displacement of a substantial number of people.

The proposed project involves the construction of roadway improvements along Mulholland Highway. The project does not include the development of any residential or commercial uses and will not displace any existing housing or residents. Therefore, the proposed project will have no impact on population and housing. .

XIV. PUBLIC SERVICES

XIV. Public Services Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:

   i. Fire protection?

A significant impact may occur if the City of Los Angeles Fire Department (LAFD) cannot adequately serve the proposed project based on response time, access, or fire hydrant/water availability.

The proposed project only involves the construction of roadway improvements consistent with the vision expressed in the Mulholland Highway Master Plan for Capital Improvements. The project does not include, nor will it facilitate, the intensification of land uses within the Mulholland Highway corridor. As a result, the project will not directly or indirectly induce growth and therefore will not increase demand for public services within the City of Calabasas.

   ii. Police protection?

A significant impact may occur if the proposed project results in an increase in demand for police services that would exceed the capacity of the police department responsible for serving the site.

The proposed project only involves the construction of roadway improvements consistent with the vision expressed in the Mulholland Highway Master Plan for Capital Improvements. The project does not include, nor will it facilitate, the intensification of land uses within the Mulholland Highway corridor. As a result, the project will not directly or indirectly induce growth and therefore will not increase demand for public services within the City of Calabasas.

   iii. Schools?

A significant impact may occur if the proposed project induces substantial employment or population growth, which could generate demand for school facilities that exceed the capacity of the school district responsible for serving the project site.

The proposed project only involves the construction of roadway improvements consistent with the vision expressed in the Mulholland Highway Master Plan for Capital Improvements. The project does not include, nor will it facilitate, the intensification of land uses within the Mulholland Highway corridor. As a result, the project will not directly or indirectly induce growth and therefore will not increase demand for public services within the City of Calabasas.

   iv. Parks?

A significant impact may occur if the available parks and recreation services cannot accommodate the population increase resulting from implementation of the proposed project.

The proposed project only involves the construction of roadway improvements consistent with the vision expressed in the Mulholland Highway Master Plan for Capital Improvements. The project does not include, nor will it facilitate, the intensification of land uses within the Mulholland

Highway corridor. As a result, the project will not directly or indirectly induce growth and therefore will not increase demand for public services within the City of Calabasas.

v. Other public facilities?

A significant impact may occur if the proposed project generates demand for other public facilities, thereby exceeding the capacity available to serve the project site.

The proposed project only involves the construction of roadway improvements consistent with the vision expressed in the Mulholland Highway Master Plan for Capital Improvements. The project does not include, nor will it facilitate, the intensification of land uses within the Mulholland Highway corridor. As a result, the project will not directly or indirectly induce growth and therefore will not increase demand for public services within the City of Calabasas.

XV. RECREATION

XV. Recreation. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☐	☒

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

A significant impact may occur if the proposed project includes substantial employment or population growth, which could generate demands for public parks and recreational facilities that exceed the capacity of those that currently exist.

The proposed project involves the construction of roadway improvements consistent with the vision expressed in the Mulholland Highway Master Plan for Capital Improvements. The project does not include, nor will it facilitate, the intensification of land uses within the Mulholland Highway corridor. As a result, the project will not directly or indirectly induce growth and will therefore have no impact on recreation within the City of Calabasas.

b) Would the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?

A significant impact may occur if the proposed project includes the construction or expansion of recreational facilities or necessitates the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

The proposed project involves the construction of roadway improvements consistent with the vision expressed in the Mulholland Highway Master Plan for Capital Improvements. The project does not include, nor will it facilitate, the intensification of land uses within the Mulholland Highway corridor. As a result, the project will not directly or indirectly induce growth and will therefore have no impact on recreation within the City of Calabasas. .

XVI. TRANSPORTATION/TRAFFIC

XVI. Transportation/Traffic. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☐	☒
b) Conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☒
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that result in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☐	☒
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒

a) Would the project conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

A significant impact may occur if the proposed project causes an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system.

The proposed project involves the construction of roadway improvements consistent with the vision expressed in the Mulholland Highway Master Plan for Capital Improvements and the City of Calabasas General Plan Circulation Element. The improvements address the current deficiencies in the overall circulation system, including, but not limited to, lane configurations, turn movements and/ or striping, access to the existing residential and commercial uses along the corridor, availability of mass-transit services, ability to access non-motorized forms of travel (pedestrian and bicycle pathways), and lack of a coordinated streetscape landscaping in keeping with the natural surroundings. No additional vehicle trips will be generated by the proposed project. Therefore, no impact will occur.

b) Would the project conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

A significant impact may occur if the proposed project exceeds, either individually or cumulatively, a level of service standard established by the Los Angeles County Metropolitan Transportation Authority (Metro), the county congestion management agency, for designated roads or highways.

The project will involve improvements to the existing roadway and will not directly or indirectly intensify land uses. The improvements will be beneficial with respect to traffic flow, access, streetscape landscaping, access to mass-transit and ability to safely use nonmotorized transportation. The improvements will therefore be consistent with the City of Calabasas General Plan Circulation Element and will also help the City achieve its specific intersection level of service performance standards for Mulholland Highway and the County of Los Angeles' Congestion Management Standards for roadway segments. Therefore, no impact will result.

c) Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

A significant impact may occur if the proposed project changes air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.

The project site is not in the vicinity of any public or private airport. The proposed roadway improvements will not impact to air traffic. .

d) Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

A significant impact may occur if the proposed project substantially increases road hazards due to a design feature or introduced incompatible uses.

The proposed project will maintain Mulholland Highway's existing horizontal and vertical curves. Intersection configurations will be slightly modified to help improve traffic flow within the corridor. The proposed median/ driveway improvements will further improve access to the existing commercial uses along Mulholland Highway and will also coincidentally minimize conflicting and/ or dangerous turning movements from the existing parking lots. Impacts to traffic safety are therefore considered beneficial.

e) Would the project result in inadequate emergency access?

A significant impact may occur if the proposed project results in inadequate emergency access.

Access to certain land uses could be limited temporarily during construction. However, any potential access limitations could be remedied through the preparation of an appropriate construction staging plan. The construction staging plan will need to ensure that minimal emergency access to all existing land uses will be maintained throughout construction. As part of building and safety plan review, the Fire Department will ensure that required fire protection safety features, including adequate emergency access, are implemented. Upon construction of an adequate construction staging plan approved by the Building and Safety Department, impacts to emergency access will be less than significant.

f) Would the project conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

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A significant impact may occur if the proposed project results in inadequate parking capacity based upon City code requirements.

The proposed project will enhance access to alternative transportation modes. Thus, no impact to alternative transportation programs, plans or policies will occur.

XVII. UTILITIES AND SERVICE SYSTEMS

XVII. Utilities and Service Systems. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand, in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☒
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

a) Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

A significant impact may occur if the proposed project exceeds wastewater treatment requirements of the regional water quality control board, the local regulatory governing agency.

The project will involve the construction of Mulholland Highway traffic improvements, including improvements and/ or replacement of portions of the existing roadway drainage system, and replacement of impervious surfaces with pervious landscape areas. The project will not result in the intensification of the land uses located along the roadway corridor. Therefore, the roadway improvements will have a net beneficial effect on wastewater treatment capacity as the total volume of runoff generated by Mulholland Highway will be decreased after completion of the project. No impact will result.

b) Would the project require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

A significant impact may occur if the proposed project requires construction of new water or wastewater treatment facilities or expansion of existing facilities.

The project will involve the construction of Mulholland Highway traffic improvements, including improvements and/ or replacement of portions of the existing roadway drainage system, and replacement of impervious surfaces with pervious landscape areas. The project will not result in the intensification of the land uses located along the roadway corridor. Therefore, the roadway improvements will have a net beneficial effect on wastewater treatment capacity as the total volume of runoff generated by Mulholland Highway will be decreased after completion of the project. No impact will result.

c) Would the project require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

A significant impact may occur if the volume of stormwater runoff from the proposed project increases to a level exceeding the capacity of the storm drain system serving the project site.

The project will involve the construction of Mulholland Highway traffic improvements, including improvements and/ or replacement of portions of the existing roadway drainage system, and replacement of impervious surfaces with pervious landscape areas. The project will not result in the intensification of the land uses located along the roadway corridor. Therefore, the roadway improvements will have a net beneficial effect on wastewater treatment capacity as the total volume of runoff generated by Mulholland Highway will be decreased after completion of the project. No impact will result.

d) Would the project have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

A significant impact may occur if the proposed project would exceed the existing water supplies available to serve the project.

The proposed roadway improvements will not result in the intensification of any existing land uses. Therefore, no significant impacts to water service capacity will result. The streetscape landscaping could incrementally increase demand for water, however, reclaimed water will be used for irrigation of the streetscape landscaping. Therefore, no impact will result.

e) Would the project result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand, in addition to the provider's existing commitments?

A significant impact may occur if the proposed project would increase wastewater generation to such a degree that the capacity of facilities currently serving the project site would be exceeded.

The proposed roadway improvements will not result in the intensification of any existing land uses. Therefore, no impacts to waste water treatment will result. Impacts will be less than significant.

f) Would the project be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

A significant impact may occur if the proposed project were to increase solid waste generation to a degree that existing and projected landfill capacities would be insufficient to accommodate the additional solid waste.

The Calabasas Landfill, located adjacent to the Ventura Freeway on Lost Hills Road, will receive the solid waste generated by project construction. The Calabasas Landfill currently averages 1,555 tons/ day with a maximum daily permitted capacity set at 3,500 tons/ day (City of Calabasas 2030 General Plan EIR and California Integrated Waste Resources Board). Therefore, there is a daily surplus capacity of 1,945 tons/ day. Based on current intake rates, the Calabasas Landfill is expected to reach capacity in 2028 (City of Calabasas 2030 General Plan EIR).

Construction debris (primarily asphalt, concrete, and soil) will be generated during construction. The proposed project will be required to comply with applicable provisions of the City's Resolution 2008-1111, which requires the City to achieve a 75% diversion rate by 2012. Thus, solid waste generation from the proposed project will have no impact to the remaining landfill capacity.

g) Would the project comply with federal, state, and local statutes and regulations related to solid waste?

A significant impact may occur if the proposed project generates solid waste that is not disposed of in accordance with applicable regulations.

Disposal of all solid waste generated will comply with federal, state, and local statutes and regulations related to solid waste. Therefore, no impact will occur

XVIII. MANDATORY FINDINGS OF SIGNIFICANCE

XVIII. Mandatory Findings of Significance.	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of an endangered, rare, or threatened species, or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☐	☐	☒	☐
c) Does the project have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐
Authority: Public Resources Code Sections 21083 and 21083.05. Reference: Government Code Section 65088.4, Public Resources Code Sections 21080(c), 21080.1, 21080.3, 21083.05, 21083.3, 21093, 21094, 21095, and 21151; *Sundstrom v. County of Mendocino*, (1988) 202 Cal.App.3d 296; *Leonoff v. Monterey Board of Supervisors (1990)*, 222 Cal.App.3d 1337; *Eureka Citizens for Responsible Government v. City of Eureka* (2007) 147 Cal.App.4th 357; *Protect the Historic Amador Waterways v. Amador Water Agency* (2004) 116 Cal.App.4th at 1109; *San Franciscans Upholding the Downtown Plan v. City and County of San* Francisco (2002) 102 Cal.App.4th 656.				

a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of an endangered, rare, or threatened species, or eliminate important examples of the major periods of California history or prehistory?

The proposed project will not have the potential to significantly degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory. The proposed project has the potential to adversely affect as-yet undiscovered archeological and paleontological resources and human remains. However, for the project site at the LAN-246, the impacts from the construction and improvements to Mulholland Highway, the surrounding housing developments, vandalism, general erosion, and the lack of subsurface prehistoric deposits identify the portion of the site recorded within the APE as not significant or important in accordance with the significance criteria thresholds provided in CEQA. Further, impacts to this site will not be significant because the portion of the site recorded within the project APE does not meet the significance criteria listed in CEQA. Additionally relevant to the non-significant evaluation of the site are the development impacts that have removed any remnants of the site in its entirety. Therefore, direct impacts to Site LAN-246 will not be considered adverse given the evaluation of the portion of the site within the APE as not significant.

b) Would the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)

The proposed project involves the construction of roadway improvements along Mulholland Highway. The roadway enhancements will improve traffic flow and roadway safety, improve the roadway's visual appearance through the planting of landscaping, and improve pedestrian connectivity by linking sidewalk segments. This is consistent with the City of Calabasas Circulation Element and the Mulholland Highway Master Plan for Capital Improvements and will not contribute to any cumulative impacts related to planned and pending development in Calabasas. As such, the project's contribution to cumulative impacts will be less than significant.

c) Would the project have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?

As discussed in Section III, Air Quality; Section IV, Biology, Section VIII, Hazards and Hazardous Materials; and Section XII, Noise, impacts related to air quality, biology, hazards and noise will be less than significant.

LIST AND DEFINITION OF ACRONYMS AND SYMBOLS USED IN THIS DOCUMENT

Acronyms

AQMD	Air Quality Management District
APE	Area of Potential Affects
BMP	Best Management Practice
BP	Before present
CA	California
Cal	Calibrated
CBC	California Building Code
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CHL	California Historic Landmarks
CHRIS	California Historical Resource Inventory System
CNEL	Community Noise Equivalent Level
CO	Carbon Monoxide
CO2	Carbon Dioxide
CRHS	California Register of Historic Resources
dB	Decibel
dBA	Decibel, A-weighted
DFG	Department of Fish and Game
EIR	Environmental Impact Report
EHS	Environmental, Health and Safety
EPA	Environmental Protection Agency
et al.	et alii (Latin) (it means “and others”)
FEIR	Federal Environmental Impact Report
FEMA	Federal Emergency Management Agency
FTA	Federal Transportation Authority
GANDA	Garcia and Associates
GHG	Greenhouse Gas
HSC	Health and Safety Code
HWY	Highway
IS	Initial Study
IS/MND	Initial Study/Mitigated Negative Declaration
LADOT	Los Angeles Department of Transportation
LAFD	Los Angeles Fire Department
Ldn	Day-Night Average Sound Level
LEQ	Equivalent Sound Level
LLC	Limited Liability Corporation
MA	Masters of Arts
MLD	Most Likely Decedent
MND	Mitigated Negative Declaration
MMRP	Mitigation, Monitoring, and Reporting Plan
MRZ	Mineral Resource Zone
N/A	Not Applicable
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NEPA	National Environmental Protection Act

NOI	Notice of Intent (to adopt a negative declaration or mitigated negative declaration)
NO_x	Oxides of Nitrogen, esp. as Atmospheric Pollutants
NPDES	National Pollutant Discharge Elimination Program
NRHP	National Register of Historic Places
O_3	Ozone
PE	Professional Engineer
$PM_{2.5}$	Fine Particles in the (Ambient) Air 2.5 Micrometers or Less in Size
PM_{10}	Fine Particles in the (Ambient) Air 10 Micrometers or Less in Size
PRC	Public Resources Code
RMS	Root Mean Square
RPA	Registered Professional Archaeologist
RWQCG	Regional Water Quality Control Board
SCAQMD	South Coast Air Quality Management District
SMARA	Surface Mining and Reclamation Act
SWPPP	Storm Water Pollution Prevention Plan
SCH	State Clearinghouse
TE	Transportation Engineer
TMDL	Total Maximum Daily Load
US/U.S.	United States
USDA	United State Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VdB	Vibration Decibel
WWECP	Wet Weather Erosion Control Plan

Symbols

§	Section
#	Number
%	Percent

REFERENCES CITED

CEQA Regulations: California Public Resources Code §§21000-21177 (http://leginfo.ca.gov)

CEQA Regulations: California Code of Regulations, Title 14, Division 6, Chapter 3, §§15000-15387 (http://leginfo.ca.gov)

California Geological Survey Special Publication 42 (ftp://ftp.consrv.ca.gov/pub/dmg/pubs/sp/Sp42.pdf)

California Stormwater Best Management Practices Handbook, July 2011

City of Calabasas 2030 General Plan, 2008 (http://www.cityofcalabasas.com/pdf/documents/gpac/CalabasasGP-EIR-FINAL.pdf)

City of Calabasas 2030 General Plan, Final Environmental Impact Report, 2008

City of Calabasas General Plan FEIR, 1995

City of Calabasas Mulholland Highway Master Plan for Capital Improvements, 2004 (http://www.cityofcalabasas.com/public-works/mulholland-masterplan.pdf)

City of Calabasas Municipal Code (http://library.municode.com/index.aspx?clientId=16235)

California Government Code § 65962.5, "Cortese List." (http://www.calepa.ca.gov/sitecleanup/corteselist/SectionA.htm)

Southern California Air Quality Management District Rules 402 and 403 (http://www.arb.ca.gov/drdb/sc/cur.htm)

U.S. Fish and Wildlife Service Wetlands Online Mapper (http://www.fws.gov/wetlands/Data/Mapper.html)

APPENDICES

APPENDIX A: MITIGATION MONITORING AND REPORTING PLAN (MMRP)

Mitigation Monitoring and Reporting Plan (MMRP)
for the
Mulholland Highway Scenic Corridor
Operations Improvement Project, Phase III

In accordance with CEQA Guidelines Section 15074(d), when adopting a mitigated negative declaration, the lead agency will adopt a Mitigation Monitoring and Reporting Plan (MMRP) that ensures compliance with mitigation measures required for project approval. The City of Calabasas is the lead agency for the above-listed project and has developed this MMRP as a part of the final Initial Study/Mitigated Negative Declaration (IS/MND) supporting the project. This MMRP lists the mitigation measures developed in the IS/MND which were designed to reduce environmental impacts to a less-than-significant level. This MMRP also identifies the party responsible for implementing the measure, defines when the mitigation measure must be implemented, and which party or public agency is responsible for ensuring compliance with the measure.

Potentially Significant Effects and Mitigation Measures
The following is a list of the resources that will be potentially affected by the project and the mitigation measures made part of the Initial Study/Mitigated Negative Declaration.

Mitigation Measure #1: Biological Resources – Oak Tree Removal

In accordance with Calabasas Municipal Code §17.26.707, an oak tree removal permit must be obtained for oak trees located on the hillside/slope construction that are slated for removal.

Schedule: Prior to oak tree removal.

Responsible Party: The City of Calabasas shall be responsible for carrying out this mitigation measure.

Verification of Compliance:
Monitoring Party: City of Calabasas
Initials: ____________
Date: ____________

Mitigation Measure #2: Cultural Resources
Prior to issuance of a grading permit, the City of Calabasas shall retain a certified archaeologist to implement the monitoring program. The certified archaeologist shall attend the pre-grading meeting with the contractors to explain and coordinate the requirements of the monitoring program. During the grading of previously undisturbed soil, the archaeological monitor shall be on-site, as determined by the consulting archaeologist, to perform inspections of the excavations. Isolates and clearly non-significant deposits will be minimally documented in the field so the monitored grading can proceed.

In the event that previously unidentified cultural resources are discovered, the archaeologist shall have the authority to divert or temporarily halt ground disturbance operation in the area of discovery to allow for the evaluation of potentially significant cultural resources. The archaeologist shall contact the lead agency at the time of discovery. The archaeologist, in consultation with the lead agency, shall determine the significance of the discovered resources. The lead agency must concur with the evaluation before construction activities will be allowed to resume in the affected area. For significant cultural resources, a Research Design and Data Recovery Program to mitigate impacts shall be prepared by the consulting archaeologist and approved by the lead agency before being carried out using professional archaeological methods. If any human bones are discovered, the county coroner and lead agency shall be contacted. In the event that the remains are determined to be of Native American origin, the most likely descendant, as identified by the NAHC, shall be contacted in order to determine proper treatment and disposition of the remains.

Before construction activities are allowed to resume in the affected area, the artifacts shall be recovered and features recorded using professional archaeological methods. The archaeological monitor(s) shall determine the amount of material to be recovered for an adequate artifact sample for analysis. All cultural material collected during the grading monitoring program shall be processed and curated according to the current professional repository standards. The collections and associated records shall be transferred, including title, to an appropriate curation facility, to be accompanied by payment of the fees necessary for permanent curation.

A report documenting the field and analysis results and interpreting the artifact and research data within the research context shall be completed and submitted to the satisfaction of the lead agency prior to the issuance of any building permits. The report will include DPR Primary and Archaeological Site Forms.

Schedule: Prior to issuance of a grading permit.

Responsible Party: The City of Calabasas shall be responsible for carrying out this mitigation measure.

Verification of Compliance:
Monitoring Party: City of Calabasas
Initials: ____________
Date: ____________

APPENDIX B: PHASE I CULTURAL RESOURCES INVESTIGATION: MULHOLLAND HIGHWAY SCENIC OPERATIONS IMPROVEMENT PROJECT, PHASE III

Phase I Cultural Resources Investigation: Mulholland Highway Improvement Project, Cities of Calabasas and Los Angeles, Los Angeles County, California

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November 2013

Statement of Confidentiality

This report identifies the locations of historic resources. Disclosure of this information to the public may be in violation of both federal and state laws. Applicable U.S. laws include, but may not be limited to, Section 304 of the National Historic Preservation Act (16 USC 470w-3) and the Archaeological Resources Protection Act (16 USC 470hh). California state laws that apply include, but may not be limited to, Government Code Sections 6250 *et seq.* and 6254 *et seq.* Furthermore, disclosure of site location information to individuals other than those meeting the U.S. Secretary of the Interior's professional standards or California State Personnel Board criteria for Associate State Archaeologist or State Historian II violates the California Office of Historic Preservation's records access policy.

National Archaeological Data Base Information

Author(s):	Clarus J. Backes, Jr., M.A., RPA
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Report Date:	November 2013
Report Title:	Phase I Cultural Resources Investigation: Mulholland Highway Improvement Project, Cities of Calabasas and Los Angeles, Los Angeles County, California
Submitted by:	Garcia and Associates 435 Lincoln Way Auburn, CA 95603 (530) 823-3151
Submitted to:	Lynette Stetler JD, Principal Stetler & McHugh EHS Consulting LLC 354-B Warwick Avenue Oakland, California 94610 (510) 239-7360
Contract Number:	Job 6276
U.S.G.S. Quadrangles:	Canoga Park, CA, T1N, R17W, Sections 24 and 25
Acreage:	0.5 acre
Key words:	Los Angeles County; Los Angeles; Calabasas; Mulholland Highway; CA-LAN-246; CA-LAN-1017; Mulholland Site

Management Summary

This Phase I Cultural Resources Assessment is intended to characterize a portion of the Mulholland Highway Improvement Project (proposed project) with respect to cultural resources and paleontological resources pursuant to the California Environmental Quality Act (CEQA). The proposed project would require land modifications, including removal of a portion of a hillside, to accommodate the construction of pedestrian improvements to a section of Mulholland Highway immediately south of its intersection with Mulholland Drive, located on the border between the City of Calabasas and the City of Los Angeles, Los Angeles County, California. The project area measures approximately 0.5 acres and is located in Sections 24 and 25 of Township 1 North, Range 17 West, as shown on the Canoga Park, California, USGS 7.5-minute quadrangle map. The Area of Potential Effects (APE) for the project consists of the area that would be subjected to ground disturbance during construction of the proposed project, plus a 20-foot (approximately 6-meter) buffer to allow for minor adjustments in the location of project and construction elements; the APE measures 167 meters long and up to 21 meters in width, or approximately 0.5 acres.

Findings for this report are based on the following:

- A records search at the South Central Coastal Information Center at California State University, Fullerton;
- Paleontological records searches at the Vertebrate Paleontology Section of the Natural History Museum of Los Angeles County and the online database of the University of California Museum of Paleontology;
- Archival research of historic maps and documents;
- Consultation with the Native American Heritage Commission and Native American groups and individuals; and
- A field survey of the APE conducted by GANDA Senior Archaeologist Clarus J. Backes, MA, RPA, on October 31, 2013.

This study determined that the majority of the proposed project area has a high potential for containing significant paleontological resources. While shallow excavations (i.e., less than 3 feet deep) in the younger Quaternary alluvium that may exist under Mulholland Highway are unlikely to uncover significant vertebrate fossils, deeper excavations that extend down into older deposits, as well as any excavations in the deposits of the Modelo Formation that make up the road cut and hillside, may well encounter significant vertebrate fossil remains. It is recommended that any excavations in the proposed project area should be monitored closely by a qualified paleontological monitor to quickly and professionally recover any fossil remains discovered.

This study also determined that the proposed project has the potential to encounter buried archaeological remains, including human remains, during grading, excavation, or other ground disturbing work. The project's APE is located in the center of an area associated with a large Native American village site and burial ground. While previous construction activities and

vandalism have largely destroyed the site, dark soil discoloration at the top of the Mulholland Highway road cut and the discovery of a prehistoric ceramic fragment suggest that isolated cultural deposits may remain in the APE.

It is recommended that a program of Extended Phase I test excavations be conducted along the top edge of the road cut and in the portion of the APE located in the City of Los Angeles. These test excavations are intended to determine whether subsurface cultural deposits remain in the APE. If test excavations determine that subsurface archaeological materials are present, additional Phase II excavation should be undertaken to determine the nature of the deposit and its horizontal and vertical extent. It may be appropriate to use mechanical equipment to incrementally remove any non-cultural fill that overlies subsurface deposits. A Native American monitor should be present during all excavations.

Regardless of the outcome of any subsurface testing and intensive excavations, all ground-disturbing activities associated with the project should be monitored by a qualified archaeologist and a Native American monitor. This monitoring is intended to identify, at the time of discovery, any archaeological materials exposed during ground disturbance and to protect such resources from damage.

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1.0 Introduction

Garcia and Associates (GANDA), under contract to Stetler & McHugh EHS Consulting LLC and pursuant to the California Environmental Quality Act (CEQA), have prepared this Phase I Cultural Resources Assessment to characterize cultural resources that may be impacted by implementation of a portion of the Mulholland Highway Improvement Project (proposed project). The proposed project would require land modifications to accommodate the construction of pedestrian improvements to a portion of Mulholland Highway immediately south of its intersection with Mulholland Drive. The project area measures approximately 0.5 acres and is located in the cities of Calabasas and Los Angeles, in the County of Los Angeles, California.

This technical report was prepared to describe the cultural resources (including those related to paleontology, archaeology, historical resources, and Native American sacred sites and cemeteries) that would potentially be affected by implementation of the proposed project. The proposed project is subject to discretionary approvals by the cities of Calabasas and Los Angeles; therefore, land modifications required to accommodate the proposed project constitute a project pursuant to the State CEQA Guidelines. Acting in their capacity as a lead agency under State CEQA Guidelines, the City of Calabasas must determine the potential for the proposed project to result in significant impacts, consider mitigation measures and alternatives to avoid significant impacts, and to consider the environmental effects of the proposed action as part of their decision-making process. This Phase I Cultural Resources Assessment provides the substantial evidence upon which the environmental analysis in relation to cultural resources can be made.

1.1 Scope of the Assessment

The scope of work for this archaeological investigation comprised records searches at the South Central Coastal Information Center of the California Historic Resource Inventory System (CHRIS), the Natural History Museum of Los Angeles County, and the University of California Museum of Paleontology; archival research of maps and documents; coordination with the Native American Heritage Commission (NAHC) and interested Native American groups and individuals; and an intensive pedestrian survey of the project's Area of Potential Effect (APE).

The analysis of cultural resources consists of a summary of the regulatory framework that guides the decision-making process, a description of the methods used to characterize cultural resources within the property, the results for baseline conditions for cultural resources, the potential for the proposed project to affect cultural resources, and recommendations for minimizing those impacts to cultural resources. This report addresses related goals and policies of the County General Plan and each of the environmental issues considered in Appendix G of the State CEQA Guidelines for cultural resources:

- Unique paleontological resources or sites or unique geologic features

- Archaeological resources
- Historical resources
- Human remains and other potential Native American areas of traditional cultural significance

1.2 Project Location and Description

In 2004 the City of Calabasas approved the Mulholland Highway Master Plan for Capital Improvements. The Master Plan divided Mulholland Highway into two zones, with Zone 1 being primarily residential with two public schools, and Zone 2 including a significant amount of commercial development with greater traffic volume. This report addresses the potential for construction of a portion of Zone 2 to impact cultural resources.

In its entirety, the limits of Zone 2 extend from Paul Revere Drive in the City of Calabasas to Mulholland Drive in the City of Los Angeles. Zone 2 improvements would include roadway widening; a roundabout or traffic signal at the intersection of Freedom Drive with Mulholland Highway; landscaped median and parkway sections; sidewalk and curb ramp installation; curb and gutter installation; grading and drainage improvements; and, construction of a retaining wall.

The portion of Zone 2 (project) analyzed by this cultural resources investigation is located in Sections 24 and 25 of Township 1 North, Range 17 West, as shown on the Canoga Park, CA, USGS 7.5-minute quadrangle map; the project is located on the border between the City of Calabasas and the City of Los Angeles, Los Angeles County, California (Figure 1). The project consists only of those Zone 2 improvements that would be located on the east side of Mulholland Highway, immediately south of its intersection with Mulholland Drive (Figure 2). Specifically, the project includes the widening of the east side of Mulholland Drive to include an eastbound turn lane, a 5-foot wide bike lane, and a 5- to 10-foot wide sidewalk. Construction of the bike lane and sidewalk will require the removal of a portion of the hillside adjacent to Mulholland Drive and the installation of two concrete retaining walls measuring approximately 6 feet tall.

The area of ground disturbance associated with the project would measure approximately 155 meters (509 feet) long and up to 15 meters (49 feet) wide. Excavations in the existing hillside would extend to depths up to 3.5 meters (11.5 feet) below the current ground surface.

1.3 Existing Conditions

The project area consists of an approximately 155 meter long portion of the east side of Mulholland Highway, including the existing bike lane, curb, and shoulder, and a portion of the hillside immediately east of Mulholland Highway. The hillside includes an exposed road cut that is approximately 15 feet tall at its highest point (Figure 3). A dirt access road branches off from Mulholland Highway at the southern end of the project area and runs up the hillside parallel to the highway and the road cut (Figure 4); the access road terminates at a chain-link fence that marks the border between the cities of Calabasas and Los Angeles. Historic aerial photographs show that both the road cut and the access road date to sometime between 1952 and 1959 (Historic Aerials 2011). The area on the south (Calabasas) side of the fence is heavily disturbed, sparsely vegetated with grass and bushes, and littered with modern trash. The top of the hill has been graded flat, and is currently occupied by a private residence. The portion of the project area on the north (Los Angeles) side of the fence is densely overgrown with scrub oak, sage, and poison oak (Figure 5); this area slopes downhill to the north and terminates at a shallow drainage at the northern end of the project area.

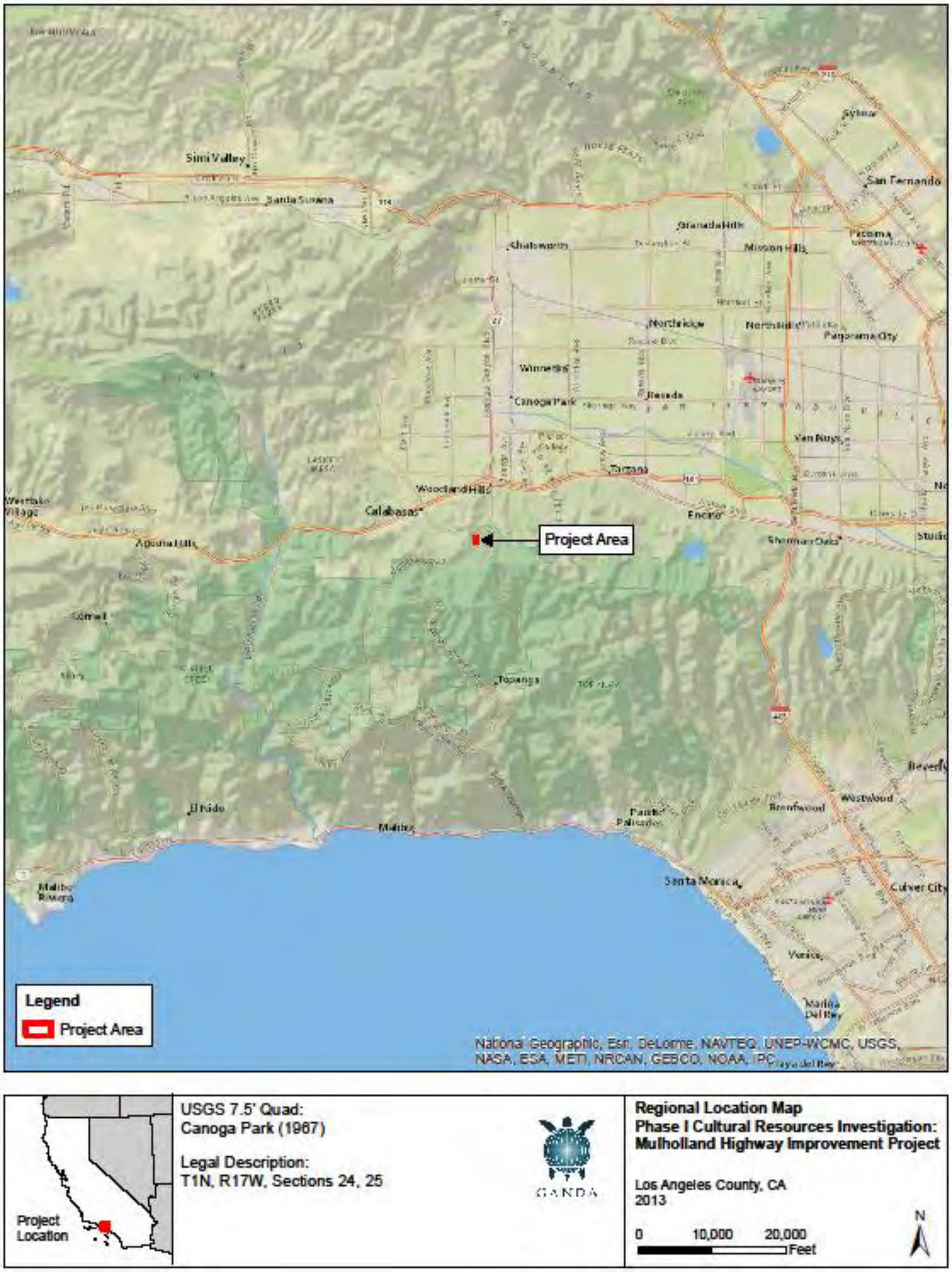

Figure 1. Regional Location Map.

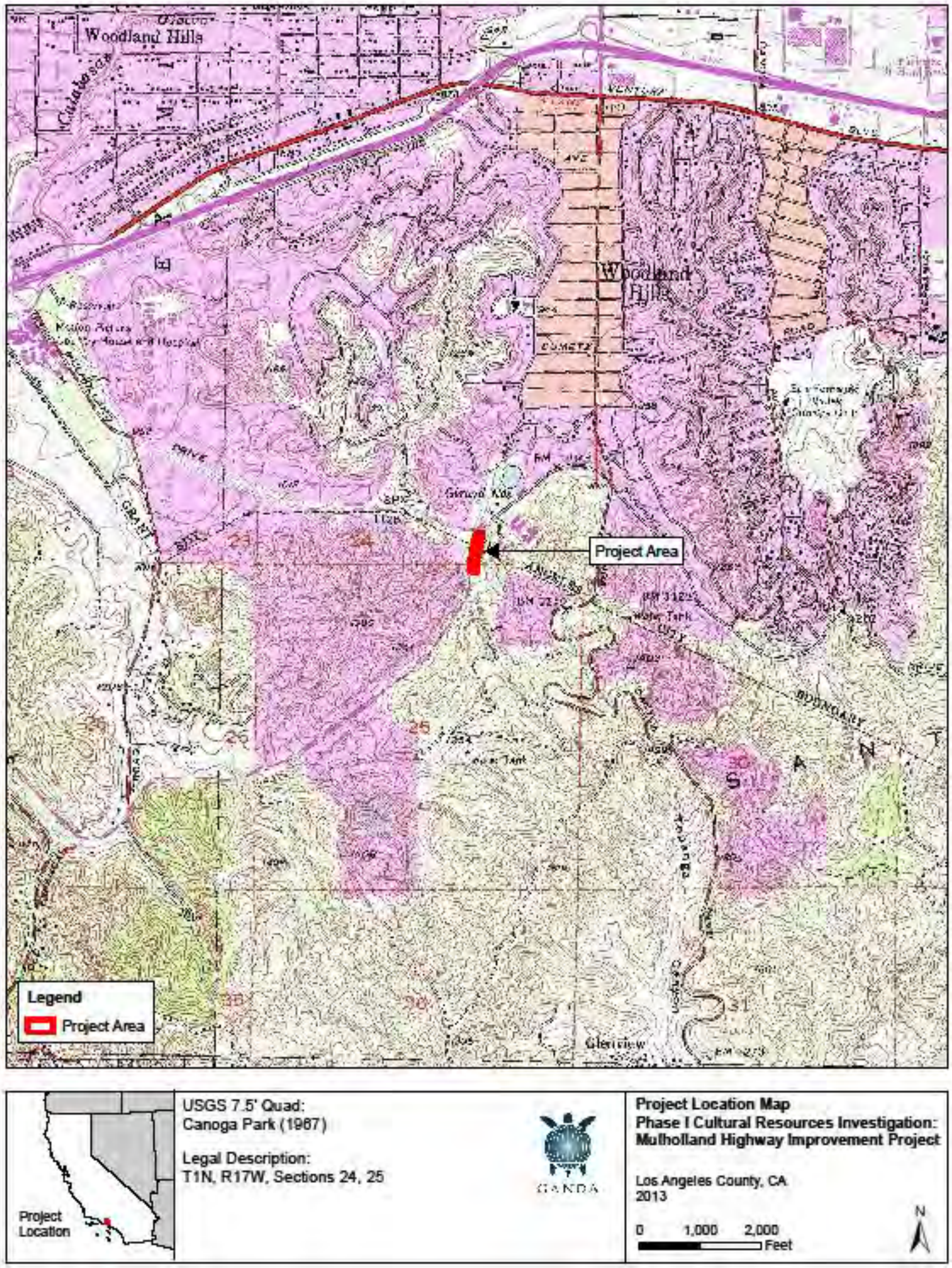

Figure 2. Project Location Map.

Figure 3. Road cut at center of project area, looking east.

Figure 4. South end of project area, looking north.

Figure 5. North end of project area, looking southeast.

1.4 Area of Potential Effects

The *Area of Potential Effects (APE)* is defined as the geographic area or areas within which a project may directly or indirectly cause alterations in the character or use of significant historical or archaeological resources. The APE is influenced by the scale and nature of the project as well as by the types of cultural resources in the vicinity. For the purposes of this analysis, the APE is understood to be the area that would be subjected to ground disturbance during construction of the proposed project, plus a 20-foot (approximately 6-meter) buffer to allow for minor adjustments in the location of project and construction elements. The APE measures approximately .05 acres, or 167 meters long and up to 21 meters in width (Figure 6). The northern end of the APE is marked by the shallow drainage at the north end of the project area, and the APE extends south to the point where the old access road intersects Mulholland Highway. The APE includes the eastern edge of Mulholland Highway, the road cut, and the access road. The eastern margin of the APE is marked by a wrought iron fence that borders the private residence on the hilltop.

Figure 6. Area of Potential Effects.

2.0 Regulatory Framework

2.1 California Environmental Quality Act

Pursuant to CEQA, a *historical resource* is a resource listed in, or eligible for listing in, the California Register of Historical Resources (CRHR). In addition, resources included in a local register of historic resources, or identified as significant in a local survey conducted in accordance with state guidelines, are also considered historic resources under CEQA, unless a preponderance of the facts demonstrates otherwise. According to CEQA, the fact that a resource is not listed in, or determined eligible for listing in, the CRHR, or is not included in a local register or survey, shall not preclude a Lead Agency, as defined by CEQA, from determining that the resource may be a historic resource as defined in California Public Resources Code (PRC) Section 5024.1.7.

CEQA applies to archaeological resources when (1) the archaeological resource satisfies the definition of a historical resource, or (2) the archaeological resource satisfies the definition of a "unique archaeological resource." A *unique archaeological resource* is an archaeological artifact, object, or site that has a high probability of meeting any of the following criteria (PRC § 21083.2(g)):

1. The archaeological resource contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.
2. The archaeological resource has a special and particular quality such as being the oldest of its type or the best available example of its type.
3. The archaeological resource is directly associated with a scientifically-recognized important prehistoric or historic event or person.

2.2 California Register of Historical Resources

Created in 1992 and implemented in 1998, the CRHR is "an authoritative guide in California to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC § 5024.1(a)). Certain properties, including those listed in or formally determined eligible for listing in the National Register of Historic Places (NRHP) and California Historical Landmarks (CHLs) numbered 770 and higher, are automatically included in the CRHR. Other properties recognized under the California Points of Historical Interest program, identified as significant in historic resources surveys, or designated by local landmarks programs may be nominated for inclusion in the CRHR.

A resource, either an individual property or a contributor to a historic district, may be listed in the CRHR if the State Historical Resources Commission determines that it meets one or more of the following criteria, which are modeled on NRHP criteria (PRC § 5024.1(c)):

Criterion 1: It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
Criterion 2: It is associated with the lives of persons important in our past.
Criterion 3: It embodies the distinctive characteristics of a type, period, region, or method of construction; represents the work of an important creative individual; or possesses high artistic values.
Criterion 4: It has yielded, or may be likely to yield, information important in history or prehistory.

Resources nominated to the CRHR must retain enough of their historic character or appearance to be recognizable as historic resources and to convey the reasons for their significance. It is possible that a resource whose integrity does not satisfy NRHP criteria may still be eligible for listing in the CRHR. A resource that has lost its historic character or appearance may still have sufficient integrity for the CRHR if, under Criterion 4, it maintains the potential to yield significant scientific or historical information or specific data. Resources that have achieved significance within the past 50 years also may be eligible for inclusion in the CRHR, provided that enough time has lapsed to obtain a scholarly perspective on the events or individuals associated with the resource (Office of Historic Preservation, undated).

2.3 Native American Heritage Commission

Section 5097.91 of the PRC established the Native American Heritage Commission (NAHC), whose duties include the inventory of places of religious or social significance to Native Americans and the identification of known graves and cemeteries of Native Americans on private lands. Under Section 5097.9 of the PRC, a State policy of noninterference with the free expression or exercise of Native American religion was articulated along with a prohibition of severe or irreparable damage to Native American sanctified cemeteries, places of worship, religious or ceremonial sites, or sacred shrines located on public property. Section 5097.98 of the PRC specifies a protocol to be followed when the NAHC receives notification of a discovery of Native American human remains from a county coroner.

2.4 California Native American Graves Protection and Repatriation Act of 2001

Codified in the California Health and Safety Code Sections 8010–8030, the California Native American Graves Protection and Repatriation Act (Cal NAGPRA) is consistent with the federal NAGPRA. Intended to "provide a seamless and consistent state policy to ensure that all California Indian human remains and cultural items be treated with dignity and respect," Cal NAGPRA also encourages and provides a mechanism for the return of remains and cultural items to lineal descendants. Section 8025 established a Repatriation Oversight Commission to oversee this process. The Act also provides a process for non-federally recognized tribes to file claims with agencies and museums for repatriation of human remains and cultural items.

2.5 Health and Safety Code, Sections 7050 and 7052

Section 7050.5 of the Health and Safety Code declares that, in the event of the discovery of human remains outside a dedicated cemetery, all ground disturbance must cease and the county coroner must be notified. Section 7052 establishes a felony penalty for mutilating, disinterring, or otherwise disturbing human remains, except by relatives.

2.6 Penal Code, Section 622.5

Section 622.5 of the Penal Code provides misdemeanor penalties for injuring or destroying objects of historic or archaeological interest located on public or private lands, but specifically excludes the landowner.

3.0 Background

3.1 Environmental Setting

The project area is located within the California Coastal Chaparral Forest and Shrub Province. This province is characterized by a Mediterranean-style climate of mild, wet winters and hot, dry summers, with brief periods of drought. The landscape consists of coastal plains and high hills, vegetated by a mosaic of woodland, dwarf-woodland, and shrubland species that are evergreen and drought deciduous (USDA - Forest Service ECOMAP Team 2007).

Non-urbanized portions of the project area consist of coastal oak woodland. Coastal oak woodland is highly variable, but is generally characterized by a relatively open canopy, with trees concentrated near but not necessarily confined to a stream course or riparian areas. Oak woodlands can occur on hillsides along a deeply incised drainage, but they are generally found on gentle to moderately steep slopes with moist, deep soils. Oak species predominate in this habitat, but other tree species include California bay and California walnut. Shrubby understory species include poison oak and chamise (City of Calabasas 2008b).

The project area is located within the western part 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 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 (City of Calabasas 2008b).

Calabasas is generally underlain by Mesozoic sedimentary, volcanic, and Cenozoic marine sedimentary rocks. The Upper and Lower Topanga geologic formations are predominant in the region. The Upper Topanga Formation contains marine clastic rocks of middle Miocene age consisting of claystone, sandstone, conglomerates of cobbles of granitic rocks, and volcanic rocks in a sandstone matrix. The Lower Topanga Formation contains marine transgressive clastic rocks of early and middle Miocene age consisting of sandstones and micaceous clay shales (Dibblee and Ehrenspeck 1992). The existing road cut within the project area exposes the upper member of the Modelo Formation, consisting of crumbly, light yellow clay stone and siltstone (Dibblee and Ehrenspeck 1992; Hoots 1931).

3.2 Prehistory

Several prehistoric cultural chronologies have been proposed for the Southern California coast and near inland areas, with two of the most frequently cited sequences developed by William Wallace (1955) and Claude Warren (1968). Such chronologies provide a framework to discuss archaeological data in relation to broad cultural changes seen in the archaeological record. The chronological sequence presented herein represents an updated synthesis of these schemes as compiled by Glassow and others (2007) for the Northern California Bight. This geographic area consists of the coastal area from Vandenberg Air Force Base south to Palos Verdes, as well as the Channel Islands and adjacent inland areas, including the Los Angeles Basin and Santa Monica Mountains. The prehistoric sequence of the area can be divided into four broad temporal categories (Table 1). It should be noted that the prehistoric chronology for the region is being refined on a continuing basis, with new discoveries and improvements in the accuracy of dating techniques.

Table 1. Southern California Coastal Regional Chronology

Epoch	Coastal Region	Dates
Late Pleistocene / Early Holocene	Paleo-Coastal Period	Circa 9500 to 7000/6500 BC
Middle Holocene	Millingstone Period	Circa 7000/6500 to 1500/1000 BC
Late Holocene	Intermediate Period	1500/1000 BC to AD 750
Late Holocene	Late Period	AD 750 to Spanish contact

Terminal Pleistocene and Early Holocene: Paleo-Coastal Period (Circa 9500 to 7000/6500 BC)

Although data on early human occupation for the Southern California coast are limited, archaeological evidence from the northern Channel Islands suggests initial settlement within the region occurred at least 12,000 years before present (BP). At Daisy Cave (CA-SMI-261) on San Miguel Island, radiocarbon dates indicate an early period of use in the terminal Pleistocene, sometime between 9600 and 9000 calibrated (cal) BC (Erlandson, et al. 1996). Evidence of early human occupation in the Northern California Bight has also been found on nearby Santa Rosa Island, where human remains from the Arlington Springs Site (CA-SRI-1730) have been dated between 11,000 and 10,000 cal BC (Johnson, et al. 2002). Archaeological data recovered from these and other coastal Paleoindian sites indicate a distinctively maritime cultural adaptation, termed the "Paleo-Coastal Tradition" (Moratto 1984), which involved the use of seafaring technology and a subsistence regime focused on shellfish gathering and fishing (Rick, et al. 2001).

Relatively few sites have been identified in Los Angeles County that date to the terminal Pleistocene and early Holocene. Evidence of possible early human occupation has been found at the sand dune bluff site of Malaga Cove (CA-LAN-138), located between Redondo Beach and Palos Verdes (Walker 1951). Researchers have proposed that archaeological remains recovered from the lowermost cultural stratum at the site, which include shell, animal bone, and chipped stone tools, may date as early as 8000 cal BC (Moratto 1984:168; Wallace 1986).

Middle Holocene: Millingstone Period (Circa 7000/6500 to 1500/1000 BC)

The Millingstone Period or Horizon, also referred to as the "Encinitas Tradition" is the earliest well-established cultural occupation of the coastal areas of the region (Sutton 2006; Sutton and Gardner 2006). The onset of this period, which began sometime between 7000 and 6500 cal BC, is marked by the expansion of populations throughout the Northern California Bight. Regional variations in technology, settlement patterns, and mortuary practices among Millingstone sites have led researchers to define several local manifestations or “patterns” of the tradition (Sutton and Gardner 2006). Groups that occupied modern day Los Angeles County are thought to have been relatively small and highly mobile during this time, with a general subsistence economy focused on the gathering of shellfish and plant foods, particularly hard seeds, with hunting being of less importance (Glassow, et al. 2007).

Two temporal subdivisions have been defined for the portion of the Topanga Pattern falling within the Millingstone Period: Topanga I (circa 6500 to 3000 BC) and Topanga II (circa 3000 to 1000 BC) (Sutton and Gardner 2006). Topanga I assemblages are characterized by abundant *manos* and *metates*, core tools and scrapers, charmstones, cogged stone, and discoidals; projectile points are quite rare with those present resembling earlier, large, leaf-shaped forms (Glassow, et al. 2007). Secondary inhumations with associated cairns are the most common burial form at Millingstone sites with small numbers of extended inhumations also identified. The subsequent Topanga II phase largely represents a continuation of the Topanga pattern with site assemblages characterized by numerous *manos* and *metates*, charmstones, cogged stones, discoidals, and some stone balls. A significant technological change in ground stone occurs at this time, with the appearance of mortars and pestles at Topanga II sites suggesting the adoption of balanophagy by coastal populations (Sutton and Gardner 2006). The quantity of projectile points also notably increases in Topanga II site deposits, indicating that the hunting of large game may have played a greater role in the subsistence economy than in earlier times. While secondary burials continue to be quite common, a few flexed inhumations have also been recovered from archaeological contexts dating to the Topanga II phase.

A number of Millingstone sites have been identified in Los Angeles County. The lower component of the Tank site (CA-LAN-1), located in the Santa Monica Mountains, was excavated in the 1940’s and determined to be Topanga I in age. In the San Fernando Valley, the Encino site (CA-LAN-111), is thought to have contained a Topanga I component. The artifact assemblage is definitive of the Topanga I period, containing many milling implements but few projectile points. The presence of mortars and pestles alongside stemmed projectile points at the Chatsworth site (CA-LAN-21), located at the western edge of the San Fernando Valley, suggests a Topanga II presence. The Big Tujunga Wash site, located at the eastern edge of the San Fernando Valley, may have also contained a Topanga II component (Sutton and Gardner 2006).

Late Holocene: Intermediate Period (1500/1000 BC to AD 750)

The Intermediate Period, which encompasses the early portion of the “Del Rey Tradition” as defined by Sutton (Sutton 2006), begins around 3500 BP. At this time, significant changes are seen throughout the coastal areas of Southern California in material culture, settlement systems, subsistence strategies, and mortuary practices. These new cultural traits have been attributed to the arrival of Takic-speaking people from the southern San Joaquin Valley (Sutton 2009). Biological, archaeological, and linguistic data indicate that the Takic groups who settled in the Los Angeles Basin were ethnically distinct from the preexisting Hokan-speaking Topanga populations and are believed to be ancestral to ethnographic Gabrielino groups (Sutton 2009). While archaeological evidence indicates that "relic" Topanga III populations continued to survive in isolation in the Santa Monica Mountains, these indigenous groups appear to have been largely replaced or absorbed by the Gabrielino or Chumash by 2000 BP (Sutton and Gardner 2006:17).

Intermediate Period sites in the region are represented by the "Angeles Pattern" of the Del Rey Tradition (Sutton 2006). Three temporal subdivisions have been defined for the portion of the Angeles Pattern that falls within the Intermediate Period: Angeles I (1500 to 600 BC), Angeles II (600 BC to AD 400), and Angeles III (AD 400 to 750) (Sutton and Gardner 2006:8). The onset of the Angeles I phase is characterized by the increase and aggregation of regional populations and the appearance of the first village settlements. The prevalence of projectile points, single-piece shell fishhooks, and bone harpoon points at Angeles I sites suggests a subsistence shift in the Intermediate Period with an increased emphasis on fishing and terrestrial hunting and less reliance on the gathering of shellfish resources. Regional trade or interaction networks also appeared to develop at this time, with coastal populations in Los Angeles County obtaining small steatite artifacts and *Olivella* shell beads from the southern Channel Islands and obsidian from the Coso Volcanic Field (Koerper, et al. 2002). Finally, marked changes are seen in mortuary practices during the Angeles I phase with flexed primary inhumations and cremations replacing extended inhumations and cairns.

The Angeles II phase largely represents a continuation and elaboration of the Angeles I technology, settlement, and subsistence systems. One exception to this pattern is the introduction of a new funerary complex around 2600 BP consisting of large rock cairns or platforms which contain abundant broken tools, faunal remains, and cremated human bone. These mortuary features have generally been thought to represent the predecessor of the Southern California Mourning Ceremony (Sutton 2006:14).

Several important changes in the archaeological record mark the beginning of the Angeles III phase. At this time, larger seasonal villages characterized by well-developed middens and cemeteries were established along the coast or inland areas. Archaeological data from Angeles III sites indicate that residents of these settlements practiced a fairly diverse subsistence strategy which included the exploitation of both marine and terrestrial resources (Sutton 2006:16). Notable technological changes at this time include the introduction of the plank canoe and bow and arrow (Glassow, et al. 2007:203-204). The appearance of new *Olivella* bead types at Angeles III sites indicates a reconfiguration of existing regional exchange networks with increased interaction with populations in the Gulf of California (Koerper, et al. 2002). Finally, cremations increase slightly in frequency at this time, with inhumations no longer placed in an extended position (Sutton 2006:18). Intermediate Period sites in Los Angeles County include CA-LAN-2 and CA-LAN-197, located in the Santa Monica Mountains. The formal cemeteries at these sites are representative of the increased sedentism that occurred during the Intermediate Period (Glassow, et al. 2007:202).*Late Holocene: Late Period (AD 750 to Spanish Contact)*

The Late Period dates from approximately AD 750 until Spanish contact at AD 1542. Sutton (2006) has divided this period, which falls within the larger Del Rey Tradition, into two phases: Angeles IV (AD 750-1200) and Angeles V (AD 1200-1550). The Angeles IV phase is characterized by the continued growth of regional populations and the development of large, sedentary villages. Although chiefdoms appear to have developed in the northern Channel Islands and Santa Barbara region after 850 BP (Arnold 1992; Gamble 2005), little direct evidence has been found to suggest this level of social complexity existed in the Los Angeles area during the late prehistoric period (Sutton 2006).

Several new types of material culture appear during the Angeles IV phase including Cottonwood series points, birdstone and “spike” effigies, *Olivella* cupped beads, and *Mytilus* shell disk beads. The presence of Southwestern pottery, Patayan ceramic figurines, and Hohokam shell bracelets at Angeles IV sites suggests some interaction between groups in Southern California and the Southwest. Notable changes are seen in regional exchange networks after 800 BP, with an increase in the number and size of steatite artifacts, including large vessels, elaborate effigies, and *comals* (cooking dishes), recovered from Angeles V sites. The presence of these artifacts suggests a strengthening of trade ties between coastal Los Angeles populations and the southern Channel Islands (Koerper, et al. 2002:69). Finally, Late Period mortuary practices remain largely unchanged from the Intermediate Period, with flexed primary inhumations continuing to be the preferred burial method.

Late Period sites in Los Angeles County include CA-LAN-227 and CA-LAN-229, located in the Santa Monica Mountains. Both sites contain fewer *manos* and *metates* than earlier sites, but more mortars, pestles, projectile points, drills, beads, pipes, and bone tools (Moratto 1984:141). Although these sites represent a move toward centralized sedentary villages during this period, it is unclear whether they represent year-round occupation or semi-permanent villages used as base settlements (Glassow, et al. 2007:210).

3.3 Ethnography

The proposed project is located in the northwest portion of the area historically occupied by the Gabrielino (Tongva) (Bean and Smith 1978:538; Kroeber 1925:Plate 57). The name Gabrielino denotes those people who were administered by the Spanish from Mission San Gabriel, which included people from the Gabrielino proper, as well as other social groups. Therefore, in the post-Contact period, the name does not necessarily identify a specific ethnic or tribal group. The names Native Americans in southern California used to identify themselves have, for the most part, been lost. Many contemporary Gabrielino identify themselves as descendants of the indigenous people living across the plains of the Los Angeles Basin and use the native term Tongva (King 1994:12). This term is used in the remainder of this section to refer to the pre-Contact inhabitants of the Los Angeles Basin and their descendants.

Tongva lands encompassed the greater Los Angeles Basin and three Channel Islands—San Clemente, San Nicolas, and Santa Catalina. Their mainland territory was bounded on the north by the Chumash at Topanga Creek, the Serrano at the San Gabriel Mountains in the east, and the Juaneño on the south at Aliso Creek (Bean and Smith 1978:538; Kroeber 1925:636).

The Tongva language, as well as that of the neighboring Juaneño/Luiseño, Tatataviam/Alliklik, and Serrano, belongs to Takic branch of the Uto-Aztecan language family, which can be traced to the Great Basin area (Mithun 1999; Sutton 2009). The Tongva established large permanent villages in the fertile lowlands along rivers and streams, and in sheltered areas along the coast, stretching from the foothills of the San Gabriel Mountains to the Pacific Ocean. A total tribal population has been estimated of at least 5,000 (Bean and Smith 1978:540), but recent ethnohistoric work suggests a number approaching 10,000 seems more likely (O'Neil 2002).

The Tongva subsistence economy was centered on gathering and hunting. The surrounding environment was rich and varied, and the tribe exploited mountains, foothills, valleys, and deserts as well as riparian, estuarine, and open and rocky coastal eco-niches. Like most native Californians, acorns were the staple food (an established industry by the time of the early Intermediate Period). Acorns were supplemented by the roots, leaves, seeds, and fruits of a wide variety of flora (e.g., islay, cactus, yucca, sages, and agave). Freshwater and saltwater fish, shellfish, birds, reptiles, and insects, as well as large and small mammals, were also consumed (Bean and Smith 1978:546; Kroeber 1925:631; McCawley 1996).

European contact with the Tongva occurred as early as 1542 with the Spanish expedition led by Portuguese navigator João Rodrigues Cabrilho (Juan Rodriguez Cabrillo in Spanish), followed by Sebastián Vizcaíno in 1602; both visited Santa Catalina Island. Colonization of Tongva lands did not begin in earnest until after the inland expedition led by Gaspar de Portolá in 1769. On September 8, 1797, the San Fernando Mission was founded. Father Fermin Francisco Lausen was appointed in charge of the mission, which was the seventeenth to be founded by the Catholic Church in California (Bean and Smith 1978; McCawley 1996). In order to assist in the establishment of the San Fernando Mission, several other California missions sent nearly one thousand cattle, horses, mules, and sheep. Crops were planted at the mission and nearby Native American groups, such as the Tongva, were forced into mission life. While living at the mission, they were under the direction of the mission priests who required the Native Americans to farm (wheat, barley, corn, beans, peas, and fruit trees), raise cattle, cure hides, tend vineyards, make wine, and practice a trade, such as carpentry, masonry, tailoring, or shoemaking. Although mission life did give indigenous Californians some skills needed to survive in a rapidly changing world, much traditional cultural knowledge was lost during this era, as populations were moved and decimated by introduced diseases for which the people had no immunity.

After governmental control of California shifted to Mexico, the missions were formally secularized in 1834, and the extensive mission lands were divided into private land grants, claimed by the growing ranchero class. With the migration of farmers to southern California after the Mexican-American War of 1846, the local native population, who continued to work as laborers, was soon a minority that was often lumped together with the Mexican-American community. Many allied themselves with remaining Native American communities in the Tehachapi and San Bernardino Mountains.

In the early twentieth century, the Tongva still living near the old missions joined the Mission Indian Federation and sought redress from the federal government over lost lands. A generation later, partly as an outgrowth of the civil rights movement, the Tongva started to form political organizations of their own to gain control over the affect handling of ancestral remains discovered at construction sites and to seek federal acknowledgement of their tribe. There are currently five such organizations with total membership approaching nearly a thousand people. They are still struggling to receive federal recognition.

3.4 History

Post-Contact history for the state of California generally is divided into three periods: the Spanish Period (1769–1822), the Mexican Period (1822–1848), and the American Period (1848–present). Although there were brief visits by Spanish, Russian, and British explorers from 1529 to 1769, the beginning of Spanish settlement in California occurred in 1769 with a settlement at San Diego. Mission San Diego de Alcala was the first of 21 missions that were established in Alta California between 1769 and 1823. The Mexican Period, which commenced when news of the revolution against the Spanish crown reached California in 1822, was an era of extensive interior land grant development and exploration by American fur trappers west of the Sierra Nevada Mountains.

With the signing of the Treaty of Guadalupe Hidalgo in 1848, ending the Mexican-American War, California became a territory of the United States. The discovery of gold in 1848 at Sutter’s Mill near Sacramento and the resulting gold rush influenced the history of the state and the nation. The rush of tens of thousands of people to the gold fields also had a devastating impact on the lives of indigenous Californians, with the introduction and concentration of diseases, the loss of land and territory (including traditional hunting and gathering locales), violence, malnutrition, and starvation. Thousands of settlers and immigrants continued to pour into the state, particularly after the completion of the transcontinental railroad in 1869.

3.4.1 Los Angeles County

The first European account of the area to become Los Angeles County was by Juan Rodriguez Cabrillo, who led a Spanish expedition along the California coast in 1542 and 1543 (Chartkoff and Chartkoff 1984:252). Cabrillo noted the numerous campfires of the Gabrielino and thus named the area the “Bay of Smokes.” Spain’s presence in the region was only intermittent for approximately 200 years. Then, because of the possibility of territorial encroachment by the British and Russians from the north, Spanish Governor of Baja California Gaspar de Portolá was instructed to lead a land–sea expedition to colonize Alta (upper) California in the 1760s (Chartkoff and Chartkoff 1984:254).

On September 8, 1771, Fathers Pedro Cambón and Angel Somera established the Mission San Gabriel de Arcángel near the present-day city of Montebello. In 1775, the mission was moved to its current location in San Gabriel due to better agricultural lands. This mission marked the first sustained European occupation of the Los Angeles County area. Mission San Gabriel, despite a slow start partially due to misconduct by Spanish soldiers, eventually became so prosperous it was known as "The Queen of the Missions" (Johnson, et al. 1972).

The pueblo that eventually became the City of Los Angeles was established in 1781. During this period, Spain also deeded ranchos to prominent citizens and soldiers (though very few in comparison to the later Mexican Period). Rancho San Pedro, one such rancho, was deeded to soldier Juan Jose Dominguez in 1784 and comprised 75,000 acres, encompassing the modern South Bay region from the Los Angeles River on the east to the Pacific Ocean on the west.

The area that became Los Angeles County saw an increase in European settlement during the Mexican Period, largely due to the many land grants (ranchos) to Mexican citizens by various governors. The period ended in early January 1847, when Mexican forces fought the combined U.S. Army and Navy forces in the Battle of the San Gabriel River on January 8, and in the Battle of La Mesa on January 9 (Nevin 1978). On January 10, leaders of the pueblo of Los Angeles surrendered peacefully after Mexican General Jose Maria Flores withdrew his forces. Shortly thereafter, newly appointed Mexican Military Commander of California Andrés Pico surrendered all of Alta California to U.S. Army Lieutenant Colonel John C. Fremont in the Treaty of Cahuenga (Nevin 1978).

Settlement of the Los Angeles region accelerated in the early American Period. The county was established on February 18, 1850, one of 27 counties established in the months prior to California becoming a state. Many ranchos in the county were sold or otherwise acquired by Americans, and most were subdivided into agricultural parcels or towns. Nonetheless, ranching retained its importance and, by the late 1860s, Los Angeles was one of the top dairy production centers in the country (Rolle 1963). In 1854, the U.S. Congress agreed to let San Pedro become an official port of entry, and by the 1880s, the railroads had established networks throughout the county, resulting in fast and affordable shipment of goods, as well as a means to transport new residents to the booming region (Dumke 1944). New residents included many health-seekers drawn to the area by the fabled climate in the 1870s–1880s (Baur 1959). In 1876, the county had a population of 30,000 (Dumke 1944:7); by 1900 it had reached 100,000.

In the early to mid-1900s, population growth accelerated due to industry associated with both world wars, as well as emigration from the Midwest "dust bowl" states during the Great Depression. The county became one of the most densely occupied areas in the U.S. The county's mild climate and successful economy continued to draw new residents in the late 1900s, with much of the county transformed from ranches and farms into residential subdivisions surrounding commercial and industrial centers. Hollywood's development into the entertainment capital of the world, and southern California's booming aerospace industry, were key factors in the county's growth.

3.4.2 Project Area Vicinity

The following historic context for the City of Calabasas and the Santa Monica Mountains is presented in the City of Calabasas 2030 General Plan (City of Calabasas 2008a):

> From Spanish contact 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, 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. A branch of the El Camino Real passed through Calabasas after leaving the San Fernando Valley, a route that was frequently traveled by Native Americans, soldiers, explorers and civilians alike. Today, the Ventura Freeway (U.S. Highway 101) follows the former alignment of the El Camino Real. Additionally, Malibu Canyon was not only a major Native American trade corridor to the Pacific Ocean, but early settlers also used the route and connecting trails to access Stokes, Piuma, Liberty, and other canyons.
>
> During the Mexican Period, large land grants dominated the region. Prior to this time, the Spanish Crown permitted settlement and allotted certain land concessions, but the deed remained in their possession. These Spanish entitlements were actually no more than permits that allowed people to graze the land. One concession under the Spanish rule and District of Santa Barbara was made in the vicinity of Calabasas and granted under the name of El Paraje de Las Virgenes. It was not until the Mexican Period however, that the basic tenants of the Land Grant system and ultimately, the land use settlement pattern for the area changed. The project area was sandwiched between Rancho Las Virgenes on the north and Rancho Topanga Malibu Sequit to the south (City of Calabasas 2008a).
>
> By the 1840s and 50s, 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, Domingo Carrillo and Nemisio Dominguez of Rancho Las Virgenes, and Matthew Keller of Rancho Topanga Malibu Sequit, owned much of the property in and around Calabasas. Just 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 (City of Calabasas 2008a).
>
> After the Mexican-American War and statehood, land use and ownership patterns evolved slowly. Leonis remained a major local ranch owner, and he enlarged and remodeled his Monterey-style house. The Leonis Adobe remains the most enduring historic example of this period of Calabasas history and serves as an anchor for Old Town Calabasas (City of Calabasas 2008a).
>
> After the turn of the century, several select spots in the Calabasas area developed into weekend respites from the city. Crater Camp in Monte Nido was opened in 1914 as a year-round picnic ground. The Calabasas Highlands community was subdivided in the 1920s, and reflects a development style that links Calabasas to its neighbor Topanga in

style and parcel pattern (City of Calabasas 2008a).

Unreliable water sources remained a constraint to larger scaled subdivision and development in Calabasas through the first half of the 20th Century. With the founding of the Las Virgenes Municipal Water District in 1958, a consistent water supply was obtained. This development coincided with the state's investment in the freeway system. These two structural events led to a sustained development boom as the rapidly urbanizing San Fernando Valley pushed westward along the U.S. 101 corridor. In 1969, Warner Ranch was purchased and subdivided, ushering in the master planned Calabasas Park area. The upgrading of U.S. 101 (the Ventura Freeway) to a full freeway occurred in the 1960s and developers began subdividing communities in proximity to freeway interchanges at Valley Circle/Mulholland Drive, Parkway Calabasas, Las Virgenes Road, and Lost Hills Road (City of Calabasas 2008a).

4.0 Methods

4.1 Cultural Resources Records Search and Literature Review

A cultural resources records search was conducted by staff of the South Central Coastal Information Center at California State University, Fullerton, on October 10, 2013, to determine if the proposed project may have the potential to adversely affect known prehistoric and historic resources. The records searches encompassed the entire project area plus a quarter-mile buffer. The purpose of the record search was to (1) identify prehistoric and historic resources previously documented in the project area and within one mile of project area boundaries; (2) determine which portions of the project area may have been previously surveyed, when those surveys took place, and how the surveys were conducted; and (3) ascertain the potential for prehistoric and historic resources to be found in the project area. This search also included a review of the appropriate USGS topographic maps on which cultural resources are plotted, archaeological site records, building/structure/object records, and data from previous surveys and research reports. In addition, the California Points of Historical Interest, the California Historical Landmarks, the California Register of Historical Resources, NRHP, and the California State Historic Resources Inventory listings were reviewed to ascertain the presence of designated, evaluated, and/or historic-era resources within the project area. Historical maps and historical aerial photographs of the area were also examined.

4.2 Native American Coordination

Coordination was initiated with NAHC on October 9, 2013. NAHC was requested to conduct a records search from their Sacred Lands File for the presence of Native American sacred sites or human remains in the vicinity of the proposed project. A written response received on October 14, 2013, stated that the Sacred Lands File failed to indicate the presence of Native American cultural resources within the project's APE.

On the recommendation of NAHC, GANDA sent letters to seven Native American contacts classified by NAHC as potential sources of information related to cultural resources in the vicinity of the project area. The letters advised the tribes and specific individuals of the proposed project and requested information regarding cultural resources in the immediate area, as well as feedback or concerns related to the proposed project.

4.3 Paleontological Resources Records Search

Paleontological potential consists of both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. Rock units which contain potentially datable organic remains older than late Holocene, including deposits associated with animal nests or middens, and rock units which may contain new vertebrate deposits, traces, or trackways are also classified as having high potential (Society of Vertebrate Paleontology 2010).

Rock units are described as having (a) high, (b) undetermined, (c) low, or (d) no potential for containing significant paleontological resources.

- High Potential: Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Rocks units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcaniclastic formations (e. g., ashes or tephras), and some low-grade metamorphic rocks which contain significant paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils (e. g., middle Holocene and older, fine-grained fluvial sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones, etc.).

- Undetermined Potential: Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources. A field survey by a qualified professional paleontologist to specifically determine the paleontological resource potential of these rock units is required before a paleontological resource impact mitigation program can be developed. In cases where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy.

- Low Potential: Rock units having low potential for yielding significant fossils will be poorly represented by fossil specimens in institutional collections, or based on general scientific consensus only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule, e. g. basalt flows or recent colluvium. Rock units with low potential typically will not require impact mitigation measures to protect fossils.

- No Potential: Some rock units have no potential to contain significant paleontological resources, for instance high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites). Rock units with no potential require neither protection nor impact mitigation measures relative to paleontological resources (Society of Vertebrate Paleontology 2010).

The presence of recorded paleontological sites and other unique geologic units in the vicinity of the proposed project area was assessed through records searches at the Natural History Museum of Los Angeles County and the online database of the University of California Museum of Paleontology. In addition, the results of the searches were compared to the corresponding geologic map for the project area to assess the potential for the geologic units that characterize the project area to yield unique paleontological resources.

4.4 Phase I Survey

A GANDA archaeologist (Clarus J. Backes, MA, RPA) conducted an intensive pedestrian survey of the entire APE on October 30 2013. The survey consisted of a systematic investigation of the ground surface in 3-meter transects; during the survey, the archaeologist examined the ground surface for artifacts (e.g., flaked stone tools, tool-making debris, stone milling tools, fire-affected rock, prehistoric ceramics), soil discoloration that might indicate the presence of a prehistoric cultural midden, soil depressions, and features indicative of the former presence of structures or buildings (e.g., standing exterior walls, postholes, foundations, wells, mines) or historic debris (e.g., metal, glass, ceramics). Ground disturbances such as gopher holes, burrows, cut banks, and arroyos were also visually inspected. No artifacts were collected during the survey.

5.0 Results

5.1 Cultural Resources Records Search and Literature Review

The cultural resources record search identified 15 previous studies within the 0.25-mile radius of the proposed project area (**Error! Reference source not found.**2).

Table 2. Previous Studies Conducted within 0.25 miles of Project Area.

Report Number	Authors	Year	Report Title
LA-00001	Wessel, Richard L., Pence Archaeological Consulting	1973	Archaeological Reconnaissance of Tentative Tract # 31319
LA-00081	Rosen, Martin D., University of California, Los Angeles Archaeological Survey	1975	Evaluation of the Archaeological Resources for the Area-wide Facilities Plan for the Las Virgenes Municipal District, (Malibu Coast, Western Santa Monica Mountains, Southern Simi Hills), Los Angeles and Ventura Counties.
LA-00288	Clewlow, William C. Jr.	1977	An Archaeological Resource Survey and Impact Assessment of Tract #32948, Los Angeles County, California.
LA-00353	Clewlow, William C. Jr., University of California, Los Angeles Archaeological Survey	1978	An Archaeological Resource Survey and Impact Assessment of Western America Development Corp. Property at the Intersection of Mulholland Drive and Highway Woodland Hills, California
LA-00520	Day, Donna A., Northridge Archaeological Research Center, CSUN	1979	Tentative Tract Map 34211, Southwest Corner of Topanga Canyon Boulevard and Mulholland Drive, Woodland Hills, California.
LA-01289	Whitley, David S., University of California, Los Angeles Archaeological Survey	1983	An Archaeological Resource Survey and Impact Assessment of a 200-Foot-Wide Road Right-of-way on Mulholland Drive Between Topanga Canyon Boulevard to 920 Feet West of San Feliciano Drive, Los Angeles, California
LA-02012	Romani, John F., Northridge Archaeological Research Center, CSUN	1975	Environmental Study Mulholland Drive - Topanga Canyon Boulevard to 920 Feet West of San Feliciano Drive W.o. 71239
LA-02074	Galdikas-Brindamour, Birute, University of California, Los Angeles Archaeological Survey	1970	Trade and Subsistence at Mulholland: a Site Report on LAN-246
LA-02729	Van Horn, David M.	1987	Trade and Subsistence in Humaliwu: a Focused Review of the Decades of Archaeology in the Conejo Corridor
LA-03186	Romani, John F. and Jerry Kleeb, Northridge Archaeological Research Center, CSUN	1975	Assessment of the Archaeological Impact of the Proposed Widening and Realignment of Mulholland Scenic Parkway (w.o. 71239) Topanga Canyon to San Feliciano Drive (sub Purchase Order 071547)
LA-03513	Chartkoff, Joseph L., University of California, Los Angeles Archaeological	1965	UCAS-025 Non-salvage Excavation of CA-LAN-246, Topanga Canyon, Los Angeles County

Report Number	Authors	Year	Report Title
	Survey		
LA-03581	Burnat, Mimi		Molluscan Remains As Archaeological Indicator, With Special Reference to CA-LAN-1031
LA-03716	Los Angeles County Department of Public Works	1977	Historic Property Survey Mulholland Drive - Topanga Canyon Boulevard to 92 Feet West of San Feliciano Drive W.o. 71239
LA-07273	Wlodarski, Robert J., Cellular Archaeological Resource Evaluations	2005	Results of a Records Search and Archaeological Reconnaissance for Bechtel Corporation Wireless Communications Site Lsanca0426a (atc Project No. 52.75132.0475) (located Near the Southwest Corner of Mulholland Drive and Mulholland Highway in the City of Calabasas
LA-08191	Whitley, David S. and Joseph M. Simon, W & S Consultants	2004	Phase I Archaeological Survey of 22241 and 22251 Mulholland Drive, Woodland Hills, Los Angeles County, California

The cultural resources record search identified two previously recorded archaeological resources within the 0.25-mile radius of the proposed project area (**Error! Reference source not ound.**3; Figure 7). Both are prehistoric archaeological sites; one site (CA-LAN-246) is located within the project's APE. Neither site has been evaluated for NRHP or CRHR eligibility.

Table 3. Previously Recorded Archaeological Resources within 0.25 miles of Project Area.

Primary Number	Trinomial	Description	Within Area of Potential Effects
P-19-000246	CA-LAN-246	Village site with dense artifact scatter, midden, burials	Yes
P-19-001017	CA-LAN-1017	Lithic scatter with midden	No

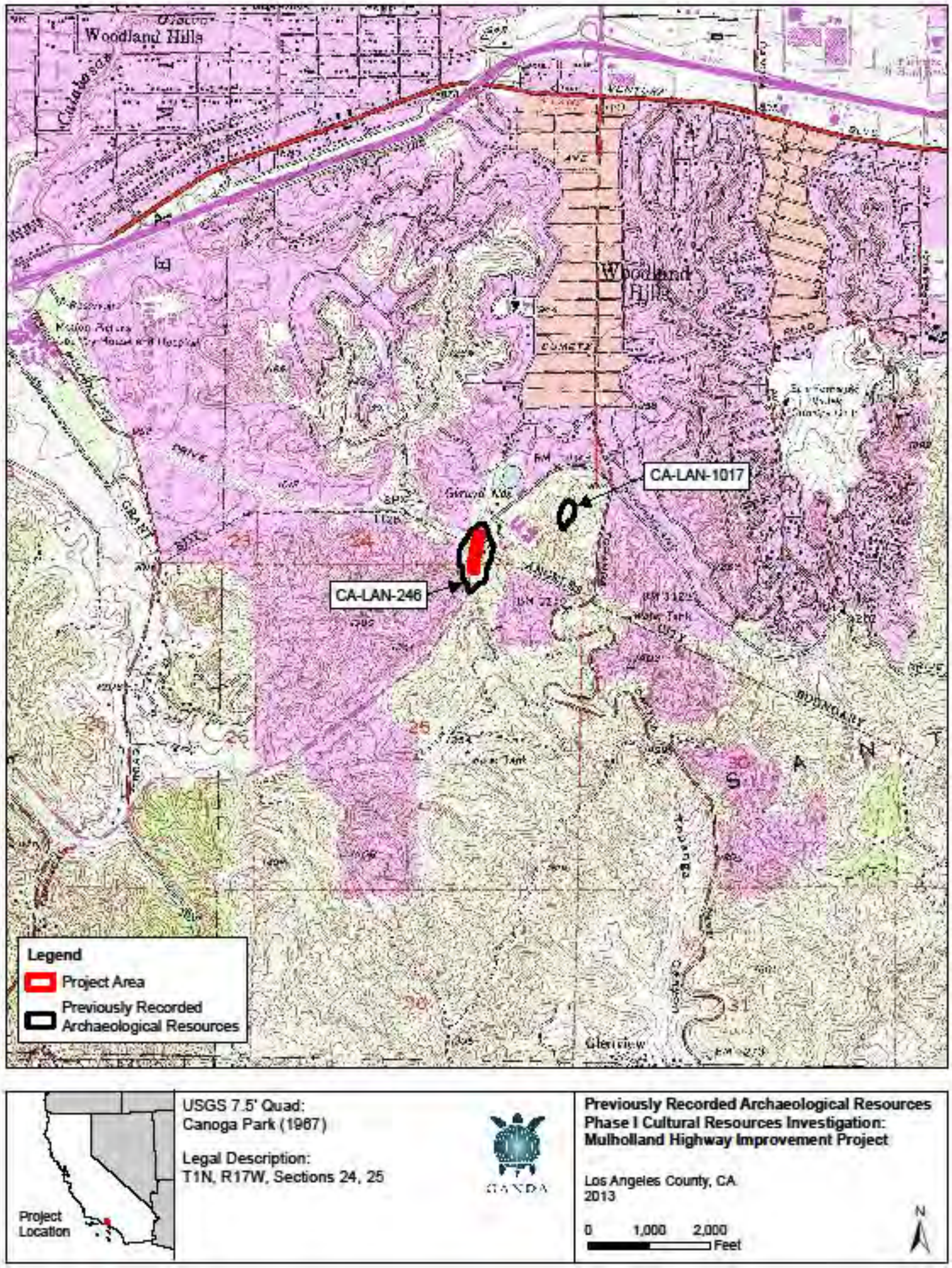

Figure 7. Previously Recorded Archaeological Resources.

CA-LAN-246

CA-LAN-246 has been characterized as a Late Period, Western Tongva village site by previous researchers (Galdikas-Brindamour 1970; Gamble and Russell 2002:Table 7.1). The site was initially recorded by Alex Apostolides in 1963. Apostolides originally estimated the site's dimensions as 300 by 100 yards, although the exact dimensions are unknown due to urban development and vandalism, and it is likely that the site originally extended west across the area now occupied by Mulholland Highway and Gelson's Village. The central portion of the site, and the area of densest artifact concentration, appears to have been on the crest of the hill, in the area immediately east of the APE where a private residence is currently located. Apostolides described the site as a heavy surface concentration of basalt core tools and flakes; steatite and granitic bowl fragments; ground stone tools and fragments; steatite, shell and bone beads; a "heavy occurrence" of yellow and red ochre; and scattered human bone. He also noted a layer of midden approximately 4 to 5 feet deep (Apostolides 1963).

By 1963 the site had been vandalized heavily – when he visited the site to gather data for his site report, Apostolides surprised three teenage vandals who had exposed an intact human burial near the access road. The teenagers had already removed the skull, the arm bones, a clavicle, and several ribs when Apostolides confronted them. When questioned about the burial, the teenagers replied, "Oh, a lot of kids come up here and dig all the time—they've taken a lot of bones out of here." Apostolides returned the next day and conducted a controlled salvage excavation of the remainder of the burial. At that time, he noted a second burial located immediately below the first. When his excavation was complete he backfilled the pit, leaving the second burial in place (Apostolides 1963).

Soon afterward a local housing development firm announced plans to develop the area containing the site. Over the next few months Apostolides and a few volunteer workers spent weekends recovering as much of the site as they could in a systematic, scientific manner, sometimes working side-by-side with vandals armed with coal scoops and window screens. While Apostolides' excavations were ongoing, the development company conducted initial grading on the center portion of the site, destroying much of what remained of the site's primary deposits. Ultimately, Apostolides and his crew recovered 22 human burials and over 1800 artifacts, although they were able to excavate no more than 5% of the site. The site's burials and artifact assemblage were later analyzed by Birute Galdikas-Brindamour (1970), who obtained four radiocarbon dates ranging from AD 1230 to AD 1500. Ironically, the development company never proceeded with construction, and the area remained unused for several years (Galdikas-Brindamour 1970).

In 1977, C. William Clewlow, Jr. relocated the site during a survey of Tract 32948, which includes the southern portion of the current project area (Clewlow 1977). At that time, Clewlow observed isolated patches of shell concentrations, isolated chipped stone debitage, and visible dark soil areas which appeared to be midden. However, Clewlow stressed that "in not one instance. . . was artifactual or shell material observed in an original context. In each case it was clearly the result of secondary or tertiary depositional forces of a modern origin. The most remarkable single observation to emerge from the surface reconnaissance, in fact, was the totally disturbed condition of the tract" (Clewlow 1977:4). Clewlow concluded that if intact archaeological deposits or human burials remained in the site, they were likely buried by modern overburden, and would only be discernable if surface materials were graded away. He recommended that "the tract surface be graded in small increments of a few inches at a time, and that an archaeologist be present to monitor such grading as it is conducted" (Clewlow 1977:5).

In 1978 the site was graded to a depth of about three feet in preparation for a housing development. In a note appended to the CA-LAN-246 site record the following year, Clement Meighan stated that all remaining occupational levels of the site had been removed and used for fill in a ravine to the south, and that "the site is now totally destroyed" (Apostolides 1963).

CA-LAN-1017

CA-LAN-1017 is a scatter of flaked stone and ground stone fragments with midden. The site measures approximately 140 by 70 meters (460 by 230 feet) and is located 475 meters (1558 feet) northeast of the proposed project area. CA-LAN-1017 was initially recorded by Donna Day in 1979; she noted quartzite, chert, and chalcedony flakes and cores, and a single hammerstone, with an area of midden located in the southeast portion of the site. Mike Merrill of Topanga Archaeological Consultants revisited the site in 1999, and found a single ground stone fragment in a modern rock ring around a planted tree. By that time, a housing development had been built on the area once occupied by the site, and no other traces of the site remained (Day 1979).

5.2 Native American Coordination

On the recommendation of NAHC, GANDA sent letters to seven Native American contacts classified by NAHC as potential sources of information related to cultural resources in the vicinity of the project area. The letters advised the tribes and specific individuals of the proposed project and requested information regarding cultural resources in the immediate area, as well as feedback or concerns related to the proposed project. Copies of Native American correspondence are provided in Appendix A.

One contact responded to the written request for information. Mr. Johntommy Rosas, Tribal Administrator of the Tongva Ancestral Territorial Tribal Nation, responded by email with a request to see grading plans for the project; he also stated that "there is a strong chance that our cultural resources might be negatively impacted." GANDA forwarded Mr. Rosas an electronic set of 90% submittal grading plans on November 6, 2013. As of November 15, 2013, no further communication from Mr. Rosas has been received.

Follow-up contacts to the remaining six Native Americans on the NAHC list occurred by telephone on November 14, 2013 (Table 4X).

Table 4. Native American Consultation Phone Log.

Name	Affiliation	Discussion
Beverly Salazar Folkes	Chumash, Tataviam, Fernandeño	A voice mail message was left for Ms. Salazar Folkes.
Larry Ortega	Fernandeño, Tataviam	Rudy Ortega spoke on Larry Ortega's behalf. He recommended that the project "proceed with caution," and requested that the tribe be notified if any prehistoric artifacts were encountered during construction.
Ron Andrade	Los Angeles Native American Indian Commission	A voice mail message was left for Mr. Andrade.
Delia Dominguez	Yowlumne, Kitanemuk	A voice mail message was left for Ms. Dominguez.
John Valenzuela	Fernandeño, Tataviam, Serrano, Vanyume, Kitanemuk	Mr. Valenzuela's office phone number is no longer in service. No answer was received when calling his cell phone.
Randy Guzman - Folkes	Chumash, Tataviam, Fernandeño, Shoshone Paiute, Yaqui	A voice mail message was left for Mr. Folkes.

5.3 Paleontological Resources Records Search

Results of the paleontological resources records search show that the western margin of the proposed project area (i.e., the soils under Mulholland Highway) may consist of surface deposits of younger Quaternary alluvium. These deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers, but they may be underlain by older Quaternary deposits that can contain significant fossil vertebrate remains. The closest recorded vertebrate fossil locality from these deposits is LACM 1213, just east of due south of the proposed project area, which produced fossil specimens of horse, *Equus*, and ground sloth, *Paramylodon* (S. McLeod to C. Backes, Jr., letter, 14 November 2013, GANDA).

Otherwise, the proposed project area, including the road cut within the project's APE, has exposures of the marine late Miocene Upper Modelo Formation (also known as the Monterey Formation or called an unnamed shale in this area), which is well known to be fossiliferous. The closest known fossil vertebrate localities from the Upper Modelo Formation, LACM 3173, 5125, 5657, and 6021, are approximately equidistant from the proposed project area. Locality LACM

3173, west of Mulholland Drive west of the northern portion of the proposed project area, produced fossil specimens of shearwater (*Puffinus*). Locality LACM 5125, due north of the proposed project area near San Feliciano Drive in Woodland Hills, produced fossil specimens of lanternfish (*Myctophidae*). Locality LACM 5657, southwest of the proposed project area south of Mulholland Highway, produced a fossil specimen of baleen whale (*Mysticeti*). Locality LACM 6021, just north of due east of the northern portion of the proposed project area just north of Mulholland Drive and east of Canoga Avenue, produced a rare fossil specimen of leatherback turtle (*Psephophorus*). There may also be deposits of older terrestrial Quaternary sediments in the proposed project area, particularly because we have a locality from these deposits, LACM 1213, just outside the northwestern corner of the proposed project area, that produced fossil specimens of horse (*Equus*), and ground sloth (*Paramylodon*) (S. McLeod to C. Backes, Jr., letter, 14 November 2013, GANDA).

5.4 Phase I Survey

GANDA Senior Archaeologist Clarus J. Backes, MA, RPA, conducted a Phase I survey of the entire APE on October 30, 2013. Survey conditions differed greatly on either end of the APE, which is bisected from east to west by the boundary between the City of Los Angeles and the City of Calabasas. The northern (Los Angeles) portion of the APE appears relatively undisturbed, and is heavily overgrown with scrub oak, sage, and grasses (Figure 8). Scattered modern trash is also present. The heavy vegetation and thick mat of dry leaves and organic material permit less than 10 percent of the ground surface to be visible. Although this area was systematically surveyed, ground visibility was poor enough that it was impossible to determine whether archaeological or historical materials were present.

Figure 8. Survey conditions at north end of APE, looking south.

The area to the west of the access road (i.e., between the access road and the Mulholland Highway road cut), however, may represent a small portion of the original, ungraded hillside. This area is visible as a raised area or berm that extends for approximately 35 meters along the very top of the road cut (Figure 9). It is 5 meters wide at its widest point, where it terminates at the fence marking the city border. Much of the upper layer of soil in this area is similar to the soil on the access road, but there are discrete areas along the very top of the road cut where the soil is grayish black to dark brown (7.5YR 3/2) silt with a few thick, platy calcrete inclusions. This soil is most apparent where the top of the road cut is actively eroding, such as the area adjacent to a buried 10-inch oil pipeline that bisects the APE (Figure 10). Similar dark soil deposits were noted by Apostolides when he documented the site in 1963: "About 100 yards S of the fork [where Mulholland Highway meets Mulholland Drive], the site area begins, denoted by the black discoloration of the soil observable at the top of the Mulholland Highway road cut as the road bisects the site" (Apostolides 1963:3).

Figure 9. Looking north up the access road from the southern edge of the APE. The raised area at the top of the road cut is on the left.

Figure 10. Dark soil near the oil pipeline at the top of the Mulholland Highway road cut, looking east.

The surface of this raised area and its dark soil deposits were carefully surveyed. One artifact was noted, a brownware ceramic body sherd. The sherd measures 9.6 cm by 6.4 cm, and is approximately 1.1 cm thick (Figure 11). The sherd's paste is medium to coarse in texture, micaceous, and brownish-black (5YR 2/1) in color. There is no color difference between the sherd's core and surfaces. The paste is tempered with medium- to fine-grained (<1 mm) quartz. The sherd's exterior surface has a rough, almost pebbled texture; the exterior is smooth but not brushed or burnished, and no coils or faceting are visible. Although archaeologists have traditionally assumed that aboriginal ceramics in Los Angeles County dated to historic times or were evidence of trade with other cultural groups, Boxt and Dillon (2013) have recently presented evidence of a Late Period Tongva ceramic industry in the Los Angeles area. If this vessel was locally produced it would be one of the northernmost examples of Southern California Brown Ware yet discovered (Boxt and Dillon 2013).

Figure 11. Brownware ceramic sherd.

6.0 Conclusions and Recommendations

6.1 Paleontological Resources

The majority of the proposed project area has a high potential for containing significant paleontological resources. While shallow excavations (i.e., less than 3 feet deep) in the younger Quaternary alluvium that may exist under Mulholland Highway are unlikely to uncover significant vertebrate fossils, deeper excavations that extend down into older deposits, as well as any excavations in the deposits of the Modelo Formation that make up the road cut and hillside, may well encounter significant vertebrate fossil remains.

6.1.1 Paleontological Monitoring

Any excavations in the proposed project area should be monitored closely by a qualified paleontological monitor to quickly and professionally recover any fossil remains discovered. A paleontological monitor should also be present during any pre-construction geotechnical work, excavations, or other ground-disturbing work. Paleontological resource monitoring of construction excavations involves field inspections of cut slopes, drilling, trenches, spoils piles, and all graded surfaces in accordance with project safety requirements for occurrences of freshly exposed fossil remains.

If a fossil is discovered by a monitor during construction, the monitor must immediately notify the equipment operator and/or construction foreman to stop work, and then mark the area surrounding the site with flagging until the discovery can be fully explored and evaluated. Construction activities in the immediate vicinity of the find should be diverted at least 20 feet from the find until authorization for work to continue is provided by the project proponent or construction foreman, or the find is assessed by a principal paleontologist. All scientifically important fossils should be salvaged and fully documented within a detailed stratigraphic framework as construction conditions and safety considerations permit.

6.2 Archaeological Resources

The proposed project has the potential to encounter buried archaeological remains, including human remains, during grading, excavation, or other ground disturbing work. The project's APE is located in the center of an area associated with a large Native American village site and burial ground. While previous construction activities (including the construction of Mulholland Highway and the housing development to the east of the project area) and vandalism have largely destroyed the site, dark soil discoloration at the top of the Mulholland Highway road cut and the discovery of a prehistoric ceramic fragment suggest that isolated cultural deposits may remain in that area. Furthermore, the portion of the APE located in the City of Los Angeles appears to have suffered less disturbance, although the ground surface could not be inspected during the survey. The potential exists for this area to also have surface or subsurface archaeological materials.

A cautious approach to construction is strongly recommended, primarily because of the possibility that human remains may still be present on site. Since the majority of the site has been destroyed and the entire area heavily disturbed, any archaeological materials discovered during construction are unlikely to meet the criteria or have the integrity required for inclusion in the California Register of Historic Resources, or to qualify as a unique archaeological resource under CEQA. As such, the site would not require any further consideration under CEQA, and no mitigation program would be required. However, due to the high number of human burials that have legally and illegally been recovered from the site, the occurrence of *any* archaeological materials should be taken as a "red flag" that human bone fragments or other human remains may also be present.

6.2.1 Extended Phase I Subsurface Testing

Prior to the beginning of construction a program of test excavations should be conducted along the top edge of the road cut and in the portion of the APE located in the City of Los Angeles. These test excavations, which could include augering, hand-excavated shovel test probes, or a combination of these techniques, are intended to determine whether subsurface cultural deposits remain in the APE. A Native American monitor should be present during all excavations.

6.2.2 Phase II Intensive Excavation

If test excavations determine that subsurface archaeological materials are present, additional excavation should be undertaken to determine the nature of the deposit and its horizontal and vertical extent. Additional excavation should utilize relatively intensive strategies such as close-interval shovel test pits, surface scrapes, isolated test units, block excavation units, linear trenching, or a combination of these methods. It may be appropriate to use mechanical equipment to incrementally remove any non-cultural fill that overlies subsurface deposits. With careful monitoring, systematic mechanical stripping of overburden may expose cultural materials within the APE in such a way that they can be easily recovered with a minimum of damage.

6.2.3 Archaeological Monitoring

Regardless of the outcome of any subsurface testing and intensive excavations, all ground disturbing activities associated with the project should be monitored by a qualified archaeologist and a Native American monitor. This monitoring is intended to identify, at the time of discovery, any archaeological materials exposed during ground disturbance and to protect such resources from damage.

Archaeological construction monitoring is defined as on-the-ground, close-up observation by a qualified monitor who watches for any kind of archaeological remains that might be exposed by machines during ground-disturbing construction activities. These activities include, but are not limited to, mechanical boring, grubbing, scraping, grading, and excavating. The monitor attempts to define and identify any discovered archaeological find, halts construction in the vicinity of a find if necessary to evaluate it, and keeps a daily log of construction activities observed and any archaeological finds made.

6.2.4 Treatment of Human Remains

If human remains are discovered during the course of the monitoring or mitigation activities, the specific procedures outlined by NAHC, in accordance with Section 7050.5 of the California Health and Safety Code and Section 5097.98 of the Public Resources Code, will be followed:

1. All excavation activities within 60 feet will immediately stop, and the area will be protected with flagging or by posting a monitor or construction worker to ensure that no additional disturbance occurs. If the discovery occurs at the end of the work day, the area must be secured by posting a guard, covering with heavy metal plates (if the human remains are found below grade), covering with other impervious material, or making other provisions to prevent damage to the remains.

2. The project owner or their authorized representative (usually the senior archaeologist) will contact the County Coroner.

3. The senior archaeologist, as a courtesy, will notify NAHC.

4. The coroner will have two working days to examine the remains after being notified in accordance with HSC 7050.5. If the coroner determines that the remains are Native American and are not subject to the coroner's authority, the coroner will notify NAHC of the discovery within 24 hours.

5. NAHC will immediately notify the Most Likely Descendent (MLD), who will have 48 hours after being granted access to the location of the remains to inspect them and make recommendations for treatment of them. Work will be suspended in the area of the find until the senior archaeologist approves the proposed treatment of the human remains.

6. If the coroner determines that the human remains are neither subject to the coroner's authority nor Native American in origin, then the senior archaeologist will determine mitigation measures appropriate to the discovery.

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Appendix A: Native American Correspondence

APPENDIX C: EXTENDED PHASE I CULTURAL RESOURCE ASSESSMENT FOR THE MULHOLLAND HIGHWAY SCENIC OPERATIONS IMPROVEMENT PROJECT, PHASE III

AN EXTENDED PHASE I CULTURAL RESOURCE ASSESSMENT FOR THE MULHOLLAND HIGHWAY IMPROVEMENT PROJECT

CITY OF CALABASAS AND CITY OF LOS ANGELES
LOS ANGELES COUNTY, CALIFORNIA

Sections 24 and 25, Township 1 North, Range 17 West of the *Canoga Park, California* USGS Quadrangle

Prepared for:

City of Calabasas
Public Works Department
100 Civic Center Way
Calabasas, California 91302

Prepared by:

Brian F. Smith, M.A. and
Tracy A. Stropes, M.A., RPA
Brian F. Smith and Associates, Inc.
14010 Poway Road, Suite A
Poway, California 92064

January 22, 2014

Fieldwork Performed: January 9, 2014
Report Summary: Negative Recovery; Not Significant

Summary Archaeological Report Information

***Authors*:**	Brian F. Smith, M.A. and Tracy A. Stropes, M.A., RPA
***Prepared by*:**	Brian F. Smith and Associates, Inc. 14010 Poway Road, Suite A Poway, California 92064
***Report Date*:**	January 22, 2014
***Report Title*:**	An Extended Phase I Cultural Resource Assessment for the Mulholland Highway Improvement Project, City of Calabasas and City of Los Angeles, Los Angeles County, California
Prepared for:	City of Calabasas Public Works Department 100 Civic Center Way Calabasas, California 91302
***USGS Quadrangle*:**	Sections 24 and 25, Township 1 North, Range 17 West of the *Canoga Park, California* USGS Quadrangle
***Study Area*:**	Less than one acre
***Key Words*:**	Archaeological testing; negative recovery; Site LAN-246; archaeology monitoring recommended; Los Angeles County; Mulholland Highway Improvement Corridor; *Canoga Park* USGS Quadrangle.

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1.0 MANAGEMENT SUMMARY/ABSTRACT

The following report describes the results of an extended Phase I cultural resources study conducted by Brian F. Smith and Associates, Inc. (BFSA) for the City of Calabasas for the Mulholland Highway Improvement Project. The proposed project would require land modifications, including removal of a portion of a hillside, to accommodate the construction of road improvements to a section of Mulholland Highway, immediately south of its intersection with Mulholland Drive, located on the border between the city of Calabasas and the city of Los Angeles, Los Angeles County, California. The project improvement area encompasses less than one acre and is located in Sections 24 and 25 of Township 1 North, Range 17 West, as shown on the *Canoga Park, California* USGS 7.5-minute quadrangle map. The Area of Potential Effect (APE) for the project consists of the area that would be subjected to ground disturbance during construction of the proposed project, plus a 20-foot (approximately six-meter) buffer to allow for minor adjustments in the location of project and construction elements. In total, the APE measures 167 meters long and up to 21 meters wide. The current project is located within the recorded boundaries of archaeological Site LAN-246, which is recorded as a large Native American village site and burial location. A previous archaeological study conducted for the APE by Backes (2013) determined that the proposed project has the potential to encounter buried archaeological remains associated with Site LAN-246, and potentially human remains, during grading, excavation, or other ground-disturbing work proposed for the road improvement project. Unfortunately, previous development in the area has greatly diminished the potential significance of this site. The 2013 Backes study suggested that isolated cultural deposits may remain in the APE and that an extended Phase I investigation should be conducted to determine the presence/absence of cultural materials within the proposed road improvement project.

The City of Calabasas Public Works Department required an extended Phase I archaeological subsurface inspection of the APE as part of the environmental review of potential impacts associated with the project. As requested by the City of Calabasas, BFSA conducted the archaeological subsurface inspection on January 9, 2014. BFSA conducted the extended Phase I study to evaluate the presence/absence of any cultural remains related to the prehistoric occupation of LAN-246 and evaluate the potential for impacts to any important cultural deposits. As part of this study, a copy of the report will be submitted to the South Central Coastal Information Center (SCCIC) at California State University, Fullerton. All investigations conducted by BFSA related to this project conformed to the California Environmental Quality Act (CEQA), City of Calabasas guidelines, and project-specific requirements provided by city staff.

1.1 Purpose of Investigation

The purpose of this investigation was to investigate the potential for the presence/absence of cultural resources within the project APE through the completion of subsurface tests focused on the location of previously recorded prehistoric deposits. One previously recorded site (LAN-246) was identified within the project boundaries. According to the data obtained from the SCCIC, an adequate survey sample of the surrounding area has determined that there is a moderate to high potential for cultural resources within the project area.

1.2 Major Findings

As a result of the previous records searches and field survey done by Backes (2013), one previously recorded prehistoric site (LAN-246) has been documented within the Mulholland Highway Improvement Project APE. The previous survey conducted by Backes (2013) had noted the presence of a piece of a prehistoric brownware ceramic body sherd within the APE, but no other evidence of LAN-246 was observed. Based upon the survey results and records data, Backes (2013) recommended a limited testing program in order to determine the presence or absence of subsurface cultural deposits associated with LAN-246 within the APE. Because human remains had been recorded in association with LAN-246, the documentation of cultural deposits within the APE, as a result of the extended Phase I excavations, could represent a significant historic resource, as defined by CEQA. The current BFSA cultural resources study was conducted on January 9, 2014. Study conditions were generally good, with approximately a 25 to 75 percent range in ground visibility over the majority of the property. Nearly all of the property has been disturbed, disked, or graded in the past. Based upon the field investigations and historic research, no evidence of cultural resources was encountered during the BFSA enhanced survey/testing. It would appear that development-related impacts over several decades have resulted in the removal of any elements associated with LAN-246 from the project APE.

1.3 Recommendation Summary

Based upon the absence of any cultural deposits (historic or prehistoric), the project APE is evaluated as having no significant impacts to cultural resources. Although no significant cultural resources were identified by the excavation of a series of shovel tests, the potential does exist that isolated or burned prehistoric deposits associated with the occupation of LAN-246 may still exist. Due to this potential for buried or masked deposits associated with LAN-246, a mitigation monitoring program is recommended during the grading for the proposed Mulholland Highway Improvement Project. This mitigation monitoring program shall include protocols to treat cultural deposits or human remains, should they be discovered during grading. A copy of this report will be permanently filed with the SCCIC at California State University, Fullerton. All notes, photographs, and other materials related to this project will be curated at the archaeological laboratory of BFSA in Poway, California.

2.0 INTRODUCTION

BFSA was retained by the City of Calabasas to conduct an extended Phase I cultural resource study for the Mulholland Highway Improvement Project. The archaeological study for the project was conducted in order to complete an environmental review for proposed improvements and comply with CEQA and City of Calabasas cultural resource evaluation requirements for the project. The proposed project would require land modifications to accommodate the construction of improvements to a portion of Mulholland Highway immediately south of its intersection with Mulholland Drive.

The project area is located in the northwestern portion of Los Angeles County, at the boundary between the city of Calabasas and the city of Los Angeles. The project is located within Sections 24 and 25 of the USGS 7.5-minute *Canoga Park*, *California* topographic map, Township 1 North, Range 17 West (Figures 2.0–1, 2.0–2, and 2.0–3).

The project area consists of an approximately 155-meter-long portion of the east side of Mulholland Highway, including the existing bike lane, curb, and shoulder, and a portion of the hillside immediately east of Mulholland Highway. The hillside includes an exposed road, a dirt access road to the south, and a chain-link fence that marks the border between the cities of Calabasas and Los Angeles. Historic aerial photographs suggest that both the road cut and the access road date to sometime between 1952 and 1959 (Historic Aerials 2011). The area on the south (Los Angeles) side of the fence is heavily disturbed, sparsely vegetated with grass and bushes, and littered with modern trash. The top of the hill has been graded flat, and is currently occupied by a private residence. The portion of the project area on the north (Calabasas) side of the fence is also disturbed, but is now densely overgrown with scrub oak, sage, and poison oak. This area slopes downhill to the north and terminates at a shallow drainage at the northern end of the project APE.

Principal Investigator Brian F. Smith directed the cultural resources study for the project. Tracy A. Stropes, M.A., RPA conducted the field testing with assistance from field director Michael Tyberg and archaeological field technicians David Grabski and Kyle Coulter. The technical report was prepared by Brian F. Smith and Tracy A. Stropes M.A., RPA. Elena Buckley conducted technical editing, copying, and distribution of the report. Tracy A. Stropes, M.A., RPA created the report graphics. Qualifications of key personnel are provided in Appendix A.

2.1 Previous Work

The records search previously conducted for the property (Backes 2013) from the SCCIC at California State University, Fullerton documented that one prehistoric site (LAN-246) has been recorded within the boundaries of the project APE. In addition, one previous study has been conducted within the project area (Backes 2013).

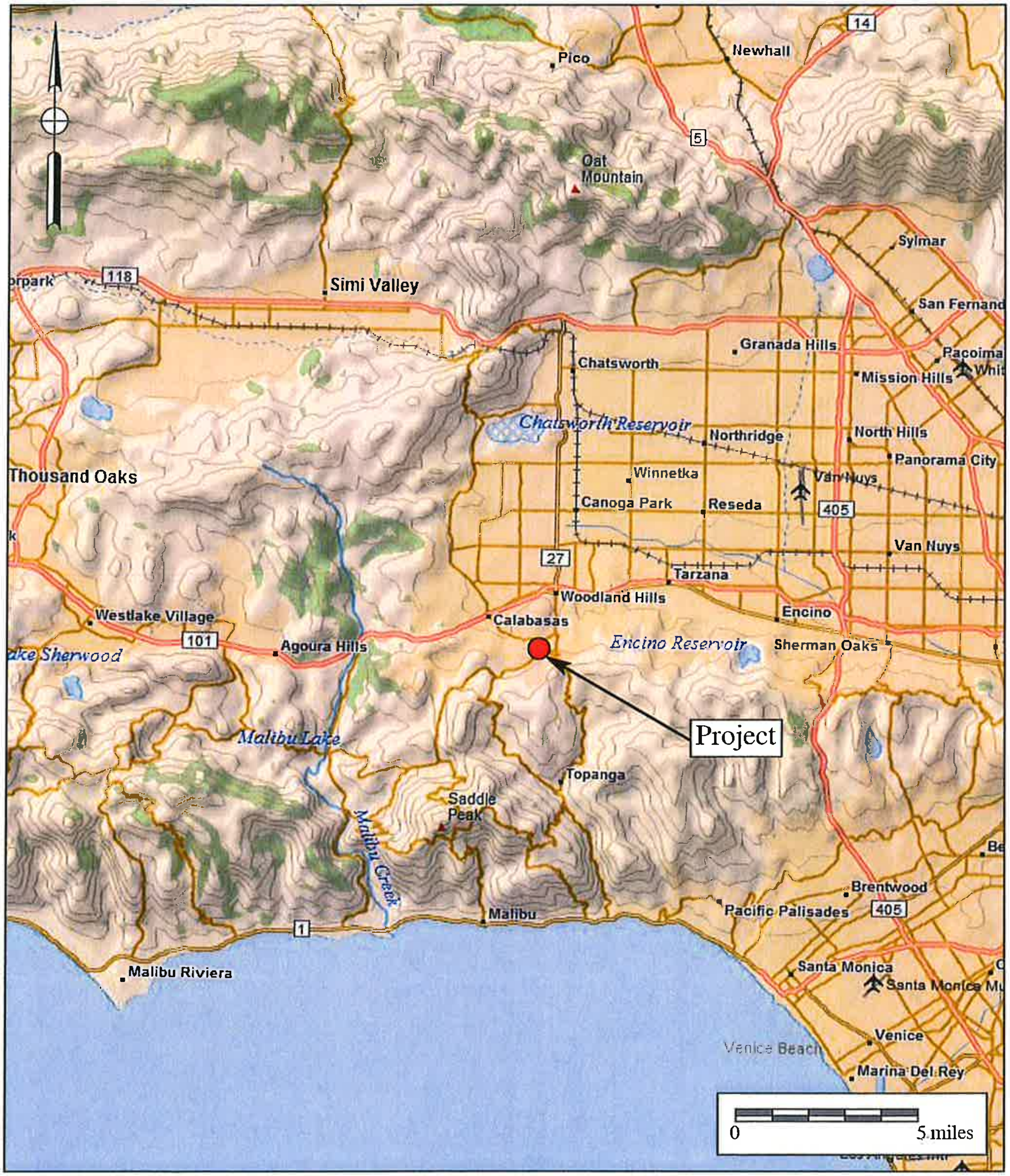

Figure 2.0–1

General Location Map

The Mulholland Highway Improvement Project

DeLorme (1:250,000 series)

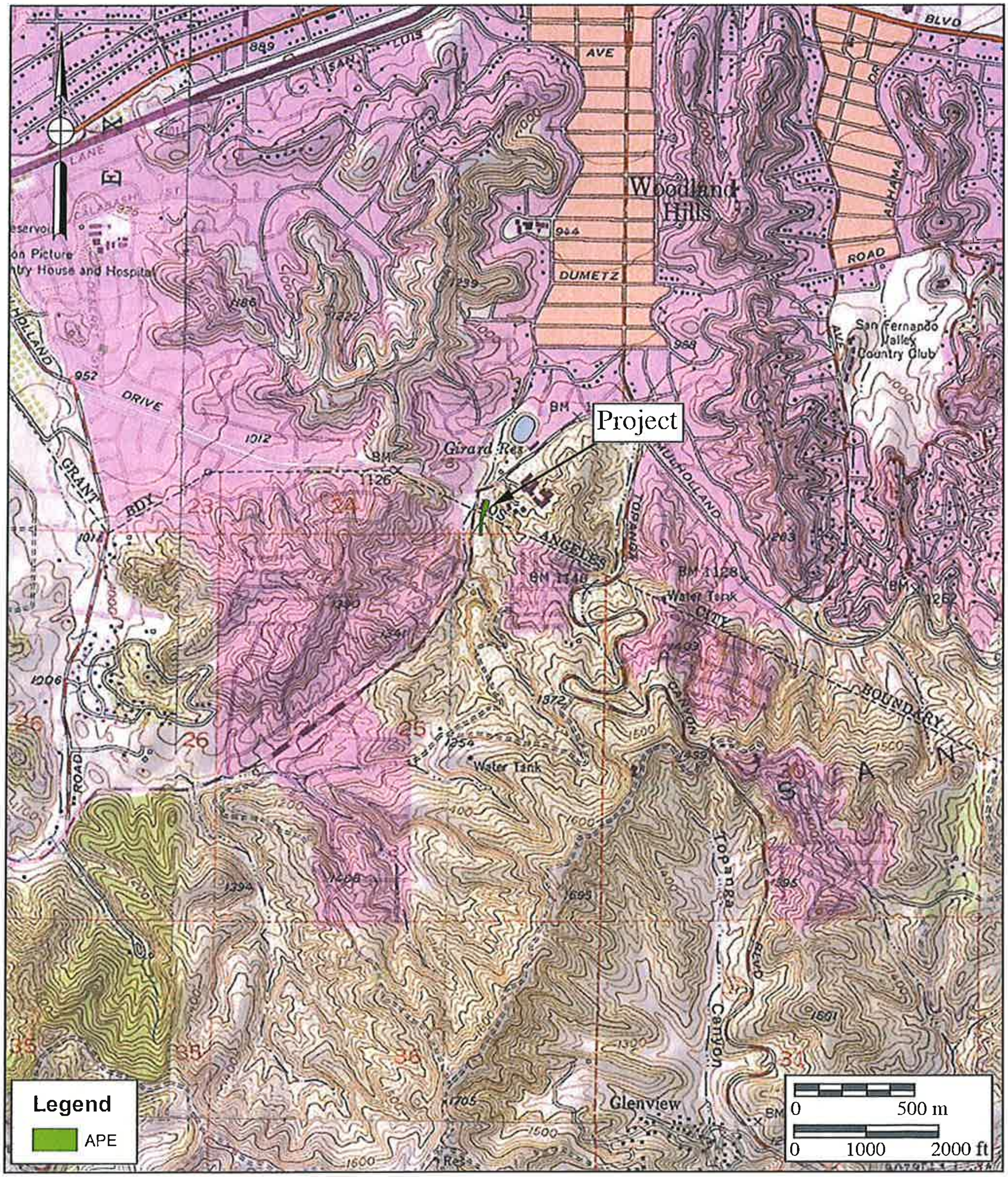

Figure 2.0–2

Project Location Map

The Mulholland Highway Improvement Project

USGS *Canoga Park* Quadrangle (7.5-minute series)

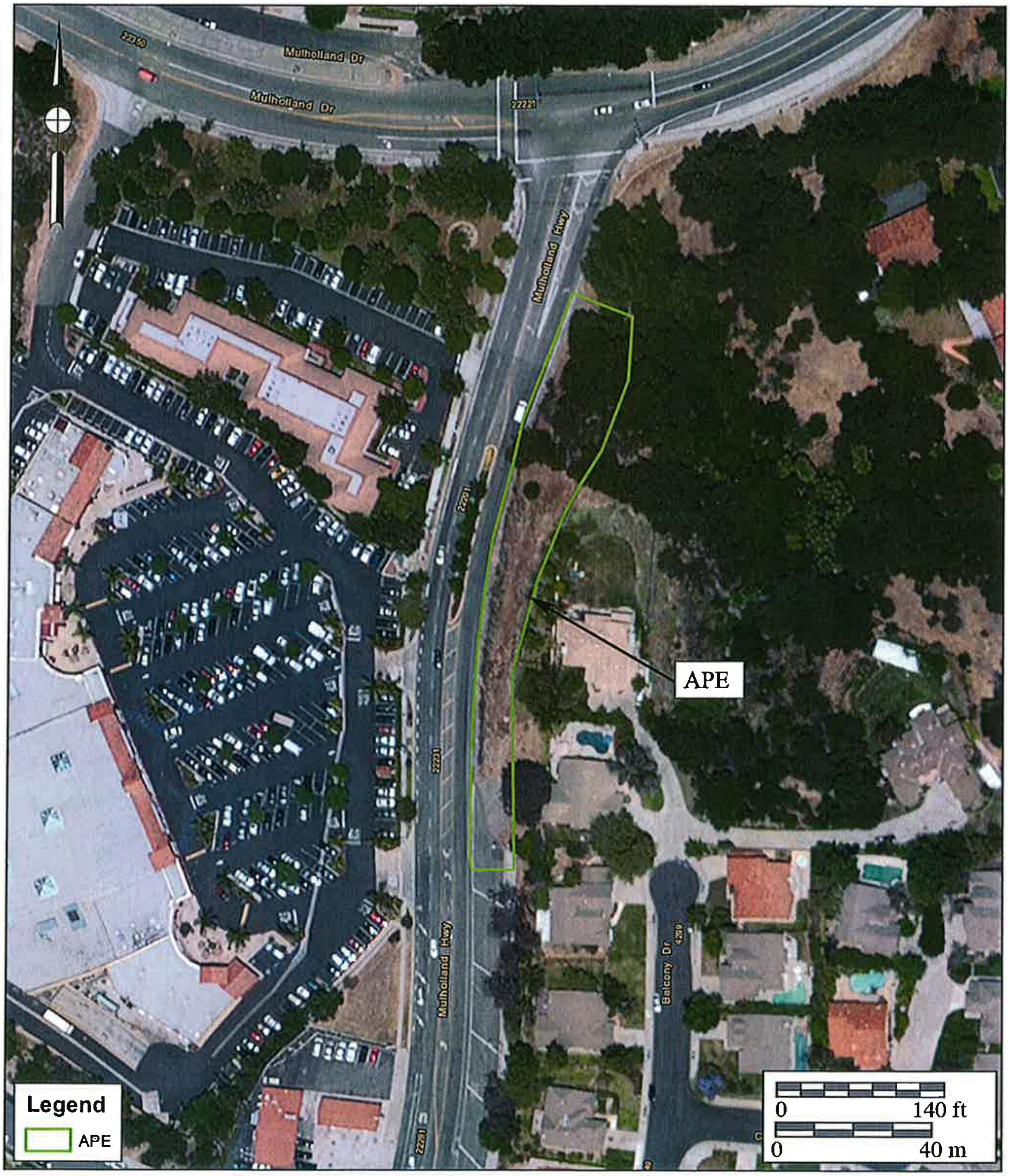

Figure 2.0–3

APE Location Map

The Mulholland Highway Improvement Project

2.2 Project Setting

The project area is located within the California Coastal Chaparral Forest and Shrub Province. This province is characterized by a Mediterranean-style climate of mild, wet winters and hot, dry summers, with brief periods of drought. The landscape consists of coastal plains and high hills, vegetated by a mosaic of woodland, dwarf-woodland, and shrubland species that are evergreen and drought deciduous (USDA – Forest Service ECOMAP Team 2007). Non-urbanized portions of the project area consist of coastal oak woodland. Coastal oak woodland is highly variable, but is generally characterized by a relatively open canopy, with trees concentrated near but not necessarily confined to a stream course or riparian area. Oak woodlands can occur on hillsides along a deeply incised drainage, but they are generally found on gentle to moderately steep slopes with moist, deep soils. Oak species predominate in this habitat, but other tree species include California bay and California walnut. Shrubby understory species include poison oak and chamise (City of Calabasas 2008b).

The project area is located within the western part 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 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 (City of Calabasas 2008b).

Calabasas is generally underlain by Mesozoic sedimentary, volcanic, and Cenozoic marine sedimentary rocks. The Upper and Lower Topanga geologic formations are predominant in the region. The Upper Topanga Formation contains marine clastic rocks of middle Miocene age consisting of claystone, sandstone, conglomerates of cobbles of granitic rocks, and volcanic rocks in a sandstone matrix. The Lower Topanga Formation contains marine transgressive clastic rocks of early and middle Miocene age consisting of sandstones and micaceous clay shales (Dibblee and Ehrenspeck 1992). The existing road cut within the project area exposes the upper member of the Modelo Formation, consisting of crumbly, light yellow claystone and siltstone (Dibblee and Ehrenspeck 1992; Hoots 1931).

2.3 Cultural Setting

Several prehistoric cultural chronologies have been proposed for the southern California coast and near inland areas, such as two of the most frequently cited sequences developed by William Wallace (1955) and Claude Warren (1968). Such chronologies provide a framework to discuss archaeological data in relation to broad cultural changes seen in the archaeological record. The chronological sequence presented herein represents an updated synthesis of these schemes as compiled by Glassow and others (2007) for the Northern California Bight. This geographic area consists of the coastal area from Vandenberg Air Force Base south to Palos Verdes, as well as the Channel Islands and adjacent inland areas, including the Los Angeles Basin and Santa Monica Mountains. The prehistoric sequence of the area can be divided into four broad temporal categories. It should be noted that the prehistoric chronology for the region is being refined on a continuing basis, with new discoveries and improvements being made in the accuracy of dating techniques.

2.3.1 Terminal Pleistocene and Early Holocene: Paleo-Coastal Period (circa 9500 to 7000/6500 B.C.)

Although data on early human occupation for the southern California coast is limited, archaeological evidence from the northern Channel Islands suggests initial settlement within the region occurred at least 12,000 years before present (BP). At Daisy Cave (SMI-261) on San Miguel Island, radiocarbon dates indicate an early period of use in the terminal Pleistocene, sometime between 9600 and 9000 calibrated (cal) B.C. (Erlandson et al. 1996). Evidence of early human occupation in the Northern California Bight has also been found on nearby Santa Rosa Island, where human remains from the Arlington Springs Site (SRI-1730) have been dated between 11,000 and 10,000 cal B.C. (Johnson et al. 2002). Archaeological data recovered from these and other coastal Paleo Indian sites indicate a distinctively maritime cultural adaptation, termed the “Paleo-Coastal Tradition” (Moratto 1984), which involved the use of seafaring technology and a subsistence regime focused upon shellfish gathering and fishing (Rick et al. 2001).

Relatively few sites have been identified in Los Angeles County that date to the terminal Pleistocene and early Holocene. Evidence of possible early human occupation has been found at the sand dune bluff site of Malaga Cove (LAN-138), located between Redondo Beach and Palos Verdes (Walker 1951). Researchers have proposed that archaeological remains recovered from the lowermost cultural stratum at the site, which include shell, animal bone, and chipped stone tools, may date to as early as 8000 cal B.C. (Moratto 1984:168; Wallace 1986).

2.3.2 Middle Holocene: Milling Stone Period (circa 7000/6500 to 1500/1000 B.C.)

The Milling Stone Period or Horizon, also referred to as the “Encinitas Tradition,” is the earliest well-established cultural occupation of the coastal areas of the region (Sutton 2006; Sutton and Gardner 2006). The onset of this period, which began sometime between 7000 and 6500 cal B.C., is marked by the expansion of populations throughout the Northern California Bight. Regional variations in technology, settlement patterns, and mortuary practices among Milling Stone sites have led researchers to define several local manifestations or “patterns” of the tradition (Sutton and Gardner 2006). Groups that occupied modern day Los Angeles County are thought to have been relatively small and highly mobile during this time, with a general subsistence economy focused upon the gathering of shellfish and plant foods, particularly hard seeds, with hunting being of less importance (Glassow et al. 2007).

Two temporal subdivisions have been defined for the portion of the Topanga Pattern falling within the Milling Stone Period: Topanga I (circa 6500 to 3000 B.C.) and Topanga II (circa 3000 to 1000 B.C.) (Sutton and Gardner 2006). Topanga I assemblages are characterized by abundant manos and metates, core tools and scrapers, charmstones, cogged stone, and discoidals. Projectile points are quite rare with those present resembling earlier, large, leaf-shaped forms (Glassow et al. 2007). Secondary inhumations with associated cairns are the most common burial form at Milling Stone sites with small numbers of extended inhumations also identified. The subsequent Topanga II phase largely represents a continuation of the Topanga pattern with site assemblages characterized by numerous manos and metates, charmstones, cogged stones, discoidals, and some stone balls. A significant technological change in ground stone occurs at this time, with the appearance of mortars and pestles at Topanga II sites suggesting the adoption of balanophagy by coastal populations (Sutton and Gardner 2006). The quantity of projectile points also notably increases in Topanga II site deposits, indicating that the hunting of large game may have played a greater role in the subsistence economy than in earlier times. While secondary burials continue to be quite common, a few flexed inhumations have also been recovered from archaeological contexts dating to the Topanga II phase.

A number of Milling Stone sites have been identified in Los Angeles County. The lower component of the Tank Site (LAN-1), located in the Santa Monica Mountains, was excavated in the 1940s and determined to be Topanga I in age. In the San Fernando Valley, the Encino Site (LAN-111), is thought to have contained a Topanga I component. The artifact assemblage is definitive of the Topanga I period, containing many milling implements, but few projectile points. The presence of mortars and pestles alongside stemmed projectile points at the Chatsworth Site (LAN-21), located at the western edge of the San Fernando Valley, suggests a Topanga II presence. The Big Tujunga Wash Site, located at the eastern edge of the San Fernando Valley, may have also contained a Topanga II component (Sutton and Gardner 2006).

2.3.3 Late Holocene: Intermediate Period (1500/1000 B.C. to A.D. 750)

The Intermediate Period, which encompasses the early portion of the "Del Rey Tradition," as defined by Sutton (Sutton 2006), begins around 3500 BP. At this time, significant changes are seen throughout the coastal areas of southern California in material culture, settlement systems, subsistence strategies, and mortuary practices. These new cultural traits have been attributed to the arrival of Takic-speaking people from the southern San Joaquin Valley (Sutton 2009). Biological, archaeological, and linguistic data indicate that the Takic groups who settled in the Los Angeles Basin were ethnically distinct from the pre-existing Hokan-speaking Topanga populations, and are believed to be ancestral to ethnographic Gabrielino groups (Sutton 2009). While archaeological evidence indicates that "relic" Topanga III populations continued to survive in isolation in the Santa Monica Mountains, these indigenous groups appear to have been largely replaced or absorbed by the Gabrielino, or Chumash, by 2000 BP (Sutton and Gardner 2006:17).

Intermediate Period sites in the region are represented by the "Angeles Pattern" of the Del Rey Tradition (Sutton 2006). Three temporal subdivisions have been defined for the portion of the Angeles Pattern that falls within the Intermediate Period: Angeles I (1500 to 600 B.C.), Angeles II (600 B.C. to A.D. 400), and Angeles III (A.D. 400 to 750) (Sutton and Gardner 2006:8). The onset of the Angeles I phase is characterized by the increase and aggregation of regional populations and the appearance of the first village settlements. The prevalence of projectile points, single-piece shell fishhooks, and bone harpoon points at Angeles I sites suggests a subsistence shift in the Intermediate Period with an increased emphasis on fishing and terrestrial hunting, and less reliance on the gathering of shellfish resources. Regional trade or interaction networks also appeared to develop at this time, with coastal populations in Los Angeles County obtaining small steatite artifacts and Olivella shell beads from the southern Channel Islands and obsidian from the Coso Volcanic Field (Koerper et al. 2002). Finally, marked changes are seen in mortuary practices during the Angeles I phase with flexed primary inhumations and cremations replacing extended inhumations and cairns.

The Angeles II phase largely represents a continuation and elaboration of the Angeles I technology, settlement, and subsistence systems. One exception to this pattern is the introduction of a new funerary complex around 2600 BP consisting of large rock cairns or platforms, which contain abundant broken tools, faunal remains, and cremated human bone. These mortuary features have generally been thought to represent the predecessor of the Southern California Mourning Ceremony (Sutton 2006:14).

Several important changes in the archaeological record mark the beginning of the Angeles III phase. At this time, larger seasonal villages characterized by well-developed middens and cemeteries were established along the coast or inland areas. Archaeological data from Angeles III sites indicate that residents of these settlements practiced a fairly diverse subsistence strategy, which included the exploitation of both marine and terrestrial resources (Sutton 2006:16). Notable technological changes at this time include the introduction of the plank canoe and the bow and arrow (Glassow et al. 2007:203-204). The appearance of new Olivella bead types at Angeles III sites indicates a reconfiguration of existing regional exchange networks with increased interaction with populations in the Gulf of California (Koerper et al. 2002). Finally, cremations increase slightly in frequency at this time, with inhumations no longer placed in an extended position (Sutton 2006:18). Intermediate Period sites in Los Angeles County include LAN-2 and LAN-197, located in the Santa Monica Mountains. The formal cemeteries at these sites are representative of the increased sedentism that occurred during the Intermediate Period (Glassow et al. 2007:202).

2.3.4 Late Holocene: Late Period (A.D. 750 to Spanish Contact)

The Late Period dates from approximately A.D. 750 until Spanish contact in 1542. Sutton (2006) has divided this period, which falls within the larger Del Rey Tradition, into two phases: Angeles IV (A.D. 750 to 1200) and Angeles V (A.D. 1200 to 1550). The Angeles IV phase is characterized by the continued growth of regional populations and the development of large, sedentary villages. Although chiefdoms appear to have developed in the northern Channel

Islands and Santa Barbara region after 850 BP (Arnold 1992; Gamble 2005), little direct evidence has been found to suggest this level of social complexity existed in the Los Angeles area during the Late Prehistoric Period (Sutton 2006).

Several new types of material culture appear during the Angeles IV phase including Cottonwood series points, birdstone and "spike" effigies, Olivella cupped beads, and Mytilus shell disk beads. The presence of Southwestern pottery, Patayan ceramic figurines, and Hohokam shell bracelets at Angeles IV sites suggests some interaction between groups in southern California and the Southwest. Notable changes are seen in regional exchange networks after 800 BP, with an increase in the number and size of steatite artifacts, including large vessels, elaborate effigies, and comals (cooking dishes) recovered from Angeles V sites. The presence of these artifacts suggests a strengthening of trade ties between coastal Los Angeles populations and the southern Channel Islands (Koerper et al. 2002:69). Finally, Late Period mortuary practices remain largely unchanged from the Intermediate Period, with flexed primary inhumations continuing to be the preferred burial method.

Late Period sites in Los Angeles County include LAN-227 and LAN-229, located in the Santa Monica Mountains. Both sites contain fewer manos and metates than earlier sites, but more mortars, pestles, projectile points, drills, beads, pipes, and bone tools (Moratto 1984:141). Although these sites represent a move toward centralized sedentary villages during this period, it is unclear whether they represent year-round occupation or semi-permanent villages used as base settlements (Glassow et al. 2007:210).

2.3.5 Late Holocene / Protohistoric Period / Ethnographic Groups (1769 to Present)

Gabrielino

The territory of the Gabrielino at the time of Spanish contact covers much of current-day Los Angeles and Orange counties. The southern extent of this culture area is bounded by Aliso Creek, the eastern extent is located east of current day San Bernardino along the Santa Ana River, the northern extent includes the San Fernando Valley, and the western extent includes portions of the Santa Monica Mountains. The Gabrielino also occupied several Channel Islands including Santa Barbara Island, Santa Catalina Island, San Nicholas Island, and San Clemente Island. Because of their access to certain resources, including a steatite source from Santa Catalina Island, this group was among the wealthiest and most populous aboriginal groups in all of southern California. Trade of materials and resources controlled by the Gabrielino extended as far north as the San Joaquin Valley, as far east as the Colorado River, and as far south as Baja California (Bean and Smith 1978; Kroeber 1925).

Subsistence and Settlement

The Gabrielino lived in permanent villages and smaller, resource-gathering camps occupied at various times of the year depending on the seasonality of the resource. Larger villages were comprised of several families or clans, while smaller, seasonal camps typically housed smaller family units. The coastal area between San Pedro and Topanga Canyon was the location of primary subsistence villages, while secondary sites were located near inland sage stands, oak groves, and pine forests. Permanent villages were located along rivers and streams, as well as in sheltered areas along the coast. As previously mentioned, the Channel Islands were also the locations of relatively large settlements (Bean and Smith 1978; Kroeber 1925).

Resources procured along the coast and on the islands were primarily marine in nature and included tuna (*Thunnus* spp.), swordfish (*Xiphias gladius*), ray and shark (Chondrichthyes), California sea lion (*Zalophus californianus*), Stellar sea lion (*Eumetopias jubatus*), harbor seal (*Phoca vitulina*), northern elephant seal (*Mirounga angustirostris*), sea otter (*Enhydra lutris*), dolphin and porpoise (Delphinidae and Phocoenidae), various waterfowl species, numerous fish species, purple sea urchin (*Strongylocentrotus purpuratus*), and mollusk, such as rock scallop (*Crassadoma gigantea*), California mussel (*Mytilus californianus*), and limpet (Fissurellidae and Acmaeidae). Inland resources included oak acorn (*Quercus* sp.), pine nut (*Pinus* sp.), Mohave yucca (*Yucca schidigera*), cacti (*Opuntia* spp.), sage (*Salvia* sp.), grass nut (*Triteleia laxa*), deer (*Odocoileus hemionus*), rabbit (*Sylvilagus* spp.), hare (*Lepus californicus*), rodent (Rodentia), quail (*Callipepla/Oreortyx* spp.), duck (Anatidae), and a variety of reptiles such as western pond turtle (*Clemmys marmorata*) and numerous different snakes (Bean and Smith 1978; Kroeber 1925).

Social Organization

The social structure of the Gabrielino is little known; however, there appears to have been at least three social classes: 1) the elite, which included the rich, chiefs, and their immediate family; 2) a middle class, which included people of relatively high economic status or long-established lineages; and 3) a class of people that included most other individuals in the society. Villages were politically autonomous units comprised of several lineages. During times of the year when certain seasonal resources were available, the village would divide into lineage groups and move out to exploit them, returning to the village between forays (Bean and Smith 1978; Kroeber 1925).

Each lineage had its own leader, with the village chief coming from the dominant lineage. Several villages might be allied under a paramount chief. Chiefly positions were of an ascribed status, most often passed to the eldest son. Chiefly duties included providing village cohesion, leading warfare and peace negotiations with other groups, collecting tribute from the village(s) under his jurisdiction, and arbitrating disputes within the village(s). The status of the chief was legitimized by his safekeeping of the sacred bundle, a representation of the link between the material and spiritual realms and the embodiment of power (Bean and Smith 1978; Kroeber 1925).

Shamans were leaders in the spirit realm. The duties of the shaman included conducting healing and curing ceremonies, guarding of the sacred bundle, locating lost items, identifying and collecting poisons for arrows, and making rain (Bean and Smith 1978; Kroeber 1925).

Marriages were made between individuals of equal social status and, in the case of powerful lineages, marriages were arranged to establish political ties between the lineages (Bean and Smith 1978; Kroeber 1925).

Men conducted the majority of the heavy labor, hunting, fishing, and trading with other groups. Women's duties included gathering and preparing plant and animal resources, and making baskets, pots, and clothing (Bean and Smith 1978; Kroeber 1925).

Material Culture

Gabrielino houses were domed, circular structures made of thatched vegetation. Houses varied in size, and could house from one to several families. Sweathouses—semicircular, earth-covered buildings—were public structures used in male social ceremonies. Other structures included menstrual huts and a ceremonial structure called a *yuvar*, an open-air structure built near the chief's house (Bean and Smith 1978; Kroeber 1925).

Clothing was minimal; men and children most often went naked, while women wore deerskin or bark aprons. In cold weather, deerskin, rabbit fur, or bird skin (with feathers intact) cloaks were worn. Island and coastal groups used sea otter fur for cloaks. In areas of rough terrain, yucca fiber sandals were worn. Women often used red ochre on their faces and skin for adornment or protection from the sun. Adornment items included feathers, fur, shells, and beads (Bean and Smith 1978; Kroeber 1925).

Hunting implements included wooden clubs, sinew-backed bows, slings, and throwing clubs. Maritime implements included rafts, harpoons, spears, hook and line, and nets. A variety of other tools included deer scapulae saws, bone and shell needles, bone awls, scrapers, bone or shell flakers, wedges, stone knives and drills, metates, mullers, manos, shell spoons, bark platters, and wooden paddles and bowls. Baskets were made from rush (*Juncus* sp.), deer grass (*Muhlenbergia rigens*), and skunkbush (*Rhus trilobata*). Baskets were fashioned for hoppers, plates, trays, and winnowers for leaching, straining, and gathering. Baskets were also used for storing, preparing, and serving food, and for keeping personal and ceremonial items (Bean and Smith 1978; Kroeber 1925).

The Gabrielino had exclusive access to soapstone, or steatite, procured from Santa Catalina Island quarries. This highly-prized material was used for making pipes, animal carvings, ritual objects, ornaments, and cooking utensils. The Gabrielino profited well from trading steatite since it was valued so much by groups throughout southern California (Bean and Smith 1978; Kroeber 1925).

2.3.6 Ethnohistoric Period (1769 to Present)

European exploration along the California coast began in 1542 with the landing of Juan Rodriguez Cabrillo and his men at San Diego Bay. Sixty years after the Cabrillo expeditions, an expedition under Sebastian Viscaíno made an extensive and thorough exploration of the Pacific coast. Although the voyage did not extend beyond the northern limits of the Cabrillo track, Viscaíno had the most lasting effect on the nomenclature of the coast. Many of the names he gave to various locations have survived, whereas practically every one of the names given by Cabrillo has faded from use. For instance, Cabrillo gave the name of "San Miguel" to the first port at which he stopped in what is now the United States; 60 years later, Viscaíno changed it to "San Diego" (Rolle 1969). The early European voyages observed Native Americans living in villages along the coast but did not make any substantial, long-lasting impact. At the time of contact, the Luiseño population was estimated to have ranged from 4,000 to as many as 10,000 individuals (Bean and Shipek 1978; Kroeber 1925).

2.3.7 Historic Period

The historic background of the project area began with the Spanish colonization of Alta California. The first Spanish colonizing expedition reached southern California in 1769 with the intention of converting and civilizing the indigenous populations, as well as expanding the knowledge of and access to new resources in the region (Brigandi 1998). In the late eighteenth century, the San Gabriel (Los Angeles County), San Juan Capistrano (Orange County), and San Luis Rey (San Diego County) missions began colonizing southern California and gradually expanded their use of the interior valley (into what is now western Riverside County) for raising grain and cattle to support the missions (Riverside County n.d.). The San Gabriel Mission claimed lands in what is now Jurupa, Riverside, San Jacinto, and the San Gorgonio Pass, while the San Luis Rey Mission claimed land in what is now Lake Elsinore, Temecula, and Murrieta (American Local History Network: Riverside County, California 1998). The indigenous groups who occupied these lands were recruited by missionaries, converted, and put to work in the missions (Pourade 1964). Throughout this period, the Native American populations were decimated by introduced diseases, a drastic shift in diet resulting in poor nutrition, and social conflicts due to the introduction of an entirely new social order (Cook 1976).

On September 8, 1771, Father Pedro Cambón and Father Angel Somera established the Mission San Gabriel de Arcángel near the present-day city of Montebello. In 1775, the mission was moved to its current location in San Gabriel due to better agricultural lands. This mission marked the first sustained European occupation of the Los Angeles County area. Mission San Gabriel, despite a slow start, partially due to misconduct by Spanish soldiers, eventually became so prosperous it was known as "The Queen of the Missions" (Johnson et al. 1972).

The pueblo that eventually became the city of Los Angeles was established in 1781. During this period, Spain also deeded ranchos to prominent citizens and soldiers (though very few in comparison to the later Mexican Period). One such rancho, Rancho San Pedro, was deeded to soldier Juan Jose Dominguez in 1784 and comprised 75,000 acres, encompassing the modern South Bay region from the Los Angeles River on the east to the Pacific Ocean on the west.

The area that became Los Angeles County saw an increase in European settlement during the Mexican Period, largely due to the many land grants (ranchos) to Mexican citizens by various governors. The period ended in early January of 1847, when Mexican forces fought the combined United States Army and Navy forces in the Battle of the San Gabriel River on January 8, 1847 and in the Battle of La Mesa on January 9, 1847 (Nevin 1978). On January 10, 1847, leaders of the pueblo of Los Angeles surrendered peacefully after Mexican General Jose Maria Flores withdrew his forces. Shortly thereafter, newly appointed Mexican Military Commander of California, Andrés Pico, surrendered all of Alta California to United States Army Lieutenant Colonel John C. Fremont in the Treaty of Cahuenga (Nevin 1978).

Settlement of the Los Angeles region accelerated in the early American Period. The county was established on February 18, 1850, one of 27 counties established in the months prior to California becoming a state. Many ranchos in the county were sold or otherwise acquired by Americans, and most were subdivided into agricultural parcels or towns. Nonetheless, ranching retained its importance, and by the late 1860s, Los Angeles was one of the top dairy production centers in the country (Rolle 1963). In 1854, the United States Congress agreed to let San Pedro become an official port of entry, and by the 1880s, the railroads had established networks throughout the county, resulting in fast and affordable shipment of goods, as well as a means to transport new residents to the booming region (Dumke 1944). New residents included many health-seekers drawn to the area by the fabled climate in the 1870s to 1880s (Baur 1959). In 1876, the county had a population of 30,000 (Dumke 1944:7); by 1900 it had reached 100,000.
In the early to mid-1900s, population growth accelerated due to industry that was associated with both world wars, as well as emigration from the Midwest "dust bowl" states during the Great Depression. The county became one of the most densely occupied areas in the United States. The county's mild climate and successful economy continued to draw new residents in the late 1900s, and much of the county transformed from ranches and farms into residential subdivisions surrounding commercial and industrial centers. Hollywood's development into the entertainment capital of the world and southern California's booming aerospace industry were key factors in the county's growth.

The City of Calabasas provides a detailed discussion of local history, which includes information concerning the city of Calabasas and the Santa Monica Mountains, in their 2030 General Plan (City of Calabasas 2008a):

> From Spanish contact 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, 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. A branch of the El Camino Real passed through Calabasas after leaving the San Fernando Valley, a route that was frequently traveled by Native Americans, soldiers, explorers and civilians alike. Today, the Ventura Freeway (U.S. Highway 101) follows the former alignment of the El Camino Real. Additionally, Malibu Canyon was not only a major Native American trade corridor to the Pacific Ocean, but early settlers also used the route and connecting trails to access Stokes, Piuma, Liberty, and other canyons.

During the Mexican Period, large land grants dominated the region. Prior to this time, the Spanish Crown permitted settlement and allotted certain land concessions, but the deed remained in their possession. These Spanish entitlements were actually no more than permits that allowed people to graze the land. One concession under the Spanish rule and District of Santa Barbara was made in the vicinity of Calabasas and granted under the name of El Paraje de Las Virgenes. It was not until the Mexican Period however, that the basic tenants of the Land Grant system and ultimately, the land use settlement pattern for the area changed. The project area was sandwiched between Rancho Las Virgenes on the north and Rancho Topanga Malibu Sequit to the south.

By the 1840s and 50s, 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, Domingo Carrillo and Nemisio Dominguez of Rancho Las Virgenes, and Matthew Keller of Rancho Topanga Malibu Sequit, owned much of the property in and around Calabasas. Just 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.

After the Mexican-American War and statehood, land use and ownership patterns evolved slowly. Leonis remained a major local ranch owner, and he enlarged and remodeled his Monterey-style house. The Leonis Adobe remains the most enduring historic example of this period of Calabasas history and serves as an anchor for Old Town Calabasas.

After the turn of the century, several select spots in the Calabasas area developed into weekend respites from the city. Crater Camp in Monte Nido was opened in 1914 as a year-round picnic ground. The Calabasas Highlands community was subdivided in the 1920s, and reflects a development style that links Calabasas to its neighbor Topanga in style and parcel pattern.

Unreliable water sources remained a constraint to larger scaled subdivision and development in Calabasas through the first half of the 20th Century. With the founding of the Las Virgenes Municipal Water District in 1958, a consistent water supply was obtained. This development coincided with the state's investment in the freeway system. These two structural events led to a sustained development boom as the rapidly urbanizing San Fernando Valley pushed westward along the U.S. 101 corridor. In 1969, Warner Ranch was purchased and subdivided, ushering in the master planned Calabasas Park area. The upgrading of U.S. 101 (the Ventura Freeway) to a full freeway occurred in the 1960s and developers began subdividing communities in proximity to freeway interchanges at Valley Circle/Mulholland Drive, Parkway Calabasas, Las Virgenes Road, and Lost Hills Road. (City of Calabasas 2008a)

2.4 Research Goals

The primary goal of the research design is to attempt to understand the way in which humans have used the land and resources within the project area through time, as well as to aid in the determination of resource significance. For the current project, the study area under investigation is the western portion of Los Angeles County. The scope of work for the archaeological program conducted for the Mulholland Highway Improvement Project included the limited testing of an approximately one-acre area. Given the area involved and the narrow focus of the cultural resources study, the research design for this project was necessarily limited and general in nature. Since the main objective of the investigation was to identify the presence of any cultural deposits within the APE, the goal here is not necessarily to answer wide-reaching theories regarding the development of early southern California, but to investigate the role and importance of the identified resources. Nevertheless, the assessment of the significance of a resource must take into consideration a variety of characteristics, as well as the ability of the resource to address regional research topics and issues.

Although extended survey-level investigations are limited in terms of the amount of information available, several specific research questions were developed that could be used to guide the initial investigations of any observed cultural resources. The following research questions take into account the small size and location of the project area discussed above.

Research Questions:

- Can located cultural resources be situated with a specific time period, population, or individual?

- Do the types of located cultural resources allow a site activity/function to be determined from a preliminary investigation? What are the site activities? What is the site function? What resources were exploited?
- How do the located sites compare to others reported from different surveys conducted in the area?
- How do the located sites fit existing models of settlement and subsistence for valley environments of the region?

Data Needs

At the extended survey level, the principle research objective is a generalized investigation of changing settlement patterns in both the prehistoric and historic periods within the study area. The overall goal is to understand settlement and resource procurement patterns of the project area occupants. Therefore, adequate information on site function, context, and chronology from an archaeological perspective is essential for the investigation. The fieldwork and archival research was undertaken with these primary research goals in mind:

1) To identify cultural resources occurring within the project area;
2) To determine, if possible, site type and function, context of the deposit, and chronological placement of each cultural resource identified;
3) To place each cultural resource identified within a regional perspective; and
4) To provide recommendations for the treatment of each of the cultural resources identified.

3.0 METHODOLOGY

The archaeological program for the Mulholland Highway Improvement Project consisted of the review of previous work for the project, a review of the previously conducted institutional records search (Backes 2013), and the extended Phase I subsurface exploratory excavations within the APE. This archaeological study conformed to City of Calabasas cultural resource requirements for the project. Statutory requirements of CEQA and subsequent legislation (Section 15064.5) were followed in evaluating the significance of cultural resources. Specific definitions for archaeological resource type(s) used in this report are those established by the State Historic Preservation Office (SHPO March, 1995).

3.1 Field Methodology

Archaeological records search results indicated that the entire project APE had been previously surveyed and studied during the course of previous projects (Backes 2013). Based upon the results of the previous studies for the property, an extended Phase I study was required for the property. For the current project, an intensive pedestrian survey, employing a series of parallel transects spaced at five-meter intervals, was conducted in order to review the project area. The archaeological survey and limited testing of the project APE were conducted on January 9, 2014. Photographs were taken to document project conditions during the test (see Section 4.2). Ground visibility throughout the property varied between 25 and 75 percent. The survey consisted of an intensive pedestrian survey and did not identify any exposed cultural resources.

Previous work for the project area (Backes 2013) and the records search conducted at the SCCIC identified the presence of one archaeological site (LAN-246) within and surrounding the project APE. In order to assess the potential for buried cultural resources, BFSA archaeologists excavated 12 shovel tests pits (STPs) across the project APE. To initiate the process, a site datum was established from which all test excavations were mapped using a Trimble Geo XT Global Positioning System (GPS) unit equipped with ARCPAD software. Subsurface tests were completed to determine if cultural deposits were present, and if so, the potential significance of the deposits as represented by the content and depth of the deposit. The shovel test series consisted of 30x30-centimeter excavations, which proceeded in decimeter levels downward to a depth of 60 centimeters, where sufficient soils remained. All excavated soils were sifted through one-eighth-inch mesh hardware cloth. Due to the lack of subsurface deposits, no test units were excavated during the investigation.

3.2 Laboratory Methods

In keeping with generally accepted archaeological procedures, any specimens collected during archaeological investigations are categorized as to artifact form, mineralogy, and function. Comparative collections curated in the laboratory of BFSA are often helpful in identifying the unusual or highly fragmentary specimens. The cataloging process for specimens utilizes a classification system commonly employed in this region. After cataloging and identification, the collections are marked with the appropriate provenience and catalog information, then packaged for permanent curation. However, no laboratory studies were conducted as part of this project due to a lack of appropriate material.

3.3 Archaeological Records Search

The records search previously conducted by Backes (2013) at the SCCIC was reviewed for an area of one-quarter mile surrounding the project in order to determine the presence of any previously recorded sites. The SCCIC also provided the standard review of the National Register of Historic Places and the Office of Historic Preservation Historic Property Directory. Land patent records, held by the Bureau of Land Management (BLM) and accessible through the BLM General Land Office (GLO) website, were also reviewed for pertinent project information. In addition, the BFSA research library was consulted for any relevant historical information.

3.4 Report Preparation and Recordation

This report contains information regarding previous studies, statutory requirements for the project, a brief description of the setting, research methods employed, and the overall results of the significance evaluation. The report includes all appropriate illustrations and tabular information needed to make a complete and comprehensive presentation of these activities, including the methodologies employed and the personnel involved. A copy of this report will be placed at the SCCIC at California State University, Fullerton. Any newly recorded sites or sites requiring updated information will be recorded on the appropriate Department of Parks and Recreation (DPR) Primary and Archaeological Site Forms, which will be filed with the SCCIC.

3.5 Native American Consultation

BFSA reviewed the previously conducted (Backes 2013) Sacred Lands File search by the Native American Heritage Commission (NAHC) to determine if any recorded Native American sacred sites or locations of religious or ceremonial importance are present within one mile of the project. No Native American cultural resources were identified by the NAHC within one mile of the project. For original correspondence from the NAHC, see the Backes 2013 report. All field investigations by BFSA were monitored by Chumash Native American monitor Randy Guzman of Indigenous Consultants, in accordance with the requirements of the City of Calabasas General Plan.

4.0 RESULTS

4.1 Records Search Results

An archaeological records search for a one-quarter-mile radius around the project area was previously conducted by Backes (2013) at the SCCIC at California State University, Fullerton. The results of the records search were reviewed by BFSA. The SCCIC reported the presence of one prehistoric site (LAN-246) within and surrounding the project boundaries (Figure 4.1–1) and an additional cultural resource location (LAN-1017) within a one-quarter-mile radius of the project area, which includes one lithic scatter with associated midden. In total, 15 cultural resource studies have been conducted within a one-quarter-mile radius of the project area. The most recent survey of the project APE was conducted in 2013 by Clarus Backes of Garcia and Associates. In addition to the discovery of a prehistoric ceramic fragment, Backes noted that dark soil discoloration was present at the top of the Mulholland Highway road cut. Backes concluded that isolated cultural deposits might remain in that area. The SCCIC reviewed the following historic sources:

- The National Register of Historic Places Index
- The Office of Historic Preservation, Archaeological Determinations of Eligibility
- The Office of Historic Preservation, Directory of Properties in the Historic Property Data File

These sources did not indicate the presence of cultural resources within or immediately adjacent to the project.

Table 4.1–1

Archaeological Sites Located Within One-Quarter Mile
of the Mulholland Highway Improvement Project

Site(s)	Description
LAN-246*	Prehistoric Habitation Site
LAN-1017	Prehistoric Lithic Scatter

** Located within the project area boundaries*

Figure 4.1–1
Cultural Resource Location Map

(Deleted for Public Review; Bound Separately)

<u>Table 4.1–2</u>

Previous Studies Conducted Within the Project Area of
the Mulholland Highway Improvement Project

Backes, Clarus

2013 Phase I Cultural Resources Investigation: Mulholland Highway Improvement Project, Cities of Calabasas and Los Angeles, Los Angeles County, California. Report on file at the South Central Coastal Information Center, California State University at Fullerton.

BFSA also reviewed the records search of the Sacred Lands File of the NAHC. The NAHC did not indicate the presence of any sacred sites within the project area. However, for records searches and background research, the absence of positive results does not necessarily indicate the absence of cultural resources. Consequently, an archaeological survey was conducted for the project area.

4.2 Results of the Field Survey

The archaeological survey took place on January 9, 2014. Senior Project Archaeologist Tracy A. Stropes, M.A., RPA, field director Michael Tyberg, and field technicians David Grabski and Kyle Coulter conducted the survey and test excavations. The archaeological survey of the property was an intensive reconnaissance consisting of a series of parallel survey transects spaced at approximately five-meter intervals. The entire property was accessible with approximate variations in the degree of visibility ranging from 25 to 75 percent. Nearly all of the project has been disturbed by previous activities including the construction of Mulholland Highway, housing developments, and access roads. The northern end of the APE is marked by the shallow drainage at the north end of the project area, and the APE extends south to the point where the old access road intersects with Mulholland Highway. The APE includes the eastern edge of Mulholland Highway, the road cut, and the access road. The eastern margin of the APE is marked by a wrought iron fence that borders the private residence on the hilltop. During the pedestrian survey, the observation was made that the majority of the property had been disturbed for several years, and this characterization of moderately-to-severely surficially disturbed is relevant to the consideration of cultural resources being present within the project area. Many areas in and around the property have been disturbed by residential construction and the grading of roads. Although dark soils were noted within the APE, no additional evidence of cultural resources was identified within the boundaries of the project. Photographs were taken to document project conditions at the time of the survey (Plates 4.2–1 through 4.2–6).

Plate 4.2–1: View of the southern edge of the impact area, facing north.

Plate 4.2–2: View of the central portion of the impact area, facing northeast.

Plate 4.2–3: View from the top of the access road, facing north.

Plate 4.2–4: View of the northern project boundary, facing south toward STPs 11 and 12.

Plate 4.2–5: View of the middle section of the impact area, facing southeast.

Plate 4.2–6: View of the northeast corner of the impact area, facing southwest.

4.3 Results of Subsurface Testing at LAN-246

Previous work within and around the APE has identified LAN-246 as a Late Period, Western Gabrieleno/Tongva village site (Galdikas-Brindamour 1970; Gamble and Russell 2002). The site was initially recorded by Alex Apostolides in 1963. Apostolides originally estimated the site's dimensions as 300x100 yards, although the exact dimensions are unknown due to urban development and vandalism. It is likely that the site originally extended west across the area now occupied by Mulholland Highway and Gelson's Village. The central portion of the site, and the area of densest artifact concentration, appears to have been on the crest of the hill, in the area immediately east of the APE where a private residence is currently located. Apostolides described the site as a heavy surface concentration of basalt core tools and flakes, steatite and granitic bowl fragments, ground stone tools and fragments, steatite, shell and bone beads, a "heavy occurrence" of yellow and red ochre, and scattered human bone. He also noted a layer of midden approximately four to five feet deep (Apostolides 1963).

By 1963, the site had been heavily vandalized. When Apostolides visited the site to gather data for his site report, he surprised three teenage vandals who had exposed an intact human burial near the access road. The teenagers had already removed the skull, the arm bones, a clavicle, and several ribs when Apostolides confronted them. When questioned about the burial, the teenagers replied, "Oh, a lot of kids come up here and dig all the time—they've taken a lot of bones out of here." Apostolides returned the next day and conducted a controlled salvage excavation of the remainder of the burial. At that time, he noted a second burial located immediately below the first. When his excavation was complete, he backfilled the pit, leaving the second burial in place (Apostolides 1963).

Soon afterward a local housing development firm announced plans to develop the area containing the site. Over the next few months, Apostolides and a few volunteer workers spent weekends recovering as much of the site as they could in a systematic, scientific manner, sometimes working side-by-side with vandals armed with coal scoops and window screens. While Apostolides' excavations were ongoing, the development company conducted initial grading on the center portion of the site, destroying much of what remained of the site's primary deposits. Ultimately, Apostolides and his crew recovered 22 human burials and over 1,800 artifacts, although they were able to excavate no more than five percent of the site. The site's burials and artifact assemblage were later analyzed by Birute Galdikas-Brindamour (1970), who obtained four radiocarbon dates ranging from A.D. 1230 to 1500. Ironically, the development company never proceeded with construction, and the area remained unused for several years (Galdikas-Brindamour 1970).

In 1977, C. William Clewlow, Jr. relocated the site during a survey of Tract 32948, which included the southern portion of the current project area (Clewlow 1977). At that time, Clewlow observed isolated patches of shell concentrations, isolated chipped stone debitage, and visible dark soil areas, which appeared to be midden. However, Clewlow stressed that "in not one instance . . . was artifactual or shell material observed in an original context. In each case it was clearly the result of secondary or tertiary depositional forces of a modern origin. The most remarkable single observation to emerge from the surface reconnaissance, in fact, was the totally disturbed condition of the tract" (Clewlow 1977:4). Clewlow concluded that if intact archaeological deposits or human burials remained in the site, they were likely buried by modern overburden, and would only be discernable if surface materials were graded away. He recommended that "the tract surface be graded in small increments of a few inches at a time, and that an archaeologist be present to monitor such grading as it is conducted" (Clewlow 1977:5).

In 1978, the site was graded to a depth of about three feet in preparation for a housing development. In a note appended to the LAN-246 site record the following year, Clement Meighan stated that all remaining occupational levels of the site had been removed and used for fill in a ravine to the south, and that "the site is now totally destroyed" (Apostolides 1963).

For the current project, in order to assess the potential for any buried portions of LAN-246, BFSA archaeologists excavated 12 shovel tests within the alignment of the APE (Figure 4.3–1). Subsurface testing of the APE took place on January 9, 2014. The testing was completed by Senior Project Archaeologist Tracy A. Stropes, M.A., RPA, field director Michael Tyberg, and field technicians David Grabski and Kyle Coulter. As required for the project, all archaeological excavations were monitored by Native American monitor Randy Guzman of Indigenous Consultants. The systematic excavation of the 12 shovel tests did not produce any cultural material (see Table 4.3–1). Each shovel test was excavated to a depth of 60 centimeters. Generally, the soil from the shovel tests was characterized as pale brown (10YR 6/3) semi-compact sandy soil that increased in compaction to depth. No evidence of any cultural materials was observed within the shovel tests.

Figure 4.3–1
Excavation Location Map

(Deleted for Public Review; Bound Separately)

Table 4.3–1

Shovel Test Excavation Data for Site LAN-246

Shovel Test	Depth (cm)	Quantity	Category	Item	Material	Cat. No(s).
1	0-10	No Recovery				
	10-20					
	20-30					
	30-40					
	40-50					
	50-60					
2	0-10	No Recovery				
	10-20					
	20-30					
	30-40					
	40-50					
	50-60					
3	0-10	No Recovery				
	10-20					
	20-30					
	30-40					
	40-50					
	50-60					
4	0-10	No Recovery				
	10-20					
	20-30					
	30-40					
	40-50					
	50-60					
5	0-10	No Recovery				
	10-20					
	20-30					
	30-40					
	40-50					
	50-60					
6	0-10	No Recovery				
	10-20					
	20-30					
	30-40					
	40-50					
	50-60					
7	0-10	No Recovery				
	10-20					
	20-30					
	30-40					
	40-50					

Shovel Test	Depth (cm)	Quantity	Category	Item	Material	Cat. No(s).
	50-60					
8	0-10	No Recovery				
	10-20					
	20-30					
	30-40					
	40-50					
	50-60					
9	0-10	No Recovery				
	10-20					
	20-30					
	30-40					
	40-50					
	50-60					
10	0-10	No Recovery				
	10-20					
	20-30					
	30-40					
	40-50					
	50-60					
11	0-10	No Recovery				
	10-20					
	20-30					
	30-40					
	40-50					
	50-60					
12	0-10	No Recovery				
	10-20					
	20-30					
	30-40					
	40-50					
	50-60					

4.4 Summary of Field Investigations

No subsurface cultural materials were identified as a result of the archaeological testing program at Site LAN-246. For Site LAN-246, the impacts from the development of Mulholland Highway, the surrounding housing developments, and access roads have likely removed the majority of intact archaeological deposits from within the project APE. As a result, the lack of subsurface deposits and overall lack of site integrity identify LAN-246 as not significant or important. Therefore, based upon the subsurface evaluation for the portion of Site LAN-246 within the project APE, the site is determined to have a lack of further research potential, and is identified as not significant in accordance with CEQA.

5.0 SIGNIFICANCE

The extended Phase I study for the Mulholland Highway Improvement Project was conducted to provide an inventory of archaeological sites within the project area, to assess resources for significance, and to evaluate potential impacts represented by the planned improvements. An updated survey, a review of previous work, and exploratory archaeological excavations were conducted as part of the current project. As has been previously noted, previous work conducted by Backes (2013) identified one cultural resource (LAN-246) within and around the project APE. The 2014 BFSA study incorporated the previous studies, an updated survey by BFSA, and a subsurface evaluation program of potential cultural resource deposits in order to complete the significance evaluation for the portion of Site LAN-246 within the APE. The goal of the archaeological study was to determine the potential impacts to cultural resources associated with the proposed project.

No subsurface cultural materials were identified as a result of the archaeological testing program at the recorded location of Site LAN-246. For Site LAN-246, the impacts from the construction and improvements to Mulholland Highway, the surrounding housing developments, vandalism, general erosion, and the lack of subsurface prehistoric deposits identify the portion of the site recorded within the APE as not significant or important in accordance with the significance criteria thresholds provided in CEQA.

As part of the current project design, the recorded location of Site LAN-246 will be directly impacted by the proposed project. Impacts to this site will not be significant because the portion of the site recorded within the project APE does not meet the significance criteria listed in CEQA. Additionally relevant to the non-significant evaluation of the site are the development impacts that have removed any remnants of the site in its entirety. Therefore, direct impacts to Site LAN-246 will not be considered adverse given the evaluation of the portion of the site within the APE as not significant.

6.0 RECOMMENDED MITIGATION

The cultural resources study for the Mulholland Highway Improvement Project confirmed the recorded location of one previously identified prehistoric site (LAN-246). However, the evaluation of the site location revealed that the resource lacked integrity and any associated subsurface deposits. Based upon these findings, the portion of the site recorded within the APE is not considered significant under CEQA criteria. With the evaluation of LAN-246 as non-significant, the proposed development for the Mulholland Highway Improvement Project will not represent a significant adverse impact to cultural resources. The portion of the site within the APE does not retain any further research potential. Therefore, no site-specific mitigation measures will be recommended as a condition of approval for the project.

As stated previously, most of the subject property has been disturbed in the past. When land is cleared, disked, or otherwise disturbed, evidence of surface artifact scatters is typically lost, especially with regards to prehistoric sites. The proposed project has the potential to encounter buried archaeological remains, including human remains, during grading, excavation, or other ground-disturbing work. The project APE is located in the center of an area associated with a large Native American village site and burial site. While previous construction activities (including the construction of Mulholland Highway and the housing development to the east of the project area) and access roads have largely destroyed the site, dark soil discoloration at the top of the Mulholland Highway road cut and the discovery of a prehistoric ceramic fragment suggest that isolated cultural deposits may remain in that area.

The previous use and disturbance of the property appear to have affected the potential to discover any additional scatters of surface artifacts. Additional cultural materials that may have been on-site could have been masked by both ground disturbance and the construction of Mulholland Highway. Given the prior disturbance within the project APE that might mask archaeological deposits and the moderate frequency of archaeological deposits in and around the proposed project, there is a potential that buried archaeological deposits may be present within the property. Therefore, it is recommended that the project be allowed to proceed with the implementation of a cultural resources monitoring program during grading of the project, which is discussed in Section 6.1.

6.1 General Project Monitoring

Monitoring of the Mulholland Highway Improvement Project during ground-disturbing activities by a qualified archaeologist is recommended to ensure that if buried cultural materials, either historic or prehistoric, are present, they will be handled in a timely and proper manner.

Mitigation Monitoring and Reporting Program (MMRP)

A MMRP to mitigate potential impacts to undiscovered buried archaeological resources within the Mulholland Highway Improvement project area shall be implemented to the satisfaction of the lead agency. This program shall include, but not be limited to, the following actions:

1) Prior to issuance of a grading permit, the City of Calabasas shall retain a certified archaeologist to implement the monitoring program.
2) The certified archaeologist shall attend the pre-grading meeting with the contractors to explain and coordinate the requirements of the monitoring program.
3) During the grading of previously undisturbed soil, the archaeological monitor shall be on-site, as determined by the consulting archaeologist, to perform inspections of the excavations.
4) Isolates and clearly non-significant deposits will be minimally documented in the field so the monitored grading can proceed.
5) In the event that previously unidentified cultural resources are discovered, the archaeologist shall have the authority to divert or temporarily halt ground disturbance operation in the area of discovery to allow for the evaluation of potentially significant cultural resources. The archaeologist shall contact the lead agency at the time of discovery. The archaeologist, in consultation with the lead agency, shall determine the significance of the discovered resources. The lead agency must concur with the evaluation before construction activities will be allowed to resume in the affected area. For significant cultural resources, a Research Design and Data Recovery Program to mitigate impacts shall be prepared by the consulting archaeologist and approved by the lead agency before being carried out using professional archaeological methods. If any human bones are discovered, the county coroner and lead agency shall be contacted. In the event that the remains are determined to be of Native American origin, the most likely descendant, as identified by the NAHC, shall be contacted in order to determine proper treatment and disposition of the remains.
6) Before construction activities are allowed to resume in the affected area, the artifacts shall be recovered and features recorded using professional archaeological methods. The archaeological monitor(s) shall determine the amount of material to be recovered for an adequate artifact sample for analysis.
7) All cultural material collected during the grading monitoring program shall be processed and curated according to the current professional repository standards. The collections and associated records shall be transferred, including title, to an appropriate curation facility, to be accompanied by payment of the fees necessary for permanent curation.
8) A report documenting the field and analysis results and interpreting the artifact and research data within the research context shall be completed and submitted to the satisfaction of the lead agency prior to the issuance of any building permits. The report will include DPR Primary and Archaeological Site Forms.

7.0 CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this archaeological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Brian F. Smith	January 22, 2014
Principal Investigator	Date

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APPENDIX A

Qualifications of Key Personnel

Brian F. Smith, MA

Owner, Principal Investigator
Brian F. Smith and Associates, Inc.
14010 Poway Road • Suite A •
Phone: (858) 679-8218 • Fax: (858) 679-9896 • E-Mail: bsmith@bfsa-ca.com

Education

Master of Arts, History, University of San Diego, California **1982**

Bachelor of Arts, History and Anthropology, University of San Diego, California **1975**

Experience

Principal Investigator **1977–Present**
Brian F. Smith and Associates, Inc.

Brian F. Smith is the owner and principal historical and archaeological consultant for Brian F. Smith and Associates. In the past 35 years, he has conducted over 2,500 cultural resource studies in California, Arizona, Nevada, Montana, and Texas. These studies include every possible aspect of archaeology from literature searches and large-scale surveys to intensive data recovery excavations. Reports prepared by Brian Smith have been submitted to all facets of local, state, and federal review agencies, including the US Army Crops of Engineers (USACE), the Bureau of Land Management (BLM), Bureau of Reclamation (BR), the Department of Defense (DOD), and Department of Homeland Security. In addition, Mr. Smith has conducted studies for utility companies (Sempra Energy) and state highway departments (CalTrans).

Professional Accomplishments

These selected major professional accomplishments represent research efforts which have added significantly to the body of knowledge concerning the prehistoric lifeways of cultures once present in the southern California area and historic settlement since the late 18th century. Mr. Smith has been principal investigator on the following select projects, except where noted.

Downtown San Diego Mitigation and Monitoring Reporting Programs: Large number of downtown San Diego mitigation and monitoring projects submitted to the Centre City Development Corporation, some of which included Strata (2008), Hotel Indigo (2008), Lofts at 707 10th Avenue Project (2007), Breeza (2007), Bayside at the Embarcadero (2007), Aria (2007), Icon (2007), Vantage Pointe (2007), Aperture (2007), Sapphire Tower (2007), Lofts at 655 Sixth Avenue (2007), Metrowork (2007), The Legend (2006), The Mark (2006), Smart Corner (2006), Lofts at 677 7th Avenue (2005), Aloft on Cortez Hill (2005), Front and Beech Apartments (2003), Bella Via Condominiums (2003), Acqua Vista Residential Tower (2003), Northblock Lofts (2003), Westin Park Place Hotel (2001), Parkloft Apartment Complex (2001), Renaissance Park (2001), and Laurel Bay Apartments (2001).

Archaeology at the Padres Ballpark: Involved the analysis of historic resources within a seven block area of the "East Village" area of San Diego, where occupation spanned a period from the 1870s to the 1940s. Over a period of two years, BFSA recovered over 200,000 artifacts and hundreds of pounds of metal, construction debris, unidentified broken glass, and wood. Collectively, the Ballpark project and the other downtown mitigation and monitoring projects represent the largest historical archaeological program anywhere in the country in the past decade. 2000-2007.

<u>The Navy Broadway Complex</u>: Architectural and historical assessment of over 25 structures that comprise the Naval Supply Depot, many of which have been in use since World War I and were used extensively during World War II. The EIR/EIS which was prepared included National Register evaluations of all structures. The archaeological component of the project involved the excavation of backhoe trenches to search for evidence of the remains of elements of the historic waterfront features that characterized the bay front in the latter half of the 19th century. This study was successful in locating portions of wharves and shanties that existed on the site prior to capping of this area after construction of the sea wall in the early 20th century.

<u>4S Ranch Archaeological and Historical Cultural Resources Study</u>: Data recovery program consisted of the excavation of over 2,000 square meters of archaeological deposits that produced over one million artifacts, primarily prehistoric materials. The archaeological program at 4S Ranch is the largest archaeological study ever undertaken in the San Diego County area and has produced data that has exceeded expectations regarding the resolution of long-standing research questions and regional prehistoric settlement patterns.

<u>Charles H. Brown Site</u>: Attracted international attention to the discovery of evidence of the antiquity of man in North America. Site located in Mission Valley, in the City of San Diego.

<u>Del Mar Man Site</u>: Study of the now famous Early Man Site in Del Mar, California, for the San Diego Science Foundation and the San Diego Museum of Man, under the direction of Dr. Spencer Rogers and Dr. James R. Moriarty.

<u>Old Town State Park Projects</u>: Consulting Historical Archaeologist. Projects completed in the Old Town State Park involved development of individual lots for commercial enterprises. The projects completed in Old Town include Archaeological and Historical Site Assessment for the Great Wall Cafe (1992), Archaeological Study for the Old Town Commercial Project (1991), and Cultural Resources Site Survey at the Old San Diego Inn (1988).

<u>Site W-20, Del Mar, California</u>: A two-year-long investigation of a major prehistoric site in the Del Mar area of the City of San Diego. This research effort documented the earliest practice of religious/ceremonial activities in San Diego County (circa 6,000 years ago), facilitated the projection of major non-material aspects of the La Jolla Complex, and revealed the pattern of civilization at this site over a continuous period of 5,000 years. The report for the investigation included over 600 pages, with nearly 500,000 words of text, illustrations, maps, and photographs which document this major study.

<u>City of San Diego Reclaimed Water Distribution System</u>: A cultural resource study of nearly 400 miles of pipeline in the City and County of San Diego.

<u>Master Environmental Assessment Project, City of Poway</u>: Conducted for the City of Poway to produce a complete inventory of all recorded historic and prehistoric properties within the City. The information was used in conjunction with the City's General Plan Update to produce a map matrix of the City showing areas of high, moderate, and low potential for the presence of cultural resources. The effort also included the development of the City's Cultural Resource Guidelines, which were adopted as City policy.

Cultural resource survey and geotechnical monitoring for the Mohyi Residence Project, La Jolla, California: Project Manager/Director of the investigation of a single-dwelling parcel—included project coordination; field survey; assessment of parcel for potentially buried cultural deposits; monitoring of geotechnichal borings; authoring of cultural resources project report. Brian F. Smith and Associates, San Diego, California. June 2000.

Enhanced cultural resource survey and evaluation for the Prewitt/Schmucker/Cavadias Project, La Jolla, California: Project Manager/Director of the investigation of a single-dwelling parcel—included project coordination; direction of field crews; assessment of parcel for potentially buried cultural deposits; authoring of cultural resources project report. June 2000.

Cultural resources survey and test of sites within the proposed development of the Menifee Ranch, Riverside County, California: Project Manager/Director of the investigation of one prehistoric and five historic sites—included project coordination and budgeting; direction of field crews; feature recordation; historic structure assessments; assessment of sites for significance based on CEQA guidelines; historic research; co-authoring of cultural resources project report. February-June 2000.

Salvage mitigation of a portion of the San Diego Presidio identified during water pipe construction for the City of San Diego, California: Project Archaeologist/Director—included direction of field crews; development and completion of data recovery program; management of artifact collections cataloging and curation; data synthesis and authoring of cultural resources project report in prep. April 2000.

Enhanced cultural resource survey and evaluation for the Tyrian 3 Project, La Jolla, California: Project Manager/Director of the investigation of a single-dwelling parcel—included project coordination; assessment of parcel for potentially buried cultural deposits; authoring of cultural resources project report. April 2000.

Enhanced cultural resource survey and evaluation for the Lamont 5 Project, Pacific Beach, California: Project Manager/Director of the investigation of a single-dwelling parcel—included project coordination; assessment of parcel for potentially buried cultural deposits; authoring of cultural resources project report. April 2000.

Enhanced cultural resource survey and evaluation for the Reiss Residence Project, La Jolla, California: Project Manager/Director of the investigation of a single-dwelling parcel—included project coordination; assessment of parcel for potentially buried cultural deposits; authoring of cultural resources project report. March-April 2000.

Salvage mitigation of a portion of Site SDM-W-95 (CA-SDI-211) for the Poinsettia Shores Santalina Development Project and Caltrans, Carlsbad, California: Project Archaeologist/ Director—included direction of field crews; development and completion of data recovery program; management of artifact collections cataloging and curation; data synthesis and authoring of cultural resources project report in prep. December 1999-January 2000.

Survey and testing of two prehistoric cultural resources for the Airway Truck Parking Project, Otay Mesa, California: Project Archaeologist/Director—included direction of field crews; development and completion of testing recovery program; assessment of site for significance based on CEQA guidelines; authoring of cultural resources project report, in prep. December 1999-January 2000.

Cultural resources Phase I and II investigations for the Tin Can Hill Segment of the Immigration and Naturalization Services Triple Fence Project along the International Border, San Diego County, California: Project Manager/Director for a survey and testing of a prehistoric quarry site along the border—NRHP eligibility assessment; project coordination and budgeting; direction of field crews; feature recordation; meeting and coordinating with U.S. Army Corps of Engineers; co-authoring of cultural resources project report. December 1999-January 2000.

Mitigation of a prehistoric cultural resource for the Westview High School Project for the City of San Diego, California: Project Archaeologist/ Director—included direction of field crews; development and completion of data recovery program including collection of material for specialized faunal and botanical analyses; assessment of sites for significance based on CEQA guidelines; management of artifact collections cataloging and curation; data synthesis; co-authoring of cultural resources project report, in prep. October 1999-January 2000.

Mitigation of a prehistoric cultural resource for the Otay Ranch SPA-One West Project for the City of Chula Vista, California: Project Archaeologist/Director—included direction of field crews; development of data recovery program; management of artifact collections cataloging and curation; assessment of site for significance based on CEQA guidelines; data synthesis; authoring of cultural resources project report, in prep. September 1999-January 2000.

Monitoring of grading for the Herschel Place Project, La Jolla, California: Project Archaeologist/ Monitor—included monitoring of grading activities associated with the development of a single-dwelling parcel. September 1999.

Survey and testing of an historic resource for the Osterkamp Development Project, Valley Center, California: Project Archaeologist/ Director—included direction of field crews; development and completion of data recovery program; budget development; assessment of site for significance based on CEQA guidelines; management of artifact collections cataloging and curation; data synthesis; authoring of cultural resources project report. July-August 1999.

Survey and testing of a prehistoric cultural resource for the Proposed College Boulevard Alignment Project, Carlsbad, California: Project Manager/Director —included direction of field crews; development and completion of testing recovery program; assessment of site for significance based on CEQA guidelines; management of artifact collections cataloging and curation; data synthesis; authoring of cultural resources project report, in prep. July-August 1999.

Survey and evaluation of cultural resources for the Palomar Christian Conference Center Project, Palomar Mountain, California: Project Archaeologist—included direction of field crews; assessment of sites for significance based on CEQA guidelines; management of artifact collections cataloging and curation; data synthesis; authoring of cultural resources project report. July-August 1999.

Survey and evaluation of cultural resources at the Village 2 High School Site, Otay Ranch, City of Chula Vista, California: Project Manager/Director —management of artifact collections cataloging and curation; assessment of site for significance based on CEQA guidelines; data synthesis; authoring of cultural resources project report. July 1999.

Cultural resources Phase I, II, and III investigations for the Immigration and Naturalization Services Triple Fence Project along the International Border, San Diego County, California: Project Manager/Director for the survey, testing, and mitigation of sites along border—supervision of multiple field crews, NRHP eligibility assessments, Native American consultation, contribution to Environmental Assessment document, lithic and marine shell analysis, authoring of cultural resources project report. August 1997-January 2000.

Phase I, II, and II investigations for the Scripps Poway Parkway East Project, Poway California: Project

Archaeologist/Project Director—included recordation and assessment of multicomponent prehistoric and historic sites; direction of Phase II and III investigations; direction of laboratory analyses including prehistoric and historic collections; curation of collections; data synthesis; coauthorship of final cultural resources report. February 1994; March-September 1994; September-December 1995.

Archaeological evaluation of cultural resources within the proposed corridor for the San Elijo Water Reclamation System Project, San Elijo, California: Project Manager/Director —test excavations; direction of artifact identification and analysis; graphics production; coauthorship of final cultural resources report. December 1994-July 1995.

Evaluation of Cultural Resources for the Environmental Impact Report for the Rose Canyon Trunk Sewer Project, San Diego, California: Project Manager/Director —direction of test excavations; identification and analysis of prehistoric and historic artifact collections; data synthesis; co-authorship of final cultural resources report, San Diego, California. June 1991-March 1992.

Reports/Papers

Author, coauthor, or contributor, to over 2,500 cultural resources management publications, a selection of which are presented below.

2009 Cultural Resource Assessment of the North Ocean Beach Gateway Project City of San Diego #64A-003A; Project #154116.

2009 Archaeological constraints study of the Morgan Valley Wind Assessment Project, Lake County, California.

2008 Results of an archaeological review of the Helen Park Lane 3.1-acre Property (APN 314-561-31), Poway, California.

2008 Archaeological Letter Report for a Phase I Archaeological Assessment of the Valley Park Condominium Project, Ramona, California; APN 282-262-75-00.

2007 Archaeology at the Ballpark. Brian F. Smith and Associates, San Diego, California. Submitted to the Centre City Development Corporation.

2007 Result of an Archaeological Survey for the Villages at Promenade Project (APNs 115-180-007-3,115-180-049-1, 115-180-042-4, 115-180-047-9) in te City of Corona, Riverside County.

2007 Monitoring Results for the Capping of Site CA-SDI-6038/SDM-W-5517 within the Katzer Jamul Center Project; P00-017.

2006 Archaeological Assessment for The Johnson Project (APN 322-011-10), Poway, California.

2005 Results of archaeological monitoring at the El Camino Del Teatro Accelerated Sewer Replacement Project (Bid No. K041364; WO # 177741; CIP # 46-610.6.

2005 Results of archaeological monitoring at the Baltazar Draper Avenue Project (Project No. 15857; APN: 351-040-09).

2004 TM 5325 ER #03-14-043 Cultural Resources.

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Education

Master of Arts, Anthropology, San Diego State University, California — **2007**

Bachelor of Science, Anthropology, University of California, Riverside — **2000**

Experience

Project Archaeologist — **March 2009–Present**
Brian F. Smith and Associates, Inc.

Duties include project management of all phases of archaeological investigations for local, state and federal agencies; field supervisor of all phases of archaeological projects; lithic analysis; National Register of Historic Places (NRHP) and California Environmental Quality Act (CEQA) site evaluations; authoring and coauthoring of cultural resource management reports primarily for southern California.

Archaeological Principal Investigator — **June 2008–February 2009**
TRC Solutions

Archaeological Principal Investigator for cultural resource segment of Natural Sciences and Permitting Division. Duties included management of all phases of archaeological investigations for private companies and local, state and federal agencies; personnel management, field supervision of all phases of archaeological projects; laboratory supervision; lithic analysis, Native American consultation, and reporting; National Register of Historic Places (NRHP) and California Environmental Quality Act (CEQA) site evaluations; authoring and coauthoring of cultural resource management reports primarily for southern California.

Principal Investigator and Project Archaeologist — **June 2006–May 2008**
Archaeological Resource Analysts

As a sub consultant, served as Principal Investigator and Project Archaeologist for several projects for SRS Inc. Primary tasks included filed direction, project management, personnel management, lab analysis, and authorship of company reports throughout southern California.

Project Archaeologist — **September 1996–June 2006**
Gallegos & Associates

Duties for Gallegos and Associates included project management, laboratory management, lithic analysis, field direction, Native American consultation, report authorship, and editing for several technical reports for various projects throughout southern California. In addition, composed several data recovery and preservation programs for sites throughout California for both CEQA and NEPA level compliance.

Project Archaeologist **September 1993–September 1996**
Macko Inc.

Duties for Macko Inc. included project management, laboratory management, lithic analysis, field supervision, report authorship, and editing for technical reports for various projects throughout southern California.

Archaeological Field Technician **January 1996–September 1993**
Chambers Group Inc.

Duties for Chambers Group Inc. included archaeological excavation, survey, monitoring, wet screen facilities management, and project logistics. —January 1993 – September 1993.

Archaeological Field Technician **May–September 1992**
John Minch and Associates

Duties for John Minch and Associates included archaeological excavation, survey, monitoring, wet screen facilities management, and project logistics.

Reports/Papers

Principal Author

2009 An Archaeological Assessment for the Rivera-Placentia Project, City of Riverside, California. Prepared for Riverside Construction Company.

2009 Cultural Resource Data Recovery Plan for the North Ocean Beach Gateway Project. Prepared for the City of San Diego and KTU+A.

2009 Cultural Resource Letter Report for the Borrego Substation Feasibility Study, Borrego Springs, California. Prepared for RBF Consulting.

2009 A Cultural Resource Study for the Gatto Residence Project, La Jolla, California. Prepared for Marengo Martin Architects Inc.

2008 Phase I Cultural Resource Survey for the 28220 Highridge Road Development Project, Rancho Palos Verdes, California. Prepared for REC Development.

2008 Wild Goose Expansion 3 Project Butte County, California Colusa County, California. Prepared for Niska Gas Storage LLC.

2008 Class III Cultural Resource Survey for the Burlington Northern Santa Fe Four Railway Bridge Renewal Project San Bernardino County, California. Prepared for BNSF Railway Company.

2008 I-80 Colfax Site Cultural Resource Records Search Report, Placer County California. Prepared for Granite Construction Company.

2008 I-80 Gold Run Site Cultural Resource Records Search Report, Placer County California. Prepared for Granite Construction Company.

2008 Cultural Resource Monitoring at 31431 Camino Capistrano, San Juan Capistrano California. Prepared for Herman Weissker, Inc.

2008 Cultural Resource Inventory for the Snow White Pumice Mine, Hinkley California. Prepared for U.S. Mining and Minerals Corporation.

2007 Nodule Industries of North Coastal San Diego: Change and Stasis in 10,000 Years of Lithic Technology. Masters Thesis on file, San Diego State University.

2007 Cultural Resource Inventory for Empire Homes (APN 104-180-04), Lake Forest, California. Prepared for Empire Homes.

2007 Phase I Archaeological Assessment for APN 104-200-09, Beumont, California. Prepared for Mary Chan.

2007 Cultural Resource Inventory for Empire Homes (APN 104-180-04), Lake Forest, California. Prepared for Empire Homes.

2006 Carlsbad Municipal Golf Course Data Recovery Program for CA-SDI-8694, and Indexing and Preservation Program Study for CA-SDI-8303 and CA-SDI-8797 Locus C, City of Carlsbad, CA. Prepared for City of Carlsbad.

2005 Grand Pacific Resorts Data Recovery and Index Sample Program for CA-SDI-8797, Area A, City of Carlsbad, CA. Prepared for Grand Pacific Resorts Inc.

2004 "Near the Harris Site Quarry" Cultural Resource Data Recovery and Preservation Program for CA-SDI-13028, San Diego County, California. Prepared for Harbrecht Development, L.P.

2004 Cultural Resource Survey and Boundary Test Report for the Lilac Ranch Project, San Diego County, California. Prepared for Empire Companies.

2003 Cultural Resource Data Recovery and Preservation Program for CA-SDI-12027, San Diego County, California. Prepared for Harbrecht Development Inc.

2002 Data Recovery Program for the Pacbell Site CA-SDI-5633, San Marcos, California. Prepared for Joseph Wong Design Associates.

2001 McCrink Ranch Cultural Resource Test Program Additional Information for Selected Sites, San Diego County, California. Prepared for Shapouri & Associates.

2001 The Quail Ridge Project Cultural Resource Test Program, San Diego County, California. Prepared for Helix Environmental Planning, Inc.

2000 Cultural Resource Survey and Evaluation for the North Sand Sheet Full Buildout Program, Owens Lake, California. Prepared for CH2MHill.

1995 Final Report: Archaeological Investigations Conducted for the Abalone Cove Dewatering Wells, City of Rancho Palos Verdes Los Angeles County, California. Prepared for the City of Rancho Palos Verdes, Environmental Services.

1995 Final Report: A Class III Intensive Survey of a 100-Acre Sand and Gravel Mining Area, Imperial County, California. Prepared for the Lilburn Corporation.

APPENDIX B

Confidential Maps

(Deleted for Public Review; Bound Separately)

APPENDIX D: NOISE IMPACT ANALYSIS

NOISE IMPACT ANALYSIS

MULHOLLAND HIGHWAY SCENIC CORRIDOR PROJECT

CALABASAS, CALIFORNIA

Prepared by:

Giroux & Associates
1820 E Garry St., #211
Santa Ana, CA 92705

Prepared for:

Stetler & McHugh EHS Consulting LLC
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354-B Warwick Avenue
Oakland, CA 94610

Date:

September 4, 2013

Project No.: P13-030 N

NOISE SETTING

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise is generally considered to be unwanted sound. Sound is characterized by various parameters that describe the rate of oscillation of sound waves, the distance between successive troughs or crests, the speed of propagation, and the pressure level or energy content of a given sound. In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level.

The decibel (dB) scale is used to quantify sound pressure levels. Although decibels are most commonly associated with sound, "dB" is a generic descriptor that is equal to ten times the logarithmic ratio of any physical parameter versus some reference quantity. For sound, the reference level is the faintest sound detectable by a young person with good auditory acuity.

Since the human ear is not equally sensitive to all sound frequencies within the entire auditory spectrum, human response is factored into sound descriptions by weighting sounds within the range of maximum human sensitivity more heavily in a process called “A-weighting,” written as dB(A). Any further reference in this discussion to decibels written as "dB" should be understood to be A-weighted.

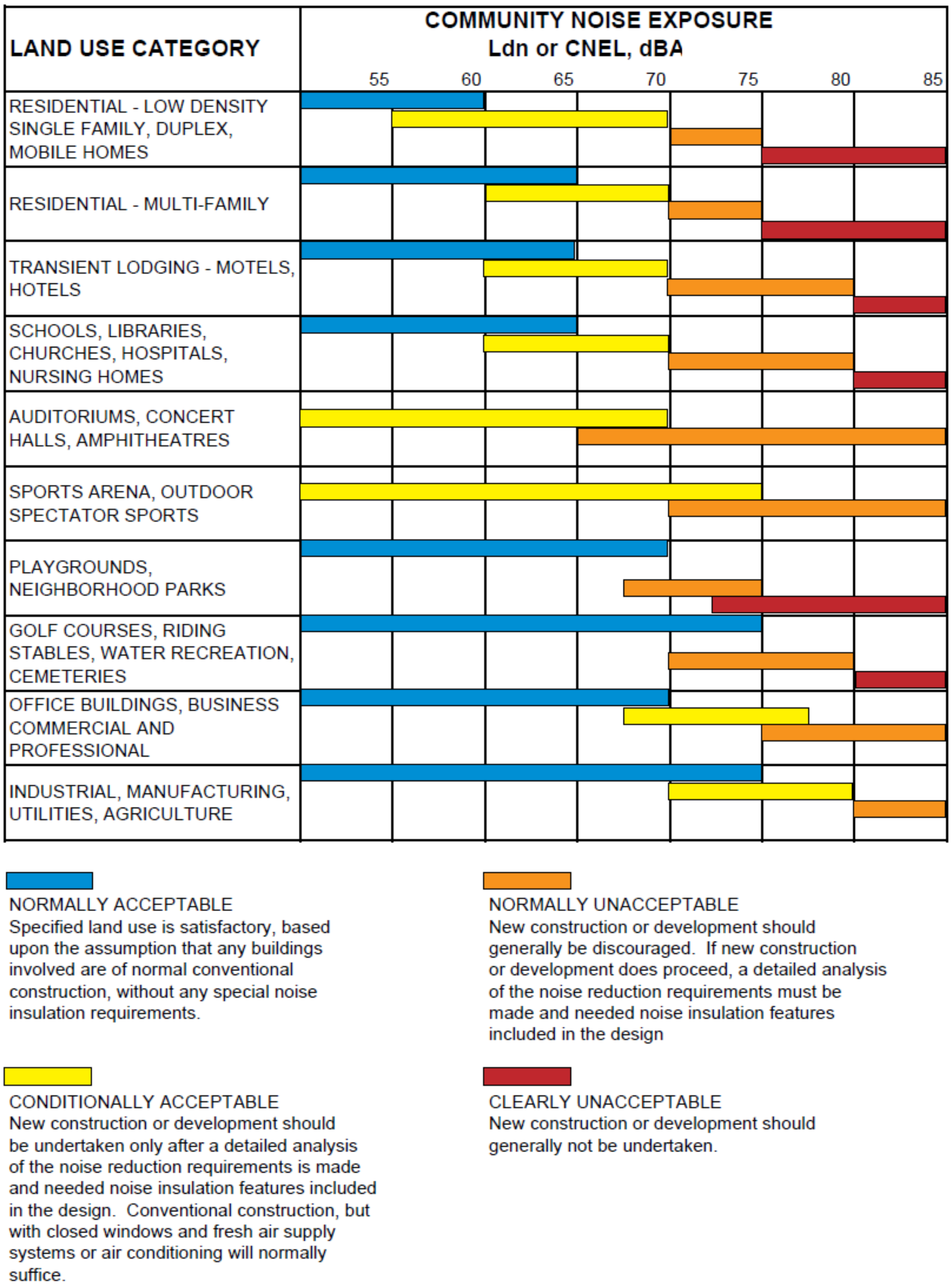
Time variations in noise exposure are typically expressed in terms of a steady-state energy level equal to the energy content of the time varying period (called LEQ), or alternately, as a statistical description of the sound pressure level that is exceeded over some fraction of a given observation period. Finally, because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, state law requires that, for planning purposes, an artificial dB increment be added to quiet time noise levels in a 24-hour noise descriptor called the Ldn (day-night) or the Community Noise Equivalent Level (CNEL). The CNEL metric has gradually replaced the Ldn factor, but the two descriptors are essentially identical.

CNEL-based standards are generally applied to transportation-related sources because local jurisdictions are pre-empted from exercising direct noise control over vehicles on public streets, aircraft, trains, etc. The City of Calabasas therefore regulates the traffic noise exposure of the receiving property through land use controls.

Noise/land use compatibility standards for various classes of land uses are generally expressed in the Noise Element of the General Plan to insure that noise exposure is considered in any development decisions. The City of Calabasas has guidelines for noise exposure standards which are shown in Figure 1. For multi-family residential uses the City recommends an exterior noise exposure of 65 dB CNEL and a 60 dB CNEL is recommended for single family homes. For either residential use, noise levels up to 70 dB CNEL are considered “conditionally acceptable” and are permitted if noise mitigation measures have been evaluated.

Figure 1

City of Calabasas Land Use Compatibility Guidelines



An interior CNEL of 45 dB is mandated by the State of California Noise Insulation Standards (CCR, Title 24, Part 6, Section T25-28) for multiple family dwellings and hotel and motel rooms. In 1988, the State Building Standards Commission expanded that standard to include all habitable rooms in residential use, included single-family dwelling units. Since normal noise attenuation within residential structures with closed windows is about 25-30 dB, an exterior noise exposure of 70 dB CNEL allows the interior standard to be met without any specialized structural attenuation (dual paned windows, etc.).

Calabasas Noise Ordinance Standards

The City of Calabasas has adopted a Noise Ordinance (Chapter 17.20.160 of the Calabasas Municipal Code), which identifies exterior noise standards, specific noise restrictions, exemptions, and variances for sources of noise within the City. The Noise Ordinance applies to all noise generated on one land use that impacts an adjacent use, typically stationary noise sources. As such, the Municipal Code provides standards against possibly intrusive noises sources.

The exterior noise standards potentially applicable to the proposed project are property line noise limits that reflect changes in noise sensitivity by time of day. The ordinance also recognizes that residential uses are more noise-sensitive than commercial or manufacturing/industrial land uses. For residential uses, the nighttime noise standard is 50 dB Leq. Daytime noise standards are less restrictive than nighttime standards. However, control of roadway noise sources is pre-empted from local control (except for Vehicle Code enforcement of proper mufflers). Any analysis of mobile source noise impacts is therefore usually performed relative to General Plan Noise Element standards shown above in Figure 1.

Regulation of noise from construction activities is not pre-empted from local jurisdiction control. However, the City of Calabasas, like most California governmental agencies has not adopted any specific standards relating to construction noise. According to the City of Calabasas Municipal Code, permissible hours of construction are between the hours of 7 a.m. to 6 p.m. Monday through Friday, and 8 a.m. to 5 p.m. on Saturday. No work is permitted on Sundays and Federal Holidays. The presumption is that by restricting construction activity noise generation to hours of lesser noise sensitivity, impacts would be less than significant.

Additionally, the Calabasas Municipal Code lists the following exemptions from adherence to noise standards:

- Noise sources associated with work performed by private or public utilities in the maintenance or modification of their facilities; and

- Traffic on public roads and any other activity to the extent regulation thereof has been preempted by state or federal law.

Baseline Noise Levels

It had been planned to monitor baseline noise levels along the improvement corridor through a combination of several 24-hour long-term measurements supplemented with selected short-term monitoring locations. Site inspection revealed that there was no public property that would allow for a 24-hour meter deployment. Noise meters were therefore only deployed at various locations within the roadway right-of-way for 15 minute intervals. Any extrapolation of short-term readings to 24-hour weighted CNELs, including effects of existing subdivision walls, was performed by computer simulations of noise propagation behavior and typical 24-hour traffic patterns.

Short term on-site noise measurements were made in order to document existing baseline levels in the project area. These help to serve as a basis for projecting future noise exposure from the project upon the surrounding community as well as determining project compatibility with the existing noise environment. Noise monitoring was conducted on Monday, August, 12, 2013, from noon – 1:30 p.m., at five area locations. Measurement locations are shown in Figure 2 and summarized below.

Measured Noise Levels (dBA)

Site No.	Leq	Lmax	Lmin	L10	L33	L50	L90
1	63	76	42	67	63	60	50
2	64	75	42	68	64	60	49
3	64	78	41	68	64	61	49
4	64	72	40	68	64	61	50
5	64	74	46	68	64	61	52

Measurements were made at approximately 45 feet from the roadway centerline. The closest residential recreational uses (pools, patios, etc.) are 60 feet from the centerline and shielded by intervening noise walls. Walls on the west side of the proposed improvements are typically 6 feet high. Double walls on the east side tend to have a combined height of close to 10 feet. Noise attenuation from combined added set-back and distance on the west side is close to -7 dB. The increased barrier height plus the greenbelt on the east side would reduce noise levels in the closed yards by -11 dB from the measurement location.

Figure 2

Noise Meter Locations

Monitoring experience shows that 24-hour weighted CNEL's can be reasonably well estimated from mid-afternoon noise readings. CNEL's are approximately equal to mid-afternoon Leq plus 2-3 dB (Caltrans Technical Noise Supplement, 2009). This would equate to existing CNELs in the rear yards on the western side of Mulholland Highway to 60 dB CNEL. On the eastern side, the existing levels are approximately 56 dB CNEL. Rear yard traffic noise exposures on the west side just meet the most stringent City General Plan standard of 60 dB CNEL. With increased set-back and greater grade separation, yards on the eastern side of Mulholland Highway meet this standard with a substantial margin of safety.

NOISE IMPACT ANALYSIS

Noise Significance Criteria

Noise impacts are considered significant if they result in:

a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

b. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

Standards of Significance

Noise impacts are considered significant if they expose persons to levels in excess of standards established in local general plans or noise ordinances. The preferred exterior noise exposure for the City of Calabasas for single-family residential uses is 60 dBA CNEL in usable outdoor space such as backyards, decks, patios, etc. If required, attenuation through setback and noise barriers can be used to reduce traffic noise to the 60 dBA CNEL goal. However, an inability to achieve this goal through the application of reasonably available mitigation measures would be considered a significant impact.

According to the Calabasas General Plan EIR, impacts may also be significant if they create either a substantial permanent or temporary increase as follows:

Significance of Changes in Operational Roadway Noise Exposure

Post- Project Noise Level (CNEL)	Significant Impact
< 60 dB	+ 5.0 dB or more
60 – 65 dB	+ 3.0 dB or more
> 65 dB	+ 1.5 dB or more

Existing noise levels in the adjacent rear yards of the scenic corridor project are estimated to be 56 dB CNEL (east of roadway) and 60 dB CNEL (west of roadway), a +3.0 dB increase due to proposed project actions would be considered a substantial increase. The following noise impacts due to project-related traffic would be considered significant:

1. If construction activities were to audibly intrude into adjacent residential areas during periods of heightened noise sensitivity.

2. If project activities were to cause an increase by a clearly perceptible amount (+3.0 dB CNEL) in usable outdoor space (patios, yard, pool, etc.) of homes backing up to Mulholland Highway.

3. If construction activities were to generate vibration levels that could be considered a nuisance or could cause cosmetic structural damage.

Noise Impact Analysis

Noise impacts can result from a variety of changes in the noise propagation dynamics, particularly as it relates to traffic sources. These factors can include:

- Increases in the number of vehicles
- Increases in travel speeds
- Increased travel during “quiet” hours when the CNEL metric penalizes values three-fold (evening) or ten-fold (night)
- Increased numbers of trucks using the constructed roadway segment
- Increased release elevation that decreases the noise reduction efficiency of any barriers
- Decreased source-receiver separation by moving traffic closer to a noise-sensitive use

For the proposed project, however, construction of the various scenic corridor improvements will not trigger any of the above traffic noise generation factors. There will be no new lanes to attract traffic, the posted speed limit will stay the same, the bus stops will remain at their current locations, the centerline will not be measurably changed and source elevations will remain unchanged. From a noise perspective, the only impact will be from construction activities. Increased landscaping has a visual benefit of reducing source visibility, but any associated noise reduction benefit is immeasurably small.

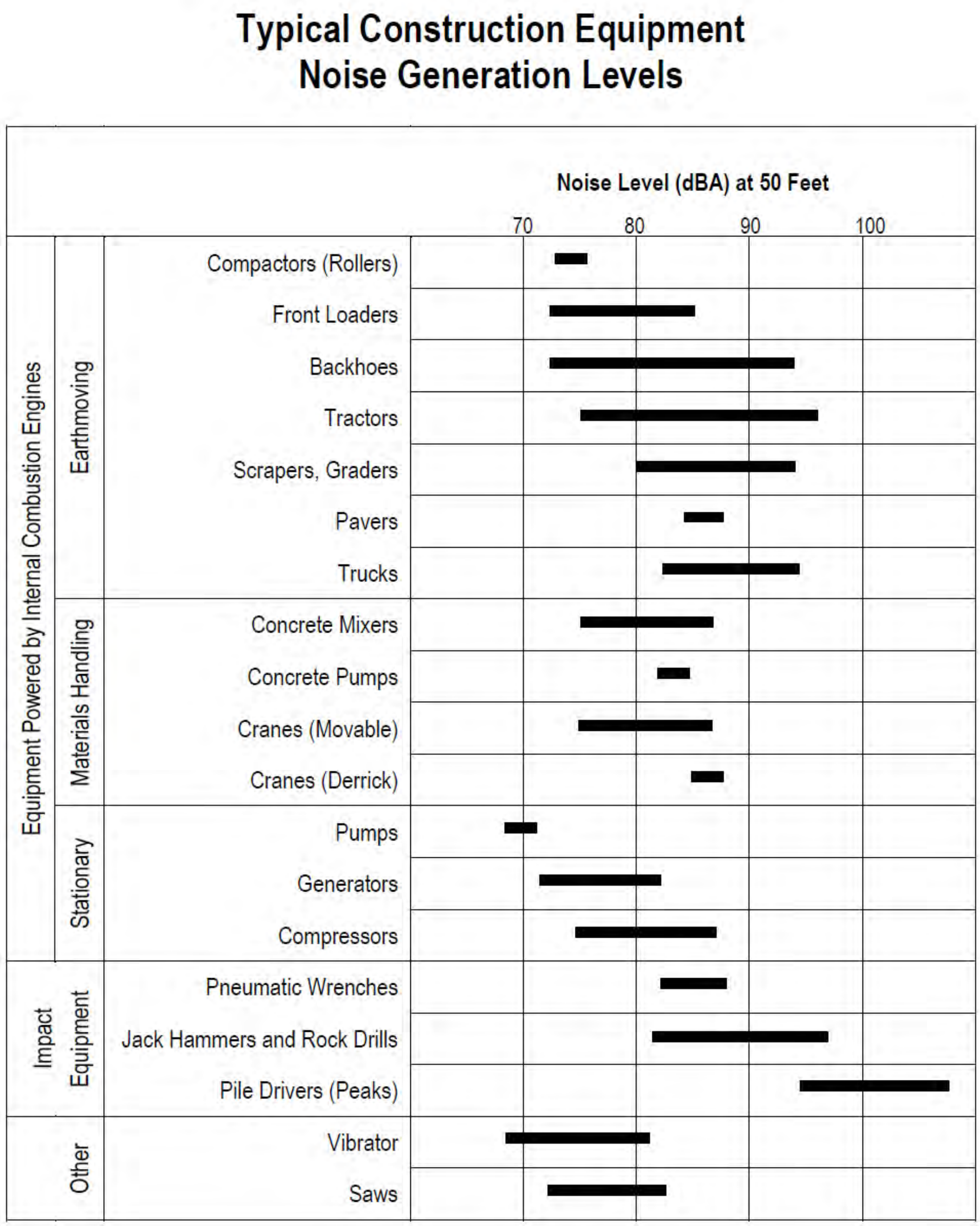
Construction Noise Impacts

Temporary construction noise impacts will vary markedly because the noise strength of construction equipment ranges widely as a function of the equipment used and its activity level. Short-term construction noise impacts tend to occur in discrete phases dominated initially by demolition of existing structures and large earth-moving sources, then by foundation and parking lot construction, and finally for finish construction. The demolition and earth-moving sources are the noisiest, with equipment noise typically ranging from 75 to 90 dBA at 50 feet from the source. For the proposed project, very little heavy equipment will be required since minimal demolition or earth-moving is necessary. Except for milling of the existing pavement surface and trucking activities to deliver materials, powered equipment will on the low end of the generation scale.

Figure 3 shows the range of noise emissions for various pieces of construction equipment. Point sources of noise emissions are attenuated by a factor of 6 dB per doubling of distance through geometrical (spherical) spreading of sound waves. Noise from the type of equipment needed for this project will drop to a 65 dBA exterior/45 dBA interior noise level by about 200 feet from the source. This estimate assumes a clear line-of-sight from the source to the receiver. Variations in terrain elevation or existing perimeter walls will act as noise barriers that may interrupt equipment noise propagation. Construction noise impacts are, therefore, somewhat less than that predicted under idealized input conditions

The City has not adopted any specific standards relating to construction noise. According to the City of Calabasas Municipal Code, permissible hours of construction are between the hours of 7 a.m. to 6 p.m. Monday through Friday, and 8 a.m. to 5 p.m. on Saturday. No work is permitted on Sundays and Federal Holidays. These hours are included as conditions on any project construction permits and these limits will serve to minimize any adverse construction noise impact potential.

Figure 3



Source: EPA PB 206717, Environmental Protection Agency, December 31, 1971, "Noise from Construction Equipment and Operations."

Construction Activity Vibration

Typical background vibration levels in residential areas are usually 50 VdB or lower, below the threshold of human perception. Perceptible vibration levels inside residences are typically attributed to the operation of heating and air conditioning systems, door slams or street traffic. Construction activities and street traffic are some of the most common external sources of vibration that can be perceptible inside residences.

Construction activities generate ground-borne vibration when heavy equipment travels over unpaved surfaces or when it is engaged in soil movement. The effects of ground-borne vibration include discernible movement of building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. Vibration related problems generally occur due to resonances in the structural components of a building because structures amplify groundborne vibration. Within the “soft” sedimentary surfaces of much of Southern California, ground vibration is quickly damped out. Groundborne vibration is almost never annoying to people who are outdoors (FTA 2006).

Groundborne vibrations from construction activities rarely reach levels that can damage structures. Because vibration is typically not an issue, very few jurisdictions have adopted vibration significance thresholds. Vibration thresholds have been adopted for major public works construction projects, but these relate mostly to structural protection (cracking foundations or stucco) rather than to human annoyance.

Vibration is most commonly expressed in terms of the root mean square (RMS) velocity of a vibrating object. RMS velocities are expressed in units of vibration decibels. The range of vibration decibels (VdB) is as follows:

65 VdB	-	threshold of human perception
72 VdB	-	annoyance due to frequent events
80 VdB	-	annoyance due to infrequent events
94-98 VdB	-	minor cosmetic damage

To determine potential impacts of the project’s construction activities, estimates of vibration levels induced by the construction equipment at various distances are presented below:

	Approximate Vibration Levels (VdB)*			
Equipment	**25 feet**	**50 feet**	**100 feet**	**185 feet**
Pile Driver	93	87	81	75
Large Bulldozer	87	81	75	69
Loaded Truck	86	80	74	68
Jackhammer	79	73	67	61
Small Bulldozer	58	52	46	40

* (FTA Transit Noise & Vibration Assessment, Chapter 12, Construction, 2006)

The on-site construction equipment that will create the maximum potential vibration is a loaded truck. The stated vibration source level in the FTA Handbook for such equipment is 80 VdB at 50 feet from the source. The nearest home foundations are 50 feet or more from the roadway centerline. There are no equipment sources capable of creating any structural damage.

NOISE IMPACT MITIGATION

Short-term construction noise intrusion and vibration impacts will be limited by conditions on construction permits requiring compliance with the City of Calabasas Noise Ordinance. Allowable hours of construction are between the hours of 7 a.m. to 6 p.m. Monday through Friday, and 8 a.m. to 5 p.m. on Saturday. No work is permitted on Sundays and Federal Holidays. In addition the following construction practices are recommended:

- Stockpiling and staging activities should be located as far as practicable from dwellings.
- All mobile equipment shall have properly operating and maintained mufflers.
- Haul routes should approach the construction area from the north and minimize the school and homes to the south.

APPENDIX E: PRELIMINARY GEOTECHNICAL ENGINEERING INVESTIGATION

PRELIMINARY

GEOTECHNICAL

ENGINEERING

INVESTIGATION

FILE NO. 20287

May 15, 2012

Geotechnologies, Inc.
Consulting Geotechnical Engineers

Celebrating 40 Years of Service 1971-2011

May 15, 2012
File No. 20287

Kimley-Horn and Associates, Inc.
6800 Owensmouth Avenue, Suite 410
Canoga Park, California 91303

Attention: Michael Choi

Subject: Preliminary Geotechnical Engineering Investigation
Proposed Street Improvements
Mulholland Highway South of Mulholland Drive
Cities of Calabasas and Los Angeles, California

Dear Choi:

This letter transmits the Preliminary Geotechnical Engineering Investigation for the subject property prepared by Geotechnologies, Inc. This report provides preliminary geotechnical recommendations for the proposed development, including earthwork, seismic design, excavations, floor slabs and foundation design. Engineering for the proposed project should not begin until approval of the geotechnical investigation is granted by the local building official. Significant changes in the geotechnical recommendations may result due to the building department review process.

This report is preliminary in nature. The analyses, conclusions, recommendations, and design parameters provided herein should be verified and re-confirmed following refinement of the proposed project plans and additional subsurface exploration and testing.

The validity of the recommendations presented herein is dependant upon review of the geotechnical aspects of the project during construction by this firm. The subsurface conditions described herein have been projected from limited subsurface exploration and laboratory testing. The exploration and testing presented in this report should in no way be construed to reflect any variations which may occur between the exploration locations or which may result from changes in subsurface conditions.

Should you have any questions please contact this office.

Respectfully submitted,
GEOTECHNOLOGIES, INC.

REGISTERED PROFESSIONAL ENGINEER
MICHAEL A. CAZENEUVE
No. 71490
Exp. 12/31/13
CIVIL
STATE OF CALIFORNIA

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SECTION

**PRELIMINARY GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED STREET IMPROVEMENTS
MULHOLLAND HIGHWAY SOUTH OF MULHOLLAND DRIVE
CITIES OF CALABASAS AND LOS ANGELES, CALIFORNIA**

INTRODUCTION

This report presents the results of the preliminary geotechnical engineering investigation performed on the subject site. The purpose of this investigation was to identify the distribution and engineering properties of the earth materials underlying the site, and to provide geotechnical recommendations for the design of the proposed improvements.

This report is preliminary in nature. Portions of the proposed project occur on City of Calabasas, City of Los Angeles, and private property. At this time, full access for geotechnical exploration has been attained for portions of the project on City of Calabasas property. However, access to City of Los Angeles and private property has yet to be granted. In addition, a preliminary plan of improvements on City of Los Angeles property has not been completed at this time. This report is therefore not intended for submission for building permit purposes. A comprehensive report should be prepared when the remaining portions of the site are available for exploration and the development plan achieves refinement.

This investigation included excavation of three exploratory borings and four test pits, collection of representative samples, laboratory testing, engineering analysis, review of published geologic data, review of available geotechnical engineering information, and the preparation of this report. The site location is shown on the enclosed Vicinity Map, and the exploration locations are shown on the enclosed Geologic Map / Plot Plan and Project Plan. The results of the exploration and the laboratory testing are presented in the Appendix of this report.

PROPOSED PROJECT

Information concerning the proposed project was furnished by the client. The overall project consists of miscellaneous street improvements on a section of Mulholland Highway between Paul Revere Drive (to the south) and Mulholland Drive (to the north). Much of the improvements will include new sidewalks, curbs, gutters, crosswalks, medians, and landscaping. Much of these improvements will occur in the existing street and sidewalk areas. As discussed in the following paragraph, this preliminary investigation addresses the northern portion of the project. Improvements to the south of Freedom Drive are beyond the scope of this preliminary investigation.

The focus of this investigation is limited to the eastern side of Mulholland Highway for approximately 600 feet south of the intersection with Mulholland Drive. In this area, Mulholland Highway will be widened (to the east) by up to approximately 15 feet. In order to complete the widening, it will be necessary to cut into an existing hillside. A combination of retaining walls and permanent 2:1 (h:v) slopes are planned for the widening. Retaining walls up to 8 feet are planned for the project. In some areas the retaining walls are planned to have a stepped configuration. Wall loads are estimated to range between approximately 1 and 3 kips per lineal foot. The proposed 2:1 (h:v) slopes will be up to approximately 15 feet in height.

For the purpose of this preliminary investigation, it is assumed that temporary 1:1 (h:v) excavations are planned for construction of the proposed retaining walls. Other methods (including shoring) could also be utilized. Grading is expected to consist of site preparations, temporary 1:1 (h:v) excavations up to approximately 30 feet in height, placement of retaining wall backfills, construction of fill slopes, and removal and recompaction of existing unsuitable site soils.

A preliminary plan of improvements on City of Los Angeles property (the northern most portion of the project) is currently being prepared. However, it was not available at the time this preliminary investigation was completed. The proposed widening, retaining walls, and slopes on City of Calabasas property are shown on the enclosed Geologic Map / Plot Plan and Cross Sections A-A', B-B', and C-C'. Recommendations for permanent slopes are provided herein. The recommendations include the use of benching and drainage devices. The recommended slope configurations are shown on the enclosed Cross Sections A-A' and B-B' (Recommended Slope Configurations).

The feasibility of incorporating limited stormwater infiltration in the vicinity of Freedom Drive is also being investigated. At this time, it is the understanding of this firm that shallow infiltration swales are under consideration. Improvements in this vicinity are shown on the enclosed Project Plan.

Any changes in the design of the project or location of any structure, as outlined in this report, should be reviewed by this office. The recommendations contained in this report should not be considered valid until reviewed and modified or reaffirmed, in writing, subsequent to such review.

SITE CONDITIONS

In the area of the proposed widening, slopes of the existing road cut ascend to the east at gradients between approximately 1:1 (h:v) and sub-vertical. The slope heights range between approximately 3 feet (at the southern end) and 30 feet (at the northern end). Above the road cut (to the east) an approximate 15 to 20 foot wide unpaved access road exists. Existing slopes then ascend to the east of the unpaved road at gradients between approximately 1½:1 and 3:1 (h:v). These slopes range between approximately 17 feet (at the southern end) and 6 feet (at the northern end). Two single family residential structures are located at the top of this slope. At the time of exploration, the site primarily consisted of vacant undeveloped land.

In general, Mulholland Highway descends gently from the south towards the north. Drainage in the area appears to occur by sheet flow along existing contours towards Mulholland Highway. Vegetation on the site consists of low lying weeds, grasses, and some bushes. Abundant trees are located on the City of Los Angeles portion of the site. The surrounding developments consist of commercial, retail, school, and residential structures.

GEOTECHNICAL EXPLORATION

FIELD EXPLORATION

The site was explored on March 28 and 29, 2012 and also on May 3, 2012 by excavating three exploratory borings and four test pits. The borings were excavated with a truck-mounted, 24-inch diameter, bucket auger drilling machine. The borings were advanced to depths between 15 and 40 feet below the ground surface. The test pits were excavated with the aid of hand labor. Test pits TP1 and TP2 were on the order of 30-inches square and extended to depths between 5 and 15 feet. Percolation testing was performed in test pits TP3 and TP4, which were each 12 inches square and 1½ feet deep. Downhole observations were made by a geologist in each of the excavations.

Samples of the earth materials encountered in the borings and test pits were collected and transported to our office for laboratory testing. The boring and test pit locations are shown on the enclosed Geologic Map / Plot Plan and Project Plan. The geologic materials encountered are logged on Plates A-1 through A-7.

Geologic Materials

The borings and test pits encountered existing fill, natural colluvial soil, and bedrock of the Miocene Modelo Formation. Fill materials were encountered in each of the excavations. The fill consists of sandy silts to silty sands, which are grayish brown to dark brown, moist, firm to medium dense, and fine grained, with varying amounts of gravel to cobble sized bedrock fragments and minor debris. Fill thicknesses between 1 and 5 feet were encountered in the majority of the borings and test pits. The full thickness of fill was not determined in test pits TP3 and TP4, which were excavated to a depth of 1½ feet.

Native colluvial soils were encountered below the fill in most of the excavations. The native soils consist of clayey sand to sandy clay and sandy silts to silty sands, which are generally dark brown, slightly moist to moist, stiff to dense, and fine grained with some gravel sized bedrock fragments.

Bedrock of the Miocene Modelo Formation was encountered in all of the borings and test pits (except TP3 and TP4) at depths ranging between 1 and 10 feet below the ground surface. The encountered bedrock predominantly consists of massive sandstones, which are generally light brown to grayish brown in color, moist, hard, fine grained, and moderately to highly weathered. Occasional interbeds of siltstone and claystone on the order of ½ to 8 inches in thickness were encountered in the borings. Siltstone interbeds on the order of several feet in thickness were also observed in the existing road cut. Occasional gravel to cobble sized concretions were encountered in the bedrock.

The geologic materials are typical to this area of Los Angeles County. More detailed descriptions of the earth materials encountered may be obtained from the individual boring and test pit logs.

Percolation Testing

Percolation testing was conducted in test pits TP3 and TP4, which were excavated by hand to a depth of 1½ feet below the top of the existing asphalt pavements on the shoulder of Mulholland Highway. The test pits were 12 inches square. Percolation testing was then performed in the lower cubic foot of the test holes. Each of the test holes was pre-soaked for a period of 4 hours by keeping the lower 12 inches of the test holes full of potable water. After presoaking, the bottom 12 inches of the test holes were filled with water and the percolation rate of the soils was determined by measuring the drop in the water surface every 30 minutes. Readings were taken over a period of approximately 3 hours. The percolation rate recorded in TP3 was 0.75 inches per hour, and the rate in TP4 was 0.5 inches per hour.

Groundwater and Caving

Groundwater was not encountered during exploration to a maximum depth of 40 feet below the ground surface. No seepage or wet conditions were observed on the site and slopes. Phreatophytic vegetation was not observed on the site or slopes.

According to the Seismic Hazard Zone Report of the Canoga Park 7½-Minute Quadrangle (CDMG, 1997, Revised 2005), the historic high groundwater level is not indicated. This is likely due to the presence of poor water bearing bedrock material and the elevated nature of the site. A copy of the historic groundwater contour map is provided in the Appendix of this report.

Fluctuations in the level of groundwater may occur due to variations in rainfall, temperature, and other factors not evident at the time of the measurements reported herein. Fluctuations also may occur across the site. High groundwater levels can result in changed conditions.

Caving of the borings and test pits did not occur during exploration to a maximum depth of 40 feet.

LOCAL GEOLOGIC STRUCTURE

The subject site is located in the foothills on the northern flank of the Santa Monica Mountains. In the vicinity of the site, the mountains are predominantly underlain by sedimentary sandstones and siltstones of the upper Miocene Modelo Formation (Dibblee, 1992). Local bedding mapped in the vicinity of the site dips predominantly to the north, and ranges between approximately 65 and 70 degrees. A copy of the geologic may by (Dibblee, 1992) is enclosed herein.

Based on the field exploration conducted by this firm, Modelo Formation bedrock appears to underlie the majority of the site. However, varying thicknesses of fill and colluvial soils cover the bedrock material. Multiple outcrops of bedrock occur in the existing road cut area. Some isolated shallow failures and/or debris flows also occur on the road cut. They appear to be on the order of 1 to 2 feet in thickness. These areas are mapped as (Qs) on the enclosed Geologic Map / Plot Plan.

Bedding orientations recorded in borings, test pits, and on the face of the road cut indicate that bedding is dipping to the north between approximately 59 and 80 degrees. This bedding orientations are consistent with mapped regional trends.

SEISMIC EVALUATION

REGIONAL GEOLOGIC SETTING

The subject property is located in the Transverse Ranges Geomorphic Province. The Transverse Ranges are characterized by roughly east-west trending mountains and the northern and southern boundaries are formed by reverse fault scarps. The convergent deformational features of the Transverse Ranges are a result of north-south shortening due to plate tectonics. This has resulted in local folding and uplift of the mountains along with the propagation of thrust faults (including blind thrusts). The intervening valleys have been filled with sediments derived from the bordering mountains.

REGIONAL FAULTING

Based on criteria established by the California Division of Mines and Geology (CDMG) now called California Geologic Survey (CGS), faults may be categorized as active, potentially active, or inactive. Active faults are those which show evidence of surface displacement within the last 11,000 years (Holocene-age). Potentially-active faults are those that show evidence of most recent surface displacement within the last 1.6 million years (Quaternary-age). Faults showing no evidence of surface displacement within the last 1.6 million years are considered inactive for most purposes, with the exception of design of some critical structures.

The enclosed Southern California Fault Map shows the location of many mapped faults in the Southern California area. Buried thrust faults are faults without a surface expression but are a significant source of seismic activity. They are typically broadly defined based on the analysis of seismic wave recordings of hundreds of small and large earthquakes in the southern California area. Due to the buried nature of these thrust faults, their existence is usually not known until they produce an earthquake. The risk for surface rupture potential of these buried thrust faults is inferred to be low (Leighton, 1990). However, the seismic risk of these buried structures in terms of recurrence and maximum potential magnitude, is not well established. Therefore, the potential for surface rupture on these surface-verging splays at magnitudes higher than 6.0 cannot be precluded.

Two major buried thrust fault structures in the Los Angeles area are the Elysian Park fold and thrust belt and the Torrance-Wilmington fold and thrust belt. It is postulated that the Elysian Park structure was responsible for the magnitude 5.9, October 1, 1987 Whittier Narrows earthquake, and that the Torrance-Wilmington structure was responsible for the magnitude 5.0, January 19, 1989 Malibu earthquake. The magnitude 6.7, January 17, 1994 Northridge earthquake was caused by a buried thrust fault located beneath the San Fernando Valley.

SEISMIC DESIGN CONSIDERATIONS

The primary geologic hazard at the site is moderate to strong ground motion (acceleration) caused by an earthquake on any of the local or regional faults. Design of the proposed project in accordance with the provisions of the 2010 California Building Code (2010 CBC), or most current applicable building code, is intended to minimize the potential effects of ground shaking. The potential for other earthquake-induced hazards was also evaluated including surface rupture, liquefaction, dynamic settlement, inundation and landsliding.

2010 CBC Seismic Parameters

Based on Table 1613.5.2 of the 2010 CBC, the subject site is classified as Site Class D, which corresponds to a "Stiff Soil" Profile. The following table outlines the Mapped Spectral Accelerations and Site Coefficients per the 2010 CBC and may be used by the structural engineer for the seismic design and analysis of structures on the site. The values below were obtained from the USGS Ground Motion Parameter Calculator (Version 5.1.0) using the site latitude and longitude coordinates (USGS, 2011).

2010 CALIFORNIA BUILDING CODE SEISMIC PARAMETERS	
Site Class	D
Mapped Spectral Acceleration at Short Periods (S_S)	1.500g
Site Coefficient (F_a)	1.0
Maximum Considered Earthquake Spectral Response for Short Periods (S_{MS})	1.500g
Five-Percent Damped Design Spectral Response Acceleration at Short Periods (S_{DS})	1.000g
Mapped Spectral Acceleration at One-Second Period (S_1)	0.600g
Site Coefficient (F_v)	1.5
Maximum Considered Earthquake Spectral Response for One-Second Period (S_{M1})	0.900g
Five-Percent Damped Design Spectral Response Acceleration for One-Second Period (S_{D1})	0.600g

Deaggregated Seismic Source Parameters

The peak ground acceleration (PGA) and mean and modal earthquake magnitudes were obtained from the USGS Probabilistic Seismic Hazard Deaggregation program (USGS, 2008). The results are based on a 10 percent in 50 years ground motion (475 year return period). A published shear wave velocity, consistent with Modelo Formation bedrock, of 385 meters per second was utilized for Vs30 (Tinsley and Fumal, 1985). The deaggregation program indicates a PGA of 0.44g and a mean magnitude of 6.77 for the site.

OTHER SEISMIC HAZARDS

Surface Rupture

In 1972, the Alquist-Priolo Special Studies Zones Act (now known as the Alquist-Priolo Earthquake Fault Zoning Act) was passed into law. The Act defines "active" and "potentially active" faults utilizing the same aging criteria as that used by California Geological Survey (CGS). However, established state policy has been to zone only those faults which have direct evidence of movement within the last 11,000 years. It is this recency of fault movement that the CGS considers as a characteristic for faults that have a relatively high potential for ground rupture in the future.

CGS policy is to delineate a boundary from 200 to 500 feet wide on each side of the known fault trace based on the location precision, the complexity, or the regional significance of the fault. If a site lies within an Earthquake Fault Zone, a geologic fault rupture investigation must be performed that demonstrates that the proposed building site is not threatened by surface displacement from the fault before development permits may be issued.

Ground rupture is defined as surface displacement which occurs along the surface trace of the causative fault during an earthquake. Based on research of available literature and results of site reconnaissance, no known active or potentially active faults underlie the subject site. In addition, the subject site is not located within an Alquist-Priolo Earthquake Fault Zone. Based on these considerations, the potential for surface ground rupture at the subject site is considered low.

Liquefaction

Liquefaction is a phenomenon in which saturated silty to cohesionless soils below the groundwater table are subject to a temporary loss of strength due to the buildup of excess pore pressure during cyclic loading conditions such as those induced by an earthquake. Liquefaction-related effects include loss of bearing strength, amplified ground oscillations, lateral spreading, and flow failures.

Liquefaction typically occurs in areas where groundwater is less than 50 feet from the surface, and where the soils are composed of poorly consolidated, fine to medium-grained sand. In addition to the necessary soil conditions, the ground acceleration and duration of the earthquake must also be of a sufficient level to initiate liquefaction.

The Seismic Hazards Zone Map of the Canoga Park Quadrangle by the State of California (CDMG, 1998), indicates that the subject site is not located within an area designated as "Liquefiable." This determination is based on groundwater depth records, soil type and distance to a fault capable of producing a substantial earthquake. A copy of this map is provided in the Appendix.

Groundwater was not encountered during exploration to a maximum depth of 40 feet below the ground surface. Based on the Seismic Hazard Zone Report of the Canoga 7½-Minute Quadrangle (CDMG, 1997, Revised 2005), the historic high groundwater level is not indicated. This is likely due to the presence of poor water bearing bedrock material and the elevated nature of the site.

The Modelo Formation bedrock underlying the site is not considered susceptible to liquefaction. Therefore, the potential for liquefaction impacting the proposed improvements is considered remote.

Dynamic Dry Settlement

Seismically-induced settlement or compaction of dry or moist, cohesionless soils can be an effect related to earthquake ground motion. Such settlements are typically most damaging when the settlements are differential in nature across the length of structures.

Foundations for the proposed retaining walls are expected to bear in the Modelo Formation bedrock or be underlain by several feet of newly compacted engineered fill placed above the bedrock. The bedrock underlying the site and newly compacted fill would not be considered prone to significant dynamic settlements.

Tsunamis, Seiches and Flooding

Tsunamis are large ocean waves generated by sudden water displacement caused by a submarine earthquake, landslide, or volcanic eruption. Review of the County of Los Angeles Flood and Inundation Hazards Map, (Leighton, 1990), indicates the site does not lie within the mapped tsunami inundation boundaries.

Seiches are oscillations generated in enclosed bodies of water which can be caused by ground shaking associated with an earthquake. Review of the County of Los Angeles Flood and Inundation Hazards Map, (Leighton, 1990), indicates the site does not lie within the mapped inundation boundaries of up-gradient reservoirs.

Landsliding

The subject site and offsite slopes do not lie within the boundaries or downslope of any mapped landslides as indicated on the geologic map by (Dibblee, 1992). Review of the Landslide Inventory Map provided in the Seismic Hazard Zone Report (CDMG, 1997, Revised 2005) indicates there are no mapped landslides in the immediate vicinity of the site. The closest mapped landslides are located approximately ½ mile to the southeast of the site. According to the Seismic Hazards Maps by the State of California (CDMG, 1998), the subject site is not located within an "Earthquake Induced Landslide" zone. Copies of these maps are provided in the Appendix.

Evidence of deep seated landslides was not observed on the site or adjacent slopes during exploration conducted by this firm. The existing road cut does exhibit minor signs of limited surficial failures and/or debris flow that are on the order of 1 to 2 feet in thickness. It is anticipated these areas will be completely removed as part of the proposed improvements and would not be expected to affect the site. In addition, the proposed slopes will be posses shallower gradients than the existing road cut, which is nearly vertical in the affected areas.

The proposed improvements will incorporate permanent 2:1 (h:v) slopes, and construction of the proposed widening is anticipated to incorporate temporary 1:1 (h:v) slopes. Based on these considerations, site specific slope stability analyses are presented in the following section.

SLOPE STABILITY

General

The enclosed Plot Plan/Geologic Map was utilized for the preparation of Cross Sections A-A' and B-B'. The locations of the these sections were chosen because they represent the most critical sections with respect to slope height, slope gradient, and proximity of existing residential structures. Stability analyses of Cross Sections A-A' and B-B' are provided herein.

It is assumed that temporary 1:1 (h:v) cuts will be utilized during construction of the proposed improvements. These cuts are included in the analyses provided herein. The analyzed slopes are significantly steeper that the proposed slopes. Therefore, it is the opinion of this firm that the analyses are highly conservative estimate of stability.

The stability of the slopes was evaluated using the slope stability program, GSTABL7 (Version 2.002). All stability calculations were performed using saturated soil and/or bedrock shear strength properties. Saturated shear strength parameters are based on laboratory tests performed on the weakest sampled materials. Bedding orientations mapped during field exploration and those mapped by (Dibblee, 1992) generally dip to the north, which is oblique with respect to the slope face. Fracture orientations mapped during field exploration are generally oblique with respect to the slope face, dipping in to the slope face, or dipping at very shallow angles to the northwest (i.e. 2 to 5 degrees). Based on these considerations, cross bedded saturated shear values and isotropic strength parameters for bedrock material were utilized in the analysis.

Groundwater or seepage was not encountered in the exploratory borings and test pits, and the historic high water level is not indicated in the vicinity of the site. No seepage or wet conditions were observed on the site and slopes. Phreatophytic vegetation was not observed on the site or slopes. Therefore, groundwater parameters were not included in the slope stability analyses.

It is the opinion of this firm that these analyzed parameters represent the most conservative estimate of stability.

Findings

Cross Sections A-A' and B-B', in their temporary 1:1 (h:v) configuration, have been analyzed for both static and pseudo-static deep seated stability utilizing the Modified Bishop Method and the Simplified Janbu Method. In Section B-B', a boundary load of 500 pounds per square foot was applied at the top of the slope to simulate the surcharge load by the existing 2-story single family residence.

The pseudo-static analyses were performed in accordance with the screening procedures set forth in CGS Special Publication 117A (CDMG, 2008), (Blake and others, 2002), and (Stewart and others, 2003). Based on the seismic coefficients provided herein, S_{DS} divided by 2.5 corresponds to a PGA of 0.40g. The USGS Probabilistic Seismic Hazard Deaggregation program (USGS, 2008) indicates a PGA of 0.44g (10 percent in 50 years ground motion), a mean magnitude of 6.77 for the site, and a modal fault distance of 16.5 km. A seismic coefficient (Keq) of 0.23g was used for the pseudo-static stability analyses. The coefficient was derived based on a displacement value (u) of 5 cm, and the ground motion parameters determined by the seismic hazard deaggregation.

Cross Sections A-A' and B-B', in their temporary 1:1 (h:v) configuration, have been calculated to be grossly stable in the static and pseudo-static conditions. The proposed finished configuration will possess flatter slope gradients (i.e. 2:1 h:v) and will be supported by retaining walls at the toe of the slope. Therefore, the finished configurations would have higher factors of safety. A total of 4000 trial surfaces were analyzed for each of the conditions. Copies of the program printouts are attached to this report. The results are summarized in the following table.

Results Of Stability Analysis			
Cross Section	Analysis	Seismic Condition	Computed Factor of Safety
Section A-A'	Modified Bishop Method (Circular Failures)	Static	1.58
		Pseudo-Static	1.10
	Simplified Janbu Method (Block Failures)	Static	1.52
		Pseudo-Static	1.05
Section B-B'	Modified Bishop Method (Circular Failures)	Static	1.72
		Pseudo-Static	1.20
	Simplified Janbu Method (Block Failures)	Static	1.64
		Pseudo-Static	1.11

For permanent slopes, a minimum factor of safety of 1.5 for static conditions is widely accepted under industry standards. Utilizing the screening method recommended in CGS Special Publication 117A (CDMG, 2008) for pseudo-static stability, a minimum safety factor of 1.0 is required. Therefore, the analyzed slopes have been calculated to be grossly stable for deep seated static and pseudo-static stability.

Surficial Stability

The attached surficial stability calculation indicates the surface of the proposed 2:1 (h:v) fill slope has a factor of safety of 1.73. This value is considered acceptable for surficial stability. The calculations are based upon saturated shear tests of site soils remolded to 90 percent of the maximum laboratory density. A saturated thickness of 4 feet was assumed.

The method of analysis used in the surficial stability analysis is based on the "parallel seepage model" recommended by the ASCE. The assumptions upon which the "parallel seepage model" method is based are: a uniform planar slope; uniform soil density and shear strength; and uniform seepage parallel to the slope. As with any analysis method, the validity of the analysis is determined in part by how closely the assumptions model the field conditions. In the case of surficial soils overlying slopes, it is the opinion of this firm that the assumptions of the "parallel seepage model" are not completely satisfied. Therefore, mitigating measures such as the use of proper drainage devices and planting of slope faces is recommended.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the exploration, laboratory testing, and research, it is the preliminary finding of this firm that construction of the proposed improvements is considered feasible from a geotechnical engineering standpoint provided the advice and recommendations presented herein are followed and implemented during construction.

This report is preliminary in nature. Portions of the proposed project occur on City of Calabasas, City of Los Angeles, and private property. At this time, full access for geotechnical exploration has been attained for portions of the project on City of Calabasas property. However, access to City of

Los Angeles and private property has yet to be granted. In addition, a preliminary plan of improvements on City of Los Angeles property has not been completed at this time. This report is therefore not intended for submission for building permit purposes. A comprehensive report should be prepared when the remaining portions of the site are available for exploration and the development plan achieves refinement.

Between 1 and 5 feet existing fill was encountered during exploration conducted on the subject site. The existing fill materials are considered to be unsuitable for support of the proposed foundations or additional fill.

Although alternative methods (such as shoring) could be implemented, it is assumed that temporary 1:1 (h:v) excavations will be used for construction of the proposed retaining walls. Therefore, the 2:1 (h:v) backslopes above the proposed retaining walls will be fill slopes placed above the temporary 1:1 (h:v) excavation (see Cross Sections A-A' and B-B' - Recommended Slope Configurations). In order to provide vertical and lateral stability, the fill slopes should be constructed in accordance with the benching, drainage, and grading recommendations provided in the "Permanent Fill Slopes" section below.

As indicated on the enclosed cross sections, excavation to the bottom of the lowest proposed retaining walls is expected to expose Modelo Formation Bedrock. The lower retaining walls may be supported on conventional foundations bearing in the bedrock. Where stepping walls occur, the temporary 1:1 (h:v) cut would remove the bedrock below the upper retaining walls (see Cross Section A-A'). The upper retaining wall may be supported on conventional foundations. The foundations should either be deepened to bear in bedrock or bear in newly compacted fill placed above the benched backcut, as discussed in the "Permanent Fill Slopes" section below. Where foundations bear in compacted fill, the footing should be underlain by a minimum of 3 feet of newly compacted fill. Benching of the temporary backcut and construction of the proposed fill slope should consider the location of the upper retaining wall footing to ensure there is a minimum of 3 feet of compacted fill below the foundation.

Variation in the depth to bedrock materials may occur across the site. The settlement characteristics between bedrock and soil (i.e. natural colluvium or compacted fill) will vary. Therefore, any foundations that transition from bedrock to soil should be constructed with isolation joints to accommodate differential settlement. As an alternative, the foundations could be deepened to bear solely in bedrock, or the area could be over-excavated to maintain a minimum of 3 feet of newly placed fill beneath the proposed foundations. Where foundations bear in compacted fill, and there is sufficient space available, the compacted fill should extend beyond the edge of foundations for a distance equal to the depth of fill beneath the foundation.

Based on Cross Section C-C', it appears there will not be sufficient space to utilize temporary 1:1 (h:v) excavations for construction of the proposed retaining wall. Where there is not adequate space for temporary 1:1 embankments, shoring will be required to maintain stable excavations. At this time, it is anticipated modifications may or may not be made to the plan so that Soldier piles are recommended for shoring. Shoring recommendations are provided in the "Temporary Excavations" section of this report.

Review of Cross Section C-C' indicates there will not be sufficient space to utilize temporary 1:1 excavations for construction of the proposed retaining wall in this area. Where there is not adequate space for temporary 1:1 embankments, shoring will be required to maintain stable excavations. At this time, it is anticipated modifications may or may not be made to the plan in this area. Shoring recommendations and design parameters will be provided should they become necessary.

It should be noted that subsurface exploration was not performed in the vicinity of Cross Section C-C' due to property access constraints. Therefore the subsurface material conditions are not shown on the section. In addition, the existing slope gradient appears to be on the order of 1½:1. The client should be aware that the local building official may require the stability of this slope be analyzed, which would require additional subsurface exploration and testing.

PERMANENT SLOPES

Permanent Cut Slopes

Permanent cut slopes are not expected as part of the project at this time. Should they become part of the project, this office should investigate the area of the cut slopes in order to establish the geologic conditions in the area so that specific recommendations may be provided.

Permanent Fill Slopes

Permanent fill slopes should be constructed at a slope gradient of 2:1 (h:v), or flatter. All fill should be placed in accordance with the "Grading Guidelines" section below. Fill shall be placed in horizontal lifts and should be benched into bedrock or competent material.

The backfill and fill slopes should be constructed as indicated on the enclosed Cross Sections A-A' and B'-B' (Recommended Slope Configuration). Due to the presence of the retaining wall at the toe of the slope, a keyway is considered unnecessary. However, since the temporary back cut is expected to be a uniform 1:1 gradient, horizontal benches shall be cut into bedrock or competent material in order to provide both lateral and vertical stability. The minimum recommended bench width is 3 feet. The maximum vertical cut in the slope face is 3 feet.

The finished 2:1 fill slope shall have backdrains installed at the contact between the compacted fill and the benched backcut to prevent future porewater pressure buildup. The drains shall consist of 4 inch perforated pipes; placed with perforations down. The pipe should be encased with at least 1 foot of gravel and wrapped with filter fabric. The gravel should consist of ¾ to 1 inch angular crushed rock.

The first drain shall be placed no higher than 3 feet above the toe of the fill slope above the back wall. If necessary, additional backdrains shall be placed at intervals roughly equivalent to 12 feet of vertical rise in elevation or where considered necessary by the representative of this firm.

Each drain shall be placed into a trench excavated along the back of a horizontal bench at the contact between fill and the backcut. The trench bottom shall slope downward to each exit drain with a minimum gradient of 2 percent. The exit pipe shall consist of a four inch diameter non-perforated pipe. This pipe need not be encased in gravel. It shall exit at a minimum gradient of 2 percent to the face of the slope. Drainage should not be allowed to flow on to unprotected slope faces.

The minimum required compaction percentage will be required out to the finished face of fill slopes. Compaction on slopes may be achieved by over building the slope and cutting back to the compacted core or by direct compaction of the slope face with suitable equipment. Direct compaction on the slope faces shall be accomplished by back-rolling the slopes in 3 to 4 foot increments of elevation gain.

All fill slopes should be properly planted as soon as possible to minimize surficial erosion.

All permanent slopes should be observed by a representative of this firm during construction and grading to verify the geologic conditions. Modifications to the slopes may be required should unfavorable geologic conditions occur. Any keyways, benches, and drainage devices should be approved by a representative of this firm prior to placement of compacted fill.

EXPANSIVE SOILS

The site soils are in the low to moderate expansion range. The Expansion Index was found to range between 20 and 54 for representative samples of the site soils. Recommended reinforcing is provided in the "Foundation Design" and "Slabs on Grade" sections of this report.

WATER-SOLUBLE SULFATES

The portland cement portion of concrete is subject to attack when exposed to water-soluble sulfates. Usually the two most common sources of exposure are from soil and marine environments. The source of natural sulfate minerals in soils include the sulfates of calcium, magnesium, sodium, and potassium. When these minerals interact and dissolve in subsurface water, a sulfate concentration is created, which will react with the exposed concrete. Over time sulfate attack will destroy improperly proportioned concrete well before the end of its intended service life.

The water-soluble sulfate content of the onsite materials was determined to be less than 0.10 percentage by weight. Based on the 2010 CBC and American Concrete Institute - (ACI 318), Table 4.3.1, the sulfate exposure is considered to be negligible for soils with less than 0.10 percentage by weight, and Type I cement may be utilized for all concrete in contact with these soils.

GRADING GUIDELINES

The following guidelines may be used in preparation of the grading plan and job specifications for any areas where fill or recompaction may be required, such as behind retaining walls, or driveway and sidewalk areas.

Site Preparation

All vegetation, existing fill, and soft or disturbed earth materials should be removed from the areas to receive controlled fill. The excavated areas shall be observed by the geotechnical engineer prior to placing compacted fill.

It is very important that the positions of the proposed improvements are accurately located so that the limits of the graded areas are accurate and the grading operation proceeds efficiently.

Any vegetation or associated root system located within the area to be graded should be removed during grading. Any existing or abandoned utilities located within the area to be graded should be removed or relocated as appropriate. All fill materials and disturbed earth materials resulting from grading operations should be removed and properly recompacted prior to foundation excavation.

Subsequent to the indicated removals, the exposed grade shall be scarified to a depth of six inches, moistened to optimum moisture content, and recompacted in excess of the minimum required comparative density.

Compaction

Fill, consisting of soil approved by a representative of this firm shall be placed in loose lifts not more than 8 inches in thickness. The loose materials shall be compacted with suitable compaction equipment. Once a layer has been adequately compacted, the next loose lift may be placed.

Fill materials shall be moisture conditioned to within 3 percent of optimum moisture content and sufficiently blended prior to placement as controlled fill. Materials larger than 6 inches in maximum dimension shall not be used in the fill.

All fill shall be compacted to at least 90 percent of the maximum laboratory density, except for cohesionless soils having less than 15 percent finer than 0.005 millimeters, which shall be compacted to a minimum 95 percent of the maximum density, in accordance with the April 15, 1998 amendment to the Los Angeles Municipal Code. The maximum density shall be determined by the laboratory operated by Geotechnologies, Inc. using test method ASTM D 1557 or equivalent.

Field observation and testing shall be performed by a representative of the geotechnical engineer during grading to assist the contractor in obtaining the required degree of compaction and the proper moisture content. Where compaction is less than required, additional compactive effort shall be made with adjustment of the moisture content, as necessary, until a minimum of 90 or 95 percent compaction is obtained.

Hillside Grading

All fill shall be placed on a gradient of 5:1 (h:v) or flatter to provide lateral and vertical stability. Permanent fill slopes shall be constructed in accordance with the "Permanent Slopes" section above.

All slopes shall be properly keyed, benched, terraced, and drained in accordance with the recommendations of this report and the 2010 CBC.

Acceptable Materials

The excavated onsite materials are considered satisfactory for reuse in the controlled fills as long as any debris and/or organic matter is removed.

Any imported materials shall be observed and tested by the representative of the geotechnical engineer prior to use in fill areas. Imported materials should contain sufficient fines so as to be relatively impermeable and result in a stable subgrade when compacted. Any required import materials should consist of soils with an expansion index of less than 60. The water-soluble sulfate content of the import materials should be less than 0.10 percentage by weight.

Imported materials should be free from chemical or organic substances which could affect the proposed development. A competent professional should be retained in order to test imported materials and address environmental issues and organic substances which might affect the proposed development.

Shrinkage

Shrinkage results when a volume of soil removed at one density is compacted to a higher density. A shrinkage factor between approximately 5 and 15 percent should be anticipated when excavating and recompacting the existing site materials to an average comparative compaction of 92 percent.

Utility Trench Backfill

Utility trenches should be backfilled with controlled fill. The utility should be bedded with clean sands at least one foot over the crown. The remainder of the backfill may be onsite soil compacted to 90 or 95 percent of the laboratory maximum density. Utility trench backfill should be tested by representatives of this firm in accordance with ASTM D-1556 or ASTM D-6938.

Weather Related Grading Considerations

When rain is forecast all fill that has been spread and awaits compaction shall be properly compacted prior to stopping work for the day or prior to stopping due to inclement weather. These fills, once compacted, shall have the surface sloped to drain to an area where water can be removed.

Temporary drainage devices should be installed to collect and transfer excess water to the street in non-erosive drainage devices. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope.

Work may start again, after a period of rainfall, once the site has been reviewed by a representative of this office. Any soils saturated by the rain shall be removed and aerated so that the moisture content will fall within three percent of the optimum moisture content.

Surface materials previously compacted before the rain shall be scarified, brought to the proper moisture content and recompacted prior to placing additional fill, if considered necessary by a representative of this firm.

Geotechnical Observations and Testing During Grading

Geotechnical observations and testing during grading are considered to be a continuation of the geotechnical investigation. It is critical that the geotechnical aspects of the project be reviewed by this firm during the construction process. Compliance with the design concepts, specifications or recommendations during construction requires review by this firm during the course of construction. Any fill which is placed should be observed, tested, and verified if used for engineered purposes. Please advise this office at least twenty-four hours prior to any required site visit.

FOUNDATION DESIGN

The proposed retaining walls may be supported on conventional spread footings bearing in bedrock or newly compacted fill. Where foundations bear in compacted fill, the footing should be underlain by a minimum of 3 feet of newly compacted fill. Where sufficient space is available, the compacted fill should extend beyond the edge of the footing for a distance equal to the depth of fill below the footing.

Variation in the depth to bedrock materials may occur across the site. The settlement characteristics between bedrock and soil (i.e. natural colluvium or compacted fill) will vary. Therefore, any foundations that transition from bedrock to soil should be constructed with isolation joints to accommodate differential settlement. As an alternative, the foundations could be deepened to bear solely in bedrock, or the area could be over-excavated to maintain a minimum of 3 feet of newly placed fill beneath the proposed foundations.

Continuous wall foundations may be designed for a bearing value of 2,500 pounds per square foot, and should be a minimum of 12 inches in width, 18 inches in depth below the lowest adjacent grade and 18 inches into the recommended bearing material.

The bearing value increase for each additional foot of width is 200 pounds per square foot. The bearing value increase for each additional foot of embedment depth is 500 pounds per square foot. The maximum recommended bearing value is 4,000 pounds per square foot.

Foundations General

The bearing values indicated above are for the total of dead and frequently applied live loads, and may be increased by one third for short duration loading, which includes the effects of wind or seismic forces.

Since the recommended bearing value is a net value, the weight of concrete in the foundations may be taken as 50 pounds per cubic foot and the weight of the soil backfill may be neglected when determining the downward load on the foundations.

All continuous foundations should be reinforced with a minimum of four #4 steel bars. Two should be placed near the top of the foundation, and two should be placed near the bottom.

Lateral Design

Resistance to lateral loading may be provided by friction acting at the base of foundations and by passive earth pressure. An allowable coefficient of friction of 0.35 may be used with the dead load forces.

Passive earth pressure for the sides of foundations poured against undisturbed or recompacted soil may be computed as an equivalent fluid having a density of 300 pounds per cubic foot with a maximum earth pressure of 3,000 pounds per square foot. When combining passive and friction for lateral resistance, the passive component should be reduced by one third. A one-third increase in the passive value may be used for wind or seismic loads.

Slope Setback Requirements

In accordance with section 1808.7 of the 2010 CBC, the following setback requirements shall be observed. Footings situated near the top of, or within, descending slopes shall be setback from the face of the slope a minimum of one third the height of the slope, but need not exceed 40 feet.

Foundation Settlement

Settlement of the foundations is expected to occur on initial application of loading. Total and differential settlements of foundations bearing in bedrock are expected to be negligible and would not be expected to exceed 0.25 inches. The maximum settlement of foundations bearing in compacted fill is not expected to exceed 0.5 inches. Differential settlement of foundations bearing in compacted fill is not expected to exceed 0.25 inches.

Foundation Observations

It is critical that all foundation excavations are observed by a representative of this firm to verify penetration into the recommended bearing materials. The observation should be performed prior to the placement of reinforcement. Foundations should be deepened to extend into satisfactory earth materials, if necessary.

Foundation excavations should be cleaned of all loose soils prior to placing steel and concrete. Any required foundation backfill should be mechanically compacted, flooding is not permitted.

RETAINING WALL DESIGN

Cantilever Retaining Walls

Cantilever retaining walls up to 8 feet in height supporting a 2:1 (h:v) back slope may be designed utilizing a triangular distribution of pressure, and an equivalent fluid pressure of 55 pounds per square foot per foot of depth. For this equivalent fluid pressure to be valid, walls which are to be restrained at the top should be backfilled prior to the upper connection being made.

Stepping walls should be designed to resist the surcharge pressure imposed by the successive walls. Additional active pressure should be added for any additional surcharge conditions, such as sloping ground (other than provided herein), adjacent structures, or adverse geology. Foundations may be designed using the allowable bearing, friction, and passive earth pressure found in the "Foundation Design" section above.

Adverse geologic conditions were not observed with respect to the proposed retaining walls during exploration conducted by this firm. The retaining wall parameters provided below are based on this consideration. A representative of this office should observe any cuts during the course of construction that are to be supported by retaining walls. This is to verify the validity of the parameters provided herein. Adverse geologic conditions would result in higher design wall pressures.

Seismic Loads on Retaining Walls

Although not anticipated at this time, retaining walls greater than 12 feet in height shall be designed to resist the additional earth pressure caused by seismic ground shaking. This office should be notified if retaining walls of 12 feet in height (or greater) become part of the proposed development. Additional recommendations would be necessary.

Waterproofing

Moisture affecting retaining walls is one of the most common post-construction complaints. Poorly applied or omitted waterproofing can lead to efflorescence or standing water. Efflorescence is a process in which a powdery substance is produced on the surface of the concrete by the evaporation of water. The white powder usually consists of soluble salts such as gypsum, calcite, or common salt. Efflorescence is common to retaining walls and does not affect their strength or integrity.

It is recommended that retaining walls be waterproofed. Waterproofing design and inspection of its installation is not the responsibility of the geotechnical engineer. A waterproofing consultant should be retained in order to recommend a product or method which would provide protection to below grade walls.

Retaining Wall Drainage

Retaining walls should be provided with a subdrain or weepholes covered with a minimum of 12 inches of gravel, and a compacted fill blanket or other seal at the surface. Certain types of subdrain pipe are not acceptable to the various municipal agencies. It is recommended that prior to purchasing subdrainage pipe, the type and brand is cleared with the proper municipal agencies. Subdrainage pipes should outlet to an acceptable location.

Retaining Wall Backfill

Backfill should be mechanically compacted in layers not more than 8 inches thick, to at least 90 or 95 percent of the maximum density obtainable by the ASTM Designation D 1557 method of compaction. All fill shall be placed in accordance with the "Grading Guidelines" section of this report. Flooding should not be permitted. Proper compaction of the backfill will be necessary to reduce settlement of overlying improvements. Some settlement of required backfill should be anticipated, and any utilities supported therein should be designed to accommodate differential settlement.

Slough Protection

Retaining walls supporting an inclined back slope should be provided with a minimum of two feet of freeboard for slough protection. An open "V" drain or brow ditch at least 2 feet in width should be placed behind the wall so that all flowing water is directed around the wall to an acceptable disposal area.

TEMPORARY EXCAVATIONS

Excavations up to approximately 30 feet in height will be required for construction of the proposed retaining walls and fill slopes. The excavations are expected to expose fill, native soils, and bedrock which are suitable for vertical excavations up to 5 feet where not surcharged by adjacent traffic, structures, slopes, or exposed adverse geologic structure. Excavations exceeding 5 feet in height should be laid back as indicated below or shored. Surcharged excavations should be shored.

Excavations for construction of the proposed retaining walls are expected to extend into the underlying bedrock materials. At this time, the excavations are expected to be oblique with respect to the bedding planes within the rock. Any north facing excavations in bedrock, which are vertical or steeper than the angle of bedding, would be surcharged by adverse geologic structure. Therefore, these excavations shall be trimmed to the angle of bedding, or sloped back at a uniform 1:1 slope gradient, whichever is flatter. It is critical that all excavations extending into the bedrock be observed by a geologist of this firm to verify the geologic conditions.

Where sufficient space is available, temporary unsurcharged embankments could be cut at a uniform 1:1 slope gradient, or trimmed to the angle of bedding, whichever is flatter. Temporary embankments may be up to a maximum height of 30 feet. As indicated in the "Slope Stability" section of this report, stability analyses of the temporary 1:1 backcut depicted in Cross Sections A-A' and B-B' indicates factors of safety between 1.52 and 1.72 in the static condition. These factors of safety are in excess of the minimum 1.25 typically used for temporary excavations. All sloped excavations should be observed by a geologist of this firm to verify the geologic conditions. Any planned excavations that deviate from those depicted on the enclosed cross sections should be reviewed and approved by this office prior to implementation on the site.

Where sloped embankments are utilized, the tops of the slopes should be barricaded to prevent vehicles and storage loads near the top of slope within a horizontal distance equal to the depth of the excavation. If the temporary construction embankments are to be maintained during the rainy season, berms are strongly recommended along the tops of the slopes to prevent runoff water from entering the excavation and eroding the slope faces. Water should not be allowed to pond on top of the excavation nor to flow towards it.

Excavation Observations

It is critical that the bedrock and soils exposed in excavations are observed by a geologist of this office during excavation so that modifications can be made if variations in the earth material conditions occur. Many building officials require that temporary excavations should be made during the continuous observation of the geotechnical engineer. All excavations should be stabilized within 30 days of initial excavation.

EXTERIOR CONCRETE FLATWORK

Outdoor concrete flatwork should be a minimum of 4 inches in thickness an should be reinforced with a minimum of #3 steel bars on 18-inch centers each way. Exterior flatwork may be cast over undisturbed natural earth materials or properly controlled fill materials. Any earth materials loosened or over-excavated should be wasted from the site or properly compacted to 90 or 95 percent of the maximum dry density.

Design Of Slabs That Receive Moisture-Sensitive Floor Coverings

In any areas where dampness would be objectionable, it is recommended that the floor slab should be supported on a vapor retarder. A qualified waterproofing consultant should be retained in order to recommend a product or method which would provide protection for concrete slabs-on-grade. The design of the slab and the installation of the vapor retarder should comply with ASTM E 1643-98 and ASTM E 1745-97 (Reapproved 2004). Where a vapor retarder is used, a low-slump concrete should be used to minimize possible curling of the slabs. The barrier can be covered with a layer of trimmable, compactible, granular fill, where it is thought to be beneficial. See ACI 302.2R-32, Chapter 7 for information on the placement of vapor retarders and the use of a fill layer.

Concrete Crack Control

The recommendations presented in this report are intended to reduce the potential for cracking of concrete slabs-on-grade due to settlement. However even where these recommendations have been implemented, foundations, stucco walls and concrete slabs-on-grade may display some cracking due to minor soil movement and/or concrete shrinkage. The occurrence of concrete cracking may be reduced and/or controlled by limiting the slump of the concrete used, proper concrete placement and curing, and by placement of crack control joints at reasonable intervals, in particular, where re-entrant slab corners occur.

For standard crack control maximum expansion joint spacing of 10 feet should not be exceeded. Lesser spacings would provide greater crack control. Joints at curves and angle points are recommended. The crack control joints should be installed as soon as practical following concrete placement. Crack control joints should extend a minimum depth of one-fourth the slab thickness. Construction joints should be designed by a structural engineer.

Complete removal of the existing fill soils beneath outdoor flatwork such as sidewalks, is not required, however, due to the rigid nature of concrete, some cracking, a shorter design life and increased maintenance costs should be anticipated. In order to provide uniform support beneath the flatwork it is recommended that a minimum of 12 inches of the exposed subgrade beneath the flatwork be scarified and recompacted to 90 or 95 percent relative compaction.

ASPHALT AND CONCRETE PAVEMENTS

It is recommended that the existing fill materials be removed and recompacted for the support of pavements that will be subjected to vehicle traffic. The client should be aware that removal of all existing fill in the area of new paving is not required, however, pavement constructed in this manner will most likely have a shorter design life and increased maintenance costs. In any case, it is recommended that a minimum 12 inches below the proposed sub-grade be moistened as required to obtain optimum moisture content, and recompacted to 90 or 95 percent of the maximum density as determined by ASTM D 1557.

Due to a wide variation which may occur during the grading process, it is recommended that R-value tests be performed near the end of grading in order to verify the subgrade condition prior to paving. The recommended paving sections shall be considered preliminary and are subject to revision. For preliminary design purposes, an R-value of 20 was assumed for the subgrade soils. An R-value of 78 was assumed for base materials. Preliminary paving sections are provided in the following table for traffic indexes of 4, 6, and 8. Additional paving sections could be provided for alternative traffic indexes.

RECOMMENDED ASPHALT PAVING SECTIONS		
Vehicular Service - Traffic Index (TI)	Asphalt Pavement Thickness (inches)	Thickness of Base Course (inches)
Passenger Vehicles (4)	3	4
Moderate Trucks (6)	4	6
Heavy Trucks (8)	6	11

RECOMMENDED CONCRETE PAVING SECTIONS		
Vehicular Service - Traffic Index (TI)	Concrete Pavement Thickness (inches)	Thickness of Base Course (inches)
Passenger Vehicles and Moderate Trucks (4 & 6)	6	4
Heavy Trucks (8)	8	4

Exterior concrete pavement should be reinforced with a minimum of #3 steel bars on 18-inch centers each way. A subgrade modulus of 150 pounds per cubic inch may be assumed for design of concrete paving.

Base materials may consist of aggregate base or crushed miscellaneous base and should be compacted to a minimum of 95 percent of the ASTM D 1557 laboratory maximum dry density. Base materials should conform with Sections 200-2.2 or 200-2.4 of the "Standard Specifications for Public Works Construction", (Green Book), current edition.

The performance of pavement is highly dependant upon providing positive surface drainage away from the edges. Ponding of water on or adjacent to pavement can result in saturation of the subgrade materials and subsequent pavement distress. It is recommended perimeter curbs should extend a minimum of 12 inches below the bottom of the aggregate base.

SITE DRAINAGE

Proper surface drainage is critical to the future performance of the project. Saturation of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Proper site drainage should be maintained at all times.

All site drainage should be collected and transferred to an acceptable location in non-erosive drainage devices. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. Planters located adjacent to a structures should be sealed to prevent moisture intrusion into the underlying soils. Irrigation in the planter areas around the proposed development should be properly controlled. Excessive irrigation may saturate the underlying soils and adversely affect the proposed development.

STORMWATER DISPOSAL

Recently, regulatory agencies have been requiring the disposal of a certain amount of stormwater generated on a site by infiltration into the site soils. This requirement goes against prudent engineering practice. Increasing the moisture content of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. This means that any overlying structure, including buildings, pavements and concrete flatwork, could sustain damage due to saturation of the subgrade soils. Structures serviced by subterranean levels could be adversely impacted by stormwater disposal by increasing the design fluid pressures on retaining walls and causing leaks in the walls. Proper site drainage is critical to the performance of any structure in the built environment.

It is the understanding of this firm that the feasibility of shallow stormwater infiltration swales are under consideration for the project. The swales would be located in the vicinity of Freedom Drive and extend towards the north, in the direction of the proposed road widening.

For preliminary feasibility analysis, the percolation rates recorded in test pits TP3 and TP4 should be utilized with caution. The subject site is underlain by shallow bedrock of the Modelo Formation, which may be relatively impermeable to water. The percolation testing performed in test pits TP3 and TP4 extended to a depth of 1½ feet and were performed in fill materials underlying the existing roadway. The test pits did not identify the deeper soil and bedrock conditions. Therefore, there could be potential for creating a perched water condition above the surface of the bedrock. Perched waters could migrate substantial distances from the infiltration site, which could affect offsite improvements and possibly the proposed retaining walls and slopes. It is recommended further subsurface investigations and analysis be performed in this area prior to implementation of a stormwater infiltration plan.

In general, the edges of infiltration devices should maintain a minimum setback of 10 feet from the property lines and any existing or proposed foundations. The bottom of infiltration devices should be sited within natural earth materials at or below the bottom of any nearby retaining walls. Infiltration devices should be kept down-gradient from retaining structures, and should not be utilized where they may adversely affect slope stability. Infiltration systems should also be equipped with overflow devices to prevent flooding.

It is recommended that the design team (including the structural engineer, civil engineer, waterproofing consultant, plumbing engineer, and landscape architect) be consulted in regards to the design and construction of infiltration systems. Please be advised that stormwater infiltration and treatment is a relatively new requirement by the various cities and has been subject to change without notice.

DESIGN REVIEW

Engineering of the proposed project should not begin until approval of the comprehensive geotechnical report by the Building Official is obtained in writing. Significant changes in the geotechnical recommendations may result during the building department review process.

It is recommended that the geotechnical aspects of the project be reviewed by this firm during the design process. This review provides assistance to the design team by providing specific recommendations for particular cases, as well as review of the proposed construction to evaluate whether the intent of the recommendations presented herein is satisfied.

EXCAVATION CHARACTERISTICS

The exploration performed for this investigation is limited to the geotechnical excavations described. Direct exploration of the entire site would not be economically feasible. The owner, design team and contractor must understand that differing excavation and drilling conditions may be encountered based on boulders, gravel, oversize materials, groundwater and many other conditions. Fill materials, especially when they were placed without benefit of modern grading codes, regularly contain materials which could impede efficient grading and drilling. Southern California sedimentary bedrock is known to contain variable layers which reflect differences in depositional environment. Such layers may include abundant gravel, cobbles and boulders. Similarly bedrock can contain concretions. Concretions are typically lenticular and follow the bedding. They are formed by mineral deposits. Concretions can be very hard. Excavation and drilling in these areas may require full size equipment and coring capability. The contractor should be familiar with the site and the geologic materials in the vicinity.

CONSTRUCTION MONITORING

Geotechnical observations and testing during construction is considered to be a continuation of the geotechnical investigation. Therefore, it is critical that the geotechnical aspects of the project be reviewed by this firm during the construction process. Compliance with the design concepts, specifications or recommendations during construction requires review by this firm during the course of construction. All foundations should be observed by a representative of this firm prior to placing concrete or steel. Any fill which is placed should be observed, tested, and verified if used for engineered purposes. Please advise this office at least twenty-four hours prior to any required site visit.

If conditions encountered during construction appear to differ from those disclosed herein, notify this office immediately so the need for modifications may be considered in a timely manner.

It is the responsibility of the contractor to ensure that all excavations and trenches are properly sloped or shored. All temporary excavations should be cut and maintained in accordance with applicable OSHA rules and regulations.

CLOSURE AND LIMITATIONS

The purpose of this report is to aid in the design and completion of the described project. Implementation of the advice presented in this report is intended to reduce certain risks associated with construction projects. The professional opinions and geotechnical advice contained in this report are sought because of special skill in engineering and geology. Geotechnologies, Inc. has a duty to exercise the ordinary skill and competence of members of the engineering profession. Those who hire Geotechnologies, Inc. are not justified in expecting infallibility, but can expect reasonable professional care and competence.

The scope of the geotechnical services provided did not include any environmental site assessment for the presence or absence of organic substances, hazardous/toxic materials in the soil, surface water, groundwater, or atmosphere, or the presence of wetlands.

Proper compaction is necessary to reduce settlement of overlying improvements. Some settlement of compacted fill should be anticipated. Any utilities supported therein should be designed to accept differential settlement. Differential settlement should also be considered at the points of entry to the structure.

Corrosion testing was not conducted as part of this investigation. However, if corrosion sensitive improvements are planned, it is recommended that a comprehensive corrosion study should be commissioned. The study would develop recommendations to avoid premature corrosion of buried pipes and concrete structures in direct contact with the soils.

GEOTECHNICAL TESTING

Classification and Sampling

The soil is continuously logged by a representative of this firm and classified by visual examination in accordance with the Unified Soil Classification System. The field classification is verified in the laboratory, also in accordance with the Unified Soil Classification System. Laboratory classification may include visual examination, Atterberg Limit Tests and grain size distribution. The final classification is shown on the boring logs.

Samples of the earth materials encountered in the borings were collected and transported to the laboratory. Undisturbed samples of soil are obtained at frequent intervals. Samples acquired while utilizing the bucket auger drill rig were obtained by driving a thin-walled, California Modified Sampler with successive 12-inch drops of a telescoping kelly bar. The bar weights are shown on the boring logs. Samples collected in test pits are obtained by driving a thin-walled sampler by hand. In either case, the soil is retained in brass rings of 2.50 inches inside diameter and 1.00 inches in height. The central portion of the samples are stored in close fitting, waterproof containers for transportation to the laboratory. Samples are retained for 30 days after the date of the geotechnical report.

Moisture and Density Relationships

The field moisture content and dry unit weight are determined for each of the undisturbed soil samples, and the moisture content is determined for SPT samples by ASTM D 4959 or ASTM D 4643. This information is useful in providing a gross picture of the soil consistency between exploration locations and any local variations. The dry unit weight is determined in pounds per cubic foot and shown on the Boring and Test Pit Logs, A-Plates. The field moisture content is determined as a percentage of the dry unit weight.

Direct Shear Testing

Shear tests are performed by ASTM D 3080 with a strain controlled, direct shear machine manufactured by GeoMatic, Inc. The rate of deformation is approximately 0.025 inches per minute. Each sample is sheared under varying confining pressures in order to determine the Mohr-Coulomb shear strength parameters of the cohesion intercept and the angle of internal friction. Samples are generally tested in an artificially saturated condition. Depending upon the sample location and future site conditions, samples may be tested at field moisture content. The results are plotted on the "Shear Test Diagrams," B-Plates.

Consolidation Testing

Settlement predictions of the soil's behavior under load are made on the basis of the consolidation tests ASTM D 2435. The consolidation apparatus is designed to receive a single one-inch high ring.

soil. The data when plotted, represent a curvilinear relationship know as the compaction curve. The values of optimum moisture content and modified maximum dry unit weight are determined from the compaction curve.

<u>**REFERENCES**</u>

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California Department of Conservation, Division of Mines and Geology, 1998, Seismic Hazard Zones Map, Canoga Park 7½-minute Quadrangle, CDMG Seismic Hazard Zone Mapping Act of 1990.

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Stewart, J.P., Blake, T.F., and Hollingsworth, R.A., 2003, A screen analysis procedure of seismic slope stability: Earthquake Spectra, v. 19, n. 3, p. 697-712.

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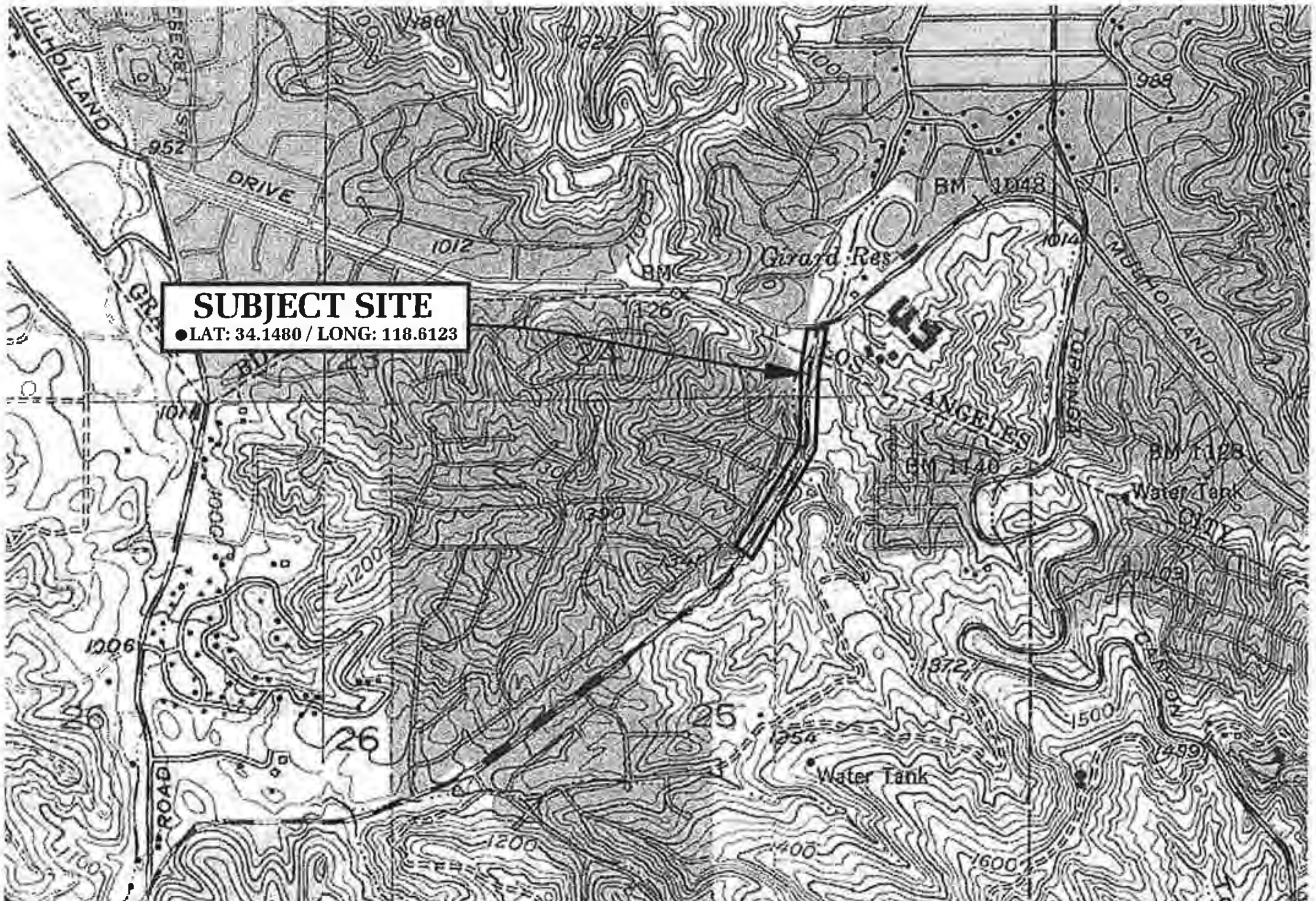
United States Geological Survey, 2011, U.S.G.S. Ground Motion Parameter Calculator (Version 5.1.0). http://earthquake.usgs.gov/hazards/designmaps/



0 1/2 1 MILE
1000 0 1000 2000 3000 4000 FEET
Printed from TOPO! ©1997 Wildflower Productions (www.topo.com)

N

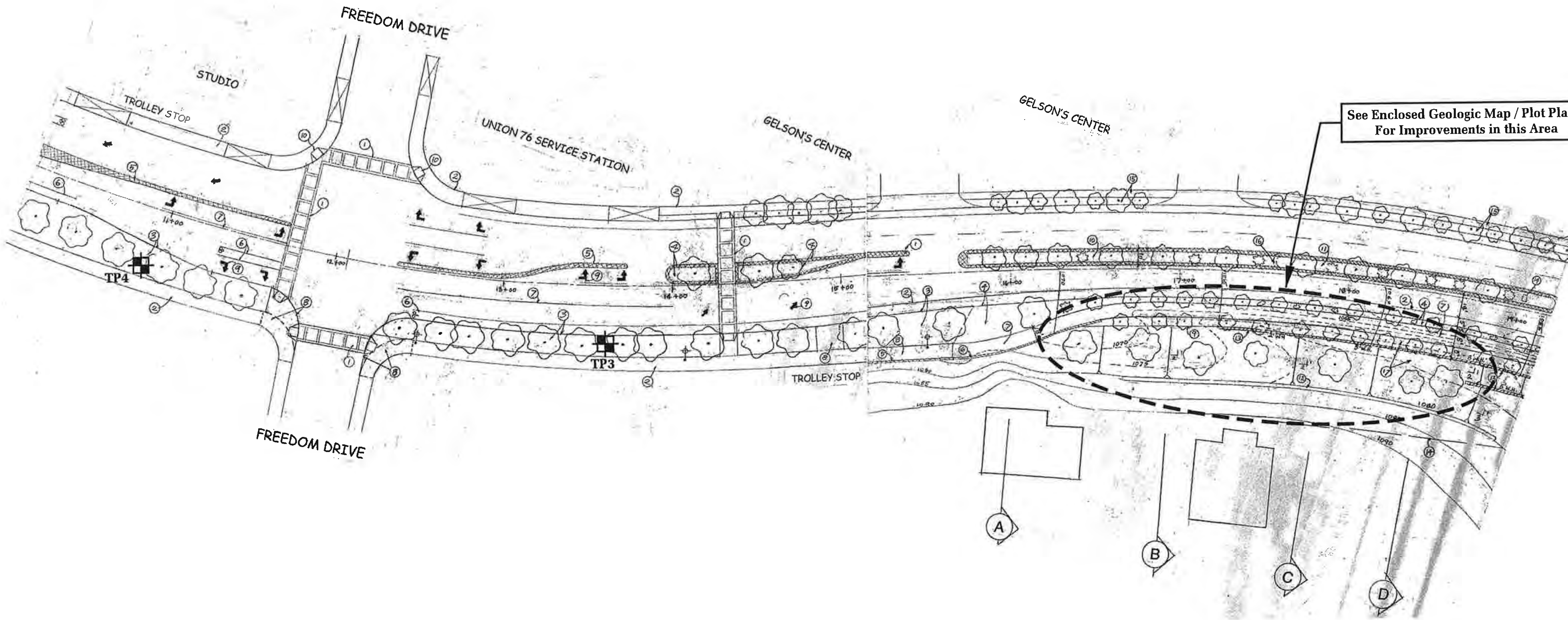
REFERENCE: U.S.G.S. TOPOGRAPHIC MAPS, 7.5 MINUTE SERIES,
CANOGA PARK, CA QUADRANGLE

VICINITY MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

KIMLEY-HORN AND ASSOCIATES, INC.

FILE NO. 20287



LEGEND

TP4 Location & Number of Test Pit

SCALE IN FEET

0 20 40 60 120

Geotechnologies, Inc.
Consulting Geotechnical Engineers

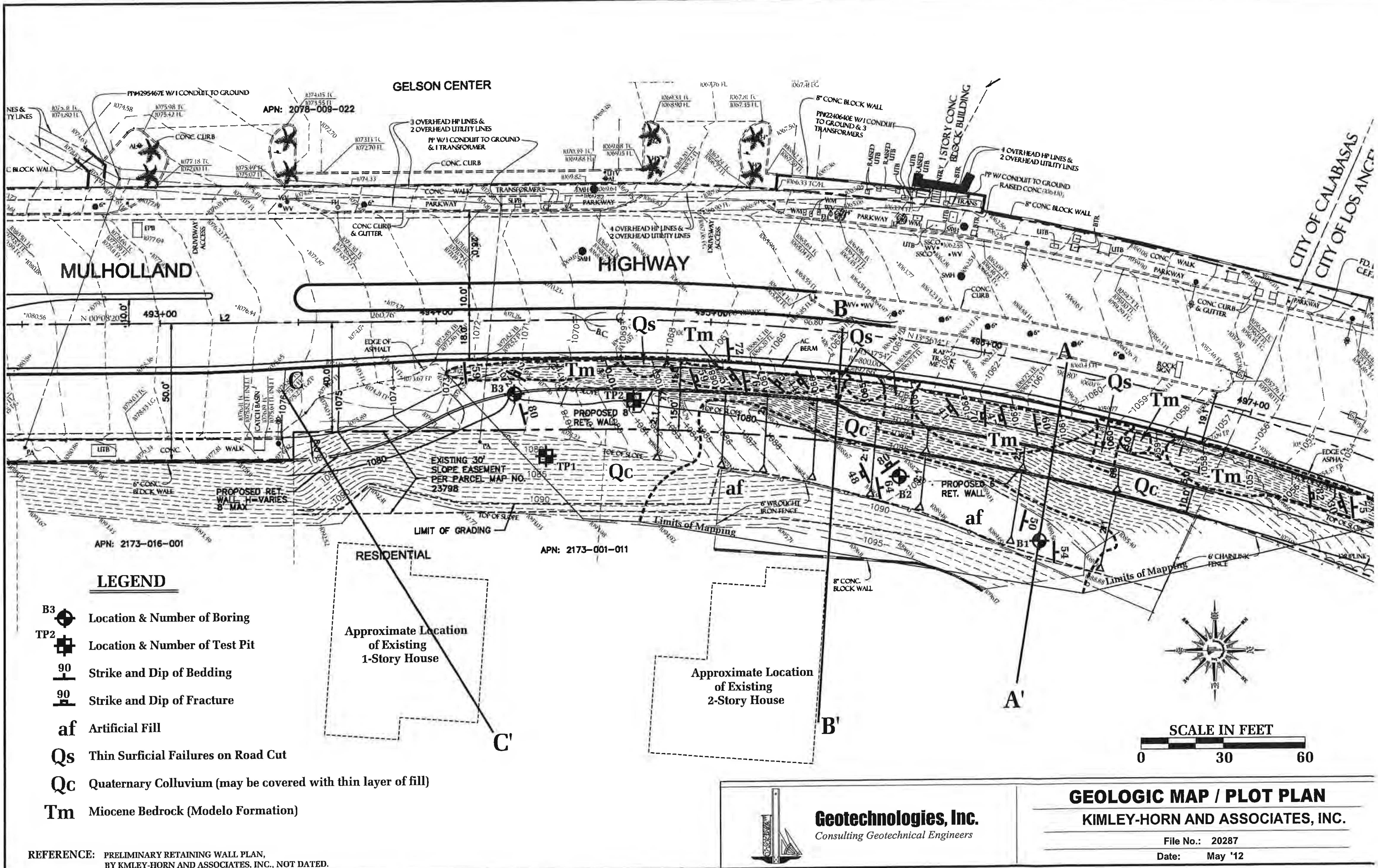
PROJECT PLAN

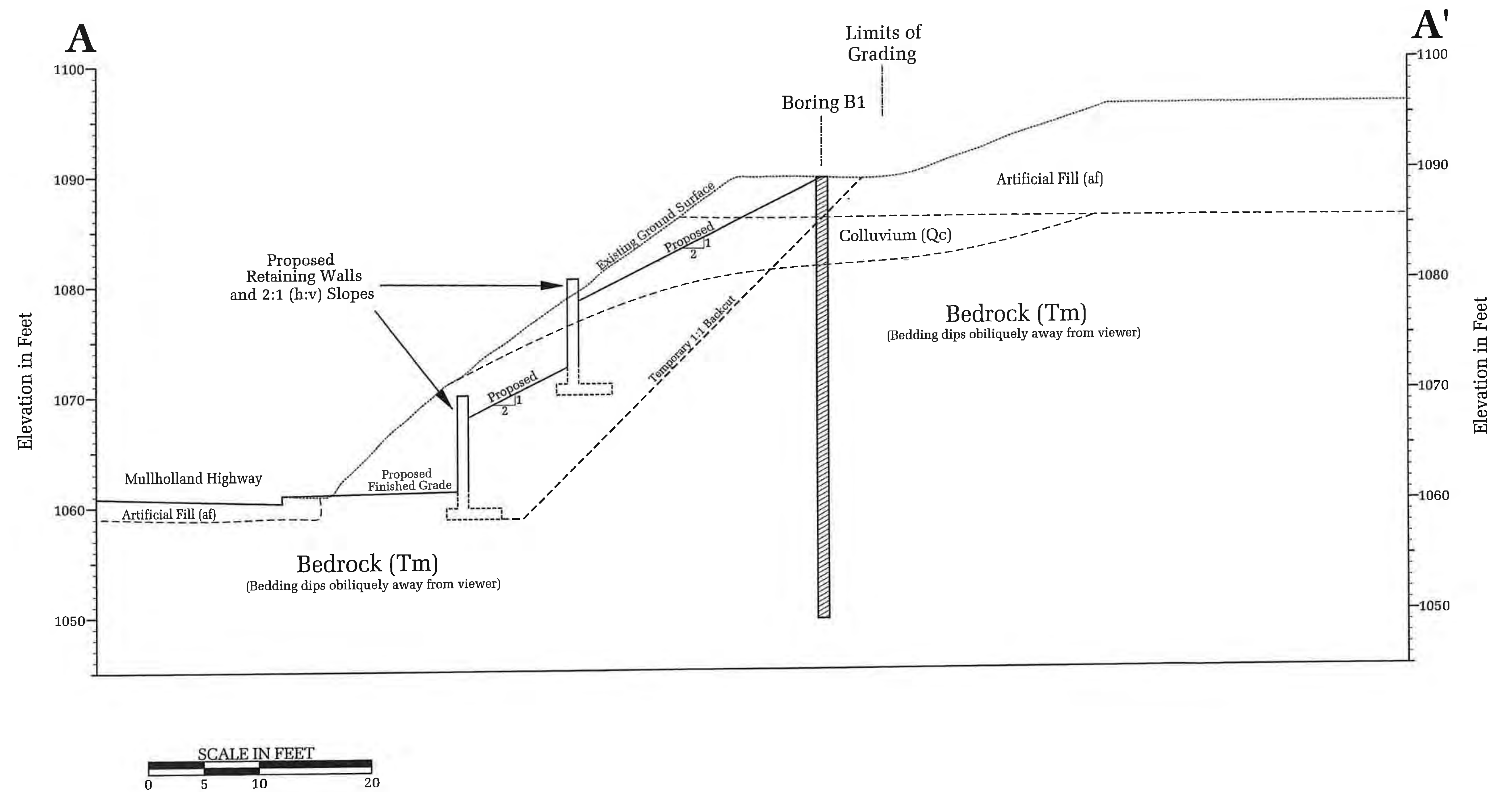
KIMLEY-HORN AND ASSOCIATES, INC.

File No.: 20287

Date: May '12

REFERENCE: MULHOLLAND HIGHWAY IMPROVEMENTS PLANS, SHEETS 3 AND 4 NOT DATED.


GELSON CENTER
APN: 2078-009-022
MULHOLLAND
HIGHWAY
CITY OF CALABASAS
CITY OF LOS ANGE
1 STORY CONC BLOCK BUILDING
EXISTING 30' SLOPE EASEMENT PER PARCEL MAP NO. 23798
PROPOSED RET. WALL H=VARIES 8' MAX.
PROPOSED 8' RET. WALL
PROPOSED 6' RET. WALL
LIMIT OF GRADING
Limits of Mapping
APN: 2173-016-001
APN: 2173-001-011
RESIDENTIAL
Approximate Location of Existing 1-Story House
Approximate Location of Existing 2-Story House
A
A'
B
B'
C
C'
B1
B2
B3
TP1
TP2
Qs
Tm
Qc
af
LEGEND
B3 Location & Number of Boring
TP2 Location & Number of Test Pit
90 Strike and Dip of Bedding
90 Strike and Dip of Fracture
af Artificial Fill
Qs Thin Surficial Failures on Road Cut
Qc Quaternary Colluvium (may be covered with thin layer of fill)
Tm Miocene Bedrock (Modelo Formation)
REFERENCE: PRELIMINARY RETAINING WALL PLAN, BY KIMLEY-HORN AND ASSOCIATES, INC., NOT DATED.
SCALE IN FEET
0 30 60
Geotechnologies, Inc.
Consulting Geotechnical Engineers
GEOLOGIC MAP / PLOT PLAN
KIMLEY-HORN AND ASSOCIATES, INC.
File No.: 20287
Date: May '12

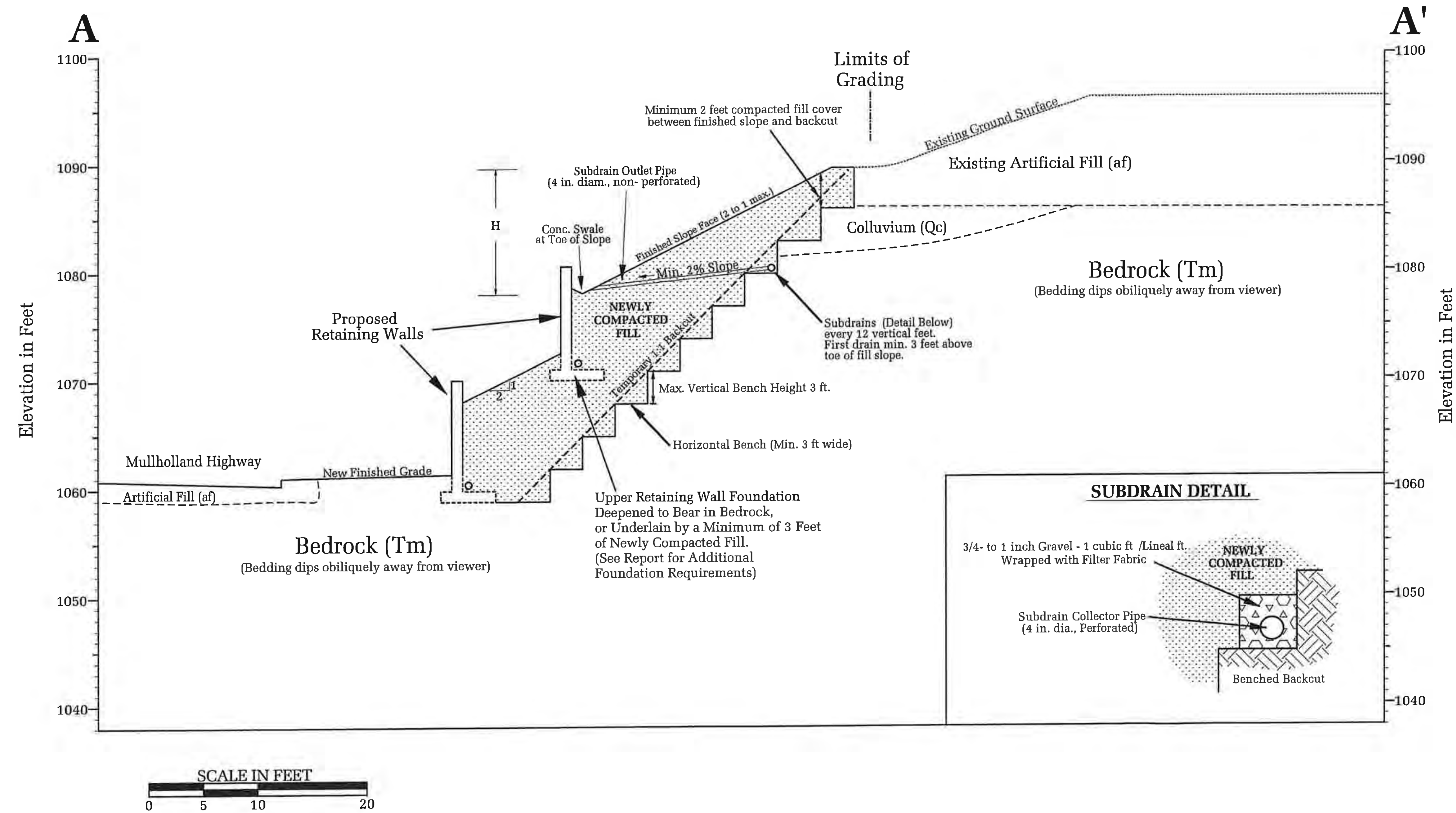


Geotechnologies, Inc.
Consulting Geotechnical Engineers

CROSS SECTION A-A'

KIMLEY-HORN AND ASSOCIATES, INC.

File No.: 20287

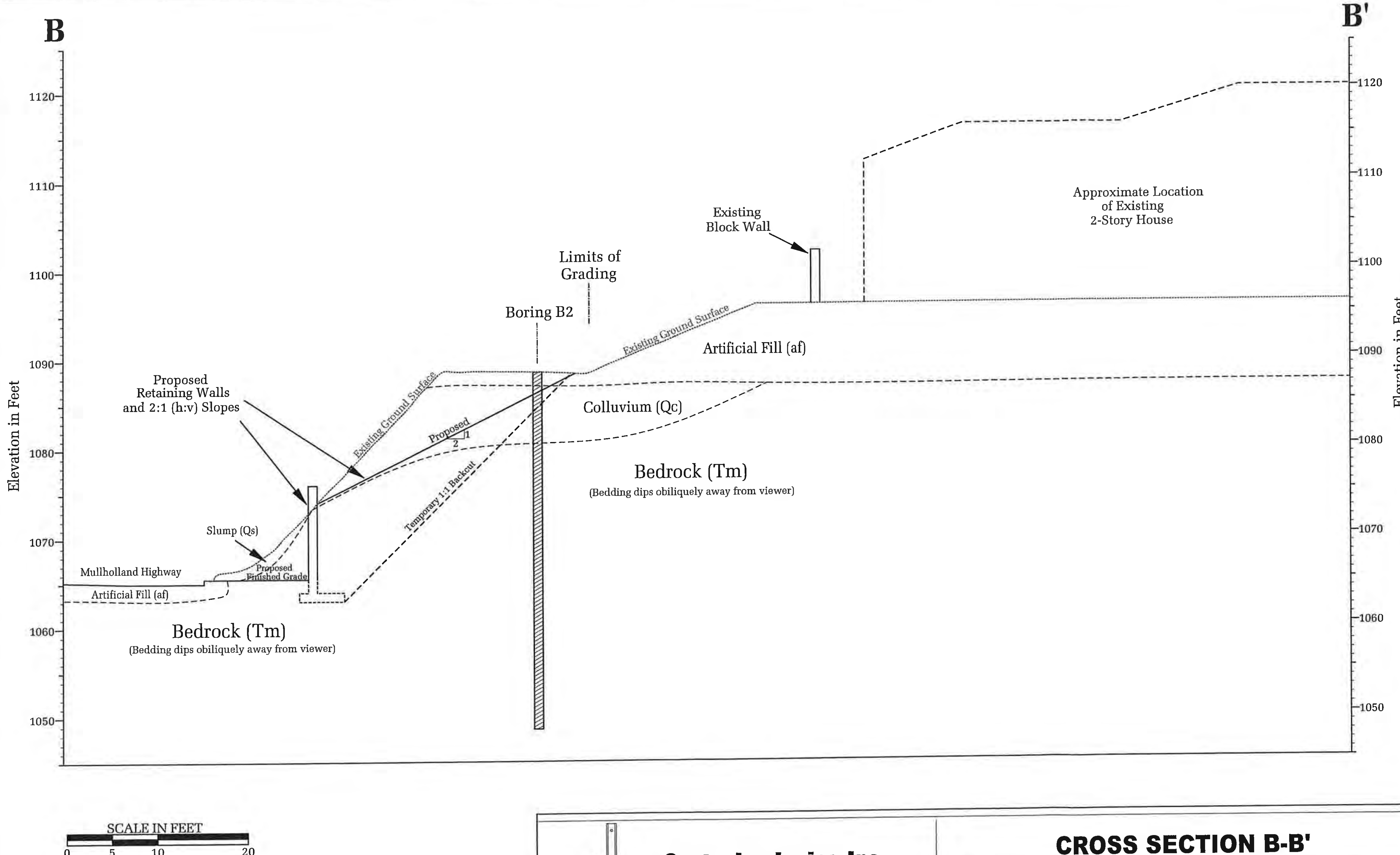


Geotechnologies, Inc.
Consulting Geotechnical Engineers

CROSS SECTION A-A'
(RECOMMENDED SLOPE CONFIGURATION)

KIMLEY-HORN AND ASSOCIATES, INC.

File No.: 20287



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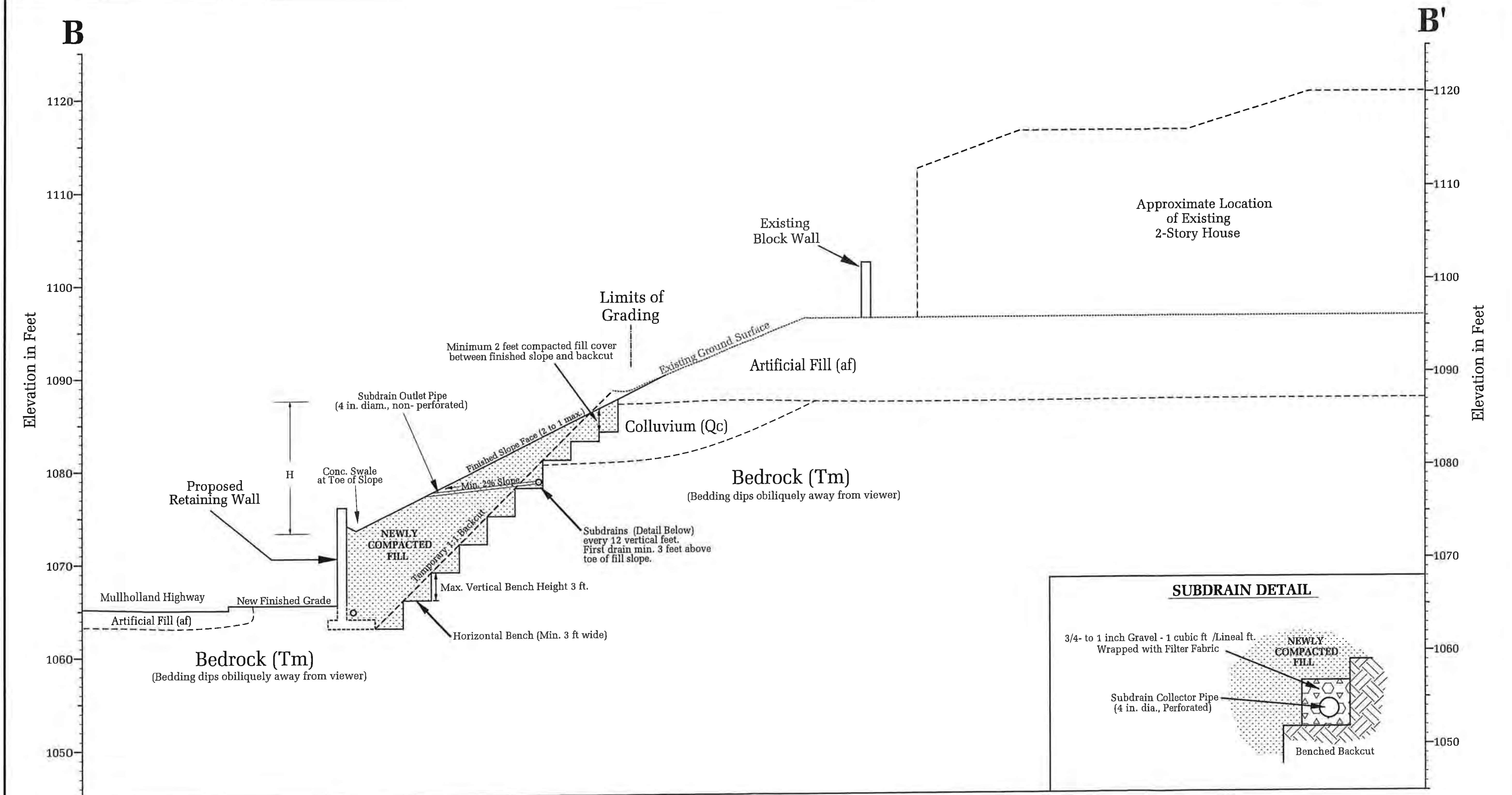
CROSS SECTION B-B'

KIMLEY-HORN AND ASSOCIATES, INC.

File No.: 20287



SCALE IN FEET

0 5 10 20

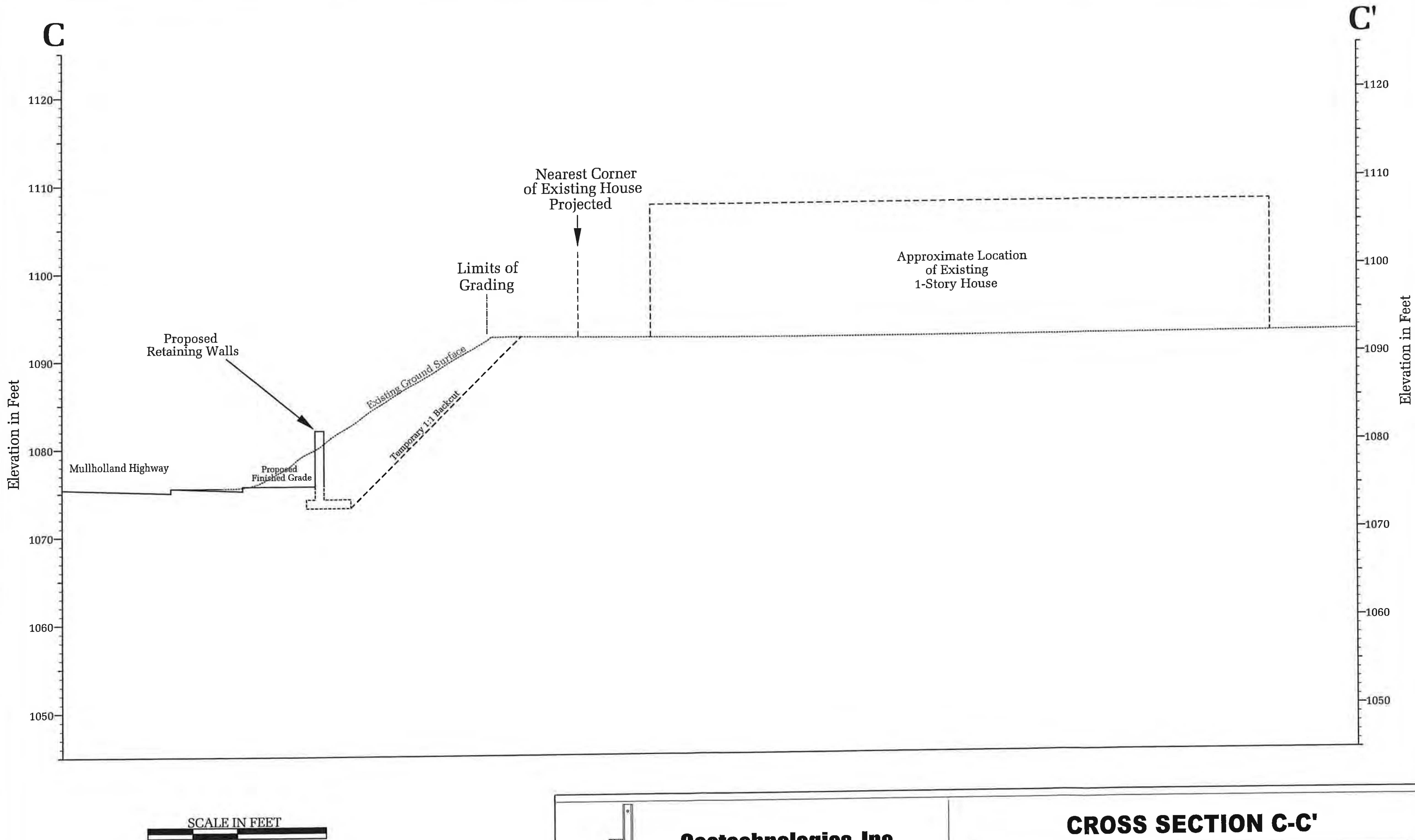
Geotechnologies, Inc.

Consulting Geotechnical Engineers

CROSS SECTION B-B'
(RECOMMENDED SLOPE CONFIGURATION)

KIMLEY-HORN AND ASSOCIATES, INC.

File No.: 20287



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Consulting Geotechnical Engineers

CROSS SECTION C-C'

KIMLEY-HORN AND ASSOCIATES, INC.

File No.: 20287

DEPTH TO GROUNDWATER IN FEET

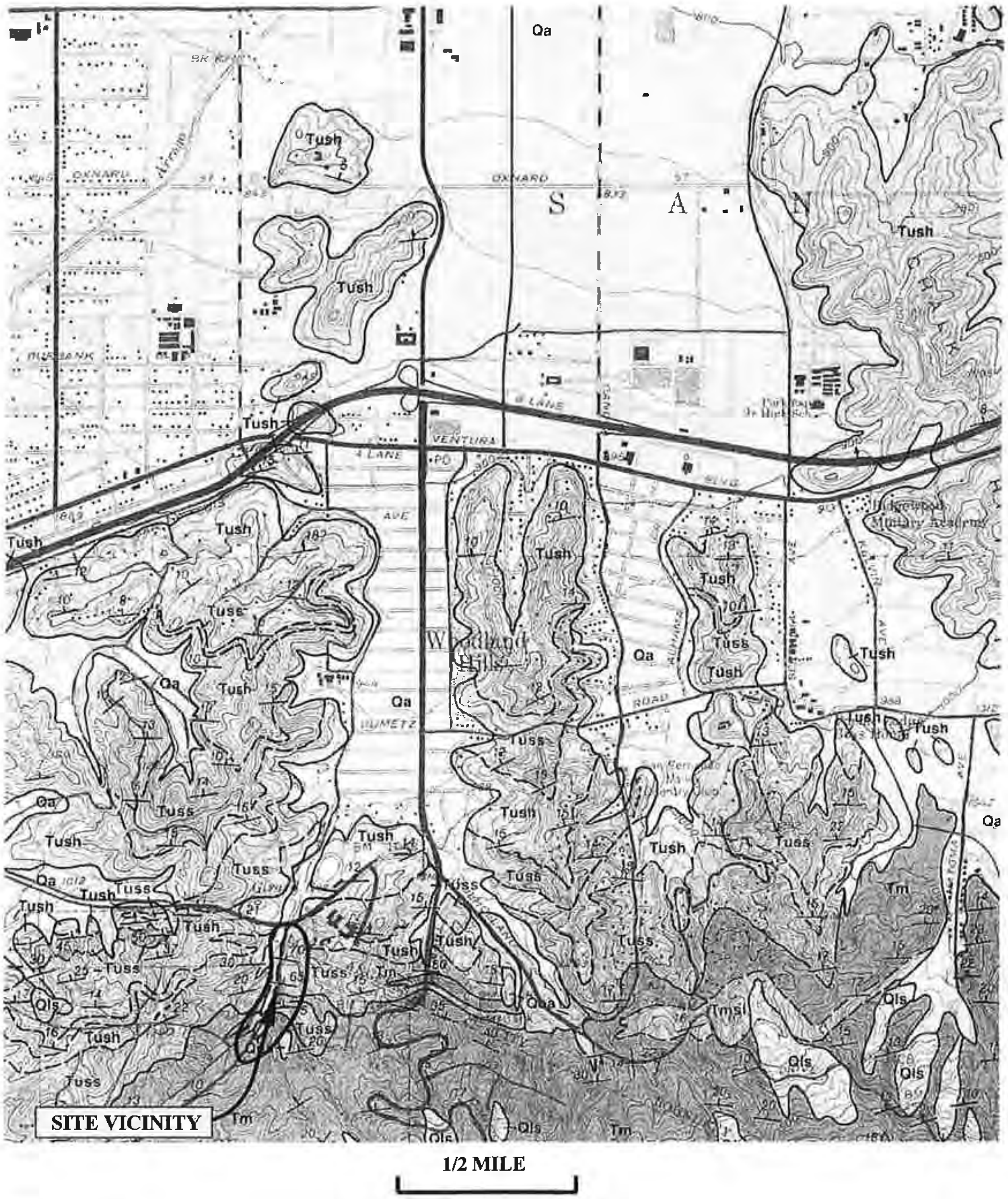
REFERENCE: CDMG, SEISMIC HAZARD ZONE REPORT, 07
CANOGA PARK 7.5 - MINUTE QUADRANGLE, LOS ANGELES COUNTY, CALIFORNIA (1997, REVISED 2005)

HISTORICALLY HIGHEST GROUNDWATER LEVELS

Geotechnologies, Inc.
Consulting Geotechnical Engineers

KIMLEY-HORN AND ASSOCIATES, INC.

FILE NO. 20287



LEGEND

Qa - alluviul gravel, sand and clay of valley areas
Qoa - older alluvium of gray to light brown pebble-gravel, sand and silt-clay derived from Santa Monica
Tuss - light gray sandstone, soft friable, fine to medium grained

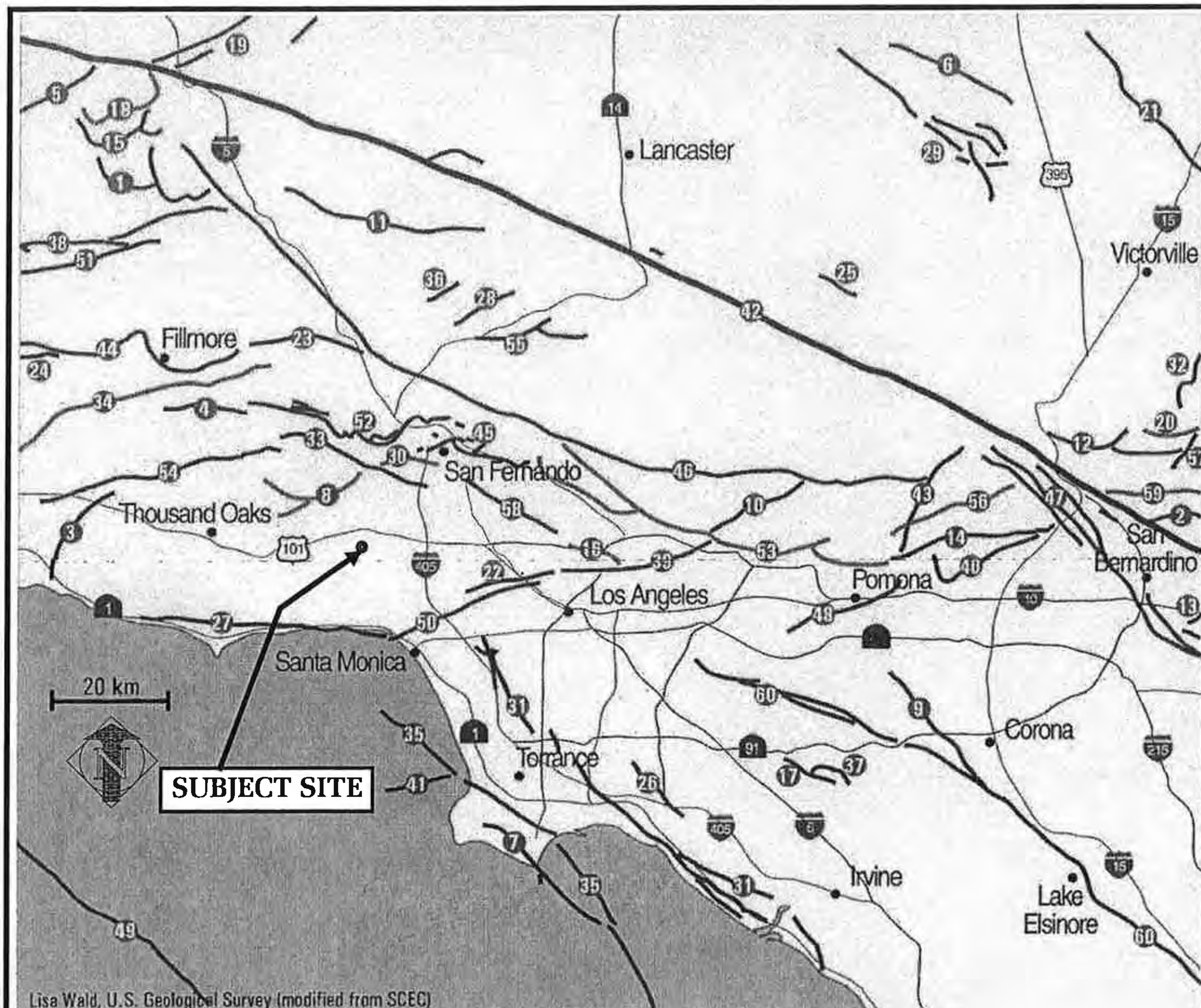
REFERENCE: Dibblee, T.W., Jr. 1992, Geologic Map of the Topanga and Canoga Park (South 1/2) Quadrangels , Map DF-35

LOCAL GEOLOGIC MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

KIMLEY-HORN AND ASSOCIATES, INC.

FILE NO. 20287



1 Alamo thrust
2 Arrowhead fault
3 Bailey fault
4 Big Mountain fault
5 Big Pine fault
6 Blake Ranch fault
7 Cabrillo fault
8 Chatsworth fault
9 Chino fault
10 Clamshell-Sawpit fault
11 Clearwater fault
12 Cleghorn fault
13 Crafton Hills fault zone
14 Cucamonga fault zone
15 Dry Creek fault
16 Eagle Rock fault
17 El Modeno fault
18 Frazier Mountain thrust
19 Garlock fault zone
20 Grass Valley fault
21 Helendale fault
22 Hollywood fault
23 Holser fault
24 Lion Canyon fault
25 Llano fault
26 Los Alamitos fault
27 Malibu Coast fault
28 Mint Canyon fault
29 Mirage Valley fault zone
30 Mission Hills fault
31 Newport Inglewood fault zone
32 North Frontal fault zone
33 Northridge Hills fault
34 Oak Ridge fault
35 Palos Verdes fault zone
36 Pelona fault
37 Peralta Hills fault
38 Pine Mountain fault
39 Raymond fault
40 Red Hill (Etiwanda Ave) fault
41 Redondo Canyon fault
42 San Andreas Fault
43 San Antonio fault
44 San Cayetano fault
45 San Fernando fault zone
46 San Gabriel fault zone
47 San Jacinto fault
48 San Jose fault
49 Santa Cruz-Santa Catalina Ridge f.z.
50 Santa Monica fault
51 Santa Ynez fault
52 Santa Susana fault zone
53 Sierra Madre fault zone
54 Simi fault
55 Soledad Canyon fault
56 Stoddard Canyon fault
57 Tunnel Ridge fault
58 Verdugo fault
59 Waterman Canyon fault
60 Whittier fault

REFERENCE: http://pasadena.wr.usgs.gov/info/images/LA%20Faults.pdf

SOUTHERN CALIFORNIA FAULT MAP

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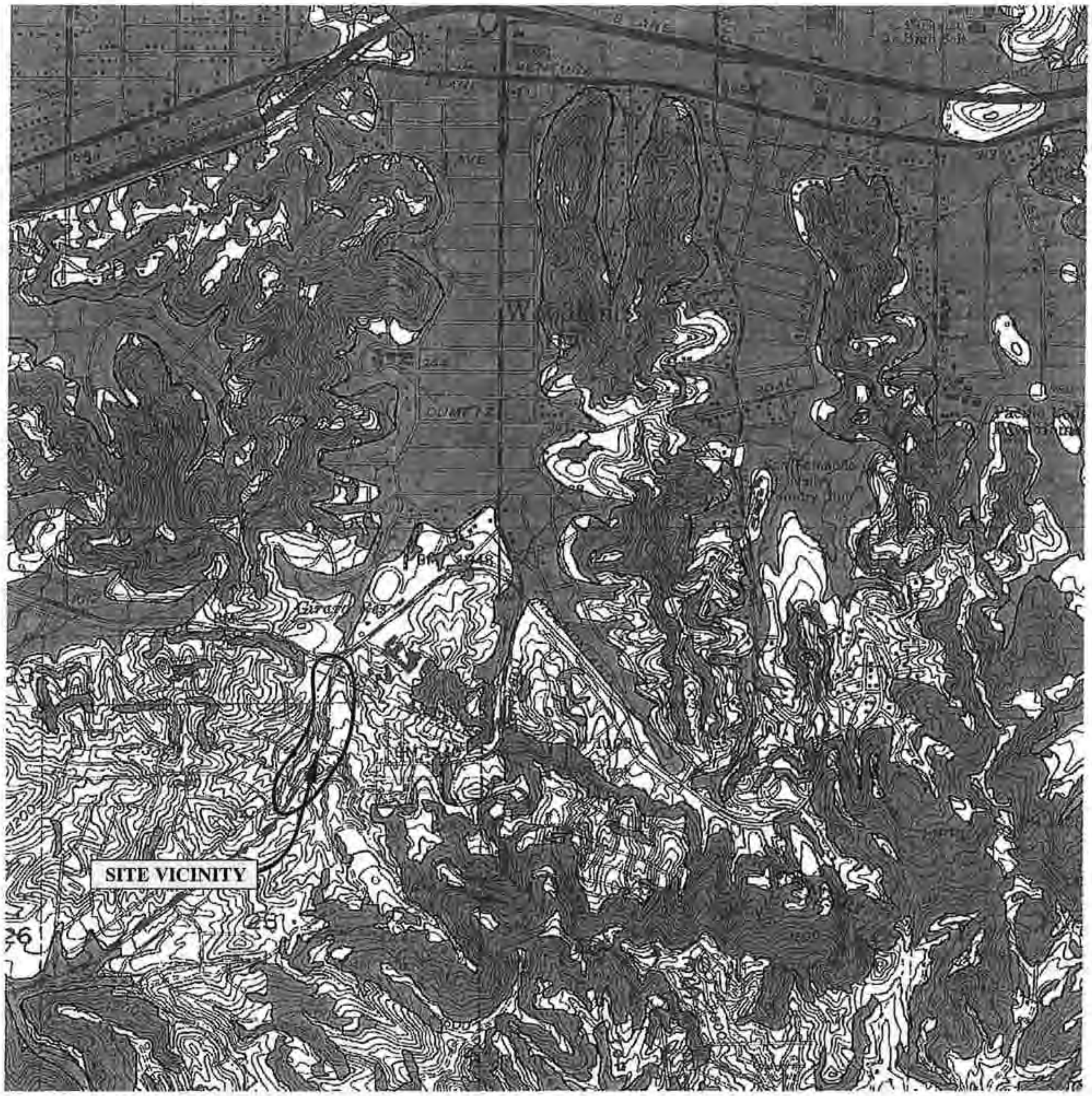
Consulting Geotechnical Engineers

KIMLEY-HORN AND ASSOCIATES, INC.

FILE No. 20287



LIQUEFACTION AREA

EARTHQUAKE INDUCED LANDSLIDES

REFERENCE: SEISMIC HAZARD ZONES, CANOGA PARK QUADRANGLE, OFFICIAL MAP (CDMG, 1998)

SEISMIC HAZARD ZONE MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

KIMLEY-HORN AND ASSOCIATES, INC.

FILE NO. 20287

Areas of Significant Grading

Landslide

REFERENCE: CDMG, SEISMIC HAZARD ZONE REPORT, 07
CANOGA PARK 7.5 - MINUTE QUADRANGLE, LOS ANGELES COUNTY, CALIFORNIA (1997, REVISED 2005)

LANDSLIDE INVENTORY MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

KIMLEY-HORN AND ASSOCIATES, INC.

FILE NO. 20287

BORING LOG NUMBER 1

Kimley-Horn & Associates | Date: 03/28/12 | Elevation: 1089.5'*

File No. 20287 | Method: 24-inch diameter Bucket Auger

km | *Reference: Survey by Iacobellis and Associates, Inc., Not dated

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Grass and Weeds
				0 --		FILL: Sandy Silt to Silty Sand, grayish brown, moist, firm to medium dense, fine grained, some gravel to cobble sized bedrock fragments, some rootlets, minor debris
				1 --		
2	Hand Sample	8.5	102.2	2 --		
				3 --		
4	Hand Sample	11.1	99.2	4 --		
				5 --		
6	Hand Sample	8.6	90.4	6 --	SC/CL	COLLUVIUM: Clayey Sand to Sandy Clay, dark brown, slightly moist, dense to stiff, fine grained, some gravel sized bedrock fragments, some roots
				7 --		
8	Hand Sample	7.7	110.9	8 --		BEDROCK (MODELO FORMATION): Sandstone, light brown to grayish brown, moist, hard, fine grained, massive, highly weathered, contact with colluvium appears gradual and sub-horizontal
				9 --		
10	8/12"	8.0	105.7	10 --		
				11 --		occasional concretions gravel to cobble sized
				12 --		
				13 --		
				14 --		
15	10/12"	16.7	109.9	15 --		
				16 --		
				17 --		
				18 --		
				19 --		
20	10/12"	7.4	116.4	20 --		
				21 --		
				22 --		
				23 --		slightly harder, moderately weathered
				24 --		
25	30/10"	9.8	115.8	25 --		approximate 2-inch thick light gray siltstone interbed Bedding [N75W, 50N]

BORING LOG NUMBER 1

Kimley-Horn & Associates

File No. 20287

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				26		
				27		
				28		
				29		
30	30/10"	11.0	108.9	30		
				31		- - - - - - - - - - - -
				32		approximate ½-inch thick gray siltstone interbed Bedding [E-W, 54N]
				33		
				34		
35	30/9"	11.2	119.1	35		
				36		
				37		
				38		
				39		
40	30/10"	17.6	111.4	40		
				41		Total depth: 40 feet No Water No Caving Fill to 5 feet
				42		
				43		
				44		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual
				45		Used 24-inch diameter Bucket Auger 2400 lbs. Kelly Bar 0-24 feet 550 lbs. Kelly Bar 25-40 feet Modified California Sampler used unless otherwise noted
				46		
				47		
				48		
				49		
				50		

BORING LOG NUMBER 2

Kimley-Horn & Associates **Date: 03/28/12** **Elevation: 1088.9'***

File No. 20287 **Method: 24-inch diameter Bucket Auger**

km *Reference: Survey by Iacobellis and Associates, Inc., Not dated

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Grass and Weeds
				0		FILL: Silty Sand, grayish brown mottled with light gray and orange brown bedrock fragments, moist, dense, fine grained
				1		
2	7/12"	16.6	112.2	2		
				3	CL/SC	COLLUVIUM: Sandy Clay to Clayey Sand, dark brown, moist, stiff, some minor rootlets, some caliche, some gravel sized bedrock fragments
				4		
5	7/12"	12.7	110.3	5		
					SM/ML	Silty Sand to Sandy Silt, dark brown, moist, dense to stiff, fine grained, abundant caliche
				6		
				7		
7.5	9/12"	11.8	108.8			
				8		
						BEDROCK (MODELO FORMATION): Sandstone, light brown to grayish brown, moist, hard, fine grained, moderately weathered, friable, contact with colluvium is sub-horizontal, occasional small silicified lenses, massive
				9		
10	9/12"	17.2	95.1	10		
				11		gray and orange brown
				12		
				13		
				14		
15	7/12"	10.9	103.9	15		
				16		
				17		
				18		
				19		
20	6/12"	7.2	105.0	20		
				21		
				22		
				23		
				24		slightly harder, less weathered
25	32/8"	10.0	119.1	25		

GEOTECHNOLOGIES, INC.

BORING LOG NUMBER 2

Kimley-Horn & Associates

File No. 20287

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				26		
				27		
				28		
				29		- - - - - - - - - - - - - -
						Claystone interbed, dark brown, approximately 4-inches thick
30	30/10"	9.2	117.9	30		Bedding [N80E, 64N]
				31		- - - - - - - - - - - - - -
						approximate 8-inch thick silicified layer
				32		Bedding [N79E, 64N]
				33		
				34		
				35		- - - - - - - - - - - - - -
						Joints [N35W, 80S], [N64E, 48S]
				36		
				37		
				38		
				39		
40	30/4"	10.4	113.3	40		
						Total depth: 40 feet
				41		No Water
						No Caving
				42		Fill to 2½ feet
				43		
						NOTE: The stratification lines represent the approximate
				44		boundary between earth types; the transition may be gradual
				45		Used 24-inch diameter Bucket Auger
						2400 lbs. Kelly Bar 0-24 feet
				46		550 lbs. Kelly Bar 25-40 feet
						Modified California Sampler used unless otherwise noted
				47		
				48		
				49		
				50		

BORING LOG NUMBER 3

Kimley-Horn & Associates | **Date: 03/29/12** | **Elevation: 1076.8'***

File No. 20287 | **Method: 24-inch diameter Bucket Auger**

km

*Reference: Survey by Iacobellis and Associates, Inc., Not dated

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
						Surface Conditions: Grass and Weeds
				0 --		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
				-		
				1 --		
				-		BEDROCK (MODELO FORMATION): Sandstone, light brown to
				2 --		grayish brown, moist, hard, fine grained, moderately weathered,
2.5	10/4"	8.3	99.3	-		friable, massive
				3 --		
				-		
				4 --		
				-		
				5 --		– – – – – – – – – – – –
				-		less weathered, slightly harder
				6 --		
				-		
				7 --		
				-		
				8 --		
8.5	15/3.2"	7.2	116.2	-		
				9 --		
				-		
				10 --		– – – – – – – – – – – –
				-		some thinly interbedded siltstone, dark brown to dark gray, moist,
				11 --		hard
				-		Bedding [N75E, 80N]
				12 --		
				-		
13	15/6"	14.6	108.4	13 --		
				-		
				14 --		
				-		
15	15/6"	11.1	115.9	15 --		
				-		Total depth: 15 feet
				16 --		No Water
				-		No Caving
				17 --		Fill to 1 foot
				-		
				18 --		
				-		NOTE: The stratification lines represent the approximate
				19 --		boundary between earth types; the transition may be gradual
				-		
				20 --		Used 24-inch diameter Bucket Auger
				-		2400 lbs. Kelly Bar 0-24 feet
				21 --		550 lbs. Kelly Bar 25-40 feet
				-		Modified California Sampler used unless otherwise noted
				22 --		
				-		
				23 --		
				-		
				24 --		
				-		
				25 --		
				-		

LOG OF TEST PIT NUMBER 1

Kimley-Horn & Associates | **Drilling Date: 03/28/12** | **Elevation: 1083.0'***

File No. 20287 | **Method: Hand Dug Test Pit**

km

*Reference: Survey by Iacobellis and Associates, Inc., Not dated

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground
			0		FILL: Silty Sand to Sandy Silt, dark brown, moist, medium dense, fine grained, stiff
1	11.2	90.6	1		
			2		
			3	SM	COLLUVIUM: Silty Sand, light brown and grayish brown, moist, medium dense, fine grained
3.5	8.5	108.7			
			4		BEDROCK (MODELO FORMATION): Sandstone, light brown to grayish brown, moist, hard, fine grained, massive, moderately weathered
			5		
			6		Total depth: 5 feet No Water No Caving Fill to 2½ feet
			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		
			15		
			16		
			17		
			18		
			19		
			20		
			21		
			22		
			23		
			24		
			25		

LOG OF TEST PIT NUMBER 2

Kimley-Horn & Associates **Drilling Date: 03/29/12** **Elevation: 1082.0'***

File No. 20287 **Method: Hand Dug Test Pit**

km

*Reference: Survey by Iacobellis and Associates, Inc., Not dated

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground
			0 --		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
			-		
			1 --		
			-		
2	19.1	102.5	2 --		
			-		
			3 --		
			-		
4	11.8	99.7	4 --		
			-	SM	COLLUVIUM: Silty Sand, dark brown, moist, medium dense, fine grained
			5 --		- - - - - - - - - - - - - -
			-		abundant rock fragments
6	19.3	92.4	6 --		
			-		
			7 --		
			-		
8	9.0	105.9	8 --		
			-		
			9 --		
			-		
10	14.6	105.5	10 --		
			-		BEDROCK (MODELO FORMATION): Sandstone, light brown to grayish
			11 --		brown, moist, hard, fine grained, massive, moderately weathered
			-		
12	13.1	104.6	12 --		
			-		
			13 --		
			-		
14	2.8	110.9	14 --		
			-		
			15 --		
			-		Total depth: 15 feet
			16 --		No Water
			-		No Caving
			17 --		Fill to 4 feet
			-		
			18 --		
			-		
			19 --		
			-		
			20 --		
			-		
			21 --		
			-		
			22 --		
			-		
			23 --		
			-		
			24 --		
			-		
			25 --		
			-		

LOG OF TEST PIT NUMBER 3

Kimley-Horn & Associates | Drilling Date: 05/03/12 | Elevation: Not Available

File No. 20287 | Method: Hand Dug Test Pit

km

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt
			0 --		4-inch Asphalt, No Base
			-		
			1 --		FILL: Sandy Silt to Silty Sand, dark and medium brown, moist, medium dense to stiff, fine grained
			-		
			2 --		
			-		Total depth: 1½ feet No Water Fill to 1½ feet
			3 --		
			-		
			4 --		
			-		
			5 --		
			-		
			6 --		
			-		
			7 --		
			-		
			8 --		
			-		
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			10 --		
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			11 --		
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			12 --		
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			13 --		
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			14 --		
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			15 --		
			-		
			16 --		
			-		
			17 --		
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			19 --		
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			-		
			21 --		
			-		
			22 --		
			-		
			23 --		
			-		
			24 --		
			-		
			25 --		
			-		

LOG OF TEST PIT NUMBER 4

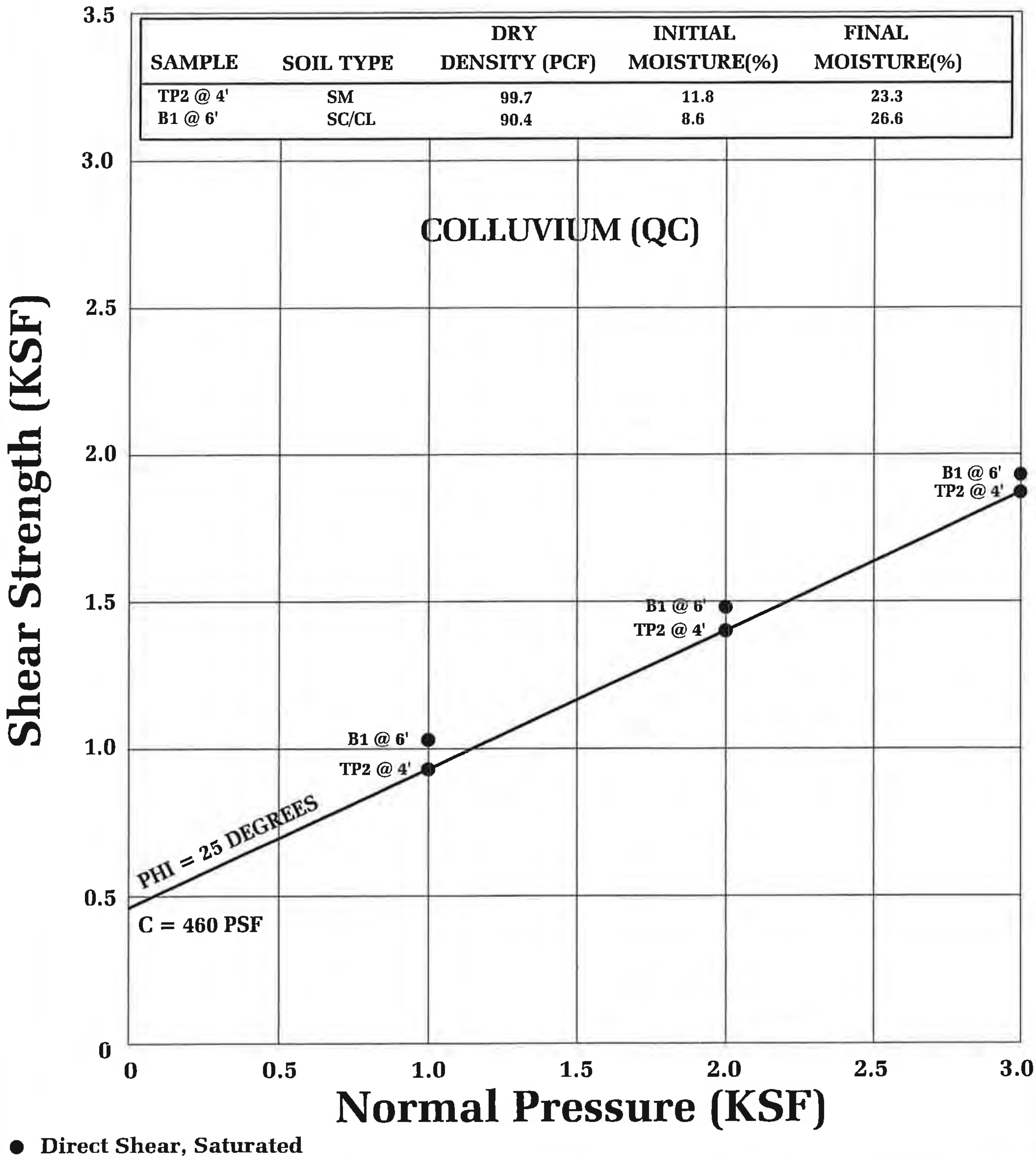
Kimley-Horn & Associates | **Drilling Date: 05/03/12** | **Elevation: Not Available**

File No. 20287 | **Method: Hand Dug Test Pit**

km

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt
			0 --		4-inch Asphalt, No Base
			1 --		FILL: Silty Sand to Sandy Silt, dark and yellowish brown, moist, medium dense to stiff, fine grained
			2 --		Total depth: 1½ feet No Water Fill to 1½ feet
			3 --		
			4 --		
			5 --		
			6 --		
			7 --		
			8 --		
			9 --		
			10 --		
			11 --		
			12 --		
			13 --		
			14 --		
			15 --		
			16 --		
			17 --		
			18 --		
			19 --		
			20 --		
			21 --		
			22 --		
			23 --		
			24 --		
			25 --		

SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
TP2 @ 4'	SM	99.7	11.8	23.3
B1 @ 6'	SC/CL	90.4	8.6	26.6



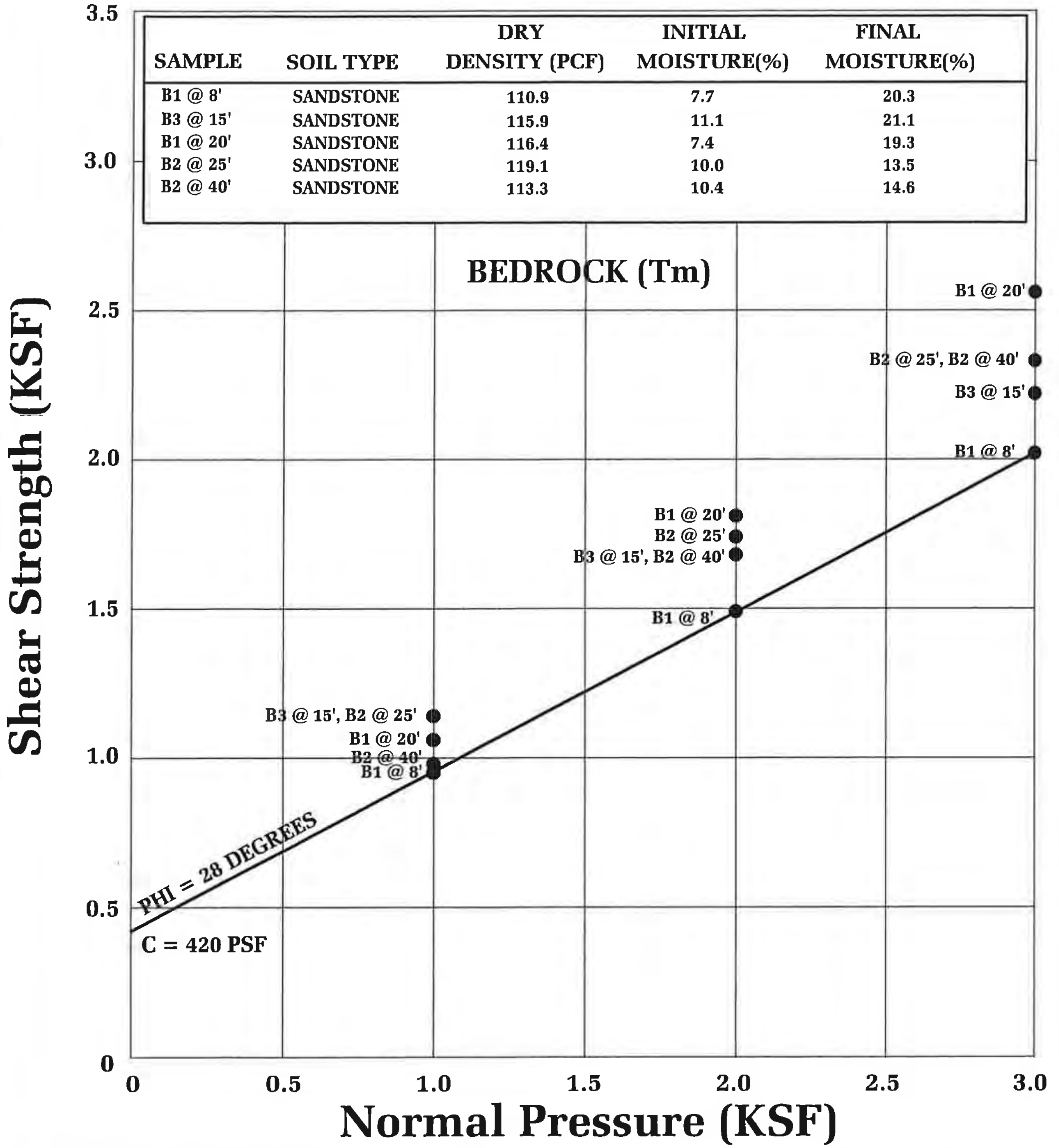
SHEAR TEST DIAGRAM

Geotechnologies, Inc.
Consulting Geotechnical Engineers

KIMLEY-HORN AND ASSOCIATES, INC.

FILE NO. 20287 | PLATE: B-1

SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
B1 @ 8'	SANDSTONE	110.9	7.7	20.3
B3 @ 15'	SANDSTONE	115.9	11.1	21.1
B1 @ 20'	SANDSTONE	116.4	7.4	19.3
B2 @ 25'	SANDSTONE	119.1	10.0	13.5
B2 @ 40'	SANDSTONE	113.3	10.4	14.6



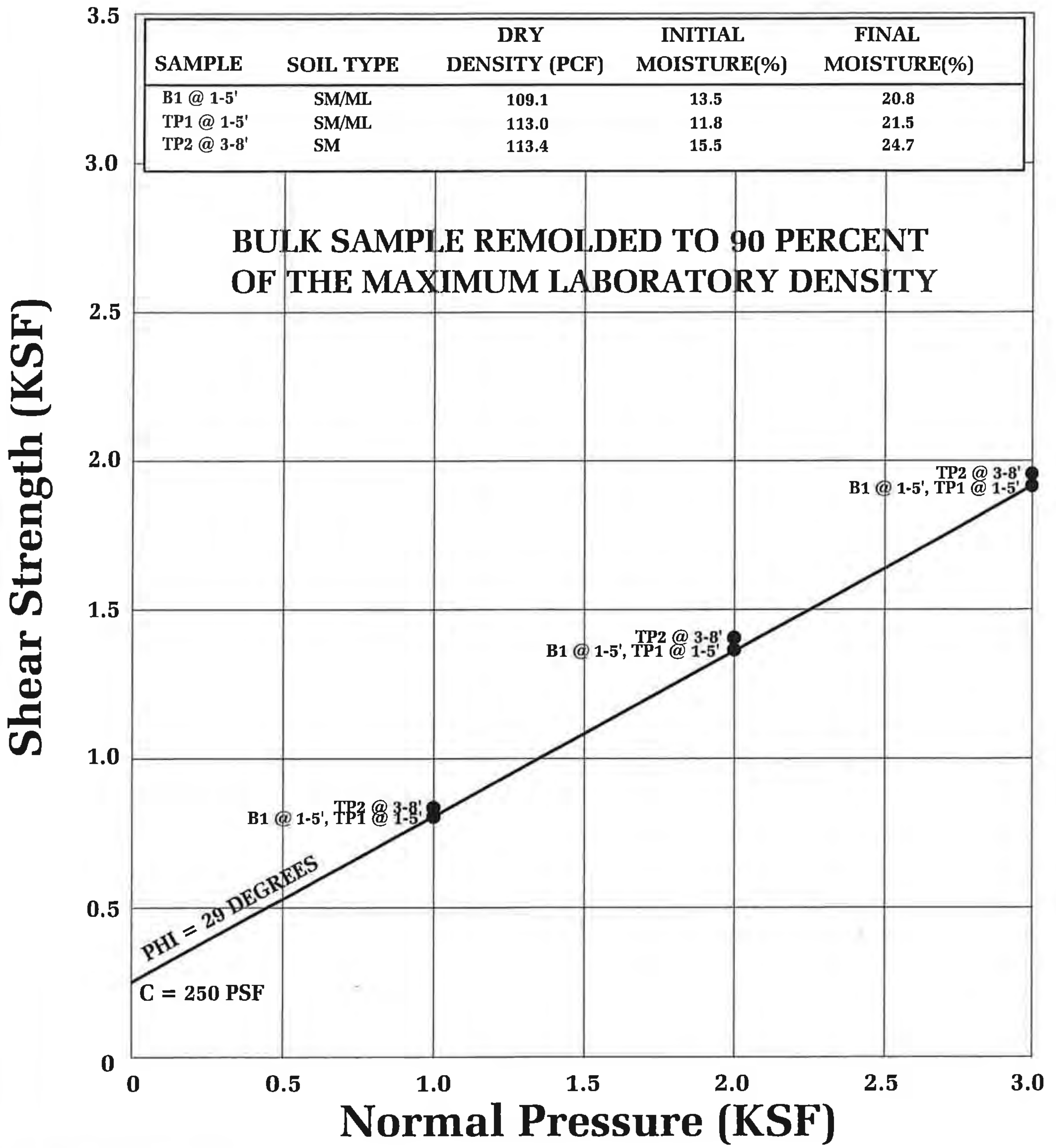
● Direct Shear, Saturated

SHEAR TEST DIAGRAM

Geotechnologies, Inc.
Consulting Geotechnical Engineers

KIMLEY-HORN AND ASSOCIATES, INC.

FILE NO. 20287 | PLATE: B-2



SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
B1 @ 1-5'	SM/ML	109.1	13.5	20.8
TP1 @ 1-5'	SM/ML	113.0	11.8	21.5
TP2 @ 3-8'	SM	113.4	15.5	24.7

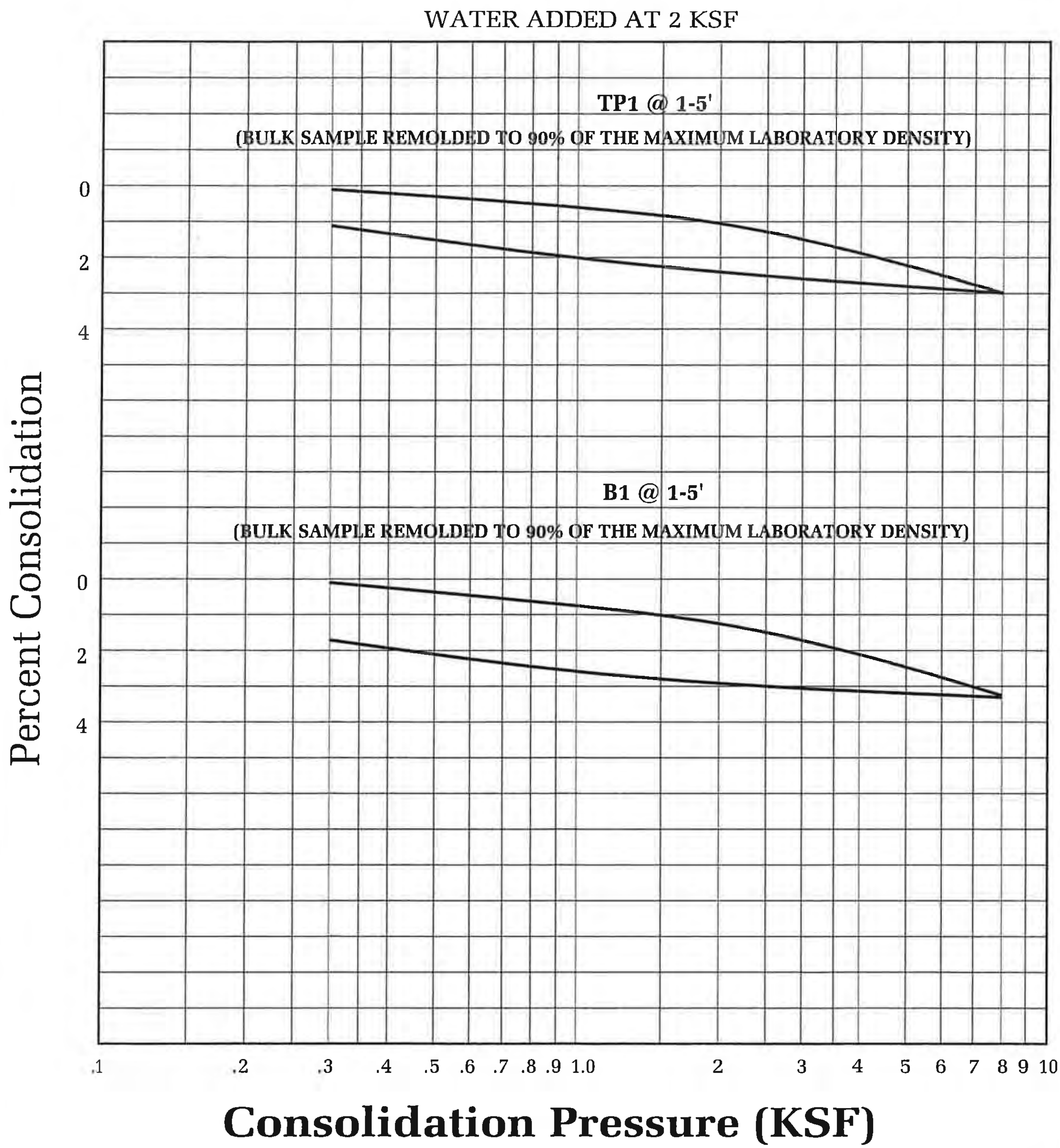
● Direct Shear, Saturated

SHEAR TEST DIAGRAM

Geotechnologies, Inc.
Consulting Geotechnical Engineers

KIMLEY-HORN AND ASSOCIATES, INC.

FILE NO. 20287 | PLATE: B-3



CONSOLIDATION TEST

Geotechnologies, Inc. *Consulting Geotechnical Engineers*	KIMLEY-HORN AND ASSOCIATES, INC.	
	FILE NO. 20287	PLATE: C

ASTM D-1557

SAMPLE	B1 @ 1-5'	TP1 @ 1-5'	TP3 @ 3-8'
SOIL TYPE:	SM/ML	SM/ML	SM
MAXIMUM DENSITY pcf.	121.2	125.6	126.0
OPTIMUM MOISTURE %	13.5	11.8	15.5

ASTM D 4829

SAMPLE	B1 @ 1-5'	TP1 @ 1-5'	TP2 @ 3-8'
SOIL TYPE:	SM/ML	SM/ML	SM
EXPANSION INDEX UBC STANDARD 18-2	54	20	43
EXPANSION CHARACTER	MODERATE	LOW	LOW

SULFATE CONTENT

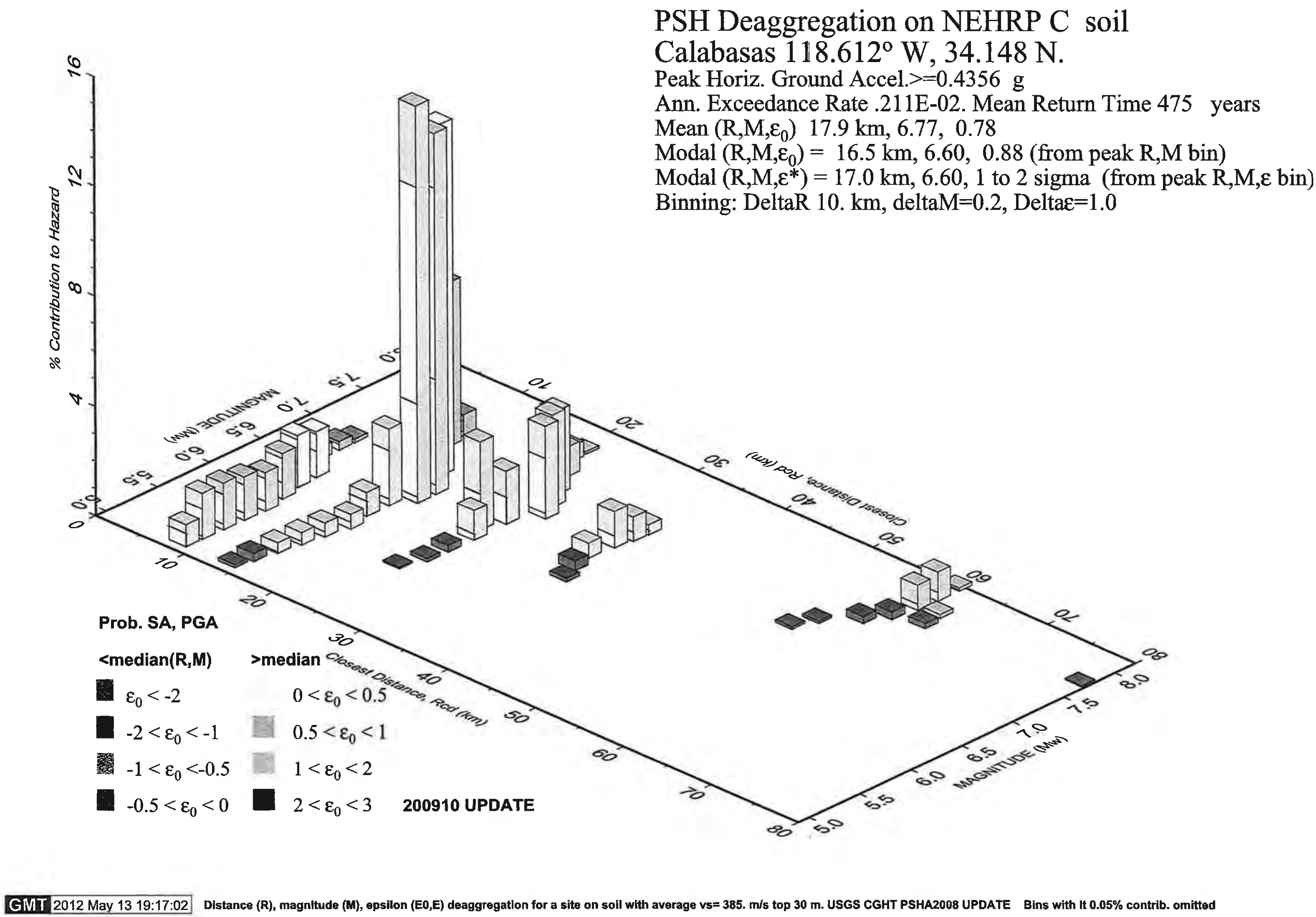
SAMPLE	B1 @ 1-5'	TP1 @ 1-5'	TP2 @ 3-8'	B1 @ 8'	B1 @ 20'
SULFATE CONTENT: (percentage by weight)	< 0.10%	< 0.10%	< 0.10%	< 0.10%	< 0.10%

COMPACTION/EXPANSION/SULFATE DATA SHEET

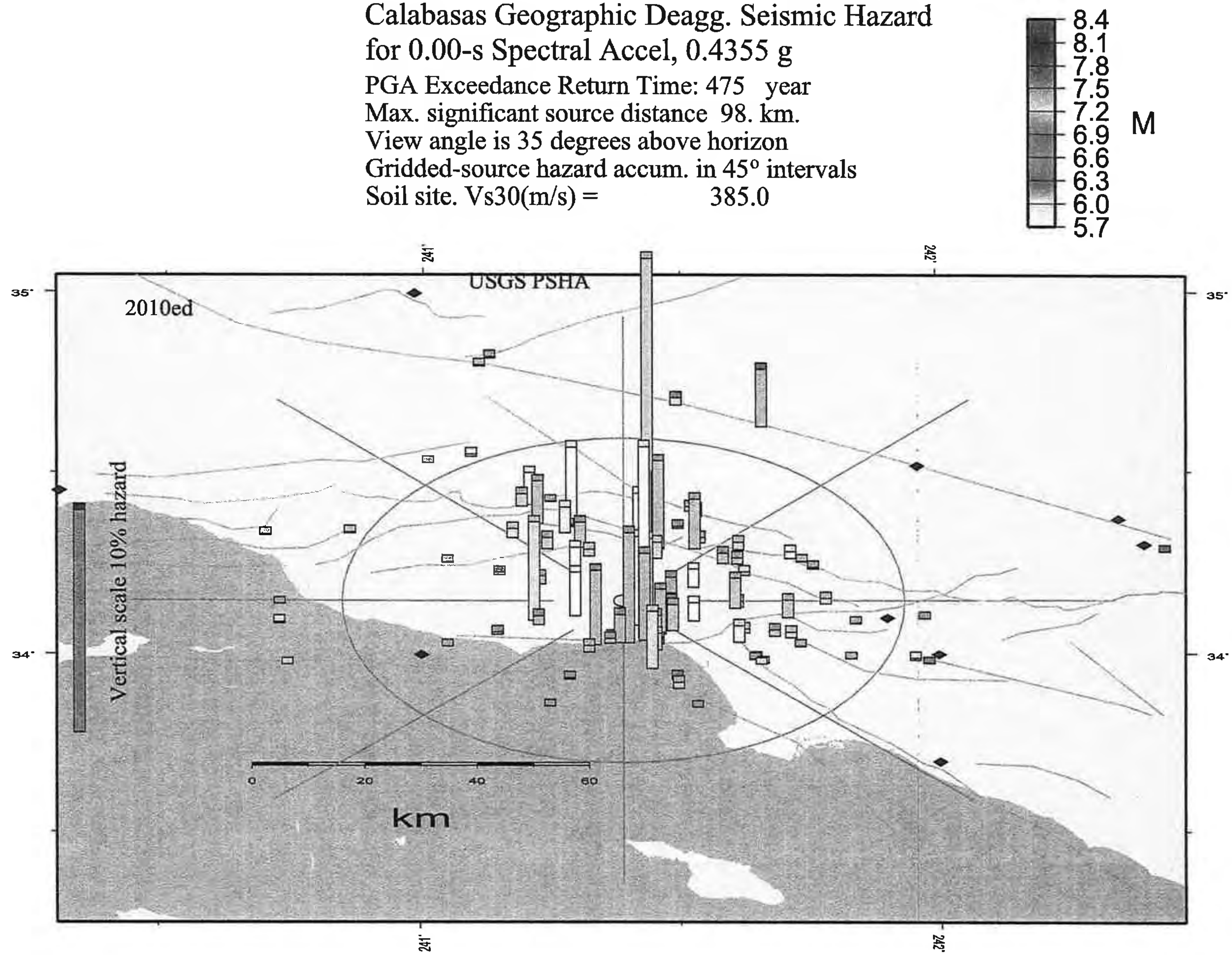
Geotechnologies, Inc.
Consulting Geotechnical Engineers

KIMLEY-HORN AND ASSOCIATES, INC.

FILE NO. 20287


PSH Deaggregation on NEHRP C soil
Calabasas 118.612° W, 34.148 N.
Peak Horiz. Ground Accel.>=0.4356 g
Ann. Exceedance Rate .211E-02. Mean Return Time 475 years
Mean (R,M,ε0) 17.9 km, 6.77, 0.78
Modal (R,M,ε0) = 16.5 km, 6.60, 0.88 (from peak R,M bin)
Modal (R,M,ε*) = 17.0 km, 6.60, 1 to 2 sigma (from peak R,M,ε bin)
Binning: DeltaR 10. km, deltaM=0.2, Deltaε=1.0
% Contribution to Hazard
MAGNITUDE (Mw)
Closest Distance, Rcd (km)
Prob. SA, PGA
<median(R,M)
>median
ε0 < -2
-2 < ε0 < -1
-1 < ε0 <-0.5
-0.5 < ε0 < 0
0 < ε0 < 0.5
0.5 < ε0 < 1
1 < ε0 < 2
2 < ε0 < 3
200910 UPDATE
GMT 2012 May 13 19:17:02
Distance (R), magnitude (M), epsilon (E0,E) deaggregation for a site on soil with average vs= 385. m/s top 30 m. USGS CGHT PSHA2008 UPDATE Bins with lt 0.05% contrib. omitted

Calabasas Geographic Deagg. Seismic Hazard
for 0.00-s Spectral Accel, 0.4355 g
PGA Exceedance Return Time: 475 year
Max. significant source distance 98. km.
View angle is 35 degrees above horizon
Gridded-source hazard accum. in 45° intervals
Soil site. Vs30(m/s) = 385.0



GMT 2012 May 13 19:17:03 Site Coords:-118.612 34.1480 (yellow disk) Vs30= 385.0. Max annual ExcdRate .2687E-03 (column height prop. to ExRate). Red diamonds: historical earthquakes, M>6

*** Deaggregation of Seismic Hazard at One Period of Spectral Accel. ***
*** Data from U.S.G.S. National Seismic Hazards Mapping Project, 2008 version ***
PSHA Deaggregation. %contributions. site: Calabasas long: 118.612 W., lat: 34.148 N.
Vs30(m/s)= 385.0 (some WUS atten. models use Site Class not Vs30).
NSHMP 2007-08 See USGS OFR 2008-1128. dM=0.2 below
Return period: 475 yrs. Exceedance PGA =0.4356 g. Weight * Computed_Rate_Ex 0.211E-02
#Pr[at least one eq with median motion>=PGA in 50 yrs]=0.01806
#This deaggregation corresponds to Mean Hazard w/all GMPEs

DIST(KM)	MAG(MW)	ALL_EPS	EPSILON>2	1<EPS<2	0<EPS<1	-1<EPS<0	-2<EPS<-1	EPS<-2
8.2	5.05	0.808	0.327	0.481	0.001	0.000	0.000	0.000
13.8	5.05	0.111	0.111	0.000	0.000	0.000	0.000	0.000
8.3	5.20	1.689	0.568	1.000	0.120	0.000	0.000	0.000
14.1	5.20	0.290	0.269	0.020	0.000	0.000	0.000	0.000
8.4	5.40	1.720	0.407	1.100	0.213	0.000	0.000	0.000
14.5	5.40	0.390	0.325	0.066	0.000	0.000	0.000	0.000
8.4	5.60	1.610	0.288	1.053	0.269	0.000	0.000	0.000
14.9	5.60	0.468	0.330	0.138	0.000	0.000	0.000	0.000
8.5	5.80	1.403	0.205	0.833	0.365	0.000	0.000	0.000
15.2	5.80	0.502	0.312	0.190	0.000	0.000	0.000	0.000
23.7	5.81	0.064	0.064	0.000	0.000	0.000	0.000	0.000
7.9	6.01	1.655	0.177	0.891	0.587	0.000	0.000	0.000
15.8	6.00	0.546	0.294	0.252	0.000	0.000	0.000	0.000
24.5	6.01	0.115	0.112	0.003	0.000	0.000	0.000	0.000
7.4	6.20	1.907	0.151	0.871	0.866	0.019	0.000	0.000
15.2	6.21	0.889	0.318	0.561	0.009	0.000	0.000	0.000
24.5	6.22	0.241	0.218	0.023	0.000	0.000	0.000	0.000
7.3	6.40	1.677	0.104	0.621	0.912	0.040	0.000	0.000
15.1	6.44	2.797	0.793	1.757	0.247	0.000	0.000	0.000
24.6	6.46	1.103	0.879	0.224	0.000	0.000	0.000	0.000
35.2	6.45	0.134	0.134	0.000	0.000	0.000	0.000	0.000
5.3	6.60	0.438	0.022	0.132	0.250	0.035	0.000	0.000
16.5	6.60	14.463	2.968	7.894	3.381	0.221	0.000	0.000
23.6	6.61	3.229	1.913	1.315	0.001	0.000	0.000	0.000
34.3	6.61	0.358	0.343	0.016	0.000	0.000	0.000	0.000
5.3	6.80	0.322	0.015	0.089	0.185	0.034	0.000	0.000
16.5	6.78	13.133	1.990	6.954	3.851	0.337	0.001	0.000
24.5	6.78	1.951	0.943	1.002	0.005	0.000	0.000	0.000
33.6	6.81	0.546	0.451	0.096	0.000	0.000	0.000	0.000
5.2	6.95	0.123	0.005	0.032	0.071	0.015	0.000	0.000
14.5	7.00	12.766	1.273	5.223	5.123	1.113	0.034	0.000
26.1	7.02	3.397	1.176	2.014	0.206	0.000	0.000	0.000
33.8	7.04	1.341	0.896	0.445	0.000	0.000	0.000	0.000
54.5	7.00	0.079	0.078	0.000	0.000	0.000	0.000	0.000
12.1	7.20	7.981	0.442	2.319	3.835	1.331	0.054	0.000
25.1	7.18	3.354	0.919	2.110	0.325	0.000	0.000	0.000
34.2	7.19	0.905	0.551	0.354	0.001	0.000	0.000	0.000
55.4	7.19	0.102	0.094	0.008	0.000	0.000	0.000	0.000
11.3	7.34	5.936	0.260	1.500	2.884	1.221	0.071	0.000
23.7	7.34	3.042	0.699	1.887	0.456	0.000	0.000	0.000
34.2	7.34	0.367	0.196	0.171	0.001	0.000	0.000	0.000
58.0	7.40	0.252	0.215	0.036	0.000	0.000	0.000	0.000
11.0	7.52	0.783	0.031	0.184	0.384	0.173	0.011	0.000
22.2	7.58	1.084	0.205	0.720	0.158	0.000	0.000	0.000
59.2	7.58	0.266	0.217	0.049	0.000	0.000	0.000	0.000
62.4	7.64	0.192	0.158	0.034	0.000	0.000	0.000	0.000
20.5	7.76	0.547	0.089	0.294	0.165	0.000	0.000	0.000
59.7	7.79	0.940	0.708	0.232	0.000	0.000	0.000	0.000
61.9	7.82	0.143	0.112	0.032	0.000	0.000	0.000	0.000
78.9	7.76	0.053	0.053	0.000	0.000	0.000	0.000	0.000
20.4	7.91	0.089	0.013	0.051	0.025	0.000	0.000	0.000
59.7	7.99	1.078	0.758	0.320	0.000	0.000	0.000	0.000
59.7	8.19	0.120	0.067	0.053	0.000	0.000	0.000	0.000

Summary statistics for above PSHA PGA deaggregation, R=distance, e=epsilon:
Contribution from this GMPE(%): 100.0

Mean src-site R= 17.9 km; M= 6.77; eps0= 0.78. Mean calculated for all sources.
Modal src-site R= 16.5 km; M= 6.60; eps0= 0.88 from peak (R,M) bin
MODE R*= 17.0km; M*= 6.60; EPS.INTERVAL: 1 to 2 sigma % CONTRIB.= 7.894

Principal sources (faults, subduction, random seismicity having > 3% contribution)

Source Category:	% contr.	R(km)	M	epsilon0 (mean values).
California B-faults Char	47.31	18.2	7.03	0.66
California B-faults GR	30.73	17.7	6.79	0.73
California A-faults	3.14	60.7	7.80	1.95
CA Compr. crustal gridded	18.82	10.5	5.89	0.93

Individual fault hazard details if its contribution to mean hazard > 2%:

Fault ID	% contr.	Rcd(km)	M	epsilon0	Site-to-src azimuth(d)
Oak Ridge (Onshore) Char	3.30	27.2	7.16	1.19	-19.9
Anacapa-Dume, alt 2 Char	5.57	11.0	7.14	-0.34	160.7
Anacapa-Dume, alt 1 Char	2.77	15.5	7.15	0.43	-107.3
Northridge Char	7.35	19.7	6.79	0.70	12.2
Santa Susana, alt 1 Char	3.96	18.0	6.80	1.39	19.9
Santa Monica, alt 2 Char	2.00	11.3	6.68	0.41	144.4
Santa Monica Connected alt 1 Cha	4.40	10.9	7.30	-0.60	157.1
Santa Monica Connected alt 2 Cha	3.02	11.0	7.34	-0.29	160.7
Northridge GR	5.39	19.8	6.64	0.82	12.3
Santa Susana, alt 1 GR	2.92	19.7	6.65	1.50	17.5
Anacapa-Dume, alt 2 GR	3.34	13.4	6.86	0.25	-158.1
Santa Monica Connected alt 1 GR	4.91	11.9	6.92	-0.23	175.3
Santa Monica Connected alt 2 GR	3.91	11.7	6.93	0.04	161.8

#*********End of deaggregation corresponding to Mean Hazard w/all GMPEs *********#

PSHA Deaggregation. %contributions. site: Calabasas long: 118.612 W., lat: 34.148 N.
Vs30(m/s)= 385.0 (some WUS atten. models use Site Class not Vs30).
NSHMP 2007-08 See USGS OFR 2008-1128. dM=0.2 below
Return period: 475 yrs. Exceedance PGA =0.4356 g. Weight * Computed_Rate_Ex 0.753E-03
#Pr[at least one eq with median motion>=PGA in 50 yrs]=0.01245
#This deaggregation corresponds to Boore-Atkinson 2008

DIST(KM)	MAG(MW)	ALL_EPS	EPSILON>2	1<EPS<2	0<EPS<1	-1<EPS<0	-2<EPS<-1	EPS<-2
7.9	5.05	0.059	0.059	0.000	0.000	0.000	0.000	0.000
8.0	5.20	0.148	0.140	0.008	0.000	0.000	0.000	0.000
8.2	5.40	0.183	0.151	0.032	0.000	0.000	0.000	0.000
13.8	5.41	0.021	0.021	0.000	0.000	0.000	0.000	0.000
8.3	5.60	0.207	0.159	0.047	0.000	0.000	0.000	0.000
14.8	5.61	0.042	0.042	0.000	0.000	0.000	0.000	0.000
8.4	5.80	0.218	0.140	0.079	0.000	0.000	0.000	0.000
15.5	5.80	0.067	0.067	0.000	0.000	0.000	0.000	0.000
7.7	6.02	0.313	0.153	0.160	0.000	0.000	0.000	0.000
16.0	6.01	0.096	0.096	0.000	0.000	0.000	0.000	0.000
24.9	6.01	0.030	0.030	0.000	0.000	0.000	0.000	0.000
7.3	6.20	0.399	0.147	0.252	0.000	0.000	0.000	0.000
15.1	6.22	0.214	0.158	0.053	0.003	0.000	0.000	0.000
24.7	6.22	0.079	0.077	0.002	0.000	0.000	0.000	0.000
7.2	6.40	0.367	0.104	0.261	0.001	0.000	0.000	0.000
16.0	6.45	1.083	0.417	0.594	0.072	0.000	0.000	0.000
24.3	6.46	0.376	0.293	0.084	0.000	0.000	0.000	0.000
35.5	6.46	0.100	0.100	0.000	0.000	0.000	0.000	0.000
42.8	6.41	0.018	0.018	0.000	0.000	0.000	0.000	0.000
5.2	6.60	0.095	0.022	0.071	0.001	0.000	0.000	0.000
16.3	6.59	4.683	0.952	2.850	0.821	0.060	0.000	0.000
23.8	6.59	1.423	0.827	0.596	0.000	0.000	0.000	0.000
34.7	6.61	0.265	0.251	0.014	0.000	0.000	0.000	0.000
42.7	6.59	0.032	0.032	0.000	0.000	0.000	0.000	0.000
5.2	6.80	0.074	0.015	0.058	0.002	0.000	0.000	0.000
16.7	6.78	4.942	0.811	3.042	1.014	0.075	0.000	0.000
24.7	6.78	1.091	0.469	0.619	0.002	0.000	0.000	0.000
33.9	6.81	0.404	0.321	0.083	0.000	0.000	0.000	0.000
43.3	6.79	0.027	0.027	0.001	0.000	0.000	0.000	0.000
54.1	6.79	0.030	0.030	0.000	0.000	0.000	0.000	0.000
5.2	6.95	0.029	0.005	0.022	0.001	0.000	0.000	0.000

14.5	7.01	4.138	0.443	1.931	1.557	0.205	0.002	0.000
26.1	7.04	1.723	0.473	1.114	0.136	0.000	0.000	0.000
34.1	7.04	0.990	0.634	0.355	0.000	0.000	0.000	0.000
54.6	7.00	0.074	0.073	0.000	0.000	0.000	0.000	0.000
12.1	7.19	2.264	0.130	0.714	1.138	0.278	0.004	0.000
25.0	7.20	1.386	0.323	0.886	0.178	0.000	0.000	0.000
34.3	7.20	0.546	0.271	0.275	0.000	0.000	0.000	0.000
55.6	7.19	0.096	0.087	0.008	0.000	0.000	0.000	0.000
62.4	7.20	0.038	0.038	0.000	0.000	0.000	0.000	0.000
11.3	7.34	2.056	0.093	0.549	1.065	0.340	0.008	0.000
23.7	7.35	1.415	0.264	0.906	0.245	0.000	0.000	0.000
34.3	7.33	0.242	0.102	0.140	0.000	0.000	0.000	0.000
58.1	7.40	0.235	0.198	0.036	0.000	0.000	0.000	0.000
64.4	7.39	0.040	0.039	0.001	0.000	0.000	0.000	0.000
11.0	7.52	0.239	0.010	0.062	0.127	0.039	0.001	0.000
22.1	7.58	0.463	0.078	0.329	0.056	0.000	0.000	0.000
59.3	7.58	0.227	0.178	0.049	0.000	0.000	0.000	0.000
62.3	7.64	0.162	0.129	0.034	0.000	0.000	0.000	0.000
78.3	7.58	0.036	0.036	0.000	0.000	0.000	0.000	0.000
20.5	7.76	0.269	0.032	0.151	0.086	0.000	0.000	0.000
59.7	7.78	0.683	0.465	0.218	0.000	0.000	0.000	0.000
61.9	7.82	0.109	0.077	0.031	0.000	0.000	0.000	0.000
78.8	7.75	0.046	0.046	0.000	0.000	0.000	0.000	0.000
20.4	7.91	0.041	0.005	0.024	0.013	0.000	0.000	0.000
59.7	7.98	0.834	0.560	0.274	0.000	0.000	0.000	0.000
59.7	8.19	0.082	0.040	0.043	0.000	0.000	0.000	0.000

Summary statistics for above PSHA PGA deaggregation, R=distance, e=epsilon:
Contribution from this GMPE(%): 35.7
Mean src-site R= 21.7 km; M= 6.92; eps0= 0.98. Mean calculated for all sources.
Modal src-site R= 16.7 km; M= 6.78; eps0= 0.83 from peak (R,M) bin
MODE R*= 17.5km; M*= 6.77; EPS.INTERVAL: 1 to 2 sigma % CONTRIB.= 3.042

Principal sources (faults, subduction, random seismicity having > 3% contribution)

Source Category:	% contr.	R(km)	M	epsilon0 (mean values).
California B-faults Char	18.61	19.6	7.03	0.84
California B-faults GR	11.42	19.3	6.80	0.93
CA Compr. crustal gridded	3.20	11.8	6.09	1.29

Individual fault hazard details if its contribution to mean hazard > 2%:

Fault ID	% contr.	Rcd(km)	M	epsilon0	Site-to-src azimuth(d)
Oak Ridge (Onshore) Char	1.36	27.2	7.16	1.12	-19.9
Anacapa-Dume, alt 2 Char	1.60	11.0	7.14	-0.06	160.7
Anacapa-Dume, alt 1 Char	0.95	15.5	7.15	0.51	-107.3
Northridge Char	2.14	19.7	6.79	0.90	12.2
Santa Susana, alt 1 Char	1.70	18.0	6.80	1.31	19.9
Santa Monica, alt 2 Char	0.73	11.3	6.68	0.43	144.4
Santa Monica Connected alt 1 Cha	1.55	10.9	7.30	-0.51	157.1
Santa Monica Connected alt 2 Cha	0.85	11.0	7.34	0.02	160.7
Northridge GR	1.55	19.8	6.65	1.00	12.3
Santa Susana, alt 1 GR	1.01	19.5	6.65	1.49	17.5
Anacapa-Dume, alt 2 GR	0.97	13.7	6.86	0.47	-158.1
Santa Monica Connected alt 1 GR	1.73	11.9	6.92	-0.21	175.3
Santa Monica Connected alt 2 GR	1.10	11.9	6.93	0.30	161.8

#*********End of deaggregation corresponding to Boore-Atkinson 2008 *********#

PSHA Deaggregation. %contributions. site: Calabasas long: 118.612 W., lat: 34.148 N.
Vs30(m/s)= 385.0 (some WUS atten. models use Site Class not Vs30).
NSHMP 2007-08 See USGS OFR 2008-1128. dM=0.2 below
Return period: 475 yrs. Exceedance PGA =0.4356 g. Weight * Computed_Rate_Ex 0.449E-0:
#Pr[at least one eq with median motion>=PGA in 50 yrs]=0.00747
#This deaggregation corresponds to Campbell-Bozorgnia 2008

DIST(KM)	MAG(MW)	ALL_EPS	EPSILON>2	1<EPS<2	0<EPS<1	-1<EPS<0	-2<EPS<-1	EPS<-2
8.2	5.05	0.206	0.157	0.048	0.000	0.000	0.000	0.000
12.7	5.05	0.014	0.014	0.000	0.000	0.000	0.000	0.000
8.2	5.20	0.486	0.344	0.142	0.000	0.000	0.000	0.000

13.3	5.21	0.053	0.053	0.000	0.000	0.000	0.000	0.000
8.4	5.40	0.569	0.303	0.266	0.000	0.000	0.000	0.000
14.2	5.41	0.104	0.104	0.000	0.000	0.000	0.000	0.000
8.4	5.60	0.548	0.247	0.302	0.000	0.000	0.000	0.000
14.7	5.60	0.139	0.133	0.005	0.000	0.000	0.000	0.000
8.5	5.80	0.453	0.184	0.269	0.000	0.000	0.000	0.000
15.0	5.80	0.140	0.129	0.011	0.000	0.000	0.000	0.000
23.3	5.81	0.014	0.014	0.000	0.000	0.000	0.000	0.000
7.9	6.01	0.503	0.169	0.334	0.000	0.000	0.000	0.000
15.7	6.00	0.144	0.134	0.010	0.000	0.000	0.000	0.000
24.1	6.01	0.024	0.024	0.000	0.000	0.000	0.000	0.000
7.4	6.20	0.585	0.150	0.426	0.009	0.000	0.000	0.000
15.2	6.21	0.214	0.176	0.037	0.000	0.000	0.000	0.000
24.6	6.22	0.050	0.050	0.000	0.000	0.000	0.000	0.000
7.3	6.40	0.535	0.104	0.411	0.020	0.000	0.000	0.000
15.3	6.44	0.596	0.333	0.256	0.008	0.000	0.000	0.000
24.9	6.45	0.191	0.176	0.015	0.000	0.000	0.000	0.000
34.6	6.43	0.011	0.011	0.000	0.000	0.000	0.000	0.000
5.3	6.60	0.161	0.022	0.115	0.024	0.000	0.000	0.000
16.1	6.59	2.861	0.783	1.616	0.440	0.022	0.000	0.000
23.8	6.59	0.707	0.487	0.220	0.000	0.000	0.000	0.000
33.5	6.60	0.039	0.039	0.000	0.000	0.000	0.000	0.000
5.3	6.79	0.112	0.015	0.079	0.018	0.000	0.000	0.000
16.0	6.77	2.737	0.728	1.461	0.518	0.031	0.000	0.000
25.1	6.78	0.421	0.290	0.130	0.000	0.000	0.000	0.000
32.6	6.81	0.046	0.045	0.001	0.000	0.000	0.000	0.000
5.2	6.95	0.042	0.005	0.029	0.007	0.000	0.000	0.000
13.9	7.01	2.932	0.432	1.296	1.056	0.149	0.000	0.000
26.4	7.03	0.667	0.338	0.327	0.001	0.000	0.000	0.000
33.5	7.03	0.098	0.093	0.005	0.000	0.000	0.000	0.000
11.8	7.20	1.744	0.134	0.633	0.825	0.152	0.000	0.000
25.8	7.18	0.591	0.214	0.361	0.015	0.000	0.000	0.000
33.4	7.19	0.072	0.065	0.007	0.000	0.000	0.000	0.000
11.2	7.34	1.537	0.085	0.477	0.815	0.160	0.000	0.000
24.2	7.34	0.461	0.181	0.259	0.021	0.000	0.000	0.000
34.2	7.33	0.030	0.029	0.001	0.000	0.000	0.000	0.000
11.0	7.52	0.197	0.010	0.060	0.105	0.021	0.000	0.000
22.6	7.55	0.101	0.048	0.048	0.004	0.000	0.000	0.000
20.5	7.74	0.065	0.031	0.035	0.000	0.000	0.000	0.000
59.7	7.77	0.011	0.011	0.000	0.000	0.000	0.000	0.000
59.7	7.97	0.021	0.021	0.000	0.000	0.000	0.000	0.000

Summary statistics for above PSHA PGA deaggregation, R=distance, e=epsilon:
Contribution from this GMPE(%): 21.3
Mean src-site R= 15.1 km; M= 6.67; eps0= 0.91. Mean calculated for all sources.
Modal src-site R= 13.9 km; M= 7.01; eps0= 0.50 from peak (R,M) bin
MODE R*= 16.7km; M*= 6.59; EPS.INTERVAL: 1 to 2 sigma % CONTRIB.= 1.616

Principal sources (faults, subduction, random seismicity having > 3% contribution)

Source Category:	% contr.	R(km)	M	epsilon0 (mean values).
California B-faults Char	9.00	16.9	7.04	0.87
California B-faults GR	6.67	16.6	6.79	0.89
CA Compr. crustal gridded	5.58	9.9	5.90	0.97

Individual fault hazard details if its contribution to mean hazard > 2%:

Fault ID	% contr.	Rcd(km)	M	epsilon0	Site-to-src azimuth(d)
Oak Ridge (Onshore) Char	0.78	27.2	7.16	1.34	-19.9
Anacapa-Dume, alt 2 Char	1.60	11.0	7.14	-0.12	160.7
Anacapa-Dume, alt 1 Char	0.50	15.5	7.15	0.88	-107.3
Northridge Char	1.32	19.7	6.78	1.17	12.2
Santa Susana, alt 1 Char	0.70	18.0	6.79	1.70	19.9
Santa Monica, alt 2 Char	0.34	11.3	6.68	0.95	144.4
Santa Monica Connected alt 1 Cha	0.95	10.9	7.30	0.05	157.1
Santa Monica Connected alt 2 Cha	0.83	11.0	7.34	-0.03	160.7
Northridge GR	1.01	19.8	6.64	1.23	12.3
Santa Susana, alt 1 GR	0.82	19.9	6.64	1.55	17.5

Anacapa-Dume, alt 2 GR	0.99	13.3	6.86	0.38	-158.1
Santa Monica Connected alt 1 GR	1.13	11.8	6.90	0.22	175.3
Santa Monica Connected alt 2 GR	1.11	11.7	6.93	0.23	161.8

#*********End of deaggregation corresponding to Campbell-Bozorgnia 2008 *********#

PSHA Deaggregation. %contributions. site: Calabasas long: 118.612 W., lat: 34.148 N.
Vs30(m/s)= 385.0 (some WUS atten. models use Site Class not Vs30).
NSHMP 2007-08 See USGS OFR 2008-1128. dM=0.2 below
Return period: 475 yrs. Exceedance PGA =0.4356 g. Weight * Computed_Rate_Ex 0.907E-0
#Pr[at least one eq with median motion>=PGA in 50 yrs]=0.03639
#This deaggregation corresponds to Chiou-Youngs 2008

DIST(KM)	MAG(MW)	ALL_EPS	EPSILON>2	1<EPS<2	0<EPS<1	-1<EPS<0	-2<EPS<-1	EPS<-2
8.3	5.05	0.543	0.307	0.236	0.000	0.000	0.000	0.000
13.9	5.05	0.096	0.096	0.000	0.000	0.000	0.000	0.000
8.4	5.20	1.055	0.526	0.529	0.000	0.000	0.000	0.000
14.3	5.20	0.229	0.229	0.000	0.000	0.000	0.000	0.000
8.4	5.40	0.968	0.404	0.564	0.000	0.000	0.000	0.000
14.7	5.40	0.266	0.252	0.014	0.000	0.000	0.000	0.000
8.5	5.60	0.855	0.284	0.567	0.003	0.000	0.000	0.000
15.0	5.60	0.287	0.256	0.031	0.000	0.000	0.000	0.000
23.0	5.61	0.027	0.027	0.000	0.000	0.000	0.000	0.000
8.5	5.80	0.732	0.200	0.511	0.020	0.000	0.000	0.000
15.3	5.80	0.294	0.235	0.059	0.000	0.000	0.000	0.000
23.7	5.80	0.039	0.039	0.000	0.000	0.000	0.000	0.000
8.0	6.01	0.838	0.176	0.633	0.029	0.000	0.000	0.000
15.8	6.00	0.306	0.235	0.071	0.000	0.000	0.000	0.000
24.4	6.01	0.061	0.061	0.000	0.000	0.000	0.000	0.000
7.5	6.20	0.923	0.151	0.705	0.067	0.000	0.000	0.000
15.2	6.21	0.456	0.262	0.192	0.002	0.000	0.000	0.000
24.3	6.21	0.110	0.109	0.001	0.000	0.000	0.000	0.000
7.4	6.40	0.775	0.104	0.565	0.106	0.000	0.000	0.000
15.5	6.43	1.234	0.450	0.660	0.124	0.000	0.000	0.000
24.1	6.45	0.357	0.326	0.031	0.000	0.000	0.000	0.000
34.5	6.42	0.022	0.022	0.000	0.000	0.000	0.000	0.000
5.3	6.60	0.182	0.022	0.123	0.037	0.000	0.000	0.000
16.6	6.60	6.591	0.921	3.228	2.304	0.138	0.000	0.000
23.3	6.60	1.118	0.638	0.479	0.001	0.000	0.000	0.000
33.5	6.61	0.055	0.053	0.001	0.000	0.000	0.000	0.000
5.3	6.80	0.136	0.015	0.086	0.035	0.000	0.000	0.000
16.6	6.78	5.881	0.798	2.730	2.118	0.235	0.001	0.000
24.2	6.78	0.692	0.373	0.316	0.003	0.000	0.000	0.000
32.8	6.80	0.096	0.085	0.010	0.000	0.000	0.000	0.000
5.3	6.95	0.053	0.005	0.032	0.016	0.000	0.000	0.000
14.6	7.00	5.482	0.429	1.886	2.387	0.749	0.032	0.000
25.8	7.03	1.161	0.410	0.685	0.067	0.000	0.000	0.000
33.5	7.02	0.230	0.171	0.060	0.000	0.000	0.000	0.000
12.5	7.19	3.569	0.156	0.884	1.679	0.800	0.050	0.000
24.9	7.20	1.155	0.323	0.698	0.134	0.000	0.000	0.000
33.8	7.18	0.309	0.213	0.095	0.000	0.000	0.000	0.000
11.3	7.34	2.750	0.089	0.532	1.237	0.829	0.063	0.000
23.6	7.35	1.181	0.228	0.741	0.212	0.000	0.000	0.000
34.1	7.35	0.098	0.067	0.030	0.000	0.000	0.000	0.000
11.0	7.52	0.347	0.010	0.062	0.152	0.112	0.010	0.000
22.5	7.55	0.352	0.060	0.217	0.075	0.000	0.000	0.000
59.2	7.57	0.037	0.037	0.000	0.000	0.000	0.000	0.000
62.4	7.64	0.024	0.024	0.000	0.000	0.000	0.000	0.000
20.6	7.74	0.341	0.047	0.215	0.079	0.000	0.000	0.000
59.7	7.79	0.168	0.167	0.000	0.000	0.000	0.000	0.000
61.9	7.81	0.032	0.032	0.000	0.000	0.000	0.000	0.000
20.4	7.91	0.040	0.005	0.023	0.012	0.000	0.000	0.000
59.7	7.99	0.301	0.240	0.061	0.000	0.000	0.000	0.000
59.7	8.20	0.035	0.024	0.011	0.000	0.000	0.000	0.000

Summary statistics for above PSHA PGA deaggregation, R=distance, e=epsilon:
Contribution from this GMPE(%): 43.0

Mean src-site R= 16.3 km; M= 6.69; eps0= 0.54. Mean calculated for all sources.
Modal src-site R= 16.6 km; M= 6.60; eps0= 0.62 from peak (R,M) bin
MODE R*= 17.1km; M*= 6.60; EPS.INTERVAL: 1 to 2 sigma % CONTRIB.= 3.228

Principal sources (faults, subduction, random seismicity having > 3% contribution)

Source Category:	% contr.	R(km)	M	epsilon0 (mean values).
California B-faults Char	19.70	17.4	7.03	0.40
California B-faults GR	12.64	16.8	6.79	0.47
CA Compr. crustal gridded	10.04	10.5	5.82	0.80

Individual fault hazard details if its contribution to mean hazard > 2%:

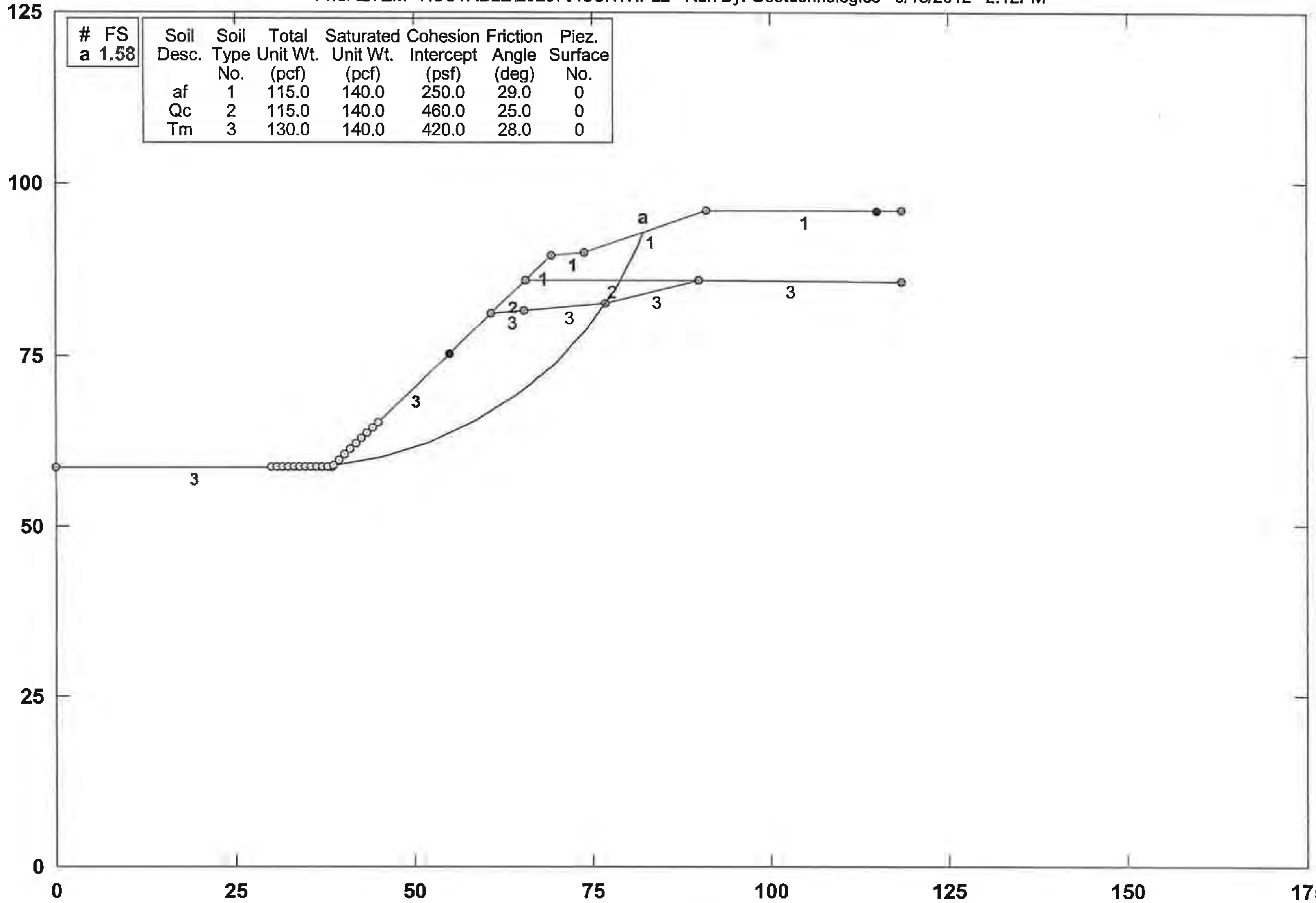
Fault ID	% contr.	Rcd(km)	M	epsilon0	Site-to-src azimuth(d)
Oak Ridge (Onshore) Char	1.15	27.2	7.17	1.16	-19.9
Anacapa-Dume, alt 2 Char	2.37	11.0	7.15	-0.67	160.7
Anacapa-Dume, alt 1 Char	1.32	15.5	7.15	0.20	-107.3
Northridge Char	3.90	19.7	6.79	0.44	12.2
Santa Susana, alt 1 Char	1.55	18.0	6.80	1.34	19.9
Santa Monica, alt 2 Char	0.93	11.3	6.68	0.20	144.4
Santa Monica Connected alt 1 Cha	1.91	10.9	7.30	-1.00	157.1
Santa Monica Connected alt 2 Cha	1.34	11.0	7.35	-0.66	160.7
Northridge GR	2.83	19.8	6.64	0.58	12.3
Santa Susana, alt 1 GR	1.10	19.7	6.65	1.46	17.5
Anacapa-Dume, alt 2 GR	1.37	13.1	6.87	0.00	-158.1
Santa Monica Connected alt 1 GR	2.04	11.8	6.93	-0.50	175.3
Santa Monica Connected alt 2 GR	1.70	11.7	6.93	-0.25	161.8

#*********End of deaggregation corresponding to Chiou-Youngs 2008 *********#

******************** Southern California **

Kimley-Horn Associates, Inc. / 20287 / Section A / Static Analysis

F:\CAZTEM~1\GSTABLE\20287\ACSNW.PL2 Run By: Geotechnologies 5/13/2012 2:12PM



#	FS
a	1.58

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
af	1	115.0	140.0	250.0	29.0	0
Qc	2	115.0	140.0	460.0	25.0	0
Tm	3	130.0	140.0	420.0	28.0	0

GSTABL7 v.2 FSmin=1.58

Safety Factors Are Calculated By The Modified Bishop Method

*** GSTABL7 ***

** GSTABL7 by Garry H. Gregory, P.E. **

** Original Version 1.0, January 1996; Current Version 2.002, December 2001 **

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SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static Earthquake, and Applied Force Options.

****

Analysis Run Date: 5/13/2012
Time of Run: 2:12PM
Run By: Geotechnologies
Input Data Filename: F:acsnw.
Output Filename: F:acsnw.OUT
Unit System: English
Plotted Output Filename: F:acsnw.PLT
PROBLEM DESCRIPTION: Kimley-Horn Associates, Inc. / 20287 /
Section A / Static Analysis

BOUNDARY COORDINATES
7 Top Boundaries
12 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	58.80	38.50	58.80	3
2	38.50	58.80	60.90	81.20	3
3	60.90	81.20	65.60	85.90	2
4	65.60	85.90	69.20	89.50	1
5	69.20	89.50	74.00	90.00	1
6	74.00	90.00	91.00	96.00	1
7	91.00	96.00	118.50	96.00	1
8	65.60	85.90	90.00	85.90	2
9	90.00	85.90	118.50	85.70	3
10	60.90	81.20	65.50	81.50	3
11	65.50	81.50	76.80	82.50	3
12	76.80	82.50	90.00	85.90	3

Default Y-Origin = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	115.0	140.0	250.0	29.0	0.00	0.0	0
2	115.0	140.0	460.0	25.0	0.00	0.0	0
3	130.0	140.0	420.0	28.0	0.00	0.0	0

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.
4000 Trial Surfaces Have Been Generated.
200 Surface(s) Initiate(s) From Each Of 20 Points Equally Spaced
Along The Ground Surface Between X = 30.00(ft)
and X = 45.00(ft)
Each Surface Terminates Between X = 55.00(ft)
and X = 115.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
7.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 4000
Statistical Data On All Valid FS Values:
FS Max = 11.410 FS Min = 1.580 FS Ave = 2.296
Standard Deviation = 0.587 Coefficient of Variation = 25.55 %

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	38.68	58.98
2	45.57	60.24
3	52.23	62.40
4	58.55	65.41
5	64.41	69.23
6	69.73	73.79
7	74.39	79.01
8	78.33	84.80
9	81.47	91.05
10	82.10	92.86

Circle Center At X = 32.72 ; Y = 111.39 ; and Radius = 52.74
Factor of Safety
*** 1.580 ***
Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	6.9	2517.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	6.7	6820.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	6.3	9677.5	0.0	0.0	0.	0.	0.0	0.0	0.0
4	2.4	4232.6	0.0	0.0	0.	0.	0.0	0.0	0.0
5	3.5	6706.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	1.1	2133.5	0.0	0.0	0.	0.	0.0	0.0	0.0
7	0.1	196.8	0.0	0.0	0.	0.	0.0	0.0	0.0
8	3.6	7118.0	0.0	0.0	0.	0.	0.0	0.0	0.0
9	0.5	1033.0	0.0	0.0	0.	0.	0.0	0.0	0.0
10	4.3	7058.4	0.0	0.0	0.	0.	0.0	0.0	0.0
11	0.4	530.3	0.0	0.0	0.	0.	0.0	0.0	0.0
12	2.4	2734.3	0.0	0.0	0.	0.	0.0	0.0	0.0
13	1.6	1368.7	0.0	0.0	0.	0.	0.0	0.0	0.0
14	0.6	400.2	0.0	0.0	0.	0.	0.0	0.0	0.0
15	2.6	1102.6	0.0	0.0	0.	0.	0.0	0.0	0.0
16	0.6	57.1	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	38.68	58.98
2	45.61	60.03
3	52.38	61.78
4	58.94	64.23
5	65.21	67.34
6	71.13	71.08
7	76.62	75.42
8	81.64	80.30
9	86.12	85.68
10	90.03	91.49
11	92.42	96.00

Circle Center At X = 32.10 ; Y = 126.19 ; and Radius = 67.52
Factor of Safety
*** 1.583 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	38.68	58.98
2	45.65	59.64
3	52.51	61.07
4	59.16	63.24
5	65.53	66.15
6	71.54	69.74
7	77.11	73.97
8	82.18	78.80
9	86.68	84.16
10	90.56	89.99

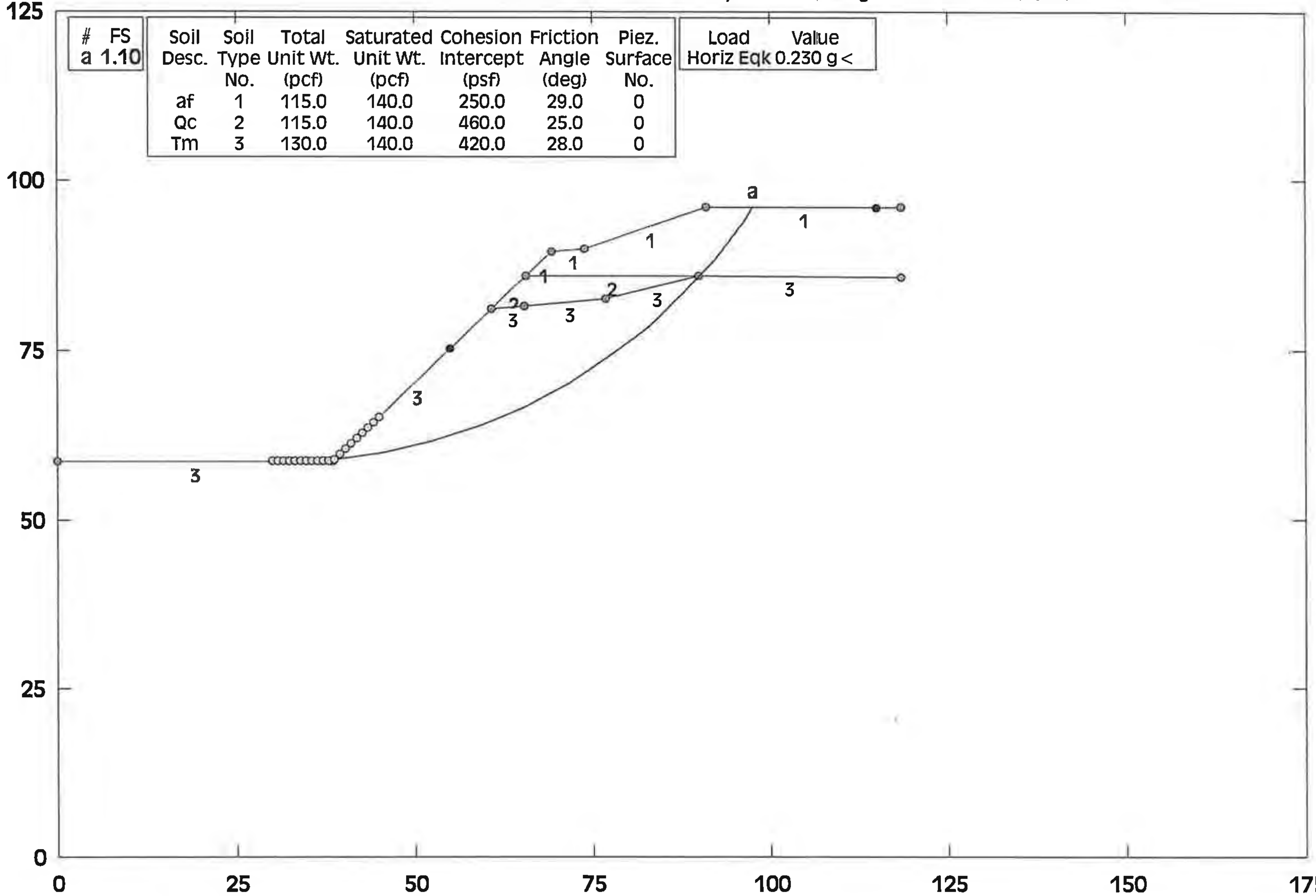
```
  11        93.66      96.00
Circle Center At X =    36.27 ; Y =   121.92 ; and Radius =    62.99
       Factor of Safety
      ***    1.597   ***
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        39.47       59.77
    2        46.35       61.07
    3        53.04       63.12
    4        59.46       65.93
    5        65.52       69.43
    6        71.14       73.60
    7        76.26       78.37
    8        80.81       83.69
    9        84.73       89.50
   10        87.47       94.76
Circle Center At X =    31.57 ; Y =   121.04 ; and Radius =    61.78
       Factor of Safety
      ***    1.598   ***
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        39.47       59.77
    2        46.36       61.04
    3        53.01       63.24
    4        59.29       66.31
    5        65.11       70.21
    6        70.34       74.86
    7        74.89       80.18
    8        78.67       86.07
    9        81.62       92.42
   10        81.72       92.72
Circle Center At X =    33.63 ; Y =   110.81 ; and Radius =    51.37
       Factor of Safety
      ***    1.604   ***
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        39.47       59.77
    2        46.44       60.47
    3        53.23       62.17
    4        59.70       64.85
    5        65.70       68.45
    6        71.12       72.88
    7        75.83       78.06
    8        79.74       83.87
    9        82.75       90.18
   10        83.75       93.44
Circle Center At X =    38.33 ; Y =   107.23 ; and Radius =    47.47
       Factor of Safety
      ***    1.605   ***
Failure Surface Specified By 12 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        38.68       58.98
    2        45.61       60.04
    3        52.41       61.69
    4        59.04       63.94
    5        65.44       66.77
    6        71.57       70.15
    7        77.38       74.05
    8        82.82       78.46
    9        87.85       83.32
   10        92.43       88.62
   11        96.53       94.29
   12        97.55       96.00
```



```
Circle Center At X =    30.35 ; Y =   137.55 ; and Radius =    79.01
       Factor of Safety
      ***    1.606   ***
Failure Surface Specified By  9 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        38.68       58.98
    2        45.58       60.19
    3        52.19       62.48
    4        58.35       65.81
    5        63.90       70.08
    6        68.68       75.19
    7        72.58       81.00
    8        75.50       87.37
    9        76.46       90.87
Circle Center At X =    34.71 ; Y =   102.20 ; and Radius =    43.40
       Factor of Safety
      ***    1.607   ***
Failure Surface Specified By  9 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        38.68       58.98
    2        45.55       60.33
    3        52.13       62.72
    4        58.27       66.09
    5        63.81       70.36
    6        68.63       75.44
    7        72.61       81.20
    8        75.66       87.50
    9        76.71       90.96
Circle Center At X =    33.43 ; Y =   104.03 ; and Radius =    45.35
       Factor of Safety
      ***    1.608   ***
Failure Surface Specified By 11 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        39.47       59.77
    2        46.29       61.36
    3        52.95       63.52
    4        59.40       66.24
    5        65.59       69.50
    6        71.48       73.29
    7        77.02       77.56
    8        82.18       82.30
    9        86.91       87.45
   10        91.19       93.00
   11        93.12       96.00
Circle Center At X =    24.45 ; Y =   140.02 ; and Radius =    81.64
       Factor of Safety
      ***    1.610   ***
           **** END OF GSTABL7 OUTPUT ****
```

Kimley-Horn Associates, Inc. / 20287 / Section A / Pseudo-Static Analysis

F:\CAZTEM~1\GSTABLE\20287\ACPSNW.PL2 Run By: Geotechnologies 5/13/2012 2:08PM



#	FS
a	1.10

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
af	1	115.0	140.0	250.0	29.0	0
Qc	2	115.0	140.0	460.0	25.0	0
Tm	3	130.0	140.0	420.0	28.0	0

Load	Value
Horiz Eqk	0.230 g <

GSTABL7 v.2 FSmin=1.10

Safety Factors Are Calculated By The Modified Bishop Method

```
                         ***  GSTABL7  ***
               ** GSTABL7 by Garry H. Gregory, P.E. **
 ** Original Version 1.0, January 1996; Current Version 2.002, December 2001 **
           (All Rights Reserved-Unauthorized Use Prohibited)
*********************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static Earthquake, and Applied Force Options.
*********************************************************************************
Analysis Run Date:         5/13/2012
Time of Run:               2:08PM
Run By:                    Geotechnologies
Input Data Filename:       F:ACPSNW.
Output Filename:           F:ACPSNW.OUT
Unit System:               English
Plotted Output Filename:   F:ACPSNW.PLT
PROBLEM DESCRIPTION:  Kimley-Horn Associates, Inc. / 20287 /
                      Section A / Pseudo-Static Analysis
BOUNDARY COORDINATES
    7 Top   Boundaries
   12 Total Boundaries
Boundary     X-Left     Y-Left     X-Right    Y-Right     Soil Type
   No.        (ft)       (ft)       (ft)       (ft)       Below Bnd
    1         0.00      58.80      38.50      58.80          3
    2        38.50      58.80      60.90      81.20          3
    3        60.90      81.20      65.60      85.90          2
    4        65.60      85.90      69.20      89.50          1
    5        69.20      89.50      74.00      90.00          1
    6        74.00      90.00      91.00      96.00          1
    7        91.00      96.00     118.50      96.00          1
    8        65.60      85.90      90.00      85.90          2
    9        90.00      85.90     118.50      85.70          3
   10        60.90      81.20      65.50      81.50          3
   11        65.50      81.50      76.80      82.50          3
   12        76.80      82.50      90.00      85.90          3
Default Y-Origin = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 3 Type(s) of Soil
Soil  Total  Saturated  Cohesion  Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt.  Intercept  Angle   Pressure Constant Surface
 No.   (pcf)    (pcf)     (psf)    (deg)    Param.   (psf)     No.
  1   115.0    140.0      250.0    29.0     0.00      0.0       0
  2   115.0    140.0      460.0    25.0     0.00      0.0       0
  3   130.0    140.0      420.0    28.0     0.00      0.0       0
A Horizontal Earthquake Loading Coefficient
Of0.230 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure =     0.0(psf)
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4000 Trial Surfaces Have Been Generated.
 200 Surface(s) Initiate(s) From Each Of    20 Points Equally Spaced
Along The Ground Surface Between  X =   30.00(ft)
                             and  X =   45.00(ft)
Each Surface Terminates Between   X =   55.00(ft)
                             and  X = 115.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
 7.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
```



```
 * * Safety Factors Are Calculated By The Modified Bishop Method * *
 Total Number of Trial Surfaces Evaluated =  4000
 Statistical Data On All Valid FS Values:
    FS Max =    9.173   FS Min =    1.104   FS Ave =    1.568
    Standard Deviation =     0.469   Coefficient of Variation =   29.90 %
 Failure Surface Specified By 12 Coordinate Points
   Point       X-Surf       Y-Surf
    No.         (ft)         (ft)
     1         38.68        58.98
     2         45.61        60.04
     3         52.41        61.69
     4         59.04        63.94
     5         65.44        66.77
     6         71.57        70.15
     7         77.38        74.05
     8         82.82        78.46
     9         87.85        83.32
    10         92.43        88.62
    11         96.53        94.29
    12         97.55        96.00
 Circle Center At X =    30.35 ; Y =   137.55 ; and Radius =    79.01
        Factor of Safety
       ***    1.104   ***
       Individual data on the     20  slices
                        Water   Water    Tie      Tie       Earthquake
                        Force   Force   Force    Force        Force     Surcharge
Slice  Width   Weight    Top     Bot     Norm     Tan      Hor     Ver     Load
 No.   (ft)    (lbs)    (lbs)   (lbs)    (lbs)    (lbs)   (lbs)   (lbs)   (lbs)
  1     6.9    2640.6    0.0     0.0      0.        0.    607.3    0.0     0.0
  2     6.8    7464.0    0.0     0.0      0.        0.   1716.7    0.0     0.0
  3     6.6   11377.5    0.0     0.0      0.        0.   2616.8    0.0     0.0
  4     1.9    3858.2    0.0     0.0      0.        0.    887.4    0.0     0.0
  5     4.5   10302.3    0.0     0.0      0.        0.   2369.5    0.0     0.0
  6     0.1     145.9    0.0     0.0      0.        0.     33.5    0.0     0.0
  7     0.1     240.7    0.0     0.0      0.        0.     55.4    0.0     0.0
  8     3.6    8964.6    0.0     0.0      0.        0.   2061.8    0.0     0.0
  9     2.4    5927.2    0.0     0.0      0.        0.   1363.2    0.0     0.0
 10     2.4    5692.6    0.0     0.0      0.        0.   1309.3    0.0     0.0
 11     2.8    6127.4    0.0     0.0      0.        0.   1409.3    0.0     0.0
 12     0.6    1220.6    0.0     0.0      0.        0.    280.7    0.0     0.0
 13     5.4   10525.9    0.0     0.0      0.        0.   2421.0    0.0     0.0
 14     5.0    7873.1    0.0     0.0      0.        0.   1810.8    0.0     0.0
 15     2.1    2679.3    0.0     0.0      0.        0.    616.2    0.0     0.0
 16     0.1      91.9    0.0     0.0      0.        0.     21.1    0.0     0.0
 17     0.9     993.9    0.0     0.0      0.        0.    228.6    0.0     0.0
 18     1.4    1354.3    0.0     0.0      0.        0.    311.5    0.0     0.0
 19     4.1    2143.4    0.0     0.0      0.        0.    493.0    0.0     0.0
 20     1.0     100.2    0.0     0.0      0.        0.     23.0    0.0     0.0
 Failure Surface Specified By 12 Coordinate Points
   Point       X-Surf       Y-Surf
    No.         (ft)         (ft)
     1         38.68        58.98
     2         45.62        59.92
     3         52.45        61.46
     4         59.12        63.60
     5         65.56        66.32
     6         71.75        69.60
     7         77.62        73.42
     8         83.13        77.74
     9         88.23        82.52
    10         92.89        87.75
    11         97.07        93.36
    12         98.70        96.00
 Circle Center At X =    31.74 ; Y =   137.40 ; and Radius =    78.72
        Factor of Safety
       ***    1.107   ***
 Failure Surface Specified By 11 Coordinate Points
```

```
 Point      X-Surf      Y-Surf
  No.        (ft)        (ft)
  1          38.68       58.98
  2          45.61       60.03
  3          52.38       61.78
  4          58.94       64.23
  5          65.21       67.34
  6          71.13       71.08
  7          76.62       75.42
  8          81.64       80.30
  9          86.12       85.68
 10          90.03       91.49
 11          92.42       96.00
Circle Center At X =    32.10 ; Y =   126.19 ; and Radius =    67.52
      Factor of Safety
     ***   1.111   ***
Failure Surface Specified By 12 Coordinate Points
 Point      X-Surf      Y-Surf
  No.        (ft)        (ft)
  1          38.68       58.98
  2          45.50       60.59
  3          52.21       62.59
  4          58.78       64.99
  5          65.21       67.76
  6          71.46       70.91
  7          77.52       74.41
  8          83.36       78.27
  9          88.97       82.46
 10          94.32       86.98
 11          99.40       91.80
 12         103.33       96.00
Circle Center At X =    14.83 ; Y =   175.62 ; and Radius =   119.05
      Factor of Safety
     ***   1.114   ***
Failure Surface Specified By 12 Coordinate Points
 Point      X-Surf      Y-Surf
  No.        (ft)        (ft)
  1          38.68       58.98
  2          45.41       60.91
  3          52.02       63.23
  4          58.47       65.94
  5          64.75       69.03
  6          70.84       72.49
  7          76.71       76.30
  8          82.35       80.46
  9          87.72       84.94
 10          92.83       89.73
 11          97.63       94.82
 12          98.63       96.00
Circle Center At X =     9.80 ; Y =   172.81 ; and Radius =   117.43
      Factor of Safety
     ***   1.114   ***
Failure Surface Specified By 11 Coordinate Points
 Point      X-Surf      Y-Surf
  No.        (ft)        (ft)
  1          38.68       58.98
  2          45.65       59.64
  3          52.51       61.07
  4          59.16       63.24
  5          65.53       66.15
  6          71.54       69.74
  7          77.11       73.97
  8          82.18       78.80
  9          86.68       84.16
 10          90.56       89.99
 11          93.66       96.00
Circle Center At X =    36.27 ; Y =   121.92 ; and Radius =    62.99
```

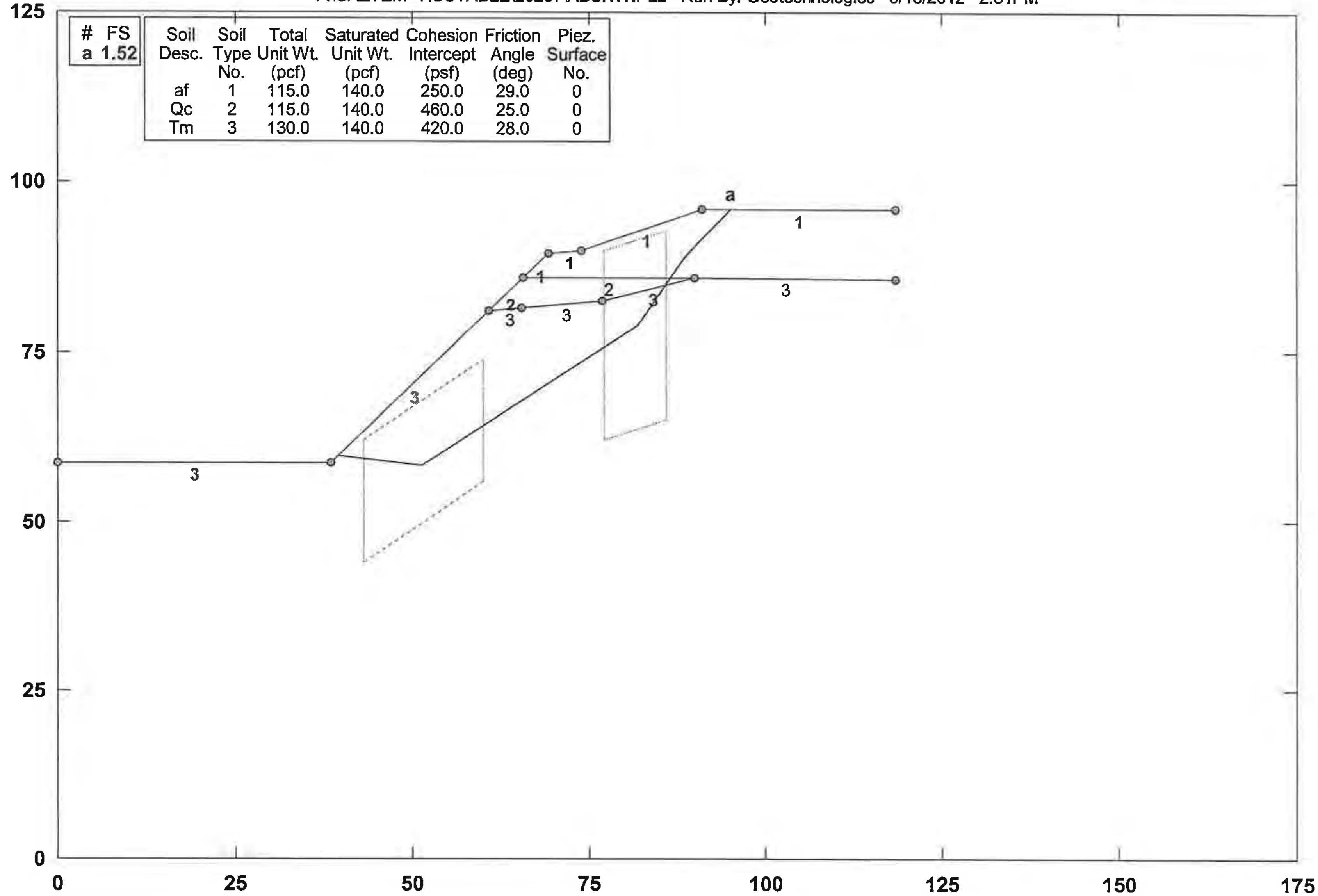


```
      Factor of Safety
     ***   1.117   ***
Failure Surface Specified By 11 Coordinate Points
 Point      X-Surf      Y-Surf
  No.        (ft)        (ft)
  1          39.47       59.77
  2          46.39       60.83
  3          53.18       62.54
  4          59.78       64.87
  5          66.13       67.82
  6          72.18       71.34
  7          77.87       75.42
  8          83.15       80.02
  9          87.97       85.09
 10          92.30       90.59
 11          95.79       96.00
Circle Center At X =    31.67 ; Y =   133.83 ; and Radius =    74.47
      Factor of Safety
     ***   1.118   ***
Failure Surface Specified By 12 Coordinate Points
 Point      X-Surf      Y-Surf
  No.        (ft)        (ft)
  1          39.47       59.77
  2          46.30       61.32
  3          53.01       63.32
  4          59.57       65.76
  5          65.95       68.64
  6          72.13       71.93
  7          78.07       75.63
  8          83.76       79.71
  9          89.16       84.17
 10          94.25       88.97
 11          99.00       94.11
 12         100.53       96.00
Circle Center At X =    19.86 ; Y =   162.40 ; and Radius =   104.48
      Factor of Safety
     ***   1.120   ***
Failure Surface Specified By 11 Coordinate Points
 Point      X-Surf      Y-Surf
  No.        (ft)        (ft)
  1          39.47       59.77
  2          46.29       61.36
  3          52.95       63.52
  4          59.40       66.24
  5          65.59       69.50
  6          71.48       73.29
  7          77.02       77.56
  8          82.18       82.30
  9          86.91       87.45
 10          91.19       93.00
 11          93.12       96.00
Circle Center At X =    24.45 ; Y =   140.02 ; and Radius =    81.64
      Factor of Safety
     ***   1.124   ***
Failure Surface Specified By 11 Coordinate Points
 Point      X-Surf      Y-Surf
  No.        (ft)        (ft)
  1          38.68       58.98
  2          45.37       61.07
  3          51.90       63.57
  4          58.27       66.49
  5          64.44       69.80
  6          70.38       73.49
  7          76.09       77.55
  8          81.52       81.96
  9          86.66       86.71
 10          91.50       91.77
```

```
   11          95.05       96.00
Circle Center At X =     9.06 ; Y =   165.63 ; and Radius =   110.68
       Factor of Safety
      ***    1.124   ***
          **** END OF GSTABL7 OUTPUT ****
```

Kimley-Horn Associates, Inc. / 20287 / Section A / Block / Static Analysis

F:\CAZTEM~1\GSTABLE\20287\ABSNW.PL2 Run By: Geotechnologies 5/13/2012 2:31PM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
af	1	115.0	140.0	250.0	29.0	0
Qc	2	115.0	140.0	460.0	25.0	0
Tm	3	130.0	140.0	420.0	28.0	0

GSTABL7 v.2 FSmin=1.52

Safety Factors Are Calculated By The Simplified Janbu Method

```
                         *** GSTABL7 ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
 ** Original Version 1.0, January 1996; Current Version 2.002, December 2001 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*********************************************************************************
                  SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static Earthquake, and Applied Force Options.
*********************************************************************************
Analysis Run Date:        5/13/2012
Time of Run:              2:31PM
Run By:                   Geotechnologies
Input Data Filename:      F:ABSNW.
Output Filename:          F:ABSNW.OUT
Unit System:              English
Plotted Output Filename:  F:ABSNW.PLT
PROBLEM DESCRIPTION:  Kimley-Horn Associates, Inc. / 20287 /
                      Section A / Block / Static Analysis
BOUNDARY COORDINATES
   7 Top   Boundaries
  12 Total Boundaries
Boundary    X-Left     Y-Left    X-Right    Y-Right    Soil Type
  No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
   1         0.00      58.80      38.50      58.80        3
   2        38.50      58.80      60.90      81.20        3
   3        60.90      81.20      65.60      85.90        2
   4        65.60      85.90      69.20      89.50        1
   5        69.20      89.50      74.00      90.00        1
   6        74.00      90.00      91.00      96.00        1
   7        91.00      96.00     118.50      96.00        1
   8        65.60      85.90      90.00      85.90        2
   9        90.00      85.90     118.50      85.70        3
  10        60.90      81.20      65.50      81.50        3
  11        65.50      81.50      76.80      82.50        3
  12        76.80      82.50      90.00      85.90        3
Default Y-Origin = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 3 Type(s) of Soil
Soil  Total  Saturated Cohesion Friction   Pore    Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept  Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)    (psf)    (deg)    Param.   (psf)     No.
  1   115.0    140.0    250.0     29.0    0.00      0.0       0
  2   115.0    140.0    460.0     25.0    0.00      0.0       0
  3   130.0    140.0    420.0     28.0    0.00      0.0       0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
4000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is  12.0
Box       X-Left     Y-Left    X-Right    Y-Right      Height
No.        (ft)       (ft)       (ft)       (ft)        (ft)
 1        43.00      53.00      60.00      65.00       18.00
 2        77.00      76.00      86.00      79.00       28.00
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Simplified Janbu Method * *
      Total Number of Trial Surfaces Evaluated =  4000
      Statistical Data On All Valid FS Values:
         FS Max =   7.584   FS Min =   1.524   FS Ave =   2.037
         Standard Deviation =    0.530   Coefficient of Variation =   26.01 %
```



```
          Failure Surface Specified By  5 Coordinate Points
            Point      X-Surf      Y-Surf
             No.        (ft)        (ft)
              1        39.50       59.80
              2        51.26       58.28
              3        81.91       78.96
              4        88.49       88.99
              5        95.13       96.00
               Factor of Safety
              ***    1.524   ***
             Individual data on the     13  slices
                          Water  Water    Tie     Tie      Earthquake
                          Force  Force   Force   Force       Force   Surcharge
Slice  Width   Weight     Top    Bot     Norm    Tan      Hor     Ver     Load
 No.   (ft)    (lbs)     (lbs)  (lbs)   (lbs)   (lbs)    (lbs)   (lbs)   (lbs)
  1    11.8   10149.8     0.0    0.0      0.      0.       0.0     0.0     0.0
  2     9.6   18611.6     0.0    0.0      0.      0.       0.0     0.0     0.0
  3     4.6   10117.2     0.0    0.0      0.      0.       0.0     0.0     0.0
  4     0.1     226.6     0.0    0.0      0.      0.       0.0     0.0     0.0
  5     3.6    8348.0     0.0    0.0      0.      0.       0.0     0.0     0.0
  6     4.8   10521.3     0.0    0.0      0.      0.       0.0     0.0     0.0
  7     2.8    5458.2     0.0    0.0      0.      0.       0.0     0.0     0.0
  8     5.1    9073.5     0.0    0.0      0.      0.       0.0     0.0     0.0
  9     3.8    5246.6     0.0    0.0      0.      0.       0.0     0.0     0.0
 10     0.7     736.7     0.0    0.0      0.      0.       0.0     0.0     0.0
 11     2.0    1703.3     0.0    0.0      0.      0.       0.0     0.0     0.0
 12     2.5    1512.9     0.0    0.0      0.      0.       0.0     0.0     0.0
 13     4.1    1033.8     0.0    0.0      0.      0.       0.0     0.0     0.0
          Failure Surface Specified By  5 Coordinate Points
            Point      X-Surf      Y-Surf
             No.        (ft)        (ft)
              1        39.50       59.80
              2        51.26       58.28
              3        81.91       78.96
              4        88.49       88.99
              5        95.13       96.00
               Factor of Safety
              ***    1.524   ***
          Failure Surface Specified By  5 Coordinate Points
            Point      X-Surf      Y-Surf
             No.        (ft)        (ft)
              1        39.50       59.80
              2        51.26       58.28
              3        81.91       78.96
              4        88.49       88.99
              5        95.13       96.00
               Factor of Safety
              ***    1.524   ***
          Failure Surface Specified By  5 Coordinate Points
            Point      X-Surf      Y-Surf
             No.        (ft)        (ft)
              1        39.50       59.80
              2        51.26       58.28
              3        81.91       78.96
              4        88.49       88.99
              5        95.13       96.00
               Factor of Safety
              ***    1.524   ***
          Failure Surface Specified By  5 Coordinate Points
            Point      X-Surf      Y-Surf
             No.        (ft)        (ft)
              1        39.50       59.80
              2        51.26       58.28
              3        81.91       78.96
              4        88.49       88.99
              5        95.13       96.00
               Factor of Safety
```

```
     ***    1.524   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         39.50       59.80
    2         51.26       58.28
    3         81.91       78.96
    4         88.49       88.99
    5         95.13       96.00
       Factor of Safety
     ***    1.524   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         39.50       59.80
    2         51.26       58.28
    3         81.91       78.96
    4         88.49       88.99
    5         95.13       96.00
       Factor of Safety
     ***    1.524   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         39.50       59.80
    2         51.26       58.28
    3         81.91       78.96
    4         88.49       88.99
    5         95.13       96.00
       Factor of Safety
     ***    1.524   ***
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         34.66       58.80
    2         36.45       57.02
    3         48.20       54.58
    4         83.11       78.70
    5         90.19       88.39
    6         93.58       96.00
       Factor of Safety
     ***    1.526   ***
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         34.66       58.80
    2         36.45       57.02
    3         48.20       54.58
    4         83.11       78.70
    5         90.19       88.39
    6         93.58       96.00
       Factor of Safety
     ***    1.526   ***
         **** END OF GSTABL7 OUTPUT ****
```

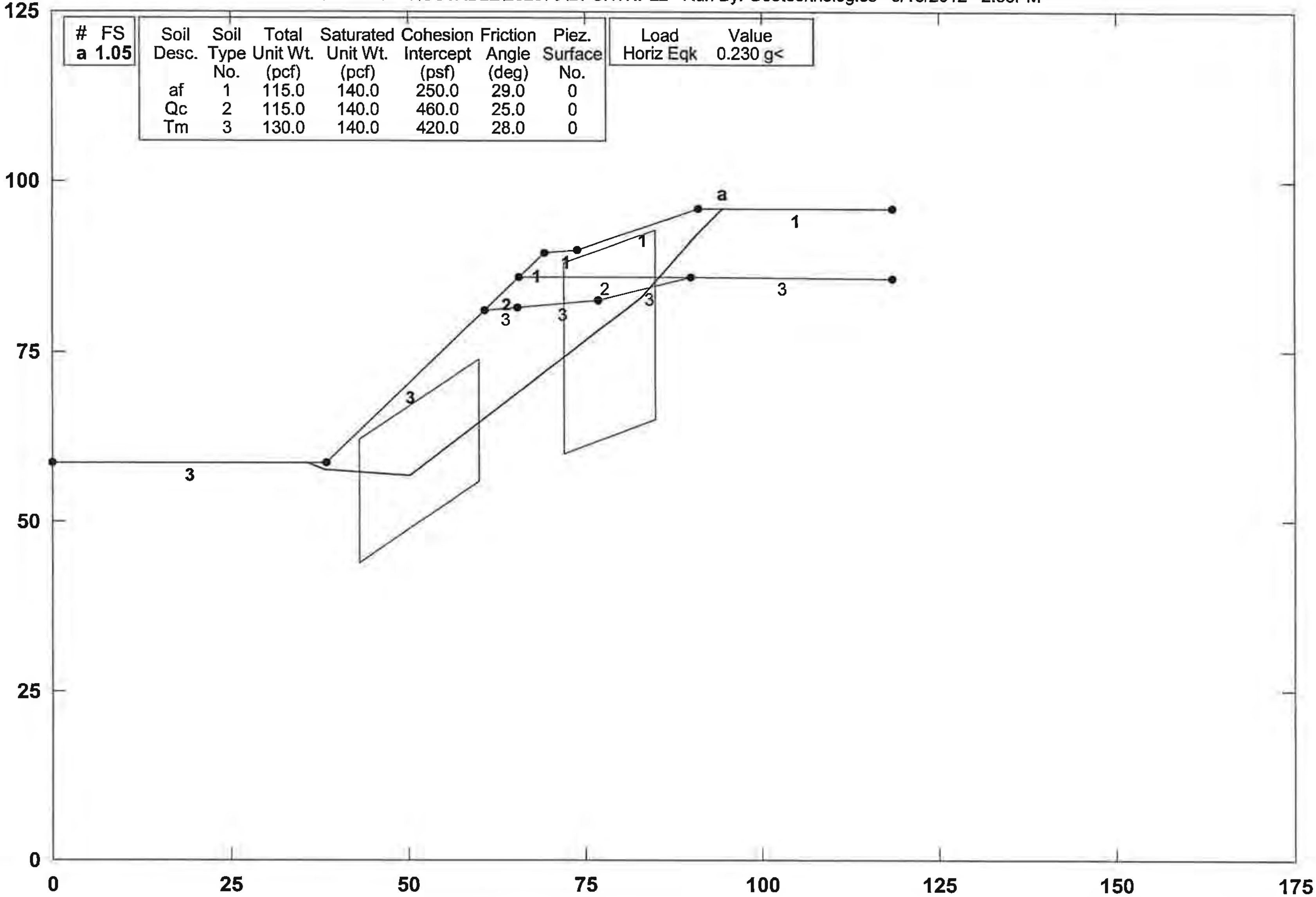
Kimley-Horn Associates, Inc. / 20287 / Section A / Block / Pseud-Static Analysis

F:\CAZTEM~1\GSTABLE\20287\ABPSNW.PL2 Run By: Geotechnologies 5/13/2012 2:38PM

#	FS
a	1.05

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
af	1	115.0	140.0	250.0	29.0	0
Qc	2	115.0	140.0	460.0	25.0	0
Tm	3	130.0	140.0	420.0	28.0	0

Load	Value
Horiz Eqk	0.230 g<



GSTABL7 v.2 FSmin=1.05

Safety Factors Are Calculated By The Simplified Janbu Method

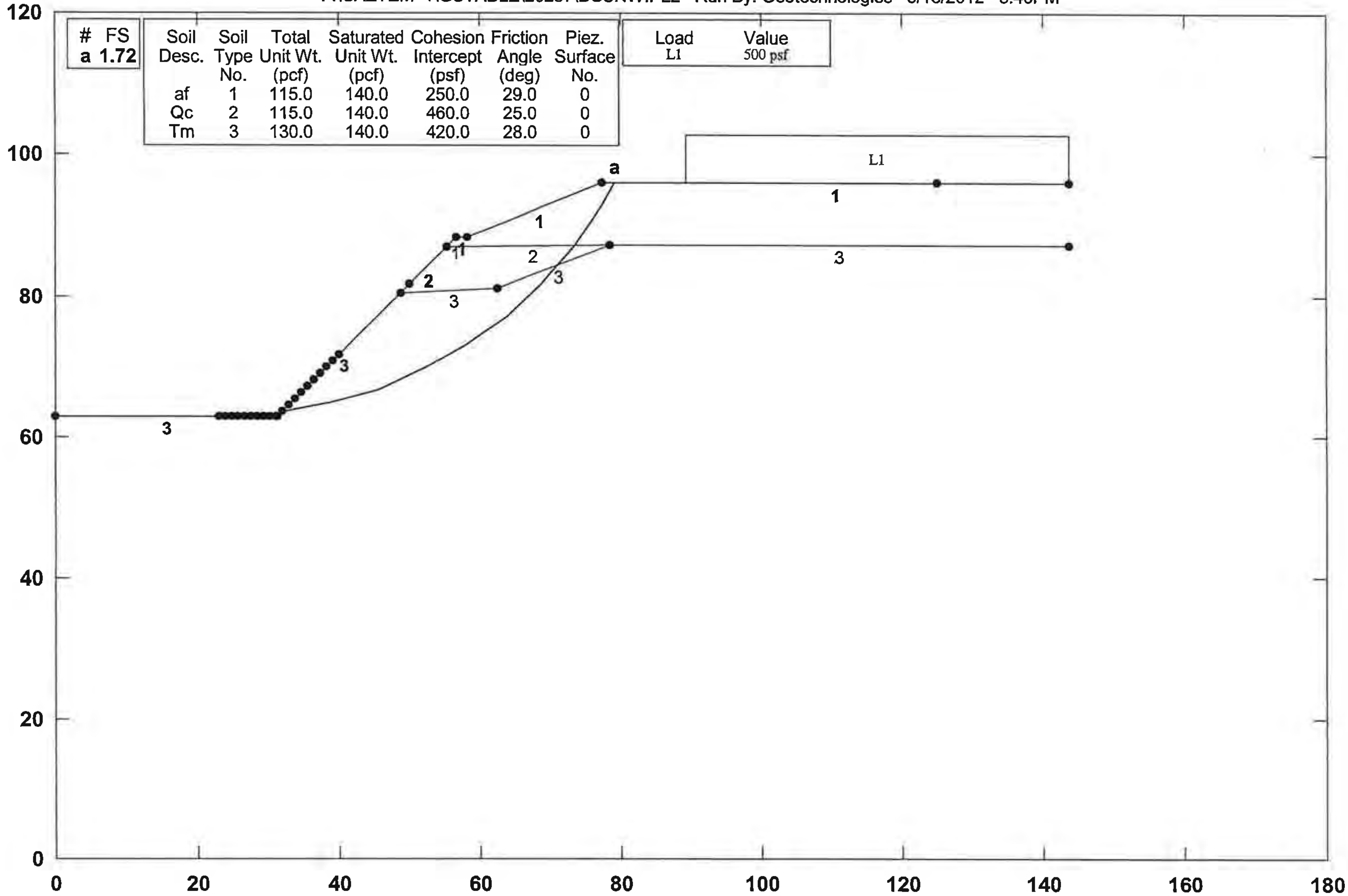
```
                        *** GSTABL7 ***
             ** GSTABL7 by Garry H. Gregory, P.E. **
 ** Original Version 1.0, January 1996; Current Version 2.002, December 2001 **
          (All Rights Reserved-Unauthorized Use Prohibited)
*********************************************************************************
                   SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static Earthquake, and Applied Force Options.
*********************************************************************************
Analysis Run Date:        5/13/2012
Time of Run:              2:38PM
Run By:                   Geotechnologies
Input Data Filename:      F:ABPSNW.
Output Filename:          F:ABPSNW.OUT
Unit System:              English
Plotted Output Filename:  F:ABPSNW.PLT
PROBLEM DESCRIPTION:  Kimley-Horn Associates, Inc. / 20287 / S
                      ection A / Block / Pseud-Static Analysis
BOUNDARY COORDINATES
    7 Top  Boundaries
   12 Total Boundaries
Boundary    X-Left     Y-Left    X-Right    Y-Right    Soil Type
  No.        (ft)       (ft)      (ft)       (ft)      Below Bnd
   1         0.00      58.80     38.50      58.80         3
   2        38.50      58.80     60.90      81.20         3
   3        60.90      81.20     65.60      85.90         2
   4        65.60      85.90     69.20      89.50         1
   5        69.20      89.50     74.00      90.00         1
   6        74.00      90.00     91.00      96.00         1
   7        91.00      96.00    118.50      96.00         1
   8        65.60      85.90     90.00      85.90         2
   9        90.00      85.90    118.50      85.70         3
  10        60.90      81.20     65.50      81.50         3
  11        65.50      81.50     76.80      82.50         3
  12        76.80      82.50     90.00      85.90         3
Default Y-Origin = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
 3 Type(s) of Soil
Soil  Total  Saturated Cohesion Friction  Pore   Pressure  Piez.
Type Unit Wt. Unit Wt. Intercept  Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)    (deg)   Param.   (psf)    No.
  1   115.0    140.0     250.0    29.0    0.00      0.0      0
  2   115.0    140.0     460.0    25.0    0.00      0.0      0
  3   130.0    140.0     420.0    28.0    0.00      0.0      0
A Horizontal Earthquake Loading Coefficient
Of0.230 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure =    0.0(psf)
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
4000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is  12.0
Box       X-Left     Y-Left    X-Right    Y-Right      Height
No.        (ft)       (ft)      (ft)       (ft)         (ft)
 1        43.00      53.00     60.00      65.00        18.00
 2        72.00      74.00     85.00      79.00        28.00
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
```



```
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated =  4000
Statistical Data On All Valid FS Values:
   FS Max =   6.359   FS Min =   1.048   FS Ave =   1.412
   Standard Deviation =    0.331   Coefficient of Variation =   23.43 %
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        35.67       58.80
    2        38.33       57.61
    3        50.30       56.72
    4        83.03       83.01
    5        90.75       92.19
    6        94.38       96.00
       Factor of Safety
      ***   1.048   ***
     Individual data on the     15  slices
                    Water  Water    Tie     Tie      Earthquake
                    Force  Force   Force   Force       Force   Surcharge
Slice  Width  Weight  Top    Bot    Norm    Tan     Hor    Ver    Load
 No.   (ft)   (lbs)  (lbs)  (lbs)   (lbs)  (lbs)   (lbs)  (lbs)  (lbs)
  1     2.7    205.8   0.0    0.0     0.     0.     47.3   0.0    0.0
  2     0.2     26.7   0.0    0.0     0.     0.      6.1   0.0    0.0
  3    11.8  11560.3   0.0    0.0     0.     0.   2658.9   0.0    0.0
  4    10.6  20568.6   0.0    0.0     0.     0.   4730.8   0.0    0.0
  5     4.6   9669.5   0.0    0.0     0.     0.   2224.0   0.0    0.0
  6     0.1    212.9   0.0    0.0     0.     0.     49.0   0.0    0.0
  7     3.6   7745.2   0.0    0.0     0.     0.   1781.4   0.0    0.0
  8     4.8   9380.9   0.0    0.0     0.     0.   2157.6   0.0    0.0
  9     2.8   4615.3   0.0    0.0     0.     0.   1061.5   0.0    0.0
 10     6.2   8562.7   0.0    0.0     0.     0.   1969.4   0.0    0.0
 11     1.2   1323.2   0.0    0.0     0.     0.    304.3   0.0    0.0
 12     1.3   1249.5   0.0    0.0     0.     0.    287.4   0.0    0.0
 13     5.3   3607.8   0.0    0.0     0.     0.    829.8   0.0    0.0
 14     0.2    103.9   0.0    0.0     0.     0.     23.9   0.0    0.0
 15     3.4    690.0   0.0    0.0     0.     0.    158.7   0.0    0.0
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        35.67       58.80
    2        38.33       57.61
    3        50.30       56.72
    4        83.03       83.01
    5        90.75       92.19
    6        94.38       96.00
       Factor of Safety
      ***   1.048   ***
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        35.67       58.80
    2        38.33       57.61
    3        50.30       56.72
    4        83.03       83.01
    5        90.75       92.19
    6        94.38       96.00
       Factor of Safety
      ***   1.048   ***
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        35.67       58.80
    2        38.33       57.61
    3        50.30       56.72
    4        83.03       83.01
    5        90.75       92.19
    6        94.38       96.00
```

Kimley-Horn Associates, Inc. / 20287 / Section B / Static Analysis

F:\CAZTEM~1\GSTABLE\20287\BCSNW.PL2 Run By: Geotechnologies 5/13/2012 3:46PM



#	FS
a	1.72

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
af	1	115.0	140.0	250.0	29.0	0
Qc	2	115.0	140.0	460.0	25.0	0
Tm	3	130.0	140.0	420.0	28.0	0

Load	Value
L1	500 psf

GSTABL7 v.2 FSmin=1.72

Safety Factors Are Calculated By The Modified Bishop Method

```
                        ***  GSTABL7  ***
              ** GSTABL7 by Garry H. Gregory, P.E. **
  ** Original Version 1.0, January 1996; Current Version 2.002, December 2001 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*********************************************************************************
                   SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static Earthquake, and Applied Force Options.
*********************************************************************************
Analysis Run Date:          5/13/2012
Time of Run:                3:46PM
Run By:                     Geotechnologies
Input Data Filename:        F:BCSNW.
Output Filename:            F:BCSNW.OUT
Unit System:                English
Plotted Output Filename:    F:BCSNW.PLT
PROBLEM DESCRIPTION:   Kimley-Horn Associates, Inc. / 20287 / S
                       ection B / Static Analysis
BOUNDARY COORDINATES
    7 Top   Boundaries
   11 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
  No.         (ft)        (ft)        (ft)        (ft)      Below Bnd
   1          0.00       63.00       31.20       63.00          3
   2         31.20       63.00       48.70       80.50          3
   3         48.70       80.50       55.30       87.00          2
   4         55.30       87.00       56.60       88.40          1
   5         56.60       88.40       58.30       88.40          1
   6         58.30       88.40       77.30       96.10          1
   7         77.30       96.10      143.80       96.10          1
   8         55.30       87.00       78.50       87.20          2
   9         78.50       87.20      143.80       87.20          3
  10         48.70       80.50       62.60       81.30          3
  11         62.60       81.30       78.50       87.20          3
Default Y-Origin = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept  Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)    (deg)   Param.   (psf)     No.
  1   115.0    140.0     250.0    29.0    0.00      0.0       0
  2   115.0    140.0     460.0    25.0    0.00      0.0       0
  3   130.0    140.0     420.0    28.0    0.00      0.0       0
BOUNDARY LOAD(S)
    1 Load(s) Specified
Load        X-Left       X-Right      Intensity      Deflection
 No.         (ft)         (ft)          (psf)           (deg)
  1         89.40        143.80         500.0            0.0
NOTE - Intensity Is Specified As A Uniformly Distributed
        Force Acting On A Horizontally Projected Surface.
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4000 Trial Surfaces Have Been Generated.
 200 Surface(s) Initiate(s) From Each Of    20 Points Equally Spaced
Along The Ground Surface Between  X =  23.00(ft)
                              and  X =  40.00(ft)
Each Surface Terminates Between   X =  50.00(ft)
                             and  X = 125.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =      0.00(ft)
 7.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
```



```
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated =  4000
Statistical Data On All Valid FS Values:
   FS Max =  10.934   FS Min =   1.720   FS Ave =   2.972
   Standard Deviation =     0.769   Coefficient of Variation =   25.88 %
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf       Y-Surf
   No.        (ft)         (ft)
    1        31.95        63.75
    2        38.85        64.94
    3        45.56        66.90
    4        52.01        69.63
    5        58.11        73.07
    6        63.77        77.19
    7        68.92        81.92
    8        73.50        87.22
    9        77.45        93.00
   10        79.08        96.10
Circle Center At X =    25.17 ; Y =   124.13 ; and Radius =    60.77
       Factor of Safety
     ***   1.720   ***
     Individual data on the    17  slices
                        Water  Water     Tie      Tie      Earthquake
                        Force  Force    Force    Force       Force    Surcharge
Slice  Width   Weight    Top    Bot     Norm     Tan      Hor     Ver    Load
 No.   (ft)    (lbs)    (lbs)  (lbs)    (lbs)    (lbs)   (lbs)   (lbs)   (lbs)
  1     6.9   2560.4    0.0    0.0       0.       0.     0.0     0.0      0.0
  2     6.7   7059.9    0.0    0.0       0.       0.     0.0     0.0      0.0
  3     3.1   4633.6    0.0    0.0       0.       0.     0.0     0.0      0.0
  4     3.3   5608.7    0.0    0.0       0.       0.     0.0     0.0      0.0
  5     3.3   6109.4    0.0    0.0       0.       0.     0.0     0.0      0.0
  6     1.3   2546.1    0.0    0.0       0.       0.     0.0     0.0      0.0
  7     1.5   2920.5    0.0    0.0       0.       0.     0.0     0.0      0.0
  8     0.2    360.5    0.0    0.0       0.       0.     0.0     0.0      0.0
  9     4.3   7582.5    0.0    0.0       0.       0.     0.0     0.0      0.0
 10     1.2   1915.4    0.0    0.0       0.       0.     0.0     0.0      0.0
 11     5.2   7419.8    0.0    0.0       0.       0.     0.0     0.0      0.0
 12     2.2   2546.1    0.0    0.0       0.       0.     0.0     0.0      0.0
 13     2.3   2213.9    0.0    0.0       0.       0.     0.0     0.0      0.0
 14     0.1     43.2    0.0    0.0       0.       0.     0.0     0.0      0.0
 15     3.8   2328.2    0.0    0.0       0.       0.     0.0     0.0      0.0
 16     0.1     55.4    0.0    0.0       0.       0.     0.0     0.0      0.0
 17     1.6    291.1    0.0    0.0       0.       0.     0.0     0.0      0.0
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf       Y-Surf
   No.        (ft)         (ft)
    1        31.95        63.75
    2        38.83        65.05
    3        45.53        67.07
    4        51.98        69.78
    5        58.12        73.15
    6        63.86        77.15
    7        69.16        81.72
    8        73.95        86.83
    9        78.18        92.41
   10        80.41        96.10
Circle Center At X =    23.09 ; Y =   129.49 ; and Radius =    66.34
       Factor of Safety
     ***   1.721   ***
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf       Y-Surf
   No.        (ft)         (ft)
    1        31.95        63.75
    2        38.87        64.79
    3        45.60        66.73
    4        52.02        69.52
```

```
      5         58.02        73.12
      6         63.51        77.46
      7         68.38        82.49
      8         72.57        88.10
      9         75.99        94.21
     10         76.64        95.83
 Circle Center At X =    27.48 ; Y =   117.13 ; and Radius =    53.57
        Factor of Safety
      ***    1.726   ***
 Failure Surface Specified By  9 Coordinate Points
   Point       X-Surf       Y-Surf
    No.         (ft)         (ft)
      1         31.95        63.75
      2         38.79        65.24
      3         45.40        67.54
      4         51.68        70.63
      5         57.54        74.45
      6         62.90        78.96
      7         67.68        84.08
      8         71.80        89.73
      9         74.78        95.08
 Circle Center At X =    23.08 ; Y =   120.90 ; and Radius =    57.84
        Factor of Safety
      ***    1.742   ***
 Failure Surface Specified By  9 Coordinate Points
   Point       X-Surf       Y-Surf
    No.         (ft)         (ft)
      1         31.95        63.75
      2         38.92        64.40
      3         45.68        66.19
      4         52.07        69.07
      5         57.89        72.95
      6         63.00        77.74
      7         67.25        83.30
      8         70.53        89.48
      9         72.04        93.97
 Circle Center At X =    31.47 ; Y =   106.25 ; and Radius =    42.51
        Factor of Safety
      ***    1.744   ***
 Failure Surface Specified By  9 Coordinate Points
   Point       X-Surf       Y-Surf
    No.         (ft)         (ft)
      1         31.95        63.75
      2         38.88        64.74
      3         45.55        66.85
      4         51.79        70.03
      5         57.42        74.19
      6         62.29        79.22
      7         66.27        84.97
      8         69.25        91.31
      9         69.74        93.04
 Circle Center At X =    29.43 ; Y =   106.19 ; and Radius =    42.51
        Factor of Safety
      ***    1.750   ***
 Failure Surface Specified By 10 Coordinate Points
   Point       X-Surf       Y-Surf
    No.         (ft)         (ft)
      1         31.95        63.75
      2         38.95        63.90
      3         45.84        65.10
      4         52.48        67.33
      5         58.71        70.53
      6         64.38        74.63
      7         69.38        79.53
      8         73.58        85.13
      9         76.89        91.29
     10         78.61        96.10
```



```
 Circle Center At X =    34.49 ; Y =   109.90 ; and Radius =    46.22
        Factor of Safety
      ***    1.750   ***
 Failure Surface Specified By 10 Coordinate Points
   Point       X-Surf       Y-Surf
    No.         (ft)         (ft)
      1         32.84        64.64
      2         39.79        65.49
      3         46.59        67.17
      4         53.13        69.66
      5         59.32        72.93
      6         65.07        76.92
      7         70.29        81.58
      8         74.92        86.83
      9         78.87        92.61
     10         80.68        96.10
 Circle Center At X =    29.48 ; Y =   121.86 ; and Radius =    57.31
        Factor of Safety
      ***    1.752   ***
 Failure Surface Specified By  9 Coordinate Points
   Point       X-Surf       Y-Surf
    No.         (ft)         (ft)
      1         31.95        63.75
      2         38.91        64.46
      3         45.64        66.38
      4         51.93        69.45
      5         57.59        73.58
      6         62.43        78.63
      7         66.31        84.46
      8         69.11        90.87
      9         69.62        92.99
 Circle Center At X =    31.41 ; Y =   103.51 ; and Radius =    39.77
        Factor of Safety
      ***    1.753   ***
 Failure Surface Specified By 10 Coordinate Points
   Point       X-Surf       Y-Surf
    No.         (ft)         (ft)
      1         31.95        63.75
      2         38.95        63.94
      3         45.82        65.26
      4         52.39        67.66
      5         58.49        71.10
      6         63.95        75.48
      7         68.64        80.68
      8         72.42        86.57
      9         75.20        92.99
     10         75.84        95.51
 Circle Center At X =    34.36 ; Y =   106.63 ; and Radius =    42.95
        Factor of Safety
      ***    1.754   ***
          **** END OF GSTABL7 OUTPUT ****
```

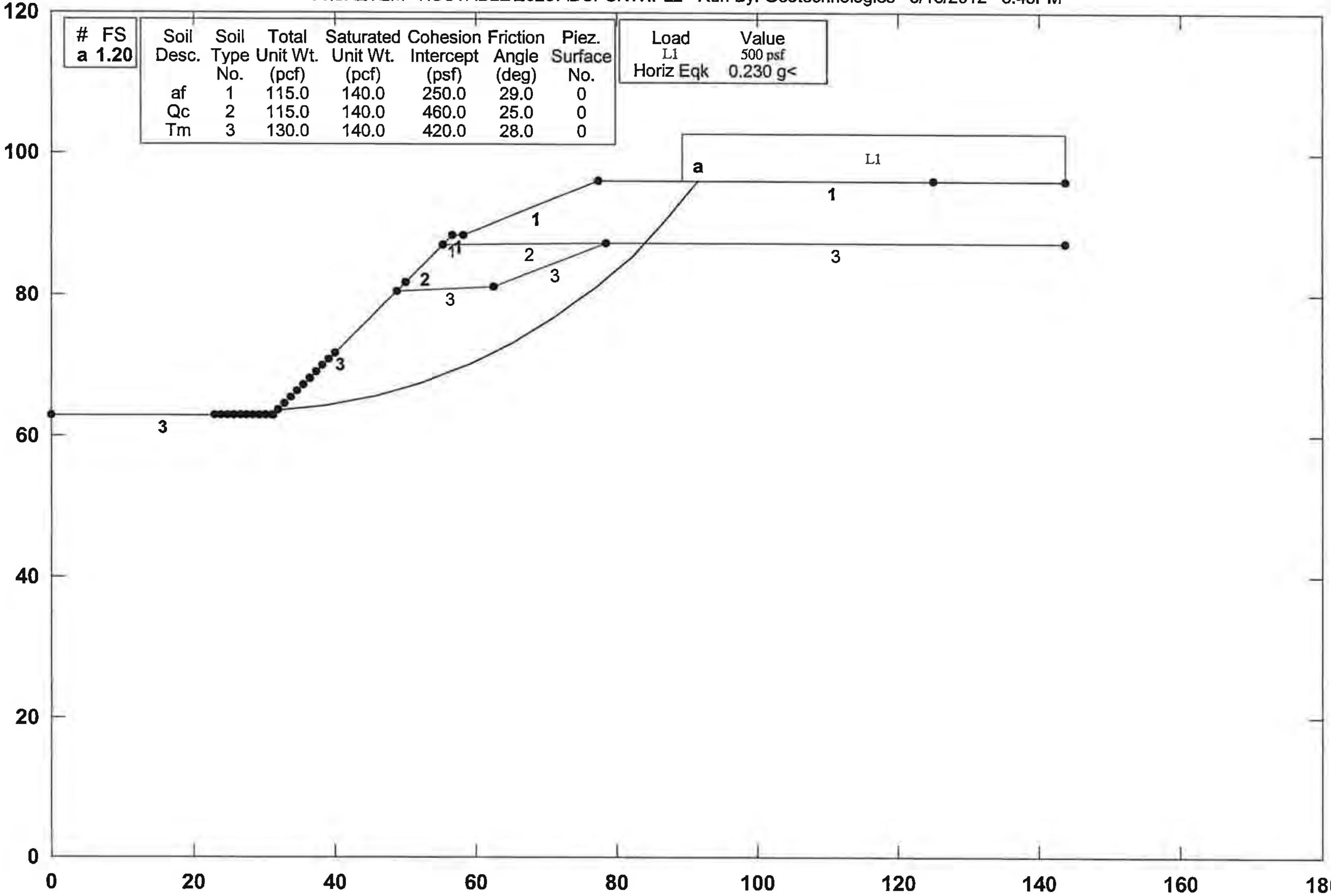
Kimley-Horn Associates, Inc. / 20287 / Section B / Pseudo-Static Analysis

F:\CAZTEM~1\GSTABLE\20287\BCPSNW.PL2 Run By: Geotechnologies 5/13/2012 3:48PM

#	FS
a	1.20

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
af	1	115.0	140.0	250.0	29.0	0
Qc	2	115.0	140.0	460.0	25.0	0
Tm	3	130.0	140.0	420.0	28.0	0

Load	Value
L1	500 psf
Horiz Eqk	0.230 g<



GSTABL7 v.2 FSmin=1.20

Safety Factors Are Calculated By The Modified Bishop Method

*** GSTABL7 ***
** GSTABL7 by Garry H. Gregory, P.E. **
** Original Version 1.0, January 1996; Current Version 2.002, December 2001 **

****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static Earthquake, and Applied Force Options.
****

Analysis Run Date: 5/13/2012
Time of Run: 3:48PM
Run By: Geotechnologies
Input Data Filename: F:BCPSNW.
Output Filename: F:BCPSNW.OUT
Unit System: English
Plotted Output Filename: F:BCPSNW.PLT
PROBLEM DESCRIPTION: Kimley-Horn Associates, Inc. / 20287 / S
ection B / Pseudo-Static Analysis

BOUNDARY COORDINATES
7 Top Boundaries
11 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	63.00	31.20	63.00	3
2	31.20	63.00	48.70	80.50	3
3	48.70	80.50	55.30	87.00	2
4	55.30	87.00	56.60	88.40	1
5	56.60	88.40	58.30	88.40	1
6	58.30	88.40	77.30	96.10	1
7	77.30	96.10	143.80	96.10	1
8	55.30	87.00	78.50	87.20	2
9	78.50	87.20	143.80	87.20	3
10	48.70	80.50	62.60	81.30	3
11	62.60	81.30	78.50	87.20	3

Default Y-Origin = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	115.0	140.0	250.0	29.0	0.00	0.0	0
2	115.0	140.0	460.0	25.0	0.00	0.0	0
3	130.0	140.0	420.0	28.0	0.00	0.0	0

BOUNDARY LOAD(S)
1 Load(s) Specified

Load No.	X-Left (ft)	X-Right (ft)	Intensity (psf)	Deflection (deg)
1	89.40	143.80	500.0	0.0

NOTE - Intensity Is Specified As A Uniformly Distributed
Force Acting On A Horizontally Projected Surface.
A Horizontal Earthquake Loading Coefficient
Of0.230 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure = 0.0(psf)
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
4000 Trial Surfaces Have Been Generated.
200 Surface(s) Initiate(s) From Each Of 20 Points Equally Spaced
Along The Ground Surface Between X = 23.00(ft)
and X = 40.00(ft)
Each Surface Terminates Between X = 50.00(ft)
and X = 125.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)
7.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Modified Bishop Method * *
Total Number of Trial Surfaces Evaluated = 4000
Statistical Data On All Valid FS Values:
FS Max = 8.785 FS Min = 1.196 FS Ave = 1.890
Standard Deviation = 0.501 Coefficient of Variation = 26.49 %
Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	31.95	63.75
2	38.91	64.44
3	45.79	65.74
4	52.53	67.65
5	59.07	70.15
6	65.36	73.21
7	71.36	76.82
8	77.01	80.95
9	82.27	85.56
10	87.11	90.62
11	91.48	96.09
12	91.49	96.10

Circle Center At X = 27.66 ; Y = 142.61 ; and Radius = 78.97
Factor of Safety
*** 1.196 ***
Individual data on the 20 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	7.0	2841.8	0.0	0.0	0.	0.	653.6	0.0	0.0
2	6.9	8103.1	0.0	0.0	0.	0.	1863.7	0.0	0.0
3	2.9	4875.0	0.0	0.0	0.	0.	1121.2	0.0	0.0
4	3.8	7497.4	0.0	0.0	0.	0.	1724.4	0.0	0.0
5	2.8	6092.9	0.0	0.0	0.	0.	1401.4	0.0	0.0
6	1.3	3035.5	0.0	0.0	0.	0.	698.2	0.0	0.0
7	1.7	3982.0	0.0	0.0	0.	0.	915.9	0.0	0.0
8	0.8	1761.9	0.0	0.0	0.	0.	405.2	0.0	0.0
9	3.5	8026.3	0.0	0.0	0.	0.	1846.1	0.0	0.0
10	2.8	6146.3	0.0	0.0	0.	0.	1413.7	0.0	0.0
11	6.0	12797.6	0.0	0.0	0.	0.	2943.4	0.0	0.0
12	5.7	10939.3	0.0	0.0	0.	0.	2516.0	0.0	0.0
13	0.3	525.0	0.0	0.0	0.	0.	120.8	0.0	0.0
14	1.2	2077.5	0.0	0.0	0.	0.	477.8	0.0	0.0
15	3.8	5478.6	0.0	0.0	0.	0.	1260.1	0.0	0.0
16	1.6	1768.8	0.0	0.0	0.	0.	406.8	0.0	0.0
17	3.3	2704.4	0.0	0.0	0.	0.	622.0	0.0	0.0
18	2.3	1064.6	0.0	0.0	0.	0.	244.9	0.0	0.0
19	2.1	313.8	0.0	0.0	0.	0.	72.2	0.0	1040.6
20	0.0	0.0	0.0	0.0	0.	0.	0.0	0.0	2.9

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	31.95	63.75
2	38.83	65.05
3	45.53	67.07
4	51.98	69.78
5	58.12	73.15
6	63.86	77.15
7	69.16	81.72
8	73.95	86.83
9	78.18	92.41
10	80.41	96.10

```
Circle Center At X =    23.09 ; Y =   129.49 ; and Radius =    66.34
       Factor of Safety
      ***    1.201   ***
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         31.95       63.75
    2         38.85       64.94
    3         45.56       66.90
    4         52.01       69.63
    5         58.11       73.07
    6         63.77       77.19
    7         68.92       81.92
    8         73.50       87.22
    9         77.45       93.00
   10         79.08       96.10
Circle Center At X =    25.17 ; Y =   124.13 ; and Radius =    60.77
       Factor of Safety
      ***    1.207   ***
Failure Surface Specified By 11 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         32.84       64.64
    2         39.75       65.76
    3         46.54       67.47
    4         53.16       69.75
    5         59.55       72.60
    6         65.67       76.00
    7         71.48       79.90
    8         76.93       84.30
    9         81.98       89.15
   10         86.59       94.42
   11         87.82       96.10
Circle Center At X =    23.41 ; Y =   145.07 ; and Radius =    80.98
       Factor of Safety
      ***    1.210   ***
Failure Surface Specified By 12 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         31.95       63.75
    2         38.94       63.99
    3         45.89       64.88
    4         52.72       66.40
    5         59.39       68.54
    6         65.83       71.28
    7         71.99       74.60
    8         77.82       78.47
    9         83.27       82.86
   10         88.30       87.73
   11         92.86       93.04
   12         95.03       96.10
Circle Center At X =    32.84 ; Y =   139.69 ; and Radius =    75.95
       Factor of Safety
      ***    1.212   ***
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         32.84       64.64
    2         39.79       65.49
    3         46.59       67.17
    4         53.13       69.66
    5         59.32       72.93
    6         65.07       76.92
    7         70.29       81.58
    8         74.92       86.83
    9         78.87       92.61
   10         80.68       96.10
```



```
Circle Center At X =    29.48 ; Y =   121.86 ; and Radius =    57.31
       Factor of Safety
      ***    1.220   ***
Failure Surface Specified By 12 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         32.84       64.64
    2         39.82       65.22
    3         46.72       66.36
    4         53.52       68.06
    5         60.15       70.30
    6         66.57       73.08
    7         72.76       76.36
    8         78.65       80.13
    9         84.22       84.37
   10         89.43       89.05
   11         94.24       94.14
   12         95.82       96.10
Circle Center At X =    29.30 ; Y =   150.49 ; and Radius =    85.92
       Factor of Safety
      ***    1.220   ***
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         31.95       63.75
    2         38.87       64.79
    3         45.60       66.73
    4         52.02       69.52
    5         58.02       73.12
    6         63.51       77.46
    7         68.38       82.49
    8         72.57       88.10
    9         75.99       94.21
   10         76.64       95.83
Circle Center At X =    27.48 ; Y =   117.13 ; and Radius =    53.57
       Factor of Safety
      ***    1.223   ***
Failure Surface Specified By 12 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         31.95       63.75
    2         38.95       63.74
    3         45.91       64.43
    4         52.78       65.80
    5         59.48       67.83
    6         65.94       70.52
    7         72.11       73.83
    8         77.92       77.73
    9         83.32       82.19
   10         88.25       87.15
   11         92.67       92.58
   12         95.00       96.10
Circle Center At X =    35.55 ; Y =   134.36 ; and Radius =    70.70
       Factor of Safety
      ***    1.224   ***
Failure Surface Specified By 13 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         31.95       63.75
    2         38.95       63.80
    3         45.92       64.48
    4         52.80       65.76
    5         59.54       67.64
    6         66.09       70.11
    7         72.40       73.15
    8         78.41       76.73
    9         84.09       80.82
```

```
   10         89.39       85.40
   11         94.26       90.42
   12         98.67       95.86
   13         98.84       96.10
Circle Center At X =    34.80 ; Y =   143.21 ; and Radius =    79.51
       Factor of Safety
      ***    1.229   ***
          **** END OF GSTABL7 OUTPUT ****
```

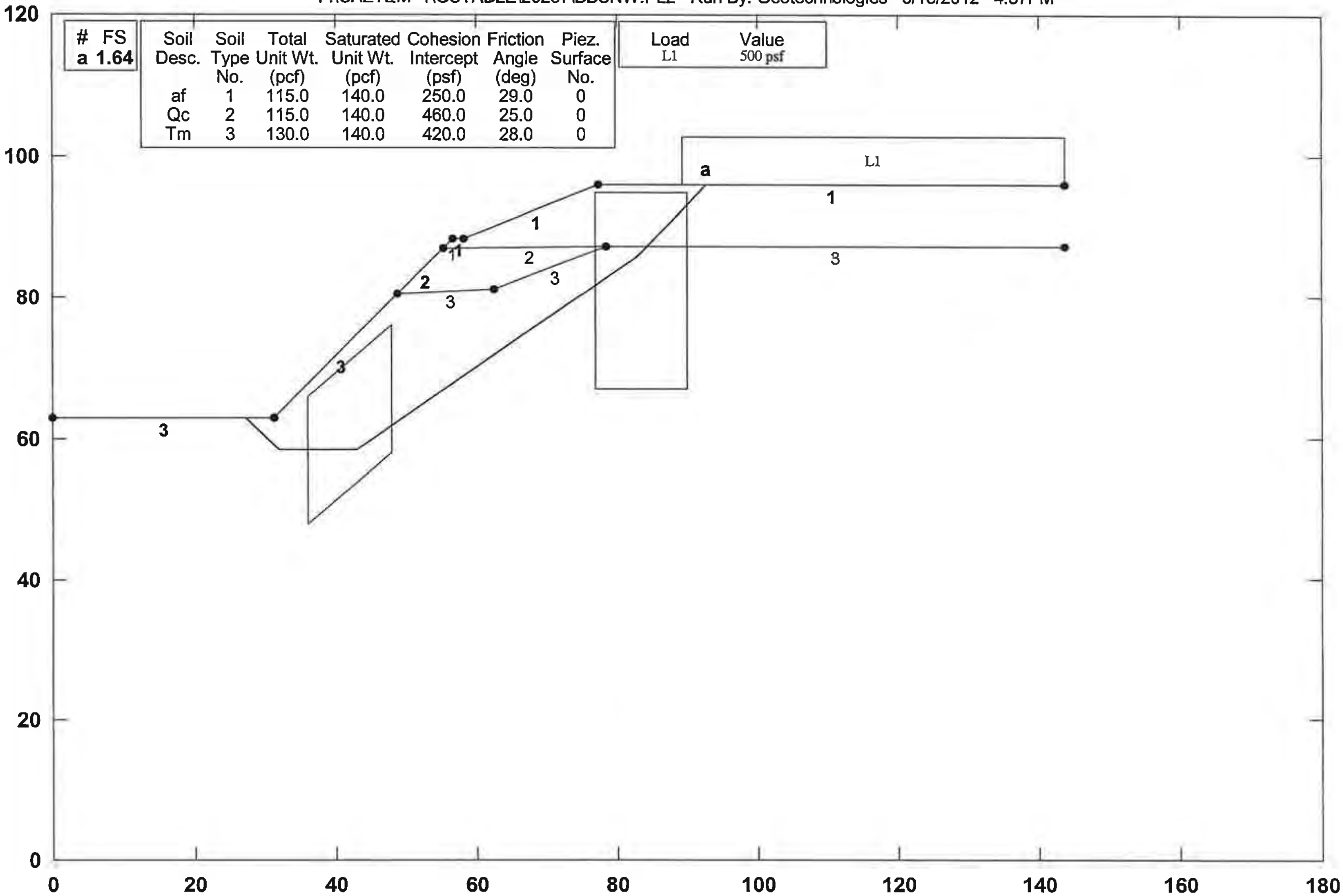
Kimley-Horn Associates, Inc. / 20287 / Section B / Block / Static Analysis

F:\CAZTEM~1\GSTABLE\20287\BBSNW.PL2 Run By: Geotechnologies 5/13/2012 4:37PM

#	FS
a	1.64

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
af	1	115.0	140.0	250.0	29.0	0
Qc	2	115.0	140.0	460.0	25.0	0
Tm	3	130.0	140.0	420.0	28.0	0

Load	Value
L1	500 psf



GSTABL7 v.2 FSmin=1.64

Safety Factors Are Calculated By The Simplified Janbu Method

```
                    ***  GSTABL7  ***
           ** GSTABL7 by Garry H. Gregory, P.E. **
 ** Original Version 1.0, January 1996; Current Version 2.002, December 2001 **
           (All Rights Reserved-Unauthorized Use Prohibited)
*********************************************************************************
              SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static Earthquake, and Applied Force Options.
*********************************************************************************
Analysis Run Date:        5/13/2012
Time of Run:              4:37PM
Run By:                   Geotechnologies
Input Data Filename:      F:BBSNW.
Output Filename:          F:BBSNW.OUT
Unit System:              English
Plotted Output Filename:  F:BBSNW.PLT
PROBLEM DESCRIPTION:  Kimley-Horn Associates, Inc. / 20287 / S
                      ection B / Block / Static Analysis
BOUNDARY COORDINATES
    7 Top   Boundaries
   11 Total Boundaries
Boundary    X-Left     Y-Left    X-Right    Y-Right    Soil Type
  No.        (ft)       (ft)      (ft)       (ft)      Below Bnd
   1         0.00      63.00      31.20      63.00        3
   2        31.20      63.00      48.70      80.50        3
   3        48.70      80.50      55.30      87.00        2
   4        55.30      87.00      56.60      88.40        1
   5        56.60      88.40      58.30      88.40        1
   6        58.30      88.40      77.30      96.10        1
   7        77.30      96.10     143.80      96.10        1
   8        55.30      87.00      78.50      87.20        2
   9        78.50      87.20     143.80      87.20        3
  10        48.70      80.50      62.60      81.30        3
  11        62.60      81.30      78.50      87.20        3
Default Y-Origin = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept  Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)    (deg)    Param.   (psf)     No.
  1   115.0    140.0     250.0    29.0    0.00       0.0      0
  2   115.0    140.0     460.0    25.0    0.00       0.0      0
  3   130.0    140.0     420.0    28.0    0.00       0.0      0
BOUNDARY LOAD(S)
    1 Load(s) Specified
Load      X-Left      X-Right      Intensity      Deflection
 No.       (ft)        (ft)          (psf)           (deg)
  1        89.40      143.80         500.0            0.0
NOTE - Intensity Is Specified As A Uniformly Distributed
       Force Acting On A Horizontally Projected Surface.
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
4000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is  11.0
Box       X-Left     Y-Left     X-Right    Y-Right      Height
No.        (ft)       (ft)       (ft)       (ft)         (ft)
 1        36.00      57.00      48.00      67.00        18.00
 2        77.00      81.00      90.00      81.00        28.00
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
```

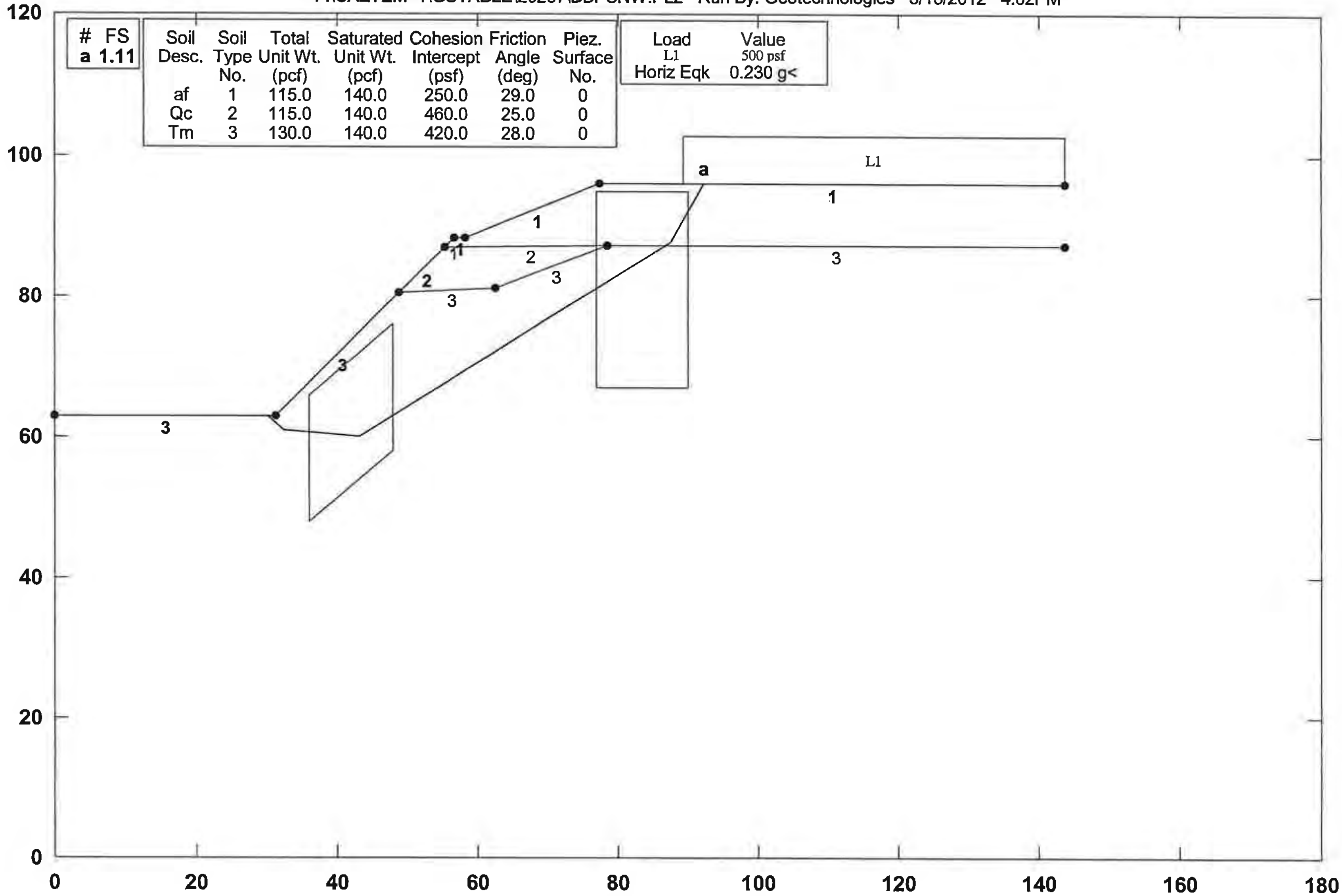


```
Ordered - Most Critical First.
* * Safety Factors Are Calculated By The Simplified Janbu Method * *
Total Number of Trial Surfaces Evaluated =  4000
Statistical Data On All Valid FS Values:
   FS Max =   6.303   FS Min =   1.645   FS Ave =   2.173
   Standard Deviation =    0.521   Coefficient of Variation =   23.98 %
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         27.25       63.00
    2         31.86       58.52
    3         42.86       58.45
    4         82.85       85.67
    5         90.43       93.65
    6         92.66       96.10
     Factor of Safety
    ***    1.645   ***
     Individual data on the    15  slices
                     Water  Water     Tie     Tie     Earthquake
                     Force  Force    Force   Force      Force    Surcharge
Slice Width  Weight   Top    Bot     Norm     Tan     Hor     Ver    Load
 No.  (ft)   (lbs)   (lbs)  (lbs)   (lbs)    (lbs)   (lbs)   (lbs)  (lbs)
  1    3.9    986.1   0.0    0.0      0.       0.     0.0     0.0      0.0
  2    0.7    384.3   0.0    0.0      0.       0.     0.0     0.0      0.0
  3   11.0  15264.6   0.0    0.0      0.       0.     0.0     0.0      0.0
  4    5.8  13017.4   0.0    0.0      0.       0.     0.0     0.0      0.0
  5    6.6  16063.9   0.0    0.0      0.       0.     0.0     0.0      0.0
  6    1.3   3304.6   0.0    0.0      0.       0.     0.0     0.0      0.0
  7    1.7   4234.8   0.0    0.0      0.       0.     0.0     0.0      0.0
  8    4.3  10012.1   0.0    0.0      0.       0.     0.0     0.0      0.0
  9   14.7  29006.0   0.0    0.0      0.       0.     0.0     0.0      0.0
 10    1.2   1987.7   0.0    0.0      0.       0.     0.0     0.0      0.0
 11    4.3   6150.1   0.0    0.0      0.       0.     0.0     0.0      0.0
 12    1.5   1628.7   0.0    0.0      0.       0.     0.0     0.0      0.0
 13    5.1   3647.0   0.0    0.0      0.       0.     0.0     0.0      0.0
 14    1.0    353.9   0.0    0.0      0.       0.     0.0     0.0    513.9
 15    2.2    315.2   0.0    0.0      0.       0.     0.0     0.0   1117.1
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         27.25       63.00
    2         31.86       58.52
    3         42.86       58.45
    4         82.85       85.67
    5         90.43       93.65
    6         92.66       96.10
     Factor of Safety
    ***    1.645   ***
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         27.25       63.00
    2         31.86       58.52
    3         42.86       58.45
    4         82.85       85.67
    5         90.43       93.65
    6         92.66       96.10
     Factor of Safety
    ***    1.645   ***
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         27.25       63.00
    2         31.86       58.52
    3         42.86       58.45
    4         82.85       85.67
    5         90.43       93.65
```

```
   6         92.66       96.10
      Factor of Safety
     ***    1.645   ***
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        27.25       63.00
    2        31.86       58.52
    3        42.86       58.45
    4        82.85       85.67
    5        90.43       93.65
    6        92.66       96.10
      Factor of Safety
     ***    1.645   ***
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        27.25       63.00
    2        31.86       58.52
    3        42.86       58.45
    4        82.85       85.67
    5        90.43       93.65
    6        92.66       96.10
      Factor of Safety
     ***    1.645   ***
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        27.25       63.00
    2        31.86       58.52
    3        42.86       58.45
    4        82.85       85.67
    5        90.43       93.65
    6        92.66       96.10
      Factor of Safety
     ***    1.645   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        30.24       63.00
    2        32.31       61.01
    3        43.26       60.00
    4        87.47       87.62
    5        92.12       96.10
      Factor of Safety
     ***    1.650   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        30.24       63.00
    2        32.31       61.01
    3        43.26       60.00
    4        87.47       87.62
    5        92.12       96.10
      Factor of Safety
     ***    1.650   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        30.24       63.00
    2        32.31       61.01
    3        43.26       60.00
    4        87.47       87.62
    5        92.12       96.10
      Factor of Safety
     ***    1.650   ***
         **** END OF GSTABL7 OUTPUT ****
```

Kimley-Horn Associates, Inc. / 20287 / Section B / Block /Pseudo-Static Analysis

F:\CAZTEM~1\GSTABLE\20287\BBPSNW.PL2 Run By: Geotechnologies 5/13/2012 4:02PM



GSTABL7 v.2 FSmin=1.11

Safety Factors Are Calculated By The Simplified Janbu Method

```
                    ***  GSTABL7  ***
          ** GSTABL7 by Garry H. Gregory, P.E. **
 ** Original Version 1.0, January 1996; Current Version 2.002, December 2001 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*********************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static Earthquake, and Applied Force Options.
*********************************************************************************
Analysis Run Date:         5/13/2012
Time of Run:               4:02PM
Run By:                    Geotechnologies
Input Data Filename:       F:BBPSNW.
Output Filename:           F:BBPSNW.OUT
Unit System:               English
Plotted Output Filename:   F:BBPSNW.PLT
PROBLEM DESCRIPTION:  Kimley-Horn Associates, Inc. / 20287 / S
                      ection B / Block /Pseudo-Static Analysis
BOUNDARY COORDINATES
    7 Top   Boundaries
   11 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right    Soil Type
   No.        (ft)        (ft)        (ft)        (ft)     Below Bnd
    1         0.00       63.00       31.20       63.00         3
    2        31.20       63.00       48.70       80.50         3
    3        48.70       80.50       55.30       87.00         2
    4        55.30       87.00       56.60       88.40         1
    5        56.60       88.40       58.30       88.40         1
    6        58.30       88.40       77.30       96.10         1
    7        77.30       96.10      143.80       96.10         1
    8        55.30       87.00       78.50       87.20         2
    9        78.50       87.20      143.80       87.20         3
   10        48.70       80.50       62.60       81.30         3
   11        62.60       81.30       78.50       87.20         3
Default Y-Origin = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  3 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept  Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)    (deg)    Param.   (psf)     No.
  1   115.0    140.0     250.0     29.0    0.00      0.0       0
  2   115.0    140.0     460.0     25.0    0.00      0.0       0
  3   130.0    140.0     420.0     28.0    0.00      0.0       0
BOUNDARY LOAD(S)
     1 Load(s) Specified
Load        X-Left      X-Right      Intensity      Deflection
 No.         (ft)        (ft)          (psf)           (deg)
  1         89.40       143.80         500.0            0.0
NOTE - Intensity Is Specified As A Uniformly Distributed
       Force Acting On A Horizontally Projected Surface.
A Horizontal Earthquake Loading Coefficient
Of0.230 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure =     0.0(psf)
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
4000 Trial Surfaces Have Been Generated.
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is  11.0
Box         X-Left      Y-Left     X-Right     Y-Right      Height
```



```
No.          (ft)        (ft)        (ft)        (ft)        (ft)
 1          36.00       57.00       48.00       67.00       18.00
 2          77.00       81.00       90.00       81.00       28.00
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Evaluated. They Are
      Ordered - Most Critical First.
      * * Safety Factors Are Calculated By The Simplified Janbu Method * *
      Total Number of Trial Surfaces Evaluated =  4000
      Statistical Data On All Valid FS Values:
         FS Max =    2.598   FS Min =    1.110   FS Ave =    1.384
         Standard Deviation =    0.194   Coefficient of Variation =   14.05 %
      Failure Surface Specified By  5 Coordinate Points
        Point       X-Surf       Y-Surf
         No.         (ft)         (ft)
          1         30.24        63.00
          2         32.31        61.01
          3         43.26        60.00
          4         87.47        87.62
          5         92.12        96.10
               Factor of Safety
              ***    1.110   ***
             Individual data on the    14  slices
                       Water  Water      Tie      Tie       Earthquake
                       Force  Force     Force    Force         Force     Surcharge
Slice  Width   Weight   Top    Bot      Norm     Tan       Hor     Ver      Load
 No.   (ft)    (lbs)   (lbs)  (lbs)    (lbs)    (lbs)     (lbs)   (lbs)    (lbs)
  1     1.0      57.9    0.0    0.0       0.       0.      13.3     0.0      0.0
  2     1.1     289.0    0.0    0.0       0.       0.      66.5     0.0      0.0
  3    11.0   12924.7    0.0    0.0       0.       0.    2972.7     0.0      0.0
  4     5.4   11371.9    0.0    0.0       0.       0.    2615.5     0.0      0.0
  5     6.6   15387.3    0.0    0.0       0.       0.    3539.1     0.0      0.0
  6     1.3    3208.8    0.0    0.0       0.       0.     738.0     0.0      0.0
  7     1.7    4128.1    0.0    0.0       0.       0.     949.5     0.0      0.0
  8     4.3    9836.0    0.0    0.0       0.       0.    2262.3     0.0      0.0
  9    14.7   29421.6    0.0    0.0       0.       0.    6767.0     0.0      0.0
 10     1.2    2091.2    0.0    0.0       0.       0.     481.0     0.0      0.0
 11     8.3   11286.8    0.0    0.0       0.       0.    2596.0     0.0      0.0
 12     0.7     675.5    0.0    0.0       0.       0.     155.4     0.0      0.0
 13     1.9    1489.1    0.0    0.0       0.       0.     342.5     0.0      0.0
 14     2.7     775.2    0.0    0.0       0.       0.     178.3     0.0   1358.9
      Failure Surface Specified By  5 Coordinate Points
        Point       X-Surf       Y-Surf
         No.         (ft)         (ft)
          1         30.24        63.00
          2         32.31        61.01
          3         43.26        60.00
          4         87.47        87.62
          5         92.12        96.10
               Factor of Safety
              ***    1.110   ***
      Failure Surface Specified By  5 Coordinate Points
        Point       X-Surf       Y-Surf
         No.         (ft)         (ft)
          1         30.24        63.00
          2         32.31        61.01
          3         43.26        60.00
          4         87.47        87.62
          5         92.12        96.10
               Factor of Safety
              ***    1.110   ***
      Failure Surface Specified By  5 Coordinate Points
        Point       X-Surf       Y-Surf
         No.         (ft)         (ft)
          1         30.24        63.00
          2         32.31        61.01
          3         43.26        60.00
          4         87.47        87.62
```

```
   5         92.12       96.10
      Factor of Safety
     ***    1.110   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
   1         30.24       63.00
   2         32.31       61.01
   3         43.26       60.00
   4         87.47       87.62
   5         92.12       96.10
      Factor of Safety
     ***    1.110   ***
Failure Surface Specified By  5 Coordinate Points
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   2         32.31       61.01
   3         43.26       60.00
   4         87.47       87.62
   5         92.12       96.10
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     ***    1.110   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
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   2         32.31       61.01
   3         43.26       60.00
   4         87.47       87.62
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     ***    1.110   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
   1         30.24       63.00
   2         32.31       61.01
   3         43.26       60.00
   4         87.47       87.62
   5         92.12       96.10
      Factor of Safety
     ***    1.110   ***
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
   1         30.12       63.00
   2         32.38       62.26
   3         42.78       58.67
   4         79.94       78.95
   5         87.31       87.12
   6         92.90       96.10
      Factor of Safety
     ***    1.112   ***
Failure Surface Specified By  6 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
   1         30.12       63.00
   2         32.38       62.26
   3         42.78       58.67
   4         79.94       78.95
   5         87.31       87.12
   6         92.90       96.10
      Factor of Safety
     ***    1.112   ***
          **** END OF GSTABL7 OUTPUT ****
```

Geotechnologies, Inc.

Project: Kimley-Horn and Associates, Inc.
File No.: 20287
Description: 2:1 (h:v) Compacted Fill Slope

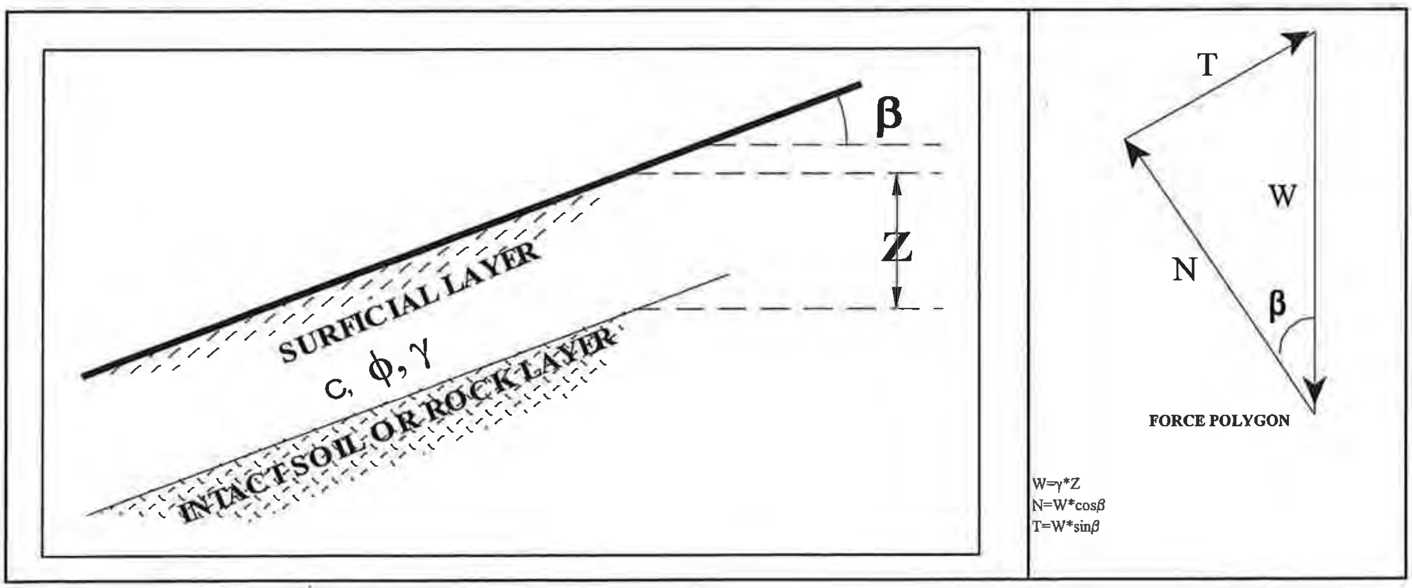
SURFICIAL SLOPE STABLITY FOR INFINITE SLOPE

Input Slope Properties:

Vertical Thickness of Surficial Materials	(Z)	4.00 feet	
Slope Angle	(β)	26.6 degrees	0.464257581 radians
Saturated Thickness	(h_s)	4.0 feet	

Input Soil Properties:

Unit Weight of Saturated Surficial Soils	(γ)	140.0 pcf	
Friction Angle of Surficial Soils	(ϕ)	29.0 degrees	0.506145483 radians
Cohesion of Surficial Soils	(c)	250.0 psf	
Density of Water	(γ_ω)	62.4 pcf	



Equation $$F = \frac{c' + (\gamma - m*\gamma w)*z*\cos^2\beta*\tan\varphi}{\gamma*z*\sin\beta\cos\beta}$$

Factor of Safety	1.73

Ref: Blake, T.F., Hollingsworth, R.A., and Stewart, J.P., 2002, Recommended Procedures for Implementation of DMG Special Publication 117 Guidelines for analyzing and Mitigating Landslide Hazards in California, Southern California Earthquake Center