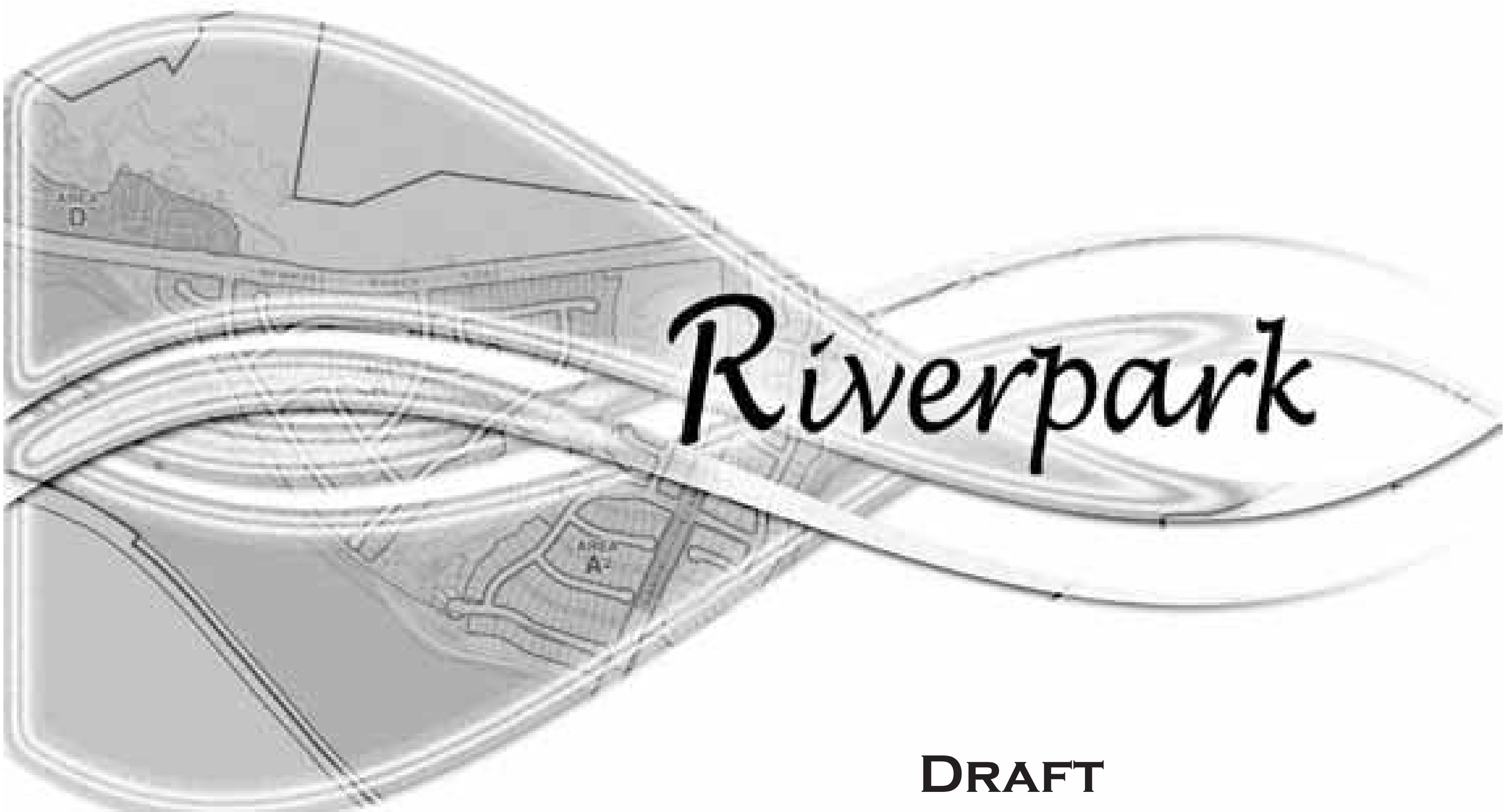

Riverpark

DRAFT
ENVIRONMENTAL IMPACT REPORT

SCH No. 2002091081

VOLUME II – APPENDICES

Prepared for:

City of Santa Clarita
Department of Planning & Building Services
23920 Valencia Boulevard, Suite 302
Santa Clarita, California 91355

Prepared by:

Impact Sciences, Inc.
30343 Canwood Street, Suite 210
Agoura Hills, California 91301

March 2004

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APPENDIX I

Notice of Preparation and Initial Study; Responses to Notice of Preparation

Revised Notice of Preparation and Initial Study

REVISED NOTICE OF PREPARATION

TO: State Clearinghouse
Office of Planning Research
P.O. Box 3044
Sacramento, CA 95812-3044

FROM: City of Santa Clarita
23920 Valencia Blvd., Suite 300
Santa Clarita, CA 91355

SUBJECT: **Revised Notice of Preparation of Draft Environmental Impact Report**

The City of Santa Clarita will be the lead agency and will prepare an Environmental Impact Report for the project identified below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The **revised project description**, location, and the probable environmental effects are contained in the attached materials. A copy of the Initial Study is attached. As indicated, the project description has changed. If this revision changes any of your previous comments please respond with written comments within the time frame referenced below.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date, but not later than 30 days after receipt of this notice.

Please send your written response to Jeff Hogan, Associate Planner or Wendy Deats, Assistant Planner II at the address shown above. We would appreciate the name of a contact person in your agency.

Project Title: Riverpark (Panhandle); Master Case #02-175

Project Applicant: Newhall Land and Farming Company

Date: October 13, 2003 ____________________

Title: Jeff Hogan, Associate Planner

Telephone: (661) 255-4330

Reference: California Administrative Code, Title 14, Sections 15082(a), 15103, 15375.

s:\pbs\current\!2002\02-175\nop#2

REVISED INITIAL STUDY
CITY OF SANTA CLARITA

Lead Agency:

City of Santa Clarita
23920 Valencia Boulevard, Suite 300
Santa Clarita, California 91355

Contact Person & Phone Number:

Jeff Hogan, Associate Planner
Wendy Deats, Assistant Planner II
City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Boulevard
Santa Clarita, California 93155
(661) 255-4330

Master Case:

MC 02-175; Tentative Tract Map 53425; General Plan Amendment 02-002; Zone Change 02-002; Conditional Use Permit 02-009; Hillside Review 02-003; Oak Tree Permit 02-025; and Adjustment 02-010.

Project Introduction:

The applicant, The Newhall Land and Farming Company, proposes the future development of a 695.4-acre site at the terminus of Newhall Ranch Road, east of Bouquet Canyon Road between the Castaic Lake Water Agency property and the Santa Clara River, north of Soledad Canyon Road. The proposal is titled Riverpark is located within the General Plan Valley Center Concept (VCC) overlay area and includes the development of 744 multi-family units, 439 single-family dwellings, and 40,000 square feet of commercial uses. A 27.4-acre park is also proposed adjacent to the Santa Clara River and approximately 330 acres of river area will remain in a natural state and be conveyed to the City of Santa Clarita. Full build-out of the project also includes the extension of Newhall Ranch Road from its western terminus, in the general vicinity of Bouquet Canyon Road, easterly to the Golden Valley Road interchange at Soledad Canyon. This extension includes the construction of a bridge over the Santa Clara River . The project also includes the construction of a portion of Santa Clarita Parkway. The current zoning of the project site is: 23.7 acres of Industrial Commercial (IC); 199.9 acres of Commercial Office Planned Development (CO PD); 150.4 acres of Community Commercial Planned Development (CC PD), 6.7 acres of Community Commercial (CC), and 37.4 acres of Mobile Home Park (MHP). The remaining 277.3 acres is within the Residential Medium zone. The applicant is proposing to change the zoning of the site to Residential Medium (RM) with a Planned Development (PD) overlay. The site will require 5.5 million cubic yards of grading (plus 3.6 mcy of removal and recompaction, overexcavation, and landslide remediation) which will be balanced on-site. The grading is required for construction of the project, as well as grading associated with the construction of Newhall Ranch Road and Golden Valley Road Bridge.

Bank stabilization will be constructed along the Santa Clara River for approximately 2,200 linear feet for the east-west extension of

Newhall Ranch Road and approximately 6,000 linear feet for the project development.

Project Description:

The applicant proposes to develop six parcels of land totaling 695.4 acres of land for single- and multi-family uses. A tentative tract map is required to subdivide the six lots into 439 single-family lots, 744 multi-family units (5 lots), two commercial lots, HOA lots, a private street lot, recreation lots, a water quality basin lot, a park lot, maintained slope lots adjacent to public right of way, river trail lots, bridge lots, open space lots, and Santa Clara River lots totaling 545 lots. A General Plan Amendment will change the land use designations of the project site to Residential Medium and Community Commercial with SEA and VCC overlays and will define the specific alignments for Santa Clarita Parkway and Newhall Ranch Road. A zone change will change the zoning designations of the site to Residential Medium and Community Commercial with a Planned Development overlay (RM PD and CC PD). Residential Medium will permit a density up to 11 dwellings per acre and the Community Commercial allows a 37.5 percent floor area ratio. A conditional use permit is required to implement the Planned Development Overlay, to allow building heights in excess of two stories and 35' tall, approval of the Hillside Innovative Application, and vehicular gating of Planning Area C. A hillside development review is required for development on slopes with an average cross slope of greater than 10%. The oak tree permit is required for the removal of 15 of the 87 oak trees on site and 3 oak tree encroachments. An adjustment is required to allow for a maximum 20% reduction in the minimum lot size and lot width for lots within Planning Area A1, a 16 foot front yard setback on a traditional garage facing street design, and 7 foot high property line walls facing public streets.

Project Location:

The Riverpark area is 695.4 acres in area and is located at the terminus of Newhall Ranch Road, east of Bouquet Canyon Road, north of Soledad Canyon Road, adjacent to the Santa Clara River.

General Plan/Zoning Designation:

The General Plan designations of the subject sites are Residential Medium, Industrial Commercial, Community Commercial, Commercial Office and Mobile Home Park. In addition, portions of the site are located within the Valley Center Concept (VCC) overlay and Significant Ecological Area overlay. The applicant is proposing to change the general plan land use designations to Residential Medium and Community Commercial maintaining the VCC and SEA overlays. The existing zoning of the project site includes Industrial Commercial (IC), Residential Medium (RM), Commercial Office with a Planned Development overlay (CO PD), Community Commercial (CC) and Community Commercial with a Planned Development overlay (CC PD) and Mobile Home Park (MHP). The applicant is proposing to change the zoning to Residential Medium Planned Development (RM PD) and Community Commercial Planned Development (CCPD).

Project Applicant:

Newhall Land and Farming Company
23823 Valencia Boulevard
Valencia, California 91355
Attn: Glenn Adamick (661) 255-4003

Surrounding Land Uses and Setting:

The Riverpark site incorporates approximately 695.4 acres of land east of Bouquet Canyon, north of Soledad Canyon Road along the Santa Clara River. Both Bouquet Canyon Road and Soledad

Canyon Road are major arterials carrying traffic though the center of the City. Open space borders the site to the north, Soledad Canyon Road borders the site to the south, undeveloped land borders to the site to the east and commercial uses border the site to the west. The site is located in the center of the City with community of Saugus to the north and west, the community of Canyon Country to the east and the Porta Bella Specific Plan to the south across Soledad Canyon Road.

Other public agencies whose approval is required (e.g. permits, financing approval, or participation agreement):

Army Corps of Engineers, U.S. Fish and Wildlife Services, California Department of Transportation, California Department of Fish & Game, Castaic Lake Water Agency, Metropolitan Transportation Authority

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be affected by this project, involving at least one impact that is a "Potentially Significant Impact" or "Potentially Significant Impacts Unless Mitigation Measures Incorporated" as indicated by the checklist on the following pages.

[X] Land Use and Planning
[X] Population and Housing
[X] Geological Problems
[X] Water
[X] Stormwater Management & Recycling
[X] Air Quality
[X] Transportation/ Circulation
[X] Biological Resources
[X] Noise
[X] Hazards
[X] Mandatory Tests of Significance
[X] Energy and Mineral Resources
[X] Public Services
[X] Recreation
[X] Aesthetics
[X] Cultural Resources
[X] Utilities and Service System

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 the <u>mitigation measures</u> described on an attached sheet have been added to the project. A NEGATIVE DECLARATION will be prepared.

[X] I find that the proposed project MAY have a significant impact on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

[ ] I find that the proposed project MAY have a significant effect(s) on the environment, but at least one effect 1) has been mitigated adequately 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, if the effect is a "potentially significant impact" or "potentially significant unless mitigated." An ENVIRONMENTAL IMPACT REPORT, 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, there WILL NOT be a significant effect in this case because all potentially significant effects (a) have been analyzed adequately in an earlier EIR pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR, including revisions or mitigation measures that are imposed upon the proposed project.

Prepared By:

Deats

10·13·03

(Signature)

Wendy Deats
Assistant Planner II

(Date)

Approved By:

JW Hogan

10/13/03

(Signature)

Jeff Hogan
Associate Planner

(Date)

ENVIRONMENTAL IMPACTS:

		Potentially Significant Impact	Potentially Significant Impact Unless Mitigation Incorporated	Less than Significant Impact	No Impact
I.	LAND USE AND PLANNING. Would the proposal:				
a)	Conflict with General Plan designation or zoning?	[X]	[ ]	[ ]	[ ]
b)	Conflict with applicable environmental plans or policies adopted by agencies with jurisdiction over the project?	[ ]	[X]	[ ]	[ ]
c)	Be incompatible with existing land use in the city?	[ ]	[X]	[ ]	[ ]
d)	Disrupt or divide the physical arrangement of an established community (including a low-income or minority community)?	[ ]	[ ]	[ ]	[X]
e)	Affect a Significant Ecological Area (SEA)?	[X]	[ ]	[ ]	[ ]
f)	Other______________________	[ ]	[ ]	[ ]	[ ]
II.	POPULATION AND HOUSING. Would the proposal:				
a)	Cumulatively exceed official regional or local population projections?	[ ]	[ ]	[X]	[ ]
b)	Create a net loss of jobs?	[ ]	[ ]	[X]	[ ]
c)	Displace existing housing, especially affordable housing?	[ ]	[ ]	[ ]	[X]
d)	Other______________________	[ ]	[ ]	[ ]	[ ]
III.	GEOLOGIC PROBLEMS. Will the proposal result in:				
a)	Unstable earth conditions or in changes in geologic substructures?	[X]	[ ]	[ ]	[ ]
b)	Disruptions, displacements, compaction or overcovering of the soil?	[X]	[ ]	[ ]	[ ]

		Potentially Significant Impact	Potentially Significant Impact Unless Mitigation Incorporated	Less than Significant Impact	No Impact
c)	Change in topography or ground surface relief features?	[X]	[ ]	[ ]	[ ]
d)	The destruction, covering or modification of any unique geologic or physical features?	[ ]	[ ]	[X]	[ ]
e)	Any increase in wind or water erosion of soils, either on or off the site?	[X]	[ ]	[ ]	[ ]
f)	Exposure of people or property to geologic hazards such as earthquakes, landslides, mudslides, ground failure, or similar hazards?	[X]	[ ]	[ ]	[ ]
g)	Changes in deposition, erosion or siltation?	[X]	[ ]	[ ]	[ ]
h)	Other modification of a wash, channel, creek, or river?	[X]	[ ]	[ ]	[ ]
i)	Earth movement (cut and/or fill) of 10,000 cubic yards or more?	[X]	[ ]	[ ]	[ ]
j)	Development and/or grading on a slope greater than 25% natural grade?	[X]	[ ]	[ ]	[ ]
k)	Development within the Alquist-Priolo Special Studies Zone?	[ ]	[ ]	[ ]	[X]
l)	Other____________________	[ ]	[ ]	[ ]	[ ]
IV.	WATER. Would the proposal result in:				
a)	Changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?	[X]	[ ]	[ ]	[ ]
b)	Exposure of people or property to water related hazards such as flooding?	[X]	[ ]	[ ]	[ ]
c)	Discharge into surface waters or other alteration of surface water quality (e.g. temperature, dissolved oxygen, or turbidity)	[X]	[ ]	[ ]	[ ]
	Changes in the amount of surface water				

		Potentially Significant Impact	Potentially Significant Impact Unless Mitigation Incorporated	Less than Significant Impact	No Impact
d)	in any water body?	[X]	[ ]	[ ]	[ ]
e)	Changes in currents, or the course of direction of water movements?	[X]	[ ]	[ ]	[ ]
f)	Changes in the quantity of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations or through substantial loss of groundwater recharge capability?	[X]	[ ]	[ ]	[ ]
g)	Altered direction or rate of flow of groundwater?	[X]	[ ]	[ ]	[ ]
h)	Impacts to groundwater quality?	[X]	[ ]	[ ]	[ ]
i)	Substantial reduction in the amount of groundwater otherwise available for public water supplies?	[X]	[ ]	[ ]	[ ]
j)	Other__________________________	[ ]	[ ]	[ ]	[ ]
V.	STORMWATER MANAGEMENT AND RECYCLING. Would the proposal result in:				
a)	Would the proposed project result in storm water system discharges from areas for materials storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas or loading docks, or other outdoor work areas?	[ ]	[X]	[ ]	[ ]
b)	Would the proposed project result in a significant environmentally harmful increase in the flow rate or volume of the project site or surrounding areas?	[ ]	[X]	[ ]	[ ]
c)	Would the proposed project result in storm water discharges that would significantly impair the beneficial uses of receiving waters or areas that provide water quality benefits (e.g., riparian corridors, wetlands, etc.)?	[X]	[ ]	[ ]	[ ]

		Potentially Significant Impact	Potentially Significant Impact Unless Mitigation Incorporated	Less than Significant Impact	No Impact
d)	Would the proposed project cause harm to the biological integrity of drainage systems and water bodies?	[X]	[ ]	[ ]	[ ]
e)	Does the proposed project include provisions for the separation and reuse of materials?	[ ]	[ ]	[ ]	[X]
VI.	AIR QUALITY. Would the proposal:				
a)	Violate any air quality standard or contribute to an existing or projected air quality violation?	[X]	[ ]	[ ]	[ ]
b)	Expose sensitive receptors to pollutants?	[ ]	[X]	[ ]	[ ]
c)	Create objectionable odors?	[ ]	[X]	[ ]	[ ]
d)	Other____________________	[ ]	[ ]	[ ]	[ ]
VII.	TRANSPORTATION/CIRCULATION. Would the proposal result in:				
a)	Increased vehicle trips or traffic congestion?	[X]	[ ]	[ ]	[ ]
b)	Hazards to safety from design features (e.g. sharp curves or dangerous intersections) or incompatible uses?	[ ]	[ ]	[ ]	[X]
c)	Inadequate emergency access or access to nearby uses?	[ ]	[X]	[ ]	[ ]
d)	Insufficient parking capacity onsite or offsite?	[ ]	[ ]	[ ]	[X]
e)	Hazards or barriers for pedestrians or bicyclists?	[ ]	[ ]	[ ]	[X]
f)	Conflicts with adopted policies supporting alternative transportation (e.g. bus stops, bicycle racks)?	[ ]	[ ]	[ ]	[X]
g)	Disjointed pattern of roadway improvements	[ ]	[ ]	[X]	[ ]
h)	Other____________________	[ ]	[ ]	[ ]	[ ]

		Potentially Significant Impact	Potentially Significant Impact Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VIII.	BIOLOGICAL RESOURCES. Would the proposal result in impacts to:				
a)	Endangered, threatened or rare species or their habitats (including but not limited to plants, fish, insects, animals, and birds)?	[X]	[ ]	[ ]	[ ]
b)	Oak trees?	[X]	[ ]	[ ]	[ ]
c)	Wetland habitat or blueline stream?	[X]	[ ]	[ ]	[ ]
d)	Wildlife dispersal or migration corridors?	[X]	[ ]	[ ]	[ ]
e)	Other: Bank Stabilization	[X]	[ ]	[ ]	[ ]
IX.	ENERGY AND MINERAL RESOURCES. Would the proposal:				
a)	Conflict with adopted energy conservation plans?	[ ]	[X]	[ ]	[ ]
b)	Use nonrenewable resources in a wasteful and inefficient manner?	[ ]	[ ]	[ ]	[X]
c)	Result in the loss of availability of a known mineral resource that would be of future value to the region and the residents of the State?	[ ]	[X]	[ ]	[ ]
d)	Other____________________	[ ]	[ ]	[ ]	[ ]
X.	HAZARDS. Would the proposal involve:				
a)	A risk of accidental explosion or release of hazardous substances (including but not limited to oil, pesticides, chemicals, or radiation)?	[ ]	[X]	[ ]	[ ]
b)	Possible interference with an emergency response plan or emergency evacuation plan?	[ ]	[X]	[ ]	[ ]
c)	The creation of any health hazard or	[ ]	[ ]	[ ]	[X]

		Potentially Significant Impact	Potentially Significant Impact Unless Mitigation Incorporated	Less than Significant Impact	No Impact
	potential health hazard?				
d)	Exposure of people to existing sources of potential health hazards (e.g. electrical transmission lines, gas lines, oil pipelines)?	[X]	[ ]	[ ]	[ ]
e)	Increased fire hazard in areas with flammable brush, grass, or trees?	[ ]	[X]	[ ]	[ ]
f)	Other___________________________	[ ]	[ ]	[ ]	[ ]
XI.	NOISE. Would the proposal result in:				
a)	Increases in existing noise levels?	[X]	[ ]	[ ]	[ ]
b)	Exposure of people to severe noise levels or vibration?	[ ]	[X]	[ ]	[ ]
c)	Other___________________________	[ ]	[ ]	[ ]	[ ]
XII.	PUBLIC SERVICES. Would the proposal have an effect on, or result in a need for new or altered government services in any of the following areas:				
a)	Fire protection?	[X]	[ ]	[ ]	[ ]
b)	Police protection?	[X]	[ ]	[ ]	[ ]
c)	Schools?	[X]	[ ]	[ ]	[ ]
d)	Maintenance of pubic facilities, including roads?	[X]	[ ]	[ ]	[ ]
e)	Other government services?	[X]	[ ]	[ ]	[ ]
XIII.	UTILITIES. Would the proposal result in a need for new systems or supplies, or substantial alterations to the following utilities:				
a)	Power or natural gas?	[X]	[ ]	[ ]	[ ]
b)	Communications systems?	[X]	[ ]	[ ]	[ ]
c)	Local or regional water treatment or distribution facilities?	[X]	[ ]	[ ]	[ ]

		Potentially Significant Impact	Potentially Significant Impact Unless Mitigation Incorporated	Less than Significant Impact	No Impact
d)	Sewer or septic tanks?	[X]	[ ]	[ ]	[ ]
e)	Storm water drainage?	[X]	[ ]	[ ]	[ ]
f)	Solid waste disposal?	[X]	[ ]	[ ]	[ ]
g)	Local or regional water supplies?	[X]	[ ]	[ ]	[ ]
h)	Other____________________	[ ]	[ ]	[ ]	[ ]
XIV.	AESTHETICS. Would the proposal:				
a)	Affect a scenic vista open to public view?	[X]	[ ]	[ ]	[ ]
b)	Have a negative aesthetic effect?	[X]	[ ]	[ ]	[ ]
c)	Create light or glare?	[X]	[ ]	[ ]	[ ]
d)	Other____________________	[ ]	[ ]	[ ]	[ ]
XV.	CULTURAL RESOURCES. Would the proposal:				
a)	Disturb paleontological or archaeological resources?	[X]	[ ]	[ ]	[ ]
b)	Have the potential to cause a physical change which would affect unique ethnic cultural values?	[ ]	[X]	[ ]	[ ]
c)	Restrict existing religious or sacred uses within the potential impact area?	[ ]	[ ]	[ ]	[X]
d)	Affect a recognized historical site?	[X]	[ ]	[ ]	[ ]
e)	Other____________________	[ ]	[ ]	[ ]	[ ]
XVI.	RECREATION				
a)	Will the proposal result in an impact upon the quality or quantity of existing recreation opportunities?	[X]	[ ]	[ ]	[ ]

XVII. MANDATORY FINDINGS OF SIGNIFICANCE

		Potentially Significant Impact	Potentially Significant Impact Unless Mitigation Incorporated	Less than Significant Impact	No Impact
a)	Does the project have the potential to 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?	[X]	[ ]	[ ]	[ ]
b)	Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively brief, definitive period of time while long-term impacts will endure well into the future.)	[ ]	[ ]	[ ]	[X]
c)	Does the project have impacts which are individually limited but cumulatively considerable? (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect of the total of those impacts on the environment is significant.)	[ ]	[X]	[ ]	[ ]
d)	Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	[X]	[ ]	[ ]	[ ]

XVIII. DEPARTMENT OF FISH AND GAME ‘DE MINUMUS’ FINDING

a)	Will the project have an adverse effect either individually or cumulatively, on fish and wildlife resources? Wildlife shall be defined for the purpose of this question as "all wild animals, birds, plants, fish, amphibians, and related ecological communities, including the habitat upon which the wildlife depends for its continued viability."	[X]	[ ]	[ ]	[ ]

IXX. DISCUSSION OF ENVIRONMENTAL IMPACTS AND/OR EARLIER ANALYSIS:

Section and Subsections	Evaluation of Impact
I. LAND USE AND PLANNING	a) The proposed development of this site is for single -family residences and multi-family units.. The site consists of six lots totaling 695.4 acres. The site is currently zoned Industrial Commercial (IC), Community Commercial Planned Development (CC PD), Commercial Office (CO PD), Residential Medium (RM) and Mobile Home Park (MHP) and is located within the Valley Center Concept (VCC) area and Significant Ecological Area overlay. The zoning of the subject site is consistent with the General Plan designations. The applicant is proposing to change the General Plan designation to Residential Medium and Community Commercial maintain the VCC and SEA overlays and the zoning to Residential Medium and Community Commercial with a Planned Development. The site would be developed for 744 multi-family units and 439 single-family units along with a 27.4-acre park. Further analysis is needed to evaluate the land use modifications. The Industrial Commercial (IC) zone permits a limited, low patronage range of commercial use, quasi industrial and light industrial activities; encourages the provision of employee recreation opportunities; and acts as a transitional zone” (UDC Section 17.11.020.O). The Community Commercial (CC) zone “is intended for retailing and service uses of a community-wide nature that attract people from beyond the immediate neighborhood. The zone will typically include at least one or two major users and shall not be construed to be an allowance for a proliferation of small, multi-tenant convenience commercial centers located on corners and in strip commercial fashion along the City’s streets” (UDC Section 17.11.020.J). The Commercial Office (CO) “is intended primarily for offices and professional services. Retail and services uses may be considered on the ground floor of such development; however, this shall not be construed to permit commercial centers or large single-tenant retail stores. Commercial office developments are generally located in centers or as individual buildings along major and secondary highways” (UDC Section 17.11.020.L). The proposed Residential Medium (RM) zone corresponds to small groupings of attached dwellings such as duplexes, triplexes, and fourplexes with a density up to 11.0 dwelling units per acre. This zone is consistent with typical densities for mobile home parks. Additional uses are permitted that are complimentary to, and can exist in harmony with, a residential neighborhood” (UDC Section 17.11.020.F). The Planned Development overlay is intended to accomplish more creative designs for development, economical and efficient use of land that is harmonious with the environment, and ensure development is consistent with approved applications. The applicant is also requesting to implement the planned development overlay, to allow building heights in excess of two-stories and 35’ tall, approval of the Hillside Innovative Application, and vehicular gating of Planning Area C. The conditional use permit procedure provides flexibility in the Unified Development Code (UDC) use regulations to account for the widely varying needs of certain uses. Because of their unusual characteristics, and in order to achieve the special purposes in certain districts, conditional uses require special consideration. In order to achieve these purposes, the Planning Commission and City Council are empowered to grant and deny applications for conditional use permits and impose reasonable conditions upon granting conditional use permits. The applicant is also requesting a hillside review to develop on slopes of greater than 10%.

Section and Subsections	Evaluation of Impact
	The intent of the hillside ordinance is to "regulate the development and alteration of hillside areas and ridgelines, to minimize the adverse effects of hillside development and to provide for the safety and welfare of the City of Santa Clarita while allowing for the reasonable development of hillside areas." The applicant is requesting an oak tree permit to remove 15 oak trees. A total of 87 total oak trees are located on site. Lastly, the applicant is requesting an adjustment to allow for a maximum 20% reduction in the minimum lot size and lot width for lots within Planning Area A1. The adjustment also includes to allow for a 16 foot front yard setback on a traditional garage facing street design with a minimum driveway length of 18 feet and to allow for 7 foot high property line block walls facing public streets. These requests will be further analyzed. b) The proposed project is located within the Valley Center Concept (VCC) overlay area. This overlay designates the central portion of the City in order to create a focal point for the City. The purpose of this overlay is to permit and encourage master planning providing a wide range of Valley-wide activities. The concept is intended to develop a central core that would include higher intensity and density for residential and commercial land uses. The project would provide residential and recreational activities, however, no commercial or any other land uses are proposed and therefore, may not consistent with the goals of the Valley Center Concept (VCC) overlay. c) Completion of the proposed project will provide 439 single family residences and 744 multi-family units with access from the future Newhall Ranch Road and other future local streets. Located north of the project site is the Castaic Lake Water Agency (CLWA) property used for administrative offices and a treatment facility, east of the site is vacant land, south of the site is the Santa Clara River and west of the site, along Bouquet Canyon Road are existing commercial uses. Impacts may occur to the existing land uses because the site is predominantly vacant due to traffic, noise, light and glare. d) The project is located in a predominantly vacant area. On the subject site there are several buildings utilized for a business, which currently operates on site, the LA Aqueduct, a water tank. In addition, there may other utility structures on site. No communities are established in this area. Therefore, construction of the project will not divide or disrupt any existing community. The proposal will establish a new community within the center of the City. Therefore, no impact is anticipated. e) The project is located within and adjacent to a Significant Ecological Area (SEA). The SEA is a category used to designate areas of importance to the community for preservation and protection. Development within these SEA areas is limited and appropriate environmental studies are required to ensure the protection of this area. The Santa Clara River will be maintained predominantly in a natural state and in accordance with the Natural River Management Plan. All development is outside of the SEA boundaries with exception of the bank stabilization and a portion of the Newhall Ranch Road and Golden Valley Road Bridge (reviewed under a separate EIR). Potential impacts exist to the Santa Clara River and require technical studies to demonstrate that the Santa Clara River and any habitat and other resources will be preserved. f) Other: No additional impacts are identified at this time for land use and planning. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.

Section and Subsections	Evaluation of Impact
II. POPULATION AND HOUSING	a) This project proposes to build 1,183 residential units, including both single- and multi-family. This will add approximately 3,430 persons to the population based on 2.9 persons per household. The estimated population for the City of Santa Clarita is 224,500 by 2020. Therefore, it can be expected that the project will not induce substantial population growth exceeding official regional or local population projections. b) The Santa Clarita Valley is considered housing rich and jobs poor. The proposal does not include any commercial, office or industrial type uses and therefore, will create a significant amount of jobs. The proposal will displace an existing business on the site, however, the jobs may be relocated within the Valley. The site is used by this business primarily for storage and it is not anticipated that this project will result in a substantial decrease in jobs. However, additional analysis is required to determine the net loss of any jobs. c) The proposed project will not displace any existing housing because the land is predominantly vacant. No significant impacts would occur. d) Other: No additional impacts with regards to population and housing are identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
III. GEOLOGIC PROBLEMS	a) The project requires 5.5 million cubic yards of cut and fill grading to develop the site as proposed. Additional remedial grading of 3.6 million yards is also proposed. The proposed project will require fill to level areas around the hillsides to create building pads on the site for development. Further analysis is required to determine if any geologic substructures will be impacted as a result of this project. There may be significant impacts to the earth conditions because substantial grading will occur and further analysis is required. b)The approval of the proposed project would result in disruption, displacement, compaction and over-covering of soil. The majority of the site will require grading activities for proposed project development causing potentially significant impacts to the existing conditions and further analysis is required. c) The project site has moderate to severe slopes, which require substantial topographical modifications. Therefore, there may be significant impacts as a result and further analysis is needed in the EIR. d) The project site is predominantly vacant and does not contain any known unique geologic or topographic features. Further review and analysis will confirm any features and then significance will be determined. e) Construction activity associated with the proposed improvements may result in a short-term wind and water driven erosion of soils. The proposed improvements will require extensive grading, which will expose soils to wind and rain. This impact is generally considered short term in nature, however, due to the size of the project, further analysis is required. Development activity would remove a majority of the natural vegetation on the site and replace the land with building pads for residential units. This is also considered a potential impact and requires additional analysis. f) The proposed project is located in hillside areas in addition to relatively level ground. The modification of the hillside could possibly expose people or property to geologic hazards such as landslides, mudslides, ground failure,

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	or any similar type hazards. All of Southern California is located in an earthquake prone region. The project may result potentially significant impacts to geologic hazards and requires further analyzed in the EIR. g) As discussed above, the majority of the site will be graded. Consequently the project will create changes in soil deposition, erosion, and siltation. The project will be subject to the National Pollutant Discharge Elimination System (NPDES) General Permit, which will require mechanisms that will minimize soil deposition, erosion or siltation, however, the extent of the impact will require additional analysis in the EIR. h) The site is bounded to the south by the Santa Clara River, however, other than bank stabilization and the construction of a portion of Newhall Ranch Road, the Santa Clara River will remain is a natural state. In addition to the river, a blue line stream may traverse the property and will require evaluation. Therefore, potentially significant impacts may result to these resources and further analysis in the EIR is required. i) The proposed project will result in earth movement of approximately 5.5 million cubic yards of cut and fill plus additional remedial grading. This may result in a potentially significant impact to the existing conditions on site and will be further evaluated in the EIR. j) The project area has significant slopes of greater than 25 percent, which will result in extensive grading. These impacts will be evaluated within the EIR. k) Although, the proposed project is not located within an Alquist-Priolo Special Studies Zone it is in close proximity to the site. l) Other: No additional impacts with regard to geologic problems are identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
IV. WATER	a) Development of the proposed project would include 744 multi-family units , 439 single-family units, up to 40,000 square feet of commercial floor space as well as the extension of two major highways. Development of this magnitude will significantly increase impermeable or impervious features. Increased runoff from impermeable surfaces would increase total site runoff. This impact requires further analysis in the EIR. b) The proposed project may expose people or property to water related hazards, such as flooding. However, as development of the site occurs, the appropriate storm drain system will be installed to accommodate flows from a capital storm. Bank stabilization will be constructed in conjunction with the proposal, which will provide further protection from water hazards. In addition there may be water tanks on site that could potentially expose people to water hazards. The impacts to hazards related to water issues will be further analyzed in detail within the EIR. c) As development occurs, the project area would be subject to urban contaminants such as motor oils, gasoline, etc. Development of the site would create additional contaminants generated by the residential uses. Runoff on the future streets will be directed into the gutters and channeled toward catch basins, which will filter out many of the solid pollutants from the runoff. Construction activities associated with the proposed project will not discharge into surface waters or alter surface water quality because the project will be required to incorporate National Pollutant Discharge Elimination System (NPDES) General Permit mechanisms designed to

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	reduce and eliminate such discharges. However, potentially significant impacts may still result from a development of this magnitude and therefore, water-related issues require further analysis in the EIR. d) The proposed development may substantially increase the amount of surface water in nearby water bodies, due to an increase in hardscape on the project site. This issue requires further analysis in the EIR. e) Development of the proposed project may also create a change in currents or the course of the direction of water due to the amount of water runoff generated to alter these resources. This requires further analysis in the EIR. f) Construction of the project may change the quantity of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations, or through substantial loss of groundwater recharge capability because the new amount of proposed hardscape necessary to construct the project is substantial and further analysis is required in the EIR. g) Construction of the project may require major cuts in the soil surface that will disturb groundwater flows thereby altering the direction or flow of groundwater, which requires further analysis in the EIR. h) The project may have impacts to groundwater quality and will be analyzed within the EIR. i) Water will be needed during construction activities for watering of exposed soil to minimize airborne dust and dirt and may significantly increase the demand on public water supplies. Although this impact is potentially significant, it would be short-term, however once the residences are occupied, there would be a long-term increase in the demand for public water. This will be further analyzed in the EIR. j) Other: No additional issues related to water are identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
V. STORMWATER MANAGEMENT & RECYCLING	a)The project may result in substantial stormwater discharges during construction activities. A new drainage system will be required to be incorporated into the project. However, due to the magnitude of the project further analysis is required in the EIR. b) The project may result in a potentially significant environmentally harmful increase in the flow rate or volume of the project site or surrounding areas. This impact requires further analysis in the EIR. c) The project may have a substantial increase in stormwater discharges from the site and may impair the beneficial uses of receiving waters or areas that provide water quality benefits. This will be analyzed in the EIR. d) A project of this magnitude may result in a significant increase in stormwater discharges and may cause harm to the biological integrity of drainage systems and water bodies and requires further analysis in the EIR. e) Waste materials expected to be generated are typical construction debris, including concrete and asphalt. Although impacts may be significant, they are short term in nature. Furthermore, the addition of residences may significantly increase the solid waste disposal at landfills and other waste disposal facilities. This significance of this impact will be further analyzed in the EIR. f) Other: No additional issues related to stormwater management and recycling have been identified at this time. Potential impacts may result from this proposal and will be evaluated within

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	the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
VI. AIR QUALITY	a) Development of the proposed project would generate exhaust emissions from construction equipment and vehicles traveling to and from the site. All construction-generated impacts are short term and will be mitigated with appropriate building and engineering requirements. In addition, this project will result in the construction of new roadways and additional traffic on the existing roadways. The impact to the air quality will be significant and further analysis is required. b) The project includes development of residential uses. These uses are typically identified as sensitive receptors. No commercial or industrial uses are proposed with the project. Future development adjacent to the project site will evaluate the impacts to the residential uses. Therefore, at this time it is not anticipated that there may be potentially significant impacts to any sensitive receptors. c) Construction activities would involve the use of a variety of gasoline or diesel-powered equipment that will emit exhaust fumes. These impacts may be potentially significant, however short term in nature. Upon occupancy of the residences, vehicle traffic would increase significantly and may have a significant impact to air quality. These impacts require further analysis. d) Other: No additional issues related to air quality have been identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.

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VII. TRANSPORTATION/ CIRCULATION	a) The proposed project will result in a significant increase in vehicle trips in this area. Currently, the site is vacant with the exception of one contractor business that operates at the site. The project includes the development of 744 multi-family units which would result in 4,910 vehicle trips per day and 439 single-family residences which would result in 4,170 trips per day. This would total approximately 9,080 trips per day. Additionally the project would add up to 40,000 square feet of commercial floor space generating .... trips. The addition of this many trips per day may create additional traffic congestion on other roadways, including but not limited to Bouquet Canyon Road, Soledad Canyon Road and Golden Valley Road. In addition, the project is located in the center of the city and three General Plan roadways cross the site. The project will require the construction of two major arterials, Newhall Ranch Road and Golden Valley Road including a bridge over the Santa Clara River. A portion of Newhall Ranch Road, also known as the Cross Valley Connector, will be constructed in conjunction with the the project. Furthermore, Santa Clarita Parkway is another north - south General Plan major arterial that is presently shown on the City's Circulation map. A traffic study should be prepared and further analyses are required to analyze these impacts to the City's transportation system. b) The project will not be constructed with any roadways that do not comply with City standards for roadways, therefore, it is not anticipated to have any impacts from design features. c) Construction and operation of the project may result in inadequate emergency services to this area. This may create the necessity for emergency services to expand in order to have access to this area and be able to respond in an appropriate amount of time. This requires further analysis in the EIR. d) No parking currently exists on the site. The project will be designed to accommodate all parking for residential uses. Therefore, the impacts are anticipated to be less than significant. e) Construction of the site will cause periodic activity that would result in the temporary presence of hazards and barriers, such as construction equipment, open trenches, demolition debris, and stockpiled material at the project site. No bike trails exist at this time and therefore, will not be impacted. Once completed, the project will provide a River trails system and bike trails along the some of the roadways. Further analysis is required to mitigate the impacts during construction. f) The project will result in many roadways throughout the site. All roadway improvements will be designed and constructed meet the City standards. Therefore, the impacts are anticipated to be less than significant. g) The proposed project will not result in a disjointed pattern of roadway improvements. The project and any associated roadway constructed will be designed and developed in compliance with the City's standards. h) Other: No additional traffic and circulation impacts have been identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.

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VIII. BIOLOGICAL RESOURCES	a) The proposed development is adjacent to the Santa Clara River and may potentially impact endangered, rare or threatened species or plants. The California Department of Fish and Game has the California Natural Diversity Database which should be utilized for determining the potential for species and plants on the site. Surveys and other research should also be conducted in accordance with the procedures set forth by Fish and Game to whether or not potential habitat exists on site. Although approximately 330 acres of natural river area will remain undisturbed there is still the potential impacts to the biological resources of the Santa Clara River. Further studies and analysis is required in the EIR. b) Several oak trees protected by the City's Oak Tree Ordinance exist on the site. Therefore, an oak tree report shall be prepared analyzing the impacts to the oaks. The oak tree report shall be included in the EIR and will provide mitigation for any impacted oaks in accordance with the City's Ordinance. c) The proposed project site may impact any federally protected wetlands through direct removal, filling, hydrological interruption, or other means. The California Department of Fish and Game and the Army Corps of Engineers will determine the boundaries to wetlands and will have jurisdiction. Further analysis is required in the EIR. d) The proposed project may impact a wildlife corridor. Further analysis is required to determine if there is a migration corridor on site that will be impacted by the proposal. e) Other: Bank stabilization will be constructed in conjunction with the project. The bank stabilization will be analyzed within the EIR for this project and within the EIR for the future Newhall Ranch Road and the Golden Valley Road bridge. Further analysis is required to determine the impact to the biological resources. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
IX. ENERGY AND MINERAL RESOURCES	a) The proposed project is not anticipated to conflict with adopted energy conservation plans, however, this should issue be further reviewed and determined to have no impact. b) The project may result in the use of nonrenewable resources and requires further analysis in the EIR. c) The proposed project is not known at this time to have a mineral resource and further analysis is required in the EIR. d) Other: No additional issues related to energy and mineral resources have been identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.

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X. HAZARDS	a) Residential uses do not typically generate hazardous materials, and consequently, development on the project site would not create a significant risk of accidental explosion or release of hazardous substance. b) The proposed project will result in additional roadways, which will increase the ease of emergency evacuation and/or emergency response. Further analysis needs to be provided in the EIR. c) No significant hazards to human health are expected to occur with the construction and operation of the project. d) Development is proposed in close proximity to high-pressure gas mains, water lines and possibly other utility lines which is common within California. California Public Utility Commission has mandated safety requirements and the applicant will be required to comply with those requirements. The site is also in close proximity to Southern California Edison electrical transmission lines traverse portions of the project site. Any potential impacts will be further analyzed in the EIR. e) The project site is not located within an area that is heavily vegetated with flammable brush, grass or trees. The project includes approximately 300 acres of natural vegetation that would be at risk of fire hazard. Therefore, further analysis is required. g) Other: No additional issues related to hazards have been identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
XI. NOISE	a) The project site is located in an undeveloped area with little on-site generated noise. The project would result in increased noise generated from the residential uses and the new roadways that will be constructed. Further analysis is required in the EIR. b) The project site will have added noise levels and vibrations and require further analysis in the EIR. c) Other: No additional issues regarding noise have been identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
XII. PUBLIC SERVICES	a) The proposed project includes approximately 1,183 new residences that would require fire services. This would result in a potentially significant impact to the current fire services. Additional fire stations and personnel may be required as a result of this proposal. Further analysis is required. b) As the residential population increases, there may be an impact to police services. Additional services will be required to serve the new residences. Further analysis is required to determine the impact. c) As the population increases, additional need for school facilities may be required. This impact requires further analysis in the EIR. d) The project will require the construction of a new major arterial through the project site. The City of Santa Clarita is in the process of preparing an EIR for this new roadway. The new roadway will require street maintenance, including but not limited to, street sweeping, landscaping maintenance, street light maintenance and will be added to the capital improvement projects that occur annually. This will result in a significant impact to these services. e) The proposal will result in an increase to the permanent resident population,

Section and Subsections	Evaluation of Impact
	and as such would result in an increased need for libraries, community centers, or related government services. Thus, further analysis is required to address these issues. f) Other: No additional issues related to public services have been identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
XIII. UTILITIES	a) The proposal will includes the expansion of the existing utility system throughout the project site. This includes requiring the services of Southern California Edison, Southern California Gas Company, and Pacific Bell telephone company, in addition to cable companies and telecommunication companies. This impact is potentially significant and further analysis is required to address this issue. b) Pacific Bell will provide telephone service to the area. Telephone facilities will be located within the public rights-of-way. No overhead telephone facilities will be permitted. However, new telephone lines are not existing in the area and will be required to be extended to service this new community. This will result in a potentially significant impact and further analysis is required in the EIR. c) The proposed project will result in the addition of approximately 1,183 new residences that will substantially increase the demand for wastewater treatment resulting in a significant impact on local and regional water treatment and distribution facilities. Additional facilities may be required to accommodate the new community. Therefore, further analysis is required. d) The proposed project will result in a potentially significant increase to the amount of sewage generated. Therefore, potentially significant impacts related to sewers or septic tanks require further analysis. e) The proposed project will require the construction of new storm water drainage facilities or expansion of existing facilities. Expansion of the system will be required to accommodate the proposed housing units. This will result in a potentially significant impact and requires further analysis. f) The project, once occupied by residents will generate a significant amount of solid waste that will need to be picked up and transported to appropriate waste facilities. At this time, the City of Santa Clarita exports virtually all its wastes except for those wastes that can be recycled, to the Chiquita Canyon Landfill. Further analysis is required in the EIR to determine the impact to solid waste and recycling facilities g) The proposed project may create a need for local or regional water supplies. Further analysis is required in the EIR. h) Other: No additional issues related to utilities have been identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.

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XIV. AESTHETICS	a) The project will significantly modify the appearance of the hillside as viewed along Soledad Canyon Road, between Bouquet Canyon Road and the future Golden Valley Road. In addition, the appearance from Bouquet Canyon Road and San Fernando Road will also be affected. The appearance of this site will be potentially significantly changed and further analysis, including photo simulations is required in the EIR. b) The overall project could potentially impact the aesthetics of the area. Special care needs to be given to the project site due to its high visibility. The site is highly visible from three major arterials and is currently in a natural state. Development may potentially impact the views as seen from these roadways. Further analysis is required to mitigate the impacts to the aesthetics. c) The site is currently vacant with no lighting. Development of the residences will include street lighting along with light generated by each residential unit. This will have a potential impact on the light and glare that will be generated and seen by adjacent roadways and residential uses. Further analysis is required in the EIR. d) Other: No additional issues related to aesthetics have been identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
XV. CULTURAL RESOURCES	a) The proposed site is predominantly undeveloped and vacant. The site has identified cultural sites, which will be addressed within the EIR. Any discovery of other paleontological or archaeological resources will be evaluated. b) The proposed project has the potential to cause a physical change which would affect unique ethnic cultural values because the site has two village sites which may have potentially significant impacts to cultural resources. Further analysis is required in the EIR. c) The proposed project would not restrict existing religious or sacred uses within the project area. d) Cultural sites have been identified on the project site and therefore, development may significantly impact these historical sites. e) Other: No additional issues related to cultural resources need to be addressed. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
XVI. RECREATION	a) The proposed project will create in 1,183 new households. This will result in increased usage of the City's recreational services, thereby causing a need to provide additional recreational opportunities for the community. The proposed project will have over 300 acres of river area, in addition to a 27-acre passive park on the site which will contribute to the recreation provided

Section and Subsections	Evaluation of Impact
	to the community. Dedication or improvement of recreation facilities is based upon the generation of a residential population. The potential impacts to recreational services will be further evaluated within the EIR. b) Other: No additional issues related to recreation need to be addressed. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
XVII. MANDATORY FINDINGS OF SIGNIFICANCE	a) – d) The analysis of the issues raised by the checklist questions indicates that project impacts are generally considered to be potentially significant impacts that require further analysis within an Environmental Impact Report. These areas include land use and planning; population & housing; air quality; hazards; biological resources; energy and mineral resources; cultural resources; public services; utilities and service system; aesthetics; and recreation. These areas may require technical studies, photo simulations and other research to provide appropriate environmental documentation for this project.
XVIII. DEPARTMENT OF FISH AND GAME 'DE MINIMUS' FINDING	a) There is evidence that this proposed project may have the potential for an adverse effect, either individually or cumulatively on wildlife resources as defined by Fish and Game Code Section 711.2. Therefore, the proposed project will require biological studies to determine and address the impacts.

Letters from Agencies in Response to Revised Notice of Preparation

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse

Gray Davis
Governor

Tal Finney
Interim Director

Notice of Preparation

October 20, 2003

RECEIVED
PLANNING DIVISION
OCT 27 2003
PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

To: Reviewing Agencies

Re: Riverpark
SCH# 2002091081

Attached for your review and comment is the Notice of Preparation (NOP) for the Riverpark draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Jeff Hogan and/or Wendy Deats
City of Santa Clarita
23920 Valencia Boulevard, Suite 300
Santa Clarita, CA 91355

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Associate Planner, State Clearinghouse

Attachments
cc: Lead Agency

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
(916)445-0613 FAX(916)323-3018 www.opr.ca.gov

Document Details Report
State Clearinghouse Data Base

SCH# **2002091081**
Project Title Riverpark
Lead Agency Santa Clarita, City of

Type **NOP** Notice of Preparation

Description The applicant proposes to develop six parcels of land totaling 695.4 acres of land for single-and multi-family uses. A tentative tract map is required to subdivide the six lots into 439 single-family lots, 744-multi-family units (5 lots), two commercial lots, HOA lots, a private street lot, recreation lots, a water quality basin lot, a park lots, bridge lots, open space lots, and Santa Clara River lots totaling bridge lots, open space lots, and Santa Clara River lots totaling 545 lots.

Lead Agency Contact

Name Jeff Hogan and/or Wendy Deats
Agency City of Santa Clarita
Phone 661-255-4330 ***Fax***
email
Address 23920 Valencia Boulevard, Suite 300
City Santa Clarita ***State*** CA ***Zip*** 91355

Project Location

County Los Angeles
City Santa Clarita
Region
Cross Streets East of Bouquet Canyon, norht of Soledad Canyon Road
Parcel No.
Township ***Range*** ***Section*** ***Base***

Proximity to:

Highways
Airports
Railways
Waterways Santa Clara River
Schools
Land Use Residential Medium, Industrial Commercial, Community Commercial, Commercial Office and Mobile Home Park.
Industrial Commercial (IC), Residential Medium (RM), Commercial Office with a Planned Development overlay (CO PD), Community Commercial (CC) and Community Commercial with a Planned Development overlay (CC PD) and Mobile Home Park (MHP).

Project Issues Landuse; Traffic/Circulation; Public Services; Population/Housing Balance; Biological Resources; Recreation/Parks; Geologic/Seismic; Noise; Aesthetic/Visual; Water Quality; Toxic/Hazardous; Archaeologic-Historic; Water Supply; Other Issues; Air Quality; Minerals

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Reviewing Agencies Resources Agency; Department of Conservation; Office of Historic Preservation; Department of Parks and Recreation; Department of Water Resources; Department of Fish and Game, Region 5; Office of Emergency Services; Native American Heritage Commission; State Lands Commission; California Highway Patrol; Department of Housing and Community Development; Caltrans, District 7; State Water Resources Control Board, Division of Water Quality; Department of Toxic Substances Control; Regional Water Quality Control Board, Region 4

Date Received 10/20/2003 ***Start of Review*** 10/20/2003 ***End of Review*** 11/18/2003

Note: Blanks in data fields result from insufficient information provided by lead agency.

OP Distribution List

County: *Los Angeles*

SCH# ~~2002091081~~

esources Agency

- ☒ **Resources Agency**
  Nadell Gayou
- ☐ **Dept. of Boating & Waterways**
  Suzi Betzler
- ☐ **California Coastal Commission**
  Elizabeth A. Fuchs
- ☐ **Colorado River Board**
  Gerald R. Zimmerman
- ☒ **Dept. of Conservation**
  Roseanne Taylor
- ☐ **California Energy Commission**
  Environmental Office
- ☐ **Dept. of Forestry & Fire Protection**
  Allen Robertson
- ☒ **Office of Historic Preservation**
  Hans Kreutzberg
- ☒ **Dept of Parks & Recreation**
  B. Noah Tilghman
  Environmental Stewardship Section
- ☐ **Reclamation Board**
  Lori Buford
- ☐ **Santa Monica Mountains Conservancy**
  Paul Edelman
- ☐ **S.F. Bay Conservation & Dev't. Comm.**
  Steve McAdam
- ☒ **Dept. of Water Resources**
  Resources Agency
  Nadell Gayou

sh and Game

- ☐ **Dept. of Fish & Game**
  Scott Flint
  Environmental Services Division
- ☐ **Dept. of Fish & Game 1**
  Donald Koch
  Region 1
- ☐ **Dept. of Fish & Game 2**
  Banky Curtis
  Region 2
- ☐ **Dept. of Fish & Game 3**
  Robert Floerke
  Region 3
- ☐ **Dept. of Fish & Game 4**
  William Laudermilk
  Region 4
- ☒ **Dept. of Fish & Game 5**
  Don Chadwick
  Region 5, Habitat Conservation Program
- ☐ **Dept. of Fish & Game 6**
  Gabrina Gatchel
  Region 6, Habitat Conservation Program
- ☐ **Dept. of Fish & Game 6 I/M**
  Tammy Allen
  Region 6, Inyo/Mono, Habitat Conservation Program
- ☐ **Dept. of Fish & Game M**
  Tom Napoli
  Marine Region

Other Departments

- ☐ **Food & Agriculture**
  Steve Shaffer
  Dept. of Food and Agriculture
- ☐ **Dept. of General Services**
  Robert Sleppy
  Environmental Services Section
- ☐ **Dept. of Health Services**
  Wayne Hubbard
  Dept. of Health/Drinking Water

Independent Commissions,Boards

- ☐ **Delta Protection Commission**
  Debby Eddy
- ☒ **Office of Emergency Services**
  John Rowden, Manager
- ☐ **Governor's Office of Planning & Research**
  State Clearinghouse

____

- ☒ **Native American Heritage Comm.**
  Debbie Treadway
- ☐ **Public Utilities Commission**
  Ken Lewis
- ☒ **State Lands Commission**
  Jean Sarino
- ☐ **Tahoe Regional Planning Agency (TRPA)**
  Lyn Barnett

Business, Trans & Housing

- ☐ **Caltrans - Division of Aeronautics**
  Sandy Hesnard
- ☐ **Caltrans - Planning**
  Ron Helgeson
- ☒ **California Highway Patrol**
  Lt. Julie Page
  Office of Special Projects
- ☒ **Housing & Community Development**
  Cathy Creswell
  Housing Policy Division

Dept. of Transportation

- ☐ **Dept. of Transportation 1**
  Mike Eagan
  District 1
- ☐ **Dept. of Transportation 2**
  Don Anderson
  District 2
- ☐ **Dept. of Transportation 3**
  Jeff Pulverman
  District 3
- ☐ **Dept. of Transportation 4**
  Tim Sable
  District 4
- ☐ **Dept. of Transportation 5**
  David Murray
  District 5
- ☐ **Dept. of Transportation 6**
  Marc Birnbaum
  District 6
- ☒ **Dept. of Transportation 7**
  Stephen J. Buswell
  District 7
- ☐ **Dept. of Transportation 8**
  Linda Grimes,
  District 8
- ☐ **Dept. of Transportation 9**
  Gayle Rosander
  District 9
- ☐ **Dept. of Transportation 10**
  Tom Dumas
  District 10
- ☐ **Dept. of Transportation 11**
  Bill Figge
  District 11
- ☐ **Dept. of Transportation 12**
  Bob Joseph
  District 12

Cal EPA

Air Resources Board

- ☐ Airport Projects
  Jim Lerner
- ☐ Transportation Projects
  Kurt Karperos
- ☐ Industrial Projects
  Mike Tollstrup

- ☐ **California Integrated Waste Management Board**
  Sue O'Leary
- ☐ **State Water Resources Control Board**
  Jim Hockenberry
  Division of Financial Assistance
- ☒ **State Water Resources Control Board**
  Student Intern, 401 Water Quality Certification Unit
  Division of Water Quality
- ☐ **State Water Resouces Control Board**
  Mike Falkenstein
  Division of Water Rights
- ☒ **Dept. of Toxic Substances Control**
  CEQA Tracking Center

Regional Water Quality Control Board (RWQCB)

- ☐ **RWQCB 1**
  Cathleen Hudson
  North Coast Region (1)
- ☐ **RWQCB 2**
  Environmental Document Coordinator
  San Francisco Bay Region (2)
- ☐ **RWQCB 3**
  Central Coast Region (3)
- ☒ **RWQCB 4**
  Jonathan Bishop
  Los Angeles Region (4)
- ☐ **RWQCB 5S**
  Central Valley Region (5)
  - ☐ **RWQCB 5F**
    Central Valley Region (5)
    Fresno Branch Office
  - ☐ **RWQCB 5R**
    Central Valley Region (5)
    Redding Branch Office
- ☐ **RWQCB 6**
  Lahontan Region (6)
  - ☐ **RWQCB 6V**
    Lahontan Region (6)
    Victorville Branch Office
- ☐ **RWQCB 7**
  Colorado River Basin Region (7)
- ☐ **RWQCB 8**
  Santa Ana Region (8)
- ☐ **RWQCB 9**
  San Diego Region (9)

- ☐ **Other** ________________
  ____
  ____

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"Enriching Lives"

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
www.ladpw.org

JAMES A. NOYES, Director

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

RECEIVED
PLANNING DIVISION
DEC 17 2003
PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

IN REPLY PLEASE REFER TO FILE: WM-4

December 4, 2003

Mr. Jeff Hogan
Associate Planner
City of Santa Clarita
23920 Valencia Boulevard, Suite 300
Santa Clarita, CA 91355

Dear Mr. Hogan:

RESPONSE TO A REVISED NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT RIVER PARK MASTER CASE NO. 02-175 CITY OF SANTA CLARITA

Thank you for the opportunity to provide comments on the subject document. The proposed project includes the development of 744 multifamily units, 439 single-family dwellings, and 40,000 square feet of commercial uses. A 27.4-acre park is also proposed adjacent to the Santa Clarita River. The 695.4 acres are located at the terminus of Newhall Ranch Road, east of Bouquet Canyon Road, north of Soledad Canyon Road, and adjacent to the Santa Clara River in the City of Santa Clarita. We have reviewed the submittal and offer the following comments:

Environmental Programs

As projected in the Los Angeles County Countywide Siting Element, which was approved in late 1997 by a majority of the cities in the County of Los Angeles with a majority of the population and by the County Board of Supervisors in January 1998, a shortfall in permitted daily landfill capacity may be experienced in the County within the next few years. The construction activities associated with the proposed project and the postdevelopment operation over the life of the proposed project will increase the generation of solid waste and may negatively impact solid waste management infrastructure in the County. Therefore, the proposed environmental document must identify what measures the project proponent plans to implement to mitigate the impact.

Mitigation measures may include implementation of waste reduction and recycling programs to divert the solid waste, including construction waste, from the landfills.

The California Solid Waste Reuse and Recycling Access Act of 1991, as amended, requires each development project to provide an adequate storage area for collection and removal of recyclable materials. The environmental document should include/discuss standards to provide adequate recyclable storage areas for collection/storage of recyclable materials for commercial establishments in this project.

Should any operation within the subject project include the construction, installation, modification or removal of underground storage tanks, our Environmental Programs Division must be contacted for required approvals and operating permits.

Food service establishments may be required to provide a grease treatment device and will be subject to review and approval by our Environmental Programs Division.

If you have any questions, please contact Mr. Wilson Fong at (626) 458-3581.

Geotechnical and Materials Engineering

The requested Environmental Impact Report (EIR) must be submitted for review.

The EIR shall address the geotechnical issues identified in the Notice of Preparation/Initial Study.

A description of the project and the associated grading, i.e., existing and proposed grades, etc., must be shown on a topographic map. Also, all geotechnical hazards must be identified, and any mitigation measures discussed in detail. The requested information shall be included in the appropriate documents, as requested by others.

Portions of the project site are located within both mapped potentially liquefiable areas and mapped potential seismically induced landslide areas, per the State of California Seismic Hazard Zone Map, Newhall Quadrangles. However, liquefaction analysis and seismic slope stability analyses are not warranted at this time. Detailed liquefaction and seismic stability analyses, conforming to the requirements of the State of California Division of Mines and Geology Special Publication 117, must be conducted at the tentative map and/or grading/building plan stages.

If you have any questions, please contact Mr. Amir Alam at (626) 458-4925.

Land Development

Hydrology and Standard Urban Storm Water Mitigation Plan (SUSMP) Review

This environmental document has been reviewed only for drainage and SUSMP impacts to County of Los Angeles areas and facilities. There are no comments regarding drainage and SUSMP at this time.

Pursuant to recent legislation related to Senate Bill 221 and Senate Bill 610, the EIR shall address the adequacy of the water supply to ensure availability of water for the new development without adversely affecting existing users. The document shall provide for review the water supply assessment and water supply verification from water purveyors of the project.

If you have any questions, please contact Mr. Timothy Chen at (626) 458-4921.

Transportation Planning

We have reviewed the subject document and the proposed project will not have any significant impacts on Los Angeles County highways.

If you have any questions, please contact Mr. Hubert Seto at (626) 458-4349.

Traffic and Lighting

The proposed project has the potential to significantly impact the County and County/City roadways and intersections in the area. We would like the opportunity to review the related environmental documents and traffic study upon its completion. The County's methodology shall be used when evaluating the County and/or County/City intersections. The study shall also address the cumulative impacts generated by this and nearby developments and include the level of service analysis for the affected intersections. If traffic signals or other mitigation measures are warranted at the affected intersections, the developer shall determine its proportionate share of traffic signal or other mitigation costs and submit this information to Public Works for review and approval. A copy of our Traffic Impact Analysis Report Guidelines is enclosed.

If you have any questions, please contact Ms. Jennifer Frary of our Traffic Studies Section at (626) 300-4792.

<u>Watershed Management</u>

San Gabriel River/Santa Clara Watersheds

Sections IV and V: Water and Storm Water Management

We agree with the subject document's analysis and findings of potential significant impacts that will require further analysis in the EIR. Also, the proposed project should include investigation of watershed management opportunities to maximize capture of local rainfall on the project area, eliminate incremental increases in flows to the storm drain or natural channel system, and provide filtering of flows to capture contaminants originating from the project site.

If you have any questions, please contact Mr. Arfan Haidary at (626) 458-4329.

If you have any questions regarding the environmental review process of Public Works, please contact Ms. Massie Munroe at (626) 458-4359.

Very truly yours,

JAMES A. NOYES
Director of Public Works

ROD H. KUBOMOTO
Assistant Deputy Director
Watershed Management Division

MM:kk
D:\EIR345_River Park.doc

Enc.

Traffic Impact Analysis Report Guidelines

January 1, 1997

Prepared by the County of Los Angeles
Department of Public Works

James A. Noyes
Director of Public Works

Table of Contents

JHC:ce
T-2/ACCESS2
(01/22/89)

I. Introduction

The County of Los Angeles Department of Public Works has established the following Guidelines for the preparation of Traffic Impact Analysis (TIA) reports. The purpose of these Guidelines is to establish procedures to ensure consistency of analysis and the adequacy of information presented and timely review by County staff. It is strongly recommended that the applicant's traffic engineer consult with County staff before beginning the study to establish the scope and basic assumptions of the study and any deviations from these Guidelines to avoid unnecessary delays or revisions. For assistance in the TIA scoping process, the Traffic and Lighting Division, Traffic Studies Unit, can be contacted at (626) 458-5909.

II. Requirements

Generally, the Department staff is concerned with adverse impacts on traffic if:

1. Traffic generated by a project considered alone or cumulatively with other related projects, when added to existing traffic volumes, exceeds ~~certain~~ capacity thresholds of ~~an~~ intersection or roadway, ~~contributes to an unacceptable level of service (LOS), or exacerbates~~ an existing congested condition.

2. Project generated traffic interferes with the existing traffic flow (e.g., due to the location of access roads, driveways, and parking facilities).

3. Proposed access locations do not provide for adequate safety (e.g., due to limited visibility on curving roadways).

4. Nonresidential uses generate commuter or truck traffic through a residential area.

5. Project generated traffic significantly increases on a residential street and alters its residential character.

A traffic report must be prepared by a registered Civil or Traffic Engineer. A traffic report is generally needed if a project generates over 500 trips per day or where other possible adverse impacts as discussed in the Analysis and Impact Section (see page 4) of these Guidelines are identified. Before a full review is conducted, the County staff will check the completeness of the TIA report using the attached check list (Exhibit A). If the report is missing any of the check list items, it will be returned for revision.

III. TIA Report Contents

A. Project Description

The following information is required:

1. A description of the project, including those factors which quantify traffic generators, e.g., dwelling units, square feet of office space, persons to be employed, restaurant seats, acres of raw land, etc. For residential developments, the description should indicate the type of residence, (e.g., one level or townhouse condominiums, and if its use is for families, adults or retirees).
2. A plot plan showing proposed driveways, streets, internal circulation, and any new parking facilities on the project site.
3. A vicinity map showing the site location and the study area relative to other transportation systems.
4. A brief history of the projects that are part of the phased Master Plan or a parent tract/parcel map.

B. Transportation Circulation Setting

The following information is required:

1. <u>Existing and Proposed Site Uses</u>

   A description of the permitted and/or proposed uses of the project site in terms of the various zoning and land use categories of the County, and the status and the usage of any facilities currently existing on the site.

2. <u>Existing and Proposed Roadways and Intersections</u>

   A description of existing streets and roadways, both within the project site (if any) and in the surrounding area. Include information on the roadway classifications (per the Highway Plan), the number of lanes and roadway widths, signalized intersections, separate turn lanes, and the signal phases for turning movements.

Existing daily directional and peak-hour through and turning traffic volumes on the roadways surrounding and/or logically associated with the project site, including Secondary and Major highways and freeways. Local streets affected by the project should also be shown. Each report shall include appendices providing count data used in the preparation of the report. The source and date of the traffic volume information shall be indicated. Count data should not be over one year old. Since peak volumes vary considerably, a ten percent daily variation is not uncommon, especially on recreational routes or roadways near shopping centers; therefore, representative peak-hour volumes are to be chosen carefully.

All assumed roadways and intersections or any other transportation circulation improvements must be identified and discussed. The discussion should include the scope and the status of the assumed improvements including the construction schedule and financing plan. It should be noted that all assumed roadways and intersections or any other transportation circulation improvements will be made a condition of approval for the project to be in place prior to the issuance of building permits. If assumed improvements do not get built on time due to an unforeseeable condition, traffic conditions for a different assumed highway network or other mitigation measures will be considered if a traffic study is submitted with a different assumed network or other measures are recommended to mitigate the traffic impact in question.

C. Analysis and Impact

The following information is required:

1. Trip Generation Analysis

Tabulate the estimated number of daily trips and a.m. and p.m. peak-hour trips generated by the proposed project entering and exiting the site. Trip generation factors and source are to be included. The trip generation rates contained in the latest edition of the Institute of Transportation Engineers Trip Generation manual should generally be used, except in the case of condominiums/townhomes when the following rates should be used per unit:

		A.M.-Peak	P.M.-Peak
	ADT	Outgoing/Incoming	Outgoing/Incoming
Condominiums/ Townhomes	8.0	0.48/0.06	0.26/0.47

There may be a trip reduction due to internal and/or pass-by trips. Internal trip reduction can only be applied for mixed-use types of developments and pass-by trip reduction for retail/commercial types of developments. Internal or pass-by trip reduction assumptions will require analytical support based on verifiable actual similar developments to demonstrate how the figures were derived and will require approval by the County.

2. Trip Distribution

Diagrams showing the percentages and volumes of the project and nearby project's a.m. and p.m. peak-hour trips logically distributed on the roadway system must be provided. The Regional Daily Trip Distribution Factors (Exhibit D-3) contained in the Congestion Management Program (CMP) Land Use Analysis Guidelines shall be referenced for regional trip distribution assumptions. If it is assumed that new routes will alter traffic patterns, adequate backup including traffic distribution maps must be provided showing how and why these routes will alter traffic patterns.

The study area should include arterial highways, freeways, and intersections generally within a one-mile radius of the project site.

Note: <u>**This distance may be greater than one-mile for rural areas depending on the proximity to nearby signalized intersections and the availability of master plan access routes.**</u>

3. Related Projects List

A list of related projects that are approximately within a one-and-a-half mile radius of the project site and would reasonably be expected to be in place by the project's build out year must be included in the report. Related projects shall include all pending, approved, recorded, or constructed projects that are not occupied at the time of the existing traffic counts.

The County of Los Angeles Department of Regional Planning (DRP) and other public agencies (if necessary) should be contacted to obtain the latest listings. A table and a map showing the status, project/zone change/conditional use permit/parcel map/tract number, and the location of each project must be provided. For a computer printout of the listing of all filed projects within the County, Land Development Management Section of the DRP, at (213) 974-6481 can be contacted.

4. LOS Analysis

If it appears that the project's generated traffic alone or together with other projects in the area could worsen the LOS of an intersection or roadway, a "before" and "after" LOS analysis is necessary. The Intersection Capacity Utilization (ICU) or Critical Movement Analysis are two methods often used to assess existing and future LOS at intersections.

If the ICU planning method is used, a maximum of 1,600 vehicles per hour per lane should be used (2,880 vehicles per hour should be used for dual left-turn lanes) and a ten percent yellow clearance cycle should be included. Intersection LOS analysis and calculation work sheets, as well as diagrams showing turning volumes shall be included in the report for the following traffic conditions:

(a) Existing traffic;
(b) Existing traffic plus ambient growth to the year the project will be completed (preproject);
(c) Traffic in (b) plus project traffic;
(d) Traffic in (c) with the proposed mitigation measures (if necessary);
(e) Traffic in (c) plus the cumulative traffic of other known developments; and
(f) Traffic in (e) with the proposed mitigation measures (if necessary).

The project's impact on two-lane roadways should also be analyzed for all of the above traffic conditions if those two-lane roadways are used for access. LOS service analysis contained in the Highway Capacity Analysis, Chapter 8, Two-Lane Highways, should be used to evaluate the project's impact. For simplified analysis, use the established significant impact thresholds for two-lane roadways as shown on page 7.

5. Significant Impact Threshold

For intersections, the impact is considered significant if the project related increase in the volume to capacity (v/c) ratio equals or exceeds the threshold shown below.

INTERSECTIONS		
Preproject		Project /C Increase
LOS	V/C	
C	0.71 to 0.80	0.04 or more
D	0.81 to 0.90	0.02 or more
E/F	0.91 or more	0.01 or more

The project is deemed to have a significant impact on two-lane roadways when it adds the following percentages based on LOS of the preproject conditions.

TWO-LANE ROADWAYS				
Directional Split	Total Capacity (PCPH)	Percentages Increase in Passenger Car Per Hour (PCPH) by Project		
		Preproject LOS		
		C	D	E/F
50/50	2,800	4	2	1
60/40	2,650	4	2	1
70/30	2,500	4	2	1
80/20	2,300	4	2	1
90/10	2,100	4	2	1
100/0	2,000	4	2	1

6. Analysis Discussion

Discuss conclusions regarding the adverse impacts caused by the proposed project on the roadway system. If the cumulative traffic impact of this and other projects require mitigation measures, such as traffic signals, then estimate the percent share using the project percent share formula given in the Section III D of the TIA Guidelines. When the proposed project and other nearby developments are expected to significantly impact adjacent roadways, the developer may be required to enter into a secured agreement to contribute to a benefit district to fund major roadway and bridge improvements in the region. Also, for all recommendations to increase the number of travel lanes on a street or at an intersection as a mitigation measure, the report must clearly identify the impacts associated with such a change such as whether or not additional right of way will be required and whether it is feasible to acquire the right of way based on the level of development of the adjacent land and buildings (if any).

Discuss other possible adverse impacts on traffic. Examples of these are: (1) the limited visibility of access points on curved roadways; (2) the need for pavement widening to provide left-turn and right-turn lanes at access points into the proposed project; (3) the impact of increased traffic volumes on local residential streets; and (4) the need for road realignment to improve sight distance.

Projects which propose to amend the County's General Plan Land Use and substantially increase potential traffic generation must provide an analysis of the project at current planned land use versus proposed land use in the build out condition for the project area. The purpose of such analysis is to provide decision makers with the understanding of the planned circulation network's ability to accommodate additional traffic generation caused by the proposed General Plan Land Use amendments.

D. Traffic Models and Model Generated TIA's

Computerized traffic models are planning tools used to develop future traffic projections based on development growth patterns. The Department currently operates two traffic models, one for the Santa Clarita Valley and another for the Ventura Corridor area. The Department can test proposed development project traffic impacts for the public in these areas for a fee. For assistance in the traffic modeling, the Planning Division, Transportation Planning/Assessments Section, can be contacted at (626) 458-4351.

The project percent share should be based on the peak-hour volumes that warrant signals. If both peak hours satisfy the installation of signals, the average of the two peak-hour volumes should be used in the percent share analysis.

F. Mitigation Measures

The following information is required.

Identify feasible mitigation measures which would mitigate the project and/or other related projects' significant impacts to a level of insignificance. Also, identify those mitigation measures which will be implemented by others. Those mitigation measures that are assumed to be implemented by others will be made a condition of approval for the project to be in place prior to issuance of building permits. Mitigation measures may include, but are not limited to, the following:

1. <u>Traffic Engineering Techniques.</u>
   - a. Locate access points to optimize visibility and reduce potential conflict.
   - b. Design parking facilities to avoid queuing into public streets during peak arrival periods.
   - c. Provide additional off-street parking.
   - d. Dedicate visibility easements to assure adequate sight distance at intersections and driveways.
   - e. Signalize or modify traffic signals at intersections.
   - f. Install left-turn phasing and/or multiple turning lanes to accommodate particularly heavy turning movements.
   - g. Widen the pavement to provide left- or right-turn lanes to lessen the interference with the traffic flow.[1]
   - h. Widen intersection approaches to provide additional capacity.
   - i. Prohibit left turns to and from the proposed development.
   - j. Restrict on-street parking during peak hours to increase street capacity.[1]
2. <u>Contribute to a benefit district to fund major capital improvements</u>

---

[1] Physical roadway improvements to improve capacity should be considered before considering parking restrictions.

a. Construct a grade separation.
b. Improve or construct alternate routes.
c. Complete proposed routes shown on the Los Angeles Highway Plan.
d. Improve freeway interchanges (bridge, widening, modifications, and etc.).

3. **Transportation System Management (TSM) Techniques**[2]

a. Establish flexible working hours.
b. Encourage employee use of carpools and public transportation (specific measures must be indicated).
c. Establish preferential parking for carpools.
d. Restrict truck deliveries to Major and Secondary highways and encourage deliveries during the off-peak hours.
e. Establish a monitoring program to ensure that project traffic volumes do not exceed projected traffic demand.

Note: When it appears that other jurisdictions will be impacted by a development, the Department will request that the involved jurisdiction also review the TIA. A written response from that jurisdiction should be provided with appropriate follow-up to the lead County agency.

G. CMP Guidelines

The following information is required:

Where the project meets the criteria established in the County of Los Angeles' CMP Land Use Analysis Guidelines, a CMP analysis must be provided. A copy of the latest Guidelines will be available upon request. A CMP TIA is required for all projects required to prepare an Environmental Assessment based on local determination or projects requiring a traffic study.

---

[2] Contributions to a benefit district and/or TSM techniques may not be used to lower LOS in the capacity calculations.

The geographic area examined in the TIA must include the following, at a minimum.

- All CMP arterial monitoring intersections (see Exhibit B of the Guidelines), including freeway on- or off-ramp intersections, where the proposed project will add 50 or more trips during either the a.m. or p.m. peak hours.
- Main line freeway monitoring locations (see Exhibit C of the Guidelines) where the project will add 150 or more trips, in either direction, during the a.m. or p.m. weekday peak hours.
- Caltrans must also be consulted to identify other specific locations to be analyzed on the State highway system.

If, based on these criteria, the TIA identifies no facilities for study, no further traffic analysis is required.

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T-2/ACCESS
(01/07/99)

Attach.

EXHIBIT A
TRAFFIC IMPACT ANALYSIS REPORT CONTENTS CHECK LIST

Note: Before a full review is conducted, PW's staff will check the completeness of the Traffic Impact Analysis Report. If the Report is missing any of the items listed below, it will be returned for revision.

CONTENT	YES/ NO	COMMENT
Site Plan • Access locations • Interior circulation		
Trip Generation Rates • Institute of Transportation Engineers (ITE) trip generation rates • Documentation for alternate rates		
Trip Distribution • Regional • Local project (am/pm) • Local related projects(am/pm)		
Traffic Counts • Taken within one year • Date/Time		
Discounting • Internal trip discounts for mixed use developments • Pass-by trip discounts for commercial/retail developments • Backup		
Level of Service Calculations • Intersection Capacity Utilization (ICU) or Criteria Movement Analysis • 10 percent yellow clearance for ICU planning method • 1,600 vehicles per lane (vpl); 2,880 vpl for dual left-turn lanes for ICU planning method • Calculation sheets • Scenarios as required per Guidelines • Existing/Future lane configurations		
Signal Warrant Analysis • Peak-hour/Average Daily Traffic per the State of California Department of Transportation standards		
Mitigation Measures • Project impacts • Cumulative developments impacts • Projects percent share of the cost to mitigate cumulative development impacts		
Congestion Management Program Analysis		

JHC:ce
T-2/ACCESS3
02/22/99

COUNTY SANITATION DISTRICTS
OF LOS ANGELES COUNTY

1955 Workman Mill Road, Whittier, CA 90601-1400
Mailing Address: P.O. Box 4998, Whittier, CA 90607-4998
Telephone: (562) 699-7411, FAX: (562) 699-[illegible]
www.lacsd.org

JAMES F. STAHL
Chief Engineer and General Manager

RECEIVED
PLANNING DIVISION
NOV 06 2003
PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

November 4, 2003

File No: 26-00.04-00

Mr. Jeff Hogan, Associate Planner
Department of Planning and Building Services
City of Santa Clarita
23920 Valencia Boulevard, Suite 302
Santa Clarita, CA 91355

Dear Mr. Hogan:

Tentative Tract Map No. 53425, Master Case No. 02-175, Riverpark

The County Sanitation Districts of Los Angeles County (Districts) received a Revised Notice of Preparation of a Draft Environmental Impact Report for the subject project on October 20, 2003. The proposed development is located within the jurisdictional boundaries of District No. 26. We offer the following comments regarding sewerage service:

- Previous comments submitted by the Districts in correspondence dated October 1, 2002 (copy enclosed), to your agency, still apply to the subject project with the following updated information.
- The Santa Clarita Valley Joint Sewerage System currently processes an average flow of 18.3 million gallons per day.
- The expected average wastewater flow from the project site is 243,204 gallons per day.

If you have any questions, please contact the undersigned at (562) 699-7411, extension 2717.

Very truly yours,

James F. Stahl

Ruth I. Frazen

Ruth I. Frazen
Engineering Technician
Planning & Property Management Section

RIF:eg

Enclosures

294236.1

WATER RECLAMATION
SOLID WASTE MANAGEMENT

COUNTY SANITATION DISTRICTS
OF LOS ANGELES COUNTY

1955 Workman Mill Road, Whittier, CA 90601-1400
Mailing Address: P.O. Box 4998, Whittier, CA 90607-4998
Telephone: (562) 699-7411, FAX: (562) 699-5422
www.lacsd.org

JAMES F. STAHL
Chief Engineer and General Manager

October 1, 2002

File No: 26-00.04-00

Mr. Jeff Hogan, Associate Planner
City of Santa Clarita
23920 Valencia Boulevard, Suite 300
Santa Clarita, CA 91355

Dear Mr. Hogan:

Tentative Tract Map No. 53425, Riverpark (Panhandle)

The County Sanitation Districts of Los Angeles County (Districts) received a Notice of Preparation of a Draft Environmental Impact Report for the subject project on September 19, 2002. The proposed development is located within the jurisdictional boundaries of District No. 26. We offer the following comments regarding sewerage service:

1. Because of the project's location, the flow originating from the proposed project would have to be transported to the Districts' trunk sewer by local sewers which are not maintained by the Districts. If no local sewer lines currently exist, it is the responsibility of the developer to convey any wastewater generated by the project to the nearest local sewer and/or Districts' trunk sewer. Local sewers west of the project area convey wastewater to the Districts' Bouquet Canyon Relief Trunk Sewer, located in Bouquet Canyon Road at Espuella Drive and Newhall Ranch Road. This 24-inch diameter trunk sewer has a design capacity of 11.6 million gallons per day (mgd) and conveyed a peak flow of 5.2 mgd when last measured in 2001.

2. The Districts operate two water reclamation plants (WRPs), the Saugus WRP and the Valencia WRP in order to provide wastewater treatment in the Santa Clarita Valley. These facilities are interconnected to form a regional treatment system known as the Santa Clarita Valley Joint Sewerage System (SCVJSS) which has a permitted treatment capacity of 19.1 mgd. A two phase expansion of the Valencia WRP has been currently approved which will increase the treatment capacity of the SCVJSS by 15 mgd. The first phase, scheduled to be completed by mid 2003, will consist of a 9 mgd expansion and is expected to meet the Regional Growth Management Plan forecasted demand through 2010. The second phase, scheduled to be completed by early 2010, will consist of an additional 6 mgd expansion and will increase the SCVJSS treatment capacity to 34.1 mgd which will be sufficient to meet the demand until 2015. The SCVJSS currently processes an average flow of 17.3 mgd.

3. The expected average wastewater flow from the project site is 238,323 gallons per day. A copy of the Districts' average wastewater generation factors is enclosed for your information.

4. The Districts are empowered by the California Health and Safety Code to charge a fee for the privilege of connecting (directly or indirectly) to the Districts' Sewerage System or **increasing the existing strength and/or quantity of wastewater attributable to a particular parcel or operation already connected**. This connection fee is required to construct an incremental expansion of the Sewerage System to accommodate the proposed project which will mitigate the impact of this project on the present Sewerage System. Payment of a connection fee will be required before a permit to connect to the sewer is issued. A copy of the Connection Fee Information Sheet is enclosed for your convenience. For more specific information regarding the connection fee application procedure and fees, please contact the Connection Fee Counter at extension 2727.

5. In order for the Districts to conform with the requirements of the Federal Clean Air Act (CAA), the design capacities of the Districts' wastewater treatment facilities are based on the regional growth forecast adopted by the Southern California Association of Governments (SCAG). Specific policies included in the development of the SCAG regional growth forecast are incorporated into the Air Quality Management Plan, which is prepared by the South Coast Air Quality Management District in order to improve air quality in the South Coast Air Basin as mandated by the CAA. All expansions of Districts' facilities must be sized and service phased in a manner which will be consistent with the SCAG regional growth forecast for the counties of Los Angeles, Orange, San Bernardino, Riverside, Ventura, and Imperial. The available capacity of the Districts' treatment facilities will, therefore, be limited to levels associated with the approved growth identified by SCAG. As such, this letter does not constitute a guarantee of wastewater service, but is to advise you that the Districts intend to provide this service up to the levels which are legally permitted and to inform you of the currently existing capacity and any proposed expansion of the Districts' facilities.

If you have any questions, please contact the undersigned at (562) 699-7411, extension 2717.

Very truly yours,

James F. Stahl

Ruth I. Frazen

Ruth I. Frazen
Engineering Technician
Planning & Property Management Section

RIF:eg

Enclosures

TABLE 1

LOADINGS FOR EACH CLASS OF LAND USE

DESCRIPTION	UNIT OF MEASURE	FLOW (Gallons Per Day)	COD (Pounds Per Day)	SUSPENDED SOLIDS (Pounds Per Day)
RESIDENTIAL				
Single Family Home	Parcel	260	1.22	0.59
Duplex	Parcel	312	1.46	0.70
Triplex	Parcel	468	2.19	1.05
Fourplex	Parcel	624	2.92	1.40
Condominiums	Parcel	195	0.92	0.44
Single Family Home (reduced rate)	Parcel	156	0.73	0.35
Five Units or More	No. of Dwlg. Units	156	0.73	0.35
Mobile Home Parks	No. of Spaces	156	0.73	0.35
COMMERCIAL				
Hotel/Motel/Rooming House	Room	125	0.54	0.28
Store	1000 ft^2	100	0.43	0.23
Supermarket	1000 ft^2	150	2.00	1.00
Shopping Center	1000 ft^2	325	3.00	1.17
Regional Mall	1000 ft^2	150	2.10	0.77
Office Building	1000 ft^2	200	0.86	0.45
Professional Building	1000 ft^2	300	1.29	0.68
Restaurant	1000 ft^2	1,000	16.68	5.00
Indoor Theatre	1000 ft^2	125	0.54	0.28
Car Wash				
Tunnel - No Recycling	1000 ft^2	3,700	15.86	8.33
Tunnel - Recycling	1000 ft^2	2,700	11.74	6.16
Wand	1000 ft^2	700	3.00	1.58
Financial Institution	1000 ft^2	100	0.43	0.23
Service Shop	1000 ft^2	100	0.43	0.23
Animal Kennels	1000 ft^2	100	0.43	0.23
Service Station	1000 ft^2	100	0.43	0.23
Auto Sales/Repair	1000 ft^2	100	0.43	0.23
Wholesale Outlet	1000 ft^2	100	0.43	0.23
Nursery/Greenhouse	1000 ft^2	25	0.11	0.06
Manufacturing	1000 ft^2	200	1.86	0.70
Dry Manufacturing	1000 ft^2	25	0.23	0.09
Lumber Yard	1000 ft^2	25	0.23	0.09
Warehousing	1000 ft^2	25	0.23	0.09
Open Storage	1000 ft^2	25	0.23	0.09
Drive-in Theatre	1000 ft^2	20	0.09	0.05

TABLE 1
(continued)

LOADINGS FOR EACH CLASS OF LAND USE

DESCRIPTION	UNIT OF MEASURE	FLOW (Gallons Per Day)	COD (Pounds Per Day)	SUSPENDED SOLIDS (Pounds Per Day)
COMMERCIAL				
Night Club	1000 ft^2	350	1.50	0.79
Bowling/Skating	1000 ft^2	150	1.76	0.55
Club	1000 ft^2	125	0.54	0.27
Auditorium, Amusement	1000 ft^2	350	1.50	0.79
Golf Course, Camp, and Park (Structures and Improvements	1000 ft^2	100	0.43	0.23
Recreational Vehicle Park	No. of Spaces	55	0.34	0.14
Convalescent Home	Bed	125	0.54	0.28
Laundry	1000 ft^2	3,825	16.40	8.61
Mortuary/Cemetery	1000 ft^2	100	1.33	0.67
Health Spa, Gymnasium				
With Showers	1000 ft^2	600	2.58	1.35
Without Showers	1000 ft^2	300	1.29	0.68
Convention Center, Fairground, Racetrack, Sports Stadium/Arena	Average Daily Attendance	10	0.04	0.02
INSTITUTIONAL				
College/University	Student	20	0.09	0.05
Private School	1000 ft^2	200	0.86	0.45
Church	1000 ft^2	50	0.21	0.11

INFORMATION SHEET FOR APPLICANTS PROPOSING TO CONNECT OR INCREASE THEIR DISCHARGE TO THE COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY SEWERAGE SYSTEM

THE PROGRAM

The County Sanitation Districts of Los Angeles County are empowered by the California Health and Safety Code to charge a fee for the privilege of connecting to a Sanitation District's sewerage system. Your connection to a City or County sewer constitutes a connection to a Sanitation District's sewerage system as these sewers flow into a Sanitation District's system. The County Sanitation Districts of Los Angeles County provide for the conveyance, treatment, and disposal of your wastewater. **PAYMENT OF A CONNECTION FEE TO THE COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY WILL BE REQUIRED BEFORE A CITY OR THE COUNTY WILL ISSUE YOU A PERMIT TO CONNECT TO THE SEWER.**

I. WHO IS REQUIRED TO PAY A CONNECTION FEE?

1. Anyone connecting to the sewerage system for the first time for any structure located on a parcel(s) of land within a County Sanitation District of Los Angeles County.
2. Anyone increasing the quantity of wastewater discharged due to the construction of additional dwelling units on or a change in land usage of a parcel already connected to the sewerage system.
3. Anyone increasing the improvement square footage of a commercial or institutional parcel by more than 25 percent.
4. Anyone increasing the quantity and/or strength of wastewater from an industrial parcel.
5. If you qualify for an Ad Valorem Tax or Demolition Credit, connection fee will be adjusted accordingly.

II. HOW ARE THE CONNECTION FEES USED?

The connection fees are used to provide additional conveyance, treatment, and disposal facilities (capital facilities) which are made necessary by new users connecting to a Sanitation District's sewerage system or by existing users who significantly increase the quantity or strength of their wastewater discharge. The Connection Fee Program insures that all users pay their fair share for any necessary expansion of the system.

III. HOW MUCH IS MY CONNECTION FEE?

Your connection fee can be determined from the Connection Fee Schedule specific to the Sanitation District in which your parcel(s) to be connected is located. A Sanitation District boundary map is attached to each corresponding Sanitation District Connection Fee Schedule. Your City or County sewer permitting office has copies of the Connection Fee Schedule(s) and Sanitation District boundary map(s) for your parcel(s). If you require verification of the Sanitation District in which your parcel is located, please call the Sanitation Districts' information number listed under Item IX below.

IV. WHAT FORMS ARE REQUIRED*?

The Connection Fee application package consists of the following:

1. Information Sheet for Applicants (this form)
2. Application for Sewer Connection

3. Connection Fee Schedule with Sanitation District Map (one schedule for each Sanitation District)

*Additional forms are required for Industrial Dischargers.

V. WHAT DO I NEED TO FILE?

1. Completed Application Form
2. A complete set of architectural blueprints (not required for connecting one single family home)
3. Fee Payment (checks payable to: County Sanitation Districts of Los Angeles County)
4. Industrial applicants must file additional forms and follow the procedures as outlined in the application instructions

VI. WHERE DO I SUBMIT THE FORMS?

Residential, Commercial, and Institutional applicants should submit the above listed materials either by mail or in person to:

County Sanitation Districts of Los Angeles County
Connection Fee Program, Room 130
1955 Workman Mill Road
Whittier, CA 90601

Industrial applicants should submit the appropriate materials directly to the City or County office which will issue the sewer connection permit.

VII. HOW LONG DOES IT TAKE TO PROCESS MY APPLICATION?

Applications submitted by mail are generally processed and mailed within three working days of receipt. Applications brought in person are processed on the same day provided the application, supporting materials, and fee is satisfactory. Processing of large and/or complex projects may take longer.

VIII. HOW DO I OBTAIN MY SEWER PERMIT TO CONNECT?

An approved Application for Sewer Connection will be returned to the applicant after all necessary documents for processing have been submitted. Present this approved-stamped copy to the City or County Office issuing sewer connection permits for your area at the time you apply for actual sewer hookup.

IX. HOW CAN I GET ADDITIONAL INFORMATION?

If you require assistance or need additional information, please call the County Sanitation Districts of Los Angeles County at (562) 699-7411, extension 2727.

X. WHAT ARE THE DISTRICTS' WORKING HOURS?

The Districts' offices are open between the hours of 7:00 a.m. and 4:00 p.m., Monday through Thursday, and between the hours of 7:00 a.m. and 3:00 p.m. on Friday, except holidays. When applying in person, applicants must be at the Connection Fee counter at least 30 minutes before closing time.

CITY OF SANTA CLARITA
MASTER CASE # 02-175

REVISED

COUNTY OF LOS ANGELES
FIRE DEPARTMENT

5823 Rickenbacker Road
Commerce, California 90040

RECEIVED
PLANNING DIVISION
SEP 08 2003
PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

CONDITIONS OF APPROVAL FOR SUBDIVISIONS - INCORPORATED

Subdivision No: 53425

Map Date Fire Dept. 09/03/03

C.U.P.

City Santa Clarita

☐ **FIRE DEPARTMENT HOLD** on the tentative map shall remain until verification from the Los Angeles County Fire Dept. Planning Section is received, stating adequacy of service. Contact (323) 881-2404.

☒ Access shall comply with Section 902 of the Fire Code, which requires all weather access. All weather access may require paving.

☒ Fire Department Access shall be extended to within 150 feet distance of any exterior portion of all structures.

☒ Where driveways extend further than 300 feet and are of single access design, turnarounds suitable for fire protection equipment use shall be provided and shown on the final map. Turnarounds shall be designed, constructed and maintained to insure there integrity for Fire Department use. Where topography dictates, turnarounds shall be provided for driveways that extend over 150 feet in length.

☒ Private driveways shall be indicated on the final map as "Private Driveway and Firelane" with the widths clearly depicted and shall be maintained in accordance with the Fire Code. All required fire hydrants shall be installed, tested and accepted prior to construction.

☒ Vehicular access must be provided and maintained serviceable throughout construction to all required fire hydrants. All required fire hydrants shall be installed, tested and accepted prior to construction.

☒ This property is located within the area described by the Fire Department as "Very High Fire Hazard Severity Zone" (formerly Fire Zone 4). A "Fuel Modification Plan" shall be submitted and approved prior to final map clearance. (Contact Fuel Modification Unit, Fire Station #32, 605 North Angeleno Avenue, Azusa, CA 91702-2904, Phone (626) 969-5205, for details).

☒ Provide Fire Department or City approved street signs and building access numbers prior to occupancy.

☐ Additional fire protection systems shall be installed in lieu of suitable access and/or fire protection water.

☐ The final concept map, which has been submitted to this department for review, has fulfilled the conditions of approval recommended by this department for access only.

☐ These conditions shall be secured by a C.U.P. and/or Covenant and Agreement approved by the County of Los Angeles Fire Department prior to final map clearance.

☐ The Fire Department has no additional requirements for this division of land.

Comments: **REVISED CONDITIONS. A second means of access is required prior to the construction of the 501st dwelling unit. The number of dwelling units includes all single family homes, and all the units within the apartments and town-homes. Please refer to page 3 for additional conditions for access. No fire station is required for development mitigation for this project.**

INSPECTOR Wally Collins

DATE September 3, 2003

Land Development Unit – Fire Prevention Division – (323) 890-4243, Fax (323) 890-9783

Form 266 9/01

COUNTY OF LOS ANGELES
FIRE DEPARTMENT

5823 Rickenbacker Road
Commerce, California 90040

REVISED

WATER SYSTEM REQUIREMENTS – INCORPORATED

Subdivision No: **53425** Map Date **Fire Dept. 09/03/03**

C.U.P. ______ City **Santa Clarita**

☒ Provide water mains, fire hydrants and fire flows as required by the County of Los Angeles Fire Department, for all land shown on map which shall be recorded.

☒ The required fire flow for public fire hydrants at this location is <u>5000</u> gallons per minute at 20 psi for a duration of <u>5</u> hours, over and above maximum daily domestic demand. <u>3</u> Hydrant(s) flowing simultaneously may be used to achieve the required fire flow.

☒ The required fire flow for private on-site hydrants is <u>2500</u> gallons per minute at 20 psi. Each private on-site hydrant must be capable of flowing <u>2500</u> gallons per minute at 20 psi with two hydrants flowing simultaneously, one of which must be the furthest from the public water source.

☒ Fire hydrant requirements are as follows:

Install <u>79</u> public fire hydrant(s). Upgrade / Verify ____ existing Public fire hydrant(s).
Install <u>24</u> private on-site fire hydrant(s).

☒ All hydrants shall measure 6"x 4"x 2-1/2" brass or bronze, conforming to current AWWA standard C503 or approved equal. All on-site hydrants shall be installed a minimum of 25' feet from a structure or protected by a two (2) hour rated firewall.

- ☒ Location: As per map on file with the office.
- ☒ Other location: **Please refer to the attached Tentative Tract Map for hydrant locations.**

☒ All required fire hydrants shall be installed, tested and accepted or bonded for prior to Final Map approval. Vehicular access must be provided and maintained serviceable throughout construction.

☐ The County of Los Angeles Fire Department is not setting requirements for water mains, fire hydrants and fire flows as a condition of approval for this division of land as presently zoned and/or submitted.

☐ Additional water system requirements will be required when this land is further subdivided and/or during the building permit process.

☐ Hydrants and fire flows are adequate to meet current Fire Department requirements.

☐ Upgrade not necessary, if existing hydrant(s) meet(s) fire flow requirements.

SUBMIT COMPLETED (ORIGINAL ONLY) FIRE FLOW AVAILABILITY FORM TO THIS OFFICE FOR REVIEW.

COMMENTS: **REVISED CONDITIONS. Please refer to page 3 for additional water system requirements.**

All hydrants shall be installed in conformance with Title 20, County of Los Angeles Government Code and County of Los Angeles Fire Code, or appropriate City regulations. This shall include minimum six-inch diameter mains. Arrangements to meet these requirements must be made with the water purveyor serving the area.

By Inspector **Wally Collins** Date **September 3, 2003**

COUNTY OF LOS ANGELES
FIRE DEPARTMENT

5823 Rickenbacker Road
Commerce, California 90040

REVISED

SUBDIVISION, WATER AND ACCESS REQUIREMENTS

ADDITIONAL PAGE

SUBDIVISION NO **53425** PAGE NO. **3**

REVISED CONDITIONS

ADDITIONAL ACCESS REQUIREMENTS FOR PUBLIC STREETS:

1. Street widths for this project shall conform to the widths indicated on the cross-sections on this Tract Map. All street widths shall be measured from the curb flow line to curb flow line.

2. Temporary turn-arounds are required for the end of Newhall Ranch Road and end of Santa Clarita Parkway. The turn-arounds shall be either a cul-de-sac bulb with a 32-foot center line or a hammer-head design, which would be posted and red curbbed "NO PARKING - FIRE LANE". These temporary turnarounds are required to stay in place until the bridges have been completed and are opened to an existing street.

3. All streets with center medians shall have a minimum paved width of 20 feet on each side of the median, with street posted and red curbed "NO PARKING - FIRE LANE".

4. The traffic circle at the end of "N" Street is approved. The area surronding the traffic circle shall posted and red curbed "NO PARKING -FIRE LANE".

5. If gates are installed, provide 4 sets of gate detail plans to the Department's Land Development Unit prior to any approvals for this Tract Map, and the construction of any dwelling unit. Gates shall conform to the Department's Regulation #5.

6. Due to "N" Street extending greater than 700 feet in length, "N" Street shall a minimum street width of 36 feet, curb-flow-line to curb-flow-line, not 34 feet as indicated on the map. Provide four (4) revised copies of this page only of the Tract Map indicating this correction. This is required to be submitted to the Land Development Unit prior to any approvals of this Tract Map.

ADDITIONAL ACCESS REQUIREMENTS FOR ON-SITE ACCESS FOR AREA "C" & AREA "D":

1. Provide a minimum unobstructed driveway width of 28 feet, clear-to-sky to posted and red curbed "NO PARKING - FIRE LANE". Each turning radius shall be 42 feet from the center-line.

2. If gates are installed, provide 4 sets of gate detail plans to the Department's Land Development Unit prior to any approvals for this Tract Map, and the construction of any dwelling unit. Gates shall conform to the Department's Regulation #5. Gates shall be the same width as the driveway (28 feet), with all gate acessory hardware out of the accessway when the gate is in the fully open position.

3. Additional access requirements may be needed during the building construction process.

ADDITIONAL WATER SYSTEM REQUIREMENTS:

1. The required fire flow for nineteen (20) public fire hydrants located on Newhall Ranch Road, adjacent to Area "C" and Area "D", is 5000 gpm at 20 psi for 5 hours with 3 fire hydrants flowing.

2. Fifty-eight (59) public fire hydrants are required to be installed on all other streets, including Newhall Ranch Road, as indicated on the tract map. The required fire flow is 1250 gpm at 20 for 2 hours with one (1) fire hydrant flowing.

3. Twenty-two (24) on-site fire hydrants are required within Area "C" & Area "D". The required fire flow is 2500 gpm at 20 psi for 2 hours with two (2) fire hydrants flowing.

By Inspector: **Wally Collins** Date: **September 3, 2003**

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY GRAY DAVIS, Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 7, REGIONAL PLANNING
IGR/CEQA BRANCH
120 SO. SPRING ST.
LOS ANGELES, CA 90012
PHONE (213) 897-6536
FAX (213) 897-1337
E-Mail:NersesYerjanian@dot.ca.gov

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OCT 27 2003
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CITY OF SANTA CLARITA

Flex your power!
Be energy efficient!

Mr. Jeff Hogan, Associate Planner
Office of Planning
City of Santa Clarita
23920 Valencia Blvd., Suite 302
Santa Clarita, CA. 91355

IGR/CEQA# 031056NY
Revised NOP/TTMap# 53425
744 Multi Family Units, 439 Single Family Units
& 40,000 SF Commercial uses
LA/126 & 14/13.5

October 23, 2003

Dear Mr. Hogan:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the revised Notice of Preparation for the Tentative Tract Map# 53425 in Santa Clarita.

Based on the information received, and to assist us in our efforts to completely evaluate and assess the impacts of this project on the State transportation system, a traffic study in advance of the DEIR should be prepared to analyze the following information:

Please reference the Department's **Traffic Impact Study Guideline** on the Internet at http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf

1. Presentations of assumptions and methods used to develop trip generation, trip distribution, choice of travel mode, and assignments of trips to state route 126 & 14.

2. Consistency of project travel modeling with other regional and local modeling forecasts and with travel data. The IGR/CEQA office may use indices to check results. Differences or inconsistencies must be thoroughly explained.

3. Analysis of ADT, AM, and PM peak-hour volumes for both existing and future conditions in the affected area. This should include freeways, interchanges, and intersections, and all HOV facilities. Interchange Level of Service should be

specified (HCM2000 method requested). Utilization of transit lines and vehicles, and of all facilities, should be realistically estimated. Future conditions would include build-out of all projects (see next item) and any plan-horizon years.

4. Inclusion of all appropriate traffic volumes. Analysis should include traffic from the project, cumulative traffic generated from all specific approved developments in the area, and traffic growth other than from the project and developments. That is, include: existing + project + other projects + other growth.

5. Discussion of mitigation measures appropriate to alleviate anticipated traffic impacts. These mitigation discussions should include, but not be limited to, the following:

☐ description of transportation infrastructure improvements
☐ financial costs, funding sources and financing
☐ sequence and scheduling considerations
☐ implementation responsibilities, controls and monitoring

Any mitigation involving transit, HOV, or TDM must be rigorously justified and its effects conservatively estimated. Improvements involving dedication of land or physical construction may be favorably considered.

6. Specification of developer's percent share of the cost, as well as a plan of realistic mitigation measures under the control of the developer. The ratio should be estimated, of additional traffic due to the project, to that amount of increase in traffic for which real mitigation must be provided (see Traffic Impact Study Guidelines). We note for purposes of determining project share of costs, the number of trips from the project on each traveling segment or element is estimated in the context of forecasted traffic volumes which include build-out of all approved and not yet approved projects, and other sources of growth. Analytical methods such as select-link travel forecast modeling might be used.

The Department as a commenting agency under CEQA has jurisdiction superceding that of MTA in identifying the freeway analysis needed for this project. Caltrans is responsible for obtaining measures that will off-set project vehicle trip generation that worsens Caltrans facilities and hence, it does not adhere to the CMP guide of 150 or more vehicle trips added before freeway analysis is needed. MTA's Congestion Management Program in acknowledging the Department's role, stipulates that Caltrans must be consulted to identify specific locations to be analyzed on the State Highway System.

We look forward to reviewing the DEIR. We expect to receive a copy from the State Clearinghouse. However, to expedite the review process, you may send two copies in advance to the undersigned at the following address:

Stephen Buswell
IGR/CEQA Branch Chief
Caltrans District 07
Regional Transportation Planning Office
120 S. Spring St., Los Angeles, CA 90012

If you have any questions regarding this response, please call the Project Engineer/Coordinator Mr. Yerjanian at (213) 897-6536 and refer to IGR/CEQA # 031056NY.

Sincerely,

STEPHEN J. BUSWELL
IGR/CEQA Branch Chief
Transportation Planning Office

County of Los Angeles
Sheriff's Department Headquarters
4700 Ramona Boulevard
Monterey Park, California 91754-2169
(661) 255-1121

Leroy D. Baca, Sheriff

November 21, 2003

Mr. Jeff Hogan, Associate Planner
City of Santa Clarita
23920 Valencia Boulevard, Suite 300
Santa Clarita, California 91355

RECEIVED
PLANNING DIVISION
NOV 24 2003
PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

Dear Mr. Hogan:

RIVERPARK PROJECT
MASTER CASE # 02-175

The proposed Project consisting of 1,183 dwelling units located at the terminus of Newhall Ranch Road, east of Bouquet Canyon between the Castaic Lake Water Agency property and the Santa Clara River, north of Soledad Canyon Road, is within the jurisdiction of the Los Angeles County Sheriff's Department, Santa Clarita Valley Station, 23740 Magic Mountain Parkway, Valencia, California. The station is located approximately 3 to 4 miles from the project site.

It is anticipated that the non-emergent response time to a request for service would be approximately 40-50 minutes. The priority response time would be approximately 8-10 minutes and the response time under emergent circumstances would be approximately 5-8 minutes. All response times are approximations, only, and would be dependent on both the deployment of area radio cars and traffic conditions.

This station serves an area of 656 square miles, which is made up of the City of Santa Clarita and unincorporated County area between the Los Angeles City Limits to the South, the Kern County Line to the North and involving all area between the Ventura County Line to the West and the township of Agua Dulce to the East. The population served by our station is approximately 200,000 residents.

A Tradition of Service Since 1850

Our ideal officer to population ratio is one deputy per 1,000 residents and with our current staffing of 161 sworn deputies currently assigned, our ratio is less than ideal at one deputy per every 1,243 residents. According to the figures released by the Department of Finance as of January, 1998, residential density is 3.011 persons per dwelling unit. This proposed project will generate a population increase of 3,562. Based on the above, the project would require 3 additional deputies to the station complement.

Our primary concern is our ability to provide an adequate level of protection and service to all areas we police. Due to the rapidly expanding population of the Santa Clarita Valley and its record-setting home building, it is difficult to project the impact of this project on law enforcement.

Adding this project and other projects in progress, either proposed, approved or committed, it is certain they will all significantly strain our resources to the breaking point. Additionally, the increase in required field personnel for this project alone, will necessitate a concomitant increase in support resources such as detectives, complaint desk officers, vehicles and portable radios. While not directly a builder's matter, our ability to provide a sufficient level of law enforcement services must be considered when applications for new projects such as these are considered.

It is suggested, for the security and safety of the residents, that the builder apply defensible space concepts in its construction designs, and the following crime prevention measures be implemented during site and building layout design:

- Provide lighting in open areas and parking lots;
- Ensure the visibility of doors and windows from the street and between buildings;
- Provide adequate parking spaces in the parking lots to accommodate shoppers, employees and residents;
- Ensure that the required building address numbers are lighted and readily apparent from the street for emergency response agencies.

Should you have further questions, please feel free to call me at (661) 255-1121 extension 5102, or Deputy Patrick Rissler at extension 5159.

Sincerely,

LEROY D. BACA, SHERIFF

Patti A Minutello

Patti A. Minutello, Captain
Santa Clarita Valley Station

PAM:par

SCOPE

Santa Clarita Organization for Planning and the Environment

TO PROMOTE, PROTECT AND PRESERVE THE ENVIRONMENT, ECOLOGY
AND QUALITY OF LIFE IN THE SANTA CLARITA VALLEY

POST OFFICE BOX 1182, SANTA CLARITA, CA 91386

1-14-03

RECEIVED
PLANNING DIVISION
NOV 24 2003
PLANNING AND BUILDING SERVIC
CITY OF SANTA CLARITA

Attn: Jeff Hogan/Wendy Deats
City of Santa Clarita
23920 Valencia Blvd.
Santa Clarita, Ca. 91355

Re: Revised Notice of Preparation, River Park Project

Thank-you for the opportunity to comment on issues that should be disclosed in the upcoming EIR. We agree with the categories you have checked on the first page of the NOP and the potentially affected environmental factors indicated on page 3, but believe that the fiscal impact of this proposal and the jobs/housing balance should also be discussed. We concur with your determination that an EIR must be provided. We request that we receive that document for review when it becomes available.

We generally agree with the areas you have found to be of potentially significant impact except on page 12 Item XVII b. and c. Both these items should be check "Potentially significant." Degrading critical habitat for endangered species, loss of water recharge areas, adding additional water users before an adequate water supply is identified, and reducing the flood plain of the Santa Clara River are all impacts that will produce long-term negative and unmitigatable impacts to the water shed. The cumulative impacts of this project when considered with all the other projects along the Santa Clara River and its tributaries are severe.

We request that the project be designed around all native oaks, particularly the rare blue oak located on the property. At this early date, tree removals could be avoided by better and more creative project design. Open pavers should be incorporated into the project mitigation to ensure tree survival. Any oak removals should have a required replacement on site of at minimum a two to 1 ratio.

Cumulative analysis of impacts to the watershed must address loss of recharge areas and surface flows, impacts to water supply, increased flood flows and water velocities and cumulative losses to species and habitats. Cumulative analysis should be prepared with an eye to the parameters and goals enumerated in the recent Appellate Court decision Communities for a Better Environment v. California Resources Agency (Oct. 28, 2002). (Third District Docket # is C038844.)

Landscaping should be accomplished with native plants to reduce water usage and reduce the spread of exotics in natural areas.

Dual plumbing should be required so that gray water could be used to water open areas. Recycled water is not currently available in this location, so dual plumbing would afford the only opportunity for using recycled water.

The City must carefully evaluate the required SB610 assessment for compliance with the law. This section of the water code does NOT allow reliance on the Urban Water Management Plan for compliance. Reported water supplies must be currently available or contracted. An independent water supply analysis should be obtained to accurately asses water availability.

This project contains several working water supply wells. Proper closure of these wells and impacts to new well sites should be addressed in the EIR. Also, financial costs to Valencia Water Co. rate payers should be disclosed.

Evaluation of water supply impacts by ammonium perchlorate should be analyzed. Variability of State Water project supplies should be disclosed. The City should not rely on the CLWA Urban Water Management Plan to properly disclose water supply as this document is currently being litigated and may be set aside, causing a domino effect on this project approval.

When evaluating biological impacts, we request that the City hire an independent biologist to do species surveys including surveys for the Arroyo Toad and endangered bird and plant species. Newhall Land did not produce complete and accurate in the past, nor was survey protocol correctly followed. Hazing machines were used to scare of endangered birds during their nesting seasons and a siting of the arroyo toad and finding of the slender-horned spine flower colonies were either not reported or inadequately reported. Brush grading of habitat areas has already occurred on site. We question why such brushing should have occurred PRIOR to the preparation of an Environmental Impact Report in a sensitive habitat area. Since normally brushing permits are required, we wonder why the City would have issued such a permit with full knowledge that a project requiring the preparation of an EIR was being proposed. We ask that these issues be addressed in the EIR. Also, when discussing biological impacts, we request that historical information PRIOR to brush grading, be used as the habitat baseline and that historical surveys prior to bush grading be included in the EIR.

Impacts to wildlife movement should be discussed. Comments from all conservation agencies engaged in ensuring viability of wildlife should be solicited, including the Santa Monica Mountains Conservancy.

This project is located in a floodway and liquefaction hazard area as determined by the State Depart of Conservation, Division of Mines and Geology. These hazards must be thoroughly disclosed in the EIR so that future residents are aware of potential health and safety factors.

This project will require permits from Regional Water Quality Control Board, Dept. of Fish and Game, Army Corps of Engineers and others. Attention should be given to ensure that the project will comply with regulations of all other permitting agencies. This could best be accomplished by applying to those agencies concurrently so that any required changes can be incorporated early in the planning process.

Thank-you for your time and attention to our comments. We look forward to receiving a copy of the DEIR for review.

Sincerely,

Pat Saletore

SANTA CLARITA WATER, A DIVISION OF CASTAIC LAKE WATER AGENCY

SCWD

22722 SOLEDAD CANYON ROAD • SANTA CLARITA, CALIFORNIA 91350 • (661) 259-2737
MAILING ADDRESS: P.O. BOX 903 • SANTA CLARITA, CALIFORNIA 91380-9003

September 11, 2003

RECEIVED
PLANNING DIVISION
SEP 15 2003
PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

Ms. Wendy Deats
Planning Department
City of Santa Clarita
23920 Valencia Boulevard, Suite 300
Santa Clarita, CA 91355

Re: SB 610 Water Supply Assessment for "Riverpark (Panhandle)" Project,
Tentative Tract Map 53425

Dear Ms. Deats:

As requested by your letter of July 14, 2003, attached is the SB 610 Water Supply Assessment for the above mentioned project. The Castaic Lake Water Agency Board of Directors approved the Assessment on September 10, 2003 on behalf of the CLWA Santa Clarita Water Division, which is the retail water purveyor for the project.

If you have any questions or comments, please call Mary Lou Cotton, Water Resources Manager, at 661/297-1600.

Sincerely,

W.J. Manetta

W. J. Manetta, Jr.
Retail Manager

WJM/naf
Enclosure

cc: Mr. Glenn Adamick, The Newhall Land and Farming Company

RECEIVED
PLANNING DIVISION

SEP 15 2003

PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

SB 610
WATER SUPPLY ASSESSMENT
for
THE RIVER PARK PROJECT

August 7, 2003

Prepared by:
Santa Clarita Water Division of
Castaic Lake Water Agency

TABLE OF CONTENTS
SB 610 WATER SUPPLY ASSESSMENT - The River Park Project

1.0 INTRODUCTION

This report is a Water Supply Assessment (Assessment) prepared at the request of the City of Santa Clarita for the proposed River Park project ("Project"). The Assessment has been drafted pursuant to the requirements of Senate Bill 610 (Costa; Chapter 643, Stats. 2001) ("SB 610") which requires the public water systems which may supply water to certain proposed development projects to prepare a water supply assessment for use by the planning agency in compliance with the California Environmental Quality Act (CEQA).[1]

This Assessment has been prepared by the Santa Clarita Water Division (SCWD)[2] of the Castaic Lake Water Agency (CLWA). SCWD will be the retail water supplier to the Project and is the operator of a "public water system" as defined by SB 610. As the operator of the public water system which may provide water to the proposed River Park development, SCWD is responsible for preparing an SB 610 Water Supply Assessment.[3]

An SB 610 Water Supply Assessment is required for any "project" that is subject to the California Environmental Quality Act (CEQA)[4] and proposes, *inter alia*, residential development of more than 500 dwelling units.[5] The River Park project is a qualifying project under this definition.

This Assessment will provide information to the City of Santa Clarita for its consideration in making a determination as to whether there is a sufficient water supply available to serve the River Park project.[6] The Assessment has been submitted to the city within 90-days of its request to the public water system.[7] The City of Santa Clarita requested this Assessment from SCWD on July 16, 2003.

No Assessment has been previously prepared for the River Park project that complies with the requirements of SB 610.[8]

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[1] SB 610 amended section 21151.9 of the California Public Resources Code, and amended sections 10631, 10656, 10910, 10911, 10912, and 10915 of, repealed section 10913 of, and added and amended section 10657 of, the California Water Code.

[2] SCWD is the "public water system" for purposes of this Assessment as defined by Water Code § 10912 (b), (c). A public water system has 3,000 or more service connections and provides piped water to the public for human consumption.

[3] Water Code 10910(b).

[4] Public Resources Code § 21080.

[5] Water Code § 10912(a)(1). This section also includes other types of development which are defined as a "project" by this section of the code.

[6] Water Code § 10911(c) states that the lead agency shall determine, based on the entire record, whether projected water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses.

[7] Water Code § 10910 (g)(1).

[8] Water Code § 10910(h) states that if a project has been the subject of a Water Supply Assessment that complies with the requirements of this part, no additional water supply Assessment shall be required for

1.1 River Park Project

The River Park project is a proposed residential development consisting of single and multi-family housing on a 695 acre site in the City of Santa Clarita. It includes 439 single-family dwellings, 744 apartments, 40,000 square feet of commercial building area, and a 29-acre passive park, of which a maximum of eight (8) acres would be landscaped and irrigated. The Project site is located at the terminus of Newhall Ranch Road, east of Bouquet Canyon Road between CLWA property and the Santa Clara River, north of Soledad Canyon Road. Home construction is anticipated to begin in 2006 and will continue until build-out in 2009. At build-out, total water demand for the project is estimated to be less than 700 acre-feet per year (afy) (Table 1.1).

1.2 Purpose of the Assessment

The purpose of the Assessment is to provide an analysis of whether the SCWD water system has sufficient projected water supplies to meet the projected demands of the Project.[9] Specifically this Assessment evaluates whether the total projected water *supply*, determined to be available for the Project during normal, single dry, and multiple dry water years over the next 20 years, will meet the projected water *demand* associated with the proposed Project, in addition to existing and planned future water uses, including agriculture and manufacturing uses.[10] If the water supply is anticipated to be insufficient, the Assessment must describe measures being taken to obtain an adequate supply.[11]

SB 610 requires this Assessment to be included in the Environmental Impact Report prepared for the River Park project pursuant to the California Environmental Quality Act (CEQA).[12] The relationship between the Assessment and other River Park environmental documents is discussed in more detail in the following paragraphs.

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subsequent projects that were part of a larger project for which a Water Supply Assessment was completed and that has complied with the requirements of this part and for which the public water system, or the city or county, has concluded that its water supplies are sufficient to meet the projected water demand associated with the proposed project, in addition to the existing and planned future uses, unless there has been substantial changes in the project or circumstances since approval of the Assessment.

[9] Water Code § 10910(c).

[10] Water Code § 10910 (c) (4).

[11] Water Code § 10911(a).

[12] Water Code § 10911(b), (c).

Table 1.1 – Estimated Water Demands

(Using SCWD Water Duty Factors From 2001)

LAND USE CATEGORY	AMOUNT	WATER DUTY FACTOR	WATER DEMAND (AFY)
Single Family Units	439 units	0.55 af/unit	241.45
Apartments	744 units	0.19 af/unit	141.36
Park	8 Acres	3 af per acre	24.0
Other Misc. Landscaping (irrigated common landscaping, pocket parks, etc.)	93 Acres	3 af per acre	279.0
Commercial (40,000 sq. ft.)	3 Acres	0.0289 af/ 100 sq ft	11.56
TOTAL PROJECT:			**697.37**

1.3 Castaic Lake Water Agency

The Castaic Lake Water Agency is a public water agency that serves an area of 195 square miles in Los Angeles and Ventura Counties. CLWA is a water wholesaler that provides about half of the water that Santa Clarita households and businesses use. CLWA, through the SCWD, also provides retail water service to the area previously served by the Santa Clarita Water Company. CLWA operates two potable water treatment plants, storage facilities and over 17 miles of transmission pipelines, and has initiated recycled water service. CLWA supplements local groundwater supplies with State Water Project (SWP) water from Northern California. This water is treated and delivered to the local water retailers, including the SCWD. The other three retail purveyors served by CLWA are: Los Angeles County Water District #36, Newhall County Water District, and Valencia Water Company.

1.4 Santa Clarita Water Division

In September 1999 CLWA acquired the Santa Clarita Water Company, an investor-owned retail water company serving the eastern part of the Santa Clarita Valley.[13] The former Santa Clarita Water Company was incorporated into CLWA's Santa Clarita Water Division, which continues to serve the same area with Santa Clarita Water Company's facilities. SCWD's service area includes portions of the City of Santa Clarita and unincorporated portions of Los Angeles County in the communities of Saugus, Canyon Country, and Newhall. SCWD supplies water from both groundwater wells and CLWA imported water. The SCWD is the retailer that will serve the River Park project. The project is located within the SCWD service area.

1.5 2000 Urban Water Management Plan

The water demand associated with the proposed River Park project is consistent with the projected future water demand figures in the most recent Urban Water Management Plan (UWMP) adopted by CLWA and the Santa Clarita Valley's retail purveyors: Los Angeles

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[13] CLWA acquired 100% the capital stock in Santa Clarita Water Company by way of a judgment in eminent domain in Los Angeles County Superior Court case number BC 215065, entered on September 2, 1999. Subsequently, CLWA's authority to own the Santa Clarita Water Company and to provide retail water service through the former assets of the Company has been challenged in *Klajic v. Castaic Lake Water Agency* (California Court of Appeal, 2nd Dist, case number B161069). In addition, the public agency borrowing undertaken by CLWA to finance the acquisition of the Santa Clarita Water Company has been challenged in *Plambeck v. Stone and Youngberg* (LASC case no. BC249168). The cases are currently pending, but neither case seeks relief affecting the availability of water to Santa Clarita Water Company, SCWD or CLWA.

County Waterworks District # 36, Newhall County Water District, the Santa Clarita Water Company and the Valencia Water Company. The timing of the Project places it well within the timeframe for calculating "planned future uses" within the 2020 water supply projection included in the 2000 UWMP. Pertinent information from the UWMP, as well as other reports and analyses of water supply and demand, is considered in this Assessment. The final version of the Urban Water Management Plan was adopted by the CLWA Board of Directors on December 20, 2000 and submitted to the California Department of Water Resources.[14] Since adoption of the UWMP by the CLWA Board of Directors, additional documents, such as the State Water Project Delivery Reliability Report 2003, have been released that contain information and data that may update the UWMP. State law requires a revision of the UWMP by December 31, 2005, and any new information or data will be incorporated into that revision.

1.6 Reliance on the 2000 UWMP to Document Water Supply and Demand

SB 610 requires the Assessment to document the water demand for existing uses, planned future uses and the proposed development. Water Code §10910(c)(2) states that if the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate and consider the requested information from the urban water management plan in preparing the Assessment. The 2000 UWMP projections were based upon projected development based on the Los Angeles County Assessor's Land Use Codes (and General Plan documents) adopted by the City of Santa Clarita and by the County of Los Angeles, and did anticipate and take into account in its overall projections of demand, a level of development in the CLWA area consistent with that proposed by the River Park project. Pursuant to §10910(c)(2), this Assessment considers the data and findings included in the UWMP document in its determination of whether there is sufficient water supply to serve the River Park project because the Project's water demand is factored into the 20-year projection as a "planned future use."

The UWMP assumed that connections would increase by about 2,240 new connections per year. Connection data compiled and maintained by CLWA since 2000 (the year the UWMP was prepared) shows 2,249 new connections in 2000, 2,822 new connections in 2001 and 2,080 new connections in 2002. These actual numbers track closely with the assumptions from the UWMP.

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[14] The validity and sufficiency of the UWMP were challenged in *County of Ventura v. Castaic Lake Water Agency*, (Kern County Superior Court case no. 245365-RJO). The trial court has ruled that UWMP meets the requirements of law. The Friends of the Santa Clara River have filed a notice of appeal from the Superior Court judgment, although the final judgment, including the award of costs, has not been filed. The County of Ventura has determined not to appeal the judgment.

1.7 Information Relied Upon in Preparation of this Assessment

Information from the following documentation has been relied upon in the preparation of this Assessment. The referenced documents are incorporated into this Assessment as if fully set forth herein. Copies of the referenced documents are available for review at the Castaic Lake Water Agency and copies can be obtained upon the payment of a fee to cover the cost of reproduction.

1.7.1 2000 Urban Water Management Plan, Castaic Lake Water Agency, Newhall County Water District, Santa Clarita Water Company and Valencia Water Company.

1.7.2 Santa Clarita Valley Water Report 2002, April 2003, CLWA, Los Angeles County Waterworks District #36, Newhall County Water District, and Valencia Water Company.

1.7.3 2001 Update Report, Hydrogeologic Conditions in the Alluvial and Saugus Formation Aquifer Systems, Richard C. Slade & Associates LLC (July 2002) ("Slade (2002)" herein).

1.7.4 Castaic Lake Water Agency, Capital Improvement Program, Kennedy-Jenks Consultants, 2003

1.7.5 The State Water Project Delivery Reliability Report, California Department of Water Resources, May 2003

1.7.6 Water Supply Contract Between the State of California Department of Water Resources and the Castaic Lake Water Agency, 1963 (plus amendments, including the "Monterey Amendment," 1995, and Amendment No. 18, 1999, the transfer of 41,000 acre-feet of Table A Amount from Kern

County Water Agency to Castaic Lake Water Agency)[15]

1.7.7 2002 Point of Delivery Agreement Among the Department of Water Resources of the State of California, Castaic Lake Water Agency and Kern County Water Agency (Semitropic Groundwater Storage Program).[16]

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[15] CLWA's contract rights to SWP water total 95,200 acre feet per year ("afy"), including a water transfer of 41,000 afy approved in 1999 from two water agencies in Kern County. CLWA's Environmental Impact Report prepared in connection with the 41,000 afy water transfer was challenged in *Friends of the Santa Clara River v. Castaic Lake Water Agency* (Los Angeles Superior Court Case No. PC 018110). The courts have required CLWA to re-certify the EIR but have held that CLWA may continue to utilize the 41,000 afy under the transfer.

[16] Due to availability of SWP water during 2002, CLWA entered into a groundwater banking agreement in 2002. Twenty-four thousand acre feet of SWP water, contracted to CLWA, was stored within the Semitropic Groundwater Storage Program in Kern County so that CLWA may withdraw the water in future years of shortage. The Negative Declaration prepared by CLWA was challenged in *California Water Network v. Castaic Lake Water Agency* (Ventura County Superior Court case no. CIV 215327), which is pending.

2.0 WATER SUPPLY ASSESSMENT

Based on the information contained in the 2000 UWMP and other supporting information relied upon in the preparation of this Assessment SCWD concludes there will be a sufficient water supply available at the time the River Park project is ready for occupancy, to meet the needs of the project in addition to existing and other planned future uses.

CLWA has existing water entitlements, rights and contracts to meet future demand as needed over time, and has committed sufficient capital resources and planned investments in various water programs and facilities to serve all of its existing and planned customers, including SCWD's customers. SCWD water entitlements, rights and contracts for local supplies, in addition to imported supplies provided by CLWA are sufficient to serve all of its existing and planned customers. SCWD has also identified an operational strategy combined with a prudent and flexible management approach to ensuring water reliability.

SCWD's current service area-wide demands are approximately 27,000 afy[17]. As mentioned previously, the River Park project will require less than 700 afy at build-out. The conclusions of the SCWD as stated in the 2000 UWMP related to the requirements of the SB 610 Assessment for River Park are as follows:

2.1 Average/Normal Year Water Assessment

The UWMP indicates that no shortages are anticipated within the Agency's service area in an average/normal water year through 2020 if projected imported and local supplies are developed as estimated.[18] Total projected water demands for the CLWA through the year 2020 are compared with the supplies projected to be available to meet demands in this analysis. The following table summarizes the data from the UWMP.

"Future Planned Water Supply Programs" as listed below, are included in the UWMP to indicate examples of how CLWA would add reliability and flexibility to its water supply portfolio. Programs such as these will be analyzed by CLWA and contracts entered into as need and cost-effectiveness are determined through time. Future Water Supply Assessments will reflect these contractual agreements.

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[17] This represents average year demand. Dry year demand is approximately 10% higher.

[18] Castaic Lake Water Agency, 2000 Urban Water Management Plan (December 2000) p.4-2.

Table 2.1 Average/Normal Water Year

SUPPLY AND DEMAND ASSESSMENT[19]
(Acre-Feet Per Year)

	Year 2005	Year 2010	Year 2015	Year 2020
EXISTING WATER SUPPLY PROGRAMS:				
Local Supplies				
Alluvial Aquifer	35,000	35,000	35,000	35,000
Saugus Formation	11,000	11,000	11,000	11,000
Recycled Water	1,700	1,700	1,700	1,700
Imported Supplies[20]				
SWP Table A Amount	56,073	56,073	56,073	56,073
TOTAL EXISTING SUPPLIES:	**103,773**	**103,773**	**103,773**	**103,773**
Total Estimated Demand	81,700	90,100	100,700	113,100
Difference Surplus/(Deficit)	22,073	13,673	3,073	(9,327)
FUTURE PLANNED WATER SUPPLY PROGRAMS:				
Local Supplies				
Recycled Water		9,000	14,000	17,000
Imported Supplies				
Water Transfers	5,200	5,200	5,200	5,200
TOTAL PLANNED SUPPLIES:	**5,200**	**14,200**	**19,200**	**22,200**

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[19] Excerpted from Table 4-1 of the UWMP

[20] 56,073 af represents approximately 58.9% of CLWA's contractual Table A Amount. Normal year supply based on assumptions from the UWMP. The DWR SWP Delivery Reliability Report (2003) indicates greater reliability of Table A deliveries (72 to 76%) than was assumed for the 2000 UWMP

2.2 Single Dry Year Water Assessment

The UWMP evaluated the estimated dry-year demands and projected supplies for the year 2010 for the purpose of assessing a single dry year. This year was selected in order to show the results of local and imported water supply development over the next 10 years. In May 2003 DWR finalized its State Water Project Delivery Reliability Report. For the worst-case scenario single dry year (1977, with a one in 73 year probability of occurrence), DWR estimates that SWP deliveries to contractors would be approximately 20 percent of contract amounts. If projected imported and local supplies are developed as indicated, no shortages are anticipated within the Agency's service area for the extreme-case single dry-year scenario analyzed.

2.3 Multiple Dry Year Water Assessment

The UWMP estimated the minimum water supply available during each of the three water years, 2001, 2002, and 2003.[21] The surface and groundwater supplies included in this analysis are reflective of supplies available during the 1987-92 drought years, and in particular, 1990, 1991, and 1992. The supplies available from recycling projects are assumed to experience no reduction in a dry year but are also assumed not to be fully on-line at this early stage of the 20-year projection. Demand reductions of 10% based on short-term water conservation programs are assumed for these dry-year scenarios (this level of conservation was achieved during the 1987-1992 drought). If projected imported and local supplies are developed as indicated, no shortages are anticipated within the Agency's service area in the dry-year scenarios analyzed.[22] Years 1, 2 and 3 in Table 2.1 represent demand projections for 2003 through 2005. The single and multiple dry year water supply and demand assessments from the UWMP are summarized in the following table[23].

Information concerning "Future Planned Water Supply Programs" as listed below, from the UWMP and other sources was included to indicate examples of how CLWA would add reliability and flexibility to its water supply portfolio. Programs such as these will be analyzed by CLWA and contracts entered into as need and cost-effectiveness are determined through time. Future Water Supply Assessments will reflect these contractual agreements.

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[21] UWMP p. 4-3. Hot, dry weather may generate a 10 % increase above normal in both urban and agricultural water usage. This percentage was used to generate the dry-year demands in Table 2.2.

[22] UWMP p. 4-4.

[23] Excerpted from Table 4-2 of the UWMP

Table 2.2 Dry-Year and Multi-Dry Year Water

SUPPLY AND DEMAND ASSESSMENT (Acre-Feet Per Year)				
	Single	Multiple Dry Years		
	Dry Year	Year 1	Year 2	Year 3
EXISTING WATER SUPPLY PROGRAMS				
Local Supplies				
Alluvial Aquifer	35,000	32,500	32,500	32,500
Saugus Formation	13,000	13,000	13,000	13,000
Recycled Water	1,700	1,700	1,700	1,700
Imported Supplies[24]				
SWP Table A Amount	19,040	37,890	37,890	37,890
Semitropic Bank Account	7,200	7,200	7,200	7,200
Flexible Storage Account	4,684	1,561	1,561	1,561
TOTAL EXISTING SUPPLIES	**82,624**	**93,851**	**93,851**	**93,851**
Total Estimated Demand	90,900	82,000	83,300	84,600
Voluntary 10% Conservation	9,090	8,200	8,330	8,460
Difference Surplus/(Deficit)	814	11,851	10,551	9,251
FUTURE PLANNED WATER SUPPLY PROGRAMS (2010)[25]				
Local Supplies				

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[24] 19,040 af represents 20% of CLWA's contractual Table A Amount. 37,890 af represents 39.8% of CLWA's contractual Table A Amount. Dry year supply based on assumptions from the UWMP.

[25] The UWMP assumed a total of 100,000 af in available future supplies by 2020. Therefore 50,000 af shown herein is assumed to be available by 2010.

Recycled Water	7,300
Saugus (New Wells)	20,000
Imported Supplies	
Water Transfers	3,500
Water Banking/Conjunctive Use	50,000
TOTAL FUTURE PLANNED SUPPLIES	**80,800**

3.0 IDENTIFICATION OF EXISTING WATER SUPPLY SOURCES

3.1 Annual Existing Water Supply Entitlements, Water Rights, or Water Service Contracts

The first substantive requirement of the SB 610 Assessment is the identification and description of the existing water supply sources in the public water system that will serve the Project. Water Code §10910(d) requires the Assessment to include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system. The identification of existing water supplies shall be demonstrated by providing information related to the following:

- Written contracts or other proof of entitlement to an identified water supply;
- Copies of a capital outlay program for financing the delivery of a water supply that has been adopted by the public water system;
- Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply; and,
- Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.

The current water supply for the Santa Clarita Valley is derived from four primary sources:

(1) Groundwater from the Alluvial Aquifer
(2) Groundwater from the Saugus Formation
(3) Imported SWP water
(4) Recycled Water

Recycled water is now available and currently being used to irrigate a golf course and several landscaped areas. The recycled water system can deliver 1,700 af, with plans to expand its use over the next 20 years.

Within the SCWD service area, these sources of water supply can be characterized as 1) *local supplies*, consisting of groundwater and recycled water, and 2) *imported supplies*, transported via the SWP, consisting of SWP Table A Amount.

Potential future water sources include additional recycled water, desalination, storm water runoff, increased Saugus pumping, and SWP reliability projects.[26]

Historically, local groundwater extracted from the Alluvial Aquifer and Saugus Formation has been the primary source of water in the SCWD's service area. However, since 1980, local groundwater supplies have been supplemented with imported water from the State Water Project.

3.2 Groundwater

Water Code §10910(f) requires this Assessment to include specific information describing groundwater resources if the water supply for a proposed project includes groundwater. Slade (2002) updates prior reports and includes a detailed review of the groundwater resources available to SCWD to supply the Project, including historic yields, estimated capacity and projected future yield capacity. Groundwater is drawn from two aquifer systems within the Santa Clara River Valley East Sub-basin, one of several sub-basins identified along the Santa Clara River in Los Angeles and Ventura counties by updated Bulletin 118 of the California Department of Water Resources. The shallow aquifer system is denominated the Alluvial Aquifer and the deeper aquifer is denominated the Saugus Formation. In addition to the SCWD, other large municipal and larger scale agriculture producers (including Newhall County Water District, Valencia Water Company, the Newhall Land and Farming Company and Wayside Honor Ranch) produce groundwater from the Alluvial Aquifer and Saugus Formation. Aggregate groundwater production by hundreds of other, small scale, water wells is estimated to account for less than 1% of total production from these aquifer systems.

The following sub-parts respond to specific requirements of Water Code §10910(f):

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[26] UWMP p.1-11.

3.2.1 Water Code §10910(f)(1).

Review of relevant information contained in the urban water management plan.

Pages 2-2 through 2-6 of the 2000 UWMP provide an overview description of the local Alluvial and Saugus Formation aquifer systems, as well as historical and projected production.

3.2.2 Water Code §10910(f)(2).

Description of any groundwater basin or basins from which the proposed project will be supplied including information concerning adjudication and overdraft.

Slade (2002) Sections 2 through 5 describe two aquifer systems, the Alluvial Aquifer and the Saugus Formation, within the Santa Clara River Valley East Sub-basin ("Basin") and provides a detailed description of the groundwater basins. Slade (2002) also provides an assessment of the operational yield and other parameters of production capacity of the aquifer systems. The Basin is about 22 miles long east to west and about 13 miles wide. Slade (2002) estimates that about 200,000 acre feet of water is in storage in the Alluvial Aquifer and about 1.6 million acre feet is stored in the Saugus Formation. Neither aquifer system is in overdraft at the present time. The Basin has not been adjudicated and has not been identified as overdrafted or projected to be overdrafted by the Department of Water Resources.

3.2.3 Water Code §10910(f)(3)

Description and analysis of the amount and location of groundwater pumped by the public water system for the past five years from any groundwater basin from which the proposed project will be supplied.

Detailed information about the amount and location of groundwater pumped from both the Alluvial Aquifer and Saugus Formation is provided in Slade (2002) Sections 4 and 5, and in the 2002 Water Report. The most recent five year average production (1998-2002) by all producers from the Alluvial Aquifer is 39,000 afy (2002 Water Report). During the same period, total production from the Saugus Formation averaged 4,500 afy, with a low of 3,700 afy (1999) and a high of 5,555 afy (1998) (2002) Water Report, Table II-7).

3.2.4 Water Code §10910(f)(4)

Description and analysis of the amount and location of groundwater that is *projected* to be pumped by the public water system from any basin from which the proposed project will be supplied.

Slade (2002) does not provide detailed descriptions and analysis of locations or yields of specific new wells that may be constructed in the future. The report, however, anticipates that new capacity and replacement wells can be located, designed and operated within the Basin, both within the Alluvial Aquifer and the Saugus Formation, without creating undesirable conditions. Slade (2002), page 85. Groundwater supplies were reviewed in the UWMP and evaluated as to whether supply projections were realistic for average and dry conditions. The review made the following critical findings:[27]

1. Both the Alluvial Aquifer and the Saugus Formation are reasonable and sustainable sources at the yields represented in the 2000 UWMP.
2. The yields are not overstated and will not deplete or "dry up" the groundwater basin.
3. There is no need to reduce the yields for purposes of planning in the context of the UWMP.

Preliminary analyses and recent studies have concluded that additional pumping can be safely carried out in both aquifers.[28] Neither aquifer is in overdraft condition.

3.2.5 Water Code §10910(f) (5)

Analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project.

Slade (2002) concludes that Alluvial Aquifer has storage capacity of about 200,000 af, with a sustainable operational yield ranging from 30,000 to 40,000 afy. Slade (2002) concludes that Alluvial Aquifer extractions should be reduced to 30,000 to 35,000 afy during dry periods.

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[27] Luhdorff and Scalmanini, Consulting Engineers, Review of Ground-Water Components 2000 Urban Water Management Plan CLWA, NCWD, SCWC, and VWC (December 15, 2000). The review was based on information provided by Richard Slade & Associates. This review and baseline information is included in the appendices of the UWMP.

[28] UWMP p. 1-13 and Slade, 2001 Update Report Hydrogeologic Conditions in the Alluvial and Saugus Formation Aquifer Systems, (dated July 2002), Volume I, see Executive Summary.

Slade (2002) concludes that the Saugus Formation has storage capacity of 1.6 million acre-feet, with a sustainable operational yield of 7,500 to 15,000 afy. Slade (2002) concludes that Saugus Formation extraction can be increased, on an infrequent basis to the range of from 15,000 to 35,000 afy, without creating undesirable conditions. Recent extractions from the Saugus Formation averaged less than 6,000 afy, but averaged 10,500 afy during the 1989 to 1992 drought.

A small portion of the Saugus Formation is contaminated with ammonium perchlorate and four wells have been unavailable since 1997. In November 2002 one Alluvial well was also found to contain perchlorate. An Environmental Oversight Agreement has been signed by CLWA and the purveyors with the California Department of Toxic Substances Control, which includes a Remedial Action Workplan. Planning and development is underway to install treatment facilities to remove the perchlorate contamination and return the wells to service.

3.3 Recycled Water

Wastewater that has been highly treated and disinfected can be reused for landscape irrigation and other purposes. It is not suitable for use as potable water. In 1993, CLWA completed a *Reclaimed Water System Master Plan* to use recycled water as a reliable water source to meet some non-potable demand within the Santa Clarita Valley. The Master Plan is being updated, and the amount of recycled water expected to be produced in the future reaches approximately 17,000 acre-feet per year in 2020.[29]

CLWA is currently under contract for 1,700 acre-feet per year and that amount is now available.

3.4 State Water Project Water

Since 1980, local supplies in the Santa Clarita Valley have been supplemented with imported water from the State Water Project (SWP). This water obtained from the SWP through CLWA, is and will continue as the largest source of water for the Valley. The SWP contract amounts, depending on annual allocation, currently meet more than half of local demand. The reliability of SWP supplies is subject to both annual hydrology and planned improvements to the system.

CLWA's current SWP Table A Amount of 95,200 AFY is affected by, and can be reduced due to, a number of factors, including hydrologic conditions, the status of SWP facilities'

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[29] UWMP p. 1-13.

construction and environmental requirements. Because of these factors, SWP supplies are subject to reduction, particularly during drought periods

In May 2003 the California Department of Water Resources completed its *State Water Project Delivery Reliability Report.* The report provides current information on the ability of the SWP to deliver water under existing and future levels of development, assuming historical levels of precipitation.

According to the report, the SWP will, on average, be able to deliver between 72-76 % of the maximum total contract amount of 4.1 million acre-feet per year, provided that an SWP contractor has the ability to utilize or store all of its Table A Amount made available for allocation. The level of deliveries drops to between 19% and 20% for an extraordinary dry year and approximately 40% for multiple dry years. This information will be used in and more fully analyzed in the discussion of CLWA's SWP supplies during the update of its Urban Water Management Plan in 2005.

South Coast
Air Quality Management District
AQMD
21865 E. Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • www.aqmd.gov

October 23, 2003

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PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

Mr. Jeff Hogan, Associate Planner
City of Santa Clarita
Dept. of Planning and Building Services
23920 Valencia Blvd.
Santa Clarita, CA 91355

Dear Mr. Hogan:

Revised Notice of Preparation of a Draft Environmental Impact Report for Riverpark (Panhandle), Master Case #02-175

The South Coast Air Quality Management District (AQMD) appreciates the opportunity to comment on the above-mentioned document. The AQMD's comments are recommendations regarding the analysis of potential air quality impacts from the proposed project that should be included in the Draft Environmental Impact Report (EIR).

Air Quality Analysis

The AQMD adopted its California Environmental Quality Act (CEQA) Air Quality Handbook in 1993 to assist other public agencies with the preparation of air quality analyses. The AQMD recommends that the Lead Agency use this Handbook as guidance when preparing its air quality analysis. Copies of the Handbook are available from the AQMD's Subscription Services Department by calling (909) 396-3720.

The Lead Agency should identify any potential adverse air quality impacts that could occur from all phases of the project and all air pollutant sources related to the project. Air quality impacts from both construction and operations should be considered. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, that is, sources that generate or attract vehicular trips should be included in the evaluation. An analysis of all toxic air contaminant impacts due to the decommissioning or use of equipment potentially generating such air pollutants should also be included.

Mitigation Measures

In the event that the project generates significant adverse air quality impacts, CEQA requires that all feasible mitigation measures be utilized during project construction and operation to minimize or eliminate significant adverse air quality impacts. To assist the Lead Agency with identifying possible mitigation measures for the project, please refer to Chapter 11 of the AQMD CEQA Air Quality Handbook for sample air quality mitigation measures. Additionally, AQMD's Rule 403 – Fugitive Dust, and the Implementation Handbook contain numerous measures for controlling construction-related emissions that should be considered for use as CEQA mitigation if not otherwise required. Pursuant to state CEQA Guidelines §15126.4 (a)(1)(D), any impacts resulting from mitigation measures must also be discussed.

Data Sources

AQMD rules and relevant air quality reports and data are available by calling the AQMD's Public Information Center at (909) 396-2039. Much of the information available through the Public Information Center is also available via the AQMD's World Wide Web Homepage (http://www.aqmd.gov).

The AQMD is willing to work with the Lead Agency to ensure that project-related emissions are accurately identified, categorized, and evaluated. Please call Charles Blankson, Ph.D., Air Quality Specialist, CEQA Section, at (909) 396-3304 if you have any questions regarding this letter.

Sincerely,

Steve Smith

Steve Smith, Ph.D.
Program Supervisor, CEQA Section
Planning, Rule Development and Area Sources

SS:CB:li

LAC031021-02LI
Control Number

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SOUTHERN CALIFORNIA

ASSOCIATION of GOVERNMENTS

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November 17, 2003

Mr. Jeff Hogan
Associate Planner
City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Boulevard
Santa Clarita, CA 93155

RE: **Comments on the Revised Notice of Preparation for a Draft Environmental Impact Report for the Riverpark (Panhandle) Project – SCAG No. I 20030603**

Dear Mr. Hogan:

Thank you for submitting the **Revised Notice of Preparation for a Draft Environmental Impact Report for the Riverpark (Panhandle) Project** to SCAG for review and comment. As areawide clearinghouse for regionally significant projects, SCAG reviews the consistency of local plans, projects, and programs with regional plans. This activity is based on SCAG's responsibilities as a regional planning organization pursuant to state and federal laws and regulations. Guidance provided by these reviews is intended to assist local agencies and project sponsors to take actions that contribute to the attainment of regional goals and policies.

We have reviewed the **Revised Notice of Preparation**, and have determined that **the proposed Project is regionally significant per California Environmental Quality Act (CEQA) Guidelines (Section 15206).** The proposed Project considers the construction of more than 500 dwelling units. CEQA requires that EIRs discuss any inconsistencies between the proposed project and the applicable general plans and **regional plans (Section 15125 [d])**. If there are inconsistencies, an explanation and rationalization for such inconsistencies should be provided.

Policies of SCAG's Regional Comprehensive Plan and Guide and Regional Transportation Plan, which may be applicable to your project, are outlined in the attachment. **We expect the DEIR to specifically cite the appropriate SCAG policies and address the manner in which the Project is consistent with applicable core policies or supportive of applicable ancillary policies. Please use our policy numbers to refer to them in your DEIR. Also, we would encourage you to use a side-by-side comparison of SCAG policies with a discussion of the consistency or support of the policy with the Proposed Project.**

Please provide a minimum of 45 days for SCAG to review the DEIR when this document is available. If you have any questions regarding the attached comments, please contact me at (213) 236-1867. Thank you.

Sincerely,

JEFFREY M. SMITH, AICP
Senior Regional Planner
Intergovernmental Review

COMMENTS ON THE REVISED PROPOSAL TO DEVELOP A DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE RIVERPARK (PANHANDLE) PROJECT
SCAG NO. I 20020494

PROJECT DESCRIPTION

The proposed Project considers a Tentative Tract Map, Zone Change and General Plan Amendment, Conditional Use Permit, Review and Oak Tree Permit for the development of approximately 1,183 dwelling units. The proposed Project will be developed on approximately 695 acres, and is located east of Bouquet Canyon Road and north of Soledad Canyon Road in the City of Santa Clarita.

CONSISTENCY WITH REGIONAL COMPREHENSIVE PLAN AND GUIDE POLICIES

The **Growth Management Chapter (GMC)** of the Regional Comprehensive Plan and Guide (RCPG) contains the following policies that are particularly applicable and should be addressed in the Draft EIR for the Riverpark (Panhandle) Project.

3.01 The population, housing, and jobs forecasts, which are adopted by SCAG's Regional Council and that reflect local plans and policies, shall be used by SCAG in all phases of implementation and review.

Regional Growth Forecasts

The Draft EIR should reflect the most current SCAG forecasts which are the 2001 RTP (April 2001) Population, Household and Employment forecasts for the North Los Angeles County Council of Governments (NLACOG) subregion and the City of Santa Clarita. These forecasts are as follows:

NLACOG Subregion	2000	2005	2010	2015	2020	2025
Population	576,478	658,450	786,419	912,257	1,083,020	1,259,354
Household	174,293	211,038	264,936	319,701	378,169	442,773
Employment	187,780	218,429	250,111	268,842	285,963	304,163

City of S. Clarita	2000	2005	2010	2015	2020	2025
Population	146,415	151,226	166,822	182,158	202,970	224,460
Household	48,571	54,372	60,227	66,197	72,555	79,581
Employment	48,971	50,783	52,846	54,064	55,179	56,366

3.03 The timing, financing, and location of public facilities, utility systems, and transportation systems shall be used by SCAG to implement the region's growth policies.

GMC POLICIES RELATED TO THE RCPG GOAL TO IMPROVE THE REGIONAL STANDARD OF LIVING

The Growth Management goals to develop urban forms that enable individuals to spend less income on housing cost, that minimize public and private development costs, and that enable firms to be more competitive, strengthen the regional strategic goal to stimulate the regional economy. The evaluation of the proposed project in relation to the following policies would be intended to guide efforts toward achievement of such goals and does not infer regional interference with local land use powers.

3.05 Encourage patterns of urban development and land use, which reduce costs on infrastructure construction and make better use of existing facilities.

3.09 Support local jurisdictions' efforts to minimize the cost of infrastructure and public service delivery, and efforts to seek new sources of funding for development and the provision of services.

3.10 Support local jurisdictions' actions to minimize red tape and expedite the permitting process to maintain economic vitality and competitiveness.

GMC POLICIES RELATED TO THE RCPG GOAL TO IMPROVE THE REGIONAL QUALITY OF LIFE

The Growth Management goals to attain mobility and clean air goals and to develop urban forms that enhance quality of life, that accommodate a diversity of life styles, that preserve open space and natural resources, and that are aesthetically pleasing and preserve the character of communities, enhance the regional strategic goal of maintaining the regional quality of life. The evaluation of the proposed project in relation to the following policies would be intended to provide direction for plan implementation, and does not allude to regional mandates.

3.12 *Encourage existing or proposed local jurisdictions' programs aimed at designing land uses which encourage the use of transit and thus reduce the need for roadway expansion, reduce the number of auto trips and vehicle miles traveled, and create opportunities for residents to walk and bike.*

3.14 *Support local plans to increase density of future development located at strategic points along the regional commuter rail, transit systems, and activity centers.*

3.17 *Support and encourage settlement patterns, which contain a range of urban densities*

3.18 *Encourage planned development in locations least likely to cause environmental impact.*

3.19 *SCAG shall support policies and actions that preserve open space areas identified in local, state and federal plans.*

3.20 *Support the protection of vital resources such as wetlands, groundwater recharge areas, woodlands, production lands, and land containing unique and endangered plants and animals.*

3.21 *Encourage the implementation of measures aimed at the preservation and protection of recorded and unrecorded cultural resources and archaeological sites.*

3.22 *Discourage development, or encourage the use of special design requirements, in areas with steep slopes, high fire, flood, and seismic hazards.*

3.23 *Encourage mitigation measures that reduce noise in certain locations, measures aimed at preservation of biological and ecological resources, measures that would reduce exposure to seismic hazards, minimize earthquake damage, and to develop emergency response and recovery plans.*

GMC POLICIES RELATED TO THE RCPG GOAL TO PROVIDE SOCIAL, POLITICAL, AND CULTURAL EQUITY

The Growth Management Goal to develop urban forms that avoid economic and social polarization promotes the regional strategic goal of minimizing social and geographic disparities and of reaching equity among all segments of society. The evaluation of the proposed project in relation to the policy stated below is intended guide direction for the accomplishment of this goal, and does not infer regional mandates and interference with local land use powers.

3.24 *Encourage efforts of local jurisdictions in the implementation of programs that increase the supply and quality of housing and provide affordable housing as evaluated in the Regional Housing Needs Assessment.*

3.27 *Support local jurisdictions and other service providers in their efforts to develop sustainable communities and provide, equally to all members of society, accessible and effective services such as: public education, housing, health care, social services, recreational facilities, law enforcement, and fire protection.*

REGIONAL TRANSPORTATION PLAN

The **Regional Transportation Plan (RTP)** also has goals, objectives, policies and actions pertinent to this proposed project. This RTP links the goal of sustaining mobility with the goals of fostering economic development, enhancing the environment, reducing energy consumption, promoting transportation-friendly development patterns, and encouraging fair and equitable access to residents affected by socio-economic, geographic and commercial limitations. Among the relevant goals, objectives, policies and actions of the RTP are the following:

Core Regional Transportation Plan Policies

4.01 *Transportation investments shall be based on SCAG's adopted Regional Performance Indicators:*

Mobility - Transportation Systems should meet the public need for improved access, and for safe, comfortable, convenient, faster and economical movements of people and goods.

- *Average Work Trip Travel Time in Minutes – 25 minutes (Auto)*
- *PM Peak Freeway Travel Speed – 45 minutes (Transit)*
- *PM Peak Non-Freeway Travel Speed*
- *Percent of PM Peak Travel in Delay (Fwy)*
- *Percent of PM Peak Travel in Delay (Non-Fwy)*

Accessibility - Transportation system should ensure the ease with which opportunities are reached. Transportation and land use measures should be employed to ensure minimal time and cost.

- *Work Opportunities within 45 Minutes door to door travel time (Mode Neutral)*
- *Average transit access time*

Environment - Transportation system should sustain development and preservation of the existing system and the environment. (All Trips)

- *CO, ROG, NOx, PM10, PM2.5 – Meet the applicable SIP Emission Budget and the Transportation Conformity requirements*

Reliability – Transportation system should have reasonable and dependable levels of service by mode. (All Trips)

- *Transit – 63%*
- *Highway – 76%*

Safety - Transportation systems should provide minimal accident, death and injury. (All Trips)

- *Fatalities Per Million Passenger Miles – 0*
- *Injury Accidents – 0*

Equity/Environmental Justice - The benefits of transportation investments should be equitably distributed among all ethnic, age and income groups. (All trips)

- *By Income Groups Share of Net Benefits – Equitable Distribution of Benefits among all Income Quintiles*

Cost-Effectiveness - Maximize return on transportation investment (All Trips). Air Quality, Mobility, Accessibility and Safety

- *Return on Total Investment – Optimize return on Transportation Investments*

4.02 Transportation investments shall mitigate environmental impacts to an acceptable level.

4.04 Transportation Control Measures shall be a priority.

4.16 Maintaining and operating the existing transportation system will be a priority over expanding capacity.

AIR QUALITY CHAPTER CORE ACTIONS

The **Air Quality Chapter** core actions related to the proposed project includes:

5.07 Determine specific programs and associated actions needed (e.g., indirect source rules, enhanced use of telecommunications, provision of community based shuttle services, provision of demand management based programs, or vehicle-miles-traveled/emission fees) so that options to command and control regulations can be *assessed.*

5.11 *Through the environmental document review process, ensure that plans at all levels of government (regional, air basin, county, subregional and local) consider air quality, land use, transportation and economic relationships to ensure consistency and minimize conflicts.*

OPEN SPACE CHAPTER ANCILLARY GOALS

Outdoor Recreation

9.01 *Provide adequate land resources to meet the outdoor recreation needs of the present and future residents in the region and to promote tourism in the region.*

9.02 *Increase the accessibility to open space lands for outdoor recreation.*

9.03 *Promote self-sustaining regional recreation resources and facilities.*

Public Health and Safety

9.04 *Maintain open space for adequate protection of lives and properties against natural and man-made hazards.*

9.05 *Minimize potentially hazardous developments in hillsides, canyons, areas susceptible to flooding, earthquakes, wildfire and other known hazards, and areas with limited access for emergency equipment.*

Resource Production

9.07 *Maintain adequate viable resource production land, particularly lands devoted to commercial agriculture and mining operations.*

Resource Protection

9.08 *Develop well-managed viable ecosystems or known habitats of rare, threatened and endangered species, including wetlands.*

WATER QUALITY CHAPTER RECOMMENDATIONS AND POLICY OPTIONS

The **Water Quality Chapter** core recommendations and policy options relate to the two water quality goals: to restore and maintain the chemical, physical and biological integrity of the nation's water; and, to achieve and maintain water quality objectives that are necessary to protect all beneficial uses of all waters.

11.07 Encourage water reclamation throughout the region where it is cost-effective, feasible, and appropriate to reduce reliance on imported water and wastewater discharges. Current administrative impediments to increased use of wastewater should be addressed.

CONCLUSIONS

All feasible measures needed to mitigate any potentially negative regional impacts associated with the proposed project should be implemented and monitored, as required by CEQA.

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

Roles and Authorities

THE SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS (SCAG) is a ***Joint Powers Agency*** established under California Government Code Section 6502 et seq. Under federal and state law, SCAG is designated as a Council of Governments (COG), a Regional Transportation Planning Agency (RTPA), and a Metropolitan Planning Organization (MPO). SCAG's mandated roles and responsibilities include the following:

SCAG is designated by the federal government as the Region's ***Metropolitan Planning Organization*** and mandated to maintain a continuing, cooperative, and comprehensive transportation planning process resulting in a Regional Transportation Plan and a Regional Transportation Improvement Program pursuant to 23 U.S.C. '134, 49 U.S.C. '5301 et seq., 23 C.F.R. '450, and 49 C.F.R. '613. SCAG is also the designated ***Regional Transportation Planning Agency***, and as such is responsible for both preparation of the Regional Transportation Plan (RTP) and Regional Transportation Improvement Program (RTIP) under California Government Code Section 65080 and 65082 respectively.

SCAG is responsible for developing the demographic projections and the integrated land use, housing, employment, and transportation programs, measures, and strategies portions of the ***South Coast Air Quality Management Plan***, pursuant to California Health and Safety Code Section 40460(b)-(c). SCAG is also designated under 42 U.S.C. '7504(a) as a ***Co-Lead Agency*** for air quality planning for the Central Coast and Southeast Desert Air Basin District.

SCAG is responsible under the Federal Clean Air Act for determining ***Conformity*** of Projects, Plans and Programs to the State Implementation Plan, pursuant to 42 U.S.C. '7506.

Pursuant to California Government Code Section 65089.2, SCAG is responsible for ***reviewing all Congestion Management Plans (CMPs) for consistency with regional transportation plans*** required by Section 65080 of the Government Code. SCAG must also evaluate the consistency and compatibility of such programs within the region.

SCAG is the authorized regional agency for ***Inter-Governmental Review*** of Programs proposed for federal financial assistance and direct development activities, pursuant to Presidential Executive Order 12,372 (replacing A-95 Review).

SCAG reviews, pursuant to Public Resources Code Sections 21083 and 21087, Environmental Impacts Reports of projects of regional significance for consistency with regional plans [California Environmental Quality Act Guidelines Sections 15206 and 15125(b)].

Pursuant to 33 U.S.C. '1288(a)(2) (Section 208 of the Federal Water Pollution Control Act), SCAG is the authorized ***Areawide Waste Treatment Management Planning Agency***.

SCAG is responsible for preparation of the ***Regional Housing Needs Assessment***, pursuant to California Government Code Section 65584(a).

SCAG is responsible (with the Association of Bay Area Governments, the Sacramento Area Council of Governments, and the Association of Monterey Bay Area Governments) for preparing the ***Southern California Hazardous Waste Management Plan*** pursuant to California Health and Safety Code Section 25135.3.

Revised July 2001

Department of Toxic Substances Control

Edwin F. Lowry, Director
1011 N. Grandview Avenue
Glendale, California 91201

Terry Tamminen
Agency Secretary
Cal/EPA

Arnold
Schwarzenegger
Governor

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CITY OF SANTA CLARITA

November 19, 2003

Mr. Jeff Hogan
Associate Planner
City of Santa Clarita
23920 Valencia Boulevard, Suite 300
Santa Clarita, California 91355

REVISED NOTICE OF PREPARATION OF DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE RIVERPARK, SCH NO. 2002091081

Dear Mr. Hogan:

The Department of Toxic Substances Control (DTSC) has received your Revised Notice of Preparation of a draft Environmental Impact Report (EIR) for the project mentioned above.

Based on the review of the document, DTSC comments are as follows:

1. The draft EIR needs to identify and determine whether current or historic uses at the Project site have resulted in any release of hazardous wastes/substances at the Project area.

2. The draft EIR needs to identify any known or potentially contaminated site within the Project area. For all identified sites, the draft EIR needs to evaluate whether conditions at the site pose a threat to human health or the environment.

3. The draft EIR should identify the mechanism to initiate any required investigation and/or remediation for any site that may require remediation, and which government agency will provide appropriate regulatory oversight.

4. If during construction of the project, soil contamination is suspected, construction in the area should stop, and appropriate health and safety procedures should be implemented. If it is determined that contaminated soils exists, the draft EIR

should identify how any required investigation and/or remediation will be conducted, and which government agency will provide regulatory oversight.

DTSC provides guidance for Preliminary Endangerment Assessment preparation and cleanup oversight through the Voluntary Cleanup Program (VCP). For additional information on the VCP please visit DTSC's web site at www.dtsc.ca.gov. If you would like to meet and discuss this matter further, please contact Mr. Alberto Valmidiano, Project Manager, at (818) 551-2870 or me, at (818) 551-2877.

Sincerely,

Harlan R. Jeche

Harlan R. Jeche
Unit Chief
Southern California Cleanup Operations Branch – Glendale Office

cc: Governor's Office of Planning and Research
State Clearinghouse
P.O. Box 3044
Sacramento, California 95812-3044

Mr. Guenther W. Moskat, Chief
Planning and Environmental Analysis Section
CEQA Tracking Center
Department of Toxic Substances Control
P.O. Box 806
Sacramento, California 95812-0806

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY GRAY DAVIS, Governor

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Mr. Jeff Hogan, Associate Planner
Office of Planning
City of Santa Clarita
23920 Valencia Blvd., Suite 302
Santa Clarita, CA. 91355

IGR/CEQA# 031056NY
River Park Project Traffic Analysis
744 Multi Family Units, 439 Single Family Units
& 40,000 SF Commercial uses
LA/5,14,126/13.5

December 29, 2003

Dear Mr. Hogan:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the River Park Project in Santa Clarita.

Based on the information received, Please provide the following backup documents and analysis:

1- Due to close proximity of the project to both I-5 and SR-14 freeways, submit a revised traffic forecast generated by the River Park Project.
2- Provide supporting data that only 1% of the trip generated by this project will use SR-14 at Golden Valley interchange.
3- Provide mitigation measures to offset the traffic impact to State Transportation facilities.

If you have any questions regarding this response, please call the Project Engineer/Coordinator Mr. Yerjanian at (213) 897-6536 and refer to IGR/CEQA # 031208NY.

Sincerely,

Nerses Yerjanian

For: STEPHEN J. BUSWELL
IGR/CEQA Branch Chief
Transportation Planning Office

"Caltrans improves mobility across California"

COUNTY OF LOS ANGELES
FIRE DEPARTMENT
1320 NORTH EASTERN AVENUE
LOS ANGELES, CALIFORNIA 90063-3294
(323) 890-4330

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P. MICHAEL FREEMAN
FIRE CHIEF
FORESTER & FIRE WARDEN

December 19, 2003

Jeff Hogan, Associate Planner
City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Boulevard
Santa Clarita, CA 93155

Dear Mr. Hogan:

NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE RIVERPARK PROJECT - "SANTA CLARITA" (EIR #1842/2003)

The Notice of Preparation of a Draft Environmental Impact Report for the proposed Riverpark Project has been reviewed by the Planning Division, Land Development Unit, and Forestry Division of the County of Los Angeles Fire Department. The following are their comments:

FIRE PROTECTION AND EMERGENCY MEDICAL SERVICE AVAILABILITY:
The subject development will receive fire protection and paramedic service from the County of Los Angeles Fire Department. We would need a general location map to identify the jurisdictional station(s) for this property.

Additional manpower, equipment, and facilities will be needed to serve this development. Limited tax revenues have restricted the Fire Department's ability to meet new growth needs. Although general plans for upgrading fire protection in this area have been developed, the Department will not be able to implement these plans without specific provisions for the necessary manpower, equipment, and facilities. Mitigation of this problem should be required prior to granting approval of this development. The Fire Department will work with the developer to establish appropriate mitigation arrangements for the proposed project.

The applicant shall participate in an appropriate financing mechanism such as a developer fee or an in-kind consideration in lieu of developer fees to provide funds for fire protection facilities which are required by new commercial, industrial or residential development in an amount proportionate to the demand created by this project. Currently, the developer fee is a set amount per square foot of building space, adjusted annually, and is due and payable at the time a building permit is issued. In the event that the developer fee is no longer in effect at the time of building permit issuance, alternative mitigation measures shall be required.

SERVICE RESPONSIBILITY:
Due to the fact that only limited information is available on this project at the present time, we are not able to respond completely as to how this project will affect our Department. We would like to reserve the right to

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AZUSA
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BRADBURY
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COVINA
CUDAHY
DIAMOND BAR
DUARTE
EL MONTE
GARDENA
GLENDORA
HAWAIIAN GARDENS
HAWTHORNE
HIDDEN HILLS
HUNTINGTON PARK
INDUSTRY
INGLEWOOD
IRWINDALE
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LA MIRADA
LA PUENTE
LAKEWOOD
LANCASTER
LAWNDALE
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PARAMOUNT
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ROSEMEAD
SAN DIMAS
SANTA CLARITA
SIGNAL HILL
SOUTH EL MONTE
SOUTH GATE
TEMPLE CITY
WALNUT
WEST HOLLYWOOD
WESTLAKE VILLAGE
WHITTIER

respond further at a future date when more specific information is available. In particular, we would need a detailed map showing the location of proposed land uses and existing and proposed roads to calculate response distances/times.

GENERAL REQUIREMENTS:
The proposed development may necessitate multiple ingress/egress access for the circulation of traffic, and emergency response issues. The Department may condition future development to provide additional means of access. The development of this project must comply with all applicable code and ordinance requirements for construction, access, water mains, fire flows and hydrants.

This property is located within the area described by the Forester and Fire Warden as a Fire Zone 4, Very High Fire Hazard Severity Zone (VHFHSZ). All applicable fire code and ordinance requirements for construction, access, water mains, fire hydrants, fire flows, brush clearance, and fuel modification plans must be met. Specific fire and life safety requirements for the construction phase will be addressed at the building fire plan check. There may be additional fire and life safety requirements during this time.

Every building constructed shall be accessible to Fire Department apparatus by way of access roadways, with an all-weather surface of not less than the prescribed width, unobstructed, clear-to-sky. The roadway shall be extended to within 150 feet of all portions of the exterior walls when measured by an unobstructed route around the exterior of the building.

Access roads shall be maintained with a minimum of ten (10) feet of brush clearance on each side. Fire access roads shall have an unobstructed vertical clearance clear-to-sky. Trees overhanging fire access roads shall be maintained to provide a vertical clearance of thirteen (13) feet, six (6) inches. When a bridge is required to be used as part of a fire access road, it shall be constructed and maintained in accordance with nationally recognized standards and designed for a live load sufficient to carry a minimum of 75,000 pounds.

The maximum allowable grade shall not exceed 15% except where the topography makes it impractical to keep within such grade, and then an absolute maximum of 20% will be allowed for up to 150 feet in distance. The average maximum allowed grade including topography difficulties shall be no more than 17%. Grade breaks shall not exceed 10% in ten (10) feet. When involved with a subdivision in a city contracting fire protection with the County of Los Angeles Fire Department, requirements for access, fire flows and hydrants are addressed during the subdivision tentative map stage.

Fire sprinkler systems are required in some residential and most commercial occupancies. For those occupancies not requiring fire sprinkler systems, it is strongly suggested that fire sprinkler systems be installed. This will reduce potential fire and life losses. Systems are now technically and economically feasible for residential use.

COMMERCIAL:
Development may require fire flows up to 5,000 gallons per minute at 20 pounds per square inch residual pressure for up to a five-hour duration. Final fire flows will be based on the size of the buildings, their relationship to other structures, property lines, and types of construction used. Fire hydrant spacing shall be 300 feet and shall meet the following requirements:

1. No portion of lot frontage shall be more than 200 feet via vehicular access from a public fire hydrant.

2. No portion of a building shall exceed 400 feet via vehicular access from a properly spaced public fire hydrant.
3. Additional hydrants will be required if hydrant spacing exceeds specified distances.
4. When cul-de-sac depth exceeds 200 feet on a commercial street, hydrants shall be required at the corner and mid-block.
5. A cul-de-sac shall not be more than 500 feet in length when serving land zoned for commercial use.
6. A Fire Department approved turning area shall be provided at the end of a cul-de-sac.

Turning radii shall not be less than 32 feet. This measurement shall be determined at the centerline of the road. A Fire Department approved turning area shall be provided for all driveways exceeding 150 feet in length and at the end of all cul-de-sacs. All on-site driveways shall provide a minimum unobstructed width of 26 feet, clear-to-sky. The on-site driveway is to be within 150 feet of all portions of the exterior walls of the first story of any building. Driveway width for non-residential developments shall be increased when any of the following conditions will exist:

1. Provide 28 feet in width when a building has three or more stories, or is more than 35 feet in height above access level. The height of the building is measured from the lowest point of access to the height of the eaves. Also, for using fire truck ladders, the centerline of the access roadway shall be located parallel to, and within 30 feet of an exterior wall on one side of the proposed structure.
2. Provide 34 feet in width when parallel parking is allowed on one side of the access roadway/driveway. Preference is that such parking is not adjacent to the structure.
3. Provide 42 feet in width when parallel parking is allowed on each side of the access roadway/driveway.
4. Any access way less than 34 feet in width shall be labeled "Fire Lane" on the final recording map, and final building plans.
5. For streets or driveways with parking restrictions: The entrance to the street/driveway and intermittent spacing distances of 150 feet shall be posted with Fire Department approved signs stating "NO PARKING – FIRE LANE" in three-inch high letters. Driveway labeling is necessary to ensure access for Fire Department use.

HIGH-DENSITY RESIDENTIAL:
Development may require fire flows up to 5,000 gallons per minute at 20 pounds per square inch residual pressure for up to a five-hour duration. Final fire flows will be based on the size of the buildings, their relationship to other structures, property lines, and types of construction used. Fire hydrant spacing shall be 300 feet and shall meet the following requirements:

1. No portion of lot frontage shall be more than 200 feet via vehicular access from a public fire hydrant.
2. No portion of a building shall exceed 400 feet via vehicular access from a properly spaced fire hydrant.
3. When cul-de-sac depth exceeds 200 feet, hydrants will be required at the corner and mid-block.
4. Additional hydrants will be required if the hydrant spacing exceeds specified distances.

Turning radii shall not be less than 32 feet. This measurement shall be determined at the centerline of the road. A Fire Department approved turning area shall be provided for all driveways exceeding 150 feet in length and at the end of all cul-de-sacs. When serving land zoned for residential uses having a density of more than four units per net acre:

1. A cul-de-sac shall be a minimum of 34 feet in width and shall not be more than 700 feet in length.
2. The length of the cul-de-sac may be increased to 1,000 feet if a minimum of 36 feet in width is provided.
3. A Fire Department approved turning area shall be provided at the end of a cul-de-sac.

All on-site driveways shall provide a minimum unobstructed width of 26 feet, clear-to-sky. The on-site driveway is to be within 150 feet of all portions of the exterior walls of the first story of any building. The 26 feet width does not allow for parking, and shall be designated as a "Fire Lane," and have appropriate signage. The 26 feet in width shall be increased to:

1. Provide 28 feet in width when a building has three or more stories, or is more than 35 feet in height above access level. The height of the building is measured from the lowest point of access to the height of the eaves. Also, for using fire truck ladders, the centerline of the access roadway shall be located parallel to, and within 30 feet of an exterior wall on one side of the proposed structure.
2. Provide 34 feet in width when parallel parking is allowed on one side of the access way.
3. Provide 36 feet in width when parallel parking is allowed on both sides of the access way.
4. Any access way less than 34 feet in width shall be labeled "Fire Lane" on the final recording map, and final building plans.
5. For streets or driveways with parking restrictions: The entrance to the street/driveway and intermittent spacing distances of 150 feet shall be posted with Fire Department approved signs stating "NO PARKING – FIRE LANE" in three-inch high letters. Driveway labeling is necessary to ensure access for Fire Department use.

SINGLE-FAMILY/TWO-FAMILY DWELLING UNITS:
Single-family detached homes shall require a minimum fire flow of 1,250 gallons per minute at 20 pounds per square inch residual pressure for a two-hour duration. Two-family dwelling units (duplexes) shall require a fire flow of 1,500 gallons per minute at 20 pounds per square inch residual pressure for a two-hour duration. When there are five or more units taking access on a single driveway, the minimum fire flow shall be increased to 1,500 gallons per minute at 20 pounds per square inch residual pressure for a two-hour duration. Fire hydrant spacing shall be 600 feet and shall meet the following requirements:

1. No portion of lot frontage shall be more than 450 feet via vehicular access from a public fire hydrant.
2. No portion of a structure should be placed on a lot where it exceeds 750 feet via vehicular access from a properly spaced public fire hydrant.
3. When cul-de-sac depth exceeds 450 feet on a residential street, hydrants shall be required at the corner and mid-block.
4. Additional hydrants will be required if hydrant spacing exceeds specified distances.

Fire Department access shall be provided to within 150 feet of all portions of the exterior walls of the first story of any single-unit. If exceeding 150 feet, provide 20 feet, paved width "Private Driveway/Fire Lane" clear-to-sky to within 150 feet of all portions of the exterior walls of the unit. Fire Lanes serving 3-4 units shall be increased to 24 feet in width, and if serving five (5) or more units, the Fire Lane shall be increased to 26 feet. A Fire Department approved turning area shall be provided for all driveways exceeding 150 feet in length and at the end of all cul-de-sacs. Streets or driveways within the development shall be provided with the following:

1. Provide 36 feet in width on all collector streets and those streets where parking is allowed on both sides.
2. Provide 34 feet in width on cul-de-sacs up to 700 feet in length. This allows parking on both sides of the street.
3. Provide 36 feet in width on cul-de-sacs from 701 to 1,000 feet in length. This allows parking on both sides of the street.
4. For streets or driveways with parking restrictions: The entrance to the street/driveway and intermittent spacing distances of 150 feet shall be posted with Fire Department approved signs stating "NO PARKING - FIRE LANE" in three-inch high letters. Driveway labeling is necessary to ensure access for Fire Department use.
5. Turning radii shall not be less than 32 feet. This measurement shall be determined at the centerline of the road.
6. A Fire Department approved turning area shall be provided at the end of a driveway of 300 feet or more in length.

LIMITED ACCESS DEVICES (GATES, ETC.):

All access devices and gates shall meet the following requirements:

1. Any single-gated opening used for ingress and egress shall be a minimum of 26 feet in width, clear-to-sky.
2. Any divided gate opening (when each gate is used for a single direction of travel – i.e., ingress or egress) shall be a minimum width of 20 feet clear-to-sky.
3. Gates and/or control devices shall be positioned a minimum of 50 feet from a public right-of-way, and shall be provided with a turnaround having a minimum of 32 feet of turning radius. If an intercom system is used, the 50 feet shall be measured from the right-of-way to the intercom control device.
4. All limited access devices shall be of a type approved by the Fire Department.
5. Gate plans shall be submitted to the Fire Department prior to installation. These plans shall show all locations, widths and details of the proposed gates.

TRAFFIC CALMING MEASURES:

All proposals for traffic calming measures (speed humps/bumps, traffic circles, roundabouts, etc.) shall be submitted to the Fire Department for review prior to implementation. Should any questions arise regarding design and construction, and/or water and access, please contact Inspector Marvin Dorsey at (323) 890-4243.

FORESTRY DIVISION:

The statutory responsibilities of the County of Los Angeles Fire Department, Forestry Division include erosion control, watershed management, rare and endangered species, vegetation, fuel modification for Very High Fire

Hazard Severity Zones or Fire Zone 4, archeological and cultural resources, and the County Oak Tree Ordinance. Potential impacts to these areas should be addressed in the Final Environmental Impact Report.

If you have any additional questions, please contact this office at (323) 890-4330.

Very truly yours,

David R. Leininger

DAVID R. LEININGER, CHIEF, FORESTRY DIVISION
PREVENTION BUREAU

DRL:sc

STATE OF CALIFORNIA – THE RESOURCES AGENCY
GRAY DAVIS, *Governor*

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1416 NINTH STREET, P.O. BOX 942836
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(916) 653-5791

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PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

October 8, 2003

To: Distribution List

The Department of Water Resources has issued the enclosed *Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001* to assist water suppliers, cities, and counties in integrating water and land use planning. The bills were effective January 1, 2002.

Senate Bill 610 (Costa) (Chapter 643, Statutes of 2001) and Senate Bill 221 (Kuehl) (Chapter 642, Statutes of 2001) require that approvals of large new developments be linked to assurances that there is an adequate water supply.

A year ago, DWR issued a Draft Guidebook for SB 610 and SB 221. Cities, counties and water agencies have been using it to achieve compliance with the laws. It provides step by step suggestions for developing detailed information about water supplies and completing the SB 610 water supply assessment and the SB 221 verification of sufficient water supply. Minor revisions and a few clarifications have been added to the Guidebook being issued today.

DWR has no regulatory, permitting or any other approval authority concerning water assessments or verifications of sufficient water supply. The Guidebook is an assistance tool only and has no effect on existing State law. The information provided in the Guidebook is not all-inclusive and is not required to be used. In case of any conflict between suggestions contained in the Guidebook and any applicable laws, those laws shall have precedence.

The Guidebook was developed with input from counties, cities, water agencies, the Bureau of Reclamation, State Department of Real Estate, CALAFCO, Sacramento Local Agency Formation Commission, Water Education Foundation, Planning and Conservation League, California Urban Water Conservation Council, the development community, the bills' sponsor, East Bay Municipal Utility District, and the State Attorney General's Office.

The Guidebook, as well as a list of frequently asked questions with responses, is available on the DWR Office of Water Use Efficiency web site at: http://www.owue.water.ca.gov.

If you have any questions or require additional information, you may contact Dave Todd, of DWR's Office of Water Use Efficiency at: (916) 651-7027 or by e-mail at dtodd@water.ca.gov.

Sincerely,

James Martin for

Michael J. Spear
Interim Director

Enclosure

Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001

to assist water suppliers, cities, and counties in integrating water and land use planning

Prepared by the California Department of Water Resources

October 8, 2003

Note: the Department of Water Resources has no regulatory, permitting or any other approval authority concerning water assessments or verifications of sufficient water supply. This Guidebook is provided only as an assistance tool for land-use agencies and public water systems affected by the legal requirement to prepare water assessments and verifications of sufficient water supply. The information provided in this guidebook is not all-inclusive and is not required to be used. In case of any conflict between suggestions contained in the guidebook, and any applicable laws, those laws shall have precedence.

The California Department of Water Resources (http://wwwdwr.water.ca.gov/) provides assistance to water agencies in implementing the Urban Water Management Planning Act, which is one of the statutes amended by **SB 610.** The Urban Water Management Plan and Urban Water Shortage Contingency Analysis, are also referenced in **SB 221**. As part of its assistance responsibility, DWR has prepared this guidance to assist water suppliers to prepare the water assessments and the written verification of water supply availability required by **SB 610** and **SB 221** respectively.

This material was circulated for comment among all interested parties. Groups that indicated their interest in reviewing materials included:

Association of California Water Agencies
Building Industry Legal Defense Foundation
California Building Industry Association
California Business Properties Association
California Chapter American Planning Association
California Department of Real Estate
California State Association of Counties
California State Attorney General's Office
California Urban Water Agencies
Castaic Lake Water Agency
East Bay Municipal Utility District
Governor's Office of Planning & Research
League of California Cities
Local Government Commission
Metropolitan Water District of Southern California
San Diego County Water Authority
U.S. Bureau of Reclamation

The Department of Water Resources (DWR) plans to revise the guidebook periodically to include new information.

GOVERNOR DAVIS'S MESSAGE UPON SIGNING SB 610 AND SB 221

To the Members of the California Legislature:

I am signing **SB 221** and **SB 610** to advance water supply planning efforts in the State of California. Together, these bills provide an important and necessary foundation for developing comprehensive water policies to prepare California to meet our future water needs.

Most notably, these bills will coordinate local water supply and land use decisions to help provide California's cities, farms and rural communities with adequate water supplies. Additionally, these bills increase requirements and incentives for urban water suppliers to prepare and adopt comprehensive management plans on a timely basis.

While these bills take a significant step toward managing the demand side of California's water equation, more needs to be done to address the need for additional supplies and improved infrastructure.

California's ability to meet its demand for water is further hampered by low rainfall during the past year. It is now necessary to address our water supply and storage needs to ensure that water is not California's next crisis and guarantee our place in the world economy.

Toward that end, I renew my commitment to develop a package of water supply actions to provide reliable and affordable water for California's citizens and the environment. This is why I have recently pledged my support for funding of CALFED programs and activities in the FY 2002 Energy and Water Appropriations bill currently before Congress. Specifically, I re-emphasize the need to aggressively pursue infrastructure projects throughout California including immediate progress on in-Delta storage, expanded Central Valley Project storage in Lake Shasta, expanded storage in Los Vaqueros and Sites reservoirs, additional storage in the upper San Joaquin River watershed, and continued investment in projects that conjunctively use surface and groundwater supplies. Where appropriate, I am directing the Department of Water Resources to assist local water supply agencies to advance these and other important local projects. I am also directing the Department to identify additional modifications to the Urban Water Management Planning Act to ensure adequate local supply and conservation planning.

Sincerely,
GRAY DAVIS
Governor of California

October 8, 2003

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ACKNOWLEDGEMENTS

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* Ms. Sproul and Mr. Stevens participated in the focus group in response to the Department's request and for the purpose of providing information. Their participation does not represent legal advice from the Attorney General in his separate role as counsel to the Department; nor does the Attorney General's Office necessarily advocate any of the recommendations discussed by the focus group.

Introduction

Senate Bills 610 (Chapter 643, Statutes of 2001) and Senate Bill 221 (Chapter 642, Statutes of 2001) amended state law, effective January 1, 2002, to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 and SB 221 are companion measures which seek to promote more collaborative planning between local water suppliers and cities and counties. Both statutes require detailed information regarding water availability to be provided to the city and county decision-makers prior to approval of specified large development projects. Both statutes also require this detailed information be included in the administrative record that serves as the evidentiary basis for an approval action by the city or county on such projects. Both measures recognize local control and decision making regarding the availability of water for projects and the approval of projects.

Under **SB 610**, water assessments must be furnished to local governments for inclusion in any environmental documentation for certain projects (as defined in Water Code 10912 [a]) subject to the California Environmental Quality Act. Under **SB 221**, approval by a city or county of certain residential subdivisions requires an affirmative written verification of sufficient water supply.

If coordinated and comprehensive water supply planning is underway at the time that the **SB 610**-water assessment is prepared, compliance with **SB 221** will be greatly facilitated. **SB 221** is intended as a 'fail safe' mechanism to ensure that collaboration on finding the needed water supplies to serve a new large subdivision occurs when it should – before construction begins.

Not every project that is subject to the requirements of **SB 610** would also require the mandatory water verification of **SB 221** (e.g. if there is no subdivision map approval). Conversely, not every project that is subject to the requirements of **SB 221** would also require the environmental document to contain an **SB 610** water supply assessment. Projects approved before January 1, 2002 were not subject to the requirements of **SB 610** or **SB 221**; however, some projects may have been subject to the requirement to prepare a water supply assessment as set forth in Senate Bill 901 of 1995 (Chapter 881, Statues of 1995).

A foundational document for compliance with both **SB 610** and **SB 221** is the Urban Water Management Plan (UWMP). Both of these statutes repeatedly identify the UWMP as a planning document that, if properly prepared, can be used by a water supplier to meet the standards set forth in both statutes. Thorough and complete UWMPs will allow water suppliers to use UWMPs as a foundation to fulfill the specific requirements of these two statutes. Cities, counties, water districts, property owners, and developers will all be able to utilize this document when planning for and proposing new projects.

UWMPs serve as important source documents for cities and counties as they update their General Plan. Conversely General Plans are source documents as water suppliers update their UWMPs. These planning documents are linked and their accuracy and usefulness are interdependent. It is crucial that cities /counties and water suppliers work closely when developing and updating these planning documents.

Special Recommendations

Because water suppliers face statutory time limits within which to provide water supply information, it is recommended that they check with planning staff from the cities and counties that the suppliers serve to see if the planning staff plan to process project permits requiring either water supply assessments or verifications of sufficient water supply.

It is also recommended that city and county planning staff immediately identify water suppliers serving their land-use planning area and determine the availability of water supply information to facilitate timely compliance with **SB 610** and **SB 221**.

Both **SB 610** and **SB 221** suggest that UWMPs may be a good source of information for developing water assessments and verifications. Therefore, it is recommended that each water supplier review its adopted UWMP to determine if the supply and demand analysis meets the requirements of these two laws, including the substantial evidence required by **SB 221**.

Guidebook Structure

The guidebook is designed to provide step-by-step suggestions for completing an **SB 610** water assessment and an **SB 221** verification of sufficient water supply. It includes commonly accepted definitions and examples of various supply and demand scenarios.

The organization of the guidebook roughly follows the flow charts (see pages iii to vii) that reflect the procedural steps that would need to be undertaken to comply with **SB 610** and **SB 221**.

The guidebook can be printed from a PDF document or viewed on a computer screen. It is recommended that the guidebook be printed and placed in a three-ring binder so the reader can see two pages at once. The layout of the guidebook allows the user to read through the preparation directions on the right-hand page and view the related citations from the statute on the left-hand page.

Throughout the guidebook the term:

- Agency is used to refer to city and county governments for SB221.
- Lead agency is used to refer to city and county governments for **SB 610** .
- Water supplier is used to refer to water agencies, water districts, and other water providers.
- UWMP is used to refer to an Urban Water Management Plan
- Assessment is used to refer to an **SB 610** Water Supply Assessment
- Verification is used to refer to an **SB 221** Verification of Sufficient Water Supply

Italicized text indicates the actual wording of the identified law or statute.

Text surrounded by a border signifies information deserving special attention.

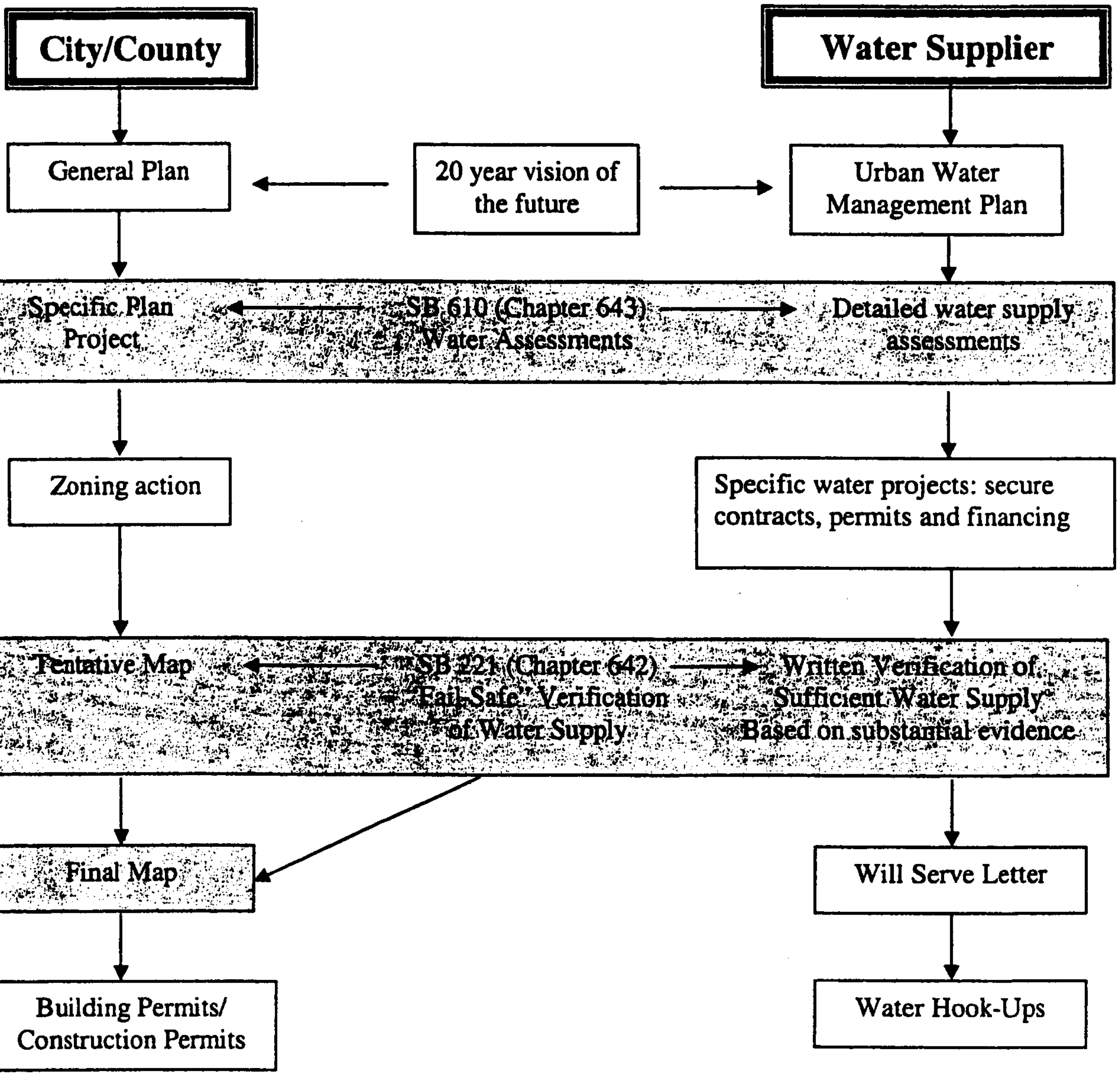
The full texts of **SB 221** and **SB 610** are included as attachments to this document and are available at the web site as either PDF or Microsoft Word documents

Frequently asked questions and responses are located on the Department of Water Resources, Office of Water Use Efficiency web site at: http://www.owue/.

Please provide your suggestions for modifications to these planning tools so that this process continues to improve California's water management and planning capabilities. For assistance and to provide suggestions, please contact the Department of Water Resources, Office of Water Use Efficiency at dtodd@water.ca.gov.

Two laws that integrate land use and water planning

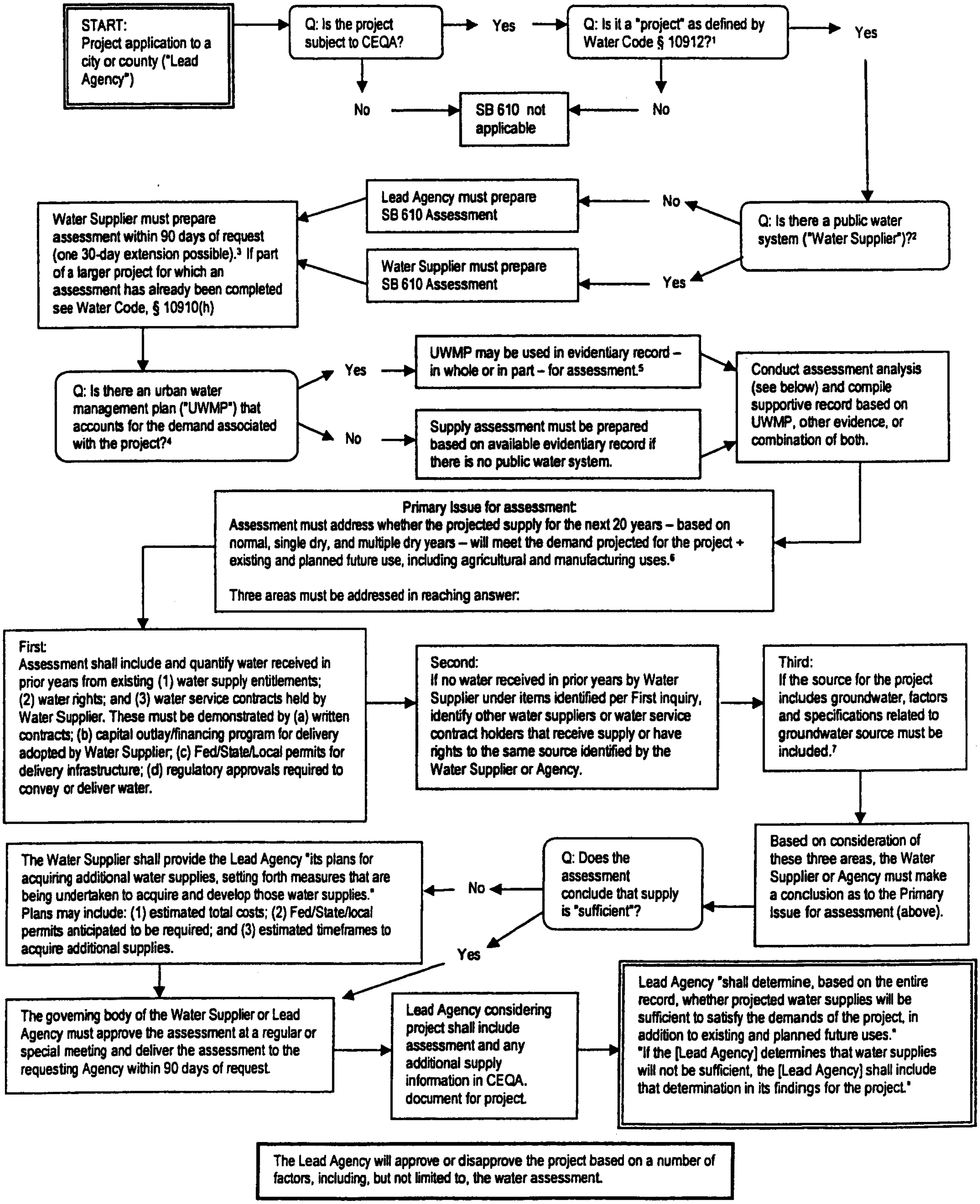
The following chart illustrates the relationship between a local land use agency and a water supplier in their planning processes. The General Plan, prepared by a City or County Planning Department, and the Urban Water Management Plan prepared by a Water Supplier are the critical source documents used to substantiate the information required by **SB 610** and **SB 221** at the local level.



For additional information on either the *California Environmental Quality Act* or General Plan Guidelines, please refer to the publications available from the Governor's Office of Planning and Research at: www.opr.ca.gov.

For information and guidance related to the *Urban Water Management Planning Act*, please refer to the Department of Water Resources, Office of Water Use Efficiency available at: http://www.owue/.

SB 610 Flowchart



START:
Project application to a city or county ("Lead Agency")

Q: Is the project subject to CEQA?

Q: Is it a "project" as defined by Water Code § 10912?[1]

SB 610 not applicable

Q: Is there a public water system ("Water Supplier")?[2]

Lead Agency must prepare SB 610 Assessment

Water Supplier must prepare SB 610 Assessment

Water Supplier must prepare assessment within 90 days of request (one 30-day extension possible).[3] If part of a larger project for which an assessment has already been completed see Water Code, § 10910(h)

Q: Is there an urban water management plan ("UWMP") that accounts for the demand associated with the project?[4]

UWMP may be used in evidentiary record – in whole or in part – for assessment.[5]

Supply assessment must be prepared based on available evidentiary record if there is no public water system.

Conduct assessment analysis (see below) and compile supportive record based on UWMP, other evidence, or combination of both.

Primary Issue for assessment:
Assessment must address whether the projected supply for the next 20 years – based on normal, single dry, and multiple dry years – will meet the demand projected for the project + existing and planned future use, including agricultural and manufacturing uses.[6]

Three areas must be addressed in reaching answer:

First:
Assessment shall include and quantify water received in prior years from existing (1) water supply entitlements; (2) water rights; and (3) water service contracts held by Water Supplier. These must be demonstrated by (a) written contracts; (b) capital outlay/financing program for delivery adopted by Water Supplier; (c) Fed/State/Local permits for delivery infrastructure; (d) regulatory approvals required to convey or deliver water.

Second:
If no water received in prior years by Water Supplier under items identified per First inquiry, identify other water suppliers or water service contract holders that receive supply or have rights to the same source identified by the Water Supplier or Agency.

Third:
If the source for the project includes groundwater, factors and specifications related to groundwater source must be included.[7]

Based on consideration of these three areas, the Water Supplier or Agency must make a conclusion as to the Primary Issue for assessment (above).

Q: Does the assessment conclude that supply is "sufficient"?

The Water Supplier shall provide the Lead Agency "its plans for acquiring additional water supplies, setting forth measures that are being undertaken to acquire and develop those water supplies." Plans may include: (1) estimated total costs; (2) Fed/State/local permits anticipated to be required; and (3) estimated timeframes to acquire additional supplies.

The governing body of the Water Supplier or Lead Agency must approve the assessment at a regular or special meeting and deliver the assessment to the requesting Agency within 90 days of request.

Lead Agency considering project shall include assessment and any additional supply information in CEQA. document for project.

Lead Agency "shall determine, based on the entire record, whether projected water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses."
"If the [Lead Agency] determines that water supplies will not be sufficient, the [Lead Agency] shall include that determination in its findings for the project."

The Lead Agency will approve or disapprove the project based on a number of factors, including, but not limited to, the water assessment.

Chart Courtesy of the
The Building Industry Legal Defense

Notes for SB 610 Flowchart

Footnote 1:
California Water Code section 10912.
For the purposes of this part, the following terms have the following meanings:

(a) "Project" means any of the following:

(1) A proposed residential development of more than 500 dwelling units.
(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
(4) A proposed hotel or motel, or both, having more than 500 rooms.
(5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.
(6) A mixed-use project that includes one or more of the projects specified in this subdivision.
(7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

(b) If a public water system has fewer than 5,000 service connections, then "project" means any proposed residential, business, commercial, hotel or motel, or industrial development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections, or a mixed-use project that would demand an amount of water equivalent to, or greater than, the amount of water required by residential development that would represent an increase of 10 percent or more in the number of the public water system's existing service connections.

Footnote 2:
California Water Code section 10912.
(c) "Public water system" means a system for the provision of piped water to the public for human consumption that has 3,000 or more service connections. A public water system includes all of the following:

(1) Any collection, treatment, storage, and distribution facility under control of the operator of the system which is used primarily in connection with the system.
(2) Any collection or pretreatment storage facility not under the control of the operator that is used primarily in connection with the system.
(3) Any person who treats water on behalf of one or more public water systems for the purpose of rendering it safe for human consumption. It also means a system that will become a public water supplier if the project puts it over 3,000 service connections.

Footnote 3:
California Water Code section 10910, subdivision (g)(1).

Footnote 4:
The requirement for and contents of an urban water management plan are provided in California Water Code section 10631, as amended by SB 610 in 2001.

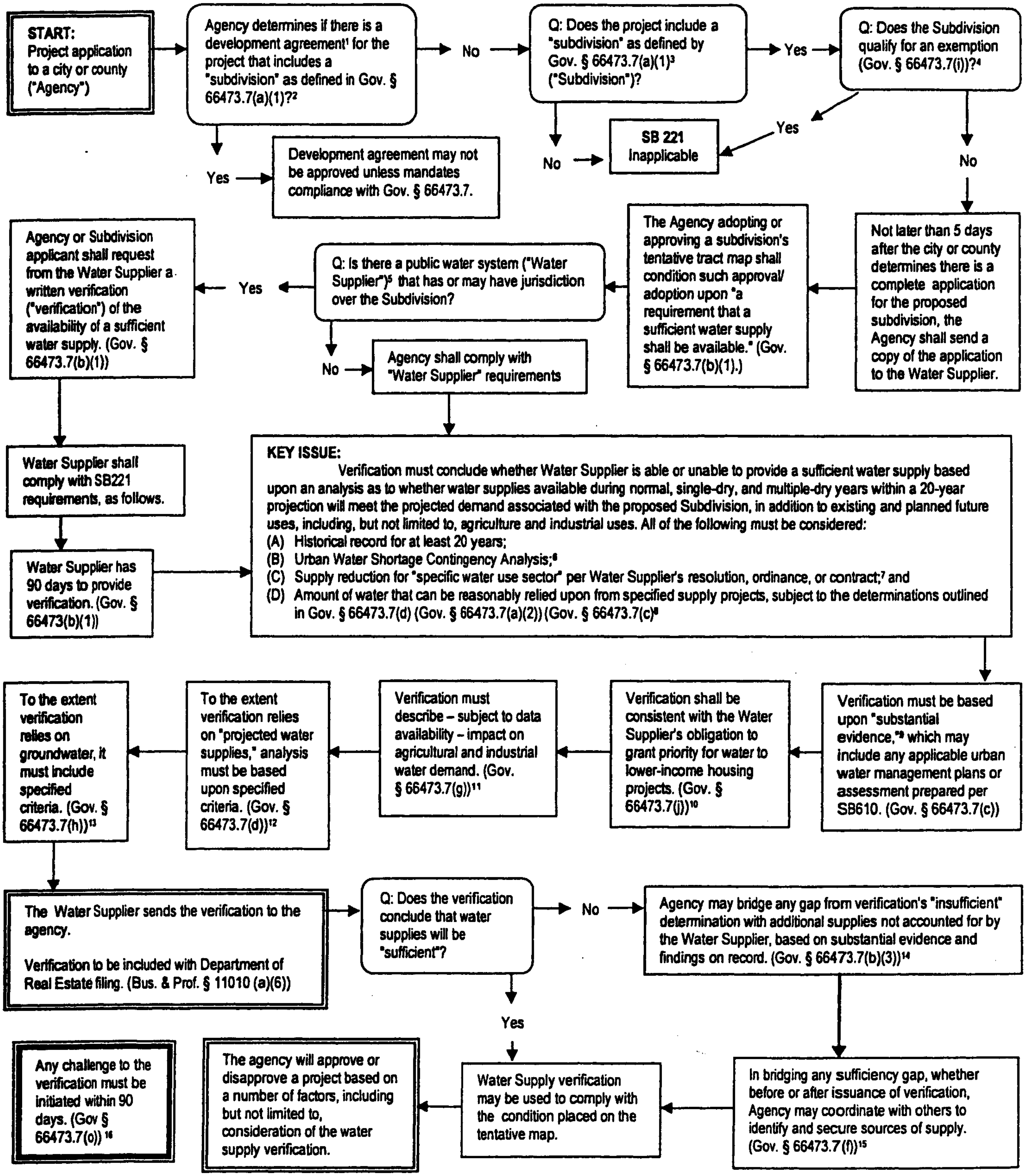
Footnote 5:
California Water Code section 10910, subdivision (c)(2) provides that the UWMP may be used, but it may or may not provide all of the information needed.

Footnote 6:
See California Water Code section 10910, subdivisions (c)(3) & (4); see also Government Code section 66473.7, subdivision (a)(2) [SB 221]

Footnote 7:
California Water Code section 10910, subdivision (f):
(f) If a water supply for a proposed project includes groundwater, the following additional information shall be included in the water assessment:

(1) A review of any information contained in the urban water management plan relevant to the identified water supply for the proposed project.
(2) A description of any groundwater basin or basins from which the proposed project will be supplied. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), of the efforts being undertaken in the basin or basins to eliminate the long-term overdraft condition.
(3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), for the past five years from any groundwater basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.
(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), from any basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.
(5) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project. A water assessment shall not be required to include the information required by this paragraph if the public water system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial and projected water demand associated with the project was addressed in the description and analysis required by paragraph (4) of subdivision (b) of Section 10631.

SB 221 Flowchart



START: Project application to a city or county ("Agency")

Agency determines if there is a development agreement[1] for the project that includes a "subdivision" as defined in Gov. § 66473.7(a)(1)?[2]

Development agreement may not be approved unless mandates compliance with Gov. § 66473.7.

Q: Does the project include a "subdivision" as defined by Gov. § 66473.7(a)(1)[3] ("Subdivision")?

SB 221 Inapplicable

Q: Does the Subdivision qualify for an exemption (Gov. § 66473.7(i))?[4]

Not later than 5 days after the city or county determines there is a complete application for the proposed subdivision, the Agency shall send a copy of the application to the Water Supplier.

The Agency adopting or approving a subdivision's tentative tract map shall condition such approval/ adoption upon "a requirement that a sufficient water supply shall be available." (Gov. § 66473.7(b)(1).)

Q: Is there a public water system ("Water Supplier")[5] that has or may have jurisdiction over the Subdivision?

Agency shall comply with "Water Supplier" requirements

Agency or Subdivision applicant shall request from the Water Supplier a written verification ("verification") of the availability of a sufficient water supply. (Gov. § 66473.7(b)(1))

Water Supplier shall comply with SB221 requirements, as follows.

Water Supplier has 90 days to provide verification. (Gov. § 66473(b)(1))

KEY ISSUE:
Verification must conclude whether Water Supplier is able or unable to provide a sufficient water supply based upon an analysis as to whether water supplies available during normal, single-dry, and multiple-dry years within a 20-year projection will meet the projected demand associated with the proposed Subdivision, in addition to existing and planned future uses, including, but not limited to, agriculture and industrial uses. All of the following must be considered:

(A) Historical record for at least 20 years;
(B) Urban Water Shortage Contingency Analysis;[6]
(C) Supply reduction for "specific water use sector" per Water Supplier's resolution, ordinance, or contract;[7] and
(D) Amount of water that can be reasonably relied upon from specified supply projects, subject to the determinations outlined in Gov. § 66473.7(d) (Gov. § 66473.7(a)(2)) (Gov. § 66473.7(c)[8]

Verification must be based upon "substantial evidence,"[9] which may include any applicable urban water management plans or assessment prepared per SB610. (Gov. § 66473.7(c))

Verification shall be consistent with the Water Supplier's obligation to grant priority for water to lower-income housing projects. (Gov. § 66473.7(j))[10]

Verification must describe – subject to data availability – impact on agricultural and industrial water demand. (Gov. § 66473.7(g))[11]

To the extent verification relies on "projected water supplies," analysis must be based upon specified criteria. (Gov. § 66473.7(d))[12]

To the extent verification relies on groundwater, it must include specified criteria. (Gov. § 66473.7(h))[13]

The Water Supplier sends the verification to the agency.

Verification to be included with Department of Real Estate filing. (Bus. & Prof. § 11010 (a)(6))

Q: Does the verification conclude that water supplies will be "sufficient"?

Agency may bridge any gap from verification's "insufficient" determination with additional supplies not accounted for by the Water Supplier, based on substantial evidence and findings on record. (Gov. § 66473.7(b)(3))[14]

In bridging any sufficiency gap, whether before or after issuance of verification, Agency may coordinate with others to identify and secure sources of supply. (Gov. § 66473.7(f))[15]

Water Supply verification may be used to comply with the condition placed on the tentative map.

The agency will approve or disapprove a project based on a number of factors, including but not limited to, consideration of the water supply verification.

Any challenge to the verification must be initiated within 90 days. (Gov § 66473.7(o))[16]

Chart Courtesy of the
The Building Industry Legal Defense Foundation

Notes for SB 221 Flowchart

Footnote 1: Gov. Code § 65867.5

Footnote 2: "Subdivision" is defined as follows per Government Code § 66473.7(a)(1): " 'Subdivision" means a proposed residential development of more than 500 dwelling units, except that for a public water system that has fewer than 5,000 service connections, "subdivision" means any proposed residential development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections." See Government Code § 65867.5(c). (development agreements)

Footnote 3: See note 2.

Footnote 4: Gov. Code § 66473.7(i) provides an exemption for "infill" or "low-income or very-low-income" housing subdivisions as follows: "This section shall not apply to any residential project proposed for a site that is within an urbanized area and has been previously developed for urban uses, or where the immediate contiguous properties surrounding the residential project site are, or previously have been, developed for urban uses, or housing projects that are exclusively for very low and low-income households."

Footnote 5: " 'Public water system' means the water supplier that is, or may become as a result of servicing the subdivision included in a tentative map pursuant to subdivision (b), a public water system, as defined in Section 10912 of the Water Code, that may supply water for a subdivision." (Gov. Code §66473.7(a)(3).) There may be one water supplier for a given project. For example there may be different providers for potable water versus reclaimed water versus groundwater.

Footnote 6: The Urban Water Shortage Contingency Analysis may be prepared pursuant to Water Code § 10632.

Footnote 7: Supply reduction resolution, ordinance, or contract may not conflict with Water Code § 354.

Footnote 8: Specifically, "The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d)." (Gov. Code § 66473.7(a)(2)(D).) Subdivision (d) addresses evidentiary requirements for "projected" water supplies, and these requirements are listed in note 13.

Footnote 9: "The applicable public water system's written verification of its ability or inability to provide a sufficient water supply that will meet the projected demand associated with the proposed subdivision as required by subdivision (b) shall be supported by substantial evidence. The substantial evidence may include, but is not limited to, any of the following:

(1) The public water system's most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610) of Division 6 of the Water Code.
(2) A water assessment that was completed pursuant to Part 2.10 (commencing with Section 10910) of Division 6 of the Water Code.
(3) Other information relating to the sufficiency of the water supply that contains analytical information that is substantially similar to the assessment required by Section 10635 of the Water Code." (Gov. Code § 66473.7(c).)

Footnote 10: "The determinations made pursuant to this section shall be consistent with the obligation of a public water system to grant a priority for the provision of available and future water resources or services to proposed housing developments that help meet the city's or county's share of the regional housing needs for lower income households, pursuant to Section 65589.7." (Gov. Code § 66473.7(j).)

Footnote 11: "The written verification prepared under this section shall also include a description, to the extent that data is reasonably available based on published records maintained by federal and state agencies, and public records of local agencies, of the reasonably foreseeable impacts of the proposed subdivision on the availability of water resources for agricultural and industrial uses within the public water system's service area that are not currently receiving water from the public water system but are utilizing the same sources of water. To the extent that those reasonably foreseeable impacts have previously been evaluated in a document prepared pursuant to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) or the National Environmental Policy Act (Public Law 91-190) for the proposed subdivision, the public water system may utilize that information in preparing the written verification." (Gov. Code § 66473.7(g).)

Footnote 12: "When the written verification pursuant to subdivision (b) relies on projected water supplies that are not currently available to the public water system, to provide a sufficient water supply to the subdivision, the written verification as to those projected water supplies shall be based on all of the following elements, to the extent each is applicable:

(1) Written contracts or other proof of valid rights to the identified water supply that identify the terms and conditions under which the water will be available to serve the proposed subdivision.
(2) Copies of a capital outlay program for financing the delivery of a sufficient water supply that has been adopted by the applicable governing body.
(3) Securing of applicable federal, state, and local permits for construction of necessary infrastructure associated with supplying a sufficient water supply.
(4) Any necessary regulatory approvals that are required in order to be able to convey or deliver a sufficient water supply to the subdivision." (Gov. Code § 66473.7(d).)

Footnote 13: "Where a water supply for a proposed subdivision includes groundwater, the public water system serving the proposed subdivision shall evaluate, based on substantial evidence, the extent to which it or the landowner has the right to extract the additional groundwater needed to supply the proposed subdivision. Nothing in this subdivision is intended to modify state law with regard to groundwater rights." (Gov. Code § 66473.7(h).)

Footnote 14: "If the written verification provided by the applicable public water system indicates that the public water system is unable to provide a sufficient water supply that will meet the projected demand associated with the proposed subdivision, then the local agency may make a finding, after consideration of the written verification by the applicable public water system, that additional water supplies not accounted for by the public water system are, or will be, available prior to completion of the subdivision that will satisfy the requirements of this section. This finding shall be made on the record and supported by substantial evidence."(Gov. Code. § 66473.7(b)(3).)

Footnote 15: "In making any findings or determinations under this section, a local agency, or designated advisory agency, may work in conjunction with the project applicant and the public water system to secure water supplies sufficient to satisfy the demands of the proposed subdivision. If the local agency secures water supplies pursuant to this subdivision, which supplies are acceptable to and approved by the governing body of the public water system as suitable for delivery to customers, it shall work in conjunction with the public water system to implement a plan to deliver that water supply to satisfy the long-term demands of the proposed subdivision." (Gov. Code § 66473.7(f).)

Footnote 16: "Any action challenging the sufficiency of the public water system's written verification of a sufficient water supply shall be governed by Section 66499.37." (Gov. § 66473.7(o).) Government Section 66499.37 states: "Any action or proceeding to attack, review, set aside, void or annul the decision of an advisory agency, appeal board or legislative body concerning a subdivision, or of any of the proceedings, acts or determinations taken, done or made prior to such decision, or to determine the reasonableness, legality or validity of any condition attached thereto, shall not be maintained by any person unless such action or proceeding is commenced and service of summons effected within 90 days after the date of such decision. Thereafter all persons are barred from any such action or proceeding or any defense of invalidity or unreasonableness of such decision or of such proceedings, acts or determinations. Any such proceeding shall take precedence over all matters of the calendar of the court except criminal.

October 8, 2003

Main Section

Section 1 - Code citations Does SB 610 or SB 221 apply to the proposed development?

SB 610

Water Code section 10910

(a) Any city or county that determines that a project, as defined in Section 10912, is subject to the California Environmental Quality Act Division 13 (commencing with Section 21000) of the Public Resources Code, under Section 21080 of the Public Resources Code shall comply with this part.

Water Code section 10912

For the purposes of this part, the following terms have the following meanings:

(a) "Project" means any of the following:

- *(1) A proposed residential development of more than 500 dwelling units.*
- *(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.*
- *(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.*
- *(4) A proposed hotel or motel, or both, having more than 500 rooms.*
- *(5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.*
- *(6) A mixed-use project that includes one or more of the projects specified in this subdivision.*
- *(7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.*

(b) If a public water system has fewer than 5,000 service connections, then "project" means any proposed residential, business, commercial, hotel or motel, or industrial development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections, or a mixed-use project that would demand an amount of water equivalent to, or greater than, the amount of water required by residential development that would represent an increase of 10 percent or more in the number of the public water system's existing service connections.

SB 221

Government Code section 65867.5

(c) A development agreement that includes a subdivision, as defined in section 66473.7, shall not be approved unless the agreement provides that any tentative map prepared for the subdivision will comply with the provisions of section 66473.7.

Government Code section 66473.7

(a) For the purposes of this section, the following definitions apply:

- *(1) "Subdivision" means a proposed residential development of more than 500 dwelling units, except that for a public water system that has fewer than 5,000 service connections, "subdivision" means any proposed residential development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections.*

(b) (1) The legislative body of a city or county or the advisory agency, to the extent that it is authorized by local ordinance to approve, conditionally approve, or disapprove the tentative map, shall include as a condition in any tentative map that includes a subdivision a requirement that a sufficient water supply shall be available. Proof of the availability of a sufficient water supply shall be requested by the subdivision applicant or local agency, at the discretion of the local agency, and shall be based on written verification from the applicable public water system within 90 days of a request.

(i) This section shall not apply to any residential project proposed for a site that is within an urbanized area and has been previously developed for urban uses, or where the immediate contiguous properties surrounding the residential project site are, or previously have been, developed for urban uses, or housing projects that are exclusively for very low and low-income households.

Section 1 Does SB 610 or SB 221 apply to the proposed development?

Lead Agency (City or County) receives project application or complete application for a proposed subdivision.

Is the project subject to SB 610?

1-1 Is the project subject to CEQA? Water Code § 10910(a) Yes ☐ No ☐
If no, see **SB 221** question 1-3, below
If yes, continue

1-2 Is it a "project" as defined by Water Code § 10912(a) or (b)? Yes No
If yes, to comply with **SB 610 go to Section 2, page 4 (SB 221** may also apply – see below)
If no, see **SB 221** question 1-3 below

Note: In determining whether a project would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project, it is generally acknowledged that one acre-foot of water can serve two to three households on an annual basis; therefore, one dwelling unit typically consumes .3 to .5 acre-feet of water per year, depending upon several factors, including the regional climate. An agency should contact its local water supplier to obtain its advice on the annual water demand for a development within the local community in order to determine whether the water demand for the development under consideration is equivalent to the water demand of a 500 dwelling unit project. Water Code § 10912 (a)(7)

While Water Code § 10912(a) provides that a "project" may include a residential development of 500 or more dwelling units, Water Code § 10912(b) provides a "sliding scale" for determining the size of a project to which **SB 610** would apply, below 500 dwelling units. Since Section 10912(b) provides that a "project" is a proposed development that would increase the number of service connections for a public water system (which currently has fewer than 5,000 service connections) by 10 percent or more, a "project" could be as few as 300 dwelling units. For example, a water utility that has 3,000 service connections would experience an increase in the number of service connections by 10% if it were required to serve a proposed residential development of 300 units, thus making the 300-unit development a "project" under **SB 610**. Similarly, for water utilities that have more than 3,000 service connections, but fewer than 5,000 service connections, the "10 percent test" in Water Code § 10912(b) would apply in determining whether a proposed development is a "project" under **SB 610**.

Is the project subject to SB 221?

1-3 Does the tentative map include a "subdivision" as defined by Government Code § 66473.7(a)(1)? Yes No

If yes, continue, go to **Section 9, Page 40**
If no, stop

Note: Government Code § 66473.7(a) provides that a "subdivision" consists of 500 or more dwelling units in order to be subject to **SB 221**, except that for a public water system that has fewer than 5,000 service connections, Government Code § 66473.7(a) provides a "sliding scale" for determining the number of dwelling units that would constitute a "subdivision," below 500 dwelling units. Because Government Code § 66473.7(a) provides that a "subdivision" for a public water system with fewer than 5,000 service connections is a proposed development that would increase the number of service connections for a public water system by 10 percent or more, a "subdivision" could be as few as 300 dwelling units. For example a water utility that has 3,000 service connections would experience an increase in the number of service connections by 10 percent if it were required to serve a proposed residential development of 300 units, thus making the 300-unit development a "subdivision" under **SB 221**. Similarly, for water utilities that have more than 3,000 service connections, but fewer than 5,000 service connections, the "10% test" in Government Code § 66473.7(a) would apply in determining whether a proposed development is a "subdivision" under **SB 221**.

If neither **SB 610** nor **SB 221** applies, **Stop** – no further action required by **SB 610** or **SB 221**

Note: Special Provisions apply for San Diego County agencies and water suppliers. See Section 17, page 80 for more information. Government Code § 66473.7(k)

Section 2 - Code citations Who will prepare the SB 610 assessment?

Water Code section 10910
(b) The city or county, at the time that it determines whether an environmental impact report, a negative declaration, or a mitigated negative declaration is required for any project subject to the California Environmental Quality Act pursuant to Section 21080.1 of the Public Resources Code, shall identify any water system that is, or may become as a result of supplying water to the project identified pursuant to this subdivision, a public water system, as defined in Section 10912, that may supply water for the project. If the city or county is not able to identify any public water system that may supply water for the project, the city or county shall prepare the water assessment required by this part after consulting with any entity serving domestic water supplies whose service area includes the project site, the local agency formation commission, and any public water system adjacent to the project site.

Water Code section 10912
(c) "Public water system" means a system for the provision of piped water to the public for human consumption that has 3,000 or more service connections. A public water system includes all of the following:
- *(1) Any collection, treatment, storage, and distribution facility under control of the operator of the system which is used primarily in connection with the system.*
- *(2) Any collection or pretreatment storage facility not under the control of the operator that is used primarily in connection with the system.*
- *(3) Any person who treats water on behalf of one or more public water systems for the purpose of rendering it safe for human consumption.*

Water Code section 10910
(c) (1) The city or county, at the time it makes the determination required under Section 21080.1 of the Public Resources Code, shall request each public water system identified pursuant to subdivision (b) to determine whether the projected water demand associated with a proposed project was included as part of the most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610).
- *(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).*

Water Code section 10910
(g) (1) Subject to paragraph (2), the governing body of each public water system shall submit the assessment to the city or county not later than 90 days from the date on which the request was received. The governing body of each public water system, or the city or county if either is required to comply with this act pursuant to subdivision (b), shall approve the assessment prepared pursuant to this section at a regular or special meeting.
- *(2) Prior to the expiration of the 90 day period, if the public water system intends to request an extension of time to prepare and adopt the assessment, the public water system shall meet with the city or county to request an extension of time, which shall not exceed 30 days, to prepare and adopt the assessment.*
- *(3) If the public water system fails to request an extension of time, or fails to submit the assessment notwithstanding the extension of time granted pursuant to paragraph (2), the city or county may seek a writ of mandamus to compel the governing body of the public water system to comply with the requirements of this part relating to the submission of the water assessment.*

Section 2 Who will prepare the SB 610 assessment?

2-1 Is there a public water system ("water supplier") for the project? Water Code § 10910(b)

Yes No

A public water system that currently has fewer than 3,000, but would have 3,000 or more service connections as a result of providing water to the proposed project is required to prepare an assessment (Water Code § 10910(b), 10912((b), 10912(c)). Close attention will need to be paid to the number of existing service connections and the number of proposed service connections as a result of serving the proposed development, as well as the percentage increase in the number of service connections, in order to determine whether the water utility is a "public water system" and whether the proposed development is a "project" under **SB 610**. For example, a water utility with fewer than 3,000 service connections may become a "public water system" as a result of supplying water to the proposed development. In other words, a water utility with 2,700 existing service connections would become a "public water system" if it were to serve a proposed development of 400 dwelling units, and an increase in the number of service connections by 400 would also represent a greater than 10% increase in service connections for the water utility, thus making the proposed development subject to an **SB 610** water supply assessment by the water utility.

A public water system is defined in the Water Code as a system that has 3,000 or more service connections and provides piped water to the public for human consumption. Water Code § 10912(c)

SB 610 (Water Code § 10912(c)) defines "public water system" as a water utility with 3,000 or more service connections. In addition, **SB 610** requires the city or county to identify the water system that is, or may become as a result of supplying water to the project, a public water system (Water Code § 10910(b)). This provision suggests that a water utility with fewer than 3,000 service connections currently could become a "public water system" if the number of service connections associated with the new development would increase the number of service connections served by the water utility to more than 3,000.

If no, the lead agency must prepare an **SB 610** assessment. Water Code § 10910(b) – **go to Section 3, page 6**
If the lead agency is unable to identify a water supplier (public water system as defined in **SB 610**), the lead agency is responsible for compliance with the requirements of **SB 610**. Prior to preparing the assessment, the lead agency is required to consult with the following:

- Any entity serving domestic water supplies whose service area includes the project site
- The Local Agency Formation Commission
- Any public water system adjacent to the project site

Even though a water supplier may not be a "public water system" or become a "public water system" as a result of serving the proposed project, it will still be involved, in a consultation role, in the preparation of the assessment. Similarly, even though the water supplier's service area may not include the project site, as long as its service area is adjacent to the project site, it will still be involved, in a consultation role, in the preparation of the assessment.

If yes, lead agency shall request each water supplier to determine whether the projected water demand associated with the proposed project was accounted for in the most recently adopted Urban Water Management Plan. If not, or if the water supplier has no Urban Water Management Plan, the lead agency shall request the water supplier to prepare an **SB 610** assessment. Water Code § 10910(c)

Go to Section 3, page 6

The water supplier must prepare the assessment within 90 days of request. The water supplier may request the lead agency to grant one 30-day extension. Water Code § 10910(g)

a) The statute does not specify a time limit on the preparation of an assessment by the lead agency, if the lead agency is undertaking the assessment because there is no identified water supplier.
b) If the assessment is not received from the water supplier within the prescribed 90-day period, and any requested time extension, the lead agency may seek legal relief. Water Code § 10910(g)(1)(2)(3)

Has an assessment already been prepared that includes this project?

Water Code section 10910

(h) Notwithstanding any other provision of this part, if a project has been the subject of a water assessment that complies with the requirements of this part, no additional water assessment shall be required for subsequent projects that were part of a larger project for which a water assessment was completed and that has complied with the requirements of this part and for which the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has concluded that its water supplies are sufficient to meet the projected water demand associated with the proposed project, in addition to the existing and planned future uses, including, but not limited to, agricultural and industrial uses, unless one or more of the following changes occurs:

1. *Changes in the project that result in a substantial increase in water demand for the project.*
2. *Changes in the circumstances or conditions substantially affecting the ability of the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), to provide a sufficient supply of water for the project.*
3. *Significant new information becomes available which was not known and could not have been known at the time when the assessment was prepared.*

Section 3 Has an assessment already been prepared that includes this project?

3-1 Has this project already been the subject of an assessment? Water Code § 10910(h) Yes No

If no, water supplier or lead agency must prepare **SB 610** assessment. Water Code § 10910(b)
go to Section 4, page 8

If yes, and ALL of the five factors listed below apply:

- the preparer of the assessment determines that it complies with the requirements of **SB 610**
- the assessment determined that sufficient water was available for the project
- there has been no change to the project that would result in a substantial increase in demand
- there has been no change in the circumstances or conditions which substantially affect the ability of the water supplier to provide a sufficient supply of water for the project
- no new information which might affect the assessment has becomes available

then, no additional assessment is required for this project for which the original assessment was prepared.

Assessment is complete – Stop

Note: The completed assessment is ready for inclusion in the environmental documentation for the project.

Otherwise, if any of the five factors do not apply, then an assessment is required.

Continue, go to Section 4, page 8

The preparer of the verification or the assessment may be a water suppler, city or county. Wherever the term "water supplier" appears, the term "preparer" of the verification or assessment also applies.

Is there a current Urban Water Management Plan?

Water Code section 10910

(c) (1) The city or county, at the time it makes the determination required under Section 21080.1 of the Public Resources Code, shall request each public water system identified pursuant to subdivision (b) to determine whether the projected water demand associated with a proposed project was included as part of the most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610).

(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

(3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

(4) If the city or county is required to comply with this part pursuant to subdivision (b), the water assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

Section 4 Is there a current Urban Water Management Plan?

4-1 Is there an adopted urban water management plan (UWMP)? Water Code § 10910(c)
Yes No

If no, assessment must be prepared based on available information. Water Code § 10910(c)(3)
Read following note and **go to Section 5, page 10**

If the water supplier will prepare the **SB 610** assessment (Water Code § 10910(c)(3), without the benefit of a UWMP, the assessment shall include a determination as to whether the water supplier's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

If the lead agency will prepare the **SB 610** assessment (Water Code § 10910(c)(4), the assessment shall include a discussion as to whether the total projected water supplies, determined to be available during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

If yes, continue

4-2 Is the projected water demand for the project accounted for in the most recent UWMP?
Water Code § 10910(c)(2) Yes No

If yes, information from the UWMP related to the projected water demand for the project may also be used for carrying out Section 5, Steps 1 and 2, and Section 7, as outlined in this guidance manual.
Go to Section 5, page 10

If no, assessment must be prepared based on either information contained within the UWMP and/or information available from other sources and reports. Water Code § 10910(c)(3)
Go to Section 5, page 10

Section 5 - Code citations What information should be included in an assessment?

Water Code section 10910

(c) (2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

(3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

(4) If the city or county is required to comply with this part pursuant to subdivision (b), the water assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

(d)(1) The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts.

(2) An identification of existing water supply entitlements, water rights, or water service contracts held by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall be demonstrated by providing information related to all of the following:

(A) Written contracts or other proof of entitlement to an identified water supply.

(B) Copies of a capital outlay program for financing the delivery of a water supply that has been adopted by the public water system.

(C) Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply.

(D) Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.

(e) If no water has been received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts, the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall also include in its water assessment pursuant to subdivision (c), an identification of the other public water systems or water service contract holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts, to the same source of water as the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has identified as a source of water supply within its water assessments.

Section 5 What information should be included in an assessment?

This section is written as if the water supplier is preparing the water assessment. If a lead agency is preparing the assessment, the same approach is used but the water supplies are those identified by the lead agency as available to meet the project's water demands. (Examples will be provided of how a lead agency assessment will differ from a water supplier assessment.)

The question to be answered is:
Will the water supplier's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection meet the projected water demand of the proposed project, in addition to the water supplier's existing and planned future uses, including agricultural and manufacturing uses?

If the water demand for the proposed project was accounted for in the most recently adopted UWMP, information from the UWMP related to the projected water demand for the project may also be used for carrying out Section 5, Steps 1 and 2, and Section 7, as outlined in this guidance manual. Water Code § 10910(c)(2)

The Urban Water Management Planning Act (Water Code § 10631 – see Appendix C) requires the supplier to document water supplies available during normal, single dry, and multiple dry water years during a 20-year projection and the existing and projected future water demand during a 20-year projection. The Act requires that the projected supplies and demands be presented in 5-year increments for the 20-year projection.

If the water demand for the proposed project was **NOT** accounted for in the most recently adopted UWMP,

- The water supplier must prepare an assessment that includes a discussion of whether the total projected water supplies determined to be available for the project during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the water supplier's existing and planned future uses, including agricultural and manufacturing uses.
- A city or county, if not able to identify a public water system that may supply water for the project, must prepare an assessment that includes a discussion of whether the total projected water supplies determined to be available for the project during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses. Water Code § 10910 subdivisions (b) and (c)(3) and (4)

Supplies from all sources, including wholesaler supplies, require documentation. This documentation includes identifying and quantifying water rights, contracts, and/or entitlements to the supply; associated capital outlay programs; federal, state and local permits for constructing infrastructure for conveying the supply; and any necessary regulatory approvals required for conveyance.

Section 5 - Code Citations

Step One: Documenting wholesale water supplies

Water Code section 10910

(d)(1) The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts.

(2) An identification of existing water supply entitlements, water rights, or water service contracts held by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall be demonstrated by providing information related to all of the following:

- *(A) Written contracts or other proof of entitlement to an identified water supply.*
- *(B) Copies of a capital outlay program for financing the delivery of a water supply that has been adopted by the public water system.*
- *(C) Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply.*
- *(D) Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.*

(e) If no water has been received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts, the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall also include in its water assessment pursuant to subdivision (c), an identification of the other public water systems or water service contract holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts, to the same source of water as the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has identified as a source of water supply within its water assessments.

Section 5

Step One: Documenting wholesale water supplies

This section describes the documentation necessary for wholesale water supplies in **SB 610** water assessments.

Many retail water suppliers in California receive supplies from one or more water wholesalers. Under **SB 610**, retail water suppliers are responsible for providing the water assessment to the local agencies. In most cases, the retail water supplier will have better information on the supply availability and system constraints for a particular development project.

Under the requirements of Water Code § 10910 (d), retail water suppliers must document wholesale supplies by:

1) Describing the quantities of water received from each wholesaler in prior years.
2) Identifying any existing entitlements, water rights, and water service contracts held by the retail water supplier for the wholesale supply.
3) Providing written contracts or other proof of entitlements, water rights and service contracts for the wholesaler's supplies; copies of relevant capital outlay programs; federal, state and local permits for construction of necessary infrastructure associated with delivering the wholesale supplies, if any, and; regulatory approvals required in order to convey or deliver the wholesale supply.

If the retail water supplier has not received water supplies from the wholesaler in prior years, then Water Code § 10910 (e), Section 5, Step 2, page 16, may apply.

The retail water supplier should coordinate with the wholesaler in assembling the information necessary to meet the provisions for documenting wholesale supplies. Wholesalers may take varying roles in assisting retail agencies. One possible role is for the wholesaler to fully document its own supplies and demands for the wholesale supplies relied upon in the assessment. In some cases the wholesale supplier's most recent UWMP and related documents may provide valuable information in assembling the information required for the water assessment. Whatever the level of assistance, information provided by a wholesaler will only form one part of the retail water supplier's overall supply assessment.

In situations where one wholesaler sells water to another wholesaler, (sometimes referred to as a "sub-wholesaler"), the retail water supplier should coordinate gathering the necessary information on its wholesale supply with the sub-wholesaler. This may include gathering documentation from both wholesalers' Urban Water Management Plans and/or supplemental reports.

Documentation for groundwater supply is discussed below, see Section 5, Step 2. page 18.

Section 5 - Code Citations

Step Two: Documenting supply

See previous Code citations page

Section 5

Step Two: Documenting supply

Identify and quantify the existing and planned sources of water available to the water supplier in 5-year increments for the 20-year projection. For each identified supply detail the quantity available and whether it is a:

(1) water supply entitlement
(2) water right
(3) water service contract

If any of the listed water sources have never have been used by the water supplier, demonstrate that the source is available by identifying other water suppliers or contract holders that receive and have rights, entitlements, or contracts to the same source. In addition, provide detailed information relating to the following:

(a) written contracts or other proof of entitlement to the source
(b) capital outlay/financing program for delivery adopted by the water supplier
(c) federal/state/local permits for delivery infrastructure
(d) regulatory approvals required to convey or deliver water

Sample Table 1 is an example of how supply source information might be summarized. It will be important to provide a detailed description of each source.

Table 1 Annual amount under each right, entitlement, and/or contract

Supply	AFY	Entitlement	Right	Contract	Ever used
Local Surface	9,300	X			Yes
Wholesaler 1	No limit			X	Yes
Wholesaler 2	4,900			X	No
Groundwater	2,300		X		Yes

Sample Table 2 is an example of how an assessment might summarize the past, current and projected deliveries from each supply source. It is important to develop realistic delivery projections. The entitlement, right or contract amount might overstate or understate the quantity of water that can actually be delivered during normal years. For instance, a contract may be for 5,000 acre feet per year but an additional 2,000 acre feet per year may be available until 2015 due to other contractors not needing full deliveries until that time.

Table 2 Quantify water received in normal year – actual and projected (not maximum possible)

Water Supply Sources	1980	1985	1990	1995	2000	2005	2010	2015	2020
Wholesaler (identify)									
Wholesaler (identify)									
Groundwater									
Local surface water									
Transfers									
Exchanges (in or out)									
Reclaimed Water									
Other (identify)									
Total									

Section 5 - Code citations
Step Two: Documenting supply
If groundwater is a source

Water Code section 10910

(f) If a water supply for a proposed project includes groundwater, the following additional information shall be included in the water assessment:

(1) A review of any information contained in the urban water management plan relevant to the identified water supply for the proposed project.

(2) A description of any groundwater basin or basins from which the proposed project will be supplied. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), of the efforts being undertaken in the basin or basins to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), for the past five years from any groundwater basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), from any basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(5) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project. A water assessment shall not be required to include the information required by this paragraph if the public water system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial and projected water demand associated with the project was addressed in the description and analysis required by paragraph (4) of subdivision (b) of Section 10631.

Section 5
Step Two: Documenting Supply
If groundwater is a source

If the water sources that will serve the project include groundwater, specific groundwater information must be included in the assessment. Amendments to the Urban Water Management Planning Act (Water Code § 10631 effective January 1, 2002) specify the data necessary to document available groundwater supplies. Water Code § 10631 and Water Code § 10910, effective January 1, 2002, require similar information, Water Code § 10910 limits the groundwater discussion to the basin or basins that will serve the proposed project. Groundwater information provided in response to Water Code § 10631 will generally also meet the groundwater requirements contained in Water Code § 10910 if the same basin(s) is (are) addressed. Water Code § 10631 adds a further requirement: "A detailed description and analysis of the location, amount, and sufficiency of groundwater that is projected to be pumped by the urban water supplier." In addition, a parallel reference to the "sufficiency analysis" is also found in Water Code § 10910(f)(5): "An analysis of the sufficiency of the groundwater from the basin...to meet the projected water demand associated with the proposed project." It is recognized that many suppliers updated their UWMPs before January 1, 2002. Therefore, the plans may not include the groundwater information needed for the assessment. Suppliers can update the UWMP to include the groundwater information, or prepare a separate groundwater assessment for the water supply assessment that could also be a basis for a subsequent update to the UWMP.

Groundwater details (for the basin or basins which will provide water for the proposed project) required to be included in the UWMP include:

(a) Specify if a groundwater management plan or any other specific authorization for groundwater management for the basin has been adopted and how it affects the water supplier's use of the basin.

(b) The description of the groundwater basin may be excerpted from the groundwater management plan, from DWR Bulletin 118, California's Ground Water, or from some other document that has been published and that discusses the basin boundaries, type of rock that constitutes the aquifer, variability of the aquifer material, and total groundwater in storage (average specific yield times the volume of the aquifer).

(c) In an adjudicated basin the amount of water the urban supplier has the legal right to pump should be enumerated in the court decision - attach a copy of the order or decree.

(d) The Department of Water Resources has projected estimates of overdraft, or "water shortage," based on projected amounts of water supply and demand (basin management), at the hydrologic region level in Bulletin 160, California Water Plan Update. Estimates at the basin or subbasin level will be projected for some basins in Bulletin 118. If the basin has not been evaluated by DWR, data that indicate groundwater level trends over a period of time should be collected and evaluated.

(e) If the evaluation indicates an overdraft due to existing groundwater extraction, or projected increases in groundwater extraction, describe actions and/or program designed to eliminate the long term overdraft condition .

(f) If water supplier wells are plotted on a map, or are available from a geographic information system, the amount of water extracted by the water supplier for the past five years can be obtained from the Department of Health Services, Office of Drinking Water and Environmental Management. A useful DHS website is: http://www.dhs.cahwnet.gov/ps/ddwem/dwsap/DWSAPindex.htm

(g) Description and analysis of the amount and location of groundwater pumped by the water supplier for the past five years. Include information on proposed pumping locations and quantities. . The description and analysis is to be based on information that is reasonably available, including, but not limited to, historic use records from DWR, and from other sources.

(h) Analysis of the location, amount, and sufficiency of groundwater that is projected to be pumped by the water supplier.

SB 610 (Water Code § 10910(f)(5)) requires the water supplier to make a determination of the sufficiency of the groundwater from the basin to be used to supply the proposed project. If a determination that includes the proposed project was included in the Urban Water Management Plan, and that information is included in the assessment, no further data is required.

Section 5 - Code citations

Step Two: Documenting supply

If the assessment relies on water supplies never before used

Water Code section 10910

(e) If no water has been received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts, the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall also include in its water assessment pursuant to subdivision (c), an identification of the other public water systems or water service contract holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts, to the same source of water as the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has identified as a source of water supply within its water assessments.

Section 5

Step Two: Documenting supply

If the assessment relies on water supplies never before used

If a water supplier, city or county identified existing water supply entitlements, rights, or contracts under which no water has been received in prior years, as a source of water supply for the proposed project in its assessment, it will need to identify other public water systems or water service contractors that receive a water supply, have existing entitlements, water rights, or water service contracts to the same source of water.

Section 5 - Code citations
Step Three: Documenting project demand (Project Demand Analysis)

Water Code section 10910

(c) (2) *If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).*

(3) *If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.*

Water Code section 10631 (Urban Water Management Plan Requirements)

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:
(A) Single-family residential.
(B) Multifamily.
(C) Commercial.
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.
(2) The water use projections shall be in the same five-year increments described in subdivision (a).

Section 5

Step Three: Documenting project demand (Project Demand Analysis)

SB 610 requires that an assessment document the water demand for existing uses, planned future uses and the proposed development.

Note:
If the proposed development was included as part of the projected water demand of the current Urban Water Management Plan, the water demand for the proposed development does not need to be separately analyzed as long as water demand for the purpose of the project has remained substantially the same.

The law (Water Code § 10910(c)(2)) states that if the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the water supplier may incorporate the requested information from the urban water management plan in preparing the assessment. The Urban Water Management Planning Act (Water Code § 10631) clearly specifies the data necessary to document the existing and projected future water demand during a -twenty year projection. The code requires that the projected demands be presented in five-year increments for the twenty year projection.

Section 5 - Code citations

Step Three: Documenting project demand (Project Demand Analysis)

Definitions

None

Section 5

Step Three: Documenting project demand (Project Demand Analysis)

Definitions

The following definitions of existing uses, planned future uses, proposed project use and agricultural and industrial uses are provided for your consideration only. Both **SB 610** and **SB 221** emphasize local control and decision-making and the information provided in this guidebook is not intended to infringe upon the planning discretion of the water supplier or lead agency.

Existing uses – demand related to current customers, and system uses/losses, during normal years (uses during single dry and multiple dry years will be discussed in Section 5, Step 4). Usually this projection will take account of historic use (during non-dry) years as well as any recent changes in demand characteristics, i.e., changes in per capita use, percentage of use by customer type, demographic variability, etc.).

Planned future uses – the lead agency, as the land-use agency, has information on planned development. Regular communication between the water supplier and lead agency will be essential to ensuring an accurate determination of sufficiency of water supply for future demand.

Planned future uses may include:

- projects that are expected to be completed during the same time frame as the proposed project. These include all new demands ranging from an individual single-family home to large-scale developments.
- proposed developments that have a reserved (or entitlement to) future water supply and are considered to be moving towards construction. Proposed projects that are included in a general or specific plan need not be included if the lead agency determines that they are not likely to begin construction during the period under consideration.
- projects which are not subject to local planning regulation – for example, US military installations, University of California, reservation lands of federally recognized Indian tribes, or lands held in trust for those tribes, etc.

Neither **SB 610**, nor **SB 221** defines planned future uses. However, it would be a reasonable interpretation that planned future uses are those that would be undertaken within the same time frame as the project under consideration. Each preparer of an assessment will determine what planned future uses it will include in the demand calculation to ensure that it is not identifying the same increment of water for more than one future use.

Section 5 - Code citations
Step Three: Documenting project demand (Project Demand Analysis)
Detailing existing and planned future uses

Water Code section 10910

(c) (2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

(3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection <u>will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.</u>

Water Code section 10631

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:
(A) Single-family residential.
(B) Multifamily.
(C) Commercial.
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.
(2) The water use projections shall be in the same five-year increments described in subdivision (a).

Section 5

Step Three: Documenting project demand (Project Demand Analysis)

Detailing existing and planned future uses

A variety of demographic factors may affect water use. The Urban Water Management Planning Act lists several demographic factors to be detailed including current and projected population, climate, density, and the mix of customer types. The assessment may detail water use per identified water use sector as reported in the Urban Water Management Planning Act. The sectors are single-family residential, multifamily, commercial, industrial, institutional and governmental, landscape, sales to other agencies, agricultural and other (saline water intrusion barriers, groundwater recharge, conjunctive use, etc.). Showing the past, current and projected water use by sector is an effective way to show growth patterns. This allows a water supplier to more accurately predict future demand.

The following tables are provided as an example of how to present this type of data. These tables allow the required five-year increments for the 20-year projection to be clearly presented.

Population projections

Year	2000	2005	2010	2015	2020
Population					

Climate data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
avg precip													
avg temp													
ETO													

Water-use Sectors – use in acre-feet* per year, actual and projected

Customer type	**1990**	**1995**	**2000**	**2005**	**2010**	**2015**	**2020**
Single Family							
Multifamily							
Commercial							
Industrial							
Institutional / gov.							
Landscape Irrigation							
Wholesale							
Agricultural							
Other (specify)							
TOTAL							

*1 AF = 325,851 gallons/year (often demand in new projects is figured in gallons).
Tables with **bold** column headings represent information required by SB 610.

Water-use Sectors – number of connections, actual and projected (Not required by **SB 610**)

Customer type	1990	1995	2000	2005	2010	2015	2020
Single Family							
Multifamily							
Commercial							
Industrial							
Institutional / gov.							
Landscape Irrigation							
Wholesale							
Agricultural							
Other (specify)							
TOTAL							

Section 5 - Code citations

Step Four: Documenting dry year(s) supply

Water Code section 10910

(c) (2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

Section 5

Step Four: Documenting dry year(s) supply

Section 5 - Code citations

Step Four: Documenting dry year(s) supply

Documenting dry year(s) supply for water suppliers with multiple sources

Water Code section 10910

(c) (2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

Water Code section 10631 (Urban Water Management Plan requirements)

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(1) An average water year.
(2) A single dry water year.
(3) Multiple dry water years.

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

Note: Water Code section 10632 requires that the Urban Water Management Plan include a water shortage contingency analysis.

Water Code section 10632 (Urban Water Management Plan requirements)

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier: (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage. (b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply. (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster. (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning. (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply. (f) Penalties or charges for excessive use, where applicable. (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments. (h) A draft water shortage contingency resolution or ordinance. (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

Section 5

Step Four: Documenting dry(s) year supply

Documenting dry year(s) supply for water suppliers with multiple sources

Single dry and multiple dry years are usually based on historic records from the watersheds that determine the water conditions to a particular supply. The information is often presented as a probability of exceedance or probability of occurrence, as discussed in the example below. Many water suppliers have multiple sources. One way to show how the total supply would be affected is to document how each individual supply will be affected by single dry and multiple dry years.

Example

Probability based estimates for Drake Reservoir supplies have been estimated in a similar manner as those for wholesaler supplies. The Drake Reservoir estimates are based on historical District supplies and the County's Big River Model. This model uses hydrologic data for the period of 1917 through 1993 to estimate reservoir water levels and system yields to the Drake Reservoir member agencies. Based on a review of this data, the District can expect to receive a supply of 9,321 acre feet per year during wet and normal years. During dry years (10 percent probability of occurrence) the Drake Reservoir supply is estimated to be 9,200 acre feet per year. During critical dry years (3 percent probability of occurrence) Drake Reservoir supplies are estimated to be 7,000 acre feet per year. The combined effects of Wholesaler and Drake Reservoir cutbacks on District water supplies are summarized below.

Percent Likelihood	Wet Year 30%	Normal Year 60%	Dry Year 10%	Critical Drought Year 3%
Demand (AFY)	15,000	16,000	17,000	17,000
Supply				
Groundwater	1,500	2,100	3,100	2,300
Drake Reservoir	9,421	9,421	9,200	7,000
West Water Project	4,500	4,500	2,500	1,700
Total	15,421	16,021	14,800	11,000

Projected supply (AF) available by source for single-dry and multiple-dry years

Source	Normal	Single Dry	Multiple - 2	Multiple - 3	Multiple - 4
Local Surface	9,300				
Wholesaler 1	NA				
Wholesaler 2	4,900				
Groundwater	1,100	2,300	2,300		
TOTAL					

Section 5 - Code citations
Step Five: Documenting dry year(s) demand

Water Code section 10910

(c) (2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

Water Code section 10631 (Urban Water Management Plan requirements)

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:
- *(1) An average water year.*
- *(2) A single dry water year.*
- *(3) Multiple dry water years.*

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

Note: Water Code section 10632 requires that the Urban Water Management Plan include a water shortage contingency analysis.

Water Code section 10632 (Urban Water Management Plan requirements)

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier: (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage. (b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply. (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster. (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning. (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply. (f) Penalties or charges for excessive use, where applicable. (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments. (h) A draft water shortage contingency resolution or ordinance. (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

Section 5

Step Five: Documenting dry year(s) demand

Water use patterns change during dry years. Document expected changes to water demand by sector.

Water-use Sectors – use in acre-feet per year, projected

Customer type	Normal	Single dry	Multiple - 2	Multiple - 3
Single Family				
Multifamily				
Commercial				
Industrial				
Institutional / gov.				
Landscape Irrigation				
Wholesale				
Agricultural				
Other (specify)				
TOTAL				

Section 6 - Code citations Is the projected water supply sufficient or insufficient for the proposed project?

Water Code section 10910

(c) (2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

(3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

Section 6 Is the projected water supply sufficient or insufficient for the proposed project?

Compare current and projected supply and demand for normal, single dry and multiple dry years. Water suppliers may want to make this comparison with and without the proposed project demand so that the impact of the project is clearly articulated. The tables provide examples of format.

Comparison of current supply and demand for normal, single dry and multiple dry years

Current Supply & Demand	**Normal**	**Single dry**	**Multiple 2**	**Multiple 3**	**Multiple 4**
Supply total					
Demand total					
Demand total (including proposed project)					
Difference					
Difference (including proposed project)					

Comparison of 20 year projection of supply and demand for normal, single dry and multiple dry years

2025 Supply & Demand	**Normal**	**Single dry**	**Multiple 2**	**Multiple 3**	**Multiple 4**
Supply total					
Demand total					
Demand total (including proposed project)					
Difference					
Difference (including proposed project)					

Water Supply and Demand Comparison table presents a comparison of the District's potable and raw water supplies and demands.

Normal Year by source – current and projected water supply and demand comparison (acre feet per year)

Water Demands	2000	2005	2010	2015	2020
Potable Water	13,040	13,680	14,310	14,930	15,540
Raw Water	810	810	810	810	810
Reclaimed Reduction	0	0	-100	-200	-280
Total	13,850	14,490	15,020	15,540	16,070
Total (including proposed project)					
Water Supply					
Drake Reservoir	9,421	9,421	9,421	9,421	9,421
West Water Project	4,500	4,500	4,500	4,500	4,500
Wells	0	2,300	2,300	2,300	2,300
Total	13,921	16,221	16,221	16,221	16,221
Surplus or (Deficiency)	71	1,731	1,201	681	151
Surplus or (Deficiency) (including proposed project)					

Section 7 - Code citations If the projected supply is determined to be insufficient

Water Code section 10910

(g) (1) Subject to paragraph (2), the governing body of each public water system shall submit the assessment to the city or county not later than 90 days from the date on which the request was received. The governing body of each public water system, or the city or county if either is required to comply with this act pursuant to subdivision (b), shall approve the assessment prepared pursuant to this section at a regular or special meeting.

Water Code section 10911

(a) If, as a result of its assessment, the public water system concludes that its water supplies are, or will be, insufficient, the public water system shall provide to the city or county its plans for acquiring additional water supplies, setting forth the measures that are being undertaken to acquire and develop those water supplies. If the city or county, if either is required to comply with this part pursuant to subdivision (b), concludes as a result of its assessment, that water supplies are, or will be, insufficient, the city or county shall include in its water assessment its plans for acquiring additional water supplies, setting forth the measures that are being undertaken to acquire and develop those water supplies. Those plans may include, but are not limited to, information concerning all of the following:

- *(1) The estimated total costs, and the proposed method of financing the costs, associated with acquiring the additional water supplies.*
- *(2) All federal, state, and local permits, approvals, or entitlements that are anticipated to be required in order to acquire and develop the additional water supplies.*
- *(3) Based on the considerations set forth in paragraphs (1) and (2), the estimated timeframes within which the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), expects to be able to acquire additional water supplies.*

Section 7 If the projected supply is determined to be insufficient

7-1 Does the assessment conclude that supply is "sufficient"? Yes No

If yes, water supplier governing body must approve assessment and deliver to lead agency
Water Code § 10910(g)(1) – **go to Section 8, page 38**

The governing body of the water supplier must approve the assessment at a regular or special meeting and deliver the assessment to the requesting lead agency within 90 days of request.

If no, water supplier must include in its assessment its plan to acquire additional water supplies, and the water supplier governing body must approve the assessment and deliver it to the lead agency within 90 days of the request. Water Code § 10911(a)
continue

The water supplier must provide the lead agency "its plans for acquiring additional water supplies, setting forth measures that are being undertaken to acquire and develop those water supplies." Plans may include (1) estimated total costs; (2) federal/state/local permits anticipated to be required; and (3) estimated timeframes to acquire additional supplies.

Note: Water Code § 10911(a) dealing with a water supplier's plans to acquire additional supplies, calls for planning information which is similar to the information which must be provided in the assessment for existing supplies. (See Water Code § 10910(d)(2).) However, actions for acquiring new supplies, which are reflected in such plans, may or may not have progressed to the point of detailed planning or to the point at which compliance with CEQA would be required. The water supplier should indicate the status or stage of development of the actions identified in the plans it provides. Identification of a potential future action in such plans does not by itself indicate that a decision to approve, or to proceed with, the action has been made. If projected supplies are included in the water supply assessment and will be relied upon for a subdivision which will be subject to the provisions of **SB 221**, those projected supplies must also meet the requirements of Gov. Code § 6647.7(d). See discussion at Section 13, Step 1, page 55.

Lead agency, **go to Section 8, page 38**

Water supplier, **Stop – SB 610** responsibilities are complete

Example of "Plans for Acquiring Additional Water Supplies"

Gravel Creek Groundwater Storage Project

SOURCE OF SUPPLY
The Gravel Creek Groundwater Storage Project (Gravel Creek Project) is planned to supply up to 500 acre-feet annually during normal and up to 1,500 acre-feet dry year conditions. During wet and/or surplus years, Bayside would replenish the groundwater with Drake Reservoir spill water and, if necessary, water purchases from outside the County.

EXPECTED SUPPLY CAPABILITY
It is estimated that the Gravel Creek aquifer can hold up to 20,000 acre-feet of additional water. This water could be extracted during normal and dry year conditions at a rate between 500 and 1,500 acre-feet per year.

Section 7 - Code citations (continued)

If the projected supply is determined to be insufficient

See previous Code citations page

RATIONALE FOR EXPECTED SUPPLY

As a part of the Bayside supply strategy, the Gravel Creek Project could be used to meet normal year demands and to provide a dry-year buffer to meet demands when other supplies are reduced.

Program Facilities: The Gravel Creek Project would consist of four new injection wells and six new production wells.

Historical Record: Bayside's Board of Directors implemented the Gravel Creek Project in April 1999.

Written Contracts or Other Proof: The Gravel Creek Project has been implemented as a component of Bayside's Supply Reliability Plan. The following Actions have occurred:

- 1998 Memorandum of Understanding (MOU) between Bayside and the U. S. Bureau of Reclamation (USBR). This MOU describes the agreement by USBR to provide Bayside with up to 2,000 acre-feet annually of surplus spill water from Drake Reservoir
- April 1999 Board of Directors Adoption of the CEQA Document (Mitigated Negative Declaration) for the Gravel Creek Project at their regularly scheduled Board of Directors meeting
- June 2000 Board of Directors approved the Gravel Creek Project and appropriated an additional $1.35 million for land acquisition, design, water quality monitoring, additional aquifer testing and other tasks. The Board authorized storage of up to 20,000 acre-feet of water, to begin in 2002

Financing: The capital cost of the Gravel Creek Project is estimated to be $2.7 million. This budget is included in Bayside's ten-year capital budget and would be financed through a combination of bonds and water sales revenue.

Federal, State and Local Permits for Construction: Bayside has applied for the appropriate federal, state and local permits for construction and operation of the project. For example, Bayside is currently conducting long-term water quality baseline monitoring in support of a possible Source Water Permit application from the Department of Health Services. One injection and one production well were completed in accordance with New Albion County permitting procedures. These are examples of permits that might be needed, but for each project a determination needs to be made as to what permits are required for the particular proposal.

Final SB 610 assessment actions by lead agency

Water Code section 10911

(b) The city or county shall include the water assessment provided pursuant to Section 10910, and any information provided pursuant to subdivision (a), in any environmental document prepared for the project pursuant to Division 13 (commencing with Section 21000) of the Public Resources Code.

(c) The city or county may include in any environmental document an evaluation of any information included in that environmental document provided pursuant to subdivision (b). The city or county shall determine, based on the entire record, whether projected water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses. If the city or county determines that water supplies will not be sufficient, the city or county shall include that determination in its findings for the project.

Section 8 Final SB 610 assessment actions by lead agency

The lead agency shall review the water supplier assessment of supply and must decide whether additional water supply information is needed for its consideration of the proposed project.

The lead agency must include the water supply assessment in the Negative Declaration or Draft Environmental Impact Report (environmental document) prepared for the project pursuant to Division 13 (commencing with Section 21000) of the Public Resources Code. The lead agency may include in the environmental documentation the lead agency's evaluation of the assessment, additional supply information and any related documents.

If the lead agency decides that the water supply is insufficient, or the assessment from the water supplier concludes that the water supply for the proposed project is insufficient, the lead agency may still approve the project but it must include that determination, based on the entire record, in the findings for the project. It must include substantial evidence in the record to support its approval of the project.

The lead agency "shall determine, based on the entire record, whether projected water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses." The lead agency will approve or disapprove a project based on a number of factors, including but not limited to the water supply assessment.

Reminder: Environmental Impact Reports and Negative Declarations that contain a water supply assessment pursuant to § 110911(b) of the Water Code must also be sent to the State Clearinghouse in the Governor's Office of Planning and Research at: P.O. Box 3044, Sacramento, CA 95812-3044 pursuant to California Code of Regulations § 15205 and 15206.

Section 9 - Code citations Does SB 221 apply to this subdivision?

Government Code section 65867.5
(a) A development agreement is a legislative act that shall be approved by ordinance and is subject to referendum.

(b) A development agreement shall not be approved unless the legislative body finds that the provisions of the agreement are consistent with the general plan and any applicable specific plan.

(c) A development agreement that includes a subdivision, as defined in Section 66473.7, shall not be approved unless the agreement provides that any tentative map prepared for the subdivision will comply with the provisions of Section 66473.7.

Government Code section 66473.7
(a) For the purposes of this Section, the following definitions apply:
  (1) ''Subdivision'' means a proposed residential development of more than 500 dwelling units, except that for a public water system that has fewer than 5,000 service connections, ''subdivision'' means any proposed residential development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections.

Government Code section 66473.7.
(i) This Section shall not apply to any residential project proposed for a site that is within an urbanized area and has been previously developed for urban uses, or where the immediate contiguous properties surrounding the residential project site are, or previously have been, developed for urban uses, or housing projects that are exclusively for very low and low-income households.

Section 9 Does SB 221 apply to this subdivision?

Agency Action

Agency receives a project application for a residential development

Is the project subject to SB 221?

9-1 Is there a development agreement for the project that includes a "subdivision" as defined in Government Code § 66473.7 (a)(1) Yes No

If yes, the development agreement shall not be approved unless the agreement provides that any tentative map prepared for the subdivision will comply with the provisions of Government Code § 66473.7, **continue**

If no, continue

9-2 Does the project include a "subdivision" as defined by Government Code § 66473.7(a)(1)? Yes No

If no, stop - SB 221 does not apply.

If yes, continue

Note: Government Code § 66473.7(a)(3), **SB 221** defines "public water system" as the water supplier that is, **or may become as a result of servicing the subdivision included in the tentative map,** a public water system as defined in Water Code section 10912. A water utility with fewer than 3,000 service connections currently would become a "public water system" if the number of service connections associated with the new subdivision would increase the number of service connections served by the water utility to more than 3,000.

Note: Government Code § 66473.7(a) provides that a "subdivision" consisting of 500 or more dwelling units is subject to **SB 221**, except that for a public water system that has fewer than 5,000 service connections, Government Code § 66473.7(a) provides a "sliding scale" for determining the number of dwelling units below 500 that would constitute a "subdivision," subject to **SB 221**. Because Government Code § 66473.7(a) provides that a "subdivision" for a public water system with fewer than 5,000 service connections is a proposed development that would increase the number of service connections for a public water system by 10% or more, a "subdivision" could be as few as 300 dwelling units. For example a water utility that has 3,000 service connections would experience an increase in the number of service connections by 10% if it were required to serve a proposed residential development of 300 units, thus making the 300-unit development a "subdivision" under **SB 221**. Similarly, for water utilities that have more than 3,000 service connections, but fewer than 5,000 service connections, the "10% test" in Government Code § 66473.7(a) would apply in determining whether a proposed development is a "subdivision" under **SB 221**.

The agency adopting or approving subdivision's tentative tract map shall condition such approval/adoption upon "a requirement that a sufficient water supply shall be available." Government Code § 66473.7(b)(1)

Section 10 - Code citations Is the subdivision exempt from SB 221?

Government Code section 66473.7

(i) This Section shall not apply to any residential project proposed for a site that is within an urbanized area and has been previously developed for urban uses, or where the immediate contiguous properties surrounding the residential project site are, or previously have been, developed for urban uses, or housing projects that are exclusively for very low and low-income households.

Section 10 Is the subdivision exempt from SB 221?

Agency Action

10-1 Is the project in an urbanized area or exclusively for low-income households? Yes No

If no, carefully review the text of subsection (i) and consult with the local land use planning agency. Government Code. § 66473.7(i)

If no, go to Section 11, page 44

If yes, substantiate, **continue**

10-2 Is the residential project exempt from **SB 221** because it is within an urbanized area and has been previously developed for urban uses? Government Code § 66473.7(i) Yes No

or

10-3 Is the project proposed for a site where the immediate contiguous properties surrounding the residential project site are, or previously have been, developed for urban uses? Government Code § 66473.7(i) Yes No

SB 221 emphasizes local decision-making regarding these two definitions.

Urbanized area and urban uses

1. The determination as to whether a project would qualify for the exemption will depend on how the agency defines "urbanized area" and "urban uses." Public Resources Code § 21071 contains a definition of "urbanized areas" which the local agencies may choose to use in determining whether or not a project is in an "urbanized area". Water suppliers should contact their local agency to determine how the terms "urbanized area" and "urban uses" are defined within the local community.

Very low and low-income households

2. Local governments define very low and low-income households in their general plan, specifically in the locally adopted Housing Element. The definition of very low and low income households is usually based on definitions established by the U.S. Department of Housing and Urban Development (HUD) and California Health and Safety Code § 50079.5, §50105, and §50093. Please see the California Department of Housing and Community Development (HCD) website for more details (http://www.hcd.ca.gov/). If the entire project falls under the categories as defined by HUD and HCD, then the proposed subdivision is exempt from **SB 221**. (Public Resources Code § 71080.14(b); See also Public Resources Code § 21080.10(c)(3) and § 21080.7(b)(2).)

If yes, document that the exemption criteria are met and **stop** - no further action required by **SB 221**

If no, the agency shall not approve any final map prepared for the subdivision until the agency governing body has received a written verification that satisfies the condition regarding a sufficient water supply that was placed on the tentative map.

Continue

To complete a **SB 221** verification **continue to Section 11, page 44**

Section 11 - Code citations Who will prepare the SB 221 verification of sufficient water supply?

Government Code section 66473.7

(a) (3) ''Public water system'' means the water supplier that is, or may become as a result of servicing the subdivision included in a tentative map pursuant to subdivision (b), a public water system, as defined in Section 10912 of the Water Code, that may supply water for a subdivision.

Water Code section 10912

(c) "Public water system" means a system for the provision of piped water to the public for human consumption that has 3,000 or more service connections. A public water system includes all of the following:(1)Any collection, treatment, storage, and distribution facility under control of the operator of the system which is used primarily in connection with the system.(2)Any collection or pretreatment storage facility not under the control of the operator that is used primarily in connection with the system.(3)Any person who treats water on behalf of one or more public water systems for the purpose of rendering it safe for human consumption.

Government Code section 66455.3.

Not later than five days after a city or county has determined that a tentative map application for a proposed subdivision, as defined in Section 66473.7, is complete pursuant to Section 65943, the local agency shall send a copy of the application to any water supplier that is, or may become, a public water system, as defined in Section 10912 of the Water Code, that may supply water for the subdivision.

Government Code section 66473.7

(b) (1) The legislative body of a city or county or the advisory agency, to the extent that it is authorized by local ordinance to approve, conditionally approve, or disapprove the tentative map, shall include as a condition in any tentative map that includes a subdivision a requirement that a sufficient water supply shall be available. Proof of the availability of a sufficient water supply shall be requested by the subdivision applicant or local agency, at the discretion of the local agency, and shall be based on written verification from the applicable public water system within 90 days of a request.

(2) If the public water system fails to deliver the written verification as required by this section, the local agency or any other interested party may seek a writ of mandamus to compel the public water system to comply.

(4) If the written verification is not provided by the public water system, notwithstanding the local agency or other interested party securing a writ of mandamus to compel compliance with this section, then the local agency may make a finding that sufficient water supplies are, or will be, available prior to completion of the subdivision that will satisfy the requirements of this section. This finding shall be made on the record and supported by substantial evidence.

(e) If there is no public water system, the local agency shall make a written finding of sufficient water supply based on the evidentiary requirements of subdivisions (c) and (d) and identify the mechanism for providing water to the subdivision.

Section 11 Who will prepare the SB 221 verification of sufficient water supply?

Agency Action

11-1 Is there a water supplier that has or may have jurisdiction over the subdivision? Yes No

A water supplier that currently has fewer than 3,000 connections, but would have 3,000 or more connections as a result of providing water to the proposed project, is required to prepare a verification (Water Code § 10912(b), 10912(c)). Additionally, a water utility with fewer than 3,000 service connections may become a "public water system" as a result of supplying water to the proposed development (Government Code § 66473.7(a)(3). For example, a water utility with 2,700 existing service connections would become a "public water system" if it were to serve a proposed development of 400 dwelling units, and an increase in the number of service connections by 400 would also represent a greater than 10% increase in service connections for the water utility, thus making the proposed development subject to an **SB 221** written verification by the water utility. Close attention will need to be paid to the number of existing service connections and the number of proposed service connections as a result of serving the proposed development, as well as the percentage increase in the number of service connections, in order to determine whether the water utility is a "public water system" and whether the proposed development is a "subdivision" under **SB 221**.

If yes, read the following section and go to Section 12, page 46

Not later than 5 days after receipt of a complete application for a proposed subdivision, the agency shall send a copy of the application to the water supplier or any water supplier that may become a "public water system" that may supply water for the subdivision. (Government Code § 66455.3). This notification does not constitute a request for verification but is meant to provide the water supplier with an early warning that a request for verification is imminent.

Starting on the day that the water supplier receives the request for verification from the lead agency or the project proponent, the water supplier has 90 days to provide the written verification to the agency. Government Code § 66473.7(a)(3) The verification shall comply with **SB 221** requirements.

If the water supplier does not provide the verification to the agency within 90 days of the request, the agency may seek a writ of mandamus to compel the water supplier to prepare and provide verification. (Government Code § 66473(b)(4)). It is recommended that the water supplier and agency communicate regularly during the 90-day preparation period so that the agency can assist the water supplier in case of difficulty.

If the water supplier does not provide the verification within 90 days, the agency may complete a verification that meets the requirements of the law. Government Code § 66473(b)(4)

If no, agency must prepare **SB 221** verification. Government Code § 66473(e) – **go to Section 13, page 48**

Note: If the agency prepares the written verification, even if there is an existing water supplier, whose service area includes the proposed subdivision, because this supplier is unable or fails to do so, the agency must comply with all of the requirements of **SB 221**.

Section 12 - Code citations Has a verification already been prepared for this subdivision?

Government Code section 66473.7

(c) The applicable public water system's written verification of its ability or inability to provide a sufficient water supply that will meet the projected demand associated with the proposed subdivision as required by subdivision (b) shall be supported by substantial evidence. The substantial evidence may include, but is not limited to, any of the following:

(1) The public water system's most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610) of Division 6 of the Water Code.

(2) A water assessment that was completed pursuant to Part 2. 10 (commencing with Section 10910) of Division 6 of the Water Code.

(3) Other information relating to the sufficiency of the water supply that contains analytical information that is substantially similar to the assessment required by Section 10635 of the Water Code.

Government Code § 66473.7(l): Nothing in this section shall preclude the legislative body of a city or county, or the advisory agency, at the request of the applicant from making the determinations required in this section earlier than required pursuant to subdivision (a). Note: The correct cross reference should be **subdivision (b) instead of subdivision (a)**

Section 12 Has a verification already been prepared for this subdivision?

The law does not preclude the preparation of a verification of sufficient water supply at an earlier point in time. Government Code § 66473.7(l) The verification document must be prepared prior to the adoption of the final subdivision map.

The verification can use data from the most recently adopted Urban Water Management Plan and/or an **SB 610** assessment if the water demand for the proposed project was accounted for in these documents.

12-1 Is there an urban water management plan (UWMP)? (Government Code § 66473.7)

Yes No

If yes, the written verification of a sufficient water supply may use the Urban Water Management Plan and provide more information where necessary. **Continue**

If no, the written verification must be based on other information which provides substantial evidence which provides substantial evidence supporting the conclusions in the verification.

SB 221 suggests that an Urban Water Management Plan (Gov. Code § 66473.7(c) may be a good source of information for developing a verification. Therefore, it is recommended that each water supplier review its most recently adopted UWMP to determine if the supply and demand analysis will provide the substantial evidence to satisfy **SB 221**. The written verification must be supported by substantial evidence. That information can come from a variety of sources including an Urban Water Management Plan.

SB 221 also suggests that an **SB 610** assessment may be a good source of information for developing verification. The water supplier should determine if any recently prepared **SB 610** assessments relating to the specific subdivision contain supply and demand analyses that meet the substantial evidence required by **SB 221**.

Water supplier or agency, continue, go to Section 13, page 48

What information should be included in a verification?

Government Code section 66473.7

(a) (2) ''Sufficient water supply'' means the total water supplies available during normal, single-dry, and multiple-dry years within a 20-year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses. In determining ''sufficient water supply,'' all of the following factors shall be considered:

- *(A) The availability of water supplies over a historical record of at least 20 years.*
- *(B) The applicability of an urban water shortage contingency analysis prepared pursuant to Section 10632 of the Water Code that includes actions to be undertaken by the public water system in response to water supply shortages.*
- *(C) The reduction in water supply allocated to a specific water use sector pursuant to a resolution or ordinance adopted, or a contract entered into, by the public water system, as long as that resolution, ordinance, or contract does not conflict with Section 354 of the Water Code.*
- *(D) The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d)*

(f) In making any findings or determinations under this section, a local agency, or designated advisory agency, may work in conjunction with the project applicant and the public water system to secure water supplies sufficient to satisfy the demands of the proposed subdivision. If the local agency secures water supplies pursuant to this subdivision, which supplies are acceptable to and approved by the governing body of the public water system as suitable for delivery to customers, it shall work in conjunction with the public water system to implement a plan to deliver that water supply to satisfy the long-term demands of the proposed subdivision.

Section 13 What information should be included in a verification?

This section is written 'as if' the water supplier is preparing the verification. If an agency is preparing the verification, the same approach is used but the water supplies are those identified by the Agency as available to meet the subdivision's water demands. (Examples will be provided of how Agency verification will differ from water supplier verification.)

Verification must demonstrate supply sufficiency by showing that water supplies available during normal, single dry, and multiple dry years within a 20-year projection will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agriculture and industrial uses. All of the following must be considered:

- Historical records for at least 20 years;
- Urban Water Shortage Contingency Analysis prepared for Urban Water Management Plan,
- Supply reduction for "specific water use sector" per water supplier's resolution, ordinance, or contract, and
- Amount of water expected from specified supply projects. (Government Code § 66473.7(a)(2)(A-D).)

Verification must be based upon "substantial evidence," possibly including relevant portions of an Urban Water Management Plan or **SB 610** assessment. Government Code § 66473.7(c)

The Urban Water Management Planning Act (Water Code § 10631 – see Appendix C) requires the supplier to document water supplies available during normal, single dry, and multiple dry water years during a 20-year projection and the existing and projected future water demand during a 20-year projection. The Act requires that the projected supplies and demands be presented in five-year increments for the 20-year projection.

If the water demand for the proposed subdivision was accounted for in the most recently adopted urban water management plan; the water supplier may incorporate information from the UWMP into the verification. (Government Code § 66473.3)

If the water demand for the proposed subdivision was accounted for in a **SB 610** assessment, the water supplier may incorporate information from the UWMP into the verification. (Government Code § 66473.3)
The next section contains sample tables and data to demonstrate one method to present the required data.

Supplies from all sources including wholesaler's supplies, require documentation. This documentation includes identifying: water rights and/or contracts to the supply, associated capital outlay programs; federal, state and local permits for constructing infrastructure for conveying the supply, and; any necessary regulatory approvals required for conveyance.

Provisions for documenting groundwater are discussed below.

Continue, go to Section 13, Step 1, page 50

Section 13 - Code citations
Step One: Documenting supply

Government Code section 66473.7

(a) (2) ''Sufficient water supply'' means the total water supplies available during normal, single-dry, and multiple-dry years within a 20-year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses. In determining ''sufficient water supply,'' all of the following factors shall be considered:

- *(A) The availability of water supplies over a historical record of at least 20 years.*
- *(B) The applicability of an urban water shortage contingency analysis prepared pursuant to Section 10632 of the Water Code that includes actions to be undertaken by the public water system in response to water supply shortages.*
- *(C) The reduction in water supply allocated to a specific water use sector pursuant to a resolution or ordinance adopted, or a contract entered into, by the public water system, as long as that resolution, ordinance, or contract does not conflict with Section 354 of the Water Code.*
- *(D) The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d)*

(d) When the written verification pursuant to subdivision (b) relies on projected water supplies that are not currently available to the public water system, to provide a sufficient water supply to the subdivision, the written verification as to those projected water supplies shall be based on all of the following elements, to the extent each is applicable:

- *(1) Written contracts or other proof of valid rights to the identified water supply that identify the terms and conditions under which the water will be available to serve the proposed subdivision.*
- *(2) Copies of a capital outlay program for financing the delivery of a sufficient water supply that has been adopted by the applicable governing body.*
- *(3) Securing of applicable federal, state, and local permits for construction of necessary infrastructure associated with supplying a sufficient water supply.*
- *(4) Any necessary regulatory approvals that are required in order to be able to convey or deliver a sufficient water supply to the subdivision.*

Section 13

Step One: Documenting supply

Documentation of annual historical deliveries should be provided for the previous 20 years. It would be useful to document deliveries from each supply source. Projected deliveries by source can be provided on a yearly basis or, similar to the UWMP, for years ending in 0 and 5. Projected deliveries should not be based on contract amount, maximum diversions, maximum groundwater extractions or other theoretical quantities but on projected availability and demand balanced with source utilization criteria (i.e., limiting groundwater extractions during wet or normal years to provide additional supply during dry years). For instance, a contract may be for 5,000 acre feet per year but an additional 2,000 acre feet per year may be available until 2015, due to other contractors not needing full deliveries until that time. This supply could be provided by another source after that time, but it would be necessary to document it by providing:

1. Written contracts or other proof of valid rights to the identified water supply that identifies the terms and conditions under which the water will be available to serve the proposed subdivision.
2. Copies of a capital outlay program for financing the delivery of a sufficient water supply that has been adopted by the applicable governing body.
3. Securing of applicable federal, state, and local permits for construction of necessary infrastructure associated with supplying a sufficient water supply.
4. Any necessary regulatory approvals that are required in order to be able to convey or deliver a sufficient water supply to the subdivision.

When the water supplier is relying on a landowner's rights to extract groundwater, the water supplier will also need to show (1) that the landowner's land overlies the particular groundwater basin, and (2) the landowner's rights to extract groundwater have been, or will be, provided or made available to the water supplier so that it can rely on them to serve the particular subdivision. This will usually be a factor only in an adjudicated basin or in basins where groundwater management plans have been adopted.

Note that Government Code § 66473.7 (g) requires the verification to contain a description of reasonably foreseeable impacts of the proposed subdivision on the availability of water resources for agricultural and industrial uses within the public water system's service area that are not currently receiving water from the public water system but are utilizing the same sources of water. Agricultural and industrial businesses not using the public water supply may be using groundwater. However, it is important to note that this provision may have broader applicability than groundwater uses. For example, an agricultural user with riparian rights may be using the same surface water source as the water supplier. Each water supplier will need to evaluate the application of this provision given its own water supply situation. This provision requires the verification to review published records maintained by federal and state agencies and public records of local agencies to determine if the water use for the proposed subdivision will have negative impacts on agricultural and industrial users within the public water system's service area who are using the same source of water. To the extent that any reasonably foreseeable adverse impacts have previously been evaluated in a document prepared pursuant to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) or the National Environmental Policy Act (Public Law 91- 190) relevant to the proposed subdivision, the public water system may utilize that information in preparing the written verification.

Table 13a and 13b are examples of how verification might summarize the past, current and projected deliveries from each source. The text of the verification should specify whether any of the listed sources are projected sources not currently available.

Section 13 - Code citations

Step One: Documenting supply (continued)

See previous Code citations page

Section 13
Step One: Documenting supply (continued)

Table 13a Actual supply received (acre feet per year)

Water Supply Sources	**1980**	**1985**	**1990**	**1995**	**2000**
Wholesaler (identify)					
Wholesaler (identify)					
Groundwater					
Local surface water					
Transfers					
Exchanges (in or out)					
Reclaimed Water					
Other (identify)					
Total					

Table 13b Projected deliveries to meet projected demand (not maximum possible)

Water Supply Sources	**2005**	**2010**	**2015**	**2020**	**2025**
Wholesaler (identify)					
Wholesaler (identify)					
Groundwater					
Local surface water					
Transfers					
Exchanges (in or out)					
Reclaimed Water					
Other (identify)					
Total					

Tables with bold column headings represent information required by SB 221.

If the water supplier has, or projects, future use of any of the listed supplies - conjunctive use, reclaimed water, water conservation, water transfers, CALFED sources, Colorado River tentative agreements, etc. – the verification should document those supplies as outlined in Government Code § 66473.7(d).

Section 13- Code citations
Step One: Documenting supply
If groundwater is a source

Government Code section 66473.7

(g) The written verification prepared under this section shall also include a description, to the extent that data is reasonably available based on published records maintained by federal and state agencies, and public records of local agencies, of the reasonably foreseeable impacts of the proposed subdivision on the availability of water resources for agricultural and industrial uses within the public water system's service area that are not currently receiving water from the public water system but are utilizing the same sources of water. To the extent that those reasonably foreseeable impacts have previously been evaluated in a document prepared pursuant to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) or the National Environmental Policy Act (Public Law 91- 190) for the proposed subdivision, the public water system may utilize that information in preparing the written verification.

(h) Where a water supply for a proposed subdivision includes groundwater, the public water system serving the proposed subdivision shall evaluate, based on substantial evidence, the extent to which it or the landowner has the right to extract the additional groundwater needed to supply the proposed subdivision. Nothing in this subdivision is intended to modify state law with regard to groundwater rights.

Water Code section 10631

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.

For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

Section 13

Step One: Documenting supply

If groundwater is a source

When a water supply for a proposed subdivision includes groundwater, the water supplier is required to evaluate, based on substantial evidence, the extent to which it or the landowner has the right to extract the additional groundwater needed to supply the proposed subdivision. When the water supplier is relying on a landowner's rights to extract groundwater, the water supplier will need to show that (1) the landowner has a right to extract the groundwater, and (2) it will be available to the supplier to serve the subdivision.

Note that Government Code § 66473.7 (g) requires the verification to contain a description of reasonably foreseeable impacts of the proposed subdivision on the availability of water resources for agricultural and industrial uses within the public water system's service area that are not currently receiving water from the public water system but are utilizing the same sources of water. Agricultural and industrial businesses not using the public water supply may be using groundwater. However, it is important to note that this provision may have broader applicability than groundwater uses. For example, an agricultural user with riparian rights may be using the same surface water source as the water supplier. Each water supplier will need to evaluate the application of this provision given its own water supply situation. This provision requires the verification to review published records maintained by federal and state agencies and public records of local agencies to determine if the water use for the proposed subdivision will have negative impacts on agricultural and industrial users within the public water system's service area who are using the same source of water. To the extent that any reasonably foreseeable adverse impacts have previously been evaluated in a document prepared pursuant to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) or the National Environmental Policy Act (Public Law 91- 190) relevant to the proposed subdivision, the public water system may utilize that information in preparing the written verification.

The verification must include a determination of the water supplier's ability to provide a sufficient water supply for the proposed subdivision and this can be based on substantial evidence from an UWMP, an **SB 610** assessment (Water Code § 10910), or other substantially similar evidence that would be provided to meet the requirements of the Urban Water Management Planning Act (Water Code § 10631-10635). Thus, if the water sources that will serve the project include groundwater, specific groundwater information must be included in the verification.

As amended in 2001 by the enactment of **SB 610**, the Urban Water Management Planning Act (Water Code § 10631) specifies the data generally necessary to document available groundwater supplies for proposed subdivisions subject to **SB 221** Government Code § 66473.7(h) limits the groundwater evaluation to the basin or basins that will serve the proposed subdivision. Information contained in the UWMP regarding groundwater may be useful to comply with this evaluation requirement. (See discussion at page 19)

Groundwater details required to be included in any UWMP adopted after January 1, 2002 include:

a) Specify if a groundwater management plan or other specific authorization for groundwater management for the basin has been adopted and how it affects the water supplier's use of the basin.
b) The description of the groundwater basin may be excerpted from the groundwater management plan, from DWR Bulletin 118, California's Ground Water, or from some other document that has been published and that discusses the basin boundaries, type of rock that constitutes the aquifer, variability of the aquifer material, and total groundwater in storage (average specific yield times the volume of the aquifer).
c) In an adjudicated basin the amount of water the urban supplier has the legal right to pump should be enumerated in the court decision - attach a copy of the order or decree.
d) The Department of Water Resources has projected estimates of overdraft, or "water shortage," based on projected amounts of water supply and demand (basin management), at the hydrologic region level in Bulletin 160, California Water Plan Update. Estimates at the basin or sub-basin level will be projected for some basins in Bulletin 118. If the basin has not been evaluated by DWR, data that indicate groundwater level trends over a period of time should be collected and evaluated.

Section 13 - Code citations

Step One: Documenting supply

If groundwater is a source (continued)

Water Code section 10631

(h) Where a water supply for a proposed subdivision includes groundwater, the public water system serving the proposed subdivision shall evaluate, based on substantial evidence, the extent to which it or the landowner has the right to extract the additional groundwater needed to supply the proposed subdivision. Nothing in this subdivision is intended to modify state law with regard to groundwater rights.

Step One: Documenting supply

If groundwater is a source (continued)

e) If the evaluation indicates an overdraft due to existing groundwater extraction, or projected increases in groundwater extraction, describe actions and/or program designed to mitigate such impacts.
f) If water supplier wells are plotted on a map, or are available from a geographic information system, the amount of water extracted by the water supplier for the past five years can be obtained from the Department of Health Services, Office of Drinking Water and Environmental Management. A useful DHS website is: http://www.dhs.cahwnet.gov/ps/ddwem/dwsap/DWSAPindex.htm
g) Description and analysis of the amount and location of groundwater pumped by the water supplier for the past five years. Include information on proposed pumping locations and quantities. The description and analysis is to be based on information that is reasonably available, including, but not limited to, historic use records from DWR, and from other sources.
h) Description and analysis of the location, amount, and sufficiency of groundwater that is projected to be pumped by the water supplier.

Below is a hypothetical example of how this could be addressed:

Project Description

The Gravel Creek Project includes an office park and a 650 dwelling unit residential development. Estimated use of groundwater to serve the proposed subdivision will be 500 acre-feet per year. The project proponent has identified the American Water District as the water supplier for the proposed subdivision.

Condition of Basin

The proposed subdivision immediately overlies a groundwater basin that is part of an active conjunctive use program by the American water District. The basin is not currently adjudicated. Historical use of the basin has left it 20 feet below its historical average. The average water level has continued to fall over the past 5 years. Extractions from this basin have exceeded safe yield on average over the past 20 years. A basin management plan was established in 2000. The basin management plan describes several programs to reverse the historic overuse of the groundwater basin including voluntary reporting of use by agriculture and industry and an ongoing conjunctive use program implemented by the American Water District.

The attached Urban Water Management Plan by the American Water District provides current and past pumping rates and volumes for all well fields managed by the District, as well as information concerning the importation of surface water supplies as part of the conjunctive use program.

Overlying property owners and current appropriative rights holders are already using water equal to the safe yield of the basin. Any new development, to secure and demonstrate a right as an appropriator, would be required to secure an imported water supply. The imported water supply could then be banked in the basin and be used by the new development.

Proposed Water Supply

Estimated use of groundwater to serve the proposed subdivision will be 500 acre-feet per year. Expansion of existing Well Field A or establishment of a new well field is under evaluation within the Project EIR. The American Water District will be utilizing its existing water service contract to import an additional 700 acre-feet per year of surface water, which will be banked in the groundwater basin as part of the District's ongoing conjunctive use program.

Section 13 - Code citations

Step One: Documenting supply

If groundwater is a source (continued)

See previous Code citations page

Section 13
Step One: Documenting supply
If groundwater is a source (continued)

Evaluation of water right condition

The American Water District has been using the groundwater basin as a source of water supply to serve its existing customers, and intends to store an additional 700 acre-feet per year of surface water in the groundwater basin as part of its ongoing conjunctive use program. The proposed water demand for the subdivision would be 500 acre-feet of year, resulting in extractions from the groundwater basin, which would result in a net benefit to the groundwater basin of approximately 200 acre-feet per year. The American Water District would appear to have sufficient right to extract the necessary 500 acre-feet per year of water to serve the proposed subdivision, based on the parameters of the existing basin management program, the nature of the existing conjunctive use program implemented by American Water District, and the proposed importation of sufficient quantities of surface water to serve the proposed subdivision without decreasing availability of water supply for its existing customers.

Section 13 - Code citations

Step One: Documenting supply

If verification relies on projected water supplies not currently available

Government Code section 66473.7

(d) When the written Verification pursuant to subdivision (b) relies on projected water supplies that are not currently available to the public water system, to provide a sufficient water supply to the subdivision, the written verification as to those projected water supplies shall be based on all of the following elements, to the extent each is applicable:

- *(1) Written contracts or other proof of valid rights to the identified water supply that identify the terms and conditions under which the water will be available to serve the proposed subdivision.*
- *(2) Copies of a capital outlay program for financing the delivery of a sufficient water supply that has been adopted by the applicable governing body.*
- *(3) Securing of applicable federal, state, and local permits for construction of necessary infrastructure associated with supplying a sufficient water supply.*
- *(4) Any necessary regulatory approvals that are required in order to be able to convey or deliver a sufficient water supply to the subdivision.*

Section 13
Step One: Documenting supply
If verification relies on projected water supplies not currently available

If the verification relies on water supplies that are not currently available to the water supplier the verification must substantiate that those supplies will be available when the water is needed.

For instance, if a water supplier plans to establish a long-term water transfer agreement but the agreement has not been completed, the following data is necessary to establish that the water will actually be available when the subdivision is completed

- The water supplier should indicate if it has a written contract that identifies the terms and conditions under which the water will be available to serve the proposed subdivision, i.e., the amount of water to be transferred per year, any exceptions, etc.

> Note: This provision of **SB 221** is different than that in **SB 610** for "written contracts". The duty to provide substantial evidence involves more than simply showing a contract; it requires identification of terms and conditions related to providing service to the proposed subdivision

- If the transfer will require a new or expanded delivery system, the water supplier should indicate if it has formally adopted a capital outlay program for financing the construction.
- The water supplier should indicate if it is securing all applicable federal, state and local permits required to secure and deliver the new water supply.
- The water supplier should indicate if any regulatory approvals are being secured.

If a water supplier receives water from a wholesale water agency, the water supplier will need information and documentation from the wholesaler to satisfy the requirements of **SB 221**.

Below is a hypothetical example of how this could be addressed:

Kanouse Canal Lining Project

Source of supply

The Kanouse Canal Lining Project can provide an annual supply that is delivered to Gotham's service area in the Verde River Aqueduct. In 1988, Public Law 100-675 authorized the Secretary of the Interior to concrete line the Kanouse Canal. The Kanouse Canal Lining Project consists of lining 33 miles of the Kanouse Canal.. The law also authorized the Secretary to enter into a construction or funding agreement with the Kanouse Irrigation District.

Expected supply capacity

The Kanouse Canal Lining Project is expected to yield 76,000 acre-feet per year of supply to Gotham's service area via the Verde River Aqueduct other than when surplus Verde River water is available for California's use when KID elects to use such water and such use does not adversely affect Gotham. Gotham would receive 20,500 acre-feet per year from the Kanouse Canal Lining Project for up to 75 years. The water supply that would be available to Gotham is presented below:

Estimated Water Supplies Available for Gotham's Use Under the Kanouse Lining Project (AFY)

Year	Multiple dry years (1990-1992)	Single dry year (1977 Hydrology)	Average year	Wet year (1985 Hydrology)
2005	20,500	20,500	20,500	20,500
2010	76,700	76,700	76,700	76,700
2015	76,700	76,700	76,700	76,700
2020	76,700	76,700	76,700	76,700

*--Represents expected supply capability for the resource program.

Section 13 - Code citations

Step One: Documenting supply

If verification relies on projected water supplies not currently available (continued)

See previous Code citations page

Section 13

Step One: Documenting supply

If verification relies on projected water supplies not currently available (continued)

Rationale for expected supply

Implementation Status: A Request for Proposal for professional consulting services in the design of canals, project management support and environmental documentation services is scheduled to be issued in February 2003 for the Kanouse Canal Lining Project.

Written Contracts: The following actions have been taken to proceed toward project implementation.
- 1988, Public Law 100-675. Authorized the Department of the Interior to reduce seepage from the existing earthen Kanouse Canal.
- 2002 KID – City of Gotham Transfer Agreement Authorized
- 2001, California Department of Water Resources-Gotham Funding Agreement. Reimburse Gotham for project work necessary to construct the lining of the Kanouse Canal in an amount not to exceed $73 million.

Financing: The construction of the Kanouse Canal is included in Gotham's long range financial plan and capital investment plan. Gotham would initially fund these projects. Up to $200 million of the costs of constructing the projects would be reimbursed by the state of California in accordance with the executed funding agreements.
Federal, state and local Permits for Construction:
- April 2000. The Bureau of Reclamation released the Final EIS/EIR for the Kanouse Canal Lining Project.

Section 13 - Code citations
Step Two: Documenting demand

Government Code section 66473.7

(a) (2) ''Sufficient water supply'' means the total water supplies available during normal, single-dry, and multiple-dry years within a 20- year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses. In determining ''sufficient water supply,'' all of the following factors shall be considered:

(A) The availability of water supplies over a historical record of at least 20 years.

(B) The applicability of an urban water shortage contingency analysis prepared pursuant to Section 10632 of the Water Code that includes actions to be undertaken by the public water system in response to water supply shortages.

(C) The reduction in water supply allocated to a specific water use sector pursuant to a resolution or ordinance adopted, or a contract entered into, by the public water system, as long as that resolution, ordinance, or contract does not conflict with Section 354 of the Water Code.

(D) The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d)

Section 13

Step Two: Documenting Demand

SB 221 requires that the verification document the projected 20-year water demand for existing uses, planned future uses and the proposed development, as well as for agricultural, industrial and any other uses the water supplier can identify.

Water suppliers may need to consider the variability of agricultural water use. To document agricultural water use, water suppliers could also consult with the county agricultural commissioner to identify trends in irrigated acreage. To document industrial demand, a water supplier could consult with city and county planners, as well as any economic development agencies.

Note: If the proposed subdivision was included as part of the projected water demand in the current Urban Water Management Plan, the water demand component of the verification may draw from that existing analysis.

Demand during single dry and multiple dry years varies from demand during normal or wet years. Section 13, Step 4 discusses how the verification might deal with this variance.

Section 13 - Code citations
Step Two: Documenting demand
Definitions

Government Code section 66473.7

(a) For the purposes of this section, the following definitions apply:

- *(1) ''Subdivision'' means a proposed residential development of more than 500 dwelling units, except that for a public water system that has fewer than 5,000 service connections, ''subdivision'' means any proposed residential development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections.*
- *(2) ''Sufficient water supply'' means the total water supplies available during normal, single-dry, and multiple-dry years within a 20- year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses. In determining ''sufficient water supply,'' all of the following factors shall be considered:*
  - *(A) The availability of water supplies over a historical record of at least 20 years.*
  - *(B) The applicability of an urban water shortage contingency analysis prepared pursuant to Section 10632 of the Water Code that includes actions to be undertaken by the public water system in response to water supply shortages.*
  - *(C) The reduction in water supply allocated to a specific water use sector pursuant to a resolution or ordinance adopted, or a contract entered into, by the public water system, as long as that resolution, ordinance, or contract does not conflict with Section 354 of the Water Code.*
  - *(D) The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d).*
- *(3) ''Public water system'' means the water supplier that is, or may become as a result of servicing the subdivision included in a tentative map pursuant to subdivision (b), a public water system, as defined in Section 10912 of the Water Code, that may supply water for a subdivision.*

Section 13

Step Two: Documenting demand

Definitions

The following definitions of existing uses, planned future uses, proposed project use and agricultural and industrial uses are provided for your consideration only. Both **SB 610** and **SB 221** emphasize local decision making and the information provided in these serves to provide examples. Local agencies may have adopted other definitions and should be consulted.

Existing uses – demand related to current customers, and system uses/losses, during normal years (uses during single dry and multiple dry years will be discussed in Section 5, Step four). Usually this projection will take account of historical use (during non-dry) years as well as any recent changes in demand characteristics, i.e., changes in per capita use, percentage of use by customer type, demographic variability, etc.).

Planned future uses – the agency, as the land-use agency, has information on planned development. Regular communication between the water supplier and agency will be essential to ensuring an accurate determination of sufficiency of water supply for future demand.

Planned future uses may include:

- projects that are expected to be completed during the same time frame as the proposed project. These include all new demands ranging from an individual single-family home to large-scale developments.
- proposed developments that have a reserved (or entitlement to) future water supply and are considered to be moving towards construction. Proposed projects that are included in a general or specific plan need not be included if the agency determines that they are not likely to begin construction during the period under consideration.
- projects which are not subject to local planning regulation – for example, US military installations, University of California, etc.

Neither **SB 610** nor **SB 221** defines planned future uses. However, it would be a reasonable interpretation that planned future uses are those that would be undertaken within the same time frame as the project under consideration. Each preparer of an assessment will determine what planned future uses it will include in the demand calculation to insure that it is not identifying the same increment of water for more than one future use.

Section 13 - Code citations

Step Two: Documenting Demand

Detailing existing and planned future uses

Government Code section 66473.7

(a)(2) ''Sufficient water supply'' means the total water supplies available during normal, single-dry, and multiple-dry years within a 20- year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses. In determining ''sufficient water supply,'' all of the following factors shall be considered:

- *(A) The availability of water supplies over a historical record of at least 20 years.*
- *(B) The applicability of an urban water shortage contingency analysis prepared pursuant to Section 10632 of the Water Code that includes actions to be undertaken by the public water system in response to water supply shortages.*
- *(C) The reduction in water supply allocated to a specific water use sector pursuant to a resolution or ordinance adopted, or a contract entered into, by the public water system, as long as that resolution, ordinance, or contract does not conflict with Section 354 of the Water Code.*
- *(D) The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d)*

Section 13

Step Two: Documenting demand

Detailing existing and planned future uses

Water-use Sectors – use in acre-feet per year, actual and projected

Customer type	1990	1995	2000	**2005**	**2010**	**2015**	**2020**
Single Family							
Multifamily							
Commercial							
Industrial							
Institutional / gov.							
Landscape Irrigation							
Wholesale							
Agricultural							
Other (specify)							
TOTAL							

Water-use Sectors – number of connections, actual and projected (Not required by **SB 221**)

Customer type	1990	1995	2000	2005	2010	2015	2020
Single Family							
Multifamily							
Commercial							
Industrial							
Institutional / gov.							
Landscape Irrigation							
Wholesale							
Agricultural							
Other (specify)							
TOTAL							

Section 13 - Code citations
Step Three: Documenting dry-year(s) supply

Government Code section 66473.7

(a)(2) ''Sufficient water supply'' means the total water supplies available during normal, single-dry, and multiple-dry years within a 20- year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses. In determining ''sufficient water supply,'' all of the following factors shall be considered:

(A) The availability of water supplies over a historical record of at least 20 years.

(B) The applicability of an urban water shortage contingency analysis prepared pursuant to Section 10632 of the Water Code that includes actions to be undertaken by the public water system in response to water supply shortages.

(C) The reduction in water supply allocated to a specific water use sector pursuant to a resolution or ordinance adopted, or a contract entered into, by the public water system, as long as that resolution, ordinance, or contract does not conflict with Section 354 of the Water Code.

(D) The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d)

Section 13

Step Three: Documenting dry-year(s) supply

"The description of "Sufficient water supply" should provide a clear picture of a public water system's current supply condition under normal, single dry and multiple dry years including any shortfall compared to demand. The definition of "sufficient water supply" allows latitude for water suppliers to use local discretion and planning scenarios when determining necessary supply and demand.

In developing supply projections, water agencies should take into account the latest urban water shortage contingency analysis done pursuant to water code section 10632. This analysis should include an estimate of the minimum water supply available during each of the next three years based on the driest three-year historical sequence for the agency's water supplies. Different sources of water supplies will have different historical dry year sequences and different yields during multiple year drought conditions based on hydrology, available storage, contract entitlements, water right characteristics, etc. In some cases there is not a direct correlation between hydrology and available water supply (e.g., groundwater, recycled water, water transfers, conservation, desalination). Alternative methodologies can be developed for these supplies that would provide an estimate of reasonably available water supplies.

This provision is not intended to preclude projected water supplies that can be reasonably relied upon, so long as there is substantial evidence put on the record that demonstrates that the projected water supplies will likely be available by the time the housing units are ready for construction. The statute does not require that water needed for new development must already be stored and available for delivery, in order for a local agency to approve a final subdivision map. The statute allows for the water supply to be in the planning phase, as long as a demonstration can be made that substantial progress is being made to bring the water supply on-line by the time the subdivision is ready for construction. Therefore, specific projects emerging from long-range planning regarding conjunctive use; reclaimed water; water conservation; water transfers; and federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, can be cited within the written verification as long as the projected water supplies meet the test provided in Section 66473.7(d).

Example

Probability based estimates for Drake Reservoir supplies have been statistically calculated based on the County's Big River Model. This model uses hydrologic data for the period of 1917 through 1993 to estimate Drake reservoir inflow and water levels and projected deliveries to member agencies. Based on a review of this data, the District can expect to receive a full contractual supply of 9,300 acre feet per year during wet and normal years. During dry years (10 percent probability of occurrence) the Drake Reservoir District deliveries are estimated to be 8,400 acre feet per year. During critical dry years (5 percent probability of occurrence) Drake Reservoir District deliveries are estimated to be 4,200 acre feet per year. The combined effects of wholesaler and Drake Reservoir cutbacks on District water supplies are summarized in Table 5-3.

Percent Likelihood	Wet Year 25%	Normal Year 60%	Dry Year 10%	Critical Drought Year 5%
Demand (AFY)	16,900	15,000	15,500	14,000
Supply Groundwater	0	1,500	2,500	3,300
Drake Reservoir	9,400	9,300	8,400	4,200
West Water Project	7,500	4,500	2,500	1,700
Total	16,900	15,300	13,900	9,200

Projected acre feet per year available by source for single dry and multiple dry years

Source	Normal	Single-Dry	Multi-dry 1	Multi-dry 2	Multi-dry 3
Local Surface	9,300	9,300	9,300	8,400	4,200
WWP	4,500	1,700	1,700	2,500	3,200
Groundwater	1,500	2,500	2,500	3,300	3,300
Water bank		1,000	1,000	300	2,500
TOTAL	15,300	14,500	14,500	14,500	13,200

Section 13 - Code citations
Step Four: Documenting dry-year(s) demand

Government Code section 66473.7

(a) (2) "Sufficient water supply" means the total water supplies available during normal, single-dry, and multiple-dry years within a 20- year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses. In determining "sufficient water supply," all of the following factors shall be considered:

- *(A) The availability of water supplies over a historical record of at least 20 years.*
- *(B) The applicability of an urban water shortage contingency analysis prepared pursuant to Section 10632 of the Water Code that includes actions to be undertaken by the public water system in response to water supply shortages.*
- *(C) The reduction in water supply allocated to a specific water use sector pursuant to a resolution or ordinance adopted, or a contract entered into, by the public water system, as long as that resolution, ordinance, or contract does not conflict with Section 354 of the Water Code.*
- *(D) The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d)*

Water Code section 10632 (Urban Water Management Plan requirements)

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier: (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage. (b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply. (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster. (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning. (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply. (f) Penalties or charges for excessive use, where applicable. (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments. (h) A draft water shortage contingency resolution or ordinance. (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

Section 13

Step Four: Documenting dry-year(s) demand

Water use patterns change during dry years. One way to analyze this is to document expected changes to water demand by sector. Calculating the demand component of a 'sufficient water supply', a water agency may take into account those planned reductions in water deliveries contemplated by that agency's water rationing program, if the water agency has one, for responding to water supply shortages associated with droughts. In other words, in determining a 'sufficient water supply', a water agency is not required to plan to provide its customers 100 % of what they delivered during a 'normal' water supply year. Rather, for the purposes of calculating whether or not the water agency is able to take on additional customers without putting existing customers at risk, a water agency may estimate the reductions in supply that customers can endure during future droughts, without experiencing unnecessary hardships or costs. Water agencies may already have in place policies, ordinances, or contracts stipulating drought year supply allocations by water use sector. To the extent these are consistent with water code section 354 they should be considered when determining sufficient water supply.

The urban water shortage contingency analysis also requires the water supplier to have a plan for catastrophic interruptions of water supplies authorizing reductions of up to 50%. While disaster response planning is important, it is entirely different from long-term water supply planning to accommodate growth. Levels of reduction approaching 50% may be necessary for catastrophe planning, but are entirely inappropriate for long-term water supply planning. This level of reduction, for long-term water supply planning, would not provide protection to the water supply needs of existing users.

Factors that can change water use patterns during dry years include educational efforts and rationing policies established in water shortage contingency plans. An urban water shortage contingency analysis can have both voluntary and mandatory rationing during water supply shortages to help control consumption. Rationing requirements should be reasonably achievable for customers to encourage reductions in consumption. A typical rationing sequence would begin with voluntary rationing. In the second or third year of an extended drought, mandatory rationing might be expected. The 50% rationing limit described in Water Code Section 10632, while achievable over a relatively short time period, should be reserved for disaster planning rather than drought planning as it would put many customers under duress and may hinder the goal of consumption reduction over an extended drought period. **SB 221** is designed to protect existing customers' water needs while accommodating future development within the means of the water provider.

Water-use Sectors – use in acre-feet per year, projected

Customer type	Normal	Single dry	Multiple 2	Multiple 3	Multiple 4
Single Family					
Multifamily					
Commercial					
Industrial					
Institutional / gov.					
Landscape Irrigation					
Wholesale					
Agricultural					
TOTAL					

Planned water-use reductions by sector – percentage target reduction

Customer type	Normal	Single dry	Multiple 2	Multiple 3	Multiple 4
Single Family					
Multifamily					
Commercial					
Industrial					
Institutional / gov.					
Landscape Irrigation					
Wholesale					
Agricultural					
TOTAL					

Determining if the projected water supply is sufficient for the subdivision

Government Code section 66473.7

(a) (2) ''Sufficient water supply'' means the total water supplies available during normal, single-dry, and multiple-dry years within a 20- year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses. In determining ''sufficient water supply,'' all of the following factors shall be considered:

(A) The availability of water supplies over a historical record of at least 20 years.

(B) The applicability of an urban water shortage contingency analysis prepared pursuant to Section 10632 of the Water Code that includes actions to be undertaken by the public water system in response to water supply shortages.

(C) The reduction in water supply allocated to a specific water use sector pursuant to a resolution or ordinance adopted, or a contract entered into, by the public water system, as long as that resolution, ordinance, or contract does not conflict with Section 354 of the Water Code.

(D) The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d)

Section 14 Determining if the projected water supply is sufficient for the subdivision

Compare current and projected supply and demand for normal, single dry and multiple dry years. Water suppliers may want to make this comparison with and without the proposed subdivision demand so that the impact of the project is clearly calculated. The tables provide examples of format.

Water Supply and Demand Comparison (acre feet per year) during normal years with proposed subdivision

Water Demands	**2000**	**2005**	**2010**	**2015**	**2020**
Potable Water	13,040	13,980	14,610	15,230	15,840
Reclaimed Reduction*	0	0	100	200	280
Total	13,040	13,980	14,710	15,430	16,120
Water Supply					
Drake Reservoir	9,300	9,300	9,300	9,300	9,300
West Water Project	4,500	4,500	4,500	4,500	4,500
Wells	0	300	1000	1800	2500
Total	13,800	14,100	14,800	15,600	16,300
Surplus or Deficit	760	120	90	170	180

***Potable water not used due to use of reclaimed water.**

Water Supply and Demand Comparison (AFY) during normal years without proposed subdivision

Water Demands	**2000**	**2005**	**2010**	**2015**	**2020**
Potable Water	13,040	13,680	14,310	14,930	15,540
Reclaimed Reduction	0	0	100	200	280
Total	13,040	13,680	14,410	15,130	15,820
Water Supply					
Total	13,800	14,100	14,800	15,600	16,300
Surplus or Deficit	760	420	390	470	480

Water Supply and Demand Comparison (AFY) during single and multiple dry years with proposed subdivison

2025 Supply & Demand	**Normal**	**Single dry**	**Multiple 2**	**Multiple 3**	**Multiple 4**
Supply totals					
Demand totals					
Difference					

Water Supply and Demand Comparison (AFY) during single and multiple dry years without proposed subdivision

2025 Supply & Demand	**Normal**	**Single dry**	**Multiple 2**	**Multiple 3**	**Multiple 4**
Supply totals					
Demand totals					
Difference					

If the projected supply is determined to be insufficient

Government Code section 66473.7

(b) (3) If the written verification provided by the applicable public water system indicates that the public water system is unable to provide a sufficient water supply that will meet the projected demand associated with the proposed subdivision, then the local agency may make a finding, after consideration of the written verification by the applicable public water system, that additional water supplies not accounted for by the public water system are, or will be, available prior to completion of the subdivision that will satisfy the requirements of this section. This finding shall be made on the record and supported by substantial evidence.

(d) When the written verification pursuant to subdivision (b) relies on projected water supplies that are not currently available to the public water system, to provide a sufficient water supply to the subdivision, the written verification as to those projected water supplies shall be based on all of the following elements, to the extent each is applicable:

- *(1) Written contracts or other proof of valid rights to the identified water supply that identify the terms and conditions under which the water will be available to serve the proposed subdivision.*
- *(2) Copies of a capital outlay program for financing the delivery of a sufficient water supply that has been adopted by the applicable governing body.*
- *(3) Securing of applicable federal, state, and local permits for construction of necessary infrastructure associated with supplying a sufficient water supply.*
- *(4) Any necessary regulatory approvals that are required in order to be able to convey or deliver a sufficient water supply to the subdivision.*

(f) In making any findings or determinations under this section, a local agency, or designated advisory agency, may work in conjunction with the project applicant and the public water system to secure water supplies sufficient to satisfy the demands of the proposed subdivision. If the local agency secures water supplies pursuant to this subdivision, which supplies are acceptable to and approved by the governing body of the public water system as suitable for delivery to customers, it shall work in conjunction with the public water system to implement a plan to deliver that water supply to satisfy the long-term demands of the proposed subdivision.

Section 15 If the projected supply is determined to be insufficient

Agency Action

If the written verification provided by the water supplier, or by the agency, indicates that the water supply is insufficient to meet the projected demand associated with the proposed subdivision, then the agency may make a finding, after consideration of the written verification, that additional water supplies not accounted for in the verification are, or will be, available prior to completion of the subdivision that will meet the demands of the subdivision. This finding must be made on the record and supported by substantial evidence. Generally, if an agency identifies a supply that was not accounted for in the verification it will be a supply that is not currently available or not currently being used. In this situation, the substantial evidence supporting the finding should comply with Government Code 66473.7(d).

That means that the agency would have to provide information relating to:

(1) Written contracts or other proof of valid rights to the identified water supply which identify the terms and conditions under which the water will be available to serve the proposed subdivision.
(2) Copies of a capital outlay program for financing the delivery of a sufficient water supply that has been adopted by the applicable governing body.
(3) Securing of applicable federal, state, and local permits for construction of necessary infrastructure associated with supplying a sufficient water supply.
(4) Any necessary regulatory approvals that are required in order to be able to convey or deliver a sufficient water supply to the subdivision.

Project Applicants, Local Agencies and Public Water Suppliers Working Together to Secure Additional Water Supplies

Section 66473.7 (f) creates the potential for a unique partnership between water suppliers, project applicants and local agencies. The intent of the statute is to encourage close cooperation in acquiring additional water supplies. Although the statute specifically authorizes a local agency to identify and acquire the projected water supplies under several specified circumstances, the statute also clearly states that the water agency will have the final say on the suitability of any such water supplies for delivery. In order for a local agency to successfully secure needed supplies, it is imperative that local agencies, project applicants, and water suppliers work in collaboration, maintaining close communication during the planning process. To this end, any of these agencies are empowered to negotiate for water supplies. Issues to consider include water quality, delivery logistics, cost, and reliability over different water year types.

Government Code section 66473.7

(b) (1) The legislative body of a city or county or the advisory agency, to the extent that it is authorized by local ordinance to approve, conditionally approve, or disapprove the tentative map, shall include as a condition in any tentative map that includes a subdivision a requirement that a sufficient water supply shall be available. Proof of the availability of a sufficient water supply shall be requested by the subdivision applicant or local agency, at the discretion of the local agency, and shall be based on written verification from the applicable public water system within 90 days of a request.

(2) If the public water system fails to deliver the written verification as required by this section, the local agency or any other interested party may seek a writ of mandamus to compel the public water system to comply.

(4) If the written verification is not provided by the public water system, notwithstanding the local agency or other interested party securing a writ of mandamus to compel compliance with this section, then the local agency may make a finding that sufficient water supplies are, or will be, available prior to completion of the subdivision that will satisfy the requirements of this section. This finding shall be made on the record and supported by substantial evidence.

(e) If there is no public water system, the local agency shall make a written finding of sufficient water supply based on the evidentiary requirements of subdivisions (c) and (d) and identify the mechanism for providing water to the subdivision.

(j) The determinations made pursuant to this section shall be consistent with the obligation of a public water system to grant a priority for the provision of available and future water resources or services to proposed housing developments that help meet the city's or county's share of the regional housing needs for lower income households, pursuant to Section 65589.7.

Section 16 Final SB 221 verification actions by agency

A written verification, supported by substantial evidence, must be provided before a final subdivision map may be approved. This verification may be requested by the local agency or by the applicant at the discretion of the local agency. It must show that there is sufficient water to meet the water demands of the proposed subdivision and existing and planned future uses for the next 20 years.

A verification may be requested at any time and an applicant may wish to secure and include it when a tentative subdivision map is submitted for approval to the city or county decision making body.

If the verification determines the water supply is sufficient, use of the water for the proposed subdivision must be determined to be consistent with the obligation of the water supplier to grant a priority for the provision of available and future water resources or services to proposed housing developments that help meet the city's or county's share of the regional housing needs for lower income households, pursuant to Government Code § 65589.7.
If the verification finds that the water supplier will be unable to provide a sufficient water supply, and the local agency is unable to find that sufficient additional supplies will be available prior to the completion of the subdivision, then the tentative map condition will not be met and the subdivision cannot receive final approval.

Although the water supply verification required by Government Code § 66473.7(b)(1) may be requested at any time, it may be advisable to seek it before a tentative map application is completed. The project proponent should know the parameters of available water supplies before committing to a project of a specific size and configuration.

Any challenge to the verification must be initiated within 90 days of the agency action.

Summary:
1. The Subdivision Map Act now requires local governments to impose on all tentative subdivision maps which are subject to the provisions of SB 221 the condition that there be sufficient water for the project, along with existing and planned uses.
2. This condition is met by a verification showing the specific items listed in the Government Code, depending on whether or not new water supplies will be required.
3. The verification must in any event be supported by substantial evidence.
4. A final map may not be filed if the condition has not been met.

Section 17 - Code citations Special circumstances

SB 610

Water Code section 10915

The County of San Diego is deemed to comply with this part if the Office of Planning and Research determines that all of the following conditions have been met:

- *(a) Proposition C, as approved by the voters of the County of San Diego in November 1988, requires the development of a regional growth management plan and directs the establishment of a regional planning and growth management review board.*
- *(b) The County of San Diego and the cities in the county, by agreement, designate the San Diego Association of Governments as that review board.*
- *(c) A regional growth management strategy that provides for a comprehensive regional strategy and a coordinated economic development and growth management program has been developed pursuant to Proposition C.*
- *(d) The regional growth management strategy includes a water element to coordinate planning for water that is consistent with the requirements of this part.*
- *(e) The San Diego County Water Authority, by agreement with the San Diego Association of Governments in its capacity as the review board, uses the association's most recent regional growth forecasts for planning purposes and to implement the water element of the strategy.*
- *(f) The procedures established by the review board for the development and approval of the regional growth management strategy, including the water element and any certification process established to ensure that a project is consistent with that element, comply with the requirements of this part.*
- *(g) The environmental documents for a project located in the County of San Diego include information that accomplishes the same purposes as a water assessment that is prepared pursuant to Section 10910.*

SB 221

Government Code section 66473.7

(k) The County of San Diego shall be deemed to comply with this section if the Office of Planning and Research determines that all of the following conditions have been met:

- *(1) A regional growth management strategy that provides for a comprehensive regional strategy and a coordinated economic development and growth management program has been developed pursuant to Proposition C as approved by the voters of the County of San Diego in November 1988, which required the development of a regional growth management plan and directed the establishment of a regional planning and growth management review board.*
- *(2) Each public water system, as defined in Section 10912 of the Water Code, within the County of San Diego has adopted an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) of the Water Code.*
- *(3) The approval or conditional approval of tentative maps for subdivisions, as defined in this section, by the County of San Diego and the cities within the county requires written communications to be made by the public water system to the city or county, in a format and with content that is substantially similar to the requirements contained in this section, with regard to the availability of a sufficient water supply, or the reliance on projected water supplies to provide a sufficient water supply, for a proposed subdivision.*

Section 17 Special circumstances

Lead agencies and water suppliers within the County of San Diego are deemed to comply with **SB 610** if the Governor's Office of Planning and Research determines that certain conditions have been met. If such a determination is made, lead agencies and water suppliers within the County of San Diego must still include information that accomplishes the same purposes as a water assessment prepared pursuant to Water Code § 10910. Until such a determination is made, agencies and water suppliers within the County of San Diego are subject to all statutory requirements.

Agencies and water suppliers within the County of San Diego are deemed to comply with **SB 221** if the Governor's Office of Planning and Research determines that conditions have been met. If such a determination is made, agencies and water suppliers within the County of San Diego must still provide written communications to be made by the public water system to the city or county, in a format and with content that is substantially similar to the requirements contained in Government Code § 66473.7, with regard to the availability of a sufficient water supply, or the reliance on projected water supplies to provide a sufficient water supply, for a proposed subdivision. Until such a determination is made, agencies and water suppliers within the County of San Diego are subject to all statutory requirements.

Appendix A

Chapter 643, Statutes of 2001 (Senate Bill 610)

Chapter 643, Statutes of 2001 (Senate Bill 610)

An act to amend Section 21151.9 of the Public Resources Code, and to amend Sections 10631, 10656, 10910, 10911, 10912, and 10915 of, to repeal Section 10913 of, and to add and repeal Section 10657 of, the Water Code, relating to water. Approved by Governor October 9, 2001. Filed with Secretary of State October 9, 2001.

The people of the State of California do enact as follows:

SECTION 1. (a) The Legislature finds and declares all of the following:
(1) The length and severity of droughts in California cannot be predicted with any accuracy.

(2) There are various factors that affect the ability to ensure that adequate water supplies are available to meet all of California's water demands, now and in the future.

(3) Because of these factors, it is not possible to guarantee a permanent water supply for all water users in California in the amounts requested.

(4) Therefore, it is critical that California's water agencies carefully assess the reliability of their water supply and delivery systems.

(5) Furthermore, California's overall water delivery system has become less reliable over the last 20 years because demand for water has continued to grow while new supplies have not been developed in amounts sufficient to meet the increased demand.

(6) There are a variety of measures for developing new water supplies including water reclamation, water conservation, conjunctive use, water transfers, seawater desalination, and surface water and groundwater storage.

(7) With increasing frequency, California's water agencies are required to impose water rationing on their residential and business customers during this state's frequent and severe periods of drought.

(8) The identification and development of water supplies needed during multiple-year droughts is vital to California's business climate, as well as to the health of the agricultural industry, environment, rural communities, and residents who continue to face the possibility of severe water cutbacks during water shortage periods.

(9) A recent study indicates that the water supply and land use planning linkage, established by Part 2.10 (commencing with Section 10910) of Division 6 of the Water Code, has not been implemented in a manner that ensures the appropriate level of communication between water agencies and planning agencies, and this act is intended to remedy that deficiency in communication.

(b) It is the intent of the Legislature to strengthen the process pursuant to which local agencies determine the adequacy of existing and planned future water supplies to meet existing and planned future demands on those water supplies.

SEC. 2. Section 21151.9 of the Public Resources Code is amended to read:
21151.9. Whenever a city or county determines that a project, as defined in Section 10912 of the Water Code, is subject to this division, it shall comply with Part 2.10 (commencing with Section 10910) of Division 6 of the Water Code.

SEC. 3. Section 10631 of the Water Code is amended to read:
10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments as described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the amount and location of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the location, amount, and sufficiency of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(1) An average water year.
(2) A single dry water year.
(3) Multiple dry water years.

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to replace that source with alternative sources or water demand management measures, to the extent practicable.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses:

(A) Single-family residential.
(B) Multifamily.
(C) Commercial
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.

(2) The water use projections shall be in the same five-year increments as described in subdivision (a). (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

(A) Water survey programs for single-family residential and multifamily residential customers.
(B) Residential plumbing retrofit.
(C) System water audits, leak detection, and repair.
(D) Metering with commodity rates for all new connections and retrofit of existing connections.
(E) Large landscape conservation programs and incentives.
(F) High-efficiency washing machine rebate programs.
(G) Public information programs.
(H) School education programs.
(I) Conservation programs for commercial, industrial, and institutional accounts.
(J) Wholesale agency programs.
(K) Conservation pricing.
(L) Water conservation coordinator.
(M) Water waste prohibition.
(N) Residential ultra-low-flush toilet replacement programs.

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of such savings on the supplier's ability to further reduce demand.

(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and non-economic factors, including environmental, social, health, customer impact, and technological factors.

(2) Include a cost-benefit analysis, identifying total benefits and total costs.

(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

(h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single dry, and multiple dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

(i) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to that council in accordance with the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).

SEC. 3.5. Section 10631 of the Water Code is amended to read:
10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments as described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(1) An average water year.

(2) A single dry water year.

(3) Multiple dry water years. For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses:

(A) Single-family residential.
(B) Multifamily.
(C) Commercial.
(D) Industrial
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.

(2) The water use projections shall be in the same five-year increments as described in subdivision (a).

(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

(A) Water survey programs for single-family residential and multifamily residential customers.
(B) Residential plumbing retrofit.
(C) System water audits, leak detection, and repair.
(D) Metering with commodity rates for all new connections and retrofit of existing connections.
(E) Large landscape conservation programs and incentives.
(F) High-efficiency washing machine rebate programs.
(G) Public information programs.
(H) School education programs.
(I) Conservation programs for commercial, industrial, and institutional accounts.
(J) Wholesale agency programs.
(K) Conservation pricing.
(L) Water conservation coordinator.
(M) Water waste prohibition.
(N) Residential ultra-low-flush toilet replacement programs.

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.

(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.

(2) Include a cost-benefit analysis, identifying total benefits and total costs.

(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

(h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single dry, and multiple dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

(i) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to that council in accordance with the ''Memorandum of Understanding Regarding Urban Water Conservation in California,'' dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).
SEC. 4. Section 10656 of the Water Code is amended to read:
10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

SEC. 4.3. Section 10657 is added to the Water Code, to read:
10657. (a) The department shall take into consideration whether the urban water supplier has submitted an updated urban water management plan that is consistent with Section 10631, as amended by the act that adds this section, in determining whether the urban water supplier is eligible for funds made available pursuant to any program administered by the department.

(b) This section shall remain in effect only until January 1, 2006, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2006, deletes or extends that date.

SEC. 4.5. Section 10910 of the Water Code is amended to read:
10910. (a) Any city or county that determines that a project, as defined in Section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part.

(b) The city or county, at the time that it determines whether an environmental impact report, a negative declaration, or a mitigated negative declaration is required for any project subject to the California Environmental Quality Act pursuant to Section 21080.1 of the Public Resources Code, shall identify any water system that is, or may become as a result of supplying water to the project identified pursuant to this subdivision, a public water system, as defined in Section 10912, that may supply water for the project. If the city or county is not able to identify any public water system that may supply water for the project, the city or county shall prepare the water assessment required by this part after consulting with any entity serving domestic water supplies whose service area includes the project site, the local agency formation commission, and any public water system adjacent to the project site.

(c) (1) The city or county, at the time it makes the determination required under Section 21080.1 of the Public Resources Code, shall request each public water system identified pursuant to subdivision (b) to determine whether the projected water demand associated with a proposed project was included as part of the most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610).

(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

(3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water supply assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

(4) If the city or county is required to comply with this part pursuant to subdivision (b), the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

(d) (1) The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts.

(2) An identification of existing water supply entitlements, water rights, or water service contracts held by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall be demonstrated by providing information related to all of the following:

(A) Written contracts or other proof of entitlement to an identified water supply.

(B) Copies of a capital outlay program for financing the delivery of a water supply that has been adopted by the public water system.

(C) Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply.

(D) Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.

(e) If no water has been received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts, the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall also include in its water supply assessment pursuant to subdivision (c), an identification of the other public water systems or water service contract-holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts, to the same source of water as the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has identified as a source of water supply within its water supply assessments.

(f) If a water supply for a proposed project includes groundwater, the following additional information shall be included in the water supply assessment:

(1) A review of any information contained in the urban water management plan relevant to the identified water supply for the proposed project.

(2) A description of any groundwater basin or basins from which the proposed project will be supplied. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), of the efforts being undertaken in the basin or basins to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), for the past five years from any groundwater basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), from any basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(5) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project. A water supply assessment shall not be required to include the information required by this paragraph if the public water system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial and projected water demand associated with the project was addressed in the description and analysis required by paragraph (4) of subdivision (b) of Section 10631.

(g) (1) Subject to paragraph (2), the governing body of each public water system shall submit the assessment to the city or county not later than 90 days from the date on which the request was received. The governing body of each public water system, or the city or county if either is required to comply with this act pursuant to subdivision (b), shall approve the assessment prepared pursuant to this section at a regular or special meeting.

(2) Prior to the expiration of the 90-day period, if the public water system intends to request an extension of time to prepare and adopt the assessment, the public water system shall meet with the city or county to request an extension of time, which shall not exceed 30 days, to prepare and adopt the assessment.

(3) If the public water system fails to request an extension of time, or fails to submit the assessment notwithstanding the extension of time granted pursuant to paragraph (2), the city or county may seek a writ of mandamus to compel the governing body of the public water system to comply with the requirements of this part relating to the submission of the water supply assessment.

(h) Notwithstanding any other provision of this part, if a project has been the subject of a water supply assessment that complies with the requirements of this part, no additional water supply assessment shall be required for subsequent projects that were part of a larger project for which a water supply assessment was completed and that has complied with the requirements of this part and for which the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has concluded that its water supplies are sufficient to meet the projected water demand associated with the proposed project, in addition to the existing and planned future uses, including, but not limited to, agricultural and industrial uses, unless one or more of the following changes occurs:

(1) Changes in the project that result in a substantial increase in water demand for the project.

(2) Changes in the circumstances or conditions substantially affecting the ability of the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), to provide a sufficient supply of water for the project.

(3) Significant new information becomes available which was not known and could not have been known at the time when the assessment was prepared.

SEC. 5. Section 10911 of the Water Code is amended to read:
10911. (a) If, as a result of its assessment, the public water system concludes that its water supplies are, or will be, insufficient, the public water system shall provide to the city or county its plans for acquiring additional water supplies, setting forth the measures that are being undertaken to acquire and develop those water supplies. If the city or county, if either is required to comply with this part pursuant to subdivision (b), concludes as a result of its assessment, that water supplies are, or will be, insufficient, the city or county shall include in its water supply assessment its plans for acquiring additional water supplies, setting forth the measures that are being undertaken to acquire and develop those water supplies. Those plans may include, but are not limited to, information concerning all of the following:

(1) The estimated total costs, and the proposed method of financing the costs, associated with acquiring the additional water supplies.

(2) All federal, state, and local permits, approvals, or entitlements that are anticipated to be required in order to acquire and develop the additional water supplies.

(3) Based on the considerations set forth in paragraphs (1) and (2), the estimated timeframes within which the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), expects to be able to acquire additional water supplies.

(b) The city or county shall include the water supply assessment provided pursuant to Section 10910, and any information provided pursuant to subdivision (a), in any environmental document prepared for the project pursuant to Division 13 (commencing with Section 21000) of the Public Resources Code.

(c) The city or county may include in any environmental document an evaluation of any information included in that environmental document provided pursuant to subdivision (b). The city or county shall determine, based on the entire record, whether projected water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses. If the city or county determines that water supplies will not be sufficient, the city or county shall include that determination in its findings for the project.

SEC. 6. Section 10912 of the Water Code is amended to read:
10912. For the purposes of this part, the following terms have the following meanings:

(a) ''Project'' means any of the following:

(1) A proposed residential development of more than 500 dwelling units.

(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.

(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.

(4) A proposed hotel or motel, or both, having more than 500 rooms.

(5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.

(6) A mixed-use project that includes one or more of the projects specified in this subdivision.

(7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

(b) If a public water system has fewer than 5,000 service connections, then ''project'' means any proposed residential, business, commercial, hotel or motel, or industrial development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections, or a mixed-use project that would demand an amount of water equivalent to, or greater than, the amount of water required by residential development that would represent an increase of 10 percent or more in the number of the public water system's existing service connections.

(c) ''Public water system'' means a system for the provision of piped water to the public for human consumption that has 3000 or more service connections. A public water system includes all of the following:

(1) Any collection, treatment, storage, and distribution facility under control of the operator of the system which is used primarily in connection with the system.

(2) Any collection or pretreatment storage facility not under the control of the operator that is used primarily in connection with the system.

(3) Any person who treats water on behalf of one or more public water systems for the purpose of rendering it safe for human consumption.

SEC. 7. Section 10913 of the Water Code is repealed.

SEC. 8. Section 10915 of the Water Code is amended to read:
10915. The County of San Diego is deemed to comply with this part if the Office of Planning and Research determines that all of the following conditions have been met:

(a) Proposition C, as approved by the voters of the County of San Diego in November 1988, requires the development of a regional growth management plan and directs the establishment of a regional planning and growth management review board.

(b) The County of San Diego and the cities in the county, by agreement, designate the San Diego Association of Governments as that review board.

(c) A regional growth management strategy that provides for a comprehensive regional strategy and a coordinated economic development and growth management program has been developed pursuant to Proposition C.

(d) The regional growth management strategy includes a water element to coordinate planning for water that is consistent with the requirements of this part.

(e) The San Diego County Water Authority, by agreement with the San Diego Association of Governments in its capacity as the review board, uses the association's most recent regional growth forecasts for planning purposes and to implement the water element of the strategy.

(f) The procedures established by the review board for the development and approval of the regional growth management strategy, including the water element and any certification process established to ensure that a project is consistent with that element, comply with the requirements of this part.

(g) The environmental documents for a project located in the County of San Diego include information that accomplishes the same purposes as a water supply assessment that is prepared pursuant to Section 10910.

SEC. 9.
Section 3.5 of this bill incorporates amendments to Section 10631 of the Water Code proposed by both this bill and AB 901. It shall only become operative if (1) both bills are enacted and become effective on or before January 1, 2002, (2) each bill amends Section 10631 of the Water Code, and (3) this bill is enacted after AB 901, in which case Section 3 of this bill shall not become operative.

SEC. 10.
No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution because a local agency or school district has the authority to levy service charges, fees, or assessments sufficient to pay for the program or level of service mandated by this act, within the meaning of Section 17556 of the Government Code.

Appendix B

Chapter 642, Statutes of 2001 (Senate Bill No. 221)

Chapter 642, Statutes of 2001 (Senate Bill No. 221)

An act to amend Section 11010 of the Business and Professions Code, and to amend Section 65867.5 of, and to add Sections 66455.3 and 66473. 7 to, the Government Code, relating to land use. Approved by Governor October 9, 2001. Filed with Secretary of State October 9, 2001.

The people of the State of California do enact as follows:

SECTION 1. Section 11010 of the Business and Professions Code is amended to read:
11010. (a) Except as otherwise provided pursuant to subdivision (c) or elsewhere in this chapter, any person who intends to offer subdivided lands within this state for sale or lease shall file with the Department of Real Estate an application for a public report consisting of a notice of intention and a completed questionnaire on a form prepared by the department.

(b) The notice of intention shall contain the following information about the subdivided lands and the proposed offering:

(1) The name and address of the owner.
(2) The name and address of the subdivider.
(3) The legal description and area of lands.
(4) A true statement of the condition of the title to the land, particularly including all encumbrances thereon.

(5) A true statement of the terms and conditions on which it is intended to dispose of the land, together with copies of any contracts intended to be used.

(6) A true statement of the provisions, if any, that have been made for public utilities in the proposed subdivision, including water, electricity, gas, telephone, and sewerage facilities. For subdivided lands that were subject to the imposition of a condition pursuant to subdivision (b) of Section 66473.7 of the Government Code, the true statement of the provisions made for water shall be satisfied by submitting a copy of the written verification of the available water supply obtained pursuant to Section 66473.7 of the Government Code.

(7) A true statement of the use or uses for which the proposed subdivision will be offered.

(8) A true statement of the provisions, if any, limiting the use or occupancy of the parcels in the subdivision.

(9) A true statement of the amount of indebtedness that is a lien upon the subdivision or any part thereof, and that was incurred to pay for the construction of any onsite or offsite improvement, or any community or recreational facility.

(10) A true statement or reasonable estimate, if applicable, of the amount of any indebtedness which has been or is proposed to be incurred by an existing or proposed special district, entity, taxing area, assessment district, or community facilities district within the boundaries of which, the subdivision, or any part thereof, is located, and that is to pay for the construction or installation of any improvement or to furnish community or recreational facilities to that subdivision, and which amounts are to be obtained by ad valorem tax or assessment, or by a special assessment or tax upon the subdivision, or any part thereof.

(11) (A) As to each school district serving the subdivision, a statement from the appropriate district that indicates the location of each high school, junior high school, and elementary school serving the subdivision, or documentation that a statement to that effect has been requested from the appropriate school district.

(B) In the event that, as of the date the notice of intention and application for issuance of a public report are otherwise deemed to be qualitatively and substantially complete pursuant to Section 11010.2, the statement described in subparagraph (A) has not been provided by any school district serving the subdivision, the person who filed the notice of intention and application for issuance of a public report immediately shall provide the department with the name, address, and telephone number of that district.

(12) The location of all existing airports, and of all proposed airports shown on the general plan of any city or county, located within two statute miles of the subdivision.

(13) A true statement, if applicable, referencing any soils or geologic report or soils and geologic reports that have been prepared specifically for the subdivision.

(14) A true statement of whether or not fill is used, or is proposed to be used in the subdivision and a statement giving the name and the location of the public agency where information concerning soil conditions in the subdivision is available.

(15) Any other information that the owner, his or her agent, or the subdivider may desire to present.

(c) The commissioner may, by regulation, or on the basis of the particular circumstances of a proposed offering, waive the requirement of the submission of a completed questionnaire if the commissioner determines that prospective purchasers or lessees of the subdivision interests to be offered will be adequately protected through the issuance of a public report based solely upon information contained in the notice of intention.

SEC. 2. Section 65867.5 of the Government Code is amended to read:
65867. 5. (a) A development agreement is a legislative act that shall be approved by ordinance and is subject to referendum.

(b) A development agreement shall not be approved unless the legislative body finds that the provisions of the agreement are consistent with the general plan and any applicable specific plan.

(c) A development agreement that includes a subdivision, as defined in Section 66473.7, shall not be approved unless the agreement provides that any tentative map prepared for the subdivision will comply with the provisions of Section 66473.7.

SEC. 3. Section 66455.3 is added to the Government Code, to read:
66455. 3. Not later than five days after a city or county has determined that a tentative map application for a proposed subdivision, as defined in Section 66473.7, is complete pursuant to Section 65943, the local agency shall send a copy of the application to any water supplier that is, or may become, a public water system, as defined in Section 10912 of the Water Code, that may supply water for the subdivision.

SEC. 4. Section 66473.7 is added to the Government Code, to read:
66473. 7. (a) For the purposes of this section, the following definitions apply:
(1) ''Subdivision'' means a proposed residential development of more than 500 dwelling units, except that for a public water system that has fewer than 5,000 service connections, ''subdivision'' means any proposed residential development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections.

(2) ''Sufficient water supply'' means the total water supplies available during normal, single-dry, and multiple-dry years within a 20- year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses. In determining ''sufficient water supply,'' all of the following factors shall be considered:

(A) The availability of water supplies over a historical record of at least 20 years.

(B) The applicability of an urban water shortage contingency analysis prepared pursuant to Section 10632 of the Water Code that includes actions to be undertaken by the public water system in response to water supply shortages.

(C) The reduction in water supply allocated to a specific water use sector pursuant to a resolution or ordinance adopted, or a contract entered into, by the public water system, as long as that resolution, ordinance, or contract does not conflict with Section 354 of the Water Code.

(D) The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d).

(3) ''Public water system'' means the water supplier that is, or may become as a result of servicing the subdivision included in a tentative map pursuant to subdivision (b), a public water system, as defined in Section 10912 of the Water Code, that may supply water for a subdivision.

(b) (1) The legislative body of a city or county or the advisory agency, to the extent that it is authorized by local ordinance to approve, conditionally approve, or disapprove the tentative map, shall include as a condition in any tentative map that includes a subdivision a requirement that a sufficient water supply shall be available. Proof of the availability of a sufficient water supply shall be requested by the subdivision applicant or local agency, at the discretion of the local agency, and shall be based on written verification from the applicable public water system within 90 days of a request.

(2) If the public water system fails to deliver the written verification as required by this section, the local agency or any other interested party may seek a writ of mandamus to compel the public water system to comply.

(3) If the written verification provided by the applicable public water system indicates that the public water system is unable to provide a sufficient water supply that will meet the projected demand associated with the proposed subdivision, then the local agency may make a finding, after consideration of the written verification by the applicable public water system, that additional water supplies not accounted for by the public water system are, or will be, available prior to completion of the subdivision that will satisfy the requirements of this section. This finding shall be made on the record and supported by substantial evidence.

(4) If the written verification is not provided by the public water system, notwithstanding the local agency or other interested party securing a writ of mandamus to compel compliance with this section, then the local agency may make a finding that sufficient water supplies are, or will be, available prior to completion of the subdivision that will satisfy the requirements of this section. This finding shall be made on the record and supported by substantial evidence.

(c) The applicable public water system's written verification of its ability or inability to provide a sufficient water supply that will meet the projected demand associated with the proposed subdivision as required by subdivision (b) shall be supported by substantial evidence. The substantial evidence may include, but is not limited to, any of the following:

(1) The public water system's most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610) of Division 6 of the Water Code.

(2) A water supply assessment that was completed pursuant to Part 2. 10 (commencing with Section 10910) of Division 6 of the Water Code.

(3) Other information relating to the sufficiency of the water supply that contains analytical information that is substantially similar to the assessment required by Section 10635 of the Water Code.

(d) When the written verification pursuant to subdivision (b) relies on projected water supplies that are not currently available to the public water system, to provide a sufficient water supply to the subdivision, the written verification as to those projected water supplies shall be based on all of the following elements, to the extent each is applicable:

(1) Written contracts or other proof of valid rights to the identified water supply that identify the terms and conditions under which the water will be available to serve the proposed subdivision.

(2) Copies of a capital outlay program for financing the delivery of a sufficient water supply that has been adopted by the applicable governing body.

(3) Securing of applicable federal, state, and local permits for construction of necessary infrastructure associated with supplying a sufficient water supply.

(4) Any necessary regulatory approvals that are required in order to be able to convey or deliver a sufficient water supply to the subdivision.

(e) If there is no public water system, the local agency shall make a written finding of sufficient water supply based on the evidentiary requirements of subdivisions (c) and (d) and identify the mechanism for providing water to the subdivision.

(f) In making any findings or determinations under this section, a local agency, or designated advisory agency, may work in conjunction with the project applicant and the public water system to secure water supplies sufficient to satisfy the demands of the proposed subdivision. If the local agency secures water supplies pursuant to this subdivision, which supplies are acceptable to and approved by the governing body of the public water system as suitable for delivery to customers, it shall work in conjunction with the public water system to implement a plan to deliver that water supply to satisfy the long-term demands of the proposed subdivision.

(g) The written verification prepared under this section shall also include a description, to the extent that data is reasonably available based on published records maintained by federal and state agencies, and public records of local agencies, of the reasonably foreseeable impacts of the proposed subdivision on the availability of water resources for agricultural and industrial uses within the public water system's service area that are not currently receiving water from the public water system but are utilizing the same sources of water. To the extent that those reasonably foreseeable impacts have previously been evaluated in a document prepared pursuant to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) or the National Environmental Policy Act (Public Law 91- 190) for the proposed subdivision, the public water system may utilize that information in preparing the written verification.

(h) Where a water supply for a proposed subdivision includes groundwater, the public water system serving the proposed subdivision shall evaluate, based on substantial evidence, the extent to which it or the landowner has the right to extract the additional groundwater needed to supply the proposed subdivision. Nothing in this subdivision is intended to modify state law with regard to groundwater rights.

(i) This section shall not apply to any residential project proposed for a site that is within an urbanized area and has been previously developed for urban uses, or where the immediate contiguous properties surrounding the residential project site are, or previously have been, developed for urban uses, or housing projects that are exclusively for very low and low-income households.

(j) The determinations made pursuant to this section shall be consistent with the obligation of a public water system to grant a priority for the provision of available and future water resources or services to proposed housing developments that help meet the city's or county's share of the regional housing needs for lower income households, pursuant to Section 65589.7.

(k) The County of San Diego shall be deemed to comply with this section if the Office of Planning and Research determines that all of the following conditions have been met:

(1) A regional growth management strategy that provides for a comprehensive regional strategy and a coordinated economic development and growth management program has been developed pursuant to Proposition C as approved

by the voters of the County of San Diego in November 1988, which required the development of a regional growth management plan and directed the establishment of a regional planning and growth management review board.

(2) Each public water system, as defined in Section 10912 of the Water Code, within the County of San Diego has adopted an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) of the Water Code.

(3) The approval or conditional approval of tentative maps for subdivisions, as defined in this section, by the County of San Diego and the cities within the county requires written communications to be made by the public water system to the city or county, in a format and with content that is substantially similar to the requirements contained in this section, with regard to the availability of a sufficient water supply, or the reliance on projected water supplies to provide a sufficient water supply, for a proposed subdivision.

(l) Nothing in this section shall preclude the legislative body of a city or county, or the designated advisory agency, at the request of the applicant, from making the determinations required in this section earlier than required pursuant to subdivision (a).

(m) Nothing in this section shall be construed to create a right or entitlement to water service or any specific level of water service.

(n) Nothing in this section is intended to change existing law concerning a public water system's obligation to provide water service to its existing customers or to any potential future customers.

(o) Any action challenging the sufficiency of the public water system's written verification of a sufficient water supply shall be governed by Section 66499.37.

SEC. 5.

No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution because a local agency or school district has the authority to levy service charges, fees, or assessments sufficient to pay for the program or level of service mandated by this act, within the meaning of Section 17556 of the Government Code.

Appendix C

Urban Water Management Plan – sample groundwater section

Established: AB 797, Klehs, 1983
Amended: AB 2661, Klehs, 1990
AB 11X, Filante, 1991
AB 1869, Speier, 1991
AB 892, Frazee, 1993
SB 1017, McCorquodale, 1994
AB 2853, Cortese, 1994
AB 1845, Cortese, 1995
SB 1011, Polanco, 1995
AB 2552, Bates, 2000
SB 553, Kelley, 2000
SB 610, Costa, 2001
AB 901, Daucher, 2001
SB 672, Machado, 2001
SB 1348, Brulte, 2002
SB 1384 Costa, 2002
SB 1518 Torlakson, 2002

CALIFORNIA WATER CODE DIVISION 6
PART 2.6. URBAN WATER MANAGEMENT PLANNING
CHAPTER 1. GENERAL DECLARATION AND POLICY

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. (a) The Legislature finds and declares all of the following:
(1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.
(2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.
(3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.
(4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.
(5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.
(6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.
(7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.
(8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.
(9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.
(b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.
10610.4. The Legislature finds and declares that it is the policy of the state as follows:
(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.
(c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

CHAPTER 2. DEFINITIONS

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.
10611.5. "Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.
10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.
10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.
10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.
10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.
10616. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.
10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.
10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

CHAPTER 3. URBAN WATER MANAGEMENT PLANS

Article 1. General Provisions

10620.
(a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).
(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.
(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.
(d)
(1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

10621.

(a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero.

(b) Every urban water supplier required to prepare a plan pursuant to this part shall notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

(c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

Article 2. Contents of Plans

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(1) An average water year.

(2) A single dry water year.
(3) Multiple dry water years.
For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.
(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.
(e)
(1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:
(A) Single-family residential.
(B) Multifamily.
(C) Commercial.
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.
(2) The water use projections shall be in the same five-year increments described in subdivision (a).
(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:
(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:
(A) Water survey programs for single-family residential and multifamily residential customers.
(B) Residential plumbing retrofit.
(C) System water audits, leak detection, and repair.
(D) Metering with commodity rates for all new connections and retrofit of existing connections.
(E) Large landscape conservation programs and incentives.
(F) High-efficiency washing machine rebate programs.
(G) Public information programs.
(H) School education programs.
(I) Conservation programs for commercial, industrial, and institutional accounts.
(J) Wholesale agency programs.
(K) Conservation pricing.
(L) Water conservation coordinator.
(M) Water waste prohibition.
(N) Residential ultra-low-flush toilet replacement programs.
(2) A schedule of implementation for all water demand management measures proposed or described in the plan.
(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.
(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.
(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.
(2) Include a cost-benefit analysis, identifying total benefits and total costs.
(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.
(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

(h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

(i) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to that council in accordance with the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).

(j) Urban water suppliers that rely upon a wholesale agency for a source of water, shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).

10631.5. The department shall take into consideration whether the urban water supplier is implementing or scheduled for implementation, the water demand management activities that the urban water supplier identified in its urban water management plan, pursuant to Section 10631, in evaluating applications for grants and loans made available pursuant to Section 79163. The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities.

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

(a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

(b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.

(c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

(d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

(e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.
(f) Penalties or charges for excessive use, where applicable.
(g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.
(h) A draft water shortage contingency resolution or ordinance.
(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.
10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:
(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.
(b) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.
(c) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.
(d) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.
(e) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.
(f) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.
10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

Article 2.5 Water Service Reliability

10635.
(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.
(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

Articl 3. Adoption and Implementation of Plans

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630). The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644.

(a) An urban water supplier shall file with the department and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be filed with the department and any city or county within which the supplier provides water supplies within 30 days after adoption.

(b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the outstanding elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has filed its plan with the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

10645. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

CHAPTER 4. MISCELLANEOUS PROVISIONS

10650. Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the "Memorandum of Understanding Regarding Urban Water Conservation in California" is deemed to be reasonable for the purposes of this section.

10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

10657.

(a) The department shall take into consideration whether the urban water supplier has submitted an updated urban water management plan that is consistent with Section 10631, as amended by the act that adds this section, in determining whether the urban water supplier is eligible for funds made available pursuant to any program administered by the department.

(b) This section shall remain in effect only until January 1, 2006, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2006, deletes or extends that date.

Appendix D

Other Resources

- California Environmental Quality Act - http://ceres.ca.gov/ceqa/
- Governor's Office of Planning and Research Planning, Zoning and Development Laws 2000 - http://www.opr.ca.gov/publications/PublicationsIndex.shtml#pubs-P
- California Land Use Planning Information Network - http://ceres.ca.gov/planning/
- The Governor's Office of Planning and Research - http://www.opr.ca.gov/
- US Bureau of Reclamation Lower Colorado Regional Office - http://www.usbr.gov/lc/region/
- US Bureau of Reclamation Mid-Pacific Region - http://www.usbr.gov/mp/
- California Department of Water Resources-Bay Delta Office State Water Project Delivery Reliabilty Report - http://swpdelivery.water.ca.gov/
- Metropolitan Water District of Southern California - http://www.mwdh2o.com/
- California Department of Water Resources Division of Planning and Local Assistance-Groundwater Management in California - http://wwwdpla.water.ca.gov/cgi-bin/supply/gw/management/hq/main.pl
- Governors Office of Planning and Research General Plan Guidelines - http://www.opr.ca.gov/

Original Notice of Preparation and Initial Study

NOTICE OF PREPARATION

TO: State Clearinghouse
Office of Planning Research
P.O. Box 3044
Sacramento, CA 95812-3044

FROM: City of Santa Clarita
23920 Valencia Blvd., Suite 300
Santa Clarita, CA 91355

SUBJECT: **Notice of Preparation of Draft Environmental Impact Report**

The City of Santa Clarita will be the lead agency and will prepare an Environmental Impact Report for the project identified below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the probable environmental effects are contained in the attached materials. A copy of the Initial Study is attached.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date, but not later than 30 days after receipt of this notice.

Please send your written response to Jeff Hogan, Associate Planner or Wendy Deats, Assistant Planner II at the address shown above. We would appreciate the name of a contact person in your agency.

Project Title: Riverpark (Panhandle); Tentative Tract Map 53425

Project Applicant: Newhall Land and Farming Company

Date: September 16, 2002 WDeats

Title: Wendy Deats, Assistant Planner II

Telephone: (661) 255-4330

Reference: California Administrative Code, Title 14, Sections 15082(a), 15103, 15375.

s:\pbs\current\!2002\02-175\nop

NOTICE OF COMPLETION

Mail to: State Clearinghouse, 1400 Tenth Street, Sacramento, CA 95814 916/445-0613

See NOTE below
SCH #________

Project Title: Riverpark
Lead Agency: City of Santa Clarita
Contact Person: Jeff Hogan/Wendy Deats
Street Address: 23920 Valencia Boulevard, Suite 300
Phone: (661) 255-4330
City: Santa Clarita
Zip: 91355
County: Los Angeles

Project Location
County: Los Angeles
City/Nearest Community: Santa Clarita
Cross Streets: East of Bouquet Canyon, north of Soledad Canyon Road
Total Acres: 664.3
Assessor's Parcel No. ______ Section: ____ Twp. __ Range: ____ Base: _
Within 2 Miles: State Hwy #: ______ Waterways: ______
Airports: ______ Railways: ______ Schools: Bridgeport Elementary is located to the west, Emblem Elementary is located to the northwest, Continuation High School, Academy of the Canyon High School and Passport High School are located to the southeast of the project site.

Document Type

CEQA:		NEPA:	
X NOP	___ Supplement/Subsequent	___ NOI	___ Joint Document
___ Early Cons	___ EIR (Prior SCH No.) ______	___ EA	___ Final Document
___ Neg Dec	___ Other ______	___ Draft EIS	___ Other ______
___ Draft EIR		___ FONSI	

Local Action Type

___ General Plan Update	___ Specific Plan	X Rezone	___ Annexation
X General Plan Amendment	___ Master Plan	___ Prezone	___ Redevelopment
___ General Plan Element	___ Planned Unit Develop.	X Use Permit	___ Coastal Permit
___ Community Plan	___ Site Plan	X Land Division (Subdiv., Parcel Map, Tract Map, etc.)	X Other Oak Tree Permit and Hillside Review

Development Type

X Residential:	*Units* 1152 *Acres* 335		___ Water Facilities:	*Type* ____ *MGD* ____
___ Office:	*Sq.ft.* ___ *Acres* ___ *Employees* ___		___ Transportation:	*Type* ____
___ Commercial:	*Sq.ft.* ___ *Acres* ___ *Employees* ___		___ Mining:	*Mineral* ____
___ Industrial:	*Sq.ft.* ___ *Acres* ___ *Employees* ___		___ Power:	*Type* ____ *Watts* ____
___ Educational	______		___ Waste Treatment:	*Type* ____
___ Recreational	______		___ Hazardous Waste:	*Type* ____
			___ Other:	____

Project Issues Discussed in Document

X Aesthetic/Visual	X Flood Plain/Flooding	X Schools/Universities	X Water Quality
___ Agricultural Land	X Forest Land/Fire Haz	___ Septic Systems	X Water Supply/Grndwtr
X Air Quality	X Geologic/Seismic	X Sewer Capacity	X Wetland/Riparian
X Archaeolog/Historical	X Minerals	X Soil Erosion/Cmp/Grdg	X Wildlife
___ Coastal Zone	X Noise	X Solid Waste	X Growth Inducing
X Drainage/Absorption	___ Pop/Housing Balance	X Toxic/Hazardous	X Land Use
___ Economic/Jobs	X Public Serv/Facilities	X Traffic/Circulation	X Cumulative Effects
___ Fiscal	X Recreation/Parks	X Vegetation	___ Other ______

Present Land Use/Zoning/General Plan Use: The current zoning of the project site is industrial Commercial (IC), Commercial Office Planned Development (CO PD), Community Commercial Planned Development (CC PD), and Mobile Home Park (MHP). The General Plan Land Use for the site is General Plan Valley Center Concept.

Project Description: The project proposal includes the development of 590 apartments, 84 townhouses and ~~478~~ 425 single-family dwellings. A 29-acre park is also proposed along the Santa Clara River. Approximately 300-acres of river area located within the project boundary will remain in a natural state with the exception of the future construction of Newhall Ranch Road and bank stabilization work. Development of the site will require 5.5 million cubic yards of grading which will be balanced onsite. The grading is required for the construction of the project as well as the future Newhall Ranch Road and Golden Valley Road Bridge project.

NOTE: Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g., from a Notice of Preparation or previous draft document), please fill it in.

Reviewing Agencies Checklist

KEY
S = Document sent by lead agency
X = Document sent by SCH
3 = Suggested distribution

____**Resources Agency**
____Boating & Waterways
____Coastal Commission
____Coastal Conservancy
____Colorado River Board
____Conservation
____Fish & Game
____Forestry
____Office of Historic Preservation
____Parks & Recreation
____Reclamation
____S.F. Bay Conservation & Development Commission
____Water Resources (DWR)

Business, Transportation & Housing
____Aeronautics
____California Highway Patrol
____Caltrans District #__________
____Department of Transportation Planning (headquarters)
____Housing & Community Development
____Food & Agriculture

Health & Welfare
____Health Services ____________________

State & Consumer Services
____General Services
____OLA (Schools)

Environmental Affairs
____Air Resources Board
____APCD/AQMD
____California Waste Management Board
____SWRCB: Clean Water Grants
____SWRCB: Delta Unit
____SWRCB: Water Quality
____SWRCB: Water Rights
____Regional WQCB #________________

Youth & Adult Corrections
____Corrections

Independent Commissions & Offices
____Energy Commission
____Native American Heritage Commission
____Public Utilities Commission
____Santa Monica Mountains Conservancy
____State Lands Commission
____Tahoe Regional Planning Agency

____Other ______________________________

Public Review Period (to be filled in by lead agency)

Starting Date September 18, 2002

Ending Date October 18, 2002

Signature

Date 9·16·02

Lead Agency (Complete if applicable):

Consulting Firm: Impact Sciences
Address: 30343 Canwood Street

City/State/Zip: Agoura Hills, CA. 91301

Contact: Susan Tebo

Phone: (818) 879-1100

Applicant: The Newhall Land and Farming Company/Glenn Adamick
Address: 23823 Valencia Boulevard
City/State/Zip: Valencia, CA 91355-2194
Phone: ( ) (661) 255-4003

For SCH Use Only:

Date Received at SCH

Date Review Starts

Date to Agencies

Date to SCH

Clearance Date

Notes:

INITIAL STUDY
CITY OF SANTA CLARITA

Lead Agency:

City of Santa Clarita
23920 Valencia Boulevard, Suite 300
Santa Clarita, California 91355

Contact Person & Phone Number:

Jeff Hogan, Associate Planner
Wendy Deats, Assistant Planner II
City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Boulevard
Santa Clarita, California 93155
(661) 255-4330

Master Case:

MC 02-175; Tentative Tract Map 53425; General Plan Amendment 02-002; Zone Change 02-002; Conditional Use Permit 02-009; Hillside Review 02-003; and Oak Tree Permit 02-025

Project Introduction:

The applicant, The Newhall Land and Farming Company, proposes the future development of a 664.3-acre site at the terminus of Newhall Ranch Road, east of Bouquet Canyon Road between the Castaic Lake Water Agency property and the Santa Clara River, north of Soledad Canyon Road. The proposal is titled Riverpark is located within the General Plan Valley Center Concept (VCC) overlay area and includes the development of 590 apartments, 84 townhouses and ~~478~~ 425 single-family dwellings. A 29-acre park is also proposed along the Santa Clara River and approximately 300 acres of river area will remain in a natural state with the exception of the future construction of Newhall Ranch Road and the bank stabilization work. The current zoning of the project site is: 21.3 acres of Industrial Commercial (IC); 201 acres of Commercial Office Planned Development (CO PD); 131.6 acres of Community Commercial Planned Development (CC PD) and 38.3 acres of Mobile Home Park (MHP). The remaining 272.1 acres is within the Residential Medium zone. The applicant is proposing to change the zoning of the site to Residential Medium (RM) with a Planned Development (PD) overlay and Open Space (OS). The site will require 5.5 million cubic yards of grading which will be balanced on-site. The grading is required for construction of the project, as well as, the future Newhall Ranch Road and Golden Valley Road Bridge. A separate EIR is being prepared by the City of Santa Clarita for these roadways.

Bank stabilization will be constructed along the Santa Clara River for approximately 1,500 linear feet for the east-west extension of Newhall Ranch Road and approximately 4,150 linear feet for the project development.

Project Description:

The applicant proposes to develop six parcels of land totaling 664.3 acres of land for single- and multi-family uses. A tentative tract map is required to subdivide the six lots into ~~478~~ 425 single-family lots, 15 multi-family lots and other lots for utilities and open space. A General Plan Amendment will change the land use designations of the project site to Residential Medium and Open Space. A zone change will change the zoning designations of the site to Residential Medium with a Planned Development overlay (RM PD) and Open Space (OS). Residential Medium will permit a density up to 11 dwellings per acre. A conditional use permit is required to permit cluster development and the hillside development review is for development on slopes with an average cross slope of greater than 10%. The oak tree permit is required for the removal of 25 of the 87 oak trees on site.

Project Location: The Riverpark area is 664.3 acres in area and is located at the terminus of Newhall Ranch Road, east of Bouquet Canyon Road, north of Soledad Canyon Road, adjacent to the Santa Clara River.

General Plan/Zoning Designation: The General Plan designations of the subject sites are Residential Medium, Industrial Commercial, Community Commercial, Commercial Office and Mobile Home Park. In addition, the site is located within the Valley Center Concept (VCC) overlay. The zoning of the project sites include Industrial Commercial (IC), Residential Medium (RM), Commercial Office with a Planned Development overlay (CO PD), Community Commercial with a Planned Development overlay (CC PD) and Mobile Home Park (MHP). The applicant is proposing to change the zoning to Residential Medium Planned Development (RM PD) and Open Space (OS).

Project Applicant:

Newhall Land and Farming Company
23823 Valencia Boulevard
Valencia, California 91355
Attn: Glenn Adamick (661) 255-4003

Surrounding Land Uses and Setting: The Riverpark site incorporates approximately 664.3 acres of land east of Bouquet Canyon, north of Soledad Canyon Road along the Santa Clara River. Both Bouquet Canyon Road and Soledad Canyon Road are major arterials though the center of the City. Open space borders the site to the north, the Santa Clara River borders the site to the south, vacant land borders to the site to the east and commercial uses border the site to the west. The site is located in the center of the City with community of Saugus to the north and west, the community of Canyon Country to the east and the Porta Bella Specific Plan to the south across Soledad Canyon Road.

Other public agencies whose approval is required (e.g. permits, financing approval, or participation agreement): Army Corps of Engineers, U.S. Fish and Wildlife Services, California Department of Transportation, California Department of Fish & Game, Castaic Lake Water Agency, Metropolitan Transportation Authority

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be affected by this project, involving at least one impact that is a **"Potentially Significant Impact"** or **"Potentially Significant Impacts Unless Mitigation Measures Incorporated"** as indicated by the checklist on the following pages.

- [X] Land Use and Planning
- [X] Population and Housing
- [X] Geological Problems
- [X] Water
- [X] Stormwater Management & Recycling
- [X] Air Quality
- [X] Transportation/ Circulation
- [X] Biological Resources
- [X] Noise
- [X] Hazards
- [X] Mandatory Tests of Significance
- [X] Energy and Mineral Resources
- [X] Public Services
- [X] Recreation
- [X] Aesthetics
- [X] Cultural Resources
- [X] Utilities and Service System

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 the <u>mitigation measures</u> described on an attached sheet have been added to the project. A NEGATIVE DECLARATION will be prepared.

[X] I find that the proposed project MAY have a significant impact on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

[ ] I find that the proposed project MAY have a significant effect(s) on the environment, but at least one effect 1) has been mitigated adequately 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, if the effect is a "potentially significant impact" or "potentially significant unless mitigated." An ENVIRONMENTAL IMPACT REPORT, 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, there WILL NOT be a significant effect in this case because all potentially significant effects (a) have been analyzed adequately in an earlier EIR pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR, including revisions or mitigation measures that are imposed upon the proposed project.

Prepared By:		
	Deats	6.18.02
(Signature)	Wendy Deats Assistant Planner II	(Date)
Approved By:		
	Hogan	6/18/02
(Signature)	Jeff Hogan Associate Planner	(Date)

ENVIRONMENTAL IMPACTS:

		Potentially Significant Impact	Potentially Significant Impact Unless Mitigation Incorporated	Less than Significant Impact	No Impact
I.	**LAND USE AND PLANNING. Would the proposal:**				
a)	Conflict with General Plan designation or zoning?	[X]	[ ]	[ ]	[ ]
b)	Conflict with applicable environmental plans or policies adopted by agencies with jurisdiction over the project?	[ ]	[X]	[ ]	[ ]
c)	Be incompatible with existing land use in the city?	[ ]	[X]	[ ]	[ ]
d)	Disrupt or divide the physical arrangement of an established community (including a low-income or minority community)?	[ ]	[ ]	[ ]	[X]
e)	Affect a Significant Ecological Area (SEA)?	[X]	[ ]	[ ]	[ ]
f)	Other____________________	[ ]	[ ]	[ ]	[ ]
II.	**POPULATION AND HOUSING. Would the proposal:**				
a)	Cumulatively exceed official regional or local population projections?	[ ]	[ ]	[X]	[ ]
b)	Create a net loss of jobs?	[ ]	[ ]	[X]	[ ]
c)	Displace existing housing, especially affordable housing?	[ ]	[ ]	[ ]	[X]
d)	Other____________________	[ ]	[ ]	[ ]	[ ]
III.	**GEOLOGIC PROBLEMS. Will the proposal result in:**				
a)	Unstable earth conditions or in changes in geologic substructures?	[X]	[ ]	[ ]	[ ]
b)	Disruptions, displacements, compaction or overcovering of the soil?	[X]	[ ]	[ ]	[ ]

		Potentially Significant Impact	Potentially Significant Impact Unless Mitigation Incorporated	Less than Significant Impact	No Impact
c)	Change in topography or ground surface relief features?	[X]	[ ]	[ ]	[ ]
d)	The destruction, covering or modification of any unique geologic or physical features?	[ ]	[ ]	[X]	[ ]
e)	Any increase in wind or water erosion of soils, either on or off the site?	[X]	[ ]	[ ]	[ ]
f)	Exposure of people or property to geologic hazards such as earthquakes, landslides, mudslides, ground failure, or similar hazards?	[X]	[ ]	[ ]	[ ]
g)	Changes in deposition, erosion or siltation?	[X]	[ ]	[ ]	[ ]
h)	Other modification of a wash, channel, creek, or river?	[X]	[ ]	[ ]	[ ]
i)	Earth movement (cut and/or fill) of 10,000 cubic yards or more?	[X]	[ ]	[ ]	[ ]
j)	Development and/or grading on a slope greater than 25% natural grade?	[X]	[ ]	[ ]	[ ]
k)	Development within the Alquist-Priolo Special Studies Zone?	[ ]	[ ]	[ ]	[X]
l)	Other______________________________	[ ]	[ ]	[ ]	[ ]
IV.	**WATER. Would the proposal result in:**				
a)	Changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?	[X]	[ ]	[ ]	[ ]
b)	Exposure of people or property to water related hazards such as flooding?	[X]	[ ]	[ ]	[ ]
c)	Discharge into surface waters or other alteration of surface water quality (e.g. temperature, dissolved oxygen, or	[X]	[ ]	[ ]	[ ]

		Potentially Significant Impact	Potentially Significant Impact Unless Mitigation Incorporated	Less than Significant Impact	No Impact
	turbidity)				
d)	Changes in the amount of surface water in any water body?	[X]	[ ]	[ ]	[ ]
e)	Changes in currents, or the course of direction of water movements?	[X]	[ ]	[ ]	[ ]
f)	Changes in the quantity of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations or through substantial loss of groundwater recharge capability?	[X]	[ ]	[ ]	[ ]
g)	Altered direction or rate of flow of groundwater?	[X]	[ ]	[ ]	[ ]
h)	Impacts to groundwater quality?	[X]	[ ]	[ ]	[ ]
i)	Substantial reduction in the amount of groundwater otherwise available for public water supplies?	[X]	[ ]	[ ]	[ ]
j)	Other______________________________	[ ]	[ ]	[ ]	[ ]
V.	**STORMWATER MANAGEMENT AND RECYCLING.** **Would the proposal result in:**				
a)	Would the proposed project result in storm water system discharges from areas for materials storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas or loading docks, or other outdoor work areas?	[ ]	[X]	[ ]	[ ]
b)	Would the proposed project result in a significant environmentally harmful increase in the flow rate or volume of the project site or surrounding areas?	[ ]	[X]	[ ]	[ ]
c)	Would the proposed project result in storm water discharges that would significantly impair the beneficial uses of receiving waters or areas that provide	[X]	[ ]	[ ]	[ ]

		Potentially Significant Impact	Potentially Significant Impact Unless Mitigation Incorporated	Less than Significant Impact	No Impact
	water quality benefits (e.g., riparian corridors, wetlands, etc.)?				
d)	Would the proposed project cause harm to the biological integrity of drainage systems and water bodies?	[X]	[ ]	[ ]	[ ]
e)	Does the proposed project include provisions for the separation and reuse of materials?	[ ]	[ ]	[ ]	[X]
VI.	**AIR QUALITY. Would the proposal:**				
a)	Violate any air quality standard or contribute to an existing or projected air quality violation?	[X]	[ ]	[ ]	[ ]
b)	Expose sensitive receptors to pollutants?	[ ]	[X]	[ ]	[ ]
c)	Create objectionable odors?	[ ]	[X]	[ ]	[ ]
d)	Other________________________	[ ]	[ ]	[ ]	[ ]
VII.	**TRANSPORTATION/CIRCULATION. Would the proposal result in:**				
a)	Increased vehicle trips or traffic congestion?	[X]	[ ]	[ ]	[ ]
b)	Hazards to safety from design features (e.g. sharp curves or dangerous intersections) or incompatible uses?	[ ]	[ ]	[ ]	[X]
c)	Inadequate emergency access or access to nearby uses?	[ ]	[X]	[ ]	[ ]
d)	Insufficient parking capacity onsite or offsite?	[ ]	[ ]	[ ]	[X]
e)	Hazards or barriers for pedestrians or bicyclists?	[ ]	[ ]	[ ]	[X]
f)	Conflicts with adopted policies supporting alternative transportation (e.g. bus stops, bicycle racks)?	[ ]	[ ]	[ ]	[X]
g)	Disjointed pattern of roadway	[ ]	[ ]	[X]	[ ]

		Potentially Significant Impact	Potentially Significant Impact Unless Mitigation Incorporated	Less than Significant Impact	No Impact
	improvements				
h)	Other________________________	[ ]	[ ]	[ ]	[ ]
VIII.	**BIOLOGICAL RESOURCES. Would the proposal result in impacts to:**				
a)	Endangered, threatened or rare species or their habitats (including but not limited to plants, fish, insects, animals, and birds)?	[X]	[ ]	[ ]	[ ]
b)	Oak trees?	[X]	[ ]	[ ]	[ ]
c)	Wetland habitat or blueline stream?	[X]	[ ]	[ ]	[ ]
d)	Wildlife dispersal or migration corridors?	[X]	[ ]	[ ]	[ ]
e)	Other: Bank Stabilization	[X]	[ ]	[ ]	[ ]
IX.	**ENERGY AND MINERAL RESOURCES. Would the proposal:**				
a)	Conflict with adopted energy conservation plans?	[ ]	[X]	[ ]	[ ]
b)	Use nonrenewable resources in a wasteful and inefficient manner?	[ ]	[ ]	[ ]	[X]
c)	Result in the loss of availability of a known mineral resource that would be of future value to the region and the residents of the State?	[ ]	[X]	[ ]	[ ]
d)	Other________________________	[ ]	[ ]	[ ]	[ ]
X.	**HAZARDS. Would the proposal involve:**				
a)	A risk of accidental explosion or release of hazardous substances (including but not limited to oil, pesticides, chemicals, or radiation)?	[ ]	[X]	[ ]	[ ]
b)	Possible interference with an emergency response plan or	[ ]	[X]	[ ]	[ ]

		Potentially Significant Impact	Potentially Significant Impact Unless Mitigation Incorporated	Less than Significant Impact	No Impact
	emergency evacuation plan?				
c)	The creation of any health hazard or potential health hazard?	[ ]	[ ]	[ ]	[X]
d)	Exposure of people to existing sources of potential health hazards (e.g. electrical transmission lines, gas lines, oil pipelines)?	[X]	[ ]	[ ]	[ ]
e)	Increased fire hazard in areas with flammable brush, grass, or trees?	[ ]	[X]	[ ]	[ ]
f)	Other____________________	[ ]	[ ]	[ ]	[ ]
XI.	NOISE. Would the proposal result in:				
a)	Increases in existing noise levels?	[X]	[ ]	[ ]	[ ]
b)	Exposure of people to severe noise levels or vibration?	[ ]	[X]	[ ]	[ ]
c)	Other____________________	[ ]	[ ]	[ ]	[ ]
XII.	**PUBLIC SERVICES. Would the proposal have an effect on, or result in a need for new or altered government services in any of the following areas:**				
a)	Fire protection?	[X]	[ ]	[ ]	[ ]
b)	Police protection?	[X]	[ ]	[ ]	[ ]
c)	Schools?	[X]	[ ]	[ ]	[ ]
d)	Maintenance of pubic facilities, including roads?	[X]	[ ]	[ ]	[ ]
e)	Other government services?	[X]	[ ]	[ ]	[ ]
XIII.	**UTILITIES.**				

Would the proposal result in a need for new systems or supplies, or substantial alterations to the following utilities:

a)	Power or natural gas?	[X]	[ ]	[ ]	[ ]

		Potentially Significant Impact	Potentially Significant Impact Unless Mitigation Incorporated	Less than Significant Impact	No Impact
b)	Communications systems?	[X]	[]	[]	[]
c)	Local or regional water treatment or distribution facilities?	[X]	[]	[]	[]
d)	Sewer or septic tanks?	[X]	[]	[]	[]
e)	Storm water drainage?	[X]	[]	[]	[]
f)	Solid waste disposal?	[X]	[]	[]	[]
g)	Local or regional water supplies?	[X]	[]	[]	[]
h)	Other____________________	[]	[]	[]	[]
XIV.	**AESTHETICS. Would the proposal:**				
a)	Affect a scenic vista open to public view?	[X]	[]	[]	[]
b)	Have a negative aesthetic effect?	[X]	[]	[]	[]
c)	Create light or glare?	[X]	[]	[]	[]
d)	Other____________________	[]	[]	[]	[]
XV.	**CULTURAL RESOURCES. Would the proposal:**				
a)	Disturb paleontological or archaeological resources?	[X]	[]	[]	[]
b)	Have the potential to cause a physical change which would affect unique ethnic cultural values?	[]	[X]	[]	[]
c)	Restrict existing religious or sacred uses within the potential impact area?	[]	[]	[]	[X]
d)	Affect a recognized historical site?	[X]	[]	[]	[]
e)	Other____________________	[]	[]	[]	[]
XVI.	**RECREATION**				
a)	Will the proposal result in an impact upon the quality or quantity of existing	[X]	[]	[]	[]

recreation opportunities?

XVII. MANDATORY FINDINGS OF SIGNIFICANCE

		Potentially Significant Impact	Potentially Significant Impact Unless Mitigation Incorporated	Less than Significant Impact	No Impact
a)	Does the project have the potential to 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?	[X]	[ ]	[ ]	[ ]
b)	Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively brief, definitive period of time while long-term impacts will endure well into the future.)	[ ]	[ ]	[ ]	[X]
c)	Does the project have impacts which are individually limited but cumulatively considerable? (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect of the total of those impacts on the environment is significant.)	[ ]	[X]	[ ]	[ ]
d)	Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	[X]	[ ]	[ ]	[ ]

XVIII. DEPARTMENT OF FISH AND GAME 'DE MINUMUS' FINDING

		Potentially Significant Impact	Potentially Significant Impact Unless Mitigation Incorporated	Less than Significant Impact	No Impact
a)	Will the project have an adverse effect either individually or cumulatively, on fish and wildlife resources? Wildlife shall be defined for the purpose of this question as "all wild animals, birds, plants, fish, amphibians, and related ecological communities, including the habitat upon which the wildlife depends for its continued viability."	[X]	[ ]	[ ]	[ ]

IXX. DISCUSSION OF ENVIRONMENTAL IMPACTS AND/OR EARLIER ANALYSIS:

Section and Subsections	Evaluation of Impact
I. LAND USE AND PLANNING	a) The proposed development of this site is for single- and multi-family residences will require a General Plan Amendment and a Zone Change. The site consists of six lots totaling 664.3 acres. The site is currently zoned Industrial Commercial (IC), Community Commercial Planned Development (CC PD), Commercial Office (CO PD), Residential Medium (RM) and Mobile Home Park (MHP) and is located within the Valley Center Concept (VCC) area. The zoning of the subject site is consistent with the General Plan designations. The applicant is proposing to change the General Plan designation to Residential Medium and Open Space and the zoning to Residential Medium with a Planned Development overlay and Open Space for the entire site and develop 590 apartment units, 84 townhouse units and 425 ~~478~~ single-family units along with a 29-acre park. Further analysis is needed to evaluate the land use modifications. The Industrial Commercial (IC) zone permits a limited, low patronage range of commercial use, quasi industrial and light industrial activities; encourages the provision of employee recreation opportunities; and acts as a transitional zone" (UDC Section 17.11.020.O). The Community Commercial (CC) zone "is intended for retailing and service uses of a community-wide nature that attract people from beyond the immediate neighborhood. The zone will typically include at least one or two major users and shall not be construed to be an allowance for a proliferation of small, multi-tenant convenience commercial centers located on corners and in strip commercial fashion along the City's streets" (UDC Section 17.11.020.J). The Commercial Office (CO) "is intended primarily for offices and professional services. Retail and services uses may be considered on the ground floor of such development; however, this shall not be construed to permit commercial centers or large single-tenant retail stores. Commercial office developments are generally located in centers or as individual buildings along major and secondary highways" (UDC Section 17.11.020.L). The proposed Residential Medium (RM) zone corresponds to small groupings of attached dwellings such as duplexes, triplexes, and fourplexes with a density up to 11.0 dwelling units per acre. This zone is consistent with typical densities for mobile home parks. Additional uses are permitted that are complimentary to, and can exist in harmony with, a residential neighborhood" (UDC Section 17.11.020.F). The Planned Development overlay is intended to accomplish more creative designs for development, economical and efficient use of land that is harmonious with the environment, and ensure development is consistent with approved applications. The applicant is also requesting to cluster the residential units, which requires the approval of a Conditional Use Permit. The conditional use permit procedure provides flexibility in the Unified Development Code (UDC) use regulations to account for the widely varying needs of certain uses. Because of their unusual characteristics, and in order to achieve the special purposes in certain districts, conditional uses require special consideration. In order to achieve these purposes, the Planning Commission and City Council are empowered to grant and deny applications for conditional use permits and impose reasonable conditions upon granting conditional use permits. The purpose of cluster development is to "minimize the disruption of natural resources and major physiographic feature and preserve land as permanent

Section and Subsections	Evaluation of Impact
	open space by encouraging innovative development alternatives" (Section 17.17.080). The applicant is requesting a hillside review to develop on slopes of greater than 10%. The intent of the hillside ordinance is to "regulate the development and alteration of hillside areas and ridgelines, to minimize the adverse effects of hillside development and to provide for the safety and welfare of the City of Santa Clarita while allowing for the reasonable development of hillside areas." b) The proposed project is located within the Valley Center Concept (VCC) overlay area. This overlay designates the central portion of the City in order to create a focal point for the City. The purpose of this overlay is to permit and encourage master planning providing a wide range of Valley-wide activities. The concept is intended to develop a central core that would include higher intensity and density for residential and commercial land uses. The project would provide residential and recreational activities, however, no commercial or any other land uses are proposed and therefore, may not consistent with the goals of the Valley Center Concept (VCC) overlay. c) Completion of the proposed project will provide ~~1,152~~ 1,099 residential single- and multi-family units with access from the future Newhall Ranch Road and other future local streets. Located north of the project site is the Castaic Lake Water Agency (CLWA) property used for administrative offices and a treatment facility, east of the site is vacant land, south of the site is the Santa Clara River and west of the site, along Bouquet Canyon Road are existing commercial uses. Impacts may occur to the existing land uses because the site is predominantly vacant due to traffic, noise, light and glare. d) The project is located in a predominantly vacant area. On the subject site there are several buildings utilized for a business, which currently operates on site, the LA Aqueduct, a water tank. In addition, there may other utility structures on site. No communities are established in this area. Therefore, construction of the project will not divide or disrupt any existing community. The proposal will establish a new community within the center of the City. Therefore, no impact is anticipated. e) The project is located within and adjacent to a Significant Ecological Area (SEA). The SEA is a category used to designate areas of importance to the community for preservation and protection. Development within these SEA areas is limited and appropriate environmental studies are required to ensure the protection of this area. The Santa Clara River will be maintained predominantly in a natural state and in accordance with the Natural River Management Plan. All development is outside of the SEA boundaries with exception of the bank stabilization and a portion of the Newhall Ranch Road and Golden Valley Road Bridge (reviewed under a separate EIR). Potential impacts exist to the Santa Clara River and require technical studies to demonstrate that the Santa Clara River and any habitat and other resources will be preserved. f) Other: No additional impacts are identified at this time for land use and planning. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.

Section and Subsections	Evaluation of Impact
II. POPULATION AND HOUSING	a) This project proposes to build ~~1,152~~ 1,099 residential units, including both single- and multi-family. This will add approximately 3,398 persons to the population based on 2.9 persons per household. The estimated population for the City of Santa Clarita is 224,500 by 2020. Therefore, it can be expected that the project will not induce substantial population growth exceeding official regional or local population projections. b) The Santa Clarita Valley is considered housing rich and jobs poor. The proposal does not include any commercial, office or industrial type uses and therefore, will create a significant amount of jobs. The proposal will displace an existing business on the site, however, the jobs may be relocated within the Valley. The site is used by this business primarily for storage and it is not anticipated that this project will result in a substantial decrease in jobs. However, additional analysis is required to determine the net loss of any jobs. c) The proposed project will not displace any existing housing because the land is predominantly vacant. No significant impacts would occur. d) Other: No additional impacts with regards to population and housing are identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
III. GEOLOGIC PROBLEMS	a) The project requires 5.5 million cubic yards of grading to develop the site as proposed. The proposed project will require fill to level areas around the hillsides to create building pads on the site for development. Further analysis is required to determine if any geologic substructures will be impacted as a result of this project. There may be significant impacts to the earth conditions because substantial grading will occur and further analysis is required. b)The approval of the proposed project would result in disruption, displacement, compaction and over-covering of soil. The majority of the site will require grading activities for proposed project development causing potentially significant impacts to the existing conditions and further analysis is required. c) The project site has moderate to severe slopes, which require substantial topographical modifications. Therefore, there may be significant impacts as a result and further analysis is needed in the EIR. d) The project site is predominantly vacant and does not contain any known unique geologic or topographic features. Further review and analysis will confirm any features and then significance will be determined. e) Construction activity associated with the proposed improvements may result in a short-term wind and water driven erosion of soils. The proposed improvements will require extensive grading, which will expose soils to wind and rain. This impact is generally considered short term in nature, however, due to the size of the project, further analysis is required. Development activity would remove a majority of the natural vegetation on the site and replace the land with building pads for residential units. This is also considered a potential impact and requires additional analysis. f) The proposed project is located in hillside areas in addition to relatively level ground. The modification of the hillside could possibly expose people or property to geologic hazards such as landslides, mudslides, ground failure, or any similar type hazards. All of Southern California is located in an earthquake prone region. The project may result potentially significant

Section and Subsections	Evaluation of Impact
	impacts to geologic hazards and requires further analyzed in the EIR. g) As discussed above, the majority of the site will be graded. Consequently the project will create changes in soil deposition, erosion, and siltation. The project will be subject to the National Pollutant Discharge Elimination System (NPDES) General Permit, which will require mechanisms that will minimize soil deposition, erosion or siltation, however, the extent of the impact will require additional analysis in the EIR. h) The site is bounded to the south by the Santa Clara River, however, other than bank stabilization and the construction of a portion of Newhall Ranch Road, the Santa Clara River will remain is a natural state. In addition to the river, a blue line stream may traverse the property and will require evaluation. Therefore, potentially significant impacts may result to these resources and further analysis in the EIR is required. i) The proposed project will result in earth movement of approximately 5.5 million cubic yards. This may result in a potentially significant impact to the existing conditions on site and will be further evaluated in the EIR. j) The project area has significant slopes of greater than 25 percent, which will result in extensive grading. These impacts will be evaluated within the EIR. k) Although, the proposed project is not located within an Alquist-Priolo Special Studies Zone it is in close proximity to the site. l) Other: No additional impacts with regard to geologic problems are identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
IV. WATER	a) Development of the proposed project would include 590 apartments, 84 townhouses and ~~478~~ 425 single-family units. Development of this magnitude will significantly increase impermeable or impervious features. Increased runoff from impermeable surfaces would increase total site runoff. This impact requires further analysis in the EIR. b) The proposed project may expose people or property to water related hazards, such as flooding. However, as development of the site occurs, the appropriate storm drain system will be installed to accommodate flows from a capital storm. Bank stabilization will be constructed in conjunction with the proposal, which will provide further protection from water hazards. In addition there may be water tanks on site that could potentially expose people to water hazards. The impacts to hazards related to water issues will be further analyzed in detail within the EIR. c) As development occurs, the project area would be subject to urban contaminants such as motor oils, gasoline, etc. Development of the site would create additional contaminants generated by the residential uses. Runoff on the future streets will be directed into the gutters and channeled toward catch basins, which will filter out many of the solid pollutants from the runoff. Construction activities associated with the proposed project will not discharge into surface waters or alter surface water quality because the project will be required to incorporate National Pollutant Discharge Elimination System (NPDES) General Permit mechanisms designed to reduce and eliminate such discharges. However, potentially significant impacts may still result from a development of this magnitude and therefore, water-related issues require further analysis in the EIR. d) The proposed development may substantially increase the amount of surface

Section and Subsections	Evaluation of Impact
	water in nearby water bodies, due to an increase in hardscape on the project site. This issue requires further analysis in the EIR. e) Development of the proposed project may also create a change in currents or the course of the direction of water due to the amount of water runoff generated to alter these resources. This requires further analysis in the EIR. f) Construction of the project may change the quantity of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations, or through substantial loss of groundwater recharge capability because the new amount of proposed hardscape necessary to construct the project is substantial and further analysis is required in the EIR. g) Construction of the project may require major cuts in the soil surface that will disturb groundwater flows thereby altering the direction or flow of groundwater, which requires further analysis in the EIR. h) The project may have impacts to groundwater quality and will be analyzed within the EIR. i) Water will be needed during construction activities for watering of exposed soil to minimize airborne dust and dirt and may significantly increase the demand on public water supplies. Although this impact is potentially significant, it would be short-term, however once the residences are occupied, there would be a long-term increase in the demand for public water. This will be further analyzed in the EIR. j) Other: No additional issues related to water are identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
V. STORMWATER MANAGEMENT & RECYCLING	a)The project may result in substantial stormwater discharges during construction activities. A new drainage system will be required to be incorporated into the project. However, due to the magnitude of the project further analysis is required in the EIR. b) The project may result in a potentially significant environmentally harmful increase in the flow rate or volume of the project site or surrounding areas. This impact requires further analysis in the EIR. c) The project may have a substantial increase in stormwater discharges from the site and may impair the beneficial uses of receiving waters or areas that provide water quality benefits. This will be analyzed in the EIR. d) A project of this magnitude may result in a significant increase in stormwater discharges and may cause harm to the biological integrity of drainage systems and water bodies and requires further analysis in the EIR. e) Waste materials expected to be generated are typical construction debris, including concrete and asphalt. Although impacts may be significant, they are short term in nature. Furthermore, the addition of residences may significantly increase the solid waste disposal at landfills and other waste disposal facilities. This significance of this impact will be further analyzed in the EIR. f) Other: No additional issues related to stormwater management and recycling have been identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.

Section and Subsections	Evaluation of Impact
VI. AIR QUALITY	a) Development of the proposed project would generate exhaust emissions from construction equipment and vehicles traveling to and from the site. All construction-generated impacts are short term and will be mitigated with appropriate building and engineering requirements. In addition, this project will result in the construction of a new roadway and additional traffic on the existing roadways. The impact to the air quality will be significant and further analysis is required. b) The project includes development of residential uses. These uses are typically identified as sensitive receptors. No commercial or industrial uses are proposed with the project. Future development adjacent to the project site will evaluate the impacts to the residential uses. Therefore, at this time it is not anticipated that there may be potentially significant impacts to any sensitive receptors. c) Construction activities would involve the use of a variety of gasoline or diesel-powered equipment that will emit exhaust fumes. These impacts may be potentially significant, however short term in nature. Upon occupancy of the residences, vehicle traffic would increase significantly and may have a significant impact to air quality. These impacts require further analysis. d) Other: No additional issues related to air quality have been identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.

Section and Subsections	Evaluation of Impact
VII. TRANSPORTATION/ CIRCULATION	a) The proposed project will result in a significant increase in vehicle trips in this area. Currently, the site is vacant with the exception of one contractor business that operates at the site. The project includes the development of 84 townhouses which would result in approximately 487 trips per day, 590 apartments which would result in 3,894 vehicle trips per day and ~~478~~ 425 single-family residences which would result in 4,541 trips per day. This would total approximately 8,922 trips per day. The addition of this many trips per day may create additional traffic congestion on other roadways, including but not limited to Bouquet Canyon Road, Soledad Canyon Road and Golden Valley Road. In addition, the project is located in the center of the city and three General Plan roadways cross the site. The project will require the construction of two major arterials, Newhall Ranch Road and Golden Valley Road and bridge on the site. Newhall Ranch Road, also known as the Cross Valley Connector, will be constructed as a result of this project, this roadway will eventually connect to State Route 14 to Interstate 5. Furthermore, Santa Clarita Parkway is another north - south General Plan major arterial that is presently shown on the City's Circulation map. The City of Santa Clarita is currently preparing an EIR for these roadways. A traffic study should be prepared and further analyses are required to analyze these impacts to the City's transportation system. b) The project will not be constructed with any roadways that do not comply with City standards for roadways, therefore, it is not anticipated to have any impacts from design features. c) Construction and operation of the project may result in inadequate emergency services to this area. This may create the necessity for emergency services to expand in order to have access to this area and be able to respond in an appropriate amount of time. This requires further analysis in the EIR. d) No parking currently exists on the site. The project will be designed to accommodate all parking for residential uses. Therefore, the impacts are anticipated to be less than significant. e) Construction of the site will cause periodic activity that would result in the temporary presence of hazards and barriers, such as construction equipment, open trenches, demolition debris, and stockpiled material at the project site. No bike trails exist at this time and therefore, will not be impacted. Once completed, the project will provide a River trails system and bike trails along the some of the roadways. Further analysis is required to mitigate the impacts during construction. f) The project will result in many roadways throughout the site. All roadway improvements will be designed and constructed meet the City standards. Therefore, the impacts are anticipated to be less than significant. g) The proposed project will not result in a disjointed pattern of roadway improvements. The project and any associated roadway constructed will be designed and developed in compliance with the City's standards. h) Other: No additional traffic and circulation impacts have been identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.

Section and Subsections	Evaluation of Impact
VIII. BIOLOGICAL RESOURCES	a) The proposed development is adjacent to the Santa Clara River and may potentially impact endangered, rare or threatened species or plants. The California Department of Fish and Game has the California Natural Diversity Database which should be utilized for determining the potential for species and plants on the site. Surveys and other research should also be conducted in accordance with the procedures set forth by Fish and Game to whether or not potential habitat exists on site. Although approximately 300 acres of natural river area will remain undisturbed there is still the potential impacts to the biological resources of the Santa Clara River. Further studies and analysis is required in the EIR. b) Several oak trees protected by the City's Oak Tree Ordinance exist on the site. Therefore, an oak tree report shall be prepared analyzing the impacts to the oaks. The oak tree report shall be included in the EIR and will provide mitigation for any impacted oaks in accordance with the City's Ordinance. c) The proposed project site may impact any federally protected wetlands through direct removal, filling, hydrological interruption, or other means. The California Department of Fish and Game and the Army Corps of Engineers will determine the boundaries to wetlands and will have jurisdiction. Further analysis is required in the EIR. d) The proposed project may impact a wildlife corridor. Further analysis is required to determine if there is a migration corridor on site that will be impacted by the proposal. e) Other: Bank stabilization will be constructed in conjunction with the Natural River Management Plan. The bank stabilization will be analyzed within the EIR for this project and within the EIR for the future Newhall Ranch Road and the Golden Valley Road bridge. The bank stabilization in conjunction with this project will result in about 4,500 linear feet. Further analysis is required to determine the impact to the biological resources. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
IX. ENERGY AND MINERAL RESOURCES	a) The proposed project is not anticipated to conflict with adopted energy conservation plans, however, this should issue be further reviewed and determined to have no impact. b) The project may result in the use of nonrenewable resources and requires further analysis in the EIR. c) The proposed project is not known at this time to have a mineral resource and further analysis is required in the EIR. d) Other: No additional issues related to energy and mineral resources have been identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.

Section and Subsections	Evaluation of Impact
X. HAZARDS	a) Residential uses do not typically generate hazardous materials, and consequently, development on the project site would not create a significant risk of accidental explosion or release of hazardous substance. b) The proposed project will result in additional roadways, which will increase the ease of emergency evacuation and/or emergency response. Further analysis needs to be provided in the EIR. c) No significant hazards to human health are expected to occur with the construction and operation of the project. d) Development is proposed in close proximity to high-pressure gas mains, water lines and possibly other utility lines which is common within California. California Public Utility Commission has mandated safety requirements and the applicant will be required to comply with those requirements. The site is also in close proximity to Southern California Edison electrical transmission lines traverse portions of the project site. Any potential impacts will be further analyzed in the EIR. e) The project site is not located within an area that is heavily vegetated with flammable brush, grass or trees. The project includes approximately 300 acres of natural vegetation that would be at risk of fire hazard. Therefore, further analysis is required. g) Other: No additional issues related to hazards have been identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
XI. NOISE	a) The project site is located in an undeveloped area with minimal noise. The project would result in increased noise generated from the residential uses and the new roadways that will be constructed. Further analysis is required in the EIR. b) The project site will have added noise levels and vibrations and require further analysis in the EIR. c) Other: No additional issues regarding noise have been identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
XII. PUBLIC SERVICES	a) The proposed project includes approximately ~~1,152~~ 1,099 new residences that would require fire services. This would result in a potentially significant impact to the current fire services. Additional fire stations and personnel may be required as a result of this proposal. Further analysis is required. b) As the residential population increases, there may be an impact to police services. Additional services will be required to serve the new residences. Further analysis is required to determine the impact. c) As the population increases, additional need for school facilities may be required. This impact requires further analysis in the EIR. d) The project will require the construction of a new major arterial through the project site. The City of Santa Clarita is in the process of preparing an EIR for this new roadway. The new roadway will require street maintenance, including but not limited to, street sweeping, landscaping maintenance, street light maintenance and will be added to the capital improvement projects that occur annually. This will result in a significant impact to these services. e) The proposal will result in an increase to the permanent resident population,

Section and Subsections	Evaluation of Impact
	and as such would result in an increased need for libraries, community centers, or related government services. Thus, further analysis is required to address these issues. f) Other: No additional issues related to public services have been identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
XIII. UTILITIES	a) The proposal will includes the expansion of the existing utility system throughout the project site. This includes requiring the services of Southern California Edison, Southern California Gas Company, and Pacific Bell telephone company, in addition to cable companies and telecommunication companies. This impact is potentially significant and further analysis is required to address this issue. b) Pacific Bell will provide telephone service to the area. Telephone facilities will be located within the public rights-of-way. No overhead telephone facilities will be permitted. However, new telephone lines are not existing in the area and will be required to be extended to service this new community. This will result in a potentially significant impact and further analysis is required in the EIR. c) The proposed project will result in the addition of approximately 1,099 ~~1,152~~ new residences that will substantially increase the demand for wastewater treatment resulting in a significant impact on local and regional water treatment and distribution facilities. Additional facilities may be required to accommodate the new community. Therefore, further analysis is required. d) The proposed project will result in a potentially significant increase to the amount of sewage generated. Therefore, potentially significant impacts related to sewers or septic tanks require further analysis. e) The proposed project will require the construction of new storm water drainage facilities or expansion of existing facilities. Expansion of the system will be required to accommodate the proposed housing units. This will result in a potentially significant impact and requires further analysis. f) The project, once occupied by residents will generate a significant amount of solid waste that will need to be picked up and transported to appropriate waste facilities. At this time, the City of Santa Clarita exports virtually all its wastes except for those wastes that can be recycled, to the Chiquita Canyon Landfill. Further analysis is required in the EIR to determine the impact to solid waste and recycling facilities g) The proposed project may create a need for local or regional water supplies. Further analysis is required in the EIR. h) Other: No additional issues related to utilities have been identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.

Section and Subsections	Evaluation of Impact
XIV. AESTHETICS	a) The project will significantly modify the appearance of the hillside as viewed along Soledad Canyon Road, between Bouquet Canyon Road and the future Golden Valley Road. In addition, the appearance from Bouquet Canyon Road and San Fernando Road will also be affected. The appearance of this site will be potentially significantly changed and further analysis, including photo simulations is required in the EIR. b) The overall project could potentially impact the aesthetics of the area. Special care needs to be given to the project site due to its high visibility. The site is highly visible from three major arterials and is currently in a natural state. Development may potentially impact the views as seen from these roadways. Further analysis is required to mitigate the impacts to the aesthetics. c) The site is currently vacant with no lighting. Development of the residences will include street lighting along with light generated by each residential unit. This will have a potential impact on the light and glare that will be generated and seen by adjacent roadways and residential uses. Further analysis is required in the EIR. d) Other: No additional issues related to aesthetics have been identified at this time. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
XV. CULTURAL RESOURCES	a) The proposed site is predominantly undeveloped and vacant. The site has two village sites, which will be addressed within the EIR. Any discovery of other paleontological or archaeological resources will be evaluated. b) The proposed project has the potential to cause a physical change which would affect unique ethnic cultural values because the site has two village sites which may have potentially significant impacts to cultural resources. Further analysis is required in the EIR. c) The proposed project would not restrict existing religious or sacred uses within the project area. d) Two village sites have been identified on the project site and therefore, development may significantly impact these historical sites. e) Other: No additional issues related to cultural resources need to be addressed. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
XVI. RECREATION	a) The proposed project will create in ~~1,152~~ 1,099 new households. This will result in increased usage of the City's recreational services, thereby causing a need to provide additional recreational opportunities for the community. The proposed project will have 300 acres of river area, in addition to a 29-acre passive park on the site which will contribute to the recreation provided to the community. Dedication or improvement of recreation facilities is based upon

Section and Subsections	Evaluation of Impact
	the generation of a residential population. The potential impacts to recreational services will be further evaluated within the EIR. b) Other: No additional issues related to recreation need to be addressed. Potential impacts may result from this proposal and will be evaluated within the Environmental Impact Report. Any mitigation measures to reduce impacts to less than significant will be listed in the DEIR Mitigation Monitoring and Reporting Program.
XVII. MANDATORY FINDINGS OF SIGNIFICANCE	a) – d) The analysis of the issues raised by the checklist questions indicates that project impacts are generally considered to be potentially significant impacts that require further analysis within an Environmental Impact Report. These areas include land use and planning; population & housing; air quality; hazards; biological resources; energy and mineral resources; cultural resources; public services; utilities and service system; aesthetics; and recreation. These areas may require technical studies, photo simulations and other research to provide appropriate environmental documentation for this project.
XVIII. DEPARTMENT OF FISH AND GAME 'DE MINIMUS' FINDING	a) There is evidence that this proposed project may have the potential for an adverse effect, either individually or cumulatively on wildlife resources as defined by Fish and Game Code Section 711.2. Therefore, the proposed project will require biological studies to determine and address the impacts.

Letters from Agencies in Response to Original Notice of Preparation

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse

Gray Davis
Governor

Tal Finney
Interim Director

Notice of Preparation

RECEIVED
PLANNING DIVISION

SEP 2 6 2002

PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

September 18, 2002

To: Reviewing Agencies

Re: Riverpark
SCH# 2002091081

Attached for your review and comment is the Notice of Preparation (NOP) for the Riverpark draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Jeff Hogan/Wendy Deats
City of Santa Clarita
23920 Valencia Boulevard, Suite 300
Santa Clarita, CA 91355

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Becky Frank

Becky Frank
Project Analyst, State Clearinghouse

Attachments
cc: Lead Agency

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
(916)445-0613 FAX(916)323-3018 www.opr.ca.gov

Document Details Report
State Clearinghouse Data Base

SCH# **2002091081**
Project Title Riverpark
Lead Agency Santa Clarita, City of

Type **NOP** Notice of Preparation

Description The project proposal includes the development of 590 apartments, 84 townhouses and 478 single-family dwellings. A 29-acre park is also proposed along the Santa Clara River. Approximately 300-acres of river area located within the project boundary will remain in a natural state with the exception of the future construction of Newhall Ranch Road and bank stabilization work. Development of the site will require 5.5 million cubic yards of grading which will be balanced onsite. The grading is required for the construction of the project as well as the future Newhall Ranch Road and Golden Valley Road Bridge project.

Lead Agency Contact

Name Jeff Hogan/Wendy Deats
Agency City of Santa Clarita
Phone 661-255-4330 ***Fax***
email
Address 23920 Valencia Boulevard, Suite 300
City Santa Clarita ***State*** CA ***Zip*** 91355

Project Location

County Los Angeles
City Santa Clarita
Region
Cross Streets East of Bouquet Canyon, norht of Soledad Canyon Road
Parcel No.
Township ***Range*** ***Section*** ***Base***

Proximity to:

Highways
Airports
Railways
Waterways
Schools
Land Use The current zoning of the project site is industrial Commercial (IC), Commercial Office Planned Development (CO PD), Community Commercial Planned Development (CC PD), and Mobile Home Park (MHP). The General Plan Land Use for the site is General Plan Valley Center Concept.

Project Issues Aesthetic/Visual; Air Quality; Archaeologic-Historic; Drainage/Absorption; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Minerals; Noise; Public Services; Recreation/Parks; Schools/Universities; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Wildlife; Growth Inducing; Landuse; Cumulative Effects

Reviewing Agencies Resources Agency; Department of Conservation; Office of Historic Preservation; Department of Parks and Recreation; Department of Water Resources; Department of Fish and Game, Region 5; Native American Heritage Commission; State Lands Commission; Office of Emergency Services; Caltrans, District 7; Department of Housing and Community Development; Air Resources Board, Transportation Projects; State Water Resources Control Board, Division of Water Rights; Regional Water Quality Control Board, Region 4; Department of Toxic Substances Control

Date Received 09/18/2002 ***Start of Review*** 09/18/2002 ***End of Review*** 10/17/2002

Note: Blanks in data fields result from insufficient information provided by lead agency.

OP Distribution List

County: Los Angeles

SCH# 2002091

sources Agency

☒ **Resources Agency**
Nadell Gayou

☐ **Dept. of Boating & Waterways**
Bill Curry

☐ **California Coastal Commission**
Elizabeth A. Fuchs

☒ **Dept. of Conservation**
Roseanne Taylor

☐ **Dept. of Forestry & Fire Protection**
Allen Robertson

☒ **Office of Historic Preservation**
Hans Kreutzberg

☒ **Dept of Parks & Recreation**
B. Noah Tilghman
Environmental Stewardship Section

☐ **Reclamation Board**
Pam Bruner

☐ **S.F. Bay Conservation & Dev't. Comm.**
Steve McAdam

☒ **Dept. of Water Resources**
Resources Agency
Nadell Gayou

Health & Welfare

☐ **Health & Welfare**
Wayne Hubbard
Dept. of Health/Drinking Water

Food & Agriculture

☐ **Food & Agriculture**
Steve Shaffer
Dept. of Food and Agriculture

Fish and Game

☐ **Dept. of Fish & Game**
Scott Flint
Environmental Services Division

☐ **Dept. of Fish & Game 1**
Donald Koch
Region 1

☐ **Dept. of Fish & Game 2**
Banky Curtis
Region 2

☐ **Dept. of Fish & Game 3**
Robert Floerke
Region 3

☐ **Dept. of Fish & Game 4**
William Laudermilk
Region 4

☒ **Dept. of Fish & Game 5**
Don Chadwick
Region 5, Habitat Conservation Program

☐ **Dept. of Fish & Game 6**
Gabrina Gatchel
Region 6, Habitat Conservation Program

☐ **Dept. of Fish & Game 6 I/M**
Tammy Allen
Region 6, Inyo/Mono, Habitat Conservation Program

☐ **Dept. of Fish & Game M**
Tom Napoli
Marine Region

Independent Commissions

☐ **California Energy Commission**
Environmental Office

☒ **Native American Heritage Comm.**
Debbie Treadway

☐ **Public Utilities Commission**
Ken Lewis

☒ **State Lands Commission**
Betty Silva

☐ **Governor's Office of Planning & Research**
State Clearinghouse Planner

☐ **Colorado River Board**
Gerald R. Zimmerman

☐ **Tahoe Regional Planning Agency (TRPA)**
Lyn Barnett

☒ **Office of Emergency Services**
John Rowden, Manager

☐ **Delta Protection Commission**
Debby Eddy

☐ **Santa Monica Mountains Conservancy**
Paul Edelman

Dept. of Transportation

☐ **Dept. of Transportation 1**
Mike Eagan
District 1

☐ **Dept. of Transportation 2**
Don Anderson
District 2

☐ **Dept. of Transportation 3**
Jeff Pulverman
District 3

☐ **Dept. of Transportation 4**
Jean Finney
District 4

☐ **Dept. of Transportation 5**
David Murray
District 5

☐ **Dept. of Transportation 6**
Marc Birnbaum
District 6

☒ **Dept. of Transportation 7**
Stephen J. Buswell
District 7

☐ **Dept. of Transportation 8**
Linda Grimes,
District 8

☐ **Dept. of Transportation 9**
Katy Walton
District 9

☐ **Dept. of Transportation 10**
Tom Dumas
District 10

☐ **Dept. of Transportation 11**
Bill Figge
District 11

☐ **Dept. of Transportation 12**
Bob Joseph
District 12

Business, Trans & Housing

☒ **Housing & Community Development**
Cathy Creswell
Housing Policy Division

☐ **Caltrans - Division of Aeronautics**
Sandy Hesnard

☐ **California Highway Patrol**
Lt. Julie Page
Office of Special Projects

☐ **Dept. of Transportation**
Ron Helgeson
Caltrans - Planning

☐ **Dept. of General Services**
Robert Sleppy
Environmental Services Section

Air Resources Board

- ☐ Airport Projects
  Jim Lerner
- ☒ Transportation Projects
  Kurt Karperos
- ☐ Industrial Projects
  Mike Tollstrup

☐ **California Integrated Waste Management Board**
Sue O'Leary

☐ **State Water Resources Control Board**
Diane Edwards
Division of Clean Water Programs

☐ **State Water Resources Contro Board**
Greg Frantz
Division of Water Quality

☒ **State Water Resouces Control Board**
Mike Falkenstein
Division of Water Rights

☒ **Dept. of Toxic Substances Control**
CEQA Tracking Center

Regional Water Quality Control Board (RWQCB)

☐ **RWQCB 1**
Cathleen Hudson
North Coast Region (1)

☐ **RWQCB 2**
Environmental Document Coordinator
San Francisco Bay Region (2)

☐ **RWQCB 3**
Central Coast Region (3)

☒ **RWQCB 4**
Jonathan Bishop
Los Angeles Region (4)

☐ **RWQCB 5S**
Central Valley Region (5)

- ☐ **RWQCB 5F**
  Central Valley Region (5)
  Fresno Branch Office
- ☐ **RWQCB 5R**
  Central Valley Region (5)
  Redding Branch Office

☐ **RWQCB 6**
Lahontan Region (6)

- ☐ **RWQCB 6V**
  Lahontan Region (6)
  Victorville Branch Office

☐ **RWQCB 7**
Colorado River Basin Region (7)

☐ **RWQCB 8**
Santa Ana Region (8)

☐ **RWQCB 9**
San Diego Region (9)

California Regional Water Quality Control Board
Los Angeles Region

Over 50 Years Serving Coastal Los Angeles and Ventura Counties
Recipient of the 2001 *Environmental Leadership Award* from Keep California Beautiful

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: http://www.swrcb.ca.gov/rwqcb4

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

RECEIVED
PLANNING DIVISION
JAN 23 2003
PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

January 21, 2003

City of Santa Clarita
23920 Valencia Blvd., Suite 300
Santa Clarita, CA 91355

RE: CEQA Documentation for Project in the Santa Clara River Watershed
SUBJECT: Riverpark

We appreciate the opportunity to comment on the CEQA documentation for the above-mentioned project. For your information a list of permitting requirements and Regional Board Contacts is provided in Attachment A hereto.

The project site lies in the Santa Clara watershed that was listed as being impaired pursuant to Section 303 (d) of the Clean Water Act. Impairments listed in reaches downstream from the proposed project include nutrients and their effects, salts, coliform bacteria, and historic pesticides. The Los Angeles Regional Water Quality Control Board will be developing Total Maximum Daily Loads (TMDLs) for the watershed, but the proposed project is expected to proceed before applicable TMDLs are adopted. In the interim, the Regional Board must carefully evaluate the potential impacts of new projects that may discharge to impaired waterbodies.

Our review of your documentation shows that it does not include information on how this project will change the loading of these pollutants into the watershed. Please provide the following additional information for both the construction and operational phases of the project.

- For each constituent listed above, please provide an estimate of the concentration (ppb) and load (lbs/day) from non-point and point source discharges.
- Estimates of the amount of additional runoff generated by the project during wet and dry seasons.
- Estimate of the amount of increased or decreased percolation due to the project.

- Estimates of the net change in cubic feet per second of groundwater and surface water contributions under historic drought conditions (as compiled by local water purveyors, the Department of Water Resources, and others) and 10-year, 50-year and 100-year flood conditions.

If you have any questions please call me at (213) 576-6683.

Sincerely,

Theresa Rodgers

for Elizabeth Erickson
Associated Geologist, TMDL Unit

EE
Attachments

Cc: file
State Clearinghouse- (2002091081)

California Environmental Protection Agency
****The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption****
****For a list of simple ways to reduce demand and cut your energy costs, see the tips at: http://www.swrcb.ca.gov/news/echallenge.html****
Recycled Paper
Our mission is to preserve and enhance the quality of California's water resources for the benefit of present and future generations.

ATTACHMENT A

✓ If the proposed project will result in a **discharge of dredge or fill into a surface water** (including a dry streambed), and is subject to a **federal license or permit**, the project may require a *Section 401 Water Quality Certification*, or waiver of Waste Discharge Requirements. For further information, please contact:

Jason Lambert, Nonpoint Source Unit at (213) 576-5733.

✓ If the project involves **inland disposal of nonhazardous contaminated soils and materials**, the proposed project may be subject to *Waste Discharge Requirements*. For further information, please contact:

Rodney Nelson, Landfills Unit, at (213) 620-6119

* * *

✓ If the overall project area is **larger than five acres**, the proposed project may be subject to the State *Board's General Construction Activity Storm Water Permit*. For further information, please contact:

Tracy Woods, Statewide General Construction Activity Storm Water Permits at (213) 620-2095.

✓ If the project involves a facility that is proposing to discharge storm water associated with **industrial activity** (e.g., manufacturing, recycling and transportation facilities, etc.), the facility may be subject to the State Board's *General Industrial Activities Storm Water Permit*. For further information, please contact:

Kristie Chung, Statewide General Industrial Storm Water Permits at (213) 620-2283.

✓ If the proposed project involves requirements for new development and construction pertaining to **municipal storm water programs**, please contact:

Dan Radulescu, Municipal Storm Water Permits, Los Angeles County at (213) 620-2038;
Matt Yeager, Municipal Storm Water Permits, Ventura County at (213) 620-2097.

✓ The proposed project also shall comply with the local regulations associated with the applicable **Regional Board stormwater permit**:

Los Angeles County and Co-permittees:
NPDES No. CAS614001
Waste Discharge Requirements Order No. 96-054.

Long Beach County and Co-permittees:
NPDES CAS004003
Waste Discharge Requirements Order No. 99-060.

Ventura County and Co-permittees:
NPDES No. CAS004002
Waste Discharge Requirements Order No. 00-108.

* * *

✓ If the proposed project involves any construction and/or groundwater **dewatering to be discharged to surface waters**, the project may be subject to *NPDES/Waste Discharge Requirements*. For further information, please contact:

Augustine Anijielo, General Permitting and Special Projects Unit at (213) 576-6657(All Region 4 Watersheds).

✓ If the proposed project involves any construction and/or groundwater **dewatering to be discharged to land or groundwater**, the project may be subject to *Waste Discharge Requirements*. For further information, please contact:

Kwang-Il Lee, Non-Chapter 15 Unit, at (213) 620-2269 (All Region 4 Watersheds).

Revised : February 15, 2002

CASTAIC LAKE
WATER AGENCY

RECEIVED
PLANNING DIVISION
OCT 18 2002
PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

October 17, 2002

Jeff Hogan/Wendy Deats
Planning Department
City of Santa Clarita
23920 Valencia Boulevard, Suite 300
Santa Clarita, CA 91355

Re: Notice of Preparation of Draft Environmental Impact Report, "Riverpark (Panhandle);" Tentative Tract Map 53425

Dear Mr. Hogan/Ms. Deats:

By this letter the Castaic Lake Water Agency informs you that the above-mentioned project may be subject to the terms of various sections of the California Water Code and Government Code, also known as "SB 221" and "SB 610." These two laws were chaptered in 2001 and took effect January 1, 2002.

SB 221 and SB 610 are companion measures that seek to promote more collaborative planning between local water suppliers and cities and counties. Both statutes require detailed information regarding water availability to be provided to city and county decision makers prior to approval of large development projects. Both statutes also require this information to be included in the administrative record that serves as the evidentiary basis for an approval action by the city or county on such projects.

Under SB 610, water assessments must be furnished to local governments for inclusion in any environmental documentation for certain projects (defined in Water Code section 10912 (a)) subject to the California Environmental Quality Act. Under SB 221, approval by a city or county of certain residential subdivisions requires an affirmative verification of sufficient water supply.

A guidebook for implementation of these two laws has been produced by the California Department of Water Resources, and is available at

www.owue.water.ca.gov/urbanplan/docs/DraftGuidebook.pdf

If you have any questions or comments, please call me or Mary Lou Cotton, Assistant to the General Manager, at 661/297-1600.

Sincerely,

Mary Lou Cotton for

Dan Masnada
General Manager

cc: Glenn Adamick, The Newhall Land and Farming Company

"A PUBLIC AGENCY PROVIDING RELIABLE, QUALITY WATER AT A REASONABLE COST TO THE SANTA CLARITA VALLEY"
27234 BOUQUET CANYON ROAD • SANTA CLARITA, CALIFORNIA 91350-2173 • 661 297•1600 FAX 661 297•1611
website address: www.clwa.org

From: <Bigbadmean@aol.com>
To: <wdeats@santa-clarita.com>
Date: 11/27/02 2:35PM
Subject: Riverpark comments Center for Biological Diversity

Center for Biological Diversity

Re: Riverpark Project

11/27/02

Attn: Jeff Hogan/Wendy Deats
City of Santa Clarita
23920 Valencia Blvd.
Santa Clarita, Ca. 91355

Re: Notice of Preparation, River Park Project

Dear Planning Department,

The Center of Biological Diversity is opposed to the Riverpark Project. We believe that cumulative impacts to sensitive, threatened and endangered species has not been addressed in regards to Newhall Land and Farming's projects along the Santa Clara River.

Further, Newhall Land and Farming requires that biologists that survey the areas sign confidentiality agreements. We have had knowledge of this for a long time now. This does not allow lead agencies to property address impacts to wildlife.

Newhall Land and Farming has a pattern of deceptive actions along the Santa Clara River. This includes apparently concealing the presence of the endangered arroyo toad, harassing migratory songbirds for a number of years, and out and out destruction of an endangered plant the San Fernando Spineflower.

The unarmored threespined stickleback has been impacted by multiple approved projects along the Santa Clara River and its tributaries. Some of these by out and out destruction of habitat, in addition the City and or Newhall have been unable to monitor mitigation. This has resulted in destruction of wetlands that were not addressed in the Natural River Management Plan, such as adjacent streambeds to San Francisquito Creek where native fish occurred last year. The die off of approximately 80% mitigated cottonwoods in the Santa Clara River have died. Off road vehicle use continues to destroy the sticklebacks breeding pools, these motorized vehicles are driving right through ponded water, again the City of Santa Clarita and Newhall has been unable to address this negative impact. Further development along the Santa Clara River has caused urban run-off of Diazinon known to be extremely toxic to native fish and bird species. People with their pets are now harassing our native wildlife and dog feces can be found all along the Santa Clara River and its triubtaries.

In short the City has failed to protect the resources of the Santa Clara River by multiple direct impacts and massive indirect impacts.

This project will be devastating for migrating wildlife. From the proposed TMC Mining Project to I-5 the Santa Clara River and its tributaries have lost nearly 100% of uplands to housing, commercial, roads, etc. This area along the river serves as an important area for foraging wildlife. It's the only upland left along the river in Santa Clarita Valley. San Diego Black Tailed Jack rabbits (California Species of Special Concern), Western Spadefoot Toads (California Species of Special Concern) are in two locations within this project, mule deer, White Tailed Kite (California Fully Protected), Coopers Hawk (California Species of Special Concern), Sharshin Hawk (Californis Species of Special Concern), coyotes, bobcats, native fox and many other species have been observed in the project area. We have not conducted any surveys these are simply species observed by individuals in the last few years in the project area. It's essential to recognized that nearly all animals that utilize the Santa Clara River for migration must be able to access uplands to escape predators, floods and for foraging.

We have many concerns on the impacts to wildlife including threatened and endangered species. We believe that this project will further degrade the Santa Clara River. We are adamantly opposed to this project!

Regards,
Peter Galvin
California and Pacific Director
Center for Biological Diversity
Post Office Box 40090
Berkeley, California 94704
Ph. (510) 841-0812
Fax (510) 841-0187

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
www.ladpw.org

JAMES A. NOYES, Director

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

RECEIVED
PLANNING DIVISION

OCT 30 2002

PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

October 22, 2002

IN REPLY PLEASE REFER TO FILE: WM-4

Mr. Jeff Hogan
City of Santa Clarita
23920 Valencia Boulevard, Suite 300
Santa Clarita, CA 91355

Dear Mr. Hogan:

RESPONSE TO A NOTICE OF PREPARATION
RIVERPARK PROJECT
TENTATIVE TRACT NO. 53425
CITY OF SANTA CLARITA

Thank you for the opportunity to provide comments on the Notice of Preparation for the proposed Tentative Tract No. 53425 Riverpark Project. This project is to develop 664 acres of land for single and multi-family uses and open space. The project is located at the terminus of Newhall Ranch Road, east of Bouquet Canyon Road, north of Soledad Canyon Road, adjacent to the Santa Clara River. We have reviewed the submittal and offer the following comments:

Environmental Programs

The document needs to address and discuss the project's impact on solid waste disposal and include these requirements. As projected in the Los Angeles Countywide Siting Element, which was approved by a majority of the cities in the County of Los Angeles in late 1997 and by the County Board of Supervisors in January 1998, a shortfall in permitted daily landfill capacity may be experienced in the County within the next few years. The construction activities and postdevelopment operation associated with the proposed development will increase the generation of solid waste and negatively impact solid waste management infrastructure in the County.

The proposed document must identify what specific measures the project proponent plans to implement to mitigate the impact. Mitigation measures may include, but are not limited to, implementation of waste reduction and recycling programs to divert the solid waste, including construction and demolition waste, from the landfills. The California Solid Waste Reuse and Recycling Access Act, as amended, requires each development project to provide an adequate storage area for collection and removal of recyclable materials. The document should include standards to provide adequate storage areas for collection of recyclable and green waste materials for this project.

Our Environmental Programs Division must be contacted for required approvals and operating permits if the project includes the construction/installation, modification, or removal of underground storage tanks, industrial waste treatment or disposal facilities, or stormwater treatment facilities.

If you have any questions, please contact Mr. Wilson Fong at (626) 458-3581.

Geotechnical and Materials Engineering

The EIR shall address the geotechnical issues identified in the Notice of Preparation/Initial Study.

Description of the project and the associated grading, i.e., existing and proposed grades, etc., must be shown on a topographic map. Also, all geotechnical hazards must be identified and any mitigation measures discussed in detail. The requested information shall be included in the appropriate documents, as requested by others.

The project is located within a mapped potentially liquefiable area, per the State of California Seismic Hazard Zone Map, Newhall Quadrangle. However, a liquefaction analysis is not warranted at this time. Detailed liquefaction analyses, conforming to the requirements of the State of California Division of Mines and Geology Special Publication 117, must be conducted at the tentative map and/or grading/building plan stages.

If you have any questions, please contact Mr. Amir Alam at (626) 458-4972.

Land Development (Grading and Drainage)

We recommend that the applicant prepare a drainage concept/SUSMP report showing the extent of drainage impacts to County jurisdiction and facilities in the area, and if necessary, provide mitigation acceptable to the County. We recommend that a copy of the drainage concept/SUSMP report, once approved, be included in the EIR and other environmental documents.

In addition, pursuant to recent legislation related to SB221 and SB610, the environmental document shall address the adequacy of the water supply to ensure availability of water for the new development without adversely effecting existing users. The document shall provide for review the water supply assessment and water verification from water purveyors of this project.

Land Development (Transportation Planning)

As requested, we have reviewed the subject document and have no comments.

If you have any questions, please contact Mr. Hubert Seto at (626) 458-4349.

Traffic and Lighting

The proposed project has a potential to significantly impact the intersections and roadways in the area. A traffic study should be prepared to identify the traffic impact and to ensure the appropriate mitigations are proposed. The County's methodology should be used when evaluating the County and/or County/City intersections. The study should also address the cumulative impacts generated by this, and nearby developments, and include the level of service analysis for the affected intersections. If traffic signals or other mitigation measures are warranted at the affected intersections, the developer should determine his proportionate share of traffic signal or other mitigation costs and submit this information to Public Works for review and approval. A copy of our Traffic Impact Analysis Report Guidelines is enclosed.

We recommend that the State of California Department of Transportation review this document for significant impacts/mitigations within its jurisdiction.

If you have any questions, please contact Mr. Patrick Arakawa of our Traffic Studies Section at (626) 300-4867.

Watershed Management (Santa Clara River/Antelope Valley and Dominguez)

We encourage the applicant to use the Riverpark Project as a model for sustainable development by integrating watershed management Best Management Practices as part of the design. Some opportunities include:

- Considering onsite stormwater recycling. Large-scale stormwater recycling serves the dual purpose of mitigating the increased storm runoff resulting from increased hardscape as well as offsetting increased water demand resulting from increased population. An example - store storm runoff in underground cisterns for irrigation.

- Integrating stormwater runoff and pollution control BMPs in the design to eliminate pollution discharge from the proposed project.
- Landscaping with native, drought tolerant plants to reduce water demand.
- Evaluating the feasibility of using solar power and other alternative energy sources in common areas to offset dependence on nonrenewable energy sources.

If you have any questions regarding the above comments, please contact Mr. Suk Chong at (626) 458-4341.

The proposed project should include investigation of watershed management opportunities to maximize capture of local rainfall on the project site, eliminate incremental increase in flows to the storm drain system, and provide filtering of flows to capture contaminants originating from the project site.

If you have any questions regarding the above comments or the environmental review process of Public Works, please contact Ms. Massie Munroe at the address on the first page or at (626) 458-4359.

Very truly yours,

JAMES A. NOYES
Director of Public Works

ROD H. KUBOMOTO
Assistant Deputy Director
Watershed Management Division

MM:ro
C:\eirriverpark.wpd

Enc.

Traffic Impact Analysis Report Guidelines

January 1, 1997

Prepared by the County of Los Angeles
Department of Public Works

James A. Noyes
Director of Public Works

Table of Contents

JHC:ce
T-2/ACCESS2
(01/22/98)

I. Introduction

The County of Los Angeles Department of Public Works has established the following Guidelines for the preparation of Traffic Impact Analysis (TIA) reports. The purpose of these Guidelines is to establish procedures to ensure consistency of analysis and the adequacy of information presented and timely review by County staff. It is strongly recommended that the applicant's traffic engineer consult with County staff before beginning the study to establish the scope and basic assumptions of the study and any deviations from these Guidelines to avoid unnecessary delays or revisions. For assistance in the TIA scoping process, the Traffic and Lighting Division, Traffic Studies Unit, can be contacted at (626) 458-5909.

II. Requirements

Generally, the Department staff is concerned with adverse impacts on traffic if:

1. Traffic generated by a project considered alone or cumulatively with other related projects, when added to existing traffic volumes, exceeds certain capacity thresholds of an intersection or roadway, contributes to an unacceptable level of service (LOS), or exacerbates an existing congested condition.
2. Project generated traffic interferes with the existing traffic flow (e.g., due to the location of access roads, driveways, and parking facilities).
3. Proposed access locations do not provide for adequate safety (e.g., due to limited visibility on curving roadways).
4. Nonresidential uses generate commuter or truck traffic through a residential area.
5. Project generated traffic significantly increases on a residential street and alters its residential character.

A traffic report must be prepared by a registered Civil or Traffic Engineer. A traffic report is generally needed if a project generates over 500 trips per day or where other possible adverse impacts as discussed in the Analysis and Impact Section (see page 4) of these Guidelines are identified. Before a full review is conducted, the County staff will check the completeness of the TIA report using the attached check list (Exhibit A). If the report is missing any of the check list items, it will be returned for revision.

III. TIA Report Contents

A. Project Description

The following information is required:

1. A description of the project, including those factors which quantify traffic generators, e.g., dwelling units, square feet of office space, persons to be employed, restaurant seats, acres of raw land, etc. For residential developments, the description should indicate the type of residence, (e.g., one level or townhouse condominiums, and if its use is for families, adults or retirees).
2. A plot plan showing proposed driveways, streets, internal circulation, and any new parking facilities on the project site.
3. A vicinity map showing the site location and the study area relative to other transportation systems.
4. A brief history of the projects that are part of the phased Master Plan or a parent tract/parcel map.

B. Transportation Circulation Setting

The following information is required:

1. **Existing and Proposed Site Uses**

   A description of the permitted and/or proposed uses of the project site in terms of the various zoning and land use categories of the County, and the status and the usage of any facilities currently existing on the site.

2. **Existing and Proposed Roadways and Intersections**

   A description of existing streets and roadways, both within the project site (if any) and in the surrounding area. Include information on the roadway classifications (per the Highway Plan), the number of lanes and roadway widths, signalized intersections, separate turn lanes, and the signal phases for turning movements.

Existing daily directional and peak-hour through and turning traffic volumes on the roadways surrounding and/or logically associated with the project site, including Secondary and Major highways and freeways. Local streets affected by the project should also be shown. Each report shall include appendices providing count data used in the preparation of the report. The source and date of the traffic volume information shall be indicated. Count data should not be over one year old. Since peak volumes vary considerably, a ten percent daily variation is not uncommon, especially on recreational routes or roadways near shopping centers; therefore, representative peak-hour volumes are to be chosen carefully.

All assumed roadways and intersections or any other transportation circulation improvements must be identified and discussed. The discussion should include the scope and the status of the assumed improvements including the construction schedule and financing plan. It should be noted that all assumed roadways and intersections or any other transportation circulation improvements will be made a condition of approval for the project to be in place prior to the issuance of building permits. If assumed improvements do not get built on time due to an unforeseeable condition, traffic conditions for a different assumed highway network or other mitigation measures will be considered if a traffic study is submitted with a different assumed network or other measures are recommended to mitigate the traffic impact in question.

C. Analysis and Impact

The following information is required:

1. Trip Generation Analysis

Tabulate the estimated number of daily trips and a.m. and p.m. peak-hour trips generated by the proposed project entering and exiting the site. Trip generation factors and source are to be included. The trip generation rates contained in the latest edition of the Institute of Transportation Engineers Trip Generation manual should generally be used, except in the case of condominiums/townhomes when the following rates should be used per unit:

	ADT	A.M.-Peak Outgoing/Incoming	P.M.-Peak Outgoing/Incoming
Condominiums/ Townhomes	8.0	0.48/0.06	0.26/0.47

There may be a trip reduction due to internal and/or pass-by trips. Internal trip reduction can only be applied for mixed-use types of developments and pass-by trip reduction for retail/commercial types of developments. Internal or pass-by trip reduction assumptions will require analytical support based on verifiable actual similar developments to demonstrate how the figures were derived and will require approval by the County.

2. Trip Distribution

Diagrams showing the percentages and volumes of the project and nearby project's a.m. and p.m. peak-hour trips logically distributed on the roadway system must be provided. The Regional Daily Trip Distribution Factors (Exhibit D-3) contained in the Congestion Management Program (CMP) Land Use Analysis Guidelines shall be referenced for regional trip distribution assumptions. If it is assumed that new routes will alter traffic patterns, adequate backup including traffic distribution maps must be provided showing how and why these routes will alter traffic patterns.

The study area should include arterial highways, freeways, and intersections generally within a one-mile radius of the project site.

Note: **This distance may be greater than one-mile for rural areas depending on the proximity to nearby signalized intersections and the availability of master plan access routes.**

3. Related Projects List

A list of related projects that are approximately within a one-and-a-half mile radius of the project site and would reasonably be expected to be in place by the project's build out year must be included in the report. Related projects shall include all pending, approved, recorded, or constructed projects that are not occupied at the time of the existing traffic counts.

The County of Los Angeles Department of Regional Planning (DRP) and other public agencies (if necessary) should be contacted to obtain the latest listings. A table and a map showing the status, project/zone change/conditional use permit/parcel map/tract number, and the location of each project must be provided. For a computer printout of the listing of all filed projects within the County, Land Development Management Section of the DRP, at (213) 974-6481 can be contacted.

4. LOS Analysis

If it appears that the project's generated traffic alone or together with other projects in the area could worsen the LOS of an intersection or roadway, a "before" and "after" LOS analysis is necessary. The Intersection Capacity Utilization (ICU) or Critical Movement Analysis are two methods often used to assess existing and future LOS at intersections.

If the ICU planning method is used, a maximum of 1,600 vehicles per hour per lane should be used (2,880 vehicles per hour should be used for dual left-turn lanes) and a ten percent yellow clearance cycle should be included. Intersection LOS analysis and calculation work sheets, as well as diagrams showing turning volumes shall be included in the report for the following traffic conditions.

(a) Existing traffic;
(b) Existing traffic plus ambient growth to the year the project will be completed (preproject);
(c) Traffic in (b) plus project traffic;
(d) Traffic in (c) with the proposed mitigation measures (if necessary);
(e) Traffic in (c) plus the cumulative traffic of other known developments; and
(f) Traffic in (e) with the proposed mitigation measures (if necessary).

The project's impact on two-lane roadways should also be analyzed for all of the above traffic conditions if those two-lane roadways are used for access. LOS service analysis contained in the Highway Capacity Analysis, Chapter 8, Two-Lane Highways, should be used to evaluate the project's impact. For simplified analysis, use the established significant impact thresholds for two-lane roadways as shown on page 7.

5. Significant Impact Threshold

For intersections, the impact is considered significant if the project related increase in the volume to capacity (v/c) ratio equals or exceeds the threshold shown below.

INTERSECTIONS		
Preproject		Project /C Increase
LOS	V/C	
C	0.71 to 0.80	0.04 or more
D	0.81 to 0.90	0.02 or more
E/F	0.91 or more	0.01 or more

The project is deemed to have a significant impact on two-lane roadways when it adds the following percentages based on LOS of the preproject conditions.

TWO-LANE ROADWAYS				
		Percentages Increase in Passenger Car Per Hour (PCPH) by Project		
		Preproject LOS		
Directional Split	Total Capacity (PCPH)	C	D	E/F
50/50	2,800	4	2	1
60/40	2,650	4	2	1
70/30	2,500	4	2	1
80/20	2,300	4	2	1
90/10	2,100	4	2	1
100/0	2,000	4	2	1

6. Analysis Discussion

Discuss conclusions regarding the adverse impacts caused by the proposed project on the roadway system. If the cumulative traffic impact of this and other projects require mitigation measures, such as traffic signals, then estimate the percent share using the project percent share formula given in the Section III D of the TIA Guidelines. When the proposed project and other nearby developments are expected to significantly impact adjacent roadways, the developer may be required to enter into a secured agreement to contribute to a benefit district to fund major roadway and bridge improvements in the region. Also, for all recommendations to increase the number of travel lanes on a street or at an intersection as a mitigation measure, the report must clearly identify the impacts associated with such a change such as whether or not additional right of way will be required and whether it is feasible to acquire the right of way based on the level of development of the adjacent land and buildings (if any).

Discuss other possible adverse impacts on traffic. Examples of these are: (1) the limited visibility of access points on curved roadways; (2) the need for pavement widening to provide left-turn and right-turn lanes at access points into the proposed project; (3) the impact of increased traffic volumes on local residential streets; and (4) the need for road realignment to improve sight distance.

Projects which propose to amend the County's General Plan Land Use and substantially increase potential traffic generation must provide an analysis of the project at current planned land use versus proposed land use in the build out condition for the project area. The purpose of such analysis is to provide decision makers with the understanding of the planned circulation network's ability to accommodate additional traffic generation caused by the proposed General Plan Land Use amendments.

D. Traffic Models and Model Generated TIA's

Computerized traffic models are planning tools used to develop future traffic projections based on development growth patterns. The Department currently operates two traffic models, one for the Santa Clarita Valley and another for the Ventura Corridor area. The Department can test proposed development project traffic impacts for the public in these areas for a fee. For assistance in the traffic modeling, the Planning Division, Transportation Planning/Assessments Section, can be contacted at (626) 458-4351.

For TIA's prepared using data from outside traffic modeling, the following information is required:

1. The type of modeling software used to generate the traffic analysis report data (i.e., TRANPLAN, EMME/2, etc.).
2. The list of land use assumptions by traffic analysis zones (TAZ's) and their sources used in the traffic model in lieu of a related projects list.
3. A copy of the computerized roadway network assumed to be in place at the time of the project. Streets should be color-coded by street type. Also, TAZ's and their corresponding centroidal connectors, as well as number of lanes should be displayed.
4. The list of trip generation rates used in the traffic model and their sources.
5. Model runs (plots) identifying both the with and without project scenarios. The volumes displayed on the plots should be in 100's for Average Daily Vehicle Trips (ADT) and 10's for peak-hour plots.

E. Traffic Signals

The following information is required:

Traffic signal warrant analysis using the State of California Department of Transportation (Caltrans) Peak-Hour (Figures 9-8 and 9-9 of Caltrans Traffic Manual) and Estimated Average Daily (Figure 9-4 of Caltrans Traffic Manual) Traffic Warrant Analysis should be provided. If the installation of signals is warranted with the addition of the project's traffic, then the installation will be the sole responsibility of the project. If it is warranted with cumulative traffic of the project and other related projects, the following formula should be used to calculate the project percent share.

$$\text{Project Percentage Share} = \frac{\text{Project Traffic}}{\text{Project+Other Related Projects Traffic}}$$

The project percent share should be based on the peak-hour volumes that warrant signals. If both peak hours satisfy the installation of signals, the average of the two peak-hour volumes should be used in the percent share analysis.

F. Mitigation Measures

The following information is required.

Identify feasible mitigation measures which would mitigate the project and/or other related projects' significant impacts to a level of insignificance. Also, identify those mitigation measures which will be implemented by others. Those mitigation measures that are assumed to be implemented by others will be made a condition of approval for the project to be in place prior to issuance of building permits. Mitigation measures may include, but are not limited to, the following:

1. **Traffic Engineering Techniques.**
    a. Locate access points to optimize visibility and reduce potential conflict.
    b. Design parking facilities to avoid queuing into public streets during peak arrival periods.
    c. Provide additional off-street parking.
    d. Dedicate visibility easements to assure adequate sight distance at intersections and driveways.
    e. Signalize or modify traffic signals at intersections.
    f. Install left-turn phasing and/or multiple turning lanes to accommodate particularly heavy turning movements.
    g. Widen the pavement to provide left- or right-turn lanes to lessen the interference with the traffic flow.[1]
    h. Widen intersection approaches to provide additional capacity.
    i. Prohibit left turns to and from the proposed development.
    j. Restrict on-street parking during peak hours to increase street capacity.[1]

2. **Contribute to a benefit district to fund major capital improvements**

---

[1] Physical roadway improvements to improve capacity should be considered before considering parking restrictions.

- a. Construct a grade separation.
- b. Improve or construct alternate routes.
- c. Complete proposed routes shown on the Los Angeles Highway Plan.
- d. Improve freeway interchanges (bridge, widening, modifications, and etc.).

3. Transportation System Management (TSM) Techniques[2]

- a. Establish flexible working hours.
- b. Encourage employee use of carpools and public transportation (specific measures must be indicated).
- c. Establish preferential parking for carpools.
- d. Restrict truck deliveries to Major and Secondary highways and encourage deliveries during the off-peak hours.
- e. Establish a monitoring program to ensure that project traffic volumes do not exceed projected traffic demand.

Note: When it appears that other jurisdictions will be impacted by a development, the Department will request that the involved jurisdiction also review the TIA. A written response from that jurisdiction should be provided with appropriate follow-up to the lead County agency.

G. CMP Guidelines

The following information is required:

Where the project meets the criteria established in the County of Los Angeles' CMP Land Use Analysis Guidelines, a CMP analysis must be provided. A copy of the latest Guidelines will be available upon request. A CMP TIA is required for all projects required to prepare an Environmental Assessment based on local determination or projects requiring a traffic study.

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[2] Contributions to a benefit district and/or TSM techniques may not be used to lower LOS in the capacity calculations.

The geographic area examined in the TIA must include the following, at a minimum.

- All CMP arterial monitoring intersections (see Exhibit B of the Guidelines), including freeway on- or off-ramp intersections, where the proposed project will add 50 or more trips during either the a.m. or p.m. peak hours.
- Main line freeway monitoring locations (see Exhibit C of the Guidelines) where the project will add 150 or more trips, in either direction, during the a.m. or p.m. weekday peak hours.
- Caltrans must also be consulted to identify other specific locations to be analyzed on the State highway system.

If, based on these criteria, the TIA identifies no facilities for study, no further traffic analysis is required.

JHC:ce
T-2/ACCESS
(01/07/99)

Attach.

EXHIBIT A

TRAFFIC IMPACT ANALYSIS REPORT CONTENTS CHECK LIST

Note: Before a full review is conducted, PW's staff will check the completeness of the Traffic Impact Analysis Report. If the Report is missing any of the items listed below, it will be returned for revision.

CONTENT	YES/ NO	COMMENT
Site Plan • Access locations • Interior circulation		
Trip Generation Rates • Institute of Transportation Engineers (ITE) trip generation rates • Documentation for alternate rates		
Trip Distribution • Regional • Local project (am/pm) • Local related projects(am/pm)		
Traffic Counts • Taken within one year • Date/Time		
Discounting • Internal trip discounts for mixed use developments • Pass-by trip discounts for commercial/retail developments • Backup		
Level of Service Calculations • Intersection Capacity Utilization (ICU) or Criteria Movement Analysis • 10 percent yellow clearance for ICU planning method • 1,600 vehicles per lane (vpl); 2,880 vpl for dual left-turn lanes for ICU planning method • Calculation sheets • Scenarios as required per Guidelines • Existing/Future lane configurations		
Signal Warrant Analysis • Peak-hour/Average Daily Traffic per the State of California Department of Transportation standards		
Mitigation Measures • Project impacts • Cumulative developments impacts • Projects percent share of the cost to mitigate cumulative development impacts		
Congestion Management Program Analysis		

JHC:ce
T-2/ACCESS3
02/22/99

COUNTY OF LOS ANGELES

FIRE DEPARTMENT

5823 Rickenbacker Road
Commerce, California 90040

CITY OF
SANTA CLARITA
MASTER CASE #
02-175

CONDITIONS OF APPROVAL FOR SUBDIVISIONS - INCORPORATED

Subdivision No: 53425 Map Date September 12, 2002

C.U.P. ____________ City Santa Clarita

☒ **FIRE DEPARTMENT HOLD** on the tentative map shall remain until verification from the Los Angeles County Fire Dept. Planning Section is received, stating adequacy of service. Contact (323) 881-2404.

☒ Access shall comply with Section 902 of the Fire Code, which requires all weather access. All weather access may require paving.

☒ Fire Department Access shall be extended to within 150 feet distance of any exterior portion of all structures.

☒ Where driveways extend further than 300 feet and are of single access design, turnarounds suitable for fire protection equipment use shall be provided and shown on the final map. Turnarounds shall be designed, constructed and maintained to insure there integrity for Fire Department use. Where topography dictates, turnarounds shall be provided for driveways that extend over 150 feet in length.

☒ Private driveways shall be indicated on the final map as "Private Driveway and Firelane" with the widths clearly depicted and shall be maintained in accordance with the Fire Code. All required fire hydrants shall be installed, tested and accepted prior to construction.

☒ Vehicular access must be provided and maintained serviceable throughout construction to all required fire hydrants. All required fire hydrants shall be installed, tested and accepted prior to construction.

☒ This property is located within the area described by the Fire Department as "Very High Fire Hazard Severity Zone" (formerly Fire Zone 4). A "Fuel Modification Plan" shall be submitted and approved prior to final map clearance. (Contact Fuel Modification Unit, Fire Station #32, 605 North Angeleno Avenue, Azusa, CA 91702-2904, Phone (626) 969-5205, for details).

☒ Provide Fire Department or City approved street signs and building access numbers prior to occupancy.

☐ Additional fire protection systems shall be installed in lieu of suitable access and/or fire protection water.

☐ The final concept map, which has been submitted to this department for review, has fulfilled the conditions of approval recommended by this department for access only.

☐ These conditions shall be secured by a C.U.P. and/or Covenant and Agreement approved by the County of Los Angeles Fire Department prior to final map clearance.

☐ The Fire Department has no additional requirements for this division of land.

Comments: **FIRE DEPARTMENT HOLD FOR SECOND MEANS OF ACCESS. A second means of access is required prior to the construction of the 301st dwelling unit. The number of dwelling units includes all single family homes, and all the units within the apartments and town-homes. Please refer to page 3 for additional conditions for access.**

RECEIVED
PLANNING DIVISION
OCT 25 2002
PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

INSPECTOR **Wally Collins** WC DATE **October 24, 2002**

Land Development Unit – Fire Prevention Division – (323) 890-4243, Fax (323) 890-9783

Form 266 9/01

COUNTY OF LOS ANGELES
FIRE DEPARTMENT

5823 Rickenbacker Road
Commerce, California 90040

WATER SYSTEM REQUIREMENTS – INCORPORATED

Subdivision No: **53425** Map Date **September 12, 2002**

C.U.P. ____ City **Santa Clarita**

☒ Provide water mains, fire hydrants and fire flows as required by the County of Los Angeles Fire Department, for all land shown on map which shall be recorded.

☒ The required fire flow for public fire hydrants at this location is 1250 gallons per minute at 20 psi for a duration of 2 hours, over and above maximum daily domestic demand. 1 Hydrant(s) flowing simultaneously may be used to achieve the required fire flow.

☐ The required fire flow for private on-site hydrants is ____ gallons per minute at 20 psi. Each private on-site hydrant must be capable of flowing ____ gallons per minute at 20 psi with two hydrants flowing simultaneously, one of which must be the furthest from the public water source.

☒ Fire hydrant requirements are as follows:

Install 73 public fire hydrant(s). Upgrade / Verify ____ existing Public fire hydrant(s).
Install ____ private on-site fire hydrant(s).

☒ All hydrants shall measure 6"x 4"x 2-1/2" brass or bronze, conforming to current AWWA standard C503 or approved equal. All on-site hydrants shall be installed a minimum of 25' feet from a structure or protected by a two (2) hour rated firewall.

- ☒ Location: As per map on file with the office.
- ☒ Other location: **Please refer to the attached Tentative Tract Map for hydrant locations.**

☒ All required fire hydrants shall be installed, tested and accepted or bonded for prior to Final Map approval. Vehicular access must be provided and maintained serviceable throughout construction.

☐ The County of Los Angeles Fire Department is not setting requirements for water mains, fire hydrants and fire flows as a condition of approval for this division of land as presently zoned and/or submitted.

☐ Additional water system requirements will be required when this land is further subdivided and/or during the building permit process.

☐ Hydrants and fire flows are adequate to meet current Fire Department requirements.

☐ Upgrade not necessary, if existing hydrant(s) meet(s) fire flow requirements.

SUBMIT COMPLETED (ORIGINAL ONLY) FIRE FLOW AVAILABILITY FORM TO THIS OFFICE FOR REVIEW.

COMMENTS: **Additional fire hydrants and increased fire flow will be required for the apartments and the town-homes.**

All hydrants shall be installed in conformance with Title 20, County of Los Angeles Government Code and County of Los Angeles Fire Code, or appropriate City regulations. This shall include minimum six-inch diameter mains. Arrangements to meet these requirements must be made with the water purveyor serving the area.

By Inspector **Wally Collins** Date **October 24, 2002**

COUNTY OF LOS ANGELES
FIRE DEPARTMENT

5823 Rickenbacker Road
Commerce, California 90040

SUBDIVISION, WATER AND ACCESS REQUIREMENTS

ADDITIONAL PAGE

SUBDIVISION NO. **53425** PAGE NO. **3**

ADDITIONAL ACCESS REQUIREMENTS:

1 Temporary turn-arounds are required for the end of Newhall Ranch Road and end of Santa Clarita Parkway. The turn-arounds shall be either a cul-de-sac bulb with a 32-foot center line or a hammer-head design, which would be posted and red curbbed "NO PARKING - FIRE LANE".

2 Provide the purpose and width of the private street located in Area C. Additional street width and a turn-around may be required.

3 All streets with center medians shall have a minimum paved width of 20 feet on each side of the median, with street posted and red curbbed "NO PARKING - FIRE LANE".

4 If gates are installed, provide 4 sets of gate detail plans to the Department's Land Development Unit prior to any approvals for this Tract Map, and the construction of any dwelling unit. Gates shall conform to the Department's Regulation #5.

5 Additional access requirements will be needed for the apartments and town-homes.

6 Any form of traffic calming measure (bulb-outs, traffic-circles, etc.) to be used in this project shall be submitted to the Department's Land Development Unit prior to approval of this Tract Map, and the construction of any dwelling unit.

7 All street widths shall be measured from the curb flow line to curb flow line. Street widths for this project shall conform to the widths indicated on the cross-sections on this Tract Map.

By Inspector: Wally Collins WC Date: October 24, 2002

COUNTY SANITATION DISTRICTS
OF LOS ANGELES COUNTY

1955 Workman Mill Road, Whittier, CA 90601-1400
Mailing Address: P.O. Box 4998, Whittier, CA 90607-4998
Telephone: (562) 699-7411, FAX: (562) 699-5422
www.lacsd.org

JAMES F. STAHL
Chief Engineer and General Manager

October 1, 2002

File No: 26-00.04-00

RECEIVED
PLANNING DIVISION

OCT 0 2 2002

PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

Mr. Jeff Hogan, Associate Planner
City of Santa Clarita
23920 Valencia Boulevard, Suite 300
Santa Clarita, CA 91355

Dear Mr. Hogan:

Tentative Tract Map No. 53425, Riverpark (Panhandle)

The County Sanitation Districts of Los Angeles County (Districts) received a Notice of Preparation of a Draft Environmental Impact Report for the subject project on September 19, 2002. The proposed development is located within the jurisdictional boundaries of District No. 26. We offer the following comments regarding sewerage service:

1. Because of the project's location, the flow originating from the proposed project would have to be transported to the Districts' trunk sewer by local sewers which are not maintained by the Districts. If no local sewer lines currently exist, it is the responsibility of the developer to convey any wastewater generated by the project to the nearest local sewer and/or Districts' trunk sewer. Local sewers west of the project area convey wastewater to the Districts' Bouquet Canyon Relief Trunk Sewer, located in Bouquet Canyon Road at Espuella Drive and Newhall Ranch Road. This 24-inch diameter trunk sewer has a design capacity of 11.6 million gallons per day (mgd) and conveyed a peak flow of 5.2 mgd when last measured in 2001.

2. The Districts operate two water reclamation plants (WRPs), the Saugus WRP and the Valencia WRP in order to provide wastewater treatment in the Santa Clarita Valley. These facilities are interconnected to form a regional treatment system known as the Santa Clarita Valley Joint Sewerage System (SCVJSS) which has a permitted treatment capacity of 19.1 mgd. A two phase expansion of the Valencia WRP has been currently approved which will increase the treatment capacity of the SCVJSS by 15 mgd. The first phase, scheduled to be completed by mid 2003, will consist of a 9 mgd expansion and is expected to meet the Regional Growth Management Plan forecasted demand through 2010. The second phase, scheduled to be completed by early 2010, will consist of an additional 6 mgd expansion and will increase the SCVJSS treatment capacity to 34.1 mgd which will be sufficient to meet the demand until 2015. The SCVJSS currently processes an average flow of 17.3 mgd.

3. The expected average wastewater flow from the project site is 238,323 gallons per day. A copy of the Districts' average wastewater generation factors is enclosed for your information.

4. The Districts are empowered by the California Health and Safety Code to charge a fee for the privilege of connecting (directly or indirectly) to the Districts' Sewerage System or **increasing the existing strength and/or quantity of wastewater attributable to a particular parcel or operation already connected**. This connection fee is required to construct an incremental expansion of the Sewerage System to accommodate the proposed project which will mitigate the impact of this project on the present Sewerage System. Payment of a connection fee will be required before a permit to connect to the sewer is issued. A copy of the Connection Fee Information Sheet is enclosed for your convenience. For more specific information regarding the connection fee application procedure and fees, please contact the Connection Fee Counter at extension 2727.

5. In order for the Districts to conform with the requirements of the Federal Clean Air Act (CAA), the design capacities of the Districts' wastewater treatment facilities are based on the regional growth forecast adopted by the Southern California Association of Governments (SCAG). Specific policies included in the development of the SCAG regional growth forecast are incorporated into the Air Quality Management Plan, which is prepared by the South Coast Air Quality Management District in order to improve air quality in the South Coast Air Basin as mandated by the CAA. All expansions of Districts' facilities must be sized and service phased in a manner which will be consistent with the SCAG regional growth forecast for the counties of Los Angeles, Orange, San Bernardino, Riverside, Ventura, and Imperial. The available capacity of the Districts' treatment facilities will, therefore, be limited to levels associated with the approved growth identified by SCAG. As such, this letter does not constitute a guarantee of wastewater service, but is to advise you that the Districts intend to provide this service up to the levels which are legally permitted and to inform you of the currently existing capacity and any proposed expansion of the Districts' facilities.

If you have any questions, please contact the undersigned at (562) 699-7411, extension 2717.

Very truly yours,

James F. Stahl

Ruth I. Frazen

Ruth I. Frazen
Engineering Technician
Planning & Property Management Section

RIF:eg

Enclosures

TABLE 1
LOADINGS FOR EACH CLASS OF LAND USE

DESCRIPTION	UNIT OF MEASURE	FLOW (Gallons per Day)	COD (Pounds per Day)	SUSPENDED SOLIDS (Pounds per Day)
RESIDENTIAL				
Single Family Home	Parcel	260	1.22	0.59
Duplex	Parcel	312	1.46	0.70
Triplex	Parcel	468	2.19	1.05
Fourplex	Parcel	624	2.92	1.40
Condominiums	Parcel	195	0.92	0.44
Single Family Home (reduced rate)	Parcel	156	0.73	0.35
Five Units or More	No. of Dwlg. Units	156	0.73	0.35
Mobile Home Parks	No. of Spaces	156	0.73	0.35
COMMERCIAL				
Hotel/Motel/Rooming House	Room	125	0.54	0.28
Store	1000 ft^2	100	0.43	0.23
Supermarket	1000 ft^2	150	2.00	1.00
Shopping Center	1000 ft^2	325	3.00	1.17
Regional Mall	1000 ft^2	150	2.10	0.77
Office Building	1000 ft^2	200	0.86	0.45
Professional Building	1000 ft^2	300	1.29	0.68
Restaurant	1000 ft^2	1,000	16.68	5.00
Indoor Theatre	1000 ft^2	125	0.54	0.28
Car Wash				
Tunnel - No Recycling	1000 ft^2	3,700	15.86	8.33
Tunnel - Recycling	1000 ft^2	2,700	11.74	6.16
Wand	1000 ft^2	700	3.00	1.58
Financial Institution	1000 ft^2	100	0.43	0.23
Service Shop	1000 ft^2	100	0.43	0.23
Animal Kennels	1000 ft^2	100	0.43	0.23
Service Station	1000 ft^2	100	0.43	0.23
Auto Sales/Repair	1000 ft^2	100	0.43	0.23
Wholesale Outlet	1000 ft^2	100	0.43	0.23
Nursery/Greenhouse	1000 ft^2	25	0.11	0.06
Manufacturing	1000 ft^2	200	1.86	0.70
Dry Manufacturing	1000 ft^2	25	0.23	0.09
Lumber Yard	1000 ft^2	25	0.23	0.09
Warehousing	1000 ft^2	25	0.23	0.09
Open Storage	1000 ft^2	25	0.23	0.09
Drive-in Theatre	1000 ft^2	20	0.09	0.05

INFORMATION SHEET FOR APPLICANTS
PROPOSING TO CONNECT OR INCREASE THEIR DISCHARGE TO
THE COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY SEWERAGE SYSTEM

THE PROGRAM

The County Sanitation Districts of Los Angeles County are empowered by the California Health and Safety Code to charge a fee for the privilege of connecting to a Sanitation District's sewerage system. Your connection to a City or County sewer constitutes a connection to a Sanitation District's sewerage system as these sewers flow into a Sanitation District's system. The County Sanitation Districts of Los Angeles County provide for the conveyance, treatment, and disposal of your wastewater. **PAYMENT OF A CONNECTION FEE TO THE COUNTY SANITATION DISTRICTS OF LOS ANGELES COUNTY WILL BE REQUIRED BEFORE A CITY OR THE COUNTY WILL ISSUE YOU A PERMIT TO CONNECT TO THE SEWER.**

I. WHO IS REQUIRED TO PAY A CONNECTION FEE?

(1) Anyone connecting to the sewerage system for the first time any structure located on a parcel(s) of land within a County Sanitation District of Los Angeles County.

(2) Anyone increasing the quantity of wastewater discharged due to the construction of additional dwelling units on or a change in land usage of a parcel already connected to the sewerage system.

(3) Anyone increasing the improvement square footage of a commercial or institutional parcel by more than 25 percent.

(4) Anyone increasing the quantity and/or strength of wastewater from an industrial parcel.

(5) If you qualify for an Ad Valorem Tax or Demolition Credit, connection fee will be adjusted accordingly.

II. HOW ARE THE CONNECTION FEES USED?

The connection fees are used to provide additional conveyance, treatment, and disposal facilities (capital facilities) which are made necessary by new users connecting to a Sanitation District's sewerage system or by existing users who significantly increase the quantity or strength of their wastewater discharge. The Connection Fee Program insures that all users pay their fair share for any necessary expansion of the system.

III. HOW MUCH IS MY CONNECTION FEE?

Your connection fee can be determined from the Connection Fee Schedule specific to the Sanitation District in which your parcel(s) to be connected is located. A Sanitation District boundary map is attached to each corresponding Sanitation District Connection Fee Schedule. Your City or County sewer permitting office has copies of the Connection Fee Schedule(s) and Sanitation District boundary map(s) for your parcel(s). If you require verification of the Sanitation District in which your parcel is located, please call the Sanitation Districts' information number listed under Item IX below.

IV. WHAT FORMS ARE REQUIRED*?

The Connection Fee application package consists of the following:

MWD
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Executive Office

October 15, 2002

Jeff Hogan, Associate Planner
City of Santa Clarita
23920 Valencia Boulevard, Suite 300
Santa Clarita, CA 91355

Dear Mr. Hogan:

Initial Study and Notice of Preparation for the
Draft Environmental Impact Report for the Riverpark Project (Tentative Tract Map 53425)

The Metropolitan Water District of Southern California (Metropolitan) has received the Initial Study and Notice of Preparation for a Draft Environmental Impact Report for the Riverpark Project (Tentative Tract Map 53425) in the city of Santa Clarita (City). The proposed project includes the development of six parcels of land totaling 664.3 acres for single- and multi-family uses. A tentative tract map is required to subdivide the six lots into 478 single-family lots, 15 multi-family lots, and other lots for utilities and open space. The proposed project is located at the terminus of Newhall Ranch Road, east of Bouquet Canyon Road, and north of Soledad Canyon Road. The comments herein represent Metropolitan's response to the Initial Study as a potentially affected public agency.

Our review of the Initial Study indicates that Metropolitan owns and operates a facility adjacent to the proposed project area. Metropolitan's Foothill Feeder pipeline is adjacent to the southwest corner of the proposed Riverpark development. The pipeline, which is located in property owned by Metropolitan, extends in a generally northwest-southeast direction in the proposed project area. The pipeline is located within a tunnel right-of-way southeast of Bouquet Canyon Road.

Based on review of the Initial Study, the document does not identify Metropolitan's pipeline as being in the vicinity of the project area. Metropolitan is concerned with potential impacts to this facility associated with future excavation and new construction as a result of the proposed project. Metropolitan requests that the City take Metropolitan's facilities into consideration in its project planning. Metropolitan also requests that the City identify whether any protection or relocation of Metropolitan's facilities would be required.

In order to avoid potential conflicts with Metropolitan's rights-of-way, we request that any design plans for any activity in the area of Metropolitan's pipelines or structures be submitted for our review and written approval. The applicant may obtain detailed prints of drawings of Metropolitan's pipelines and rights-of-way by calling Metropolitan's Substructures Information Line at (213) 217-6564. To assist the applicant in preparing plans that are compatible with Metropolitan's facilities and easements, we have enclosed a copy of the "Guidelines for Developments in the Area of Facilities, Fee Properties, and/or Easements of The Metropolitan Water District of Southern California." Please note that all submitted designs or plans must clearly identify Metropolitan's facilities and rights-of-way.

Metropolitan must be allowed to maintain its right-of-way and access to its facilities at all times in order to repair and maintain the current condition of those facilities.

The Initial Study indicates that bank stabilization will be constructed along the Santa Clara River as part of the proposed project. Bank stabilization will be constructed for approximately 1,500 linear feet for the east-west extension of Newhall Ranch Road and approximately 4,150 linear feet for the project development. Metropolitan is concerned with the impacts that bank stabilization could have on Metropolitan's property north of Bouquet Canyon Road in the vicinity of the Santa Clara River. Metropolitan requests that the City consider the effect of bank stabilization on the flow of the Santa Clara River and its potential impact to Metropolitan's property. If impacts to Metropolitan's property are identified, corrective measures or additional maintenance activities required on Metropolitan property must be identified and discussed in the EIR by the project proponent.

Additionally, the Initial Study also acknowledges that further analysis of water issues, such as increased runoff into the Santa Clara River caused by the proposed increase in impermeable or impervious features, is required in the Draft EIR. Metropolitan is concerned with the increased runoff and how it may impact Metropolitan's property in the proposed project area. Metropolitan requests that the City analyze the impacts of increased runoff to the Santa Clara River and its potential impact to Metropolitan's property. If impacts to Metropolitan's property are identified, corrective measures or additional maintenance activities required on Metropolitan property must be identified and discussed in the EIR by the project proponent.

Metropolitan encourages projects to include water conservation measures. Water conservation, reclaimed water use, and groundwater recharge programs are integral components to regional water supply planning. Metropolitan supports mitigation measures such as using water efficient fixtures, drought-tolerant landscaping, and reclaimed water to offset any increase in water use associated with the proposed project.

We appreciate the opportunity to provide input to your planning process and we look forward to receiving future environmental documentation on this project. If we can be of further assistance, please contact William Fong of the Environmental Planning Team at (213) 217-6066.

Very truly yours,

Laura J. Simonek

Laura J. Simonek
Manager, Asset Management
and Facilities Planning Unit

JAH: rdl
(Public Folders/EPT/Letters/15-OCT-02.doc – Jeff Hogan)

Enclosures: Planning Guidelines

SCOPE
Santa Clarita Organization for Planning and the Environment
TO PROMOTE, PROTECT AND PRESERVE THE ENVIRONMENT, ECOLOGY
AND QUALITY OF LIFE IN THE SANTA CLARITA VALLEY
POST OFFICE BOX 1182, SANTA CLARITA, CA 91386

11-27-02

Attn: Jeff Hogan [redacted]
City of Santa Clarita
23920 Valencia Blvd.
Santa Clarita, Ca. 91355

Re: Notice of Preparation, River Park Project

Thank-you for the opportunity to comment on issues that should be disclosed in the upcoming EIR. We agree with the categories you have checked on the first page of the NOP and the potentially affected environmental factors indicated on page 3, but believe that the fiscal impact of this proposal and the jobs/housing balance should also be discussed. We concur with your determination that an EIR must be provided. We request that we receive that document for review when it becomes available.

We generally agree with the areas you have found to be of potentially significant impact except on page 12 Item XVII b. and c. Both these items should be check "Potentially significant " Degrading critical habitat for endangered species, loss of water recharge areas, adding additional water users before an adequate water supply is identified, and reducing the flood plain of the Santa Clara River are all impacts that will produce long-term negative and unmitigatable impacts to the water shed. The cumulative impacts of this project when considered with all the other projects along the Santa Clara River and its tributaries are severe.

When evaluating biological impacts, we request that the City hire an independent biologist to do species surveys including surveys for the Arroyo Toad and endangered bird and plant species. Newhall Land did not produce complete and accurate in the past, nor was survey protocol correctly followed. Hazing machines were used to scare of endangered birds during their nesting seasons and a siting of the arroyo toad and finding of the slender-horned spine flower colonies were either not reported or inadequately reported. Brush grading of habitat areas has already occurred on site. We question why such brushing should have occurred PRIOR to the preparation of an Environmental Impact Report in a sensitive habitat area. Since normally brushing permits are required, we wonder why the City would have issued such a permit with full knowledge that a project requiring the preparation of an EIR was being proposed. We ask that these issues be addressed in the EIR. Also, when discussing biological impacts, we request that historical information PRIOR to brush grading, be used as the habitat baseline and that historical surveys prior to bush grading be included in the EIR.

Impacts to wildlife movement should be discussed. Comments from all conservation agencies engaged in ensuring viability of wildlife should be solicited, including the Santa Monica Mountains Conservancy.

Cumulative analysis of impacts to the watershed must address loss of recharge areas and surface flows, impacts to water supply, increased flood flows and water velocities and cumulative losses to species and habitats. Cumulative analysis should be prepared with an eye to the parameters and goals enumerated in the recent Appellate Court decision Communities for a Better Environment v. California Resources Agency (Oct. 28, 2002). The case has no official citation yet, but the Third District Docket # is C038844.

The City should be aware that this area is in the Valencia Water Co. service area. The Valencia Water Co. is the wholly owned subsidiary of Newhall Land and Farming and as a private water company, is governed by the Public Utilities Commission. Since the water company is owned by the developer of the proposed project, water supply information may be structured to support the approval of the parent company's proposal. Therefore, independent analysis should be obtained to accurately asses water availability. Further, the Public Utilities Commission is now acting under new regulations. All new projects within the Valencia Water Service Area will have to provide Public Advise letters and go though a public comment process prior to receiving PUC authority to provide water service. In addition to the requirements of SB221 and SB610, water service may not be permitted if the PUC determines that water supply is not adequate.

This project contains several working water supply wells. Proper closure of these wells and impacts to new well sites should be addressed in the EIR. Also, financial costs to Valencia Water Co. rate payers should be disclosed.

Evaluation of water supply impacts by ammonium perchlorate should be analyzed. Variability of State Water project supplies should be disclosed. The City should not rely on the CLWA Urban Water Management Plan to properly disclose water supply as this document is currently being litigated and may be set aside, causing a domino effect on this project approval.

This project is located in a floodway and liquefaction hazard area as determined by the State Depart of Conservation, Division of Mines and Geology. These hazards must be thoroughly disclosed in the EIR so that future residents are aware of potential health and safety factors.

This project will require permits from Regional Water Quality Control Board, Dept. of Fish and Game, Army Corps of Engineers and others. Attention should be given to ensure that the project will comply with regulations of all other permitting agencies. This could best be accomplished by applying to those agencies concurrently so that any required changes can be incorporated early in the planning process.

Thank-you for your time and attention to our comments. We look forward to receiving a copy of the DEIR for review.

Sincerely,

Lynne O. Plambeck

Lynne Plambeck
President

SIERRA CLUB
FOUNDED 1892

3435 Wilshire Boulevard
Suite 320
Los Angeles, CA 90010-1904

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Santa Clarita Valley Group
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November 19, 2002

RECEIVED
PLANNING DIVISION
NOV 19 2002
PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

ATTN: Jeff Hogan/Wendy Deats
City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Blvd.
Santa Clarita, CA 91355

Dear Planning Department of the City of Santa Clarita,

This letter is in regard to what you call the "River Park Project" proposed by Newhall Land and Farming for the Panhandle area of Saugus. The potential impacts that I can see on the community that this proposal entails and for which I would like the EIR to respond to are as follows:

- At this point, as I understand it, the plan is for two entrances onto Bouquet Canyon Road. One behind the shopping center and another road designed to skirt Central Park and go beyond the dividing hill on the south side of the park. Bouquet Canyon Road is already overly congested. How are you going to "mitigate" the incredible traffic gridlock that will be added to the gridlock that already exists on Bouquet Canyon Road during the rush hours? How are you going to "mitigate" the additional health problems from the pollution that the added traffic will cause?
- How can you prove where the drinkable water for this development will come from? Do you plan on using that farce that CLWA put out that includes the water from contaminated wells as part of "available" water? (CLWA has been clear that "available" does not have to mean "drinkable".) Will you make a request of them to give you an accurate estimate of drinkable water available? (This would not unrealistically report that 100 percent of state water is available, because it never is.)
- Will you find the accurate amount of drinkable water available for existing homes and developments which have already been approved before risking any more development?
- How are you going to mitigate the threats to the sensitive species of the area including those that are state or federally endangered or threatened species, also those species that are listed by the California Dept. of Fish and Game as species of special concern, those listed by California Department of Forestry and Fire Protection as sensitive, California Fully Protected Species, Audubon Society Watchlist, Bureau of Land Management sensitive species, Forest Service sensitive, Partners in Flight watchlist, or those listed by the California Fish and Game as warranting CEQA consideration for project impacts in this area? Can you protect their last bastions of habitat in this area? This is probably the last uplands available for species to escape to when the river floods. Uplands are needed so these species don't drown in time of flood. How will you mitigate the deaths of animals drowned by floods because of lack of uplands? How can you preserve the natural habitat that exists in the uplands and the corridor from the river to those uplands? How do you mitigate the death of an entire species?
- What are you going to do with the heritage oaks on this property? How will you "mitigate" the 25 oaks that you wish to remove?

- How will you make up for the percolation of water to our aquifer that won't occur because of the encroachment on the river and the paving on the project?
- Can you ensure the same amount of water recharge area will be present if this proposed development actually occurs?
- How will you protect the 500 year flood plain of the river in this area?
- How can you justify more destruction of the ridgeline when the amount of destruction that has already happened to the ridgeline should not have occurred? How does this comply with the city's ridgeline ordinance? Why can you not tell us how much ridgeline you are going to attempt to remove? Why do you set a deadline for comments before we are given accurate knowledge of this proposed project?
- How do you "mitigate the ruination of the views of nature that the existing residents will have imposed on them? (Note, my back yard is much higher than the rest of those that face the back end of the Bouquet Shopping Center. I used to look at nature where the shopping center is and now I see those intrusive ugly cement walls. In addition, I am awakened every week by the garbage trucks that pick up the garbage cans inconsiderately placed right next to the back fences of the neighboring houses. Those garbage cans stink and attract crows. I used to have my phone lines covered with song birds until those crows came and scared them away. It was the county that approved the stupid planning on that shopping center. May I strongly suggest that you keep all garbage cans away from the existing neighborhood and demonstrate much more considerate planning than that fiasco was.) Where does this project propose to actually place the apartments in area D? How high are they going to be? Can you guarantee that I will not be looking at even more ugly cement if those things go in?
- How will you "mitigate" the health problems that will occur as a result of the massive amounts of dirt being moved? If you say they'll water the land as they go along, please know that adequate watering has been an unfulfilled promise for a number of past developments leaving many skeptics. What penalties can be inflicted if proper watering is not done? How will you determine what proper watering is?
- How will you determine a baseline for existing health problems, such as Asthma, lung problems and Valley Fever and then determine whether indeed, the amount of dirt removal creates more incidents of these maladies--as local doctors believe. Then how will you compensate the victims of these diseases most of which are caused by the particulate matter from dirt moving?
- How will you ensure the privacy of the existing neighborhood will not be assailed? (Note, a few weeks ago, I stopped three teen age boys that were cutting through my back yard going from Bouquet Shopping Center to the Boys Club at Emblem and thinking the cut across would be quicker. How would you stop the additonal youths in the proposed apartment complex from further infringing on my privacy?
- How will you mitigate severe overcrowding to Emblem School and to Espuella--Emblem's approach road from this development?

At one time, if I recall correctly, the city wanted to build a true river park in this area. It is my humble request that you investigate all possible grants available to make that happen. Thank you for your attention to these concerns.

Sincerely,

Karen Pearson

Karen Pearson
Chair, Open Space Committee, Santa Clarita Valley Sierra Club

South Coast
Air Quality Management District
21865 E. Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 · http://www.aqmd.gov

RECEIVED
PLANNING DIVISION
SEP 30 2002
PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

September 27, 2002

Mr. Jeff Hogan
City of Santa Clarita
23920 Valencia Blvd., Suite 300
Santa Clarita, CA 91355

Dear Mr. Hogan:

Notice of Preparation of an Environmental Impact Report for
<u>Riverpark</u>

The South Coast Air Quality Management District (AQMD) appreciates the opportunity to comment on the above-mentioned document. The AQMD's comments are recommendations regarding the analysis of potential air quality impacts from the proposed project that should be included in the Draft Environmental Impact Report (EIR).

<u>Air Quality Analysis</u>
The AQMD adopted its California Environmental Quality Act (CEQA) Air Quality Handbook in 1993 to assist other public agencies with the preparation of air quality analyses. The AQMD recommends that the Lead Agency use this Handbook as guidance when preparing its air quality analysis. Copies of the Handbook are available from the AQMD's Subscription Services Department by calling (909) 396-3720.

The Lead Agency should identify any potential adverse air quality impacts that could occur from all phases of the project and all air pollutant sources related to the project. Air quality impacts from both construction and operations should be considered. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, that is, sources that generate or attract vehicular trips should be included in the evaluation. An analysis of all toxic air contaminant impacts due to the decommissioning or use of equipment potentially generating such air pollutants should also be included.

Mitigation Measures
In the event that the project generates significant adverse air quality impacts, CEQA requires that all feasible mitigation measures be utilized during project construction and operation to minimize or eliminate significant adverse air quality impacts. To assist the Lead Agency with identifying possible mitigation measures for the project, please refer to Chapter 11 of the AQMD CEQA Air Quality Handbook for sample air quality mitigation measures. Additionally, AQMD's Rule 403 – Fugitive Dust, and the Implementation Handbook contain numerous measures for controlling construction-related emissions that should be considered for use as CEQA mitigation if not otherwise required. Pursuant to state CEQA Guidelines §15126.4 (a)(1)(D), any impacts resulting from mitigation measures must also be discussed.

Data Sources
AQMD rules and relevant air quality reports and data are available by calling the AQMD's Public Information Center at (909) 396-2039. Much of the information available through the Public Information Center is also available via the AQMD's World Wide Web Homepage (http://www.aqmd.gov).

The AQMD is willing to work with the Lead Agency to ensure that project-related emissions are accurately identified, categorized, and evaluated. Please call Dr. Charles Blankson, Transportation Specialist, CEQA Section, at (909) 396-3304 if you have any questions regarding this letter.

Sincerely,

Steve Smith

Steve Smith, Ph.D.
Program Supervisor, CEQA Section
Planning, Rule Development and Area Sources

SS:CB:li

RVC020920-01LI
Control Number

SOUTHERN CALIFORNIA

ASSOCIATION of GOVERNMENTS

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RECEIVED
PLANNING DIVISION
OCT 18 2002
PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

October 16, 2002

Ms. Wendy Deats
Assistant Planner II
City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Boulevard
Santa Clarita, CA 93155

RE: **Comments on the Notice of Preparation for a Draft Environmental Impact Report for the Riverpark (Panhandle) Project – SCAG No. I 20020494**

Dear Ms. Deats:

Thank you for submitting the **Notice of Preparation for a Draft Environmental Impact Report for the Riverpark (Panhandle) Project** to SCAG for review and comment. As areawide clearinghouse for regionally significant projects, SCAG reviews the consistency of local plans, projects, and programs with regional plans. This activity is based on SCAG's responsibilities as a regional planning organization pursuant to state and federal laws and regulations. Guidance provided by these reviews is intended to assist local agencies and project sponsors to take actions that contribute to the attainment of regional goals and policies.

We have reviewed the **Notice of Preparation**, and have determined that **the proposed Project is regionally significant per California Environmental Quality Act (CEQA) Guidelines (Section 15206).** The proposed Project considers the construction of more than 500 dwelling units. CEQA requires that EIRs discuss any inconsistencies between the proposed project and the applicable general plans and **regional plans (Section 15125 [d])**. If there are inconsistencies, an explanation and rationalization for such inconsistencies should be provided.

Policies of SCAG's Regional Comprehensive Plan and Guide and Regional Transportation Plan, which may be applicable to your project, are outlined in the attachment. **We expect the DEIR to specifically cite the appropriate SCAG policies and address the manner in which the Project is consistent with applicable core policies or supportive of applicable ancillary policies. Please use our policy numbers to refer to them in your DEIR. Also, we would encourage you to use a side-by-side comparison of SCAG policies with a discussion of the consistency or support of the policy with the Proposed Project.**

Please provide a minimum of 45 days for SCAG to review the DEIR when this document is available. If you have any questions regarding the attached comments, please contact me at (213) 236-1867. Thank you.

Sincerely,

JEFFREY M. SMITH, AICP
Senior Regional Planner
Intergovernmental Review

COMMENTS ON THE PROPOSAL TO DEVELOP A DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE RIVERPARK (PANHANDLE) PROJECT
SCAG NO. I 20020494

PROJECT DESCRIPTION

The proposed Project considers a Tentative Tract Map, Zone Change and General Plan Amendment, Conditional Use Permit, Review and Oak Tree Permit for the development of approximately 1,152 dwelling units. The proposed Project will be developed on approximately 664-acres, and is located east of Bouquet Canyon Road and north of Soledad Canyon Road in the City of Santa Clarita.

CONSISTENCY WITH REGIONAL COMPREHENSIVE PLAN AND GUIDE POLICIES

The **Growth Management Chapter (GMC)** of the Regional Comprehensive Plan and Guide (RCPG) contains the following policies that are particularly applicable and should be addressed in the Draft EIR for the Riverpark (Panhandle) Project.

3.01 The population, housing, and jobs forecasts, which are adopted by SCAG's Regional Council and that reflect local plans and policies, shall be used by SCAG in all phases of implementation and review.

Regional Growth Forecasts

The Draft EIR should reflect the most current SCAG forecasts which are the 2001 RTP (April 2001) Population, Household and Employment forecasts for the North Los Angeles County Council of Governments (NLACOG) subregion and the City of Santa Clarita. These forecasts are as follows:

NLACOG Subregion	2000	2005	2010	2015	2020	2025
Population	576,478	658,450	786,419	912,257	1,083,020	1,259,354
Household	174,293	211,038	264,936	319,701	378,169	442,773
Employment	187,780	218,429	250,111	268,842	285,963	304,163

City of S. Clarita	2000	2005	2010	2015	2020	2025
Population	146,415	151,226	166,822	182,158	202,970	224,460
Household	48,571	54,372	60,227	66,197	72,555	79,581
Employment	48,971	50,783	52,846	54,064	55,179	56,366

3.03 *The timing, financing, and location of public facilities, utility systems, and transportation systems shall be used by SCAG to implement the region's growth policies.*

The **Regional Transportation Plan (RTP)** also has goals, objectives, policies and actions pertinent to this proposed project. This RTP links the goal of sustaining mobility with the goals of fostering economic development, enhancing the environment, reducing energy consumption, promoting transportation-friendly development patterns, and encouraging fair and equitable access to residents affected by socio-economic, geographic and commercial limitations. Among the relevant goals, objectives, policies and actions of the RTP are the following:

Core Regional Transportation Plan Policies

4.01 *Transportation investments shall be based on SCAG's adopted Regional Performance Indicators:*

Mobility - Transportation Systems should meet the public need for improved access, and for safe, comfortable, convenient, faster and economical movements of people and goods.

- *Average Work Trip Travel Time in Minutes – 25 minutes (Auto)*
- *PM Peak Freeway Travel Speed – 45 minutes (Transit)*
- *PM Peak Non-Freeway Travel Speed*
- *Percent of PM Peak Travel in Delay (Fwy)*
- *Percent of PM Peak Travel in Delay (Non-Fwy)*

Accessibility - Transportation system should ensure the ease with which opportunities are reached. Transportation and land use measures should be employed to ensure minimal time and cost.

- *Work Opportunities within 45 Minutes door to door travel time (Mode Neutral)*
- *Average transit access time*

Environment - Transportation system should sustain development and preservation of the existing system and the environment. (All Trips)

- *CO, ROG, NOx, PM10, PM2.5 – Meet the applicable SIP Emission Budget and the Transportation Conformity requirements*

<u>Reliability</u> – Transportation system should have reasonable and dependable levels of service by mode. (All Trips)
- *Transit – 63%*
- *Highway – 76%*

<u>Safety</u> - Transportation systems should provide minimal accident, death and injury. (All Trips)
- *Fatalities Per Million Passenger Miles – 0*
- *Injury Accidents – 0*

<u>Equity/Environmental Justice</u> - The benefits of transportation investments should be equitably distributed among all ethnic, age and income groups. (All trips)
- *By Income Groups Share of Net Benefits – Equitable Distribution of Benefits among all Income Quintiles*

<u>Cost-Effectiveness</u> - Maximize return on transportation investment (All Trips). Air Quality, Mobility, Accessibility and Safety
- *Return on Total Investment – Optimize return on Transportation Investments*

4.02 Transportation investments shall mitigate environmental impacts to an acceptable level.

4.04 Transportation Control Measures shall be a priority.

4.16 Maintaining and operating the existing transportation system will be a priority over expanding capacity.

GMC POLICIES RELATED TO THE RCPG GOAL TO IMPROVE THE REGIONAL STANDARD OF LIVING

The Growth Management goals to develop urban forms that enable individuals to spend less income on housing cost, that minimize public and private development costs, and that enable firms to be more competitive, strengthen the regional strategic goal to stimulate the regional economy. The evaluation of the proposed project in relation to the following policies would be intended to guide efforts toward achievement of such goals and does not infer regional interference with local land use powers.

3.05 Encourage patterns of urban development and land use, which reduce costs on *infrastructure construction and make better use of existing facilities.*

3.09 *Support local jurisdictions' efforts to minimize the cost of infrastructure and public service delivery, and efforts to seek new sources of funding for development and the provision of services.*

3.10 *Support local jurisdictions' actions to minimize red tape and expedite the permitting process to maintain economic vitality and competitiveness.*

GMC POLICIES RELATED TO THE RCPG GOAL TO IMPROVE THE REGIONAL QUALITY OF LIFE

The Growth Management goals to attain mobility and clean air goals and to develop urban forms that enhance quality of life, that accommodate a diversity of life styles, that preserve open space and natural resources, and that are aesthetically pleasing and preserve the character of communities, enhance the regional strategic goal of maintaining the regional quality of life. The evaluation of the proposed project in relation to the following policies would be intended to provide direction for plan implementation, and does not allude to regional mandates.

3.12 *Encourage existing or proposed local jurisdictions' programs aimed at designing land uses which encourage the use of transit and thus reduce the need for roadway expansion, reduce the number of auto trips and vehicle miles traveled, and create opportunities for residents to walk and bike.*

3.14 *Support local plans to increase density of future development located at strategic points along the regional commuter rail, transit systems, and activity centers.*

3.17 *Support and encourage settlement patterns, which contain a range of urban densities*

3.18 *Encourage planned development in locations least likely to cause environmental impact.*

3.19 *SCAG shall support policies and actions that preserve open space areas identified in local, state and federal plans.*

3.20 *Support the protection of vital resources such as wetlands, groundwater recharge areas, woodlands, production lands, and land containing unique and endangered plants and animals.*

3.21 *Encourage the implementation of measures aimed at the preservation and protection of recorded and unrecorded cultural resources and archaeological sites.*

3.22 *Discourage development, or encourage the use of special design requirements, in areas with steep slopes, high fire, flood, and seismic hazards.*

3.23 *Encourage mitigation measures that reduce noise in certain locations, measures aimed at preservation of biological and ecological resources, measures that would reduce exposure to seismic hazards, minimize earthquake damage, and to develop emergency response and recovery plans.*

GMC POLICIES RELATED TO THE RCPG GOAL TO PROVIDE SOCIAL, POLITICAL, AND CULTURAL EQUITY

The Growth Management Goal to develop urban forms that avoid economic and social polarization promotes the regional strategic goal of minimizing social and geographic disparities and of reaching equity among all segments of society. The evaluation of the proposed project in relation to the policy stated below is intended guide direction for the accomplishment of this goal, and does not infer regional mandates and interference with local land use powers.

3.24 *Encourage efforts of local jurisdictions in the implementation of programs that increase the supply and quality of housing and provide affordable housing as evaluated in the Regional Housing Needs Assessment.*

3.27 *Support local jurisdictions and other service providers in their efforts to develop sustainable communities and provide, equally to all members of society, accessible and effective services such as: public education, housing, health care, social services, recreational facilities, law enforcement, and fire protection.*

AIR QUALITY CHAPTER CORE ACTIONS

The **Air Quality Chapter** core actions related to the proposed project includes:

5.07 *Determine specific programs and associated actions needed (e.g., indirect source rules, enhanced use of telecommunications, provision of community based shuttle services, provision of demand management based programs, or vehicle-miles-traveled/emission fees) so that options to command and control regulations can be assessed.*

5.11 *Through the environmental document review process, ensure that plans at all* *levels of government (regional, air basin, county, subregional and local) consider air quality, land use, transportation and economic relationships to ensure consistency and minimize conflicts.*

WATER QUALITY CHAPTER RECOMMENDATIONS AND POLICY OPTIONS

The **Water Quality Chapter** core recommendations and policy options relate to the two water quality goals: to restore and maintain the chemical, physical and biological integrity of the nation's water; and, to achieve and maintain water quality objectives that are necessary to protect all beneficial uses of all waters.

11.07 Encourage water reclamation throughout the region where it is cost-effective, feasible, and appropriate to reduce reliance on imported water and wastewater discharges. Current administrative impediments to increased use of wastewater should be addressed.

OPEN SPACE CHAPTER ANCILLARY GOALS

Outdoor Recreation

9.01 Provide adequate land resources to meet the outdoor recreation needs of the present and future residents in the region and to promote tourism in the region.

9.02 Increase the accessibility to open space lands for outdoor recreation.

9.03 Promote self-sustaining regional recreation resources and facilities.

Public Health and Safety

9.04 Maintain open space for adequate protection of lives and properties against natural and man-made hazards.

9.05 Minimize potentially hazardous developments in hillsides, canyons, areas susceptible to flooding, earthquakes, wildfire and other known hazards, and areas with limited access for emergency equipment.

Resource Production

9.07 Maintain adequate viable resource production land, particularly lands devoted to commercial agriculture and mining operations.

Resource Protection

9.08 Develop well-managed viable ecosystems or known habitats of rare, threatened and endangered species, including wetlands.

CONCLUSIONS

All feasible measures needed to mitigate any potentially negative regional impacts associated with the proposed project should be implemented and monitored, as required by CEQA.

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

Roles and Authorities

THE SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS (SCAG) is a ***Joint Powers Agency*** established under California Government Code Section 6502 et seq. Under federal and state law, SCAG is designated as a Council of Governments (COG), a Regional Transportation Planning Agency (RTPA), and a Metropolitan Planning Organization (MPO). SCAG's mandated roles and responsibilities include the following:

SCAG is designated by the federal government as the Region's ***Metropolitan Planning Organization*** and mandated to maintain a continuing, cooperative, and comprehensive transportation planning process resulting in a Regional Transportation Plan and a Regional Transportation Improvement Program pursuant to 23 U.S.C. '134, 49 U.S.C. '5301 et seq., 23 C.F.R. '450, and 49 C.F.R. '613. SCAG is also the designated ***Regional Transportation Planning Agency***, and as such is responsible for both preparation of the Regional Transportation Plan (RTP) and Regional Transportation Improvement Program (RTIP) under California Government Code Section 65080 and 65082 respectively.

SCAG is responsible for developing the demographic projections and the integrated land use, housing, employment, and transportation programs, measures, and strategies portions of the ***South Coast Air Quality Management Plan***, pursuant to California Health and Safety Code Section 40460(b)-(c). SCAG is also designated under 42 U.S.C. '7504(a) as a ***Co-Lead Agency*** for air quality planning for the Central Coast and Southeast Desert Air Basin District.

SCAG is responsible under the Federal Clean Air Act for determining ***Conformity*** of Projects, Plans and Programs to the State Implementation Plan, pursuant to 42 U.S.C. '7506.

Pursuant to California Government Code Section 65089.2, SCAG is responsible for ***reviewing all Congestion Management Plans (CMPs) for consistency with regional transportation plans*** required by Section 65080 of the Government Code. SCAG must also evaluate the consistency and compatibility of such programs within the region.

SCAG is the authorized regional agency for ***Inter-Governmental Review*** of Programs proposed for federal financial assistance and direct development activities, pursuant to Presidential Executive Order 12,372 (replacing A-95 Review).

SCAG reviews, pursuant to Public Resources Code Sections 21083 and 21087, Environmental Impacts Reports of projects of regional significance for consistency with regional plans [California Environmental Quality Act Guidelines Sections 15206 and 15125(b)].

Pursuant to 33 U.S.C. '1288(a)(2) (Section 208 of the Federal Water Pollution Control Act), SCAG is the authorized ***Areawide Waste Treatment Management Planning Agency***.

SCAG is responsible for preparation of the ***Regional Housing Needs Assessment***, pursuant to California Government Code Section 65584(a).

SCAG is responsible (with the Association of Bay Area Governments, the Sacramento Area Council of Governments, and the Association of Monterey Bay Area Governments) for preparing the ***Southern California Hazardous Waste Management Plan*** pursuant to California Health and Safety Code Section 25135.3.

Revised July 2001

Department of Toxic Substances Control

Edwin F. Lowry, Director
1011 N. Grandview Avenue
Glendale, California 91201

Winston H. Hickox
Agency Secretary
California Environmental
Protection Agency

Gray Davis
Governor

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PLANNING DIVISION

OCT 18 2002

PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

October 15, 2002

Mr. Jeff Hogan
Associate Planner
City of Santa Clarita
23920 Valencia Boulevard, Suite 300
Santa Clarita, California 91355

NOTICE OF PREPARATION OF DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE RIVERPARK, SCH NO. 2002091081

Dear Mr. Hogan:

The Department of Toxic Substances Control (DTSC) has received your Notice of Preparation of a draft Environmental Impact Report (EIR) for the project mentioned above.

Based on the review of the document, DTSC comments are as follows:

1. The draft EIR needs to identify and determine whether current or historic uses at the Project site have resulted in any release of hazardous wastes/substances at the Project area.

2. The draft EIR needs to identify any known or potentially contaminated site within the Project area. For all identified sites, the draft EIR needs to evaluate whether conditions at the site pose a threat to human health or the environment.

3. The draft EIR should identify the mechanism to initiate any required investigation and/or remediation for any site that may require remediation, and which government agency will provide appropriate regulatory oversight.

4. If during construction of the project, soil contamination is suspected, construction in the area should stop, and appropriate health and safety procedures should be implemented. If it is determined that contaminated soils exists, the draft EIR

should identify how any required investigation and/or remediation will be conducted, and which government agency will provide regulatory oversight.

DTSC provides guidance for Preliminary Endangerment Assessment preparation and cleanup oversight through the Voluntary Cleanup Program (VCP). For additional information on the VCP please visit DTSC's web site at www.dtsc.ca.gov. If you would like to meet and discuss this matter further, please contact Mr. Alberto Valmidiano, Project Manager, at (818) 551-2870 or me, at (818) 551-2877.

Sincerely,

Harlan R. Jeche

Harlan R. Jeche
Unit Chief
Southern California Cleanup Operations Branch – Glendale Office

Enclosure

cc: Governor's Office of Planning and Research
State Clearinghouse
P.O. Box 3044
Sacramento, California 95812-3044

Mr. Guenther W. Moskat, Chief
Planning and Environmental Analysis Section
CEQA Tracking Center
Department of Toxic Substances Control
P.O. Box 806
Sacramento, California 95812-0806

RECEIVED
PLANNING DIVISION
OCT 14 2002
PLANNING AN
CITY OF S
VICES

County of Los Angeles
Sheriff's Department Headquarters
4700 Ramona Boulevard
Monterey Park, California 91754-2169
(661) 255-1121

LEROY D. BACA, SHERIFF

October 8, 2002

Mr. Jeff Hogan, Associate Planner
City of Santa Clarita
23920 Valencia Boulevard
Santa Clarita, California 91355

Dear Mr. Hogan:

RIVERPARK DEVELOPMENT
ENVIRONMENTAL IMPACT REPORT
MC 02-175; TENTATIVE TRACT NO. 53425

The proposed project consisting of 1,152 residential units is within the jurisdiction of the Los Angeles County Sheriff's Department, Santa Clarita Valley Station, 23740 Magic Mountain Parkway, Valencia, California. The station is located approximately 2.5 miles from the project site.

It is anticipated that the routine response time to a request for service would be approximately 20-25 minutes. The immediate response time would be approximately 5-12 minutes and an emergent response, approximately 2-5 minutes. All response times are approximations, only, and would be dependent on both the deployment of area radio cars and traffic conditions.

This station serves an area of 656 square miles, which is made up of the City of Santa Clarita and unincorporated County area between the Los Angeles City Limits to the South, to Kern County Line to the North and involving all area between the Ventura County Line to the West and the township of Aqua Dulce to the East. The population served by our station is approximately 200,000 residents.

Our ideal officer to population ratio is one deputy per 1,000 residents and with our current staffing of 178 sworn deputies currently assigned, our ratio is at one deputy per every 1,179 residents. Assuming a residential density of 3.01 persons per dwelling unit, this proposed project will generate a population increase of 3,467. Based on the above, this project and other projects in the Santa Clarita Valley could require additional deputies to the station compliment.

Our primary concern is our ability to provide an adequate level of protection and service to all areas we police. Due to the rapidly expanding population of the Santa Clarita Valley and its record-setting home building, it is difficult to project the impact of this project on law enforcement.

Adding this project and other projects in progress, either proposed, approved or committed, it is certain they will all significantly strain our resources to the breaking point. Additionally, the increase in required field personnel will necessitate a concomitant increase in support resources such as detectives, complaint desk officers, vehicles and portable radios. While not directly a builder's matter, our ability to provide a sufficient level of law enforcement services must be considered when applications for new projects such as these are considered.

It is also suggested, for the security and safety of the students, that the builder apply defensible space concepts in its construction designs, and the following crime prevention measures be implemented during site and building layout design:

- Provide adequate lighting in open areas and parking lots;
- Assure visibility of doors and windows and between buildings;
- Provide adequate parking spaces in the parking lots to accommodate students, employees and visitors;
- Insure the required building address numbers be lighted and/or large enough to be readily apparent from the street for emergency response agencies.

Should you have further questions, please feel free to call me at (661) 255-1121 ext. 5101, or Deputy Patrick Rissler at ext. 5159.

Sincerely,

LEROY D. BACA, SHERIFF

Donald A. Rodriguez, Captain
Santa Clarita Valley Station

DAR:par

Department of Toxic Substances Control

Edwin F. Lowry, Director
1001 "I" Street, 25th Floor
P.O. Box 806
Sacramento, California 95812-0806

Winston H. Hickox
Agency Secretary
California Environmental
Protection Agency

Gray Davis
Governor

MEMORANDUM

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
SOUTHERN CALIFORNIA SITE MITIGATION BRANCH
SEP 27 2002
RECEIVED

TO: Sayâreh Amirebrahimi, Branch Chief
Site Mitigation Program, Region 3

FROM: Guenther W. Moskat, Chief
Planning and Environmental Analysis Section

DATE: September 24, 2002

SUBJECT: TRANSMITTAL AND REVIEW OF LEAD AGENCY ENVIRONMENTAL DOCUMENTS FOR RiverPark - 2002091081

The Department has received the project listed above. The project is being referred to you as a:

☑ Non-Essential/Information Item Only
☐ Sensitive Land Use Project
☐ Non-Sensitive land Use Project

A Courtesy Copy of the Notice of Completion Transmittal Form has also been sent to:

☑ Permitting Branch (document not included)

The Department is encouraged to review this project and if applicable make comments pertaining to the project as it relates to hazardous waste and/or any activities which may fall within the Department's jurisdiction. Please have your staff: 1) conduct its review of the attached document prior to the end of the comment period; 2) complete the applicable items below' stating whether the department made comments or that no comments were necessary for the document; and 3) return this original transmittal sheet and a copy of any response letter from your office to:

Planning & Environmental Analysis Section (PEAS)
CEQA Tracking Center
1001 I Street, 22nd Floor
P.O. Box 806
Sacramento, California 95812-0806
Fax (916) 323-3215

Date Comment Period Began: 09/18/2002
Comments due to OPR: 10/17/2002

Reviewed by: ALBERTO T. VALMIDIANO Date: 10/08/02

COMMENTS have been prepared and a copy has been provided to PEAS via:

☑ Attached Copy
☐ FAX (916) 323-3215

NO COMMENTS NECESSARY because;
☐ All Department concerns have been adequately addressed; **OR**
☐ Project does not fall within the Department's areas of responsibility

Thank you for your assistance with this project. If you have any questions, please contact Ken Tipon, CEQA Tracking Center, at (916) 322-5266.

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY GRAY DAVIS, Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 7, REGIONAL PLANNING
IGR/CEQA BRANCH
120 SO. SPRING ST.
LOS ANGELES, CA 90012
PHONE (213) 897-6536
FAX (213) 897-1337

Flex your power!
Be energy efficient!

SEP 24 2002
PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

Mr. Jeff Hogan, Associate Planner
City of Santa Clarita
23920 Valencia Blvd., Suite 300
Santa Clarita, CA. 91355

RE: IGR/CEQA# 020954NY
Notice of Preparation
Riverpark (Panhandle); Tentative Tract Map 53425

LA/14/35

September 19, 2002

Dear Mr. Hogan:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for Riverpark (Panhandle) project.

Based on the information received, and to assist us in our efforts to completely evaluate and assess the impacts of this project on the State transportation system, a traffic study in advance of the DEIR should be prepared to analyze the following information:

Please reference the Department's **Traffic Impact Study Guideline** on the Internet at http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf

1. Presentations of assumptions and methods used to develop trip generation, trip distribution, choice of travel mode, and assignments of trips to Route 14 and 5.
2. Consistency of project travel modeling with other regional and local modeling forecasts and with travel data. The IGR/CEQA office may use indices to check results. Differences or inconsistencies must be thoroughly explained.
3. Analysis of ADT, AM, and PM peak-hour volumes for both existing and future conditions in the affected area. This should include freeways, interchanges, and intersections, and all HOV facilities. Interchange Level of Service should be specified (HCM2000 method requested). Utilization of transit lines and vehicles, and of all facilities, should be realistically estimated. Future conditions would include build-out of all projects (see next item) and any plan-horizon years.

4. Inclusion of all appropriate traffic volumes. Analysis should include traffic from the project, cumulative traffic generated from all specific approved developments in the area, and traffic growth other than from the project and developments. That is, include: existing + project + other projects + other growth.

5. Discussion of mitigation measures appropriate to alleviate anticipated traffic impacts. These mitigation discussions should include, but not be limited to, the following:

☐ description of transportation infrastructure improvements
☐ financial costs, funding sources and financing
☐ sequence and scheduling considerations
☐ implementation responsibilities, controls and monitoring

Any mitigation involving transit, HOV, or TDM must be rigorously justified and its effects conservatively estimated. Improvements involving dedication of land or physical construction may be favorably considered.

6. Specification of developer's percent share of the cost, as well as a plan of realistic mitigation measures under the control of the developer. The ratio should be estimated, of additional traffic due to the project, to that amount of increase in traffic for which real mitigation must be provided (see Traffic Impact Study Guidelines). We note for purposes of determining project share of costs, the number of trips from the project on each traveling segment or element is estimated in the context of forecasted traffic volumes which include build-out of all approved and not yet approved projects, and other sources of growth. Analytical methods such as select-link travel forecast modeling might be used.

We look forward to reviewing the DEIR. We expect to receive a copy from the State Clearinghouse. However, to expedite the review process, you may send two copies in advance to the undersigned at the following address:

Stephen Buswell
IGR/CEQA Branch Chief
Caltrans District 07
Regional Transportation Planning Office
120 S. Spring St., Los Angeles, CA 90012

If you have any questions regarding this response, please call the Project Engineer/Coordinator Mr. Yerjanian at (213) 897-6536 and refer to IGR/CEQA # 020954NY.

Sincerely,

Stephen J. Buswell

STEPHEN J. BUSWELL
IGR/CEQA Branch Chief
Transportation Planning Office

The Gas Company®
A Sempra Energy® utility

RECEIVED
PLANNING DIVISION

SEP 26 2002

PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

Southern California
Gas Company
9400 Oakdale Avenue
Chatsworth, CA 91311

September 23, 2002

Jeff Hogan, Associate Planner
City of Santa Clarita
23920 Valencia Blvd. #300
Santa Clarita, CA 91355

Re: Notice of Preparation of Draft Environmental Impact Report
Riverpark (Panhandle); Tentative Tract Map 53425
(Gas Co. Atlas C2056N – Plan File V2-036)

This letter is in response to your Notice of Preparation, which was received on September 19, 2002. The Southern California Gas Company maintains the following pipelines in the area of your project:

1) 6" medium pressure gas main in Newhall Ranch Rd.
2) 3" medium pressure gas main in Bouquet Canyon Rd.
3) 6" high pressure gas supply line in Bouquet Canyon Rd.

Should the new project require transporting natural gas to some or all of the 590 apartments, 84 townhouses and 478 single-family dwellings, there will be a need for construction of a new pipeline system, which would be an extension of the existing pipeline system. Depending on the load requirements of the development, the alterations of the existing pipeline system may include the necessity of building one or more new pressure regulator stations to maintain the system pressure within the area. I have attached a copy of the Gas Company atlas showing the facilities mentioned above. If you have any questions regarding this reply, please contact me at 818-701-3228.

Sincerely Yours,

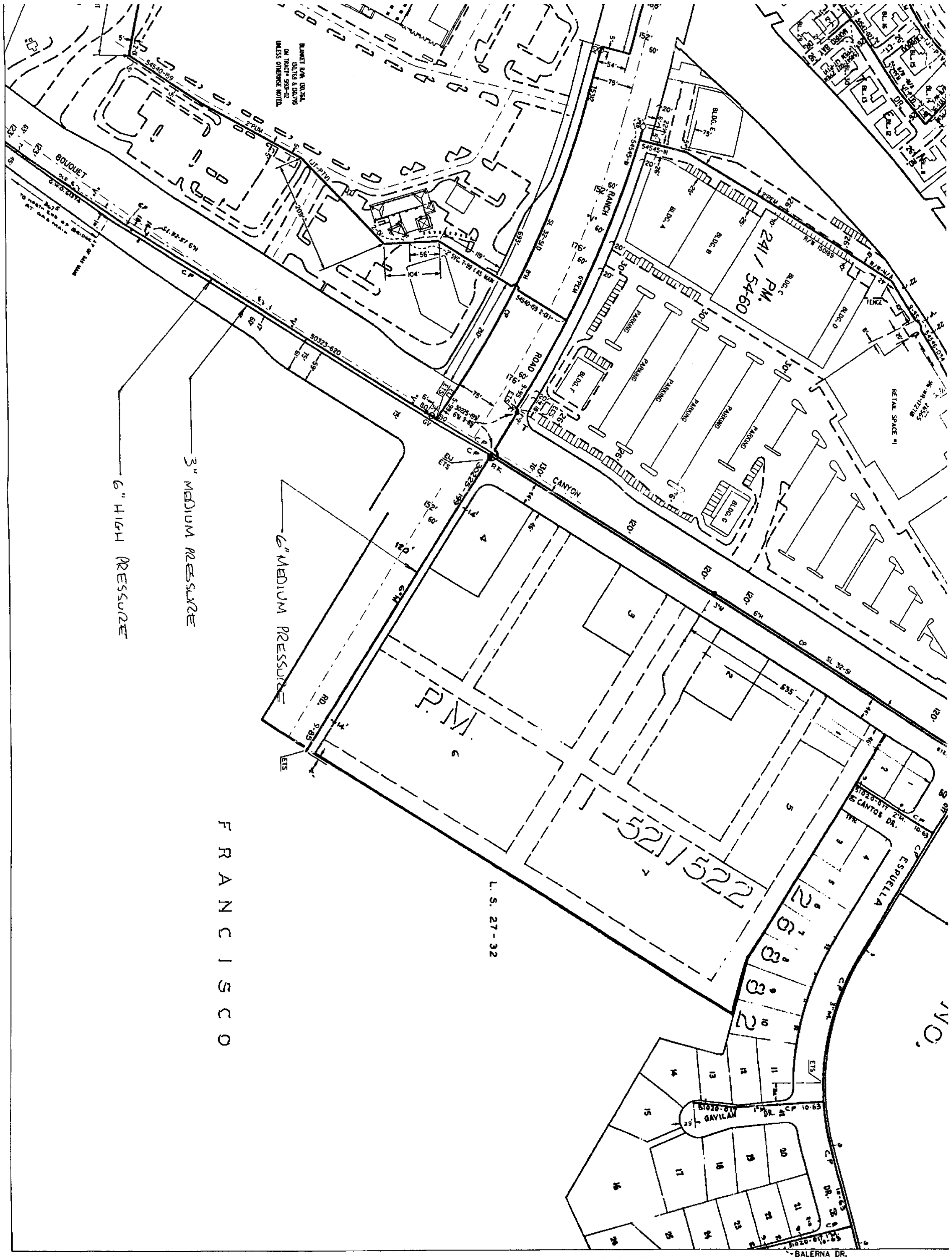
Jack Russo

Jack Russo
Planning Associate

The Gas Company®
A Sempra Energy® utility

Jack Russo
Planning Associate
Distribution Operations - Northern Region
Technical - Chatsworth

9400 Oakdale Ave., SC9331, Chatsworth, CA 91311-6511
Tel: 818.701.3228 Fax: 818.701.3380 Pager: 818.202.1835
JRusso@SempraUtilities.com



REVISED BY: AYK 8/9/02
VECTOR CREATED BY: ra 1-4-96

VECTOR FILE: c2056n.45
RASTER FILE: c2056n.clt
ATLAS REF CHK: 1-16-97 fmg

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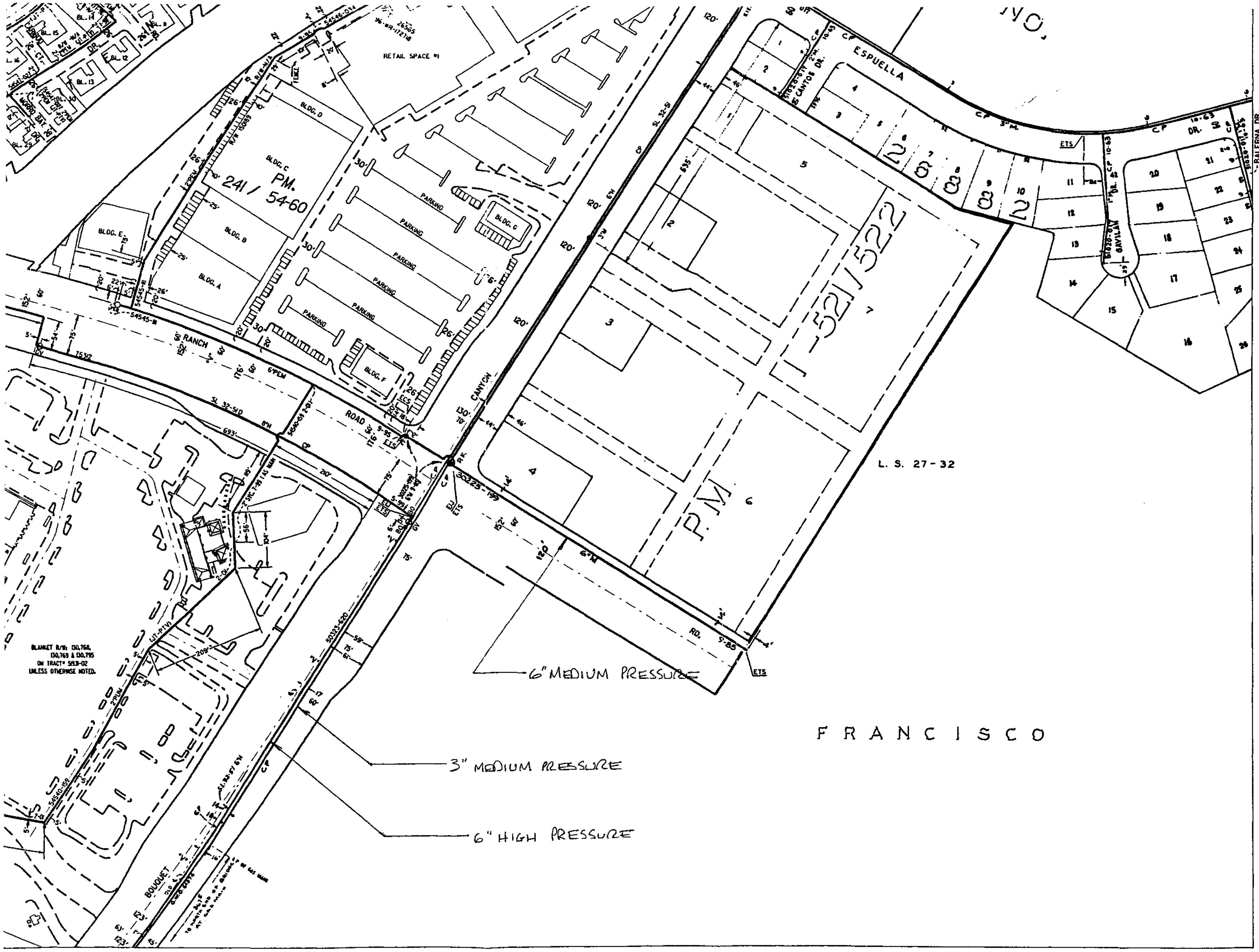

REVISED BY: AYK 8/9/02
VECTOR CREATED BY: ra 1-4-96

VECTOR FILE: c2056n.45
RASTER FILE: c2056n.cit
ATLAS REF CHK: 1-16-97 fmg

C-2056-N

RECEIVED
PLANNING DIVISION

To: Wendy Deats & Jeff Hogan
Please include for SCOPING COMMENTS

PETITION TO SAVE THE PANHANDLE and ITS RIVER CORRIDOR

To the City of Santa Clarita Planning Department, the Planning Commission and City Council:

We the undersigned request that you use every means to find the money to create a true River Park out of the panhandle area and that the zoning not be changed to facilitate the proposed "River Park" development in the panhandle because of the following concerns: Encroachment on the flood plain of the Santa Clara River. Loss of 25 magnificent oaks. Excess traffic that will be generated from over 1000 units adding to gridlock on Bouquet Canyon Road and to air pollution which creates a danger to the health of existing residents. Severe health threats (such as that from lung problems, rats, and Valley Fever) from the massive amounts of dirt moving that has been proposed. Severe overcrowding to Emblem School and excessive traffic problems on Espuella as a result. The carnage to habitat needed by the wildlife that exist there, some of which are already suffering from extreme species diminishment due to development. The generation of excessive noise, loss of view-shed, loss of privacy and diminishment in home values of the homeowners in the Emblem Tract. Further, we are concerned about the diminishment of the water recharge area that this proposal threatens. We also feel it is irresponsible to bother with a new proposed development, when there is no proven supply of drinkable water for existing homes plus already approved of developments. This is for use in the SCOPING process as well as for any City Planning Commission or City Council meetings. Please notify of all hearings meetings.

Name **Address: (Street, City and Zip Code)** **Phone Number**

Print FRANCISCO G. NOGALES 26614 Gavilan 661 297 2496
Signature Francisco G Nogales Saugus, Ca 91350 E-mail For contact re. meetings (optional)

Print ANITA NOGALES " 661 297 2496
Signature Anita Nogales " E-mail For contact re. meetings (optional)

Print Lori Anne Nogales 22919 Oak St Apt 8 (661) 287-1621
Signature Lori Anne Nogales Newhall, Ca 91321 E-mail For contact re. meetings (optional) Loriannen@aol.com

Print Martin S. Nogales " (661) 287-1621
Signature Martin S Nogales " E-mail For contact re. meetings (optional)

Print Jennifer Peralta 26614 Gavilan Dr Jper3540@aol.com
Signature Jen Peralta Saugus Ca 91350 E-mail For contact re. meetings (optional)

Print Charles Peralta " CC Peralta@aol.com
Signature Charles Peralta E-mail For contact re. meetings (optional)

Prepared by the Santa Clarita Valley Sierra Club, 21827 Parvin Dr., Santa Clarita, CA 91350

Gloria N. Peralta " 661 254-4640
Gloria N. Peralta

PETITION TO SAVE THE PANHANDLE and ITS RIVER CORRIDOR

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Name **Address: (Street, City and Zip Code)** **Phone Number**

LINDA KATHRYN SPRING 297-3121
Print Linda K. Spring 26607 GAVILAN DR, SAUGUS 91350
Signature E-mail For contact re. meetings (optional)

WILLIAM K. SPRING 297-3121
Print William K. Spring 26607 GAVILAN DR, SAUGUS 91350
Signature E-mail For contact re. meetings (optional)

DORIS H SCHONERT 296-2660
Print Doris H. Schonert 26603 GAVILAN DR. SAUGUS, CA 91350
Signature E-mail For contact re. meetings (optional)

Kenneth G Schonert 296-2660
Print Kenneth G Schonert 26603 GaviLan Dr Saugus 91350
Signature E-mail For contact re. meetings (optional)

Maureen J. Wade 20103 Alejandro D, Valencia 91355
Print Maureen J Wade ~~[illegible]~~ ~~[illegible]~~ mwade@lapl.org
Signature E-mail For contact re. meetings (optional)

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Signature E-mail For contact re. meetings (optional)

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Signature E-mail For contact re. meetings (optional)

Prepared by the Santa Clarita Valley Sierra Club, 21827 Parvin Dr., Santa Clarita, CA 91350

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Name **Address: (Street, City and Zip Code)** **Phone Number**

HENRY BALSZ 26620 GAVILAN DR 91350 297-1981
Print
Henry Balsz
Signature E-mail For contact re. meetings (optional)

DONA L. BALSZ 26620 GAVILAN Dr 91350 2971981
Print
Dona L Balsz
Signature E-mail For contact re. meetings (optional)

Patti L. Palominos 22142 Alamogordo Rd. Saugus 91350 661 297-1991
Print
Patti Palominos
Signature E-mail For contact re. meetings (optional)

PATRICK J. MORGAN 22142 ALAMOGORDO Rd. Saugus 91350 661-297-1991
Print
Patrick J. Morgan
Signature E-mail For contact re. meetings (optional)

Leslie E Morgan 22142 Alamogordo Rd. Saugus 91350 661-297-1991
Print
Leslie E. Morgan
Signature E-mail For contact re. meetings (optional)

Print
Signature E-mail For contact re. meetings (optional)

Prepared by the Santa Clarita Valley Sierra Club, 21827 Parvin Dr., Santa Clarita, CA 91350

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Name **Address: (Street, City and Zip Code)** **Phone Number**

Teresa Tovar 22503 Espuella Dr. Saugus 91350 661 297.1993
Print
Signature Teresa To E-mail For contact re. meetings (optional) TeresaT43@Aol.com

Jodeane R. Boina 22509 Espuella Dr. Saugus 91350 661-296-5271
Print Jodeane R. Boine
Signature E-mail For contact re. meetings (optional)

Rita Mendoza 22512 Espuella Dr. Saugus 91350 (661)2969254 ritam-cri-corp.com
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Signature E-mail For contact re. meetings (optional)

Manuel Mendez 22506 Espuella Dr. Saugus 91350
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Signature E-mail For contact re. meetings (optional)

Print LAWRENCE KANNER 25242 AVE DORENA NEWHALL 91321
Signature E-mail For contact re. meetings (optional) LARRYKANNER@PRODIGY.NET

Print TERESA SAVAIKIE 26734 Mocha Dr. Saugus Ca 913
Signature Teresa Savaikie E-mail For contact re. meetings (optional)

Prepared by the Santa Clarita Valley Sierra Club, 21827 Parvin Dr., Santa Clarita, CA 91350

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Name **Address: (Street, City and Zip Code)** **Phone Number** 661 25574

MICHELLE HOFFMAN 25634 SALICEOAK RD VALENCIA 91355
Print stitchnbike@thevline.net
Signature E-mail For contact re. meetings (optional)

Loren Vallin-Flores 291-1085
Print Loren Vallin-Flores 22315 Paraguay Dr. Saugus CA 91350
Signature E-mail For contact re. meetings (optional)
Xvixen118X@hotmail.com

Print Judith McClure r-j_mcclure@msn.com
Signature Judith McClure ~~E-mail For contact re. meetings (optional)~~ 29111 Lotusgarden Dr 91387

Print Ray Lee 15628 Rosehaven LN 91387
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rrlee@jps.net

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Signature E-mail For contact re. meetings (optional)
Sydell Stokes 11/14/02 sydell@earthlink.net

Print David Morrow 24448 Valencia Blvd #8316 Valencia 91355 DLRCHMORROW@JUNO.COM
Signature E-mail For contact re. meetings (optional)

Prepared by the Santa Clarita Valley Sierra Club, 21827 Parvin Dr., Santa Clarita, CA 91350

PETITION TO SAVE THE PANHANDLE and ITS RIVER CORRIDOR

To the City of Santa Clarita Planning Department, the Planning Commission and City Council:

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Name **Address: (Street, City and Zip Code)** **Phone Number**

Karen Pearson 26617 Gavilan Dr
Print
Karen Pearson Santa Clarita, CA 91350
Signature E-mail For contact re. meetings (optional)

Ray Lorme 28125 Caraway Lane
Print
Ray Lorme Santa Clarita, Ca 91350
Signature E-mail For contact re. meetings (optional)

John F. Wilkin
Print
JOHN F. WILKIN, 24078 AVE. CRESCENTA, VALENCIA, CA 91355
Signature E-mail For contact re. meetings (optional)

KENNETH KERNER 16243 HIGHFALLS DR, CANYON COUNTRY 91387
Print
Kenneth Kerner
Signature E-mail For contact re. meetings (optional)

Edward J Benison 23621 Mesa Ct. Valencia 91355
Print
EDWARD J. BENISON
Signature E-mail For contact re. meetings (optional)

Print
MELINDA ARREDONDO
Signature E-mail For contact re. meetings (optional)

Prepared by the Santa Clarita Valley Sierra Club, 21827 Parvin Dr., Santa Clarita, CA 91350

PETITION TO SAVE THE PANHANDLE and ITS RIVER CORRIDOR

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Prepared by the Santa Clarita Valley Sierra Club, 21827 Parvin Dr., Santa Clarita, CA 91350

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Print Veronica Avila VAVILA@SBCDLA.COM
Signature Veronica Avila E-mail For contact re. meetings (optional)

Prepared by the Santa Clarita Valley Sierra Club, 21827 Parvin Dr., Santa Clarita, CA 91350

6

PETITION TO SAVE THE PANHANDLE and ITS RIVER CORRIDOR

To the City of Santa Clarita Planning Department, the Planning Commission and City Council:

We the undersigned request that you use every means to find the money to create a true River Park out of the panhandle area and that the zoning not be changed to facilitate the proposed "River Park" development in the panhandle because of the following concerns: Encroachment on the flood plain of the Santa Clara River. Loss of 25 magnificent oaks. Excess traffic that will be generated from over 1000 units adding to gridlock on Bouquet Canyon Road and to air pollution which creates a danger to the health of existing residents. Severe health threats (such as that from lung problems, rats, and Valley Fever) from the massive amounts of dirt moving that has been proposed. Severe overcrowding to Emblem School and excessive traffic problems on Espuella as a result. The carnage to habitat needed by the wildlife that exist there, some of which are already suffering from extreme species diminishment due to development. The generation of excessive noise, loss of view-shed, loss of privacy and diminishment in home values of the homeowners in the Emblem Tract. Further, we are concerned about the diminishment of the water recharge area that this proposal threatens. We also feel it is irresponsible to bother with a new proposed development, when there is no proven supply of drinkable water for existing homes plus already approved of developments. This is for use in the SCOPING process as well as for any City Planning Commission or City Council meetings.

Name **Address: (Street, City and Zip Code)** **Phone Number**

Ron Ayres 26656 Dian Dr 292-3887
Print Saugus Ca
Signature E-mail For contact re. meetings (optional)

Print Kathryn A. Stromberg 22338 Espuella Dr 297-7809
Signature E-mail For contact re. meetings (optional)
Kathryn A. Stromberg Saugus, CA
Print DANIEL STROMBERG 22338 ESPUELLA DR.
Signature E-mail For contact re. meetings (optional)
SAUGUS, CA
Print David Stromberg 22338 Espuella Dr
Signature E-mail For contact re. meetings (optional)
Saugus, CA
Print Adria Faulconer 22324 Espuella Dr
Signature E-mail For contact re. meetings (optional)
Adria Faulconer Saugus Ca 91350
Print JAMIE FAULKONER 22324 ESPUELLA Dr. SAUGUS CA 91350
Signature E-mail For contact re. meetings (optional)

Prepared by the Santa Clarita Valley Sierra Club, 21827 Parvin Dr., Santa Clarita, CA 91350

⑥

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Name **Address: (Street, City and Zip Code)** **Phone Number**

Print MERRILL FILLMORE 661-573-8799 ~~550-0119~~
Signature Merrill Fillmore E-mail For contact re. meetings (optional) MMF111@ATTBI.COM

Print JUNE R. LARSON 661-297-7904
Signature June R. Larson E-mail For contact re. meetings (optional) —

Print Ellen Floyd 26705 Bouquet Canyon #171
Signature Ellen FLOYD E-mail For contact re. meetings (optional)

Print FRIEDA CHARTRAND 26705 Bouquet Canyon #140
Signature Frieda Chartrand E-mail For contact re. meetings (optional)

Kimberly Holbrook
Print 23235 Sherwood Pl. Saugus CA, 91350
Signature E-mail For contact re. meetings (optional)

Phyllis White
Print Phyllis J. White 22924 LAS Mananitas DR 91354
Signature E-mail For contact re. meetings (optional)

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Name **Address: (Street, City and Zip Code)** **Phone Number**

Maria Ignacia Santana 22321- ESPuella Dr
Print
Maria Ignacia Santana
Signature E-mail For contact re. meetings (optional)

Denise Morgan 22345 Espuella Dr. 661-297-7015
Print
Denise L Morgan
Signature E-mail For contact re. meetings (optional)

Carolyn Grijalva 661-299-5950
Print
Carolyn Grijalva
Signature E-mail For contact re. meetings (optional)

Print
REY MANZANO 661-299-4575
Signature E-mail For contact re. meetings (optional)

Rocque Sandon 661-259-5435
Print
Signature E-mail For contact re. meetings (optional)

David White
Print
David White 661-296-2339
Signature E-mail For contact re. meetings (optional)

Prepared by the Santa Clarita Valley Sierra Club, 21827 Parvin Dr., Santa Clarita, CA 91350

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Name **Address: (Street, City and Zip Code)** **Phone Number**

EFFIE J. BIRD 24877 WALNUT ST #209 661·254·7732
Print
Effie J. Bird NEWHALL CA 91321
Signature E-mail For contact re. meetings (optional)

Lois Pellerin 32943 No. Ridge Rt. Rd.,
Print
Lois Pellerin Castaic, Ca. 91384
Signature E-mail For contact re. meetings (optional)

H. MAXINE Murphy 21844 Pebblecom Dr. Saugus
Print

Signature E-mail For contact re. meetings (optional)

Donna M. Brockway, 21317 Simpson Way 661-254-5256
Print
DONNA M. BROCKWAY Cyn Ctry, CA 91351
Signature E-mail For contact re. meetings (optional)

Print JEAN ERICKSON 20862 BENZ RD SAUGUS 91350
Signature E-mail For contact re. meetings (optional)
Jean C. Erickson
Print Sharon L. Prince 45534 12st W Lancaster
Signature E-mail For contact re. meetings (optional)
Sharon L Prince

Prepared by the Santa Clarita Valley Sierra Club, 21827 Parvin Dr., Santa Clarita, CA 91350

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Name **Address: (Street, City and Zip Code)** **Phone Number**

Juan Paraon - 22369 Espuella Dr. Saugus CA
Print
Signature E-mail For contact re. meetings (optional)

NORMA WILDER - 26815 ALCON DR SAUGUS CA
Print Norma Wilder
Signature E-mail For contact re. meetings (optional)

Jeff White 22924 LAS MANANITAS DR.
Print
Signature E-mail For contact re. meetings (optional)

Rafaela Celedon 23007 Soledad Cyn Rd Saugus, CA 91350
Print Rafaela Celedon
Signature E-mail For contact re. meetings (optional)

Vanessa Gonzalez 29263 Abelia Rd Canyon Country CA. 91385
Print
Signature E-mail For contact re. meetings (optional)

Maggie Gonzalez 23007 Soledad Cyn Rd Saugus, Ca. 91350
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Signature E-mail For contact re. meetings (optional)

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Name **Address: (Street, City and Zip Code)** **Phone Number**

BETTY MOUSEL 27850 GLASSER AVE, SANTA CLARITA, 91351-2045 (661) 251-1817
Print
Betty Mousel
Signature E-mail For contact re. meetings (optional)

Print Louis Robbins 25832 Browning Pl., Stevenson Ranch 91381 661 255 2478
Signature E-mail For contact re. meetings (optional)
Louis Robbins
Print Kay Donnelly ropinthewind@hotmail.co
Signature E-mail For contact re. meetings (optional)
Kay Donnelly 22373 Los Tigres Dr. Saugus 91351 269-2056
Print Harold J Donnelly "
Signature E-mail For contact re. meetings (optional)
Harold J Donnelly
Print THOMAS J THREW
Signature E-mail For contact re. meetings (optional)
Thomas J Threw 22362 LOS TIGRES 286 1171
Print LEE VUONG 23007 Soledad Cyn Rd. 254 7047
Signature Lee Vuong E-mail For contact re. meetings (optional)

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Name **Address: (Street, City and Zip Code)** **Phone Number**

Orlando ESpitia 29263 Abelia Rd. CC. CA 91387
Print Orlando Espitia
Signature E-mail For contact re. meetings (optional)

CANDACE STICH 27358 BRIGHTON DR. VALENCIA CA. 91354
Print Candace Stich
Signature E-mail For contact re. meetings (optional)

Christina Jaramillo 25000 Walnut St #2
Print Christina Jaramillo Newhall CA 91321
Signature E-mail For contact re. meetings (optional)

Charlotte Cox 26810 Palacita Dr. Val. 91354
Print Charlotte Cox
Signature E-mail For contact re. meetings (optional)

OYESUMBO JDOWU 26916 TERRY DR CANYON COUNTRY 9135,
Print . S. Idowu
Signature E-mail For contact re. meetings (optional)

Print
Denise Whaley 29021 Bouquet Ctn #333, SAUGUS CA 91390
Signature E-mail For contact re. meetings (optional)

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Name **Address: (Street, City and Zip Code)** **Phone Number**

297-0757
Print John Gonzalez 26604 Gavilan Dr SAUGUS 91350
Signature E-mail For contact re. meetings (optional)
jongon@aol.com
Print

Signature 22271 Birmingham Place Saugus 91350 E-mail For contact re. meetings (optional)
Print Gloria Blumenthal
Signature 22271 Birmingham Place Saugus - 91350 E-mail For contact re. meetings (optional)
Print HARRY BLUMENTHAL
Signature E-mail For contact re. meetings (optional)
James Delaplane 26604 Gavilan dr Saugus 91350
Print
Signature E-mail For contact re. meetings (optional)

Print

Signature E-mail For contact re. meetings (optional)

Prepared by the Santa Clarita Valley Sierra Club, 21827 Parvin Dr., Santa Clarita, CA 91350

Letters from Individuals in Response to Original Notice of Preparation

From: "Alex Gaston" <gastone@earthlink.net>
To: <mmclean@santa-clarita.com>, <lweste@santa-clarita.com>, <kpulskamp@santa-clarita.com>, <csmyth@santa-clarita.com>, <bkellar@santa-clarita.com>
Date: 12/2/02 3:40PM
Subject: Fw: Emblem Tract" Letter to Mayor"

----- Original Message -----
From: Alex Gaston
To: fferry@santa-clarita.com
Sent: Monday, December 02, 2002 3:39 PM
Subject: Emblem Tract

Hello Mayor,

My name is Alex Gaston and I live in the Emblem Tract of Saugus. I am writing to you to ask for your help in stopping the planned development of the hills above the Emblem Tract. My 1st question is why hasn't the City of Santa Clarita notified me and most of the rest of the tract about the proposed destruction of one of the last remaining hills and open areas in the valley. It is required by law. We found out from neighbors after the city council meeting on the matter was already over. Only a small handful of citizens were notified, is this because the City of Santa Clarita was trying to slip this by and hoped no one noticed? I live at the end of the cul de sac and have the hill as my backyard and enjoy the peace and do not want apartments looking into my backyard. The location is the reason I bought the house in the 1st place. This proposal does not include a school as well and their children will overcrowd Emblem Elementary School where my children attend. My 2nd concern is the impact on the roads. I have lived here for 8 years and now find the roads horribly jammed at most hours of the day, not to mention the I-5 which reached it's limit years ago. When is someone going to say stop!!!!!!!!! Enough is enough. Please help restore or at least maintain the Valley at reasonable levels. Newhall Land and Farm has shown complete disregard to the people of Santa Clarita and will continue to destroy and build until we can't get down the block to take our children to another overcrowded school. My 3rd concern is where is the water going to come from?

Thank You,
Alex S. Gaston

YOUR CONSTRUCTION will CAUSE MAYOR NOISE + ~~Sou~~ AIR POLLUTION CAUSING ~~Res~~ ALLERGIES AND Other HEALTH PROBLEMS.

AS USUAL, the residences you build will get only the absolute MINIMUM AMOUNT OF property so you can CROWD As many units as possible on This Land MAXIMIZING your PROFITS.

This Type of building is asthetically offensive and obliterates the quality of what makes our are exceptional.

SPACE!!

John Gayag

RESIDENT SINCE 1963

CITY OF SANTA CLARITA

Attn.: Jeff Hogan

Wendy Deats

RECEIVED
PLANNING DIVISION
NOV 19 2002
PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

As property owners in the Emblem track, we are very concerned about the River Park Project. The reasons are listed below and hope this will help in your decision on this matter.

- **TRAFFIC** Newhall Ranch road and Bouquet Cyn is one of worst accident areas of Santa Clarita. New homes being built in the Plum Cyn. Area is going to add even more traffic, and possible accidents. This area from Newhall Ranch road to Espuella has at least one accident a month or more. It takes me 20 –30 mins. at 6:15 a.m. to get to Lyons Ave. now. What will it be when more homes and apartments are built. Safety for the children and pedestrians should be on the top of the city councils list. I see only problems with this many homes and aptments being built with Newhall Ranch Road as the entrance and exit. Yes, our neighborhood needs Newhall Ranch Rd. No, to apartments and single family homes.

- **SCHOOLS** Emblem school is the school slated for this project. This school has been the overflow school for all new projects. When the children from Bridgeport were going there, the area was a nightmare during the 30-40 mins before and after school with traffic. The parents are rude, blocking all streets and driveways. We could not get out to go to work, and the litter was terrible on the streets. Let alone when the school has functions we are lucky to be able to get into our driveway. Our streets are very narrow and if an emergency would arrive no fire truck could get in during this time. Our streets are old who is going to do repairs to the streets, sewers etc. It should not be the homeowners of the track. We are not asking for this traffic. Air quality is very bad with the cars waiting to move to let off the children. I want to know who will pay for the upgrades to the school and the building of a new middle school and high school since our schools are already full. I did not hear anything about Newhall Land building schools. If they want to build houses they should build the schools. Not just give a piece of property to the school district. Who will pay for this the property owners. Not the tenants of the apt houses? Is this fair to the retired people to have this burden added to them? We also have the liability if the children are on our property even when we are not home. They do get on the lawns and jump off the low walls. I have had to tell them a few times to stop it before they get hurt. I do not want to be worried about someone on my property getting hurt.

- **NOISE AND POLUTION** from building near us. Who will pay when we get sick? The groundwater is already contaminated with chemicals Now your approving even more homes and traffic.. What kind of noise barriers are going to be put up? What about cleaning our homes and yards from the dust I have a fishpond full of koi who will take responsibility if they die from the dust and dirt? Let alone anyone with allergies or asthma. Who will pay for the Dr. bills or loss of work*? I AM SURE IT WON'T BE NEWHALL LAND.*

- **WATER** Where is it coming from, Castaic Lake Water District was told that they could not store all the water they wanted to for all these projects. What of a drought, where will they get the water from? Most of our ground water here is contaminated. The study was just in on the river being polluted with chemicals from homes using pesticides. We are going to have more homes right at the river to do more damage. We are to desalt the river for Ventura county. What will it cost us to clean up the contaminates from the river? *I AM SURE IT WON'T BE NEWHALL LAND.*

- **WILDLIFE** There is a lot of wildlife in the hills adjacent to the river what happens to them? We have learned to live with them.We have them all, what happens to the deer, weasels, rabbits, endangered toads, plants and our vireo's yes we have them here. They feed at my feeder all the time. It seems that when people move into an area the wildlife suffers. What a shame. What do we do when the rats, snakes and other pests leave their homes and invade ours? Who will rid us of the pests? Or pay for the exterminators? *I AM SURE IT WON'T BE NEWHALL LAND*

- **El Nino** is upon us again a few years ago the bridge at Bouquet was closed what will happen to the homes that are going to be so close to the river? Or what if we have to evacuate the area with this many homes no one would be able to get out.

Leave the open spaces alone. **Please** we will look like the San Fernando Valley soon enough. Nothing but houses what a shame. We have more smog than the basin now crime is on the rise. Do you think it could be because we have more people? The river should be protected it's the last wild river in Calif. why ruin it with houses. Everywhere you go there is building when will you tell the builders no more. Quality does not mean quantity. Progress should not mean destroying the environment.

One last thing. The speedway is so much a part of the history of Saugus. Will the new homeowners insist that it close because of noise? Just like the dairys closed because homeowners moved in and could not stand the smell.

Bruce and Louise Hartwell

22570 Los Tigres Drive

Santa Clarita

661-263-8322

RECEIVED
PLANNING DIVISION
DEC 02 2002
PLANNING AND BUILDING SERVICES
OF SANTA CLARITA

Dear Mr. Hogan: 11/26/02

It is with much distress that today I learned of yet another development being planned for the already overcrowded Santa Clarita Valley. This development is called the 'River Park Project'. I can't believe that another 1,000 homes are being considered for an already fragile river area. Animals, which depend on that area for their habitat, will be threatened with extinction again. The land there is needed to preserve the river, which in turn is needed to percolate our water into our aquifer.

We already have schools stuffed with portable classrooms just to house the students they have now. Emblem School has crowding now, let alone with many more families moving in.

The roads that all those new residents would need to use are already way overcrowded. Bouquet Canyon Road is very congested during rush hour and even at other times of the day. The weekends are impossible. All that is needed is one little accident and the road backs up into all the other main thoroughfares.

I am also very concerned about where the useable water would come from to support 1,000 new homes. During years of drought, water can become increasingly scarce. All the new developments that are being built may add up to big problems in years to come.

Please vote no on this development.

I would like to be informed of the date of the first hearing on the environmental impact report and on all other hearings.

Sincerely,

Barbara Lewin

Kerry & Barbara Lewin
27723 N. Heartwood Ct.
Valencia, CA 91354

Nov 25, 2002

Attn: Wendy Deats, Planning Dept

I would like to express my concern about the the potion of land East of Bouquet Cyn and Ranch Road, known as River Park. Until this year, that area was home to a family of 8 Red-Tailed Hawks. The devestation to that property, has broken up the hawk family. That portion of the Santa Clara River is home to a lot of wildlife, including Fox, Coyote, Deer, Quail, Owl, Cooper's Hawk, Red-shouldered Hawk, Red-tailed Hawk, Sharp-shinned Hawk, and all the wildlife they prey on.

If those river banks can be restored to what they were, it could be a beautiful place again. To be shared by families in the community (new and old), and a great place for schools to have field trips at certain times of the year. We've lost so many nice places in the area recently, we have to save something for future generations before its too late.

Jerry Murphy
Jerry@MurphysHome.org

RECEIVED
PLANNING DIVISION

NOV 26 2002

PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

From the desk of . . .

Karen Pearson

26617 Gavilan Dr., Santa Clarita, CA 91350-2333. Ph. & Fax 661 296 4438.

November 26, 2002

ATTN: Wendy Deats
City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Blvd.
Santa Clarita, CA 91355

Dear Wendy Deats,

Enclosed please find my SCOPING comments. Also, included are approximately 157 signatures which are written on a petition regarding this panhandle housing development project--euphemistically called the River Park Project. All of these people want you to know that they have the concerns about this proposal that are delineated in the top paragraph. Those that included their addresses are expecting to be notified by your department of any forthcoming meetings regarding this project. It is my understanding as a result of our phone call that you will be happy to inform them of these future meetings. If you could also notify those that only left their e-mails and phone numbers, I am sure they would appreciate it. As a result of our phone call, I also have the understanding that you will notify anyone who leaves their name and address with you about future meetings regarding this project even if those names are given after the SCOPING deadline. This would include people who write or phone or e-mail or are included on petitions such as this and leave their name and address. It shows your interest in being responsive to the community and this, of course, is something our city strives for.

Your cooperation in extending the deadline for SCOPING comments to November 27 is also much appreciated as is your cooperation in being diligent in individually notifying all interested parties of all meetings regarding this project.

I sincerely hope you have a happy Thanksgiving.

Karen Pearson

Karen Pearson

RECEIVED
PLANNING DIVISION

NOV 20 2002

PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Boulevard, Suite 300
Santa Clarita, CA 91355

Attention: Jeff Hogan/Wendy Deats

Dear Sir or Madam:

I have lived in the Santa Clarity Valley since 1974 and I am totally opposed to the proposed River Park Project. In my opinion the city growth is completely out of control. The quality of life in our peaceful valley is rapidly becoming non-existent. It is obvious to anyone who travels anywhere in the Santa Clarity Valley that the current infrastructure system cannot handle the daily import of new families. What is to happen with the proposed site? Adding two lanes to Newhall Ranch Road will not solve the problem of the additional traffic.

And what of our environment? What of our river and natural habitat? What of our schools, already grossly overcrowded. Are these not major quality of life issues? What of water, air quality, noise, pollution?

I implore you to consider the families who are trying to co-exist with your run-away growth peacefully. If Newhall Land and Farm goes forward with this massive project, my list of demands will be long and expensive. Please do not destroy the little open space that is left.

Sincerely,

Linda Spring

Linda Spring
26607 Gavilan Drive
Saugus, CA 91350

Dear Sir or Madam:

The proposed development will significantly impact quality of life at our house. Construction noise and dust will be very noticeable. This is borne our by the face of the previous development - Bouquet Shopping Center. In addition, the site map shows a multiple story apartment near all our property. Building a sound wall across the back of all our property and undergrounding of utilities would assist in mitigating the negative impact to our lives and property as a result of the project.

Sincerely,

William K. Spring

William Spring
26607 Gavilan Drive
Saugus, CA 91350

RIVER PARK PROJECT
ENVIRONMENTAL REVIEW
COMMENT FORM

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ATTN: Jeff Hogan/Wendy Deats
City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Boulevard
Suite 300
Santa Clarita, CA 91355

Please also provide your name and address so you can receive additional information on this project as the City's review progresses. Please provide your comments below:

I AM [illegible] AGAINST THE PANHANDLE PROJECT. IT IS TO CLOSE TO OUR SANTA CLARA RIVER. WE NEED THIS UPLAND AREA FOR OUR WILDLIFE. I FEEL ITS VERY IMPORTANT TO PROTECT OUR WILDLIFE. ADDING 1000 UNITS TO THIS AREA IS GOING TO MAKE AN ALLREADY VERY BUSY BOUQUET CYN RD ALMOST IMPOSSIBLE TO TRAVEL ON.

Name: MELINDA ARREDONDO

Address: 27611 NUGGET DR UNIT 3
SANTA CLARITA 91387

Please attach additional sheets if necessary

RIVER PARK PROJECT
ENVIRONMENTAL REVIEW
COMMENT FORM

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ATTN: Jeff Hogan/Wendy Deats
City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Boulevard
Suite 300
Santa Clarita, CA 91355

Please also provide your name and address so you can receive additional information on this project as the City's review progresses. Please provide your comments below:

Please make every effort to acquire funding to create a "River Park" area in the panhandle area in lieu of housing development. Development will result in a further general environmental degradation of the area, e.g. excessive traffic, some increased health problems, wildlife destruction, excessive noise, etc. etc. With no proven supply of water for development, this puts the area in jeopardy

Name: EDWARD BENISON

Address: 23621 MESA COURT
VALENCIA 91355

Please attach additional sheets if necessary

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PLANNING AND BUILDING [illegible]
[illegible]

RIVER PARK PROJECT
ENVIRONMENTAL REVIEW
COMMENT FORM

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ATTN: Jeff Hogan/Wendy Deats
City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Boulevard
Suite 300
Santa Clarita, CA 91355

Please also provide your name and address so you can receive additional information on this project as the City's review progresses. Please provide your comments below:

Despite the double talk I received when asking about overcrowding at EMBLEM SCHOOL the plan DID NOT include a school. THE PLAN NEEDS TO INCLUDE A SCHOOL! EMBLEM CANNOT accomadate the HUNDREDS OF KIDS That will certainly move into these residences.

TRAFFIC IS ALREADY A NIGHTMARE ESPECIALLY FOR PEOPLE WHO Commute To The VALLEY + L.A.

THE HILL IN BACK OF VON'S IS A ~~SOUND~~ NOISE BARRIER FOR THE PEOPLE THAT LIVE IN THE EMBLEM TRACK; YOUR PLAN CALLS FOR Leveling that hill.

THERE IS A LOT OF WILDLIFE THAT WILL BE DISRUPTED!

OVER →

Name: John Gonzalez

Address: 26604 Gavilan Dr
Saugus, CA 91350

Please attach additional sheets if necessary

RIVER PARK PROJECT
ENVIRONMENTAL REVIEW
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ATTN: Jeff Hogan/Wendy Deats
City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Boulevard
Suite 300
Santa Clarita, CA 91355

Please also provide your name and address so you can receive additional information on this project as the City's review progresses. Please provide your comments below:

Name:

Bruce & Louise Hartwell
Address: *22570 Los Tigres Drive*
Saugus, CA 91350

Please attach additional sheets if necessary

[illegible]

[illegible]

PLANNING AND BUILDING SERVICES
CITY OF SANTA CLARITA

RIVER PARK PROJECT
ENVIRONMENTAL REVIEW
COMMENT FORM

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ATTN: Jeff Hogan/Wendy Deats
City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Boulevard
Suite 300
Santa Clarita, CA 91355

Please also provide your name and address so you can receive additional information on this project as the City's review progresses. Please provide your comments below:

This is a bad project - because of the ecological impact on the river.

also, because of the close proximity to the existing residential neighborhood

Name: KENNETH KERNER

Address: 16743 NIGHFALLS DR.
CANYON COUNTRY, CA 91387

Please attach additional sheets if necessary

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CITY OF SANTA

RIVER PARK PROJECT
ENVIRONMENTAL REVIEW
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ATTN: Jeff Hogan/Wendy Deats
City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Boulevard
Suite 300
Santa Clarita, CA 91355

Please also provide your name and address so you can receive additional information on this project as the City's review progresses. Please provide your comments below:

I am concerned about impacts to the Santa Clara River and the wildlife corridor along the river. Also the density of the project & traffic on Bouquet Canyon Road. There should be no native oaks taken out. Also, what happened to the City vision of a riverfront park? I went to a few meetings a few years back & I haven't seen anything happen. I know an equestrian trail was planned from 1 side of the city all the way to the 5 freeway.

Name: Ray Lorme

Address: 28125 Caraway Lane
Santa Clarita, Ca. 91350

Please attach additional sheets if necessary

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RIVER PARK PROJECT ENVIRONMENTAL REVIEW

COMMENT FORM

This form is provided for your convenience to make written comments regarding potential impacts on the community you believe may result from the proposed River Park Project. Your comments will be considered by the City of Santa Clarita in determining the issues to be addressed in the Environmental Impact Report (EIR) the City will be preparing on this proposed project. You may use this form in addition to, or instead of, making oral comments at this public meeting. After filling out the form, please leave it in the designated box prior to leaving this meeting or, mail it to:

ATTN: Jeff Hogan/Wendy Deats
City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Boulevard
Suite 300
Santa Clarita, CA 91355

Please also provide your name and address so you can receive additional information on this project as the City's review progresses. Please provide your comments below:

(1) A more "out-of-the box" treatment of the 25 oaks slated for removal

(A) Could some of the 25 be saved by more creative planning? COULD THE HOUSING BE PLANNED AROUND THE TREES (not the other way around)?

(B) Could oaks to be removed be moved to another location ON THE PROPERTY? Oaks simply should not be chopped down. Oaks should stay within the same habitat (same dirt, etc.)

(2) Wildlife Corridor

(A) Will this development choke off this very important wildlife corridor? In this area you must address the ramifications of the construction of Newhall Ranch Road, the bank stabilization, the grading

Name: Mr. and Mrs Roger W. McClure

Address: 29111 Lotusgarden Drive
Canyon Country, CA 91387

Please attach additional sheets if necessary

② (A.) the Golden Valley Rd. Bridge construction, the impacts to the river itself, etc. — all these issues for this area itself, i.e., the very important + essential WILDLIFE CORRIDOR.

(B) No grading should occur during nesting season!

③ Bank Stabilization

We urge more creative implementation. We do not want to see Concrete! Please research what else has been done or will be done in LA River and other rivers in the United States to avoid the concrete "look."

Visual impacts are very important!!!

We attended the first meeting and had to leave a little early - but we do recall these issues being discussed.

Thank you!

RIVER PARK PROJECT
ENVIRONMENTAL REVIEW
COMMENT FORM

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ATTN: Jeff Hogan/Wendy Deats
City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Boulevard
Suite 300
Santa Clarita, CA 91355

Please also provide your name and address so you can receive additional information on this project as the City's review progresses. Please provide your comments below:

How will you protect the habitat of threatened species — especially on the River's edge?
Doesn't rip rap destroy habitat?
When you move all this earth aren't you also removing the animal habitat of those who live underground?
What do you plan on doing about it?
If, as with other dirt removal projects rattlesnakes and rats are dislodged how do you plan on protecting the nearby neighborhood from their arrival in their backyards?
How can you insure that just as much water will percolate to our much needed aquifers as has percolated before?

Name: Karen Pearson

Address: 26617 Gavilan Dr
Santa Clarita, CA 91350

How will you insure that these last remaining uplands will be available to the animals that live on the river when flood comes?

SCOPING COMMENTS CONT.:

Please attach additional sheets if necessary

How will you retain wide enough CORRIDORS FOR THEM TO GET TO THE UPLANDS?
How can you put apartments in area D without having a deleterious effect on existing Residents.

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City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Boulevard
Suite 300
Santa Clarita, CA 91355

Please also provide your name and address so you can receive additional information on this project as the City's review progresses. Please provide your comments below:

Bouquet Cyn Rd. moves at the rate of a snail. Your approval of the location of In + Out Hamburger will make more Traffic in a Congestive area and "more Accidents the River Park Project will increase This Bouquet Cyn Rd Traffic!!" You say Emblem School for K-6, but what Jr. High and High School? Water, where is it to come from? Roads need repair now, this additional increase in Traffic will keep the roads from ever being repaired. Are you going to pay for more Santa Clarita Sheriff Deputies?? Crime will go up with the proposed project. There isn't enough parking for the exiting buildings (Vons, Sav-On Drugs). There is a wildlife population that should be considered. Newhall Land and Farm should donate this property to the City of Santa Clarite for wildlife study + park.

Name: Mary + Harry Rasmussen
Address: 22558 Los Ticres Dr.
Santa Clarita, Ca 91350

Please attach additional sheets if necessary

RIVER PARK PROJECT
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ATTN: Jeff Hogan/Wendy Deats
City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Boulevard
Suite 300
Santa Clarita, CA 91355

Please also provide your name and address so you can receive additional information on this project as the City's review progresses. Please provide your comments below:

Where are the plans for the Area D. multifamily & Development?

Name: John Steffen
Address: 22714 Espuella Dr.
S.C., Ca 91350

Please attach additional sheets if necessary

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CITY OF SANTA CLARITA

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City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Boulevard
Suite 300
Santa Clarita, CA 91355

Please also provide your name and address so you can receive additional information on this project as the City's review progresses. Please provide your comments below:

① This area is infested with rattlesnakes— how are you going to stop them?

② Will there be enough water for this ~~pro~~ project— Who will guarantee & substantiate this answer besides the builder?

③ Will a new school be built to accomodate the residence?

④ How will the air quality be affected?

⑤ How much more traffic will result?

⑥ How will the wildlife be effected

⑦ How ~~[illegible]~~ will it impact traffic in the Emblem Tract?

⑧ Will the S.C. River be impacted & how?

⑨ How can anyone make an intelegent assesment of this project without a definitive map?

Name: John Steffen

Address: 22714 Espuella Dr.
Saugus, Ca 91350

Please attach additional sheets if necessary

+ ⑩ How will this project impact other schools & the traffic thereto?

RIVER PARK PROJECT
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ATTN: Jeff Hogan/Wendy Deats
City of Santa Clarita
Department of Planning and Building Services
23920 Valencia Boulevard
Suite 300
Santa Clarita, CA 91355

Please also provide your name and address so you can receive additional information on this project as the City's review progresses. Please provide your comments below:

when the "master plan" of Santa Clarita was created there was a road capacity for the roads in our city. We have far surpassed the capacity of our roads & freeway system. How can you justify building more homes in an already severly crowded traffic area? Is it acceptable to sit on Valencia blvd for over 30 minutes to turn onto Bouquet Cyn on your way home from work during rush hour? The people in the Emblem Elementary tract deserve better treatment that what you are proposing to impact on them - this housing development will negatively impact our quality of life and is not fair to long standing citizens of our community.

Name: Dana Lora

Address: 22327 Paraguay Dr.
Saugus Ca 91350

Please attach additional sheets if necessary

SIGN-IN

RIVER PARK
SCOPING MEETING
November 6, 2002
6:00 P.M.

Name	Address	Phone
		w(213) 345-5375
Richard Martinez	22576 Paraguay Drive	H (661) 296-2416
Larry P Burnt	24724 V[illegible] 114	254 2223
GEO. ROBIDEAUX	2	296-1382
Jim Bowg	22509 Espuella Dr	296-5271
BLAKE BONELLI	8617 N. 49TH ST P.V. AZ	480-607-6460
MANUEMENDEZ	22506 ESPUELLA SAUGUS	297 7024
DORA MENDEZ	" " "	"
JK Robiderux	22552 PARAGUAY DR.	
Teresa Tovar	22503 Espuella	297-1993
Rita Mendoza	22512 Espuella Dr	296 9254
John Gonzalez	26604 Gavilan Dr	297 0757
April Garland	26604 Gavilan Dr	297-0757
DWAYNE MCCLINTOCK	26600 GAVILAN Dr	263-7750
Colleen Hamilton	22310-Espuella Dr	296-1930
Doug Hamilton	22310-Espuella Dr	296-1930
WILLIAM SPRING	26607 GAVILAN DR	297-3124
Bruce Hartwell	22570 Los Tigres Dr	2638322
Louise Hartwell	22570 Los Tegres Dr	2638322
Collette George	22520 Los Tigres Dr	263-7497
Kelsey George	Same as above	Same as above
Joe Sanchez	22318 Espuella DR	297-7453
HAROLD PIERRE	28545 Red Cedar PL SAUGUS	513-0965
Karen Peerser	26617 Gavilan Dr	296 4438
Linda Hubbach	22358 Espuella Drive	297-0366
Richard Cookie Martinez	22576 Paraguay Dr. Saugus	—
Mike Ballard	27361 Sierra Hwy #227	
Teresa Savailu	26724 Mocha Dr. Saugus CA 91350	263-9624

SIGN-IN

RIVER PARK
SCOPING MEETING

November 6, 2002
6:00 P.M.

661

Name	Address	Phone
DAN + DANA LORA	22327 PARAGUAY DR	297-0215
Roger + Judy McClure	29111 Lotusgarden Dr.	252-6187
[illegible]		
Jerry Wingenroth	26603 Caballeta Dr.	263-6978
BLAKE A. BONELLI	8617 N. 49TH ST. PARADISE VALLEY, AZ 85253	480-60 6460

APPENDIX 1.0

Resolution

RESOLUTION NO. 00-143

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SANTA CLARITA, CALIFORNIA, SUPPORTING THE IMPLEMENTATION OF THE CROSS-VALLEY CONNECTOR

WHEREAS, the Cross-Valley Connector is defined as Newhall Ranch Road from the Interstate 5/Newhall Ranch Road/State Route 126 interchange to the east to the connection of Newhall Ranch Road and Golden Valley Road, and Golden Valley Road from that point east to the interchange of Golden Valley Road and State Route 14; and

WHEREAS, the Cross-Valley Connector will support the Santa Clarita Valley's commercial and industrial base and economic development by enhancing the efficient movement of goods; and

WHEREAS, the Cross-Valley Connector consists of a series of existing links both fully and partially improved, links presently under construction, and links that are not built; and

WHEREAS, the Cross-Valley Connector will provide a substantial addition to the Los Angeles County Congestion Management Program (CMP) roadway network and will directly link four CMP highways: Interstate 5, State Route 126, State Route 14, and Sierra Highway;

WHEREAS, the Cross-Valley Connector has been divided into links for the purposes of project funding and phasing. Some of the links have already successfully competed for design and construction funding through the Metropolitan Transportation Authority (MTA) Call for Projects; and

WHEREAS, the Cross-Valley Connector was previously identified by the City Council as the City's number one road priority for the purposes of the 2000 Call for Projects; and

WHEREAS, one-third of the funding for the construction of the Golden Valley Road/Soledad Canyon Road interchange was awarded to the City by the MTA through the 2000 Call for Projects; and

WHEREAS, one-half of the funding for the design of the portion of Newhall Ranch Road from Copper Hill Drive to Interstate 5 was awarded to the City by the MTA through the 2000 Call for Projects; and

WHEREAS, gaps exist between existing segments of the route. The unbuilt links have been prioritized so that "gaps" in the route can become eligible for public funding as soon as possible; and

WHEREAS, the City Council has directed through the Fiscal Year 2000/01 budget to allocate funding for the preliminary design of a portion of Newhall Ranch Road between Bouquet Canyon Road and Golden Valley Road; and

WHEREAS, the Cross-Valley Connector will provide a much-needed alternate route across the City, enhancing emergency services; and

WHEREAS, opportunities to provide east-west road capacity are severely limited within the City; and

WHEREAS, various local sources of funding such as Bridge and Thoroughfare (B&T) District fees and developer mitigation are and will be available to help leverage public financing opportunities; and

WHEREAS, the Cross-Valley Connector will provide safe and unobstructed crossing over Soledad Canyon Road and the Metrolink railroad tracks; and

WHEREAS, the completion of the Cross-Valley Connector will connect the Interstate 5 freeway at State Route 126 to the State Route 14 freeway at the Golden Valley Road interchange. This route will provide an east-west "cross-valley" connection that is expected to reduce the need for local trips to utilize the State highway system and the City's dependence on the State system for local traffic; and

WHEREAS, the Cross-Valley Connector will support a multi-modal transportation network by reducing cross-valley bus travel times, and accommodate bicycle and pedestrian travel by including Class I bike paths.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF SANTA CLARITA does hereby resolve as follows:

That the City will prioritize the Cross-Valley Connector as its number one priority in terms of seeking public funding and financing opportunities.

That the City will maximize the public investment in the Cross-Valley Connector, looking to all potential sources of revenue, including, but not limited to, funding opportunities through the MTA, the State of California, and the federal government.

That the City will use existing sources of local capital (e.g., B&T District Fees), as well as seek to implement strategies to raise local sources of capital and to leverage those local funds to the highest degree.

That the City will search for innovative strategies to complete the improvements in phases or as a program of improvements that seeks to balance the current transportation needs of residents with the realities of funding sources and development proposals.

RESOLUTION NO. 00-143
November 14, 2000 – Page 3

That the City will design the Golden Valley Road Bridge over the Santa Clara River in an environmentally sensitive manner.

That the City will seek to complete the funding for the unbuilt links of the Cross-Valley Connector as soon as possible.

That upon the completion of the Cross-Valley Connector, the City will submit a formal request to the MTA for the route to be included in the Los Angeles County Congestion Management Program (CMP) highway network.

PASSED, APPROVED, AND ADOPTED this 14th day of November, 2000.

J Anne Darcy
MAYOR

ATTEST:

Sharon L Dawson
CITY CLERK

STATE OF CALIFORNIA)
COUNTY OF LOS ANGELES) ss.
CITY OF SANTA CLARITA)

I, Sharon L. Dawson, CMC, City Clerk of the City of Santa Clarita, do hereby certify that the foregoing Resolution was duly adopted by the City Council of the City of Santa Clarita at a regular meeting thereof, held on the 14th day of November, 2000, by the following vote of Council:

AYES: COUNCILMEMBERS: Ferry, Kellar, Weste, Smyth, Darcy
NOES: COUNCILMEMBERS: None
ABSENT: COUNCILMEMBERS: None

Sharon L Dawson
CITY CLERK

APPENDIX 3.0

Development Monitoring System Database

10/1/2003

SERVICE PROVIDER REPORT

Service Provider COUNTY SANITATION DISTRICT NO. 26 & 32

Development Profile	Status		
	Pending	Approved	Recorded
RESIDENTIAL			
Number of active cases	54	27	179
Total number of dwelling units	8931	14368	11999
Single Family Units (detached)	6730	6477	9129
Duplex Units			
Multiple Family Units	2201	7891	2870
Mobile Home Units			
COMMERCIAL			
Number of active cases	6	5	5
Total acreage	305.16	107.1	59.61
INDUSTRIAL			
Number of active cases	5	1	9
Total acreage	195.14	106	199.56

Explanation of Status

Pending - subdivisions filed with Regional Planning Department, not yet approved nor denied

Approved - subdivisions approved by the County, not yet recorded nor expired.

Recorded - subdivisions recorded, not yet built.

10/1/2003

SERVICE PROVIDER REPORT

Service Provider VAL VERDE WATERWORKS DISTRICT NO. 36

Development Profile	Status Pending	 Approved	 Recorded
RESIDENTIAL			
Number of active cases	13	4	8
Total number of dwelling units	480	134	413
Single Family Units (detached)	480	79	413
Duplex Units			
Multiple Family Units		55	
Mobile Home Units			
COMMERCIAL			
Number of active cases	0	0	0
Total acreage			
INDUSTRIAL			
Number of active cases	0	1	0
Total acreage		106	

Explanation of Status

Pending - subdivisions filed with Regional Planning Department, not yet approved nor denied

Approved - subdivisions approved by the County, not yet recorded nor expired.

Recorded - subdivisions recorded, not yet built.

10/1/2003

SERVICE PROVIDER REPORT

Page 1 of 1

Service Provider VALENCIA WATER COMPANY

Development Profile	Status Pending	 Approved	 Recorded
RESIDENTIAL			
Number of active cases	10	6	89
Total number of dwelling units	1744	5544	6023
Single Family Units (detached)	615	1306	4982
Duplex Units			
Multiple Family Units	1129	4238	1041
Mobile Home Units			
COMMERCIAL			
Number of active cases	1	4	5
Total acreage	47.54	71.1	59.61
INDUSTRIAL			
Number of active cases	2	0	1
Total acreage	145.4		32.4

Explanation of Status

Pending - subdivisions filed with Regional Planning Department, not yet approved nor denied

Approved - subdivisions approved by the County, not yet recorded nor expired.

Recorded - subdivisions recorded, not yet built.

10/1/2003

SERVICE PROVIDER REPORT

Page 1 of 1

Service Provider SANTA CLARITA WATER COMPANY

Development Profile	Status Pending	Status Approved	Status Recorded
RESIDENTIAL			
Number of active cases	21	15	56
Total number of dwelling units	2719	8417	4394
Single Family Units (detached)	2319	4819	2565
Duplex Units			
Multiple Family Units	400	3598	1829
Mobile Home Units			
COMMERCIAL			
Number of active cases	2	1	0
Total acreage	4.54	36	
INDUSTRIAL			
Number of active cases	2	0	5
Total acreage	35.24		7.03

Explanation of Status

Pending - subdivisions filed with Regional Planning Department, not yet approved nor denied

Approved - subdivisions approved by the County, not yet recorded nor expired.

Recorded - subdivisions recorded, not yet built.

SERVICE PROVIDER REPORT

Service Provider NEWHALL WATER DISTRICT

Development Profile	Status		
	Pending	Approved	Recorded
RESIDENTIAL			
Number of active cases	18	2	27
Total number of dwelling units	4099	273	1224
Single Family Units (detached)	3347	273	1224
Duplex Units			
Multiple Family Units	752		
Mobile Home Units			
COMMERCIAL			
Number of active cases	3	0	0
Total acreage	253.08		
INDUSTRIAL			
Number of active cases	1	0	3
Total acreage	14.5		160.13

Explanation of Status

Pending - subdivisions filed with Regional Planning Department, not yet approved nor denied

Approved - subdivisions approved by the County, not yet recorded nor expired.

Recorded - subdivisions recorded, not yet built.

10/1/2003

SERVICE PROVIDER REPORT

Page 1 of 1

Service Provider CASTAIC UNION SCHOOL DISTRICT - ELEMENTARY

Development Profile	Pending	Approved	Recorded
RESIDENTIAL			
Number of active cases	19	7	35
Total number of dwelling units	2704	894	2338
Single Family Units (detached)	2218	299	2224
Duplex Units			
Multiple Family Units	486	595	114
Mobile Home Units			
COMMERCIAL			
Number of active cases	1	1	1
Total acreage	4	5	9.5
INDUSTRIAL			
Number of active cases	3	1	4
Total acreage	159.9	106	192.53

Explanation of Status

Pending - subdivisions filed with Regional Planning Department, not yet approved nor denied

Approved - subdivisions approved by the County, not yet recorded nor expired.

Recorded - subdivisions recorded, not yet built.

10/1/2003

SERVICE PROVIDER REPORT

Service Provider CASTAIC UNION SCHOOL DISTRICT - JUNIOR HIGH

Development Profile	Status Pending	 Approved	 Recorded
RESIDENTIAL			
Number of active cases	19	8	50
Total number of dwelling units	2704	1517	3347
Single Family Units (detached)	2218	299	2776
Duplex Units			
Multiple Family Units	486	1218	571
Mobile Home Units			
COMMERCIAL			
Number of active cases	1	1	3
Total acreage	4	5	54.96
INDUSTRIAL			
Number of active cases	3	1	4
Total acreage	159.9	106	192.53

Explanation of Status

Pending - subdivisions filed with Regional Planning Department, not yet approved nor denied

Approved - subdivisions approved by the County, not yet recorded nor expired.

Recorded - subdivisions recorded, not yet built.

10/1/2003

SERVICE PROVIDER REPORT

Page 1 of 1

Service Provider NEWHALL SCHOOL DISTRICT

Development Profile	Pending	Approved	Recorded
RESIDENTIAL			
Number of active cases	15	3	35
Total number of dwelling units	3119	1635.72	2868
Single Family Units (detached)	1724	472.72	2262
Duplex Units			
Multiple Family Units	1395	1163	606
Mobile Home Units			
COMMERCIAL			
Number of active cases	3	1	3
Total acreage	296.62	5	50.11
INDUSTRIAL			
Number of active cases	0	0	0
Total acreage			

Status columns: Pending, Approved, Recorded

Explanation of Status

Pending - subdivisions filed with Regional Planning Department, not yet approved nor denied

Approved - subdivisions approved by the County, not yet recorded nor expired.

Recorded - subdivisions recorded, not yet built.

10/1/2003

SERVICE PROVIDER REPORT

Page 1 of 1

Service Provider SAUGUS UNION SCHOOL DISTRICT

Development Profile	Status Pending	 Approved	 Recorded
RESIDENTIAL			
Number of active cases	14	11	77
Total number of dwelling units	1555	8788.28	4577
Single Family Units (detached)	1511	4276.28	3940
Duplex Units			
Multiple Family Units	44	4512	637
Mobile Home Units			
COMMERCIAL			
Number of active cases	1	4	1
Total acreage	2.04	97.1	
INDUSTRIAL			
Number of active cases	0	0	5
Total acreage			7.03

Explanation of Status

Pending - subdivisions filed with Regional Planning Department, not yet approved nor denied

Approved - subdivisions approved by the County, not yet recorded nor expired.

Recorded - subdivisions recorded, not yet built.

10/1/2003

SERVICE PROVIDER REPORT

Service Provider SULPHUR SPRINGS UNION SCHOOL DISTRICT

Development Profile	Status		
	Pending	Approved	Recorded
RESIDENTIAL			
Number of active cases	15	8	41
Total number of dwelling units	1666	2567	2887
Single Family Units (detached)	1310	1429	1374
Duplex Units			
Multiple Family Units	356	1138	1513
Mobile Home Units			
COMMERCIAL			
Number of active cases	1	0	0
Total acreage	2.5		
INDUSTRIAL			
Number of active cases	2	0	0
Total acreage	35.24		

Explanation of Status

Pending - subdivisions filed with Regional Planning Department, not yet approved nor denied

Approved - subdivisions approved by the County, not yet recorded nor expired.

Recorded - subdivisions recorded, not yet built.

10/1/2003

SERVICE PROVIDER REPORT

Service Provider WILLIAM S. HART UNION HIGH SCHOOL DISTRICT - JUNIOR HIGH

	Status		
Development Profile	Pending	Approved	Recorded
RESIDENTIAL			
Number of active cases	44	20	135
Total number of dwelling units	6340	12368	9123
Single Family Units (detached)	4545	6178	6824
Duplex Units			
Multiple Family Units	1795	6190	2299
Mobile Home Units			
COMMERCIAL			
Number of active cases	5	5	2
Total acreage	301.16	102.1	4.65
INDUSTRIAL			
Number of active cases	2	0	5
Total acreage	35.24		7.03

Explanation of Status

Pending - subdivisions filed with Regional Planning Department, not yet approved nor denied

Approved - subdivisions approved by the County, not yet recorded nor expired.

Recorded - subdivisions recorded, not yet built.

10/1/2003

SERVICE PROVIDER REPORT

Service Provider WILLIAM S. HART UNION HIGH SCHOOL DISTRICT - HIGH SCHOOL

Development Profile	Status Pending	 Approved	 Recorded
RESIDENTIAL			
Number of active cases	63	27	180
Total number of dwelling units	9044	14368	12054
Single Family Units (detached)	6763	6477	9184
Duplex Units			
Multiple Family Units	2281	7891	2870
Mobile Home Units			
COMMERCIAL			
Number of active cases	6	5	5
Total acreage	305.16	107.1	59.61
INDUSTRIAL			
Number of active cases	5	1	9
Total acreage	195.14	106	199.56

Explanation of Status

Pending - subdivisions filed with Regional Planning Department, not yet approved nor denied

Approved - subdivisions approved by the County, not yet recorded nor expired.

Recorded - subdivisions recorded, not yet built.

INVENTORY INFORMATION FOR LIBRARY SERVICE (Space in square feet)

LIBRARY DISTRICT		Existing Demand	Pending Demand	Approved Demand	Recorded Demand	Total Demand	Existing Supply
CANYON COUNTRY							
	SPACE	12,560	2,944	6,940	2,427	24,871	5,050
	BOOKS	64,408	15,098	35,591	12,447	127,544	66,790
NEWHALL							
	SPACE	8,229	84	1,504	16	9,833	4,842
	BOOKS	42,198	433	7,713	80	50,424	59,682
VALENCIA							
	SPACE	33,948	5,118	7,409	6,638	53,112	23,966
	BOOKS	174,090	26,246	37,995	34,039	272,370	211,688
SCV BOOKMOBILE							
	SPACE	7,781	5,285	8,815	4,355	26,237	0
	BOOKS	39,902	27,105	45,207	22,335	134,549	10,307
LAS VIRGENES							
	SPACE	10,728	782	0	170	11,680	7,523
	BOOKS	55,016	4,011	0	871	59,898	95,035
MALIBU							
	SPACE	13,572	249	71	178	14,071	16,530
	BOOKS	69,600	1,279	365	915	72,159	85,180
WESTLAKE VILLAG							
	SPACE	2,996	81	0	83	3,159	6,000
	BOOKS	15,362	414	0	426	16,202	44,114
LAS VIR BKMOBILE							
	SPACE	1,073	0	0	19	1,092	0
	BOOKS	5,500	0	0	99	5,599	7,436
LANCASTER							
	SPACE	40,137	7	3,898	1,898	45,941	48,721
	BOOKS	205,832	37	19,992	9,734	235,595	254,390
QUARTZ HILL							
	SPACE	9,970	1,006	3,845	3,347	18,169	3,530
	BOOKS	51,130	5,160	19,720	17,162	93,172	51,917
LITTLEROCK							
	SPACE	4,585	1,047	0	5	5,637	1,600
	BOOKS	23,514	5,370	0	25	28,909	44,409
LAKE LOS ANGELES							
	SPACE	4,864	16	0	0	4,879	3,245
	BOOKS	24,942	80	0	0	25,022	46,050

..BRARY DISTRICT	Existing Demand	Pending Demand	Approved Demand	Recorded Demand	Total Demand	Existing Supply
AV BOOKMOBILE						
SPACE	1,452	682	0	61	2,195	0
BOOKS	7,444	3,498	0	315	11,257	6,243
HACIENDA HEIGHTS						
SPACE	28,538	96	29	67	28,731	10,398
BOOKS	146,350	494	148	346	147,338	100,033
ROWLAND HEIGHTS						
SPACE	19,119	57	24	210	19,409	14,863
BOOKS	98,044	290	124	1,075	99,533	125,739
DIAMOND BAR						
SPACE	26,559	0	0	66	26,625	9,859
BOOKS	136,198	0	0	340	136,538	93,833

INVENTORY INFORMATION FOR SEWER SERVICES (million gallons per day)

SEWER DISTRICT	Existing Demand	Pending Demand	Approved Demand	Recorded Demand	Total Demand	Existing Supply	Future Supply	Incr. Exp. Date
S.D. NO. 26 & 32	15.04	3.22	5.19	3.01	26.46	19.10	28.10	2002
SAN.DIST. #27	0.10	0.00	0.01	0.00	0.11	0.30	0.30	N/A
LAS VIRGENES	10.80	0.31	0.00	0.13	11.24	16.10	16.10	N/A
SAN.DIST. #14	9.80	0.10	1.94	1.10	12.93	16.00	16.00	N/A
SAN.DIST. #20	7.80	0.14	0.07	0.56	8.57	15.00	15.00	N/A
S.D. NO. 15 & 21	497.00	0.09	0.02	0.10	497.21	576.00	616.00	2006

Note:

FUTURE SUPPLY reflects the next stage of incremental expansion.

INVENTORY INFORMATION FOR WATER SERVICE (acre-feet per year)

WATER COMPANY	EXISTING DEMAND	PENDING DEMAND	APPROVED DEMAND	RECORDED DEMAND	TOTAL DEMAND	DRY SUPPLY	NORMAL SUPPLY
SC VALLEY WIDE	64,350	7,044.56	9,372.36	5,983.81	86,750.73	90,600	96,000
WATERWORKS #36	654	283.20	406.40	203.55	1,547.15		
VALENCIA WC	22,735	1,332.70	4,973.30	2,895.06	31,936.05		
SANTA CLARITA WC	24,513	1,671.03	3,776.99	1,447.03	31,408.05		
NEWHALL WD	9,348	3,757.63	215.67	1,438.17	14,759.47		
OTHER-SCV	7,100	0.00	0.00	0.00	7,100.00		

Note:

DRY SUPPLY - Ranges from 90,600 to 147,500 acre-feet-per year.

Conjunctive-use and groundwater banking supplies are not included in table.

NORMAL SUPPLY - Ranges from 96,000 to 151,900 acre-feet-per year.

INVENTORY INFORMATION FOR SCHOOL SERVICE (in students)

SCHOOL DISTRICT	Enrollment	Pending Demand	Approved Demand	Recorded Demand	Total Demand	Capacity
ACTON AGUA-DULCE	480	1,050	246	286	2,062	770
ACTON AGUA-DULCE J	357	1,050	246	286	1,939	930
ACTON-AGUA DULCE	1,236	1,050	246	286	2,818	2,252
ANTELOPE VALLEY HS	16,089	489	1,371	1,053	19,002	16,156
CASTAIC UNION EL	1,135	722	206	644	2,707	1,430
CASTAIC UNION JH	1,350	380	152	452	2,334	1,800
EASTSIDE UNION	2,235	0	136	42	2,413	3,180
GORMAN	165	335	0	0	500	150
HACIENDA LP ELEM	12,498	119	25	59	12,701	12,714
HACIENDA LP HIGH	6,300	40	8	20	6,368	10,050
HACIENDA LP JH	3,347	40	8	20	3,415	5,440
HUGHES-ELIZABETH	495	0	0	0	495	660
KEPPEL UNION	3,060	855	0	7	3,922	3,780
NCASTER	13,632	3	256	704	14,595	18,117
LAS VIRGENES EL	5,019	362	0	167	5,548	4,710
LAS VIRGENES JH	2,562	131	0	60	2,753	3,780
LAS VIRGENES SH	3,182	107	0	49	3,338	4,480
NEWHALL	6,050	824	290	901	8,065	4,687
PALMDALE ELEM	15,200	264	231	753	16,448	19,551
PALMDALE JR HIGH	3,871	61	53	172	4,157	5,148
POMONA ELEM	20,362	0	0	0	20,362	21,106
POMONA HIGH	6,207	0	0	0	6,207	7,716
POMONA JR HIGH	4,599	0	0	0	4,599	7,259
ROWLAND ELEM	10,578	15	6	67	10,666	11,866
ROWLAND HIGH	5,148	9	4	41	5,202	4,959
ROWLAND JR HIGH	2,621	7	3	32	2,663	2,828
SANTA MONICA EL	5,272	6	5	8	5,291	5,675
SANTA MONICA JH	2,643	3	2	4	2,652	2,160
SANTA MONICA SH	3,318	4	3	5	3,330	3,390

NVENTORY INFORMATION FOR SCHOOL SERVICE (in students)

SCHOOL DISTRICT	Enrollment	Pending Demand	Approved Demand	Recorded Demand	Total Demand	Capacity
SAUGUS UNION	8,979	657	3,777	940	14,353	7,579
SULPHUR SPRINGS	4,662	678	835	785	6,960	4,975
WALNUT VALLEY EL	5,121	0	0	6	5,127	6,045
WALNUT VALLEY JH	3,242	0	0	2	3,244	4,192
WALNUT VALLEY SH	4,684	0	0	3	4,687	6,138
WESTSIDE JR HIGH	2,123	110	840	321	3,394	2,610
WESTSIDE UNION E	3,984	329	2,521	964	7,798	6,750
WILSONA	2,172	8	0	0	2,180	2,936
WM.S. HART JR HI	5,217	602	1,406	650	7,875	5,174
WM.S. HART SR HI	9,903	1,575	2,811	1,680	15,969	9,512

Note:

Capacity includes permanent and temporary (portable) classrooms.

DMS SERVICE PROVIDER CASEDATA REPORT FOR
WILLIAM S. HART UNION HIGH SCHOOL DISTRICT - HIGH SCHOOL

PROJECT NO.	CASE NO.	GROSS ACRES	FINAL MAP NO.	LOT TYPE	UNITS	ACRES	ZONE DISTRICT	STATUS	EXP. DATE
	PM00-001	2.66		SF	2		CITY OF SANTA CLARITA	PENDING	
87150	PM18108	31.4		I		31.4	CASTAIC CANYON	PENDING	
88216	PM19776	34.5		SF	15		CASTAIC CANYON	PENDING	
88221	PM19784	304	PM19784-01	I		76.46	CASTAIC CANYON	RECORDED	
88221	PM19784		PM19784-02	I		78.68	CASTAIC CANYON	RECORDED	
88230	PM19939	4.2		SF	4		CASTAIC CANYON	PENDING	
89205	PM20938	5		SF	2		SOLEDAD	PENDING	
90445	PM20983	197		I		106	NEWHALL	APPROVED	11/29/2003
90445	PM20983			SF	1		NEWHALL	APPROVED	11/29/2003
	PM21110	8.4	PM21110	SF	3		CITY OF SANTA CLARITA	RECORDED	
89430	PM21497	0.6		SF	4		NEWHALL	PENDING	
91194	PM21689	10		SF	2		CASTAIC CANYON	PENDING	
90380	PM22530	5.5		SF	2		SAND CANYON	PENDING	
91290	PM22992	41.9	PM22992	C		9.5	CASTAIC CANYON	RECORDED	
91290	PM22992		PM22992	I		32.4	CASTAIC CANYON	RECORDED	
95009	PM24179	5		SF	2		CASTAIC CANYON	PENDING	
97119	PM24801	1.515		SF	2		NEWHALL	PENDING	
	PM24804			C		2.5	CITY OF SANTA CLARITA	PENDING	
	PM24804			SF	60		CITY OF SANTA CLARITA	PENDING	
97074	PM24810	4.99	PM24810	I		4.99	CASTAIC CANYON	RECORDED	
	PM25634		PM25634	SF	4		CITY OF SANTA CLARITA	RECORDED	
99153	PM25705	4.65	PM25705	C		4.65	NEWHALL	RECORDED	
	PM25740	6.1		SF	3		CITY OF SANTA CLARITA	APPROVED	
99213	PM25852	1.1		SF	4		CASTAIC CANYON	APPROVED	3/5/2004
00-13	PM25884	5.52		SF	2		SAND CANYON	PENDING	
	PM26037		PM26037	SF	1		CITY OF SANTA CLARITA	RECORDED	
	PM26125		PM26125	SF	1		CITY OF SANTA CLARITA	RECORDED	
	PM26275		PM26275	C	1		CITY OF SANTA CLARITA	RECORDED	
081	TR30562	80	TR30562	SF	55		BOUQUET CANYON	RECORDED	
86189	TR31158	277.5	TR31158	MF	180		SAND CANYON	RECORDED	
86189	TR31158		TR46269	SF	116		SAND CANYON	RECORDED	
86189	TR31158		TR46270	SF	47		SAND CANYON	RECORDED	
86237	TR31803	206		MF	54		SAND CANYON	APPROVED	4/26/2004
86237	TR31803			SF	445		SAND CANYON	APPROVED	4/26/2004
86524	TR32224	204		C		2.04	SAND CANYON	PENDING	
86524	TR32224			SF	510		SAND CANYON	PENDING	
205	TR33608	132.3	TR33608-1	MF	4	0	NEWHALL	RECORDED	
205	TR33608		TR33608-2	MF	145	0	NEWHALL	RECORDED	
86257	TR33613	690.7	TR33613	SF	314		NEWHALL	RECORDED	
86257	TR33613		TR49760	SF	146		NEWHALL	RECORDED	
86257	TR33613		TR49761	SF	425		NEWHALL	RECORDED	
	TR34466	257		SF	299		CITY OF SANTA CLARITA	APPROVED	
88422	TR35783	157	TR35783	SF	81		NEWHALL	RECORDED	
88422	TR35783		TR35783-01	SF	22		NEWHALL	RECORDED	
88422	TR35783		TR35783-02	SF	65		NEWHALL	RECORDED	
88422	TR35783		TR35783-03	SF	98		NEWHALL	RECORDED	
88422	TR35783		TR35783-04	SF	137		NEWHALL	RECORDED	
97009	TR36943	424.5	TR36943	SF	16		SOLEDAD	RECORDED	
97009	TR36943		TR36943-01	SF	46		SOLEDAD	RECORDED	
97009	TR36943		TR36943-03	SF	13		SOLEDAD	RECORDED	
97009	TR36943		TR36943-04	SF	52		SOLEDAD	RECORDED	
97009	TR36943		TR52901	SF	5	0	SOLEDAD	RECORDED	
	TR42670		TR42670-01	I		7.03	CITY OF SANTA CLARITA	RECORDED	

DMS SERVICE PROVIDER CASEDATA REPORT FOR
WILLIAM S. HART UNION HIGH SCHOOL DISTRICT - HIGH SCHOOL

PROJECT NO.	CASE NO.	GROSS ACRES	FINAL MAP NO.	LOT TYPE	UNITS	ACRES	ZONE DISTRICT	STATUS	EXP. DATE
	TR42670		TR42670-02	I			CITY OF SANTA CLARITA	RECORDED	
	TR42670		TR42670-03	I	8		CITY OF SANTA CLARITA	RECORDED	
	TR42670		TR42670-04	I	14		CITY OF SANTA CLARITA	RECORDED	
	TR42670		TR42670-05	I	19		CITY OF SANTA CLARITA	RECORDED	
85299	TR43147	40		SF	26		SAND CANYON	PENDING	
98046	TR43589	75.53		SF	90		SAND CANYON	PENDING	
86259	TR43737	9.9		MF	80		SAND CANYON	PENDING	
97204	TR43896	262.78	TR43896	SF	54		NEWHALL	RECORDED	
97204	TR43896		TR43896-02	SF	54		NEWHALL	RECORDED	
97204	TR43896		TR43896-03	SF	13		NEWHALL	RECORDED	
97204	TR43896		TR43896-06	SF	40		NEWHALL	RECORDED	
97204	TR43896		TR43896-07	SF	74		NEWHALL	RECORDED	
87318	TR44163	139.5		SF	49		CASTAIC CANYON	PENDING	
	TR44360		TR44360-3	MF	60		CITY OF SANTA CLARITA	RECORDED	
	TR44360		TR44360-4	MF			CITY OF SANTA CLARITA	RECORDED	
	TR44360		TR44360-5	MF			CITY OF SANTA CLARITA	RECORDED	
85340	TR44373	213.4	TR44373-03	SF	19		CASTAIC CANYON	RECORDED	
85340	TR44373		TR44373-04	SF	39		CASTAIC CANYON	RECORDED	
85340	TR44373		TR44373-05	SF	30		CASTAIC CANYON	RECORDED	
	TR44374		TR44374-01	SF	58		CITY OF SANTA CLARITA	RECORDED	
	TR44374		TR44374-02	MF	1		CITY OF SANTA CLARITA	RECORDED	
	TR44374		TR44374-04	MF	35		CITY OF SANTA CLARITA	RECORDED	
	TR44374		TR44374-05	MF	3		CITY OF SANTA CLARITA	RECORDED	
86201	TR44429	76.3	TR44429	SF	288		CASTAIC CANYON	RECORDED	
86255	TR44471	161.8	TR47353	SF	56		CASTAIC CANYON	RECORDED	
86255	TR44471		TR47354	SF	62		CASTAIC CANYON	RECORDED	
86255	TR44471		TR47355	SF	62		CASTAIC CANYON	RECORDED	
86255	TR44471		TR52439	SF	32		CASTAIC CANYON	RECORDED	
86255	TR44471		TR52440	SF	45		CASTAIC CANYON	RECORDED	
86255	TR44471		TR52441	SF	31		CASTAIC CANYON	RECORDED	
86255	TR44471		TR52442	SF	57		CASTAIC CANYON	RECORDED	
91332	TR44492	42.3	TR44492	MF	634		SAND CANYON	RECORDED	
86365	TR44800	189	TR44800	SF	97		NEWHALL	RECORDED	
86365	TR44800		TR44800-01	SF	139		NEWHALL	RECORDED	
86365	TR44800		TR44800-02	SF	99		NEWHALL	RECORDED	
86365	TR44800		TR44800-03	SF	59		NEWHALL	RECORDED	
	TR44831			C		19.8	CITY OF SANTA CLARITA	APPROVED	
	TR44831		TR44831	SF	21		CITY OF SANTA CLARITA	RECORDED	
	TR44831		TR44831-02	SF	4		CITY OF SANTA CLARITA	RECORDED	
87287	TR44945	140		SF	140		CASTAIC CANYON	PENDING	
86441	TR44967	360.3	TR44967	SF	63		BOUQUET CANYON	RECORDED	
86441	TR44967		TR49433	SF	75		BOUQUET CANYON	RECORDED	
86441	TR44967		TR49434	SF	62		BOUQUET CANYON	RECORDED	
86522	TR45023	46.2		MF	438		SAND CANYON	APPROVED	8/29/2004
86522	TR45023		TR45023-01	MF	304		SAND CANYON	RECORDED	
86522	TR45023		TR45023-02	MF	10	0	SAND CANYON	RECORDED	
88027	TR45084	150.4	TR45084	SF	294		CASTAIC CANYON	RECORDED	
87036	TR45123	76		SF	12		SAND CANYON	PENDING	
	TR45148	17.5	TR45148	SF	10		CITY OF SANTA CLARITA	RECORDED	
87343	TR45287	27.8	TR45287	MF	463		SAND CANYON	RECORDED	
87222	TR45433	757		C		10	NEWHALL	APPROVED	2/17/2006
87222	TR45433			MF	1563		NEWHALL	APPROVED	2/17/2006
87222	TR45433		TR45433-02	SF	202	0	NEWHALL	RECORDED	

DMS SERVICE PROVIDER CASEDATA REPORT FOR
WILLIAM S. HART UNION HIGH SCHOOL DISTRICT - HIGH SCHOOL

PROJECT NO.	CASE NO.	GROSS ACRES	FINAL MAP NO.	LOT TYPE	UNITS	ACRES	ZONE DISTRICT	STATUS	EXP. DATE
87222	TR45433	757	TR45433-04	SF	211	0	NEWHALL	RECORDED	
87222	TR45433		TR45433-05	SF	1	0	NEWHALL	RECORDED	
87222	TR45433		TR45433-06	SF	1	0	NEWHALL	RECORDED	
87222	TR45433		TR45433-07	SF	1	0	NEWHALL	RECORDED	
93179	TR45440	99.9	TR51875	SF	7		NEWHALL	RECORDED	
87303	TR45645	160	TR45645	SF	68	0	CASTAIC CANYON	RECORDED	
88139	TR45883	527.2		C		29.58	NEWHALL	PENDING	
88139	TR45883			MF	266		NEWHALL	PENDING	
88139	TR45883			SF	219		NEWHALL	PENDING	
87539	TR45958	400	TR45958	SF	66	0	CASTAIC CANYON	RECORDED	
87539	TR45958		TR48573	SF	61		CASTAIC CANYON	RECORDED	
87539	TR45958		TR48574	SF	49		CASTAIC CANYON	RECORDED	
85628	TR46018	603		C		36	SAND CANYON	APPROVED	12/12/2004
85628	TR46018			MF	2406		SAND CANYON	APPROVED	12/12/2004
85628	TR46018			SF	1511		SAND CANYON	APPROVED	12/12/2004
85628	TR46018		TR46018-1	SF	142	0	SAND CANYON	RECORDED	
85628	TR46018		TR46018-2	SF	1	0	SAND CANYON	RECORDED	
85628	TR46018		TR46018-3	SF	106	0	SAND CANYON	RECORDED	
85628	TR46018		TR46018-5	SF	32	0	SAND CANYON	RECORDED	
	TR46072	1.55	TR46072	SF	5		CITY OF SANTA CLARITA	RECORDED	
88044	TR46183	74	TR46183	SF	51		NEWHALL	RECORDED	
88044	TR46183		TR46183-02	SF	65		NEWHALL	RECORDED	
97148	TR46353	26		MF	110		SAND CANYON	APPROVED	7/20/2004
88321	TR46389	361	TR46389-14	MF	132		NEWHALL	RECORDED	
88321	TR46389		TR46389-17	MF	150		NEWHALL	RECORDED	
90433	TR46468	93.4		SF	14		SAND CANYON	PENDING	
88280	TR46564	133	TR46564	SF	45		CASTAIC CANYON	RECORDED	
88280	TR46564		TR46564-02	SF	48		CASTAIC CANYON	RECORDED	
88280	TR46564		TR46564-03	SF	38		CASTAIC CANYON	RECORDED	
88280	TR46564		TR46564-04	SF	52		CASTAIC CANYON	RECORDED	
88280	TR46564		TR46564-05	SF	47		CASTAIC CANYON	RECORDED	
	TR46626		TR46626	SF	138		CITY OF SANTA CLARITA	RECORDED	
88298	TR46648	93.2		SF	73		BOUQUET CANYON	PENDING	
88309	TR46688	9.4		SF	19		CASTAIC CANYON	PENDING	
88361	TR46775	1.1		SF	2		NEWHALL	PENDING	
88360	TR46776	2.4		SF	2		NEWHALL	PENDING	
88582	TR46777	6.1		SF	4		NEWHALL	PENDING	
89345	TR46798	36.9		MF	55		CASTAIC CANYON	APPROVED	3/12/2004
89345	TR46798			SF	1		CASTAIC CANYON	APPROVED	3/12/2004
88596	TR46908	205		SF	269		CASTAIC CANYON	APPROVED	10/25/2004
88596	TR46908		TR46908-01	SF	29		CASTAIC CANYON	RECORDED	
88596	TR46908		TR46908-02	SF	38		CASTAIC CANYON	RECORDED	
88596	TR46908		TR46908-03	SF	40		CASTAIC CANYON	RECORDED	
88596	TR46908		TR46908-04	SF	34		CASTAIC CANYON	RECORDED	
88596	TR46908		TR46908-05	SF	31		CASTAIC CANYON	RECORDED	
88596	TR46908		TR46908-06	SF	31		CASTAIC CANYON	RECORDED	
88596	TR46908		TR46908-07	SF	50		CASTAIC CANYON	RECORDED	
88596	TR46908		TR46908-08	SF	24		CASTAIC CANYON	RECORDED	
88596	TR46908		TR46908-09	SF	23		CASTAIC CANYON	RECORDED	
88596	TR46908		TR46908-10	SF	23		CASTAIC CANYON	RECORDED	
88596	TR46908		TR46908-11	SF	3		CASTAIC CANYON	RECORDED	
89469	TR47099	9.5		MF	167		SAND CANYON	PENDING	
89094	TR47200	240	TR47200	SF	2		SAND CANYON	RECORDED	

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PROJECT NO.	CASE NO.	GROSS ACRES	FINAL MAP NO.	LOT TYPE	UNITS	ACRES	ZONE DISTRICT	STATUS	EXP. DATE
92074	TR51644	1738		C		11.2	CASTAIC CANYON	APPROVED	5/18/2004
92074	TR51644			MF	1802		CASTAIC CANYON	APPROVED	5/18/2004
92074	TR51644			SF	1090		CASTAIC CANYON	APPROVED	5/18/2004
92074	TR51644		TR51644-1	SF	3	0	CASTAIC CANYON	RECORDED	
92074	TR51644		TR51644-10	SF	65	0	CASTAIC CANYON	RECORDED	
92074	TR51644		TR51644-2	SF	6	0	CASTAIC CANYON	RECORDED	
92074	TR51644		TR51644-3	SF	93	0	CASTAIC CANYON	RECORDED	
92074	TR51644		TR51644-4	SF	3	0	CASTAIC CANYON	RECORDED	
92074	TR51644		TR51644-5	SF	7	0	CASTAIC CANYON	RECORDED	
92074	TR51644		TR51644-6	SF	129	0	CASTAIC CANYON	RECORDED	
92074	TR51644		TR51644-7	SF	174	0	CASTAIC CANYON	RECORDED	
92074	TR51644		TR51644-8	SF	158	0	CASTAIC CANYON	RECORDED	
92074	TR51644		TR51644-9	SF	66	0	CASTAIC CANYON	RECORDED	
94021	TR51789	79	TR51789-01	SF	100	0	BOUQUET CANYON	RECORDED	
94021	TR51789		TR51789-02	SF	93	0	BOUQUET CANYON	RECORDED	
98047	TR51852	975		C		4	CASTAIC CANYON	PENDING	
98047	TR51852			I		14.5	CASTAIC CANYON	PENDING	
98047	TR51852			MF	486		CASTAIC CANYON	PENDING	
98047	TR51852			SF	1603		CASTAIC CANYON	PENDING	
	TR51857		TR51857	SF	37		CITY OF SANTA CLARITA	RECORDED	
	TR51931			MF	623		CITY OF SANTA CLARITA	APPROVED	
	TR51931		TR51931-01	C		2.23	CITY OF SANTA CLARITA	RECORDED	
	TR51931		TR51931-03	C		43.23	CITY OF SANTA CLARITA	RECORDED	
	TR51931		TR51931-04	SF	10		CITY OF SANTA CLARITA	RECORDED	
	TR51931		TR51931-05	MF	2		CITY OF SANTA CLARITA	RECORDED	
	TR51931		TR52985	SF	80		CITY OF SANTA CLARITA	RECORDED	
	TR51931		TR52986	SF	75		CITY OF SANTA CLARITA	RECORDED	
	TR51931		TR52987-01	SF	45		CITY OF SANTA CLARITA	RECORDED	
	TR51931		TR52987-02	SF	42		CITY OF SANTA CLARITA	RECORDED	
	TR51931		TR53130-01	MF	63		CITY OF SANTA CLARITA	RECORDED	
	TR51931		TR53130-02	SF	132		CITY OF SANTA CLARITA	RECORDED	
	TR51931		TR53147	MF	76		CITY OF SANTA CLARITA	RECORDED	
	TR51931		TR53268	MF	78		CITY OF SANTA CLARITA	RECORDED	
	TR51963		TR51963	SF	159		CITY OF SANTA CLARITA	RECORDED	
95085	TR51995	15.2	TR51995	MF	30		CASTAIC CANYON	RECORDED	
95085	TR51995		TR51995-01	MF	22		CASTAIC CANYON	RECORDED	
95085	TR51995		TR51995-02	MF	30		CASTAIC CANYON	RECORDED	
95085	TR51995		TR51995-03	MF	32		CASTAIC CANYON	RECORDED	
	TR52004	420.3	TR52004A	SF	82		CITY OF SANTA CLARITA	RECORDED	
97080	TR52192	204		SF	141		BOUQUET CANYON	PENDING	
97079	TR52193	80.7		SF	62		BOUQUET CANYON	PENDING	
97078	TR52194	176.5		SF	126		BOUQUET CANYON	PENDING	
97088	TR52302	22.39	TR52302	SF	11	0	NEWHALL	RECORDED	
	TR52354		TR52354	MF	39		CITY OF SANTA CLARITA	RECORDED	
	TR52355	34.3		SF	63		CITY OF SANTA CLARITA	PENDING	
	TR52372		TR52372	SF	3		CITY OF SANTA CLARITA	RECORDED	
	TR52385			MF	44		CITY OF SANTA CLARITA	PENDING	
	TR52414	1310		SF	866		CITY OF SANTA CLARITA	PENDING	
	TR52448	3.8	TR52448	SF	6		CITY OF SANTA CLARITA	RECORDED	
99048	TR52475	69.55		SF	63		NEWHALL	PENDING	
98071	TR52535	276		SF	80		CASTAIC CANYON	PENDING	
98034	TR52584	432		SF	216		CASTAIC CANYON	APPROVED	
	TR52606	2.3	TR52606	SF	8		CITY OF SANTA CLARITA	RECORDED	

DMS SERVICE PROVIDER CASEDATA REPORT FOR
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PROJECT NO.	CASE NO.	GROSS ACRES	FINAL MAP NO.	LOT TYPE	UNITS	ACRES	ZONE DISTRICT	STATUS	EXP. DATE
	TR52667			C		30.1	CITY OF SANTA CLARITA	APPROVED	
	TR52667			MF	250		CITY OF SANTA CLARITA	APPROVED	
	TR52667		TR52667-01	SF	10		CITY OF SANTA CLARITA	RECORDED	
	TR52673		TR52673-01	SF	11		CITY OF SANTA CLARITA	RECORDED	
	TR52673		TR52673-02	SF	21		CITY OF SANTA CLARITA	RECORDED	
	TR52673		TR52673-03	SF	27		CITY OF SANTA CLARITA	RECORDED	
03112	TR52715	83.9		SF	9		SAND CANYON	APPROVED	12/20/2003
98173	TR52729	80		SF	70		CASTAIC CANYON	PENDING	
00-187	TR52763	9.4		SF	11		SAND CANYON	PENDING	
99129	TR52785	41		SF	26		BOUQUET CANYON	PENDING	
98176	TR52790	53.3		SF	37		SAND CANYON	APPROVED	4/26/2004
98176	TR52790		TR52790-1	SF	38	0	SAND CANYON	RECORDED	
00-136	TR52796	229.6		SF	203		NEWHALL	PENDING	
99003	TR52807	5.4	TR52807	SF	5		NEWHALL	RECORDED	
99020	TR52829	75.06		SF	181		NEWHALL	APPROVED	
00-128	TR52833	602.1		MF	590		SAND CANYON	APPROVED	12/12/2003
00-128	TR52833			SF	938		SAND CANYON	APPROVED	12/12/2003
00-128	TR52833		TR52833-1	SF	93	0	SAND CANYON	RECORDED	
00-128	TR52833		TR52833-2	SF	94	0	SAND CANYON	RECORDED	
00-128	TR52833		TR52833-3	SF	82	0	SAND CANYON	RECORDED	
00-128	TR52833		TR52833-4	SF	1	4	SAND CANYON	RECORDED	
00-137	TR52908	39		SF	19		NEWHALL	PENDING	
99101	TR52938	28.2	TR52938	SF	24	0	SAND CANYON	RECORDED	
	TR52985		TR52985	SF	80		CITY OF SANTA CLARITA	RECORDED	
	TR52986		TR52986	SF	75		CITY OF SANTA CLARITA	RECORDED	
	TR52987		TR52987-01	SF	54		CITY OF SANTA CLARITA	RECORDED	
	TR52987		TR52987-02	SF	42		CITY OF SANTA CLARITA	RECORDED	
00-196	TR53108	291		C		47.54	CASTAIC CANYON	PENDING	
00-196	TR53108			MF	1129		CASTAIC CANYON	PENDING	
00-196	TR53108			SF	315		CASTAIC CANYON	PENDING	
	TR53122		TR53122	SF	93		CITY OF SANTA CLARITA	RECORDED	
	TR53130		TR53130-01	SF	13		CITY OF SANTA CLARITA	RECORDED	
	TR53130		TR53130-02	SF	155		CITY OF SANTA CLARITA	RECORDED	
00-81	TR53189	185.8		SF	60		CASTAIC CANYON	PENDING	
00-210	TR53295	114		I		114	NEWHALL	PENDING	
	TR53419			MF	109		CITY OF SANTA CLARITA	PENDING	

LOT TYPES:

C = Commercial (Acres)

DP = Duplex (Units)

I = Industrial (Acres)

MF = Multiple Family (Units)

MH = Mobile Home (Units)

SF = Single Family (Units)

PROJECT AND CASE LISTING FILED FOR THE ANTA CLARITA VALLEY SINCE 1/1/1993

PROJECT NO	CASE NO	DESCRIPTION
00-108	OT00-108	ONE OAK TREE ENCROACHMENT
00-116	CP00-116	CUP FOR REQUIREMENT OF MPD ZONE
	PM26037	(TN) 1 INDUSTRIAL LOT/(4 NC)/2.65 AC
00-123	CP00-123	BEER & WINE FOR EXISTING SERV. STATION/CONVENIENCE
00-124	CP00-124	POLE-MOUNTED WIRELESS COMMUNICATIONS ANTENNAS
00-127	CP00-127	WIRELESS TELECOMMUNICATIONS FACILITY
00-128	TR52833	(TN) 751 SF LOTS+140 NC+2 PF+26 OS+1C
	OT00-128	REMOVAL OF 2 OAKS
	CP00-128	TO ENSURE COMPLIANCE WITH SPECIFIC PLAN
00-13	CP00-13	2 SF RESIDENCES
	PM25884	(TN) 2 SF LOTS/5.52 ACRES
00-134	OT00-134	6 TREES TO BE TRIMMED
00-136	OT00-136	RELOCATE 1 TREE
	CP00-136	HM, DENSITY CONTROL DEVELOPMENT, DP ZONE
	PA00-136	SCVAP: HM TO URBAN 2 (3.4 TO 6.6 DU/AC)
	TR52796	(TN) 209 (184 SF+25 OS) LOTS ON 229.6 ACRES
	ZC00-136	ZC: A2-2 TO A1-1-DP & RA-10,000-DP
00-137	CP00-137	HILLSIDE MANAGEMENT, DENSITY CONTROL DEVELOPMENT
	TR52908	(TN) 19 SF LOTS/ 39.72 ACRES
	ZC00-137	ZC: A2-2 TO A1-1
00-139	CP00-139	BEER & WINE FOR ON-SITE CONSUMPTION
00144	CP00144	NEW PLAY AREA
00-148	OT00-148	ENCROACHMENT INTO PROTECTED ZONE OF ONE OAK TREE
	CP00-148	CONT'D. USE OF SF RESIDENCE IN C-3 ZONE
00 151	CP00-151	TO LEGALIZE EXISTING GRANNY/GUEST/MOBILEHOME GROOM
00-152	CP00-152	OFF-SITE SALE OF ALCOHOLIC BEVERAGES
00 157	OT00-157	REMOVAL OF 15 OAK TREES FOR FREEWAY INTERCHANGE
00 159	CP00-159	WIRELESS TELECOMMUNICATIONS FACILITY W 9 ANTENNAS
0-164	CP00-164	PRIVATE RECREATION CLUB FOR PAINTBALL
0 166	CP00-166	TO SUPPLY POTABLE WATER TO RESIDENTIAL PROPERTIES
0 170	PM26068	2 SF LOTS/10.02 AC
	CP00-170	2 SF LOTS (HILLSIDE MANAGEMENT)

PROJECT NO	CASE NO	DESCRIPTION
00-171	CP00-171	CONSTRUCT A 100' TALL WIRELESS TELECOMMUNICATIONS
00-177	CP00-177	TELECOMMUNICATIONS WIRELESS CELLULAR FACILITY
00-180	PK00-180	REDUCED PARKING WITH DEVELOPMENT OF MEZZANINE
00-187	LP00-187	LP (SCV PLAN) FROM HM to U-2
	CP00-187	HILLSIDE MANAGEMENT
	ZC00-187	FROM A-2-1 to R-1-5000
	TR52763	11 SF LOTS AND 1 OS LOT/9.4 AC
00-188	CP00-188	RPD & HM FOR 65UNIT CONDO PROJECT
	TR53235	2 (1MF/65NC+1 OS LOTS
	PK00-188	RECIPROCAL PARKING FOR EACH RESIDENTIAL LOT
	ZC00-188	ZC: A-1-1 TO RPD-5,000-12U
	OT00-188	REMOVED ONE OAK TREE
00-19	CP00-19	WIRELESS TELECOMMUNICATION FACILITY
00-193	PM26125	(TN)1 INDUSTRIAL LOT (8 NC)/5.22 AC
	CP00-193	CUP FOR MPD ZONE
00-194	CP00-194	TO AMEND CUP 86312 RE: OPERATION OF LANDFILL
00-195	CP00-195	WIRELESS TELECOMMUNICATIONS FACILITY
00-196	TR53108	315SF,18MF(677NC+452APT),27C,44OS,REC,1SC,2B/291.2
00-197	CP00-197	UNMANNED TELECOMMUNICATIONS FACILITY
00-21	SM00-21	SURFACE MINING PERMIT FOR 2 LAND QUARRIES
00-210	HR00-210	REALIGNMENT OF HENRY MAYO DR
	ZC00-210	FROM A-2-5 AND M1-1/2 TO M1-1/2DP
	OT00-210	REMOVE ONE HERITAGE OAK TREE
	CP00-210	DEVELOPMENT PROGRAM/GRADING/SEA
	TR53295	(TN) 27 INDUSTRIAL LOTS/114 AC
00-211	ZC00-211	ZC: A-2-5 TO R-R-DP ON 21 AC
	LP00-211	SCV: OS TO U2 ON 21 AC
	CP00-211	MOBILE HOME PARK EXPANSION (ADD 30 SPACES)
00-213	OT00-213	REMOVAL OF 37 OAKS AND 14 ENCROACHMENTS
00-23	CP00-23	UNMANNED WIRELESS TELECOMMUNICATION
00-250	PM26185	(TN) 2 SF LOTS/13.3 AC (3.75 AC REMAINDER PARCEL)
00-252	CP00-252	SENIOR CITIZEN'S RESIDENCE
00-253	CP00-253	HOTEL: 121 SUITES (POOL, DINING FOR BREAKFAST)
00-259	OT00-259	REMOVAL OF 13 OAK TREES
00-27	CP00-27	PERMIT RESIDENTIAL IN A COMMERCIAL ZONE
	PM26016	LEASE PROJECT/2 APT BLDGS (44UNITS)/2.18 AC
00-32	CP00-32	CONTINUANCE OF RECREATIONAL VEHICLE PARK

PROJECT NO	CASE NO	DESCRIPTION
00-35	CP00-35	CARETAKER TRAILER RESIDENCE
00-36	CP00-36	SALE OF ON-SITE CONSUMPTION FOR RESTAURANT
00-38	CP00-38	EXPANSION OF ALCOHOLIC BEVERAGE SALES
00-40	CP00-40	PRE-SCHOOL/DAY CARE
00-41	CP00-41	GRANNY HOUSE/SENIORS
00-43	HR00-43	HIGHWAY REALIGNMENT
00-53	CP00-53	WIRELESS TELECOMMUNICATIONS FACILITY
00-54	VA00-54	VARIANCE FOR OVERSIZED TEMPORARY REAL ESTATE SIGN
00-55	ZC00-55	ZONE CHANGE FROM A-1-1 TO M-1-DP
	CP00-55	CP TO ALLOW BOAT STORAGE IN M-1-DP ZONE
00-56	CP00-56	TWO STORY HOME WITH ATTACHED GARAGE
00613	CP00613	BOAT STORE- RENTALS AND SALES
00-76	CP00-76	12 PANEL ANTENNAS ON THE ROOF-TOP
00-77	CP00-77	10 PANEL ANTENNAS ON PIPES ADJACENT TO WATER TANKS
00-79	CP00-79	CAMPGROUND SERVING CHRONICALLY ILL CHILDREN
00-81	CP00-81	60 SF LOTS/2 OS LOTS
	TR53189	60 SINGLE FAMILY AND 2 OPEN SPACE LOTS
00-84	CP00-84	CELLULAR TELEPHONE BROADCASTING
00-85	CP00-85	BEER & WINE TO EXISTING RESTAURANT
00-87	CP00-87	NEW MOBILEHOME PARK (EXPANSION)
00-90	SM00-90	RECLAMATION PLAN, SURFACE MINING PERMIT
00-92	CP00-92	TO MOUNT 3 SETS OF ANTENNA PANELS ONTO MONOPOLE
00-95	CP00-95	TO SELL ALCOHOL WITHIN EXISTING ON-SITE MARKET
00-96	CP00-96	BEER & WINE ON-SITE IN RESTAURANT
01-018	OT01-018	29 OAKS TO BE ENCROACHED;23 REMAIN INTACT
01-019	OT01-019	24 OAKS REMOVED; FOUR ENCROACHMENTS
01-021	CP01-021	SECOND DWELLING UNIT FOR RESIDENTIAL USE/HUD
01-023	SM01-023	RECLAMATION PLAN (SURFACE MINING, STOCKPILES)
01-032	CP01-032	TO BUILD SENIOR CITIZEN RESIDENCE
01-046	OT01-046	REMOVAL OF 1 OAK TREE
01-085	CP01-085	TRUCK/VEHICLE WASH W/ RETAIL COMMERCIAL
01-094	CP01-094	OFFSITE GRADING TO CREATE FISH & GAME RESTORATION
	OT01-094	5 OAK TREE ENCROACHMENTS
01-095	NR01-095	CONVENIENCE STORE AND OFF-SALE BEER & WINE
01-096	PM20685	MAJ REV FOR 21 INDUSTRIAL LOTS, 1 REMAINDER PARCEL
01-101	PM26363	8 LOT INDUSTRIAL SUBDIVISION

PROJECT NO	CASE NO	DESCRIPTION
01-108	CP01-108	UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY
01-129	CP01-129	WIRELESS TELECOMMUNICATION FACILITY
01-154	SM01-154	EXCAVATION AND EXPORT
01-165	PM26458	1 SF LOT/5 ACRES
01-166	CP01-166	RELIGIOUS RETREAT & CARETAKER'S RESIDENCE
01-171	CP01-171	WIRELESS "MICROCELL" FACILITY
01-172	CP01-172	
01-173	CP01-173	
01-174	CP01-174	
01-175	CP01-175	
01-176	CP01-176	
01-177	CP01-177	
01-182	CP01-182	CP/SEA FOR EQUIPMENT STORAGE
	ZC01-182	ZONE CHANGE FOR STORAGE OF EQUIPMENT
01-183	CP01-183	GUEST RANCH; RIDING ACADEMY & STABLES
01-185	CP01-185	WIRELESS TELECOMMUNICATION FACILITY
01-188	PM21894	3 SF LOTS/18 ACRES
01-191	PM26460	4 SF Lots/40 acres
01-208	OT01-208	ONE OAK TREE REMOVAL
01-216	PM26508	4 SF LOTS/4.54 AC
01-218	OT01-218	THREE OAK TREE ENCROACHMENTS
01-221	CP01-221	COMMERCIAL DEVELOPMENT ON VACANT LAND
01-238	CP01-238	ON-SITE SALE FOR BEER AND WINE
01-241	CP01-241	WINERY IN UNLIMITED COMMERCIAL ZONE
01-257	CP01-257	SECOND UNIT FOR SF RESIDENCE
01-259	CP01-259	BOAT SALES, PARTS AND ACCESSORIES, SERVICE
01-264	CP01-264	PAINTBALL BUSINESS/PRIVATE REC. CLUB
01352	SP1352	REV. EXH. A (ABOVE GROUND FUEL TANK)
0144	CP144	REVISED EX."A" CUP BUILDING EXPANSION
01455	CP1455	REV. EXH. "A"
01559	SP1559	REVISED EXHIBIT A WITH A CUP AND SPECIAL PERMIT
01631	CP01631	ADD ROOM TO EXISTING MOBILE HOME
01869	CP01869	REPLACEMENT/EXISTING 80' TOWER/EARTHQUAKE DAMAGE
01989	CP01989	REV. EXH. "A"
02-005	PM26549	(TN) 3 SF LOTS/18.05 ACRES
02-010	PM26574	(TN) 14 INDUSTRIAL LOTS (RESUBDIVISION)/11.2 ACRES
02-012	CP02-012	SALE OF ALCOHOLIC BEVERAGES FOR ALBERTSONS
02-016	OT02-016	ONE REMOVAL AND THREE OAK TREE ENCROACHMENTS
02-023	PM26478	4 SF LOTS/19.85 AC

PROJECT NO	CASE NO	DESCRIPTION
02-029	LP02-029	SP: OC TO R-3 (25)U ON 9.9 AC
	TR53795	(TN) 6 LOTS (154 NC)/9.9 AC
	CP02-029	SPECIFIC PLAN CONFORMANCE
02-030	OT02-030	REMOVAL AND RELOCATION OF TWO OAKS
02-031	HR02-031	PROPOSED LAND USE OF SCHOOL SITES
02-034	TR47718	86 SINGLE FAMILY RESIDENCE
02-039	CP02-039	WIRELESS TELECOMMUNICATIONS FACILITY
02-050	CP02-050	HILLSIDE CONDITIONAL USE PERMIT
	PM26653	VESTING MINOR LAND DIVISION, 4SF LOTS/20.15 ACRES
02-053	OT02-053	31 REMOVALS AND 7 ENCROACHMENTS
	ZC02-053	FROM A-2-1 TO M-1-DP
	CP02-053	RECREATIONAL VEHICLE AND BOAT STORAGE FACILITY
02-054	CP02-054	CONT. USE OF CHURCH AND ADDITION OF REC. HALL
02-055	TR52905	23 SF LOTS ON 39.42 AC
	OT02-055	TWO ENCROACHMENTS; FOUR REMAIN
	CP02-055	HILLSIDE MANAGEMENT, DENSITY CONTROLLED DEVELOPMEN
02-071	CP02-071	INSTALLATION OF WIRELESS TELECOMMUNICATIONS FAC.
02-072	CP02-072	INSTALL WIRELESS TELECOMMUNICATION FACILITIES
02-073	CP02-073	
02-087	CP02-087	RETAIL, RESTAURANT AND DAY CARE FACILITY
02-101	CP02-101	WIRELESS TELECOMMUNICATION FACILITY
02-108	CP02-108	MINOR MODIFICATIONS TO CP92-074; (TR51644)
02-116	CP02-116	150 SENIOR APARTMENTS IN C-3-DP ZONE
02-139	CP02-139	WIRELESS TELECOMMUNICATIONS FACILITY
02-152	CP02-152	PROPOSED PARKING LOT FOR MOTEL CUSTOMERS
02-172	TR53847	8 SF LOTS/60.34 ACRES
	CP02-172	HILLSIDE MANAGEMENT CUP
02-177	OT02-177	ONE OAK TREE STUMP REMOVED
02-178	CP02-178	CONTINUED OPERATION OF PRIVATE BOARDING SCHOOL
02-191	OT02-191	EIGHT OAK TREE ENCROACHMENTS
02-193	OT02-193	TWO OAK REMOVALS; 12 ENCROACHMENTS
02-194	CM02-194	PROPOSED CEMETERY
02-196	OT02-196	48 REMOVALS PLUS ENCROACHMENTS
	TR53822	VESTING TENT. TR. FOR 335 SF UNITS
	CP02-196	HILLSIDE MANAGEMENT DENSITY CONTROLLED DEVELOPMENT
02-215	PM19149	4 SF LOTS/20 AC
02-219	PM26866	PARCEL FOR 4 RESIDENTIAL LOTS
02-226	CP02-226	SEA/WIRELESS "MICROCELL" FACILITY
02-232	CP02-232	MASTER PLANNED, MIXED-USE DEVELOPMENT
	ZC02-232	A-2-5 AND A-2-10 TO "SPECIFIC PLAN"
	PL02-232	SPECIFIC PLAN FOR MASTER PLAN
	SP02-232	PLAN AMENDMENT FOR MASTER PLAN DEVELOPMENT
02-234	CP02-234	UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY
02-236	CP02-236	SEA/STORAGE & EXPORT OF SPRING WATER/CARETAKER RES
02-249	CP02-249	HILLSIDE MANAGEMENT FOR 211 ACRE SITE
	TR54020	DEVELOP 211 ACRE SITE WITH 568 LOTS
	SP02-249	PLAN AMENDMENT COUNTYWIDE FOR 211 ACRE SITE
	ZC02-249	FROM A-2-1 TO SPECIFIC PLAN (211.3 ACRES)
	PL02-249	SPECIFIC PLAN FOR 211 ACRE SITE
02-251	CP02-251	HOTEL USE WITH 112 ROOMS
02-260	CP02-260	COMMERCIAL AUTO SERVICE/SALES OF NEW TRUCKS
02-279	LP02-279	CHANGE FROM N1 AND HM TO M
	CP02-279	STORAGE OF VINTAGE VEHICLES ON SUBJECT SITE
	ZC02-279	FROM A1-1 TO M1-DP
02-289	CP02-289	UNMANNED WIRELESS TELECOMMUNICATION FACILITY
02-290	OT02-290	13 OAKS REMOVED; 4 ENCROACHED
02-298	CP02-298	WIRELESS FACILITY ON NEW STREET LIGHT
02-299	CP02-299	
02-300	CP02-300	REPLACE EXISTING POLE WITH 50' UTILITY POLE
02-311	CP02-311	RECREATONAL VEHICLE RESORT/CURRENT GOLF COURS
02-320	HR02-320	PROPOSED REALIGNMENT TO REDUCE EARTHEN FILL
02-325	OT02-325	RIGHT-0F-WAY REALIGNMENT; 23 REMOVALS
02-334	OT02-334	TWO OAK TREE ENCROACHMENTS
02-341	TR54073	VESTING TENT. TR. FOR 6 SF LOTS
	CP02-341	SIX SF LOTS FOR CUP - HILLSIDE
02-343	CP02-343	OUTDOOR STORAGE OF TRACTORS, TRAILERS
02-344	PM26755	3 SF LOTS/10.01 AC
	CP02-344	SF RESIDENCE
02396	CP02396	NINE DETACHED CONDOMINIUM UNITS (TR33698)
03-010	CP03-010	PRIVATE SPORTS-RECREATIONAL FACILITY
03-014	TU03-014	EVENING FUNDRAISING MAX. OF 1,100 GUESTS EACH NGT
03-015	CP03-015	SENIOR CITIZEN RESIDENCE - 1,000 SQ. FT.
03-017	CP03-017	WATER WELL, COMMUNITY PARKING LOT
03-023	OT03-023	DECK UNDER OAK TREE; THREE ENCROACHMENTS
03-025	TR43196	22 SF LOTS/22.6 ACRES

PROJECT NO	C E NO	DESCRIPTION
03-025	CP03-025	MODIFICATION TO ACTON CSD DEVELOPMENT STANDARDS
03-032	CP03-032	ELECTRICITY GENERATING WINDMILL; NEW HOUSING
03-033	CP03-033	SECOND RESIDENCE FOR SINGLE FAMILY
03-052	CP03-052	MINOR CUP - WIND TURBINE
03-053	OT03-053	REMOVAL OF 1 OAK TREE
	CUP03-05	HILLSIDE MANAGEMENT
	PM27079	2 COMMERCIAL LOTS ON 4 AC
03-056	TU03-056	FUNDRAISING EVENT/MAX. OF 1,100 GUESTS EACH NIGHT
03-065	CP03-065	UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY
03-069	CP03-069	ON-SITE SALE OF ALCOHOLIC BEVERAGES
03-070	TR54237	SIX 5 ACRE PARCELS
03-071	OT03-071	REMOVAL OF ONE OAK TREE
03-072	PM27081	3 SF LOTS ON 8.5 AC
03-074	CP03-074	MULTIPLE FAMILY HOUSING - 534 CONDOMINIUMS
03-079	PM27121	(TN) 4 SF LOTS/28.69 ACRES
03-090	CP03-090	CHURCH GYM WITH ADJACENT CLASSROOMS/OFFICES
03-097	PM27143	2 COMMERCIAL LOTS ON 4.56 AC
03-098	CP03-098	SALE OF BEER/WINE FOR NEW RESTAURANT
03-099	OT03-099	ONE OAK TREE ENCROACHMENT
03-106	TR54337	(TN) 5 SF LOTS/ 79.22 AC
03-108	PR03-108	CASTAIC CSD
03-109	CP03-109	STORAGE, BOTTLING AND EXPORT OF WELL WATER
03-110	PM27044	(TN) 3 SF LOTS/9.8 AC (GROSS)
03-112	TR52715	(TN) 9(8 SF, 1 OS) LOTS/68.23
	OT98141	REMOVE SIX OAK TREES
	CP98141	COND USE FOR RPD & HILLSIDE MANAGEMENT
03-116	CP03-116	OFF-SALE LIQUOR IN FULL SERVICE FOOD MARKET
03-117	ZC03-117	FROM R1-7,500 TO C2-DP
	CP03-117	ALCOHOL SALES FOR MINI-MART AND GAS STATION
03-119	TR53525	30 SINGLE FAMILY RESIDENCES
	CP03-119	HILLSIDE MANAGEMENT
03-141	PM27144	(TN) 2 SF LOTS/1.5 AC (GROSS)
03-145	CP03-145	SALE OF ALCOHOLIC BEVERAGES FOR OFF-SITE
03-146	TR53725	SPLIT INTO 42 SF DETACHED RESIDENTIAL LOTS
	CP03-146	HILLSIDE FOR SF DETACHED LOTS
	OT03-146	8 OAK TREE REMOVALS
03-153	CP03-153	MINOR WECS-N 80' TOWER
03-154	CP03-154	(WECS-N) WIND TOWER

I JECT NO	CASE NO	DESCRIPTION
03-156	CP03-156	MOBILEHOME PARK WITH SPACES FOR 113 MOBILEHOMES
03-163	PM27075	SUBDIVIDE 5 ACRE LOT INTO TWO 2 1/2 LOTS
03-169	CP03-169	CUP FOR -DP ZONE, RESIDENTIAL USE IN COMM ZONE
	TR60024	(TN) 2 MF LOTS (85 DET NC)/7.8 ACRES (GROSS)
03-172	CP03-172	6 BLDGS. OF 84,143 SQ.FT. COMMERCIAL SITE
03-174	CP03-174	CUP FOR HILLSIDE MGMT
	PM60046	(TN) 4 SF LOTS/20 ACRES
03-175	CP03-175	CUP FOR HILLSIDE MGMT
	PM60047	(TN) 4 SF LOTS/20 ACRES
03-208	CP03-208	ALLOW THE SALE OF ALCOHOL BY A CHAIN SUPERMARKET
03-215	PM27074	2 SF LOTS/ 10 AC
03-221	CP03-221	CHURCH RETREAT FACILITY
	PK03-221	5 BUS STALLS AND 32 AUTO STALLS ARE PROVIDED
03-231	PD03-231	30% REDUCTION OF REQUIRED PARKING
03-238	TR60030	(TN) 21 INDUSTRIAL LOTS/110.2 ACRES
	CP03-238	GRADING (ON-SITE & OFF-SITE TRANSPORT), -DP
03-239	CP03-239	PROPOSED SWIMMING POOL AND RECREATION FACILITY
03-240	CP03-240	ALCOHOL SALES FOR PROPOSED SHOPPING CENTER
03-246	OT03-246	OAK TREE WITH PUBLIC HEARING/29 REMOVALS
	TR60319	(TN) 1 MF LOT (36 DET NC)/5.7 ACRES
	CP03-246	RESIDENTIAL USE IN COMM ZONE, MAYBE HILLSIDE MGMT
03-248	PM27011	2 LOT MINOR LAND DIVISION FOR SINGLE HOUSING
03-249	CP03-249	GRADING AND A CLUSTER CUP
	TR060259	492 DU SUBDIVISION
03-250	CP03-250	CUP FOR HM, GRADING CLUSTERING
	TR060257	PROPOSED 257 LOT SUBDIVISON OF 244 SF DU
	ZC03-250	FROM A-1 TO A-10,000; A-1 TO CPD; TO RPD10,000-7.5
	SP03-250	FROM HM TO U1 & U2; HM,U1 TO OS; HM TO CPD
03-251	ZC03-251	FROM A-2-1 TO RPD-5,000-3.9U
	CP03-251	HILLSIDE AND RPD CLUSTER DEVELOPMENT ON 24 ACRES
	TR54372	VESTING TRACT FOR 75 SF LOTS ON 24 ACRES
03-253	OT03-253	ENCROACHED BY LOOSE SOIL WITHIN DRIPLINE
03-259	CP03-259	SOLID FILL PROJECT
03-264	TR49042	APPROVAL OF 28 LOT SF SUBDIVISION/ALONG DRAINAGE
	CP03-264	28 LOT SINGLE FAMILY SUBDIVISION
03-285	OT03-285	24 ENCROACHMENTS; 57 REMOVALS
	PM27082	4 LOT PARCEL ON 40 ACRES

PROJECT NO	(E NO	DESCRIPTION
03 300	PM60475	2 LOT SUBDIVISION
03-301	TR60359	58 LOT TRACT
	CP03-301	DENSITY BONUS
		HILLSIDE MANAGEMENT
1165	CP1165	CONSTRUCT STORAGE BLDG. & ENLARGE RESTROOM
1404	CP1404	CONSTRUCTION OF METAL HANGAR BUILDING
1494	CP1494	AMEND THE EXH. A TO EXISTING CUP(FILMING PICTURES)
173	CP2396	ROUGH GRADED PADS
	PP173	CHANGE BLDG.PLANS ON LOTS WITHIN TRACT
2116	CP2116	REV. EXH. A FOR MINOR MODIFICATIONS/SITE PLAN
84187	CP84187	PLOT PLAN APPROVAL PURSUANT TO C.U.P. 84187
84188	CP84188	APPROVAL OF FUTURE MODEL HOME PLOT PLAN
85042	CP85042	ADDITION OF NEW HIGH DEFINITION TV ANTENNA
85533	CP85833	REVISED EXHIBIT A
86201	TR44429	(RV1) 288 SF + 10 OS LOTS ON 135.9 AC.
86257	CP86257	CHANGE HOUSE MODELS IN LOTS 181 & 182
86299	CP86299	ADD & MODIFICATION TO WIRELESS COMM FACILITY
87-036	TR45123	10 SF LOTS/40.37 ACRES & 36 ACRE REMINDER PARCEL
	CP02-164	10 SF LOTS.40.37 ACRES & 36 ACRE REMAINDER PARCEL
87222	TR45433	(RV1) 732SF,8MF/523DU,76MF/500NC,5C,ETC ON 1755 AC
87426	TR45707	(RV2) 7 SF LOTS ON 160 AC IN A2-1 & A1-1
87487	CP87487	C.U.P FOR PM19149
87539	CP87539	(RV) WATER TANK
88086	TR46217	(RV) 11 SF LOTS ON 77.5 AC
88280	TR46564	(RV)305 (303 SF, 1 OS, 1 PF) LOTS/133.0 AC
88321	TR46389	(RV2)701SF+11MF/730NC+29OS+2R+4PF+1PK+1SC+1S/361 AC
88430	TR46712	(RV) 4 SF LOTS ON 70.3 AC
88587	TR44806	(RV1) 8 COMMERCIAL LOTS ON 20.46 AC
89094	CP96174	HILLSIDE MANAGEMENT, GRADING
	TR47200	(RV1) 393 SF, 3 C, 2 SCHOOL, 1 PARK, 18 OS/ 240 AC
89153	OT89153	REMOVE/REPLACE 44 OAK TREES
89486	TR48450	(RV1) 36 (33 SF + 1 PF + 2 OS) LOTS ON 90 AC
89512	PM21618	(RV) 3 SF LOTS ON 10.0 AC IN A2-2
90011	CP90011	REVISED EXHIBIT A FOR MCDONALDS
90395	PM22372	(RV) 3 SF LOTS/7.5 AC
90145	CP90445	POSSIBLE DP
92074	TR51644	(TN) 898SF, 8MF/893NC, 1COM, 104 PF LOTS/1795 AC
	SP92074	CW AND SCV GENERAL PLAN AMEND/TR51644

I JECT NO	CASE NO	DESCRIPTION
	OT92074	REMOVE 34 OAKS; ENCROACH PROTECTED ZONE OF 60 OAKS
	DA92074	3,029 DWELLING UNITS,SCHOOLS,PARKS ETC..
	ZC92074	ZC: FROM A2-2 TO RPD,C2DP,R3DP,OS
92156	LP92156	SCV: N1 TO C
92240	CP92240	HILLSIDE
92705	CP92705	REVISED EXHIBIT "A"
93004	CP93004	CELLULAR TELEPHONE COMMUNICATION FACILITY
93011	CP93011	ALCOHOLIC BEVERAGE SALE
93015	CP93015	2 SIDED 8'X10',16' HIGH OFF-SITE SIGN
93021	CP93021	HM, DEN.CONTROLLED, WATER TANK FOR TR 51521
	LP93021	AV PLAN: FROM N1 TO N2 ON 201.9 AC/ TR 51521
	TR51521	(TN) 159 SF, 3 PF, 3 OS LOTS ON 229.7 AC
93040	CP93040	HILLSIDE MANAGEMENT FOR PM 22188
	PM22188	(TN) 2 SF LOTS ON 5 ACRES
93047	CP93047	DETACHED LIVING QUARTERS
93050	PM23759	4 SF LOTS ON 73.3 ACRES
93053	PM23688	2 LOTS SUBD ON 10 ACRES PROPERTY
93061	CP93061	DIRECTIONAL SIGN
93066	CP93066	4 UNITS
	PM23734	4 SINGLE-FAMILY LOTS ON 20 ACRES
93072	CP93072	BEER AND WINE SALE
	VA93072	SIMILAR USE WITHIN 500'
93076	CP93076	EXPAND EXISTING CAMPGROUND
93081	CP93081	RECREATION,GOLF COURSE W/ DRIVING RANGE AND CLUB H
93085	HR93085	HIGHWAY REALIGNMENT
93097	CP93097	RECOVERY CAMP
93098	AP93098	7 DOGS
93099	CP93099	AUTOMATED ELECTRICAL SUBSTATION
93104	CP93104	CHILDCARE CENTER
93105	CP93105	ALCOHOLIC BEVERAGE SALE IN A RESTAURANT
	VA93105	SIMILAR USE WITHIN 500' RADIUS
93114	PM23665	(TN) 3 SF LOTS/40.5 AC
93118	CP93118	MARKET W/ BEER & WINE SALE
	VA93118	SIMILAR USE W/M 500' RADIUS
93125	PM23877	2 LOT SUBDIVISIONS ON 10.2 AC
93132	CP93132	CHURCH
93134	PM23849	(TN) 2 SF LOTS ON 11.09 ACRES
93145	NR93145	MOBILEHOME PARK, 57 MH SPACES & 8 RV SPACES

PROJECT NO	(E NO	DESCRIPTION
93147	ZC93147	CHANGE A-2-1 ZONE TO SP (SPECIFIC PLAN) ZONE
	PL93147	SPECIFIC PLAN/MOBILEHOME PARK
	CP93147	MOBILEHOME PARK - 550 UNITS
93148	CP93148	UNMANNED CELLULAR TELECOMMUNICATIONS STATION
93150	HR93150	HIGHWAY ALIGNMENT
93156	PM23916	(TN) 3 INDUSRIAL LOTS/ 23.3 AC PLUS REMAINDER OF 1
93157	TR51777	19 SINGLE FAMILY LOTS ON 190 ACRES
93169	CP93169	ON-SITE SALES ALCOHOL
93173	CP93173	MODIFY SETBACK CONDITIONS OF CP87360
93178	PM23885	SINGL FAM RESIDENCE/TO CREATE 2 SINGL FAM RESIDTL
93179	CP93179	DETACHED SFR CONDOS IN RPD ZONE
	TR45440	(RV#2) 146 SF, 244 NEW CONDOS, CHURCH, PARK ON 99.
93181	AP93181	REQUESTS PERMIT FOR KEEPING OF WILD ANIMALS
93184	TR51808	CONVERT EXISTING MOBILE HOME PARK TO CONDOMINIUMS
	VA93184	EXCEED PERMITTED DENSITY IN A1-2 ZONE
	CP93184	CONDO CONVERSION/EXPAND CONDITION OF OPERATION/APP
93202	CP93202	TO ENSURE COMPLIANCE WITH HILLSD DEVELMNT PERFORM
	PM23944	TO CREATE TWO SINGLE FAMILY LOTS ON 10.4 ACRES
93212	NR93212	CONTINUE EXISTING MOBILEHOME PARK WITH DENSITY MOD
94011	ZC94011	ZONE CHANGE FROM M1 TO C-3-DP
	CP94011	TO ALLOW MOTEL IN C-3-DP ZONE
94013	CP94013	HILLSIDE MANAGEMENT FOR TR51829
	OT94013	REMOVE 4 OAKS; ENCROACH ON 12 OAKS -TR 51829
	TR51829	(TN) 5 SF LOTS ON 12.39 AC
94016	PM23933	4 SF LOTS/30.4 ACRES
94021	ZC94021	ZC FROM A2-2 TO RPD-1-3U
	CP94021	RPD AND HM FOR TR51789
	TR51789	(TN) 194 SF LOTS/79 AC
94024	CP94024	TO ENSURE COMPLIANCE WITH M-1 DP DEVELOPMENT STAND
	ZC94024	CHANGE OF ZONE FROM A-2-1 TO M-1 DP
94030	CP94030	TO CONSTRUCT A WATER STORAGE TANK
94032	NR94032	NON-CONFORMING USE - ROOFING MATERIAL SUPPLY YARD
94033	ZC94033	TO CHANGE ZONE FROM C-3 DP TO R-2 DP
	CP94033	DEVELOPMENT PROGRAM FOR 64 RESIDENTIAL UNITS
	TR51786	TO DEVELOP 64 UNITS OF CONDOMINIUM ON 7.25 ACRES

I JECT NO	CASE NO	DESCRIPTION
94034	OT94034	TO PERMIT ENCROACHMENT ON DRIPLINE OF 14 OAK TREES
94035	OT94035	TO REMOVE ONE (1) OAK TREE
94041	TR51828	TO CREATE 73 INDUSTRIAL LOTS ON 277 ACRES
94042	PM20436	REACTIVATION TO CREATE 2 S.F LOTS ON 10 ACRES
94045	OT94045	OAK TREE PERMIT/GRADING IN DRIPLINE AREA
94046	CP94046	CUP FOR NEW CELLULAR REPEATER & 200' HIGH TOWER
94049	OT94049	REMOVE 12 OAK TREES
94050	CP94050	UNMANNED TELECOMMUNICATIONS MICROWAVE STATION FACI
94059	TR51852	(TN) 564SF, 27MF/556NC, 7PF, 7C, 10I, 4R, 14 OS/52
	CP94059	CUP FOR SPEC PLAN CONSISTENCY, SEWAGE TRMNT PLNT &
94067	CP94067	TO ALLOW AN OFF-SITE 2-SIDED SUBDIVISION DIRECTION
94073	CP94073	CONVENIENCE MARKET WITH OFF-SITE LICENSE FOR BEER
94087	PM24500	(TN) 30 (24 SF/C/MIXED USE, 6 OS) LOTS/11,963 AC
	SP94087	CW,SCV: NEWHALL RANCH SPECIFIC PLAN
	PL94087	CREATE NEWHALL RANCH SPECIFIC PLAN
	CP94087	HILLSIDE MANAGEMENT/SEA
	DA94087	NEWHALL RANCH DEVELOPMENT AGREEMENT
94092	OT94092	(1) ENCROACHMENT, (3) REMOVALS
	CP94092	CONTINUE EXISTG ANIMAL REFUGE & ADD MOBILEHOMES
94095	OT94095	ENCROACH WITHIN PROTECTED ZONE OF ONE OAK TREE
	CP94095	RADIO COMMUNICATIONS FOR CITY OF L.A. EMERGENCY NE
94102	CP94102	BEER & WINE SALES W/EXISTG GAS STATION & PROPOSED
94113	OT94113	OAK TREE PERMIT/LACFCD EASEMENT
94114	CP94114	C.U.P. DUE TO S.E.A. & HM FOR PM23793
	PM23793	(TN) 2 SF LOTS ON 25.38 ACRES
94117	CP94117	C.U.P. FOR SENIOR CITIZEN RESIDENCE
94123	CP94123	EXPAND TENT CAMPGRND/CONTINUE TRAVEL TRAILER/MRKT/
94128	CP94128	LANDFILL/TO AMEND CUP86312/REMOVE L.A. CITY USE RE
94129	SM94129	C.U.P. FOR S.E.A.
	CP94129	SURFACE MINING
94139	CP94139	MOBILE HOME ON PERMANENT FOUNDATION
94143	CP94143	RETAIL GAME ARCADE & BILLIARDS IN EXISTING RETAIL
94148	CP94148	RESIDENTIAL WITH ONE ADDITIONAL SENIORS RESIDENCE
94151	LP94151	1800 RESIDENTIAL SUBDIVISION/COMMERCIAL

PROJECT NO	CASE NO	DESCRIPTION
94151	TR51931	(TN) 12 MF/1800 NC+3 C+1 PF+ 17 OS LOTS ON 299 AC.
	ZC94151	1800 RESIDENTIAL SUBDIVISION/COMMERCIAL
	CP94151	RPD&SEA/CONCEPT CUP 1800 RES UNITS & COMMERCIAL
94152	OT94152	TRIM ONE (1) OAK TREE
94154	PM24150	(TN) 1 I LOT/10 IND. OFFICE CONDOS ON 1.13 AC.
94156	ZC94156	ZONE CHANGE FROM A1-10K & C3 TO CM-DP
	CP94156	DEVELOPMENT PROGRAM/ASSEMBLY OF LIGHT FIXTURES
	LP94156	LOCAL PLAN AMENDMENT FROM U1 & C TO C
94157	HR94157	HIGHWAY REALIGNMENT
94158	CP94158	OFF-SITE SALE OF BEER AND WINE
94174	CP94174	WASTE DISPOSAL FACILITY
95009	CP95009	HILLSIDE REVIEW/2-LOT LAND DIVISION
	PM24179	(TN) 2 SINGLE-FAMILY LOTS ON 5 ACRES
95010	AP95010	ANIMAL PERMIT FOR FOUR POT BELLY PIGS
95012	CP95012	C.U.P. FOR NEW RADIO REPEATER SITE
95019	PM23942	(TN) 3 SF LOTS ON 149 AC.
95029	CP95029	CONTINUE & EXPAND ADULT RESIDENTIAL FACILITY
95035	CP95035	CHURCH
95040	CP95040	MODIFY CONDITIONS FOR COVERED PARKING
95042	TR52003	(TN) 4 SF LOTS ON 30.7 AC + 12.9 AC REMAINDER
95059	CP95059	HILLSIDE FOR PM19149
95068	CP95068	RADIO TELEPHONE TRANSMISSION EQUIPMENT
95069	HR95069	HIGHWAY REALIGNMENT
95071	CP95071	NEW CELLULAR RADIO REPEATER SITE IN SEA
95075	ZC95075	ZC FROM A-2-5 TO RPD 5,000-8.6U
	VA95075	REQ TO MODIFY STDs FOR SUBDIV DIR SIGNS
	TR48202	(TN) 230 LOTS(190SF, 11MF/268NC, 3R, 26OS)/69.7AC
	CP95075	CUP FOR RPD, URB HILLSIDE, OFF-SITE GRADING
	OT95075	REMOVE 6 OAK TREES
95084	CP95084	802 CONDOMINIUM UNITS AND GRADING
	LP95084	M TO U-3 AND C
	TR52043	(TN) 8 MF LOTS/802 NEW CONDOS ON 91.1 AC.
	ZC95084	MPD TO C-3 AND RPD-5,000-24U
95085	LP95085	SCV: U-4,P,M TO U-3
	TR51995	(TN) 1 MF LOT/114 NEW CONDOS ON 15.2 AC.
	ZC95085	CHANGE OF ZONE FROM R-4 TO A-2-2, M-1DP TO R-2DP
	CP95085	114 DETACHED SFR CONDOMINIUMS
95094	CP95094	CONSTRUCTION OF CELLULAR COMMUNICATION ANTENNA FAC
95095	OT95095	REMOVE 1 TREE & ENCROACH ON DRIP LINE OF 2 TREES

PROJECT NO	CASE NO	DESCRIPTION
95097	PM24247	(TN) 2 SF LOTS ON 10 AC.
95099	CP95099	CONT. KEEPING WILD ANIMALS & CARETAKER RESIDENCES
95105	CP95105	OFF-SALE FULL LINE LIQUOR LIC. AT NEW SUPER MARKET
95111	OT95111	O.T. PERMIT TO ENCROACH & TRIM 1 TREE
95118	TR34900	(TN) 45 SF LOTS ON 572 AC.
	ZC95118	ZC: A-2-5 TO RPD-5,000-27.5U
	LP95118	SCV: HM & M TO U-2 & U-1
	CP95118	HILLSIDE MANAGEMENT, RESIDENTIAL PLANNED DEVELOPMT
95124	ZC95124	A-2-5 TO RPD-5,000-27U
	CP95124	SEA AND HILLSIDE
	TR46029	(TN) 5 MF/1397 NC + 2 C + 2 OS LOTS ON 246.7 AC.
95128	CP95128	UNSTAFFED CELLULAR COMMUNICATIONS ANTENNA FACILITY
95129	OT95129	OAK TREE PERMIT TO ENCROACH ON 8 TREES
95137	HR95137	REALIGNMENT OF COPPERHILL DR.
95140	CP95140	SALE OF ALCOHOLIC BEVERAGES IN NEW SUPERMARKET
95141	OT95141	OT TO CONSTRUCT SFR
95142	PM24351	(TN) 4 SF LOTS ON 5 AC.
95143	OT95143	OAK TREE PERMIT CONSTRUCT SINGLE FAMILY DWELLING
95147	AP95147	HORSE ON UNDERSIZED PARCEL
95148	CP95148	MAINTAIN MOBILE HOME FOR HOUSING INVALID PARENT
95149	PK95149	LESS THAN REQUIRED PARKING
	CP95149	COMMERCIAL USES, GAS STATION W/BEER & WINE IN MPD
95155	CP95155	ALLOW USE OF MOBILEHOME AS CARETAKER'S RESIDENCE
95158	CP95158	WATER STORAGE AND DISTRIBUTION SYSTEMS
95163	CP95163	ALLOW SALE OF BEER & WINE FOR OFF-SITE CONSUMPTION
95175	CP95175	RELIGIOUS SANCTUARY/RECEPTION HALL
95178	CP95178	SHOTGUN RANGE,PICNIC AREA, CLUBHOUSE
95184	CP95184	ALLOW SALE OF ALCOHOLIC BEVERAGES IN A RESTAURANT
95185	CP95185	
95196	CP95196	CUP NEW CELLULAR RADIO REPEATER SITE
95211	CP95211	UNMANNED TELECOMMUNICATIONS SITE
	VA95211	MOD.HEIGHT LIMIT TO PERMIT 150'TALL MONOPOLE
95223	CP95223	LAND DIVISIONS IN SEA, 20 ACRE PARCELS
95229	OT95229	OAK TREE ENCROACHMENT SFR

PROJECT NO	CASE NO	DESCRIPTION
95232	CP95232	WIRELESS TELECOMMUNICATIONS FACILITY IN SEA
95233	CP95233	C.U.P. TO INSTALL A 40' MONOPOLE & CELLULAR SITE
95234	TR47573	(RV) 25 SF LOTS ON 250 AC (10 AC LOTS)
	CP95234	25 SF LOTS ON 250 ACRES(10 ACRE LOTS)
95238	CP95238	MINOR MODIFICATION
		C.U.P. TO INSTALL AN 80' CELLULAR MONOPOLE
95243	CP95243	CELLULAR SITE WITH 6 ANTENNAS ATOP 100' MONOPOLE
95244	CP95244	C.U.P. FOR PERSONAL COMMUNICATION ANTENNAS
96007	SP96007	HR,CW,SCV: AMEND, HR SEE TR51852 & TR44429
	HR96007	HR,CW/SCV AMEND.,HR SEE TR51852 & TR44429
96014	CP96014	REV CP EX "A" FOR RESIDENTIAL LOTS FOR CP96014
		HM & DENSITY CONTROLLED DEV-ASSOC. WITH TR44429
96015	CP96015	TELECOMMUNICATION FACILITY WITH A 100' MONOPOLE
96026	CP96026	30' MONOPOLE FOR WIRELESS COMMUNICATION FACILITY
96031	CP96031	CONTINUE AND EXPAND EXISTING RV PARK
96035	CP96035	COMMUNICATION FACILITY WITH A 150' MONOPOLE
96036	CP96036	COMMUNICATION FACILITY WITH A 40' MONOPOLE
96040	CP96040	ON-SITE SALE OF BEER AND WINE IN RESTAURANT
96043	CP96043	CP HILLSIDE MANAGEMENT FOR TR52155
	TR52155	(TN) 31 SF LOTS/39.77 AC
96044	SP96044	C W: R TO 1 & SCVAP: HM TO U1 ON 162 AC
	CP96044	HILLSIDE MGT AND DENSITY CONTROLLED DEVELOP
	ZC96044	ZC: FROM A-2-1 TO R-1-7,000 ETC.
	TR48086	SEE PROJECT 90115 FOR DETAILS & STATUS
	OT96044	FOUR OAKS TO BE REMOVED
96055	CP96055	UNMANNED COMMUNICATION SITE WITH TWO 20' MONOPOLES
96058	CP96058	COMMUNICATION FACILITY WITH TWO 15-FOOT MONOPOLES
96063	CP96063	COMMUNICATION FACILITY WITH 3 20-FOOT MONOPOLES
96067	CP96067	COMMUNICATION FACILITY WITH 2 20-FOOT MONOPOLES
96073	OT96073	ALLOW ENCROACHMENT OF ONE OAK TREE
96078	CP96078	SENIOR CITIZEN RESIDENCE
96080	HR96080	HIGHWAY REALIGNMENT OF MCBEAN PARKWAY
96091	CP96091	UNMANNED TELECOMMUNICATIONS FACILITY
96095	OT96095	SFR REMOVAL OF ONE OAK TREE
96097	CP96097	SALE OF ALCOHOLIC BEVERAGES OFF-SITE CONSUMPTION
96098	PM24527	(TN) 1 SF LOT + 1 SF LOT/2 DU LEASE PROJ. ON 10 AC
96099	CP96099	CHURCH & ASSOCIATED ACTIVITIES

PROJECT NO	CASE NO	DESCRIPTION
96106	PM24540	(TN) 3 SF LOTS/7.86 AC
96108	VA96108	SIGN EXCEED HEIGHT LIMIT WITHIN AN A-2 ZONE
	CP96108	ALLOW SUBDIVISION DIRECTIONAL SIGN
96113	CP96113	SEA CUP FOR GREEN WASTE COMPOSTING FACILITY
	ZC96113	ZONE CHANGE TO M-2 DP FOR SALVAGE/RECYCLING YARD
96115	PM24567	3 SF LOTS/6.23 ACRES
96116	CP96116	HILLSIDE CUP
	PM22782	3 SF LOTS ON 19.00 ACRES
96122	VA96122	TO ALLOW FREESTANDING ADVERTISING SIGN
96126	CP96126	RESTAURANT WITH FULL BAR
96127	HR96127	HIGHWAY REALIGMENT OF THE OLD ROAD
96129	CP96129	COMMUNICATIONS SITE WITH 4 ANTENNAS ON WATER TANK
96134	CP96134	ON-SITE SALE (BEER & WINE ONLY) REST. & BREW PUB
96135	CP96135	UNMANNED TELECOMMUNICATIONS FACILITY
96136	CP96136	
96138	PM23883	SF 3 LOTS ON 15.02 ACRES
	CP96138	HILLSIDE MANAGEMENT
96140	CP96140	ON SITE SALE BEER & WINE IN RESTAURANT
96144	SM96144I	INTERIM MANAGEMENT PLAN
	SM96144	SURFACE MINING PERMIT & RECLAMATION PLAN
96146	CP96146	TRANSFER AFFORDABLE UNITS TO ANOTHER SITE
96151	CP96151	SELF-STORAGE
96155	CP96155	RECREATION (HUNT) CLUB & SKEET RANGE IN SEA
	OT96155	ENCROACHMENT WITHIN THE PROTECTED ZONE OF 7 OAKS
96160	CP96160	CHURCH FACILITY INCLUDING DAY CARE
96161	CP96161	GUEST RANCH
96174	CP96174	SPECIFIC PLAN, HILLSIDE MANAGEMENT/TR47200 (RV1)
96182	CP96182	WIRELESS TELECOMMUNICATIONS FACILITIES
96190	HR96190	HIGHWAY REALIGNMENT
96192	HR96192	
96200	CP96200	SERVICE STATION OFF-SITE SALE BEER/WINE
96201	VA96201	SIGNS IN EXCESS OF CODE
96204	SM96204	RECLAMATION PLAN FOR EXISTING MINE
97002	CP97002	GRINDING NON-METALLIC ORE
97009	TR36943	(RV1) 198 (197 SF + 1 PARK) LOTS/225 AC
	ZC97009	ZC TO R-1-5,000,R-1-40,000 & O-S
	CP97009	HILLSIDE MANAGEMENT ASSOC WITH TR36943
97013	PM24725	(TN) 2 COMMERCIAL LOTS ON 1.08 AC

PROJECT NO	(E NO	DESCRIPTION
97018	CP97018	CELLULAR TELECOMMUNICATIONS FAC. W/85FT. MONOPOLE
97031	PM24736	(TN) 2 SF LOTS ON 4.94 AC
97035	OT97035	OAK TREE PERMIT
97038	CP97038	ARCADE & ON-SITE ALCOHOL AT RESTAURANT
97041	ZC97041	C-2 TO C-3-DP
	CP97041	CONDITIONAL USE PERMIT FOR (-DP) ZONE
97042	CP97042	WIRELESS TELECOMMUNICATIONS SITE & MICROWAVE DISH
97044	CP97044	SECOND RESIDENTIAL UNIT (GOVT. CODE 65852.2)
97052	PM24756	(TN) 4 SF LOTS/154 AC
97062	CP97062	ALCOHOL SALES FOR OFF-SITE CONSUMPTION
97064	PM24795	2 COMMERCIAL LOTS ON 1.96 ACRES
97074	PM24810	(TN) 4 INDUSTRIAL LOTS/4.99 AC
97078	CP97078	HILLSIDE MGMT & DENSITY CONTROLLED DEVELOPMENT CUP
	OT97078	REMOVE 2 OAK TREES - 21 REMAINING
	TR52194	(TN) 134 (126 SF, 7 OS, 1 PF) LOTS ON 176.5 AC
97079	OT97079	REMOVE 1 OAK TREE
	TR52193	62 SF EQUESTRIAN LOTS ON 80.7 ACRES
	CP97079	HILLSIDE MGMT. & DENSITY CONTROLLED DEV. CUP
97080	OT97080	REMOVE 48 TREES - 15 REMAIN
	TR52192	(TN) 147 (141 SF+5 OS) LOTS/203.8 AC
	CP97080	HILLSIDE MGMT. & DENSITY CONTROLLED DEV. CUP
97082	PM24798	(TN) 5 INDUSTRIAL LOTS/2.4 AC
97084	CP97084	ONSITE SALE OF ALCOHOLIC BEVERAGES
97087	CP97087	SENIOR CITIZENS RESIDENCE IN SEA
97088	CP97088	DENSITY CONTROLLED DEV. AND HM FOR TR52302
	TR52302	11 SF LOTS ON 22.39 AC
97098	CP97098	BEER AND WINE (ON-SITE) AT RESTAURANT
97109	CP97109	BEER/WINE, OFF-SITE, GAS STATION
97114	PK97114	APPEAL OF H.O. APPROVAL OF ARCADE/REST. PARK. PMT.
97119	PM24801	(TN) 2 COMM. LOTS/1.515 AC
97120	CP97120	GAS STATION/MINI MARKET IN CPD ZONE
97124	CP97124	SALE OF BEER & WINE, FOR OFF-SITE
97125	CP97125	BEER/WINE AT EXISTING RESTAURANT
97128	OT97128	REMOVE 8 OAK TREES AND 3 ENCROACHMENTS.24 REPLACED
		TEMPORARY TRAILER SALES OFFICE
97131	CP97131	139 ROOM HOTEL

1)JECT NO	CASE NO	DESCRIPTION
97140	CP97140	CONTINUE EXISTING WATER BUSINESS/CARETAKER RESIDEN
97141	CP97141	CHURCH & SCHOOL FOR GRADES K THROUGH 8
97146	PM24913	(TN) 3 INDUSTRICAL LOTS/13.5 AC
97148	TR46353	(RV1) 2 MF LOTS/110 NC/ 65 AC
	CP98152	HM AND RPD FOR 110 NC PROJECT/TR46353
97151	CP97151	HOLLYWOOD INTERNATIONAL FILM ACADEMY - VOCATIONAL
97159	NR97159	CONTINUE EXISTING TRAILER & RV PARK
97161	VA97161	VARIANCE FROM SIGN ORDINANCE TO ALLOW CONSTRUCTION
97168	PM24917	(TN) 2 COMMERCIAL LOTS/1.86 ACRES
97171	CP97171	KEEPING AND MAINTAINING OF WILD ANIMALS
97172	CP97172	COMMERCIAL SERVICE/RETAIL BUSINESS
	ZC97172	A-1-7,000 and C3 to C3-DP
97182	CP97182	SENIOR CITIZEN RESIDENCE
97183	CP97183	BEER & WINE IN A RESTAURANT
97195	CP97195	CUP.SEA CONSTRUCTION OF FOUR-LANE BRIDGE
	OT97195	REMOVE TWO OF SIX OAK TREES
97198	CP97198	MOBILEHOME FOR CARETAKER
97200	AP97200	THREE SPIDER MONKEYS
97204	CP97204	DENSITY CONTROLLED DEVELOPMENT/HM/SEA
	OT97204	59 OAK TREES REMOVED; 25 FOR ENCROACHMENT
	TR43896	(RV2) 289 (280 SF,1 PK, 6 OS, 2 R)LOTS/247.4 AC
98002	TR34385	(RV)1 MF LOT/54 NEW SF CONDOS/5.41 AC
	CP98002	CONFORMANCE WITH DP ZONE/54 NEW SF CONDOS/5.41 AC
	OT98002	ENCROACHMENT INTO DRIPLINES OF 3 TREES
	ZC98002	ELIMINATE UNILATERAL CONTRACT
98003	CP98003	CONTINUED OPERATION OF RECREATIONAL TRAILER PARK
	TU98003	TEMPORARY USE PERMIT FOR AMUSEMENT PARK
98004	CP98004	SINGLE-FAMILY RESIDENCE IN ZONE R-R-1
98006	CP98006	BEER & WINE AT EXISTING RESTAURANT
98008	ZC98008	FROM A-2-5 TO RPD, C2-DP & OS
	PK98008	TO ALLOW OFF-SITE PARKING
	SP98008	CW & SCV: AMEND SEA & CHANGE LAND USE CATEGORIES
	CP98008	CUP FOR RPD, DP & SEA
	TR52455	(TN) 1248 SF; 1297 CONDOS/APTS, C & OS ON 966 AC
	OT98008	REMOVAL OF 13 OAK TREES
98012	CP98012	127 ROOM MOTEL

PROJECT NO	CASE NO	DESCRIPTION
98013	CP98013	HM, WASTEWATER TREATMENT PLANT FOR TR48786
	TR48786	(RV1) 66 (65 SF, 1 PF) LOTS/ 157 AC
98016	CP98016	RES IN COMM ZONE, CHILD CARE FACILITIES
	PM25058	(TN) 1 MF/23 RES BLDGS/330 APRT+ 2 COMM/20.7 AC
98023	CP98023	MPD INDUSTRIAL DEVELOPMENT/5 NC/3.3 AC (PM 25035)
	PM25035	(TN) 1 INDUSTRIAL LOT/5 NC (INDUSTRIAL)/3.29 AC
98024	OT98024	REMOVAL OF 1 OAK TREE
98026	CP98026	CARETAKER'S MOBILEHOME
98031	OT98031	ENCROACH ON DRIP LINE OF OAK TREE
98034	TR52584	(TN) 209SF, 1GOLF, 2 OS, 2 ST) LOTS/432 ACRES
	CP98034	HM, DENSITY CONTROLLED CUP FOR TR52584
	OT98034	REMOVAL OF 17 OAK TREES AND 33 ENCROACHMENTS
98037	CP98037	SENIOR CITIZEN'S RESIDENCE
98041	CP98041	HELISTOP FOR EMERGENCY ACCESS TO PACOIMA DAM
98046	CP98046	CUP FOR HILLSIDE DEVELOPMENT ON 90 SF LOTS
	TR43589	94 (91 SF+2 OS+1 PF) LOTS/75.72 ACRES
	ZC98046	ZC FOR 90 SF LOTS FOR HILLSIDE DEVELOPMENT
98047	CP98047	CONDITIONAL USE PERMIT/HILLSIDE&SPECIFIC PLAN
	TR51852	(REAC)1629(1548SF+21 MF(586 DU)+6C+7OS)LOTS/860 AC
	ZC98047	ZONE CHANGE FROM A-2-2 TO SPECIFIC PLAN
	SP98047	CW & SCV: AMEND NORTHLAKE SPECIFIC PLAN
	PL98047	AMEND NORTHLAKE SPECIFIC PLAN
98052	TR33608	(RV)140SF +126NC +567 APTS/111.6 AC
	ZC98052	ZONE CHANGE
	OT98052	TO REMOVE 36 TREES
	CP98052	RPD DEVELOPMENT
98053	CP98053	SPORTS COMPLEX OF BASEBALL FIELDS
98055	CP98055	WIRELESS TELECOMMUNICATION FACILITY (CONT'D. USE)
98057	CP98057	SENIOR CITIZEN RESIDENCE
	VA98057	EXCEED 1200 SQ.FT. FOR SEN. CITIZEN RESIDENCE
98064	NR98064	CONTINUE EXISTING MOBILEHOME PARK
98068	CP98068	PRIVATE RECREATIONAL FACILITY/PAINTBALL, ETC
98071	TR52535	(TN) 200 (199 SF+ 1 OS) Lots/434.3 ac
	CP98071	80 SFR (2 CUP'S; HILLSIDE MGMT/DENSITY CONTROLLED
98072	CP98072	TRUCK STORAGE & OFFICE SPACE IN M1-DP
98078	CP98078	WIRELESS TELECOMMUNICATION ANTENNAS
98080	CP98080	UNMANNED WIRELESS TELECOMMUNICATION FACILITY
98083	CP98083	WIRELESS TELECOMMUNICATIONS ANTENNAS
98088	TR52637	(TN) 10 SF LOTS/13.3 AC.
98092	CP98092	SENIOR CITIZEN RESIDENCE
98094	OT98094	REMOVAL OF 5 OAK TREES ON LOT 9 OF TR. 33622
98095	OT98095	REMOVE ONE OAK TREE ON LOT 50 OF TR. 33622
98096	OT98096	REMOVE ONE OAK TREE ON LOT 11 OF TR. 33622
98098	CP98098	100-BED GRP HOME/DEVELOPMENTALLY DISABLED
98106	CP98106	WIRELESS TELECOMMUNICATIONS FACILITY
98109	PM25140	(TN) 4 SF LOTS/2.5 AC
98110	CP98110	CONSTRUCT AN UNMANNED REGENERATION FACILITY
98111	CP98111	SERVICE STATION WITH OFF-SITE SALE OF ALCOHOL
98113	CP98113	104 ROOM EXTENDED STAY HOTEL & RESTAURANT
98117	CP98117	WIRELESS TELECOMMUNICATIONS FACILITY
98121	CP98121	GENERAL RETREAT PURPOSES WITH DORMITORY
98123	CP98123	89 SF DWELLINGS
	OT98123	30 TREES REMOVED; 9 ENCROACHMENTS
	TR52652	(TN) 69 SFD (R1)+20 SFD (RPD) & 3 OS LOTS/58.3 AC
98132	CP98132	25' HIGH WIRELESS TELECOMMUNICATIONS FACILITY
98133	CP98133	63 SF DETACHED CONDOMINIUMS
	TR52608	(TN) 63 SF DETACHED CONDOS ON 1 LOT & 1 OPEN SPARE
98135	CP98135	ON-SITE BEER AND WINE SALES
98136	CP98136	DRUG/VARIETY CTR WITH BEVERAGE DEPT INCLD BEER/WIN
98139	CP98139	NEW BLDG FOR RELIGIOUS RETREAT
98143	SP98143	HWY PLAN: RECLASS THE OLD ROAD
98151	OT98151	ENCROACHMENT OF TWO OAK TREES
98154	PM25349	(TN) 2 COMMERCIAL LOTS ON 1.51 ACRES
98155	OT98155	OAK TREE PERMIT
	TR44471	(RV1) TENT. MAP (376 SF UNITS)
	CP98155	DENSITY CONTROL DEV & HILLSIDE MANAGEMENT
98160	CP98160	CUP FOR CARETAKER'S MOBILE HOME
98164	CP98164	TO ALLOW ZERO LOT LINES IN VALENCIA COMMERCE CNTR.
98170	CP98170	HM, SEA, RPD FOR REVISED TR47657
	TR47657	(RV1) 421 SF, 13MF/115 NC, 1 C,4OS, LOTS/163 AC
98173	ZC98173	ZONE CHANGE FOR HILLSIDE MANAGEMENT
	CP98173	CUP FOR HILLSIDE MANAGEMENT
	LP98173	LOCAL PLAN AMENDMENT FOR HILLSIDE MANAGEMENT
	TR52729	(TN) 70 SF/80 AC
98176	ZC98176	ZC: A-2-1 TO R-1-5,000
	TR52790	(TN) 75 SF LOTS/53.3 AC
	CP98176	HILLSIDE CUP FOR TR52790
	LP98176	SCV: HM AND U3 TO U1

PROJECT NO	CASE NO	DESCRIPTION
98178	VA98178	MOBILE HOME PARK
	NR98178	MOBILE HOME PARK EXPANSION
98179	CP98179	ARCHERY CENTER WITH INDOOR/OUTDOOR RANGES
98182	DA98182	DEVELOPMENT AGREEMENT FOR STEVENSON RANCH
	HR98182	HIGHWAY REALIGNMENT OF PICO CANYON ROAD
	ZC98182	Z C FROM A-2-2 & A-2-5 TO SPECIFIC PLAN
	SP98182	PLAN AMENDMENT & SPECIFIC PLAN FOR 3,532 DU'S
98190	HR98190	REALIGNMENT OF RIDGE ROUTE ROAD
99002	CP99002	CUP FOR PROPOSED TRANSMITTAL ANTENNA FOR CAMPUS
99003	TR52807	(TN) 5 SF LOTS/5.4 ACRES
	CP99003	CUP FOR HILLSIDE MANAGEMENT
99013	CP99013	MPD ZONING REQUIREMENTS FOR PM25425
	PM25425	(TN) 1 INDUS. LOT/4 NEW CONDOS/2.65 AC
99014	CP99014	HILLSIDE MANAGEMENT FOR TR 52883
	TR52883	(TN) 71 SF LOTS/148 AC
99016	CP99016	MAINTAIN EXISTING SENIOR CITIZEN'S RESIDENCE
99020	TR52829	(TN) 99 (95 SF + 1 OS+1 PARK+2 LANDSCAPE) LOTS
	ZC99020	ZC: A-2-2 TO A-2-1 & R-1-7000 ON 14.7 AC
	CP99020	HM & DEN CONTRL DEV RE: TR52829
99024	CP99024	SALE OF BEER/WINE FOR PROPOSED RESTAURANT
99027	CP99027	SENIOR CITIZEN'S RESIDENCE
99030	OT99030	1 OAK TREE; SLIGHT ENCROACHMENT IN PROTECTED ZONE
99031	CP99031	SENIOR CITIZEN RESIDENCE; 1,300 SQ. FOOT
99033	CP99033	CONT'D. USE OF EXISTING WILD ANIMAL FACILITY
99040	CP99040	TO UTILIZE PROPERTY AS A MOVIE RANCH
	ZC99040	ZONE CHANGE FROM A-1-1 TO A-2-1-U/C
99044	CP99044	TO INSTALL ROOF MOUNTED WIRELESS TELECOMMUNICATION
99045	CP99045	PRIVATE RECREATIONAL FACILITY FOR PAINTBALL
99048	CP99048	CUP FOR TENT. TR. MAP CONSISTING OF 63 LOTS
	OT99048	13 OAK TREES TO REMOVE AND 26 TO SAVE
	PA99048	COUNTYWIDE PLAN AMEND. FOR 63 LOTS
	TR52475	(TN) 46(44 SF, 2 OS) LOTS/70.4 AC
	ZC99048	ZONE CHANGE FOR TRACT MAP OF 63 LOTS
99053	CP99053	TO ALLOW A FOUR SIDED SUBDIVISION DIR. SIGN
	VA99053	VARIANCE TO ALLOW A FOUR SIDED SUBDIV. DIR. SIGN
99056	OT99056	ONE OAK TREE REMOVED
9066	PM24909	(TN) 4 SF LOTS/ 19.86 ACRES

PROJECT NO	CASE NO	DESCRIPTION
99071	CP99071	A ROOF MOUNTED WIRELESS TELECOMMUNICATIONS FAC.
99072	OT99072	REMOVAL OF 10 OAK TREES & 6 ENCROACH
99074	TR52882	(TN) 83(81 SF, 1 PF, 1 OS) LOTS/198.7 AC
	CP99074	HILLSIDE MANAGEMENT FOR TR 52882
99084	SP99084	HWY PLAN: RECLASS CROWN VALLEY RD
99100	PM24912	(TN) 3 SF LOTS/66 AC
99101	TR52938	(TN) (194 NC+2 OS) LOTS/28.2 AC
	CP99101	TO ENSURE COMPLIANCE WITH SP 1 FOR TR 52938
99106	PM25536	(TN) 3 SF LOTS/30 AC
99116	CP99116	FIBER OPTIC REGENERATION SITE
99117	CP99117	
99119	ZC99119	A-1-40K TO M-1-DP
	CP99119	CUP FOR EQUIP. SALES & DISPLAY
99122	CP99122	GRADING PERMIT FOR REMOVAL OFORGANIC MATERIAL
99128	CP99128	TO OPERATE AND MAINTAIN MOTION PICTURE SETS
99129	OT99129	REMOVAL OF 3 OAK TREES OUT OF 50
	TR52785	(TN) 26 SF LOTS/41.4 AC
	CP99129	HILLSIDE MGMT. & DENSITY CONTROLLED DEVELOPMENT
99134	OT99134	ENCROACHMENT & PRUNING OF ONE OAK TREE IN C-3
99137	PM25485	(TN) 2 INDUSTRIAL LOTS/1.14 AC
99143	CP99143	WIRELESS TELECOMMUNICATIONS FACILITY
99144	CP99144	SALE OF ALCOHOLIC BEVERAGE FOR ON-SITE CONSUMPTION
99153	PM25705	(TN) 2 COMMERCIAL LOTS/4.65 AC
99155	CP99155	PROPOSED OFFICE/TECHNICAL/WAREHOUSE
99157	PM25697	(TN) 2 INDUSTRIAL LOTS/ 1.49 AC
99169	OT99169	ENCROACHMENT INTO ZONE OF 8 OAK TREES
99173	AP99173	PERMIT FOR 8 DOGS
99177	HR99177	NEW ALIGNMENT UTILIZES THE EXISTING TRAVELED WAY
99190	PM25687	(TN) 3 SF Lots/ 176 Acres
99204	HR99204	Highway Realignment
99206	CP99206	CELLULAR TELECOMMUNICATIONS FACILITY
99213	PM25852	(TN) 4 SF LOTS/1.1 AC
99215	TR43766	(REAC) 39 SF LOTS/79.7 AC
99224	CP99224	WIRELESS TELECOMMUNICATION FACILITY
99225	NR99225	OFF-SALE BEER & WINE FOR CONVENIENCE MARKET
	CP99225	PERMIT FOR BEER & WINE & RENEWAL OF CARETAKER'S RE
99226	TR52990	(TN) 63 SF LOTS/80 ACRES
	CP99226	63 SF LOTS/80 ACRES

PROJECT NO	C E NO	DESCRIPTION	I JECT NO	CASE NO	DESCRIPTION
99229	OT99229	ELEVEN TREES FOR ENCROACHMENT			
99232	OT99232	ONE OAK TREE TRIMMED			
99239	CP99239	HILLSIDE MGT & DENSITY CONTROLLED DEVELOP			
	OT99239	REMOVE 56 OAK TREES RE TR 53138			
	TR53138	(TN)429(388SF+25 OS+14ST+1HLPAD+1SHRF)LOTS/230ACS			
99245	CP99245	WIRELESS TELECOMMUNICATION FACILITY			
99247	ZC99247	ZC: A-2-2 TO CPD/C-M-DP			
	LP99247	SCV AP: FROM U2 TO C			
99251	CP99251	SENIOR CITIZEN RESIDENCE			
99252	CP99252	WIRELESS TELECOMMUNICATIION FACILITY			
99265	HR99265	HIGHWAY REALIGNMENT			
TU03-020	TU03-020	COUNTRY FAIR			

APPENDIX 4.1

Geotechnical Report(s)

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

GEOLOGIC AND GEOTECHNICAL REPORT

Review of Tentative Tract Map (Dated February 25, 2003)

Tentative Tract 53425
River Park
City of Santa Clarita, California

VOLUME I OF II

Prepared for:

Newhall Land
23823 West Valencia Boulevard
Valencia, California 91355

Job No: 03-1571-4
Dated April 4, 2003

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[1] Bucket-auger boring logs from report dated 3/3/00, prepared for Castaic Lake Water Agency regarding Road Alignment and Development.

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ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

April 4, 2003 Job No: 03-1571-4

Newhall Land
23823 West Valencia Boulevard
Valencia, California 91355

Attention: Mr. Glenn Adamick

Subject: **GEOLOGIC AND GEOTECHNICAL REPORT**
Review of Tentative Tract Map (Dated February 25, 2003)

Project: Tentative Tract 53425
River Park
City of Santa Clarita, California

References: See at end of text

Gentlemen:

This report presents our opinions on the existing geologic and geotechnical conditions on the above-referenced tentative tract and their effects on the proposed development.

1.0 SCOPE OF INVESTIGATION

This investigation included the following:

1. Review of previous reports by this firm in the vicinity of the subject site.

2. Review of reports by others in the vicinity of the subject project (see References).

3. Review of Published reports and maps listed in the **References** section.

4. Review of the 1999 Munger Map Book, California-Alaska Oil & Gas Field.

5. Review of Alquist-Priolo Fault Rupture Hazard Zones in California (CDCDMG Special Publication 42).

6. Review of the following aerial photographs:

YEAR	PHOTO	SCALE	AGENCY
1928	C300: E-173, 212, 213,	1" = 1700'±	Fairchild
11/4/52	AXJ: 3K-95, 3K-96	1" = 1600'±	USDA
11/27/63	1, 2, 3, 23, 24	1" = 500'±	Horizon Survey
8/25/80	480-163, -164	1" = 4000'±	USDA
3/8/81	PW 11484-4 Color	1" = 2,800'±	Pacific Western Aerial Surveys
10/13/81	14, 15	1" = 1000'±	Sikand Engineering
7/3/85	WAC-85CA 16-68, 16-69	1" = 1100'±	WAC Corp
6/1/92	2, 3	1" = 900'±	Ampak Engineering
11/20/98	1-1, 1-2, 2-1, thru 2-5	1" = 770'±	Robert Lung & Assoc.

7. Coordination with the Supervising Civil Engineer, Psomas.

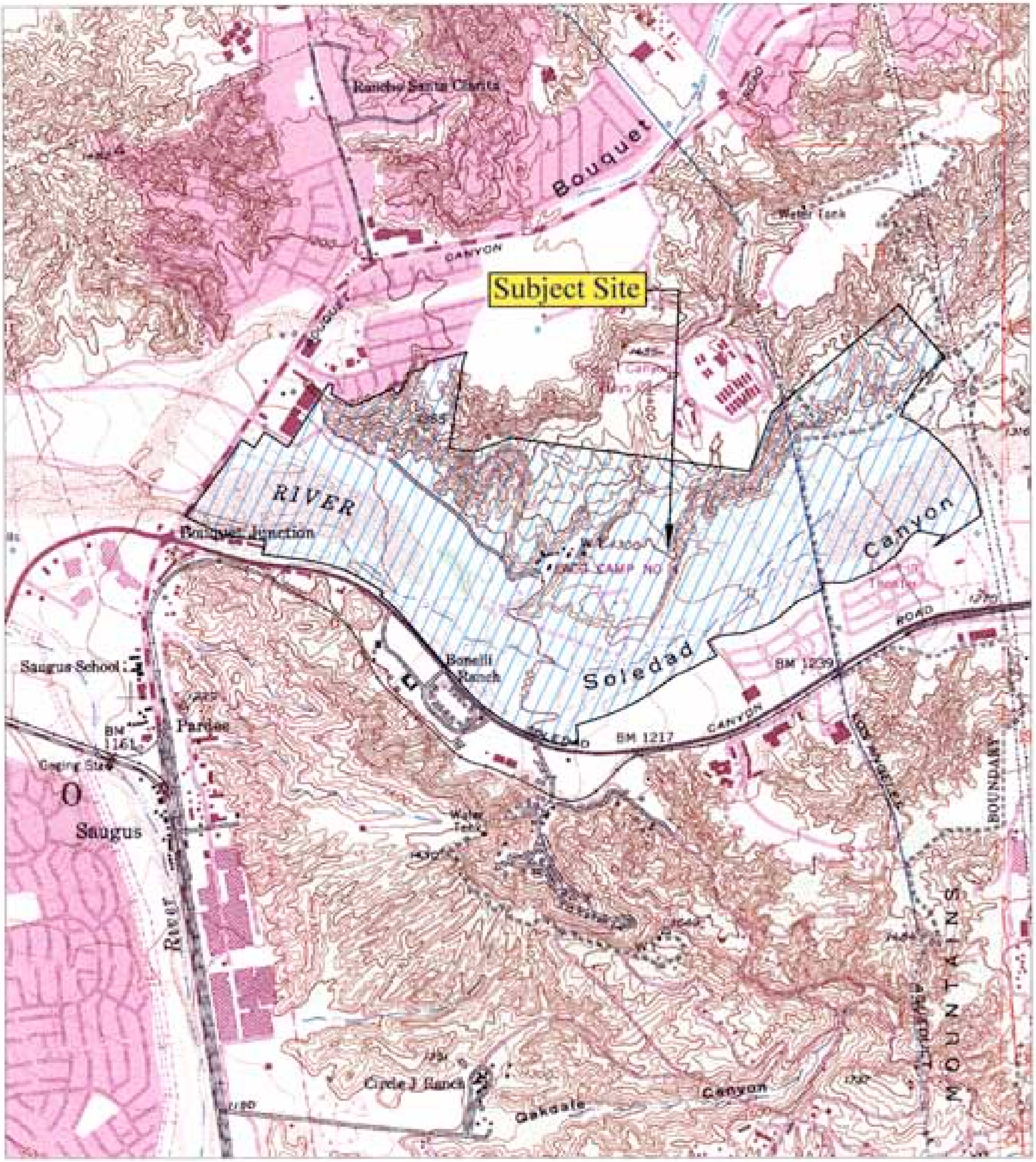
8. Review of the site topography and the vesting tentative tract map design, dated February 25, 2003, provided to our office in computerized format (AutoCAD), prepared by Psomas. This computerized map was used as the base for our 300-scale Geologic/Geotechnical Map, **Sheet 1**, and 100-scale Geologic/Geotechnical map **Sheets 2-4**). We make no representations regarding the accuracy of the base map.

9. Geologic field mapping of the site.

10. Coordination with Underground Service Alert.

11. Excavation, sampling and logging of 9 hollow-stem-auger borings drilled to a maximum depth of 55 feet, 10 rotary-wash borings drilled to a maximum depth of 51 feet, and 13 bucket-auger borings drilled to a maximum depth of 115 feet.

12. Excavation, sampling and logging of 118 backhoe trenches excavated to a maximum depth of 15 feet.



Source: U.S. Geological Survey Newhall Quadrangle, Dated 1952, Photorevised 1988

Approximate Scale: 1" = 2,000'

NOTE: THIS IS NOT A SURVEY OF THE PROPERTY

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ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

LOCATION MAP

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Date: 4/4/03

13. Performed 37 Cone Penetrometer Test (CPT) soundings within the alluvial areas.

14. Laboratory testing of selected bulk and relatively undisturbed samples obtained in our subsurface investigations. Testing included dry density and moisture content of in-situ soils, percent minus #200 sieve, grain-size analysis including hydrometer, Atterberg Limits, compaction, direct shear, hydroconsolidation, expansion index, sulphates, chlorides, pH and resistivity.

15. Evaluation of potential seismic ground motions at the site utilizing computer programs by Thomas Blake in accordance with current State Guidelines.

16. Geotechnical analysis of potential liquefaction, lateral spreading and seismic settlements based on our subsurface investigations, laboratory testing and potential seismic ground motion estimates.

17. Assessment of recommended grading removal depths based on weak soils, seismic settlements and proposed fill heights above the exiting ground surface.

18. Preparation of 31 geologic cross sections illustrating anticipated conditions for the proposed cut, fill and natural slopes.

19. Stability analyses of proposed cut-slopes, fill slopes and natural slopes on the site.

20. Preparation of Geologic/Geotechnical Maps, a Geologic/Geotechnical Removal Map, Location Map, drill hole logs, trench logs and pertinent figures.

21. Preparation of this report summarizing the results of our investigations and our conclusions and recommendations for the proposed development.

2.0 BACKGROUND

Previous engineering geology and geotechnical investigations on the site include studies by Huntingdon Engineering & Environmental, Inc./Schaefer Dixon Associates and Southwestern Engineering Geology. See references at the end of text for reviewed reports. Huntingdon/Schaefer Dixon prepared reports for Kennedy/Jenks Consultants/Castaic Lake Water Agency (CLWA) and provided the geologic and geotechnical observation and testing for the grading and construction of the Rio Vista Water Treatment Facility which included grading for the raw and treated water lines located within the Newhall Ranch Road alignment. The performed grading was also intended to accommodate the future extension of Newhall Ranch Road and the associated cut and fill slopes from approximately 600 feet east of the intersection of Newhall Ranch Road and Bouquet Canyon Road to their facility to the east in which the pipelines are located. The rough grading was performed between March 1993 and December 1994. Southwest Engineering Geology prepared a general feasibility report evaluating the site geologic conditions. Where appropriate, their data was incorporated into our evaluation.

Our investigation for the site was performed over a period of approximately 4 years.

3.0 SITE DESCRIPTION

The River Park project is located immediately northeast of Bouquet Junction in the city of Santa Clarita. The site consists of 692 acres and is bounded by Soledad Canyon Road, Tentative Tract Map 20838 and the East Greenbrier and West Greenbrier mobile home developments in the south, the Los Angeles Department of Water and Power Easement (transmission lines) on the east, Bouquet Square shopping mall, Tract No. 33948 and Bouquet Canyon Road to the west and the Castaic Lake Water Agency (CLWA) property and developed Tracts 27994 and 26882 along the north. The southern portion of the property encompasses the Santa Clara River (see **Location Map)** and includes the main channel and floodplain. The northern portion of the property includes the elevated areas characterized by southwest to southeast trending spur ridges that descend from plateaus elevated up to about 350 feet above the river. Elevations on the site range from approximately 1155 feet along the Santa Clara River to 1490 feet along the northeastern corner of the site. Slopes range from gentle to moderately steep with the steepest slopes existing in the side canyons and swale areas. Details of the site topography are illustrated on the attached **Geologic/Geotechnical Maps (Sheets 1 through 4).** Although much of the property appears to remain in a natural state, the property is traversed by a number of large utilities including the Los Angeles Aqueduct (Los Angeles Department of Water and Power), large water lines of the CLWA that lead to their facility and various water wells. Previous grading on the site include significant grading performed for the construction of the CLWA Rio Vista Water Treatment Plant including raw and treated water pipelines. Minor grading has also been performed for the various access roads that traverse the site including the stockpiling of artificial fill at various locations. A construction equipment yard including existing buildings is present within the canyon located southwesterly of the CLWA facility. The lowland areas have been used in the past for farming. Oil exploration and production occurred at isolated areas on the site.

4.0 PROPOSED DEVELOPMENT

The Tentative Tract Map for this site includes 524 Lots for residences, recreational facilities and open space and future bridge lots including the extension of Newhall Ranch Road from Bouquet Canyon Road to Soledad Canyon Road. A portion of proposed Newhall Ranch Road traverses a portion of the CLWA property at the north central portion of the property just west of the DWP aqueduct. Bank stabilization and slope toe protection are proposed at various locations at the southerly portion of the development. It is anticipated that mass grading by cut and fill techniques will be used to create level building pads at a variety of grades between the Santa Clara River and the crest of the ascending ridges. Infrastructure for the development is anticipated to include roadways and flood control channels.

5.0 GEOLOGIC SETTING

The site is situated in the western Transverse Ranges geomorphic province in the western portion of the Soledad Basin just north of the San Gabriel fault zone. Numerous east-west trending folds and reverse faults that are the result of on-going compressional tectonics characterize this region. The Soledad Basin is roughly a rectangular-shaped southwesterly plunging synclinal structure that extends between the San Gabriel fault in the Newhall-Saugus area and the San Andreas Fault near Palmdale. A thick accumulation of Cenozoic sedimentary rocks has accumulated in this structural/depositional basin and has subsequently been faulted and folded by repeated tectonic deformation.

Much of the elevated portion of the River Park property is underlain by accumulations of ancient river channel deposits deposited on a series of successively lower benches cut in the underlying Saugus Formation bedrock by the ancestral Santa Clara River. These depositional terrace deposits exhibit crude horizontal stratification. Quaternary alluvium covers the valley floors.

The geologic structure of the Saugus Formation bedrock below much of the River Park property has been uplifted and deformed by past tectonic forces into an open anticline that trends northwest across the northeastern portion of the site. The southern limb of the anticline, the Saugus Formation bedrock dips toward the south at angles ranging from 6 to 25 degrees and dips towards the north at angles ranging from 8 to 56 degrees along the northern limb. The structure is more complicated at the northeast corner of the site where relatively steeply north dipping bedrock has been deformed by a northwest trending fault. The San Gabriel Fault is located offsite towards the south. For more detailed discussion on the fault, please see **Section 8 (Seismic Considerations)** of this report.

The River Park property has been affected by slope movements that range in size from small debris flows and rockfalls to large, deep-seated failures. Fourteen (14) landslides have been mapped on the site.

6.0 FIELD EXPLORATIONS

6.1 Surface Mapping

For this report, surface geologic mapping in conjunction with aerial photo interpretations was undertaken by personnel from Allan E. Seward Engineering Geology Inc. (AESEGI) using the proposed 100-scale Tentative Map as the base map. We also reviewed all our previous geologic/geotechnical data and reports by others in the vicinity of the project.

6.2 Subsurface Investigations

Our subsurface explorations included CPT soundings, and logging of rotary-wash, hollow-stem-auger and bucket-auger drill holes and trenches. Valley Well Drilling performed the rotary-wash and hollow-stem-auger drill holes. Tri-Valley Drilling excavated the bucket-auger drill holes, D.E. Eddings excavated the trenches, and Holguin, Fahn and Associates performed the CPT soundings. The drill holes and trenches were logged and sampled by AESEGI personnel. Copies of all of our drill holes and trench logs are presented in **Appendix A**. The locations of the drill holes, trenches and CPTs are shown on the **Geologic/Geotechnical Maps (Sheets 1 through 4 of 4)**.

The drill hole logs included in **Appendix A** represent our interpretation of field data prepared for each boring by our geologic/engineering staff at the time of drilling, along with refinements based on inspection and laboratory test results. Unit boundaries shown in the graphic log column of our rotary-wash and hollow-stem-auger drill hole logs are approximate and may represent gradual transitions.

6.3 Sampling Procedures

California-Drive (relatively undisturbed ring samples) and Standard Penetration Test (SPT) samples were obtained in the exploratory drill holes at various depths (see logs in **Appendix A**). Recovered soil samples were sealed in plastic containers and brought to our laboratory for further classification and testing.

Bulk (disturbed) samples of the near surface soils and rock were obtained from cuttings developed during excavation of the exploratory drill holes and trenches. The bulk samples were collected for classification and testing purposes and represent a mixture of soils within the noted depths.

7.0 GENERALIZED GEOLOGIC/GEOTECHNICAL SUBSURFACE CONDITIONS AND SOIL PROPERTIES

7.1 Laboratory Program

After visual and tactile classification in the field, the soil samples were brought to our laboratory. The soil classifications were checked in accordance with the Unified Soils Classification System. The field logs were reviewed to assess which samples would be analyzed or tested further. The results of the field investigation and the laboratory tests were used as the basis for our analyses and recommendations presented in this report. Laboratory test results are presented in **Appendix B**.

7.2 Geologic Units

A general description of geologic units, including bedrock, terrace deposits, alluvium, landslides, and artificial fill are presented below. Distribution of these units is shown on the Geologic/Geotechnical maps.

7.2.1 Saugus Formation (TQs)

The bedrock encountered consists of sedimentary rocks of the late Pliocene to Pleistocene Saugus Formation. This section contains fluvial and transitional lithologies of the lower Saugus Formation, including light-gray sandstone and conglomerate, greenish-gray siltstone, silty sandstone and reddish-brown and brown sandy mudstone and mudstone. Low strength clay beds can be present within the reddish-brown mudstone units and are generally the result of original deposition. These clay layers were encountered during our subsurface exploration for the site. The Saugus Formation is typically moderately indurated.

7.2.2 Quaternary Terrace Deposits (Qt)

Remnants of fluvial terrace deposits mantle large portions of the study area (see **Geologic/Geotechnical Maps**). These deposits consist primarily of poorly to well-bedded, light-gray to yellowish-orange sand, conglomerate and sandy silts. Large boulders occur throughout the terrace deposits but are generally concentrated at the basal contact. These deposits are typically friable to poorly indurated and are typically weathered to a depth of 8 feet.

7.2.3 Quaternary Alluvium (Qal)

Recent river-channel deposits are present in the lower elevations of the property, largely underlying the immediate modern drainage and major tributaries of the Santa Clara River (see **Geologic/Geotechnical Maps**). Based on the CPT and boring data obtained for the project, the alluvial deposits consist of interbeds of sandy, silty and clayey soils with limited inclusions of coarser soils. The surficial 20 feet of silty and clayey throughout the tract hard lenses of silty and clayey soils, apparently desiccated by the local dry climate. The conditions of the alluvial soils present in each of Planning Areas A1, A2, C and D, in the Remainder Parcel east of Area C and in the large side canyon designated as Open Space Lot No. 367 (Proposed Park Site) are summarized below.

Planning Area A1 is located south of Newhall Ranch Road, north of the Santa Clara River and west of the large side canyon of which is proposed as a park site (Lot 367). Alluvial areas of Planning Area A1 were explored by rotary wash borings RW-2, RW-3, RW-4, RW-5 and RW-7 by CPT Nos. 5, 6, 7, 8, 10, 12, 14, 15, 16, 17, 18, 19 and 20. The CPT and drive sampler penetration resistances exhibited by the alluvial soils of Area A1 were classified using the criteria set forth by NAVFAC (1982). The granular alluvial soils of Area A1 were found to predominantly range from medium to very dense with lenses of loose granular soils from the recommended removal depths to the maximum depth explored, 60 feet. Similarly, the silty and clayey alluvial soils of Area A1 were found to predominantly range from medium to hard with very soft to soft clay and silt lenses from the recommended removal depths to the maximum depth explored, 60 feet. CPT-17 encountered material classified as organic at 26.1 feet depth.

The alluvial areas in Planning Area A1 include portions of Lot Nos. 5-57, 61-64, 84-101, 103-130, 134-138, 146-148, 150-167, 226, Recreation Lot 149, Open Space Lot Nos. 231, 233-242, the 20-foot to 35-foot wide Trail and Joint Use Easement and two Water Quality Basin Easements near CPT-20 and CPT-9, as illustrated on the **Geologic/ Geotechnical Map**. It is useful to note that a large temporary stockpile of earth fill occupied much of the alluvial area within Area A1. The borings and CPTs were typically located outside the stockpile area. To the extent that the stockpile preloaded the area that it covered, the soil conditions within the areas preloaded by the stockpile may be better than indicated by the borings and CPTs.

B

Planning Area A2 is located east of the proposed Park Site (Lot 367), south of Newhall Ranch Road and north and west of the Santa Clara River. The alluvial areas of Area A2 include Lot Nos. 325-352, Open Space Lot Nos. 357-362 and adjacent portions of Santa Clarita Parkway. The alluvial areas of Planning Area A2 were explored by CPT Nos. 21, 22, 23, 24, 25, 27, 28, 29 and 30 and boring RW-1. The granular alluvial soils of Area A2 below the recommended removal depths were found to predominantly range from dense to very dense with lenses of loose to medium sandy soils. The alluvial silts and clays of Area A2 below recommended removal depths were similarly evaluated and found to predominantly range from stiff to hard with lenses of very soft to medium clays and silts to the maximum depth explored, 51 feet.

Areas located easterly of the Los Angeles Aqueduct include Area C (Lots 508-510), proposed Newhall Ranch Road, future street area, bridge lot (Lot 521) and various open space lots (Lots 503-507and 521). The adjoining Remainder Parcel is not part of the tentative tract map. Alluvial areas easterly of the Los Angeles Aqueduct including the adjacent Remainder Parcel were explored by CPTs 31, 32, 33, 34, 35, 36 and 37 and borings HS-1, RW-9 and RW-10 (see **Geologic/Geotechnical Map**). The alluvial granular soils below recommended removal depths for this portion of the tract were found to range from medium to very dense. The alluvial silts and clays below the recommended removal depths for this portion of the tract were found to be very stiff to hard to the maximum depth explored, 51 feet.

Planning Area D Lots 513 and 514) and the proposed Commercial Area (518 and 519) and the associated open space lots 516 and 517 are located at the westerly portion of the site, east and south of the existing Bouquet Center commercial mall. Planning Area D was explored by CPT Nos. 13 and 26 and boring RW-6 (see **Geologic/Geotechnical Map**). The alluvial granular soils below the recommended removal depths for Area D were found to be predominantly dense to very dense with lenses of medium sands to the maximum depth explored, 51 feet. The alluvial silts and clays below the recommended removal depths were found to predominantly range from stiff to hard with a 1½-foot thick lens of very soft to medium clay layer found in CPT-26 at 35 feet depth.

The large side canyon located between Planned Area A1 and Planned Area A2 is designated as Park Site/Open Space Lot 367. The alluvial areas of this lot were explored by CPT Nos. 1 through 4 and boring RW-8. The granular alluvial soils in this portion of the tract were found to range from medium to very dense to the maximum depth explored, 51 feet. The alluvial silts and clays were found to range from soft to hard to the maximum depth explored.

7.2.4 Slopewash (Qsw)

Swales and side-canyons adjacent to the main drainage of the Santa Clara River commonly contain loose debris consisting of poorly sorted sand, silt and bedrock fragments. This material has accumulated via daily surface wash and periodic debris flows and is present above levels where they are incorporated and reworked by modern stream flow. They are generally poorly consolidated. The maximum thickness of Slopewash/colluvium encountered in our exploratory excavations was 13.5 feet. Slopewash has been noted on the Geologic logs and is indicated on the **Geologic/Geotechnical Maps** where it is estimated to be greater than 4 feet in thickness.

7.2.5 Residual Soil

Ungraded areas of the site are mantled by surface soils consisting of moderate- to yellowish-brown and yellowish gray silty sand with scattered pebbles. This unit is noted on our geologic logs, but is not shown on the Geologic Maps. Soil developed in the alluvial flats and in the relatively flat mesa areas has been disturbed by past agricultural and grading activities.

7.2.6 Artificial Fill (af) and Debris

Existing non-compacted artificial fill on the River Park property ranges from minor spill fills generated during past grading of minor roads and oil well pads to large stockpile fill areas (see Geologic/Geotechnical Maps). Fill associated with the construction of the DWP aqueduct has been placed at locations along the aqueduct. In proposed fill areas, all artificial fill impacting the proposed development will be entirely removed prior to placement of compacted/certified fill material. If artificial fill is present below proposed cut grade elevations, it should be completely removed and replaced with certified engineered fill.

Asphalt debris piles have been mapped on the CLWA property within the Newhall Ranch Road alignment as shown on the **Geologic/Geotechnical Maps (Sheet 3 of 4).** This material should be removed from the site during the grading operations.

7.2.7 Certified Engineered Fill (Cef)

Certified engineered fill has been placed on the River Park site for the construction of CLWA's Rio Vista Water Treatment Facility and the associated raw and treated water lines for the CLWA. The grading was performed between March 1, 1993 and December 30, 1994 to achieve the existing grades to accommodate the raw and treated water lines as well as portions of the future Newhall Ranch Road, which is identified as a major highway in the City's General Plans. The grading operations, including the placement of certified engineered fill, were observed by Huntingdon Engineering & Environmental, Inc./Schaefer Dixon Associates. The limits of certified engineered fill near Newhall Ranch Road that are shown on our Geologic/Geotechnical Maps are from their report on rough grading and onsite construction (See references).

7.2.8 Mass Movement Deposits

7.2.8.1 Landslides (Qls)

Landslides are present on the subject site and typically represent a translational type of failure within the Saugus Formation and terrace deposits which failed along a low strength clay bed. The landslides typically consist of highly fractured rock resting above a low strength slip surface. Voids created by dilation of the bedrock (grabens) are commonly backfilled with rock debris and colluvial material. Landslides were identified based on examination of field exposures and suggestive geomorphic features observed on aerial photographs and on topographic base maps and confirmed via subsurface explorations. Fourteen (14) landslides have been mapped on the site (see **Geologic/Geotechnical Maps**). Recommended mitigation measures for each landslide are discussed in the **Landslide** Summary (**Table 1**) located after the references.

7.2.8.2 Surficial Failures (sf)

Shallow (5 to 13 feet in depth) surficial failures involving soil, slopewash and weathered bedrock were observed. Approximate locations and extent are shown on the **Geologic/Geotechnical Maps.** Any of the surficial failure material, which exists below proposed grade should be removed prior to the placement of certified engineered fill.

7.3 Ground Water

Ground water beneath the River Park project can be grouped into two categories: 1) ground water contained in the recent alluvium; and ground water perched above low permeability layers in the Saugus Formation and the Quaternary Terrace Deposits.

7.3.1 Alluvial Aquifer

Historic ground water levels for the alluvium were interpolated for the site based on records from ground water contours by Robson (1972) and water levels observed in exploratory excavations by this firm. These data indicate that historic ground water levels have risen to within 5 feet of the existing ground surface along the margins of the Santa Clara River.

Ground water was not encountered within our hollow-stem auger borings but was encountered in all of our rotary-wash borings. Ground water levels measured during our subsurface investigations ranged from a minimum depth of 14.25 feet within rotary-wash boring RW-1 within Open Space Lot 360 in the south central portion of the site to 34 feet depth within rotary-wash RW-10 in the eastern portion of the site at the future Newhall Ranch Road alignment just east of the proposed development.

Recommended removal depths in the alluvium may encounter ground water at the locations of CPT-5, CPT-8, CPT-10, CPT-17, CPT-20, and CPT-27. Dewatering may locally be required to complete the necessary removals. The proposed grades shown on the Tentative Map are at least 15 feet above the assumed historic high ground water depth of 5 feet. It should be noted that the ground water table will fluctuate up and down in response to natural recharge and pumping requirements.

In our liquefaction evaluation of the alluvium deposits for the site we assumed a ground water elevation of 5 feet below the existing alluvial ground surface.

7.3.2 Perched Ground Water in the Saugus Formation Bedrock and Quaternary Terrace Deposits

Perched ground water was encountered in the Saugus formation bedrock and Quaternary terrace deposits within our bucket auger borings BA-1 through BA-6, BA-8, BA-12 and BA-13 at the elevated portions of the site. Perched ground water conditions can contribute to slope instability in proposed natural and proposed cut-slopes. Where appropriate, ground water was used in our slope stability analysis for the project. All stability/buttress fills are required to have backdrains. Subdrains are required in fill areas.

7.4 Soil Compressibility and Hydroconsolidation

Based upon consolidation test data developed for this project, the **compressibility** of the subsurface soils below the recommended removals is considered to be typically low to moderate within the depths tested ranging from 4 feet to 20 feet. The relatively lightly loaded residential buildings proposed for this site are not expected to impose significant stress increases more than 10 feet below existing grade. Based upon laboratory data developed for this project, **no significant hydroconsolidation effects** due to water incursion are expected at the site after the recommended removals are completed.

Lenses of very soft to medium clays and silts were identified as deep as 50 feet below existing grade in some of the CPT's performed in Planning Area A1. Depending on the consolidation characteristics of these weak clays, the thickness of the clay lenses and the height of fill added, the clay lenses could potentially consolidation under the weight of the fill. Also, additional consolidation settlement may occur due to a possible lowering of the groundwater table after development. The actual consolidation characteristics of the weak clay and silt lenses below the groundwater table in Planning Area A1 will be further evaluated during the Grading Plan review stage. The bridging effect of the relatively thick layers of existing native soils, removed and replaced soils, and new fill above the potentially compressible clayey lenses will help mitigate any potential settlement due to lowering of the groundwater table. A potential measure to mitigate the potential groundwater lowering settlement, if needed, is surcharging with a temporary earth fill above final grade.

7.5 Potential Expansion of Onsite Materials

Per CPT and boring data, the alluvial soils at the site are predominantly granular. The Terrace Deposits also typically have a very low to low expansion potential. Based on Expansion Index Tests (**Appendix B**), low to medium expansive Saugus Formation bedrock materials were identified at the site. The medium expansive materials typically consist of the siltstone and mudstone units.

7.6 Potential Corrosivity of Soils

7.6.1 Soils Electrical Resistivity and pH

Selected samples of on-site soils were tested for resistivity and pH. Soil electrical resistivity values of selected shallow soils suggest that on-site soils classifying (per Peabody, 1969) as moderately corrosive to ferrous metals exist at the site; pH data shows no significant acidity of tested soils. Test results are presented in **Appendix B**.

7.6.2 Soluble Sulfate and Chloride Content in Soils

Selected samples of on-site soils were collected and tested for sulphates and chloride contents. Based upon test results, concrete exposure to sulfates in shallow soils classifies as negligible (per 1997 UBC Classification). Test results are presented in **Appendix B**.

7.7 Soils Shear Strength

Direct Shear tests were performed on samples of on-site Alluvium (Qal), Terrace Deposits (Qt), Saugus Sandstone (TQs), landslide material (Qls) and landslide plane material. Remolded samples of on-site soils were also tested for shear strength. Tests results are presented in **Appendix B**.

7.8 Rippability

The bedrock encountered at the site consists primarily of siltstone and sandstone of the Saugus Formation. This formation generally is graded using typical grading equipment and techniques. Heavy single-shank ripping may be required within the more indurated portions.

7.9 Sewage Disposal

It is our understanding that sewage disposal will be by public sanitary sewers.

7.10 Erosion Potential

The existing provisions in the Grading Ordinance for planting and irrigation of constructed slopes in conjunction with drainage recommendations provided in the section "Surface Drainage and Erosion Control," will be sufficient mitigation against potential erosion within the subject site.

7.11 Debris Flow Hazards

Review of the tentative tract map design, the topographic base map and field mapping of the site indicates that debris flow hazard exists on Lot 485 within planned Area D. Debris flow hazard is designated (dfh) **(color-coded PINK)** on the **Geologic/ Geotechnical Map, Sheet 2 of 4**. The following mitigation measures are available to mitigate the potential for debris flow hazard:

1. Remove loose surficial material
2. Construct diverter slough walls
3. Construct impact walls
4. Construct debris basins
5. Control run-off
6. Plant selective deep-rooted vegetation

Alternative debris control devices are also shown on **Figure E10** within **Appendix E**. Appropriate mitigations/options will be addressed at the Final Map stage for Tract 53425.

8.0 SEISMIC CONSIDERATIONS

8.1 Introduction

The subject property is within the Transverse Ranges Geomorphic Province of Southern California. The Transverse Ranges consist of a series of west-trending mountains and intervening valleys, which is contrary to the northwest geomorphic trend that is typical of most of California and reflects the underlying structural (geologic) trend. These ranges are largely the result of north-south compression, which has resulted in east-west-trending folds and thrust faults. Associated faults in the vicinity of the site include the San Gabriel Fault, Santa Susana, Northridge (East Oakridge) and Sierra Madre (San Fernando) reverse/thrust faults. The January 17, 1994 Northridge (M6.8) Earthquake occurred on a south-dipping thrust fault which uplifted the Santa Susana Mountains at least 40 cm.

The Southern California region is traversed by the San Andreas Fault, which is a transform boundary between the Pacific Plate and the North American Plate. The San Andreas Fault is part of the San Andreas system of northwest-striking, right-lateral faults. The faults of this system are generally historically active, as evidenced by the June 28, 1992 Landers (M7.6) Earthquake (**See Fault and Earthquake Epicenter Location Map, Figure D-1 in Appendix D**).

The Southern California region is seismically active and commonly experiences strong ground shaking resulting from earthquakes along active faults. Earthquakes along these faults are part of a continuous, naturally occurring process, which has contributed to the characteristic landscape of the region.

Three common types of geologic hazards may be produced during a seismic event (earthquake). These include:

1. Ground Rupture;
2. Ground Motion; and
3. Ground Failure

8.2 Ground Rupture

Review of the CDMG Special Publication 42 indicates that the nearest fault designated as an active fault zone under Alquist-Priolo criteria is the San Gabriel Fault located south of the site. This fault is a major structural element of Southern California. In the Newhall-Saugus area, the San Gabriel Fault is classified as active under Alquist–Priolo criteria and is included within an Alquist-Priolo Special Studies Zone by the State of California. Approximately 2.5 acres at the southwestern corner of the property is included within the Alquist-Priolo zone established for the fault. Development is not proposed within this area.

During our subsurface exploration, a minor fault zone was discovered at the northeastern corner of the site in the Saugus Formation bedrock. This fault was recognized based on a change in bedding structure (dip) from the regional, moderate northeast dips to steeply northeast dipping. Two long trenches (T-39 & T-40) (**Figures A1 & A2**) were excavated in this vicinity and only minor faulting and shearing was encountered. The observed faulting typically consists of a zone of disturbed Saugus Formation lithologies with carbonate lined fractures and minor faults. The minor faults and shears are generally trending approximately N52W to N88W and are generally dipping towards the northeast. This fault was originally mapped by Winterer and Durham (1958); however, more recently Treiman (1986) interpreted this feature to be a fold. This minor fault is not classified as active on the California Fault Map by Jennings (1994), and was not considered a seismic source in the probabilistic seismic hazard assessment for California (Peterson, et al. 1996). Review of the aerial photographs listed at the beginning of this report did not reveal any evidence of photo lineaments or obvious geomorphic expression such as aligned saddles, swales, linear drainage or other topographic features usually indicative of active faults. The faults, shears and fractures are carbonate lined. This carbonate is not present in modern or pre-Holocene alluvium. It is therefore most likely precipitated under soil climates of the past. The faults and shears are generally planar and continuous without the "flowering upward" structure so characteristic of relatively young faults. We interpret these planar faults as features that formed under high confining pressure caused by a once thick cover of sediments, now long since stripped away. Based on the corroborating evidence provided by the lack of geomorphic expression and lineaments, the presence of carbonate deposits along faults, shears and fracture planes and the lack of flowering upward structures, the last displacement of these minor faults within this small fault zone took place in pre-Holocene time and therefore a setback zone is not required. However, a Stabilization Fill has been recommended for proposed Cut-Slope CS-19 to mitigate possible unstable, fractured conditions along the fault zone (see Cut-Slope section for details).

8.3 Ground Motion

Potential ground motions from future earthquakes on nearby faults have been evaluated utilizing the procedures outlined in the California Department of Conservation, Division of Mines and Geology (CDCMG) Guidelines described in Special Publication 117. **Appendix D** summarizes our ground motion evaluation, which utilized fault parameters from Peterson et al. (1996) and computer programs by Thomas F. Blake. Based on our probabilistic analysis, a peak horizontal acceleration of 0.71g was estimated as the design basis ground motion (10% chance of exceedance in 50 years) for use in our liquefaction assessment of the site. Our deaggregation analysis utilizing Boore, et al. (1997) indicates this acceleration would most likely be produced by a 6.5 M earthquake on the Santa Susana fault. The Average magnitude-weighted (7.5) acceleration was found to be 0.49g for the design basis earthquake (see Table D-III).

8.4 Ground Failure

Ground Failure is a general term describing seismically induced secondary permanent ground deformation caused by strong ground motion. This includes liquefaction, lateral spreading, seismic settlement of poorly consolidated materials (dynamic densification), differential materials response, slope failures, sympathetic movement on weak bedding planes or non-causative faults, shattered ridge effects and ground lurching.

Potential secondary seismic hazards to Tentative Tract 53425 are described in **Appendix D**. The potential for liquefaction and seismic settlement are evaluated in detail in **Appendix C**. The potential for adverse impacts to the proposed development from liquefaction and other secondary seismic effects is considered to be low to non-existent provided that our recommendations are incorporated into the Grading Plan and implemented during construction.

9.0 GENERAL CONCLUSIONS AND RECOMMENDATIONS

9.1 Feasibility of Development

Tentative Tract 53425 is feasible for development from the standpoint of geology/geotechnical conditions subject to the following recommendations:

9.2 Earthworks Recommendations

9.2.1 Introduction

All grading shall be accomplished under the observation and testing of the Project Soils Engineer, Engineering Geologist and/or their authorized representatives in accordance with the recommendations contained herein, the current Uniform Building Code requirements and this firm's "Recommended Earthwork Specifications" (**Appendix E**).

9.2.2 Site Preparation

The purpose of site preparation is to clear and strip the site of organics (vegetation), topsoil, roots, undocumented artificial fill, rubble, construction debris and other unsuitable materials, as applicable, and to grade the site to provide a firm base for compacted fill. All organics should be removed from the site for proper disposal. Topsoil may either be separately stockpiled for later reuse as topsoil in landscaped areas or properly disposed of offsite. On-site rubble should be disposed of as discussed in the "Debris" section below. The geotechnical engineer and/or his representatives shall observe the excavated areas prior to placing compacted fill.

9.2.3 Removals and Benching

In order to provide a uniform firm bottom prior to placing fill, all unconsolidated alluvium, slopewash, colluvial soils and severely weathered terrace deposits and bedrock should be removed from areas to receive fill. The estimated depths of removals (excluding landslides) are 5 to 23 feet as shown on the **Geologic/Geotechnical Removal Map (Plate I)**. The exact depth and extent of necessary removals will be determined in the field during the grading operations when observations and more location-specific evaluations can be performed.

Removal depths for these areas are based on our subsurface investigations and analyses (including liquefaction and cyclic settlement analyses) as well as geologic and geotechnical judgment.

All existing artificial fill (af) i.e. uncertified fill is considered unsuitable for support of proposed engineered fills and/or structures and must be removed and replaced with compacted fill. It is estimated that a maximum thickness of 35 feet of artificial fill currently exists in the vicinity of proposed Lots 39 to 52 (see Geologic/Geotechnical Map) at the site. It should be noted that the topography indicated on the tentative map at this area does not reflect actual conditions at the site due to recent and periodic removal of the artificial (stockpile) material. The recommended removals indicated on the removal map **(Plate I)** are measured from the pre-artificial fill topography. Colluvium/slopewash is present within the canyon swales and on drainage sideslopes as shown on the **Geologic/Geotechnical Maps.** Slopewash typically interfingers with the alluvium as illustrated on the **Schematic Alluvial/Slopewash Detail, Figure E1** within **Appendix E**. Colluvium/slopewash may locally be 10 to 15 feet in thickness. Anticipated removal depths for landslides range from 10 to 106 feet as shown on the **Geologic/Geotechnical Removal Map**. Removals at the locations of exploratory trenches should be extended to the bottom of the trench backfill if the adjacent removal depths are shallower than the trench (see **Geologic/Geotechnical Maps** for locations).

In areas to receive compacted fill where the surface gradient is steeper than 5:1 (H:V) the soil mantle, colluvium and unsuitable material should be removed and such areas benched horizontally into competent material prior to our in conjunction with fill placement (See **Appendix E, Fill Over Natural Slope, Figure E2**).

9.2.4 Preparation of Removal Bottom Areas

After the ground surface to receive fill has been exposed, it shall be ripped to a minimum depth of six inches, brought to optimum moisture content or above and thoroughly mixed to obtain a near uniform moisture condition and uniform blend of materials, and then compacted to the required relative compaction per the latest ASTM D 1557 laboratory maximum density.

9.2.5 Dewatering During Removals

As previously discussed, ground water may be encountered during grading removals to the recommended depths at the locations of CPT Nos. 5, 8, 10, 17, 20 and 27. The grading contractor should be prepared to implement dewatering measures as necessary, to achieve the required removals.

Where recommended removals encounter ground water, water levels will probably have to be controlled by providing an adequate excavation bottom slope and sumps for pumping water out as the excavation proceeds, or ground water may be lowered by installing shallow dewatering well points prior to grading. Partial removals of soils above the water table and soil improvement below the water table (e.g. shallow compaction grouting) may be another option. Dewatering may be needed depending on the season when the removals are performed.

9.2.6 Over-Excavation

It is recommended that a minimum 5-foot thick over-excavation be performed on all cut-lots, transitional lots (transitions between bedrock, fill, terrace deposits and alluvium) and streets. This over-excavation will provide attenuation of potential differential settlements or differential material response to seismic events and provide a uniform base for structural support of buildings. If on a cut/fill transition lot the maximum depth of fill exceeds 15 feet, then the thickness of the fill cap should be one-third of the deepest fill thickness below any proposed structure [see **Appendix E, Cut Lot and Cut Fill Lot (Transitional), Figure E3**]. If excavation of the native soils (i.e. bedrock) exposes expansive materials, then the lot over-excavation should be deepened to 8 feet.

9.2.7 Fill Materials

Onsite soils that are free of debris, over-size rocks, topsoil and organic matter may be used as sources for compacted fills. Rock or similar irreducible material with a maximum dimension greater than eight (8) inches may not be placed in the fill. Rocks or hard fragments larger than four (4) inches shall not compose more than 25 percent of the fill and/or lift. Any large rock fragments over eight (8) inches in size, may be incorporated into the fill as rockfill in windrows after being reduced to the specific maximum rock fill size (see **Figure E4, Rock Disposal**, in **Appendix E**).

Where fill depths are too shallow to allow large rock disposal, special handling or removal may be required (see **"Recommended Earthwork Specifications," Appendix E**).

9.2.8 Fill Compaction

All fill material should be placed in uniform lifts not exceeding 8 inches in its loose state and compacted to a minimum of 90 percent relative compaction as determined based on the latest ASTM Test Designation D-1557. Additional field compaction requirements are presented in **Appendix E, "Recommended Earthwork Specifications"**. **Appendix E** also includes recommended specifications for placement of trench backfill.

For fills deeper than 40 feet, the portion of fill below 40 feet depth should be compacted to a minimum of 93 percent relative compaction. To ensure compliance, these areas should be delineated at the Grading Plan stage.

9.2.9 Proposed Fill Slopes

Fill slope inclination should not be steeper than 2:1 (h:v). The fill material within approximately one equipment width (typically 15 feet) of the slope face should be constructed with cohesive material obtained from on-site soils. The finished fill-slope face shall be constructed by over-building the slope and cutting back to the compacted fill material. Stability Fills are recommended where cut-slope faces will expose fill-over bedrock, alluvium-over-bedrock or Quaternary Terrace Deposits over bedrock conditions. These fills should be constructed with a keyway at the toe of the fill slope with a minimum equipment width but not less than 15 feet, and a minimum depth of 3 feet into the firm undisturbed earth. Following completion of the keyway excavations, the project engineering geologist shall observe and approve the keyway bottom prior to backfilling with Certified Engineered Fill.

Where fill slopes are constructed above natural ground with a gradient of 5:1 (H:V) or steeper, all topsoil, colluvium, and unsuitable material should be removed and a keyway should be constructed at the toe of the fill slope with a minimum width of 15 feet, and a minimum depth of 3 feet into firm undisturbed earth (see **Appendix E, Fill Slope Over Natural Slope diagram, Figure E5**). Following completion of the keyway excavations, the project Engineering Geologist/Geotechnical Engineer or his representative shall observe and approve the keyway bottom prior to backfilling with compacted fill.

Where fill slopes toe out on relatively level natural ground, the removals should be performed to a minimum 1:1 projection from the toe of slope to the recommended removal depth, (see **Appendix E, Fill Slope Toeing Out on Flat Alluviated Canyon, Figure E6**).

Where sliver fill-slopes are proposed, it is recommended that the slope be constructed with a minimum 15-foot width Stability Fill throughout, which is keyed in at the toe of slope (see **Appendix E, Stability/Buttress Fill and Backdrains Detail, Figure E7**).

9.2.10 Proposed Cut-Slopes

We have identified nineteen (19) proposed cut-slopes (25± feet or higher) on the subject site and designated them as CS-1 through CS-19. The slope geometry, anticipated geologic conditions and recommended mitigation, if necessary, for each slope are presented in the Cut-Slope Summary (**Table 2**) located at the end of the text. It has been conservatively assumed for the purposes of stability analysis that weak bedding planes may occur anywhere in the proposed cut-slopes. If any of the smaller proposed cut-slopes (less than 25± feet in height) have adverse geologic of grading configurations (fill over cut) they can be mitigated if necessary with a standard 15 to 20-foot wide key (depending on the proposed cut-slope height) and benching similar to a Stability Fill. A "Typical Fill above Cut-Slope" detail is shown on **Figure E8** within **Appendix E**.

All permanent cut-slopes should be constructed at a slope ratio not steeper than 2:1 (horizontal to vertical). All permanent cut-slopes exposing terrace deposits or alluvium should be constructed as a stability fill. Temporary cut slopes in competent rock may be constructed as steep as 1.5:1 (h:v). Potential unstable subsurface conditions exposed during construction, such as adverse bedding, joint planes, zones of weakness or exposed seepage, may require either flatter slopes than specified above or construction of benches. We recommend that an Engineering Geologist observe all backcuts during the grading operations and provide appropriate recommendations if necessary.

9.2.11 Natural Slopes

The natural slopes proposed on Tentative Tract 53425 have gradients ranging from 5:1 to ½:1 (h:v). All natural slopes that are relatively steep and have accumulations of soil and colluvium/slopewash which are prone to debris flow hazard. We constructed Geologic Cross Sections where natural slopes and the underlying geologic conditions either above or below the proposed building pads warranted analysis.

The south and southwest facing natural ridge slope located above planned area D in the vicinity of Lot 513 was evaluated using cross-sections 3-3,' 5-5', 6-6'and 7-7' inclusive. Subsurface exploration using backhoe trenches was performed to determine the subsurface geologic conditions. Slope stability analyses of these cross sections indicate that in order to satisfy the City of Santa Clarita's slope stability requirement, both a) grading the top of the ridge as illustrated on the tentative map and b) permanently and consistently limiting groundwater levels within the natural ridge to those assumed in our analysis are required. In order to permanently limit groundwater levels to those found to be necessary for stability of the affected slopes, it is recommended that no permanent piped water be allowed above elevation 1250 on the existing natural ridge north and northeast of Lot 513. Thus, the area of the existing natural ridge above elevation 1250 msl should be recorded as a Restricted Use Area (RUA) on the Final Map. This recommended RUA is color-coded **ORANGE** on the **Geologic/Geotechnical Map, Sheet 2 of 4**. See our slope stability analysis in **Appendix F** for details.

The northwest facing proposed natural slope descending from proposed Lots 260 through 270, 275 and 277 through 282 (see **Geologic/Geotechnical Maps)** has been evaluated. The three dimensional geometry is illustrated on cross section 21-21' which was constructed due to the steep descending natural slope. The geologic structure of the Saugus Formation bedrock is anticipated to be oriented neutral to the proposed natural slope face. It is anticipated that approximately 5 to 8 feet of Quaternary Terrace Deposits will exist above the bedrock at this location. Slope stability analysis indicated that this natural slope satisfies the City of Santa Clarita factor of safety requirement for slope stability.

The proposed southeast facing natural slope located in the vicinity of proposed Lots 388 through 398 and below portions of proposed cut-slope CS-10 is illustrated on cross sections 16-16' through 19-19'. Slope stability analyses performed on cross sections 16-16' through 18-18' indicate that this natural slope and proposed cut-slope CS-10 satisfies the City of Santa Clarita's slope stability requirement for factor of safety. Proposed cut-slope CS-10 is recommended to be constructed as a stability fill due to Quaternary Terrace deposits anticipated to be exposed within the proposed slope face. We have recommended a 20 foot building setback from the top of proposed cut-slope CS-10 for Lots 388 through 393 due to the steep gradient of the natural slope located below the proposed cut slope. This setback is based on geologic/geotechnical judgment and will be designated on the Final Map as a Restricted Use Area. We have color coded this setback line **YELLOW** on the **Geologic/Geotechnical Map, Sheet 3 of 4**. For details see our slope stability section in **Appendix F**.

The proposed natural slope located east of lots 400 through 402 just north of proposed cut-slope CS-10 is illustrated on cross section 26-26'. Slope stability on this section indicates this slope satisfies the City of Santa Clarita's slope stability requirement for factor of safety. For details see our slope stability section in **Appendix F**.

Lots 178 though 189 and the adjacent easterly facing natural slope are located within landslide Qls-5b. Options for mitigating this landslide and the associated natural slope are presented within the Summary of Landslides Table located after the references Ⓔ

9.2.12 Existing Cut-Slopes

Existing cut-slopes are presented along the Newhall Ranch corridor. These cut-slopes were graded between 1993 and 1994 and are addressed in reports by Huntingdon/Schaefer Dixon Associated (see references). The current tentative map design indicates that the existing south facing cut-slopes along the north side of Newhall Ranch Road will remain. The existing cut-slopes along the south side of Newhall Ranch Road will be removed.

9.2.13 Slopes in Debris Basins

Fill slopes along planned debris basins were analyzed for slope stability under rapid drawdown conditions based on a groundwater level at maximum basin level and an empty basin. Mitigation measures for slope stability conditions due to rapid drawdown seepage forces were included in design of grading for the respective slopes.

9.2.14 Building Setbacks

A recommended building setback from the top of proposed cut-slope CS-10 at the rear of Lots 388 through 393 located on **Sheet 3 of 4** of the **Geologic/Geotechnical Map** will be delineated on the Final Map as a Restricted Use Area. The standard setbacks from ascending and descending slopes provided in the California Code/Uniform Building Code should be followed, unless superseded by specific geologic and/or soils engineering evaluations.

9.2.15 Restricted Use Areas

The Building Setback presented within Section 9.2.14 Building Setbacks above for Lots 388 through 393 (Sheet 3 of 4) should be included on the Final Map as a Restricted Use Area.

A Restricted Use Area has been recommended northerly of Planned Area D (Lot 513) in order to permanently limit the groundwater levels to those found to be necessary for stability of the affected slopes. Within this Restricted Use Area it is recommended that no permanent piped water be allowed above elevation 1250. This recommended Restricted Use Area is color-coded **ORANGE** on the Geologic/Geotechnical Maps, Sheets 1 and 2 of 4. See Section 9.2.11 Natural Slopes and our slope stability analysis in Appendix F for details.

9.2.16 Areas Where Geologic/Geotechnical Conditions Potentially Affect Newhall Ranch Road

Due to the south dipping geologic structure of the bedrock all southerly facing proposed cut and proposed natural slopes in the vicinity of proposed Newhall Ranch Road are anticipated to expose adverse geologic conditions that may potentially affect proposed Newhall Ranch Road. Areas where potential instability to proposed Newhall Ranch Road, regardless of the proposed grading for the River Park Tentative Tract development include proposed Cut-Slopes CS-15, CS-17 and the bluff area southerly of Cut-Slope CS-15 in the vicinity of cross section 23-23'. Designed buttresses are proposed for these three areas. See Table 1- Summary of Cut-Slopes located after the text and Appendix F –Slope Stability Analyses for details

9.2.17 Exploratory Trench and Boring Backfill

All of the exploratory trenches and borings previously excavated for this project should be over-excavated and backfilled with compacted fill in accordance with the earthworks recommendations of this report.

9.3 Oil Wells

Review of the 1999 Munger Map book indicates that four oil wells are present on the subject property. Oil well records on file with the California Department of Conservation, Division of Oil, Gas and Geothermal Resources (DOGGR) were obtained for each well. All of these wells were abandoned prior to 1971: however the DOGGR will require review of the original abandonment files relative to the proposed development and possibly require re-abandonment to the latest DOGGR requirements. We have included the abandonment records for these wells after the text. The following table provides the names and the location of the existing oil wells on the subject site. ✓

OIL WELL	DATE DRILLED	LOCATION	COMMENTS
Union Oil Company "Bonelli No. 1"	3/58	North of Lot 485	TD 2,923 Ft. Non Producer Abandoned 4/58
Edward Lustgarten "Lucky Lusty No. 1"	2/58	North of Lot 485	TD 2,982 Ft. Producer Abandoned 2/71
Edward Lustgarten "Lucky Lusty No. 3"	11/20/57	Within Lot 485	TD 3,200 Ft. Non Producer Abandoned 5/61
Texaco NL&F "H-1"	1/63	Open Space Lot 479	TD 1,700 Ft. Non Producer Abandoned 1968

For approximate location of the oil wells, see the **Geologic/Geotechnical Maps**.

If any leaking of undocumented oil wells are encountered during grading operations, their locations should be surveyed and the current well conditions evaluated immediately. ✓

Soils in the vicinity of oil wells sould be contaminated with petroleum products spilled during operation of the wells. Wells may have associated mud pits which could also contain materials considered to be hazardous under current environmental regulations. If potentially hazardous materials are encountered during future grading operations, they should be assessed and mitigated.

9.4 Drainage Control

Ground water and soil moisture conditions can vary seasonally or for other reasons. It must be recognized that we do not and cannot have complete knowledge of the subsurface conditions at the site. It is possible that seepage could be encountered while stripping and excavating during site preparation at some areas (e.g. in drainages or along terrace/bedrock contacts on the site). Whenever seepage is observed, the condition must be evaluated by the Engineering Geologist and Geotechnical Engineer prior to covering with fill material.

9.4.1 Surface Drainage and Erosion Control

Surface drainage control design should include provisions for positive surface gradients to ensure that surface runoff is not permitted to pond, particularly above slopes or adjacent to building foundations or slabs. Surface runoff should be directed away from slopes and foundations and collected in lined ditches or drainage swales, via non-erodible drainage devices, which should discharge to paved roadways, or existing watercourses. If these facilities discharge onto natural ground, means should be provided to control erosion and to create sheet flow.

It should be expected that, even with the construction of carefully planned and designed erosion control measures, some erosion may occur during the first few wet seasons after the project is completed. Site grading should be inspected, particularly after heavy, prolonged rainfall, to identify erosion areas at an early stage. Maintenance work should be done as soon as practical to repair these areas and prevent their enlargement.

9.4.2 Subsurface Water Control

Fill slopes and stability fills, as applicable, should be provided with subsurface drainage as necessary for stability. A typical backdrain detail is shown on **Figure E7,**

Appendix E. Also, subdrains along the bottom of canyon fills should be constructed. A typical canyon subdrain detail is presented on **Figure E9**. The existing subdrains constructed during the grading for the Rio Vista water treatment facility should be extended to daylight out of the future planned grading or connected to the future storm drains.

9.5 Shrinkage, Bulking and Subsidence

The following bulking and shrinkage factors are based on judgment and in-situ densities compared to average of 92 percent relative to the maximum dry density as determined per the ASTM D 1557 test. For the materials encountered at the site, shrinkage (decrease in volume) or bulking of those materials, when excavated, placed and compacted as controlled fill is estimated to be as follows:

MATERIAL TYPE	SHRINKAGE (%)	BULKING (%)
Artificial Fill (af)	20-25%	
Alluvium (Qal)	15-18%	
Slopewash (SW)	15-20%	
Upper Qt (0-8′ depth)[1]	12-15%	
Qt (>8′ depth)	3-6%	
Upper TQs (0-3′ depth)*	5-8%	
TQs (>3′ depth)		2-5%

In planning Area A1 subsidence in alluvial areas due to proposed fills is expected to be on the order of 1 to 2 feet. Where the stockpile of artificial fill exists the subsidence is expected to be less.

The above shrinkage, bulking and subsidence factors are only approximations. The actual volume changes from cut to fill depend on the quality or degree of compaction. The Supervising Civil Engineer should design pad grades with sufficient flexibility to accommodate a possible shortage of fill of up to 10 percent of the total yardage graded.

It should be noted that bedrock will provide the majority of the total on-site fill materials.

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[1] Denotes typical upper weathered zones in Terrace Deposits (Qt) and Saugus Formation (TQs) that are prone to shrinkage

9.6 Landscaping

All final grades should be sloped away from the building foundations to allow rapid removal of surface water runoff. No ponding of water should be allowed adjacent to the foundations. Plants and other landscaped vegetation requiring excessive watering should be avoided adjacent to the building foundations. Should landscaping be constructed, an effective water-tight barrier should be provided to prevent water from affecting the building foundations.

9.7 Foundation and Settlement Considerations

No specific building foundation designs have been provided at this time. The following general foundation criteria are provided for future design and planning consideration. The proposed Tentative Tract may generally involve the following foundation support conditions:

- Foundation support within engineered fill
- Foundation support within transition zones of cut and fill

The structural design should include seismic geotechnical parameters in accordance with UBC requirements for Seismic Zone 4. These parameters will be established at the Grading Plan stage in conformance.

Shallow spread footings for foundation support of residential structures can adequately be founded on engineered fill compacted as previously recommended. Support for heavier structures, if applicable, should be addressed at the Grading Plan stage. Minimum recommended continuous (wall) foundation dimensions are 12 inches width and 12 inches depth below lowest adjacent grade for single-story residential structures. Tentatively, an allowable bearing capacity of **1,800 psf** can be used for (minimum-sized) shallow foundations constructed in certified compacted fill. This tentative allowable bearing value should be confirmed by further field and laboratory testing of the site soils before use in design. Lateral resistance of footing walls should be provided at the Grading Plan stage.

Figure E3 (Appendix E), "Cut Lot (Transitional)" and "Cut-Fill Lot (Transitional") provides a foundation grading detail for locations where foundations will straddle transition zones between cut and fill materials. If the remaining cut-fill transition is steep at depth below the building area, the geometry of the transition should be reviewed during grading operations by the soils engineer on a site specific basis to evaluate the need for additional overexcavation removals and/or additional foundation reinforcement. As a general guideline, steep cut/fill transitions would include slope gradients steeper than 4:1 (h:v) and overall variations in fill thickness of greater than 15 feet which occur within 20 feet of final pad grade.

To minimize significant settlements, it is recommended that the upper soils in areas to receive fills be removed and replaced with compacted fill. No specific foundation design loads are available at this time. Some minor settlements will be expected due to loads from high fills (e.g. higher than 30 feet). Currently, locations of proposed high fills are: CPT-6, CPT-7, CPT-8, CPT-10, CPT-11, CPT-12, CPT-14, CPT-17, CPT-19, CPT-32 and CPT-33. Most of the settlements due to the load of added fill will occur during and shortly after rough grading is complete. However, since lenses of relatively compressible clayey soils exist below recommended removal depths, some of the fill settlements will not occur until the ground water table is lowered below the compressible clay lenses. Ground water table lowering is usually done by pumping from water wells. Alternatively, the site may be temporarily surcharged with earth fill sufficient to simulate the load increase on the compressible clay lenses due to lowering of the ground water table.

At other areas, potential settlements in alluvium will be minimized by the removals and recompaction recommended in this report. Also, potential effects from localized seismically-induced settlements will be attenuated by the recompacted upper layers and proposed additional fills (see **Appendix C**).

9.8 Excavations, Shoring and Backfill Recommendations

Excavations deeper than 3 feet should conform to **safety** requirements for excavations as set forth in the State Construction Safety Orders enforced by the State Division of Industrial Safety, CAL OSHA. Temporary excavations 12 feet or lower shall be no steeper than 1:1 (h:v). For excavations to 20 feet in height, the bottom 3.5 feet may be vertical and the upper portion between 3.5 and 20 feet should be no steeper than 1.5:1 (h:v). Excavations not complying with these requirements should be shored.
It is strongly recommended that excavation walls in sands and dry soils be kept moist, but not saturated at all times.

Parameters for design of cantilever and braced shoring will be provided at the Grading Plan stage.

The bases of excavations or trenches should be firm and unyielding prior to foundations or utility construction. On-site materials other than topsoil or soils with roots or deleterious materials may be used for backfilling excavations. Densification (compaction) by jetting may be used for on site clean sands or imported equivalent of coarser sand provided they have a Sand Equivalent greater than or equal to 30 as determined by ASTM D2419 test method. Recommended specifications for placement of trench backfill are presented in **Appendix E.**

9.9 Expansive Soils Considerations

Soil expansion has been found to be a significant consideration for design and construction of foundations and concrete slabs-on-grade. The recommendations presented in the attached **Table E1, Minimum Foundation and Slab Recommendations for Expansive Soils**, in **Appendix E**, have been found to minimize the effects of soil expansion potential in Southern California when followed during project design and construction. It is anticipated that compacted fill from the onsite materials will have a very low to medium expansion potential. The expansion potential of the site soils exposed at rough grade should be tested again after site grading is complete and the final foundation design should be based on those expansion test results.

9.10 Hydroconsolidation Considerations

Based upon our hydroconsolidation test data, existing (non-vegetative) soils do not show significant hydroconsolidation characteristics.

9.11 Corrosivity and Chemical Attack Considerations

Soil corrosivity testing was performed for this study; test results are presented in **Appendix B**. As stated previously in this report, based on resistivity test data, on-site soils classify as severely corrosive to corrosive to buried metals per County of Los Angeles classification. Sulfate concentrations were negligible per UBC (1997) classification, and pH was near-neutral (ranging from 6.0 to 8.0). Chloride concentrations were very low. Pending additional testing, either Type I or II cement may be considered for use in concrete placed in contact with the ground. Mitigating recommendations against soil corrosivity should be revised/expanded based on additional confirmatory tests that should be performed at the Grading Plan stage. Final recommendations for concrete will be in accordance with the latest UBC requirements, and a corrosion specialist should provide mitigating recommendations for potential corrosion of metals in contact with on-site soils.

9.12 Retaining Walls and Pavement Design

Retaining wall geotechnical design parameters and pavement design(s) will be provided at the Grading Plan stage.

10.0 18.03.100F STATEMENT (CITY OF SANTA CLARITA)

In compliance with Section 18.03.100f of the City of Santa Clarita Building Code and the California Building Code, it is the finding of this firm that tentative tract map 53425 dated February 25, 2003 (River Park Development) will be safe against hazard from landslide, settlement or slippage and will not adversely affect off-site property provided all our recommendations provided in this report are followed. 6a

11.0 GEOLOGIST/GEOTECHNICAL ENGINEER OF RECORD

This report has been prepared assuming that Allan E. Seward Engineering Geology, Inc. will refine all geology and geotechnically-related data for the Grading Plan stage of this project. If the recommendations contained in this report are to be utilized and expansion of the geology/geotechnical work is performed by others, the party performing the work must review this report and assume full responsibility for recommendations contained herein. That party would then assume the title of responsibility as "Geologist/Geotechnical Engineer of Record" for the specific work.

12.0 LIMITATIONS

This report has been prepared for the exclusive use of Newhall Land and their design consultants for the specific site discussed herein. This report should not be considered transferable. Prior to use by others, we should be notified, as additional work may be required to update this report.

In the event that any modifications in the design or location of the proposed development, as discussed herein, are planned, the conclusions and recommendations contained in this report will require a written review by this firm with respect to the planned modifications.

In performing these professional services, we have used the degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineering geologists and geotechnical engineers practicing in this or similar localities.

The analyses and interpretations presented in this report have been based on the results of pertinent field and laboratory soil investigations. It should be recognized that subsurface conditions can vary in time and laterally and with depth at a given site. Our conclusions and recommendations are based on the data available and our interpretation of the data based on our experience and background. Hence, our **conclusions** and **recommendations** are **professional opinions** and are **not meant** to be a control of nature; therefore, **no warranty** is herein **expressed** or **implied.**

It should be noted that faulting is normally confined to the area immediately adjacent to a known fault, or within a few feet of the last fault movement. Regardless of what criteria is used however, absolute assurance against future fault displacement or strong ground motion cannot be obtained in tectonically active areas. New faults can form, as the orientation and magnitude of deformational forces in the earth's crust change with time. Therefore, the location of new breaks or ground motions during a seismic event cannot be located or anticipated.

This report may not be duplicated without the written consent of this firm.

This opportunity to be of service is greatly appreciated. If you have any questions regarding this report please give us a call.

Respectfully submitted,

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The following attachments and appendices complete this report.

VOLUME I

VOLUME II

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[1] Bucket-auger boring logs from report dated 3/3/00, prepared for Castaic Lake Water Agency regarding Road Alignment and Development.

- **Cross Sections** (In pockets)

Geologic Cross Sections 1-1' through 8-8'	**Plate II**
Geologic Cross Sections 9-9' through 11-11'	**Plate III**
Geologic Cross Sections 12-12' through 14-14'	**Plate IV**
Geologic Cross Sections 15-15' through 22-22'	**Plate V**
Geologic Cross Sections 23-23' through 27-27'	**Plate VI**
Geologic Cross Sections 28-28' through 31-31'	**Plate VII**

Distribution: (4) Newhall Land
Attn: Glenn Adamick
(2) Psomas
1 - Attn: Jeannine Giem – Santa Clarita Office
1 - Attn: Matt Heideman – Costa Mesa Office
(3) City of Santa Clarita
(2) Castaic Lake Water Agency c/o Kennedy/Jenks Consultants
Attn: Lynn Takaichi
(1) Impact Sciences
Attn: Ms. Susan Tebo

REFERENCES

By Allan E. Seward Engineering Geology, Inc.

1) Geologic/Geotechnical Constraints Report
Preliminary Stability Evaluation of Existing Fill Buttress Above Cut-Slope, Landslide (Qls-a), and Stability of Proposed Cut-Slope CS-1, and Fault Rupture Hazard Assessment
CLWA Proposed Road Alignment and Associated Development
Valencia, California
Dated March 3, 2000 - JN: 00-1571C-1

By Others

2) Geotechnical Investigation Report
Raw and Treated Water Pipelines and
Raw Water Pump Station, for Rio Vista Water Treatment Plant,
Castaic Lake Water Agency
Santa Clarita, California
By Schaefer Dixon Associates, Inc.
Dated November 6, 1991 – JN: 9L-266

3) Preliminary Review of Geologic Conditions and Engineering Geology Constraints to Development;
"Valencia Panhandle" - ~760 Acres Northeast of Bouquet Junction;
Valencia, California
By Southwestern Engineering Geology
Dated October 17, 1994 – JN: 1-32/72-94

4) Grading and Onsite Construction
Raw and Treated Water Pipelines for
Rio Vista Water Treatment Plant
Castaic Lake Water Agency
Santa Clarita, California
Volumes I & II
By Huntington/Schaefer Dixon Associates, Inc.
Dated March 30, 1995 – JN: 9L-266PC

Published

Blake, T.F., 1998, FRISKSP - Version 4.00: A computer program for the probabilistic estimation of peak acceleration and uniform hazard spectra using 3-D faults as earthquake sources: Thomas F. Blake, Computer Services & Software.

Blake, T.F., 1999, EQSEARCH - Version 3.00: A computer program for the estimation of peak horizontal acceleration from California historical earthquake catalogs: Thomas F. Blake, Computer Services & Software.

Boore, D.M., Joyner, W.B., and Fumal, T.E., 1997, Equations for estimating horizontal response spectra and peak acceleration from western North American earthquakes: A summary of recent work: Seismological Research Letters, v. 68, no. 1, p. 128-153.

Campbell, K.W., 1997, Empirical near-source attenuation relationships for horizontal and vertical components of peak ground acceleration, peak ground velocity, and pseudo-absolute acceleration response spectra: Seismological Research Letters, v. 68, no. 1., p. 154-179.

REFERENCES

CDCDMG, 1995, Checklists for the review of geologic/seismic reports for California public schools, hospitals, and essential services buildings: CDMG Note 48, 3 p.

CDCDMG, 1997, Guidelines for evaluating and mitigating seismic hazards in California: California Department of Conservation Division of Mines and Geology Special Publication 117.

CDCDMG, 1998, Seismic Hazard Zones Map for the Newhall Quadrangle Released February 1, 1998, California

CDCDMG, 1997, Seismic Hazard Evaluation of the Newhall 7.5-Minute Quadrangle, Los Angeles County, California: Open-File Report 97-11.

Dibblee, T.W., Jr., 1996, Geologic Map of the Newhall Quadrangle, Los Angeles County, California: Dibblee Geological Foundation, Map DF-56.

Golden Software, Inc., 1998, Grapher^{TM}, Golden Software, Inc.

Hart, E.W., 1997, Fault-rupture hazard zones in California: California Division of Mines and Geology Special Publication 42, 24 p.

Jennings, C.W., 1988, Fault map of California with locations of volcanoes, thermal springs, and thermal wells: California Division of Mines and Geology, Geologic Data Map No. 1, 4th Printing.

Kew, W.S.W., 1924, Geology and oil resources of a part of Los Angeles and Ventura Counties, California: U.S. Geological Survey Bulletin 753, 202 p.

Martin, G.R., and Lew, M., 1999, Recommended procedures for implementation of DMG Special Publication 117 - Guidelines for analyzing and mitigating liquefaction hazards in California: Southern California Earthquake Center, 63p.

Morton, D.M., 1976, Reconnaissance surficial geologic maps of the Newhall, Oat Mountain, Santa Susana and Val Verde 7.5' Quadrangles, Los Angeles and Ventura Counties, southern California: U.S. Geological Survey Open File Map 76-211.

Peabody, A.W., 1969, Principles of cathodic protection, Chapter 5, NACE Corrosion Course: National Academy of Corrosion Engineers

Petersen, M.D., Bryant, W.A., Cramer, C.H., Cao, T., Reichle, M.S., Frankel, A.D., Lienkaemper, J.J., McCrory, P.A., and Schwartz, D.P., 1996, Probabilistic seismic hazard assessment for the State of California: California Department of Conservation Division of Mines and Geology Open-File Report 96-08, 33 p.

Real, C.R., Toppozada, T.R., and Parke, D.L., 1978, Earthquake epicenter map of California, showing events from 1900 through 1974 equal to or greater than magnitude 4.0 or intensity V: California Division of Mines and Geology Map Sheet 39.

Robson, S.G., 1972, Water-Resources Investigation Using Analog Model Techniques in the Saugus-Newhall Area, Los Angeles County, California.

Sadigh, K., Chang, C.Y., Egan, J.A., Makdisi, F., and Youngs, R.R., 1997, Attenuation relations for shallow crustal earthquakes based on California strong motion data: Seismological Research Letters, v. 68, no. 1, p. 180-189.

REFERENCES

Stein, R.S., and Yeats, R.S., 1989, Hidden earthquakes, Scientific American, v. 260, no. 6, p. 48-57.

Stewart, J.P. et al., 1994, Preliminary report on the principal geotechnical aspects of the January 17, 1994 Northridge Earthquake: EERC, U.C. Berkeley, Report No. UCB/EERC-94/08, 245 pages.

Treiman, J., and Saul, R., 1986, The mid-Pleistocene inception of the Santa Susana Mountains: in Ehlig, P.L. (trip leader): Neotectonics in the area between the central and western Transverse Ranges, southern California: Geological Society of America Field Trip Number 10, p. 7-12.

Uniform Building Code (UBC), 1997.

Wells, D.L., and Coppersmith, K.J., 1994, New empirical relationships among magnitude, rupture length, rupture area, and surface displacement: Bulletin of the Seismological Society of America, v. 84, no. 4, p. 974-1002.

Winterer, E.L., and Durham, D.L., 1962, Geology of southeastern Ventura Basin, Los Angeles County, California: U.S. Geological Survey Professional Paper 334-H, p. 275-366.

Youd, T.L, and Idriss, I.M., eds., 1997, Proceedings of the NCEER workshop on evaluation of liquefaction resistance of soils: National Center for Earthquake Engineering Research Technical Report NCEER-97-0022, 276 p.

Ziony, J.I., and Jones, L.M., 1989, Map showing late Quaternary faults and 1978-84 seismicity of the Los Angeles region, California: Miscellaneous Field Studies Map, MF 1964, scale 1:250,000.

SUMMARY OF LANDSLIDES

LANDSLIDE NO.	SHEET NO.	MITIGATION
1	2 of 4	It is recommended that this landslide be completely removed and reconstructed to its approximate original configuration using Certified Engineered Fill utilizing a keyway and backdrains designed by the soils engineer. The design of this keyway will be based on the configuration of the future removal. It is anticipated that the removal will range up to 35 feet. In areas to receive fill the removal bottoms should be surveyed in order to document the removal for future reference.
2 and 3	2 of 4	These landslides are located partially within existing cut-slopes and will be subject to periodic maintenance. These landslides are located in an area where they do not impact the proposed development and are safe for the use intended. At the completion of grading, these landslides will be designated as Restricted Use Areas on the Final Map.
4	2 of 4	Located in the vicinity of Lots 83 and 84 within a proposed fill area. It is recommended that this landslide be completely removed under the continuous observation of the Project Engineering Geologist. It is anticipated that the removal will range up to 25 feet. In areas to receive fill, the removal bottoms should be surveyed in order to document the removal for future reference and/or later additional grading.
5a	3 of 4	This landslide is located north of Newhall Ranch Road and was buttressed during the grading and construction of the CLWA facility and associated water line. This landslide is located in an area where it does not impact the proposed development and is safe for the use intended. At the completion of grading, this landslide will be designated as a Restricted Use Area on the Final Map.

SUMMARY OF LANDSLIDES

LANDSLIDE NO.	SHEET NO.	MITIGATION
5b	3 of 4	This large landslide is located south of Newhall Ranch Road. Stability calculations performed at Cross Section 9-9' indicate this landslide at the proposed Tentative Map grading configuration does not satisfy the City of Santa Clarita requirements for factor of safety. Due to the large size of this landslide, mitigation options are provided. Option 1 - construct a designed buttress utilizing a 150-foot wide by 45-foot deep keyway (at the toe). Option 2 – Construct a designed shear keyway located within the landslide mass. This shear keyway would be based on additional subsurface exploration and analysis. Option 3 – redesign such that proposed structures are not proposed on this landslide (avoidance). At the completion of grading, this landslide would be designated as a Restricted Use Area on the Final Map. Option 4 – completely remove the landslide and replace it with certified engineered fill. In areas to receive fill, the removal bottoms should be surveyed in order to document the removal for future reference. If complete removal is performed, it is anticipated that removals will range up to 106 feet.
6	3 of 4	This landslide is located east of Landslide Qls-5b. Stability evaluation on Cross Section 10-10' indicates that previous grading for Newhall Ranch Road is grossly stable but the landslide mass south of Newhall Ranch Road does not satisfy the City of Santa Clarita factor of safety requirement. This area will be subject to deformation and settlement in the event that the landslide moves. A park trail with grading is currently proposed. It is recommended that grading be performed such that the existing topography is only minimally altered. It is recommended that this trail not be paved and that minimal watering be performed. At the completion of grading, this landslide would be designated as a Restricted Use Area on the Final Map.
7	2 of 4	This landslide is located in the vicinity of Lot 145 in a proposed fill area. It is recommended that this landslide be completely removed under the continuous observation of the Project Engineering Geologist. The removal bottoms should be surveyed in order to document the removal for future reference and/or later additional grading. It is anticipated that the removal will range up to 24 feet.

SUMMARY OF LANDSLIDES

LANDSLIDE NO.	SHEET NO.	MITIGATION
8	3 of 4	This landslide is located beneath proposed Santa Clarita Parkway mostly within a proposed fill area. It is recommended that this landslide be completely removed under the continuous observation of the Project Engineering Geologist. The removal bottoms should be surveyed in order to document the removal for future reference and/or later additional grading. It is anticipated that the removal will range up to 24 feet.
9	3 of 4	This landslide is located in a proposed cut and proposed fill area. It is recommended that this landslide be completely removed under the continuous observation of the Project Engineering Geologist. The removal bottoms should be surveyed in order to document the removal for future reference and/or later additional grading. It is anticipated that the removal will range up to 45 feet.
10	3 of 4	This landslide is located in a proposed cut and proposed fill area. It is recommended that this landslide be completely removed under the continuous observation of the Project Engineering Geologist. The removal bottoms should be surveyed in order to document the removal for future reference and/or later additional grading. It is anticipated that the removal will range up to 35 feet.
11	3 of 4	This landslide is located in proposed cut and proposed fill areas in the vicinity of proposed cut-slopes CS-13 and CS-14. Slope stability analysis on cross section 23-23' indicates this slope/area does not satisfy the city of Santa Clarita factor of safety requirement for slope stability. A remedial buttress fill utilizing a 150 feet wide keyway is required to obtain slope stability factor of safety requirement. Prior to construction of the remedial buttress, it is recommended that this landslide be completely removed. It is anticipated that the removal will range up to 40 feet. In areas to receive fill, the removal bottoms should be surveyed in order to document the removal for future reference.
12	3 of 4	It is recommended that the portions of this landslide located beneath the proposed bike trail be completely removed during the grading operations and replaced with Certified Engineered Fill. It is anticipated that the removal will range up to 24 feet. At the completion of grading, the remaining portion of this landslide will be designated as a Restricted Use Area on the Final Map.

SUMMARY OF LANDSLIDES

LANDSLIDE NO.	SHEET NO.	MITIGATION
13	4 of 4	This landslide is located in the vicinity between proposed cut-slopes CS-16 and CS-19. A portion of this landslide is located in an area where grading is proposed. It is recommended that the portion of this landslide within the graded area be removed under the continuous observation of the Project Engineering Geologist prior to placing certified engineered fill. It is anticipated that the removal will range up to 35 feet. In areas to receive fill, the removal bottoms should be surveyed in order to document the removal for future reference and/or later additional grading.
14	4 of 4	This landslide is located in the vicinity of proposed Cut-Slope CS-19. It is recommended that this landslide be completely removed under the continuous observation of the Project Engineering Geologist. The removal bottoms should be surveyed in order to document the removal for future reference and/or later additional grading. It is anticipated that the removal will range up to 24 feet.

SUMMARY OF CUT-SLOPES

Proposed Cut-Slope CS-1

Location: Sheet 2 of 4 – Vicinity of Lot 514 within Area D

Direction Slope Faces: Semicircular facing west to southwest to south

Slope Parameters: 120± feet high with a 2:1 gradient

Cross Sections: 1-1', 2-2'

Anticipated Geologic Conditions: West facing portion - TQs bedrock anticipated to be dipping 4 - 15° towards the south which is neutral to the proposed slope face; Southwesterly facing portion – TQs bedding anticipated to be oriented such that the bedding planes are dipping out of the proposed slope face. Slope stability analysis of this slope indicates this slope has a safety factor greater than the City of Santa Clarita requirements for slope stability and therefore **grossly stable as designed.**

Mitigation Measures: **Not required**

Proposed Cut-Slope CS-2

Location: Sheet 2 of 4 – Vicinity of Lot 513 within Area D

Direction Slope Faces: Southwest

Slope Parameters: 60± feet high with a 2:1 gradient

Cross Sections: 4-4', 28-28'

Anticipated Geologic Conditions: The eastern portion of the slope is anticipated to expose landslide (Qls-1) material within the proposed cut-slope face; **grossly unstable** due to fractured and broken nature of the landslide material. The western portion of the slope is anticipated to expose Saugus Formation bedrock bedding planes dipping out of the proposed slope face. Slope stability analysis performed on Cross Sections 4-4' and 28-28' indicate this slope has a safety factor greater than the City of Santa Clarita requirements for slope stability and therefore **grossly stable as designed.**

Mitigation Measures: It is recommended that this landslide be **completely removed** from the proposed cut-slope face and replaced using Certified Engineered Fill utilizing a keyway and backdrains designed by the soils engineer. The design of this keyway will be based on the configuration of the future removal. It is anticipated that the removal depth will range up to 35 feet. In areas to receive fill the removal bottoms should be surveyed in order to document the removal for future reference. A Restricted Use Area has been recommended in order to permanently limit groundwater levels to those found to be necessary for stability. Within this Restricted Use Area, it is recommended that no permanent piped water be allowed above elevation 1250 on the existing natural ridge north of Lot 513.

SUMMARY OF CUT-SLOPES

Proposed Cut-Slope CS-3

Location: Sheet 2 of 4 - Lot 513 just westerly of the existing water tank

Direction Slope Faces: South

Slope Parameters: 55± feet high with a 2:1 gradient

Cross Sections: 29-29'

Anticipated Geologic Conditions: TQs bedding anticipated to be dipping out of the proposed slope face. Slope stability analysis indicates this slope has a safety factor greater than the City of Santa Clarita requirements for slope stability. **Grossly stable as designed.**

Mitigation Measures: **No mitigation required.**

Proposed Cut-Slope CS-4

Location: Sheet 2 of 4 - Northeast of Lot 513 just westerly of the existing water tank

Direction Slope Faces: Westerly

Slope Parameters: 35± feet high with a 2:1 gradient

Cross Sections: None

Anticipated Geologic Conditions: TQs bedrock is anticipated to be oriented neutral to the proposed cut-slope face. **Grossly stable**

Mitigation Measures: **No mitigation required**. A Restricted Use Area has been recommended in order to permanently limit groundwater levels to those found to be necessary for stability. Within this Restricted Use Area it is recommended that no permanent piped water be allowed above elevation 1250 on the existing natural ridge north of Lot 513.

Proposed Cut-Slope CS-5

Location: Sheet 2 of 4 – Vicinity of Lots 60-74 within Area A1

Direction Slope Faces: Southerly

Slope Parameters: 25± feet high with a 2:1 gradient

Cross Sections: None; see section 8-8' for cut-slope CS-6 for similar configuration

Anticipated Geologic Conditions: TQs bedrock anticipated to be dipping out of the proposed slope face. Slope stability analysis on cross section 8-8', which depicts similar geologic conditions, indicates this slope satisfies the City of Santa Clarita factor of safety requirement for slope stability. However, due to anticipated seepage from the existing adjacent CLWA pipelines, this slope may be subject to surficial instability. **Grossly stable but surficially unstable**

Mitigation Measures: **Stability fill required** utilizing a 20 feet wide keyway for the south facing portion of the slope.

SUMMARY OF CUT-SLOPES

Proposed Cut-Slope CS-6

Location: Sheet 2 of 4 – Vicinity of Lots 209-213 within Area A1

Direction Slope Faces: West and south

Slope Parameters: 30± feet high with a 2:1 gradient

Cross Sections: 8-8'

Anticipated Geologic Conditions:

- West facing portion - TQs bedrock anticipated to be oriented neutral to the proposed cut-slope face with the exception of a small portion of the slope which may expose landslide (Qls-5b) material. The portion of the slope exposing the TQs bedrock is anticipated to be **grossly stable**; the portion of the slope exposing the landslide material will be **grossly unstable**.
- South facing portion - TQs bedrock anticipated to be dipping out of the proposed slope face. Slope stability analysis indicates this slope satisfies the City of Santa Clarita factor of safety requirement for slope stability. However, due to potential seepage from the existing adjacent CLWA pipelines, this slope may be subject to surficial instability. **Grossly stable but surficially unstable**

Mitigation Measures: All landslide material exposed within the slope will require complete removal and replacement with certified engineered fill. **Stability fill required** utilizing a 20 feet wide keyway for the south-facing portion of the proposed cut-slope. See landslide summary (Table 1) for mitigation options for landslide Qls-5b.

Proposed Cut-Slope CS-7

Location: Sheet 2 of 4 – Vicinity of Lots 218-224 within Area A1

Direction Slope Faces: Southeast

Slope Parameters: 30± feet high with a 2:1 gradient

Cross Sections: 8-8', 22-22'

Anticipated Geologic Conditions: TQs bedrock anticipated to be dipping out of the proposed cut-slope face with the exception of a small portion of the slope, which may expose landslide (Qls-5b) material. Slope stability analysis indicates this slope satisfies the City of Santa Clarita factor of safety requirement for slope stability. However, due to anticipated seepage from the existing adjacent CLWA pipelines, this slope may be subject to surficial instability. **Grossly stable but surficially unstable**

Mitigation Measures: All landslide material exposed within the slope will require complete removal and replacement with certified engineered fill. **Stability fill required** utilizing a 20 feet wide keyway for the remaining portion of the proposed cut-slope exposing TQs material. See landslide summary (Table 1) for mitigation options for landslide Qls-5b.

SUMMARY OF CUT-SLOPES

Proposed Cut-Slope CS-8

Location: Sheet 2 of 4 – Vicinity of Lots 276 and 277 Area A2

Direction Slope Faces: Semicircular – south to east to northeast

Slope Parameters: 35± feet high with a 2:1 gradient

Cross Sections: 30-30'

Anticipated Geologic Conditions: Anticipated to expose Quaternary Terrace Deposits over TQs bedrock dipping up to 12 degrees out of the south to southeast facing portion of the proposed slope face and oriented neutral to the east facing portion of the proposed slope face. Quaternary Terrace Deposits are subject to surficial instability due to their friable nature. Slope stability analysis of this slope indicates this slope satisfies the City of Santa Clarita factor of safety requirement for slope stability. **Grossly stable but surficially unstable**

Mitigation Measures: **Stability fill required** utilizing a 25 feet wide keyway.

Proposed Cut-Slope CS-9

Location: Sheet 3 of 4 – Vicinity of Santa Clarita Parkway and Lot 260 Area A2

Direction Slope Faces: Westerly

Slope Parameters: 32± feet high with a 2:1 gradient

Cross Sections: None

Anticipated Geologic Conditions: Anticipated to expose crudely bedded horizontally oriented Quaternary Terrace Deposits. Quaternary Terrace Deposits are subject to surficial instability due to their friable nature. **Grossly stable but surficially unstable**

Mitigation Measures: **Stability fill required.**

Proposed Cut-Slope CS-10

Location: Sheet 3 of 4 – Lots 388 – 399 Area B

Direction Slope Faces: Southeast

Slope Parameters: 50± feet high with a 2:1 gradient

Cross Sections: 16-16', 17-17', 18-18' & 19-19'

Anticipated Geologic Conditions: Anticipated to expose Quaternary Terrace Deposits over TQs bedrock dipping neutral to 3 degrees out of the proposed slope face. Quaternary Terrace Deposits are subject to surficial instability due to their friable nature. Slope stability analysis of this slope performed on Cross Sections 16-16', 17-17' and 18-18' indicates this slope satisfies the City of Santa Clarita factor of safety requirement for slope stability. **Grossly stable but surficially unstable**

Mitigation Measures: **Stability fill required.**

SUMMARY OF CUT-SLOPES

Proposed Cut-Slope CS-11

Location: Sheet 3 of 4 – South of Lots 470 and 471 within Area B

Direction Slope Faces: Southeast

Slope Parameters: 70± feet high with a 2:1 gradient

Cross Sections: 11-11'

Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping out of the proposed slope face. Slope stability analysis of this slope indicates this slope does not satisfy the City of Santa Clarita factor of safety requirement for slope stability. **Grossly unstable.**.

Mitigation Measures: **Buttress fill required** utilizing an 80 feet wide keyway.

Proposed Cut-Slope CS-12

Location: Sheet 3 of 4 – Vicinity of Lots 463-469 and 471-477 within Area B

Direction Slope Faces: South to southeast

Slope Parameters: 30± feet high with a 2:1 gradient

Cross Sections: 11-11', 27-27'

Anticipated Geologic Conditions: Anticipated to expose landslide (Qls-9) material within the proposed slope face in the vicinity of Lots 407-414 and TQs bedrock dipping out of the proposed slope face in the vicinity of Lots 415-420. Subsurface exploration indicates that perched ground water conditions exist in this vicinity. Slope stability analyses performed on Cross Section 11-11' indicate that this slope satisfies the City of Santa Clarita factor of safety requirement for slope stability. Thus, proposed cut-slope CS-12 is considered to be **grossly stable but surficially unstable** due to anticipated surficial instability due to the anticipated elevated ground water conditions.

Mitigation Measures: **Remove landslide Qls-9** and replace with certified engineered fill. The remaining bedrock portions will require a Stability fill utilizing a 20 feet wide keyway.

Proposed Cut-Slope CS-13

Location: Sheet 4 of 4 – Vicinity of Lots 479, 480 and 415- 421 – Area B

Direction Slope Faces: South to southeast

Slope Parameters: 50± feet high with a 2:1 to 3:1 gradient

Cross Sections: 11-11', 14-14' & 23-23'

Anticipated Geologic Conditions: Anticipated to expose TQs Bedrock dipping out of the proposed cut-slope face. Landslide Qls-11 material is anticipated to be exposed within the eastern portion of the slope. Subsurface exploration indicates perched ground water conditions exist in this vicinity. Slope stability analysis indicates the western portion of this slope satisfies the City of Santa Clarita factor of safety requirement and is considered grossly stable as designed, but potentially **surficially unstable** due to expected surficial instability due to the anticipated perched ground water conditions. Slope stability analysis performed on the eastern portion of this slope indicates this portion of the slope does not satisfy the factor of safety requirement for slope stability. This portion of the slope is considered **grossly unstable** as designed.

Mitigation Measures: Remove entire landslide Qls-11. **Stability fill required** utilizing a 20 to 30 feet wide keyway is proposed for the western portion of this slope. The eastern portion requires **buttress fill** utilizing a 150 feet wide and 24 feet deep keyway constructed at the toe of proposed cut-slope CS-14 in the vicinity of the proposed bike trail. This designed keyway and backcut at the toe of proposed cut-slope CS-14 encompasses the eastern portion of cut-slope CS-13.

Proposed Cut-Slope CS-14

Location: Sheet 4 of 4 – Southeast of Lot 480 adjacent to the Pedestrian/Bike Trail easement.

Direction Slope Faces: Southeast

Slope Parameters: 25± feet high with a 2:1 gradient

Cross Sections: 23-23'

Anticipated Geologic Conditions: Anticipated to expose landslide Qls-11 material within the proposed cut-slope face. The underlying geologic structure of the Saugus Formation bedrock is dipping towards the proposed cut-slope face. Perched groundwater conditions were encountered within bucket auger boring BA-6. Slope stability analysis of this slope indicates this slope does not satisfy the City of Santa Clarita factor of safety requirement for slope stability. **Grossly unstable.**

Mitigation Measures: Remove entire landslide Qls-11 and construct a **Buttress fill** utilizing a 150 feet wide keyway starting from the toe of proposed cut-slope CS-14. This buttress fill encompasses portions of proposed cut-slope CS-13.

Proposed Cut-Slope CS-15

Location: Within the CLWA property north of Newhall Ranch Road Sheet 3 of 4

Direction Slope Faces: Southeast

Slope Parameters: 95± feet high with a 2:1 gradient

Cross Sections: 11-11', 12-12', 13-13' & 14-14'

Anticipated Geologic Conditions: Quaternary Terrace Deposits over TQs bedrock. The TQs bedrock is anticipated to be dipping out of the proposed cut-slope face. Subsurface exploration indicates perched ground water conditions exist in this vicinity. Slope

SUMMARY OF CUT-SLOPES

stability analysis of this slope indicates this slope does not satisfy the City of Santa Clarita factor of safety requirement for slope stability. **Grossly unstable**

Mitigation Measures: **Buttress fill required** utilizing a designed keyway. This keyway is proposed to be 40 feet wide along the western portion and 95 feet wide along the eastern portion of the slope.

Proposed Cut-Slope CS-16

Location: Sheet 4 of 4 – North of Lot 508 in the vicinity of the proposed debris basin within Area C.

Direction Slope Faces: Southeast

Slope Parameters: 50± feet high with a 2:1 gradient

Cross Sections: 15-15', 20-20', & 31-31'

Anticipated Geologic Conditions: An anticlinal axial trace within the Saugus Formation bedrock is anticipated to be exposed within the northern portion of the proposed cut-slope face. South of the axial trace, the TQs bedrock is anticipated to be dipping out of the proposed slope face. North of the axial trace, the TQs bedrock is anticipated to be dipping into the proposed slope face. Local deformation including faulting and fracturing may be present within the core of the anticline axis and may be subject to surficial failures. Quaternary Terrace Deposits are also anticipated to be exposed within the proposed cut-slope and are also subject to surficial failures. Slope stability analysis utilizing rapid drawdown condition indicates this slope satisfies the City of Santa Clarita factor of safety requirement for slope stability and is **grossly stable but surficially unstable.**

Mitigation Measures: **Stability fill required** utilizing a 25 feet wide keyway.

Proposed Cut-Slope CS-17

Location: Sheet 4 of 4 – South of Newhall Ranch Road within open space Lot 504

Direction Slope Faces: Southeast

Slope Parameters: 65± feet high with a 2:1 gradient

Cross Sections: 15-15'

Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping out of the proposed slope face as well as a fill over bedrock situation. Slope stability analysis of this slope indicates this slope does not satisfy the City of Santa Clarita factor of safety requirement for slope stability. **Grossly unstable.**

Mitigation Measures: **Buttress fill required** utilizing a 30 feet wide keyway.

SUMMARY OF CUT-SLOPES

Proposed Cut-Slope CS-18

Location: Sheet 4 of 4 – Vicinity of Lot 509 within Area C.

Direction Slope Faces: South

Slope Parameters: 28± feet high with a 2:1 gradient

Cross Sections: None

Anticipated Geologic Conditions: An anticlinal axial trace within the Saugus Formation bedrock is anticipated to be exposed within the western portion of the proposed cut-slope face. South of the axial trace, the TQs bedrock is anticipated to be dipping out of the proposed slope face. North of the axial trace, the TQs bedrock is anticipated to be dipping into the proposed slope face. Local deformation including faulting and fracturing may be present within the core of the anticline axis and may be subject to surficial failures. Quaternary Terrace Deposits are also anticipated to be exposed within the upper portion of the proposed cut-slope and are also subject to surficial failures. **Grossly stable but surficially unstable.**

Mitigation Measures: **Stability fill required** utilizing a 20 feet wide keyway.

Proposed Cut-Slope CS-19

Location: Sheet 4 of 4 –Lot 510 within Area C

Direction Slope Faces: South to southeast

Slope Parameters: 30± feet high with a 2:1 gradient

Cross Sections: 24-24'

Anticipated Geologic Conditions: Anticipated to expose Quaternary Terrace Deposits over TQs bedrock dipping into the proposed slope face. Quaternary Terrace Deposits are subject to surficial instability due to their friable nature. Landslide Qls-14 anticipated to be exposed within the lower portion of the proposed cut-slope. Potential minor faults and fractures may be present due to a mapped minor fault zone located in this vicinity. Lower portion of the cut-slope **grossly unstable** due to the presence of landslide material and **surficially unstable** due to the Qt deposits and potential minor fault zone located in this vicinity.

Mitigation Measures: Remove landslide Qls-14 and construct a **Stability fill.**

FORM 159

STATE OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Inglewood, California

February 13, 1964

Mr. O. W. Chonette
P. O. Box 3337
Ventura, California
Agent for TEXACO INC.

DEAR SIR:

Your report of abandonment of Well No. "N. L. & F." H-1, Proj. ~~S~~ec. 24, T. 4 N., R. 16 W., S. B. B. & M., - - - field, Los Angeles County, dated February 4, 1964, received February 7, 1964, has been examined in conjunction with records filed in this office.

A review of the reports and records shows that the requirements of this Division, which are based on all information filed with it, have been fulfilled.

JLZ:es
cc - Mr. E. R. Murray-Aaron
Mr. R. B. Livesay
Conservation Comm.
Production Dept.
Mr. L. A. Dutton
Fire Prevention Bureau

BLANKET BOND.

E. R. MURRAY-AARON
State Oil and Gas Supervisor

By
Deputy Supervisor

FORM 159 (9-49)

①

STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Inglewood California

May 25 1961

Mr. Edward Lustgarten
16187 Royal Oak Road
Encino California
Agent for EDWARD LUSTGARTEN

DEAR SIR:

Your report of abandonment of Well No. "Lucky Lusty" 3, Sec. 14, T. 4 N, R. 16 W, S B B. & M., --- field, Los Angeles County, dated May 16, 1961, has been examined in conjunction with records filed in this office.

A review of the reports and records shows that the requirements of this Division, which are based on all information filed with it, have been fulfilled.

MAP	MAP BOOK	CARDS	BOND	[illegible] 114	[illegible]
13.13 5-26	2 -61		150 k 5-25-61		

DER:es
cc Mr E H Musser
Mr Edward Lustgarten
Conservation Comm
Production Dept
Mr L A Dutton
Fire Prevention Bureau

E. H. MUSSER
State Oil and Gas Supervisor

By
Deputy Supervisor

37864 3-61 5M SPO

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Santa Paula, California
May 12, 1981

Mr. Geo. Atha, Agent
Edward Lustgarten
2221 California Street
San Marino, CA 91108

Your report of abandonment of well "Lucky Lusty" 1 (Name and number),
A.P.I. No. 037-01116, Section 14, T. 4N, R. 16W, S.B. B. & M.,
Bouquet Canyon field, Los Angeles County,
dated Feb. 14, 1972, received Feb. 18, 1972 has been examined in conjunction with records filed in this office, and we have determined that all of the requirements of this Division have been fulfilled.

MAP	MAP BOOK	CARDS	BOND	FORMS 114	FORMS 121
OR Dr		—	—	—	✓

M. G. MEFFERD
State Oil and Gas Supervisor

By John L. Hardoin
Deputy Supervisor
John L. Hardoin

FORM 159 (9-49)

STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

(31)

Inglewood California
May 14 1958

Mr. C F Bowden
P O Box 7600
Los Angeles 54 California
Agent for UNION OIL CO OF CALIFORNIA

DEAR SIR:

Your report of abandonment of Well No. "Bonelli" 1, Sec. 14, T. 4 N, R. 16 W, S B B. & M., - - - field, Los Angeles County, dated April 16, 1958, has been examined in conjunction with records filed in this office.

A review of the reports and records shows that the requirements of this Division, which are based on all information filed with it, have been fulfilled.

MAP	MAP BOOK	CARDS	BOND	FORMS 114	FORMS 121
18A RJ 5-16	RJ		Blanket		GB

E. H. MUSSER
State Oil and Gas Supervisor

By
Deputy Supervisor

cc Mr E H Musser
Mr F R Wade
Conservation Committee
Mr L A Dutton
Fire Prevention Bureau
Geol Dept

es

Appendix A

JOB NO. 98-1571-9
LOGGED BY CJS

Trench Log No. 1

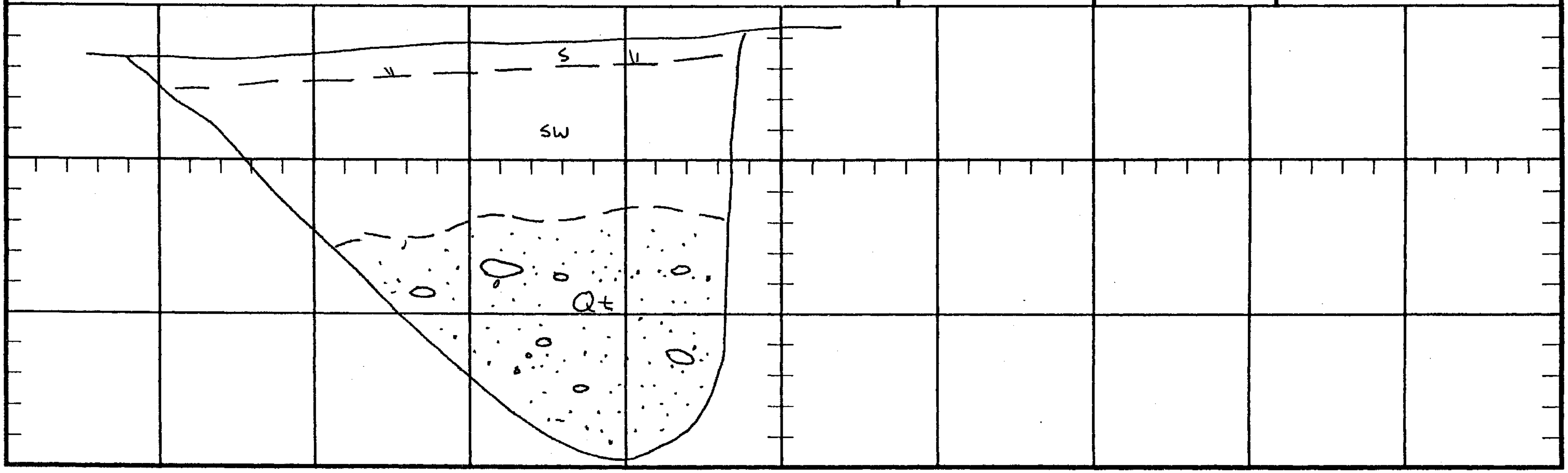
PROJECT Panhandle
DATE 4/4/03

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 10"	SOIL; s, Pale brown fine-grained silty sand, loose; dry; numerous roots			Trenches 1 thru 11 excavated on 8/6/98 using a 24" bucket on a trackmounted backhoe
10" - 6'	SLOPEWASH, sw, Moderate reddish-brown to moderate yellowish-brown, very fine- to fine-grained, silty to clayey sand, dense, dry to slightly damp			
6 - 14'	QUATERNARY TERRACE; Qt, Moderate brown to moderate yellow-brown, medium- to very coarse-grained, gravelly sand with 10-15% sub-angular to subrounded, granitic cobbles and boulders up to ~18" maximum dimension; very friable; damp to moist			Caving Below 6' No Ground Water

N 65 E →

SCALE 1" = 5'

TOTAL DEPTH 14 Ft.



ALLAN E. SEWARD

JOB NO. 98-1571-9

LOGGED BY CJS

Trench Log No. 2

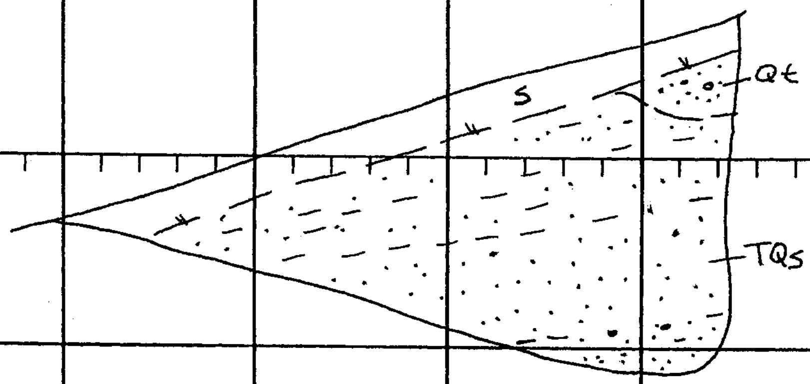
PROJECT Panhandle

DATE 4/4/03

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 1'	SOIL; s, Light to moderate greyish-brown, fine-grained silty sand; loose; dry			
1 - 2'	QUATERNARY TERRACE; Qt, Moderate reddish-brown, medium- to coarse-grained gravelly sand with cobbles and silt binder; dense; damp			
2 - 10'	SAUGUS FORMATION; TQs, Moderate reddish-brown clayey siltstone with sand, and moderate yellowish-gray; medium- to coarse-grained sandstone; contact very gradational and indistinct; moderately hard to hard; damp to moist	B:N40W,9SW		No Ground Water No Caving TOTAL DEPTH 10 Ft.

SCALE 1" = 5'

N 45 E →



ALLAN E. SEWARD

JOB NO. 98-1571-9

LOGGED BY CJS

Trench Log No. 3

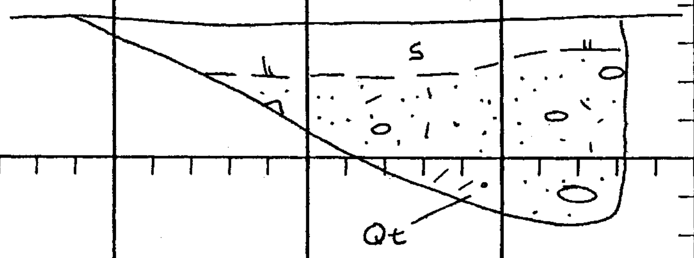
PROJECT Panhandle

DATE 4/4/03

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 18" SOIL; s, Moderate brown to moderate yellow-brown, fine-grained silty sand with pebbles; dry to slightly damp; loose; very porous; numerous roots 18" - 5.5' QUARTNERY TERRACE; Qt, Moderate to dark reddish-brown; medium- to coarse-grained silty to clayey sand with gravel and ∼5% rounded granitic cobbles; very dense; damp			No Ground Water No Caving TOTAL DEPTH 5.5'

N 25 W

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 98-1571-9

LOGGED BY CJS

Trench Log No. 4

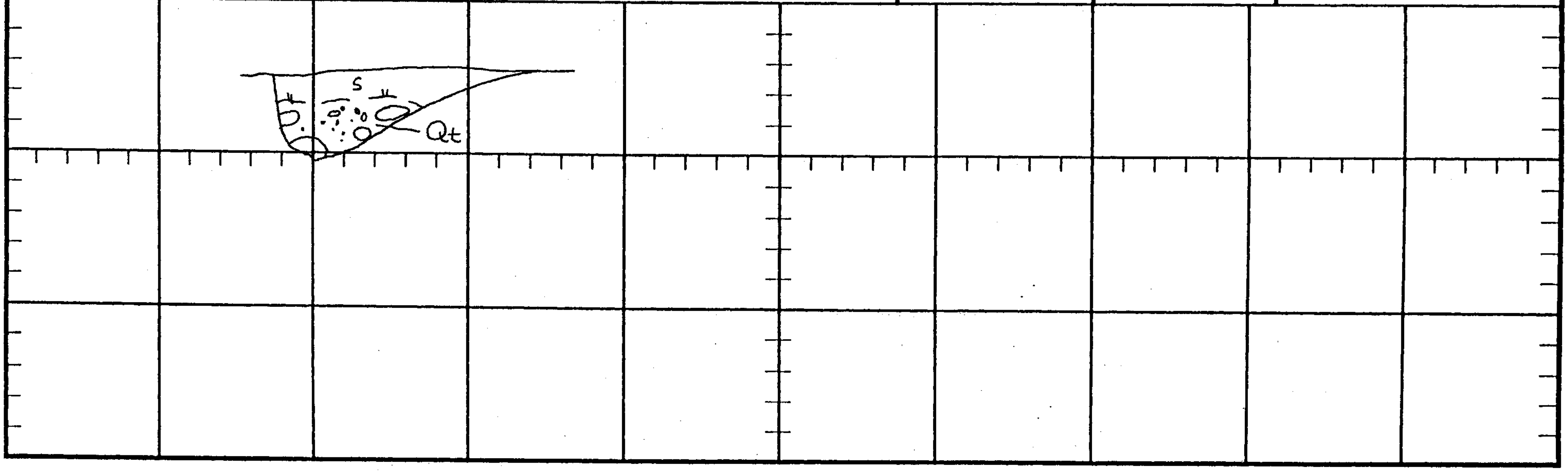
PROJECT Panhandle

DATE 4/4/03

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 1'	SOIL; s, Moderate brown to moderate yellow-brown; very fine- to fine-grained, silty sand; loose; dry; numerous roots			
1 - 2.5'	QUATERNARY TERRACE; Qt, Moderate reddish-brown medium- to coarse-grained silty to clayey sand with gravel; boulders range up to 24" maximum dimension; dense; damp; refusal at 2 1/2 feet			Refusal on boulders at 2 1/2 ft. No Ground Water No Caving TOTAL DEPTH 2.5 Ft.

SCALE 1" = 5'

N 30 W



ALLAN E. SEWARD

JOB NO. 98-1571-9

LOGGED BY CJS

Trench Log No. 5

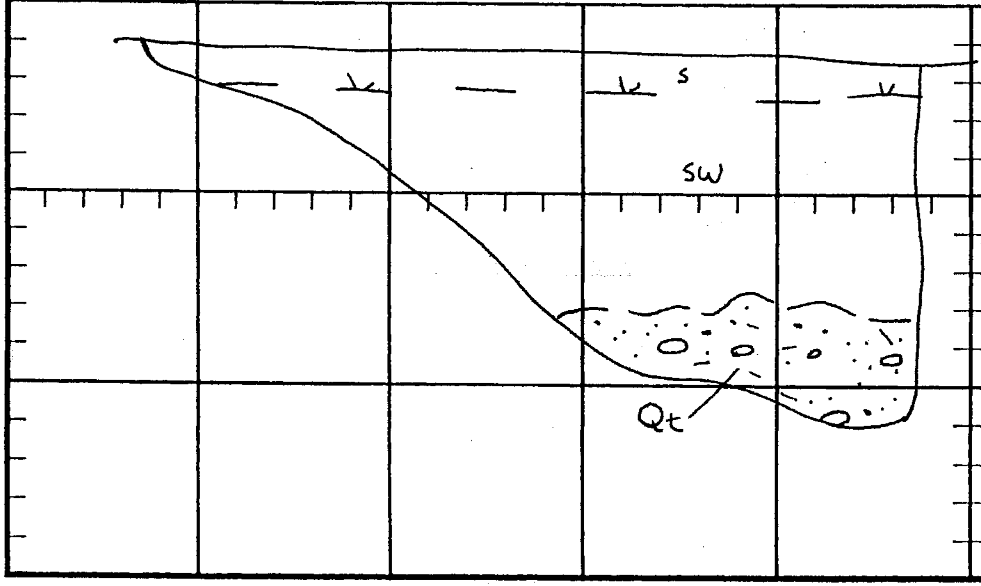
PROJECT Panhandle

DATE 4/4/03

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 12"	<u>SOIL</u>; s, Moderate brown, very fine- to fine-grained silty sand; dry; loose			
12" - 6.5'	<u>SLOPEWASH</u>; sw, Moderate reddish-brown to moderate yellowish-brown, fine-grained silty to clayey sand; dense; damp; excavates with blocky texture			
6.5 - 9.5'	<u>QUATERNARY TERRACE</u>; Qt, Light brown to light yellow brown, medium- to very coarse-grained pebbly sand with 5-10% rounded granitic cobbles; very friable; damp; upper contact irregular			No Ground Water No Caving TOTAL DEPTH 9.5 Ft.

SCALE 1" = 5'

N 60 W



ALLAN E. SEWARD

JOB NO. 98-1571-9

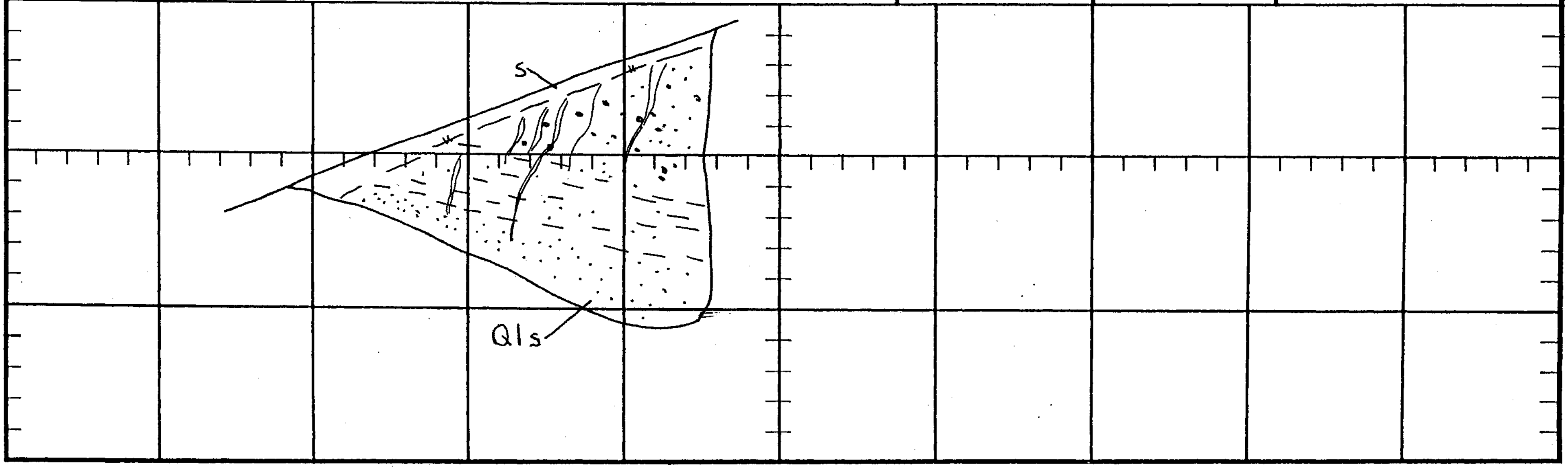
LOGGED BY CJS

Trench Log No. 6

PROJECT Panhandle

DATE 4/4/03

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 6" SOIL; s, Light brown, fine- to medium-grained silty sand with isolated pebbles and cobbles; loose; damp; numerous roots			
6" - 9.5' LANDSLIDE DEBRIS; Qls, Light-gray, coarse-grained, pebbly sandstone; reddish-brown mudstone and light yellowish-brown, fine- to medium-grained sandstone; slightly fractured with carbonate along fractures; overall hard and damp	B:N58W,13SW		
SCALE 1" = 5' N 66 E			No Ground Water No Caving TOTAL DEPTH 9.5 Ft.



ALLAN E. SEWARD

JOB NO. 98-1571-9

LOGGED BY CJS

Trench Log No. 7

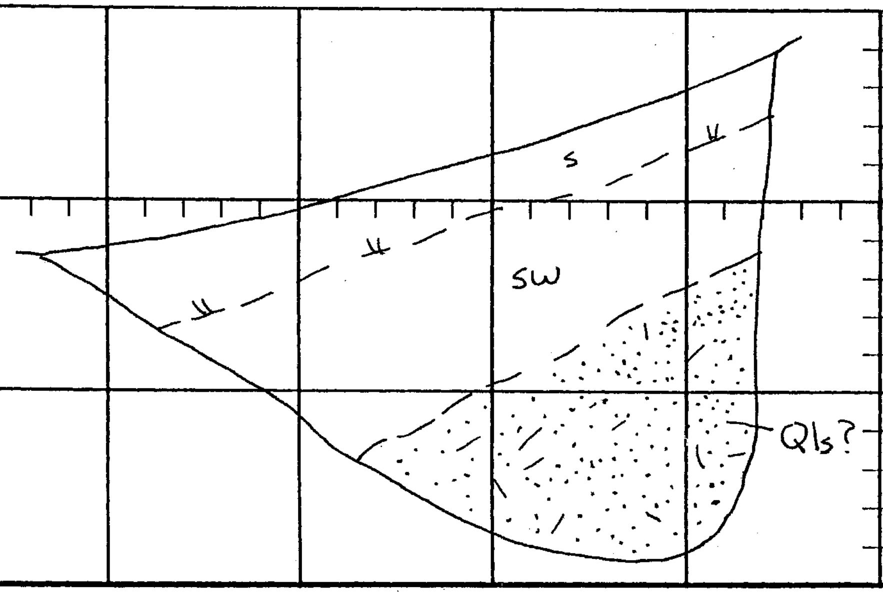
PROJECT Panhandle

DATE 4/4/03

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 18"	SOIL; s, Moderate brown, fine- to coarse-grained silty sand with scattered gravel and rare cobbles; loose; damp			
18" - 5'	SLOPEWASH; sw, Moderate brown to moderate reddish-brown, fine- to medium-grained silty sand with gravel and cobbles; moderately dense; damp to moist			
5 - 13.5'	LANDSLIDE GRABEN BACKFILL?; Qls, Mixture of yellowish-grey, medium-grained sandstone and pale reddish-brown, fine- to medium-grained silty sandstone; all highly weathered with carbonate stringers common; overall only moderately dense; damp to moist			No Ground Water No Caving TOTAL DEPTH 13.5 Ft.

SCALE 1" = 5'

N 10 E



ALLAN E. SEWARD

JOB NO. 98-1571-9

LOGGED BY CJS

Trench Log No. 8

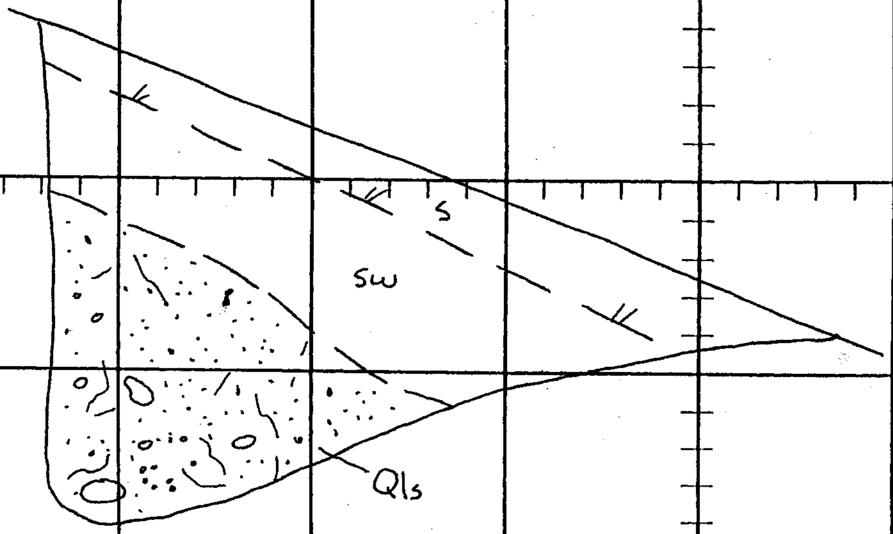
PROJECT Panhandle

DATE 4/4/03

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 12" SOIL; s, Light- to moderate-brown, fine- to coarse-grained silty sand; loose; damp 12" - 4.5' SLOPEWASH; sw, Light-brown, fine- to coarse-grained silty sand with minor gravel and rare boulders (up to 12"); moderately dense; damp 4.5 - 12.5' LANDSLIDE DEBRIS; Qls, Pale reddish-brown to pale yellowish-brown; chaotic mixture of mudstone, sandstone and pebbly sandstone with isolated cobbles and boulders; no discernible structure; excavates easily; carbonate stringers pervasive			No Ground Water No Caving TOTAL DEPTH 12.5 Ft.

SCALE 1" = 5'

N 60 W



ALLAN E. SEWARD

JOB NO. 98-1571-9
LOGGED BY CJS

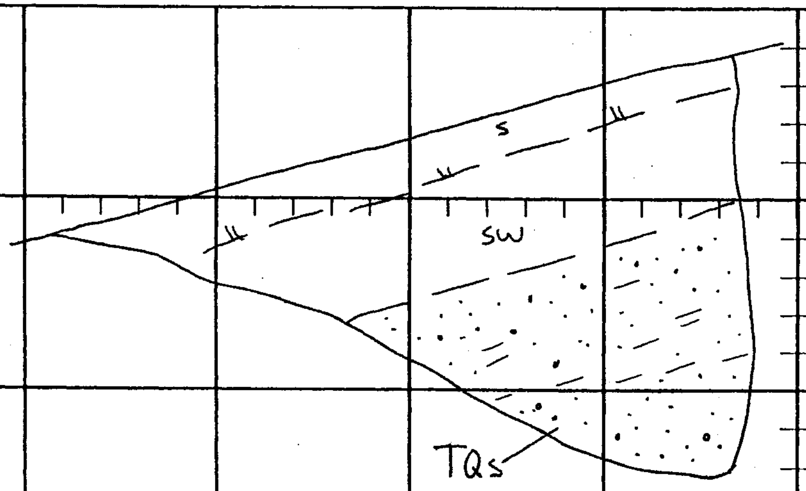
Trench Log No. 9

PROJECT Panhandle
DATE 4/4/03

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 12"	<u>SOIL</u>; s, Moderate-brown to moderate orange-brown; fine- to medium-grained silty sand with minor gravel; loose; dry to damp			
12" - 4'	<u>SLOPEWASH</u>; sw, Moderate yellow-brown, fine- to medium-grained, silty sand; moderately dense; moist			
4 - 11.5'	<u>BEDROCK</u>; TQs, Moderate yellow-brown, fine- to medium-grained, slightly silty sandstone, and yellowish-gray fine- to medium-grained, very uniform sandstone; yellow-gray sandstone is very friable, with texture, consistency and cementation similar to beach sand	N29E,5SE		Minor Caving below 6' No Ground Water TOTAL DEPTH 11.5 Ft.

SCALE 1" = 5'

N 72 W



ALLAN E. SEWARD

JOB NO. 98-1571-9
LOGGED BY CJS

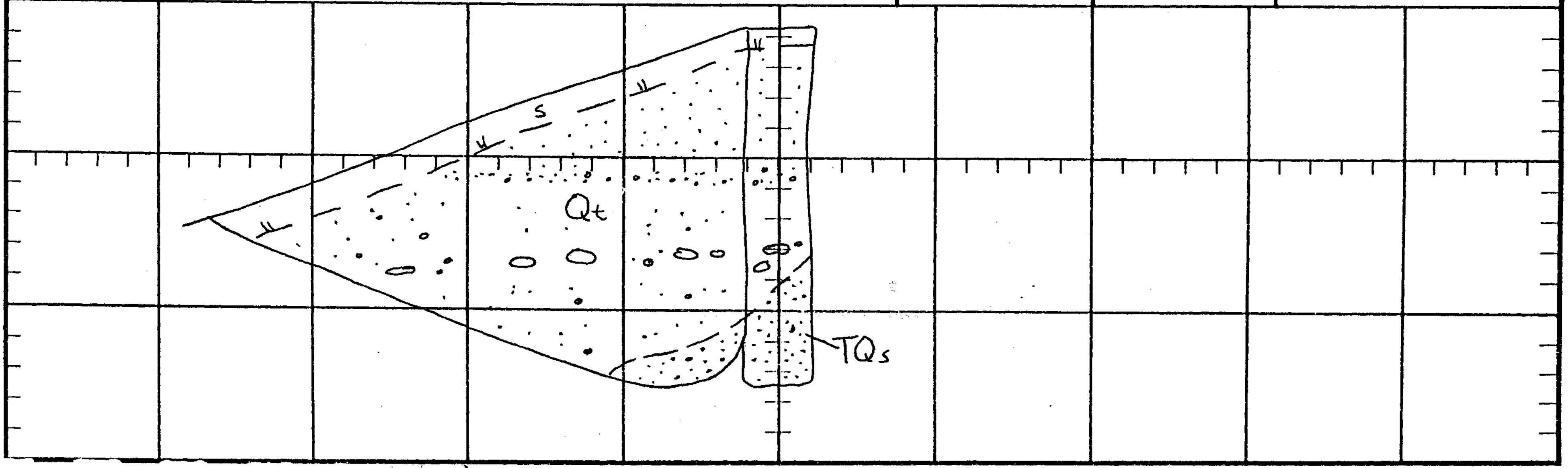
Trench Log No. 10

PROJECT Panhandle
DATE 4/4/03

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 6"	SOIL; s, Light- to moderate grayish-brown; fine-grained, silty sand with gravel; loose; dry			
6" - 7.5'	QUATERNARY TERRACE; Qt, Moderate yellow-brown, medium-grained gravelly sand with 5-10% rounded granitic cobbles and isolated boulders up to 18" maximum dimension; friable; dense; moist; lower contact sharp and inclined to the north		N82E, 48NW (contact Qt/ TQs)	
7.5 - 11'	BEDROCK; TQs, Pale yellowish-gray, medium- to coarse-grained pebbly sandstone; moderately hard to hard; damp	N45E,10SE		
				No Ground Water No Caving TOTAL DEPTH 11 Ft.

SCALE 1" = 5'

Due West



JOB NO. 98-1571-9

LOGGED BY CJS

Trench Log No. 11

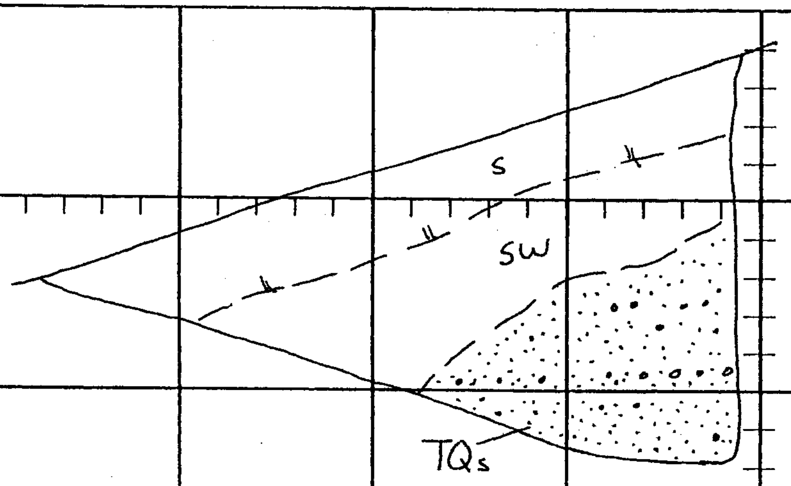
PROJECT Panhandle

DATE 4/4/03

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 2'	SOIL; s, Moderate reddish-brown, fine-grained, silty to clayey sand with scattered pebbles; moderately dense; damp			
2 - 4'	SLOPEWASH: sw, Moderate yellowish-brown, fine-grained, silty sand, moderately dense; moist			
4 - 11'	BEDROCK; TQs, Moderate yellowish-gray, fine- to coarse-grained, pebbly sandstone; moderately hard to hard; damp	N57E, 4SE		
				No Ground Water No Caving TOTAL DEPTH 11 Ft.

SCALE 1" = 5'

N 10 W →



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JOB NO. 98-1571-9

LOGGED BY CJS

Trench Log No. 12

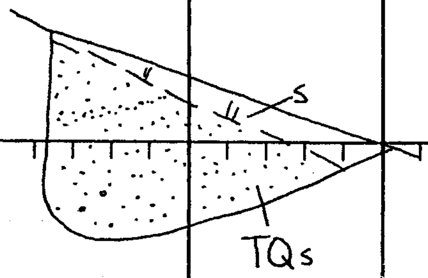
PROJECT Panhandle

DATE 4/4/03

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 6"	SOIL; s, Light-brown, fine- to medium-grained, silty sand; loose; dry to slightly damp			Trenches 12 through 27 excavated on 8/7/98 using a 24" bucket on a track-mounted backhoe
6" - 5.5'	BEDROCK; TQs, Pale yellowish-gray, fine- to medium-grained sandstone; moderately hard to hard; damp; bedding defined by thin (1-2") finer-grained inter-bed stained with FeOx.	N52E,9NW		
				No Ground Water No Caving
				TOTAL DEPTH 5.5 Ft.

SCALE 1" = 5'

N 65 W



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JOB NO. 98-1571-9

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Trench Log No. 13

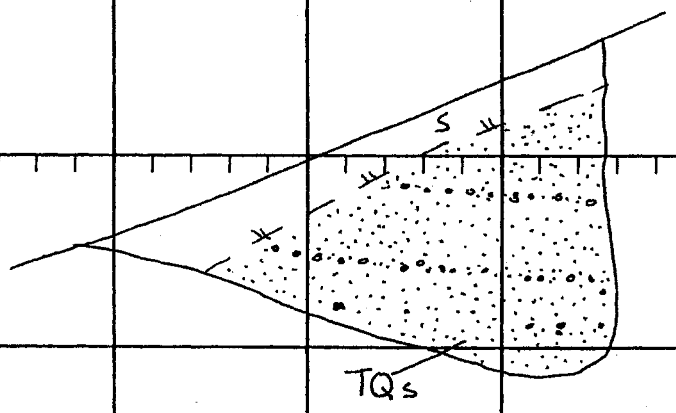
PROJECT Panhandle

DATE 4/4/03

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 12"	SOIL; s, Light to moderate yellow-brown, fine-grained silty sand with minor coarse-grained fraction; loose; dry to slightly damp			
12" - 8.5'	BEDROCK; TQs, Pale yellow-gray to moderate yellow-brown; medium-grained; silty sandstone with pebble lenses, moderately hard; damp	N70E,10NW		No Ground Water No Caving TOTAL DEPTH 8.5 Ft.

SCALE 1" = 5'

N 13 W



ALLAN E. SEWARD

JOB NO. 98-1571-9
LOGGED BY CJS

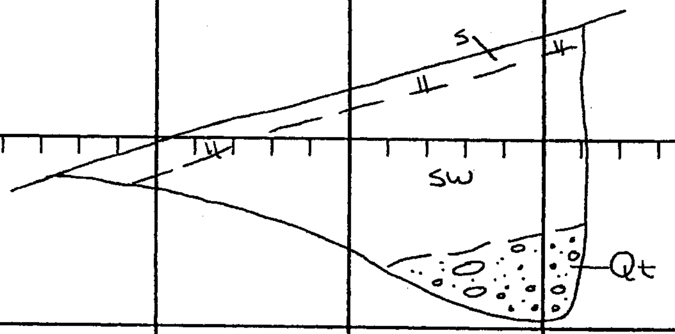
Trench Log No. 14

PROJECT Panhandle
DATE 4/4/03

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 6"	SOIL; s, Light greyish-brown; fine- to medium-grained, silty sand with minor gravel; loose; dry			
6" - 5'	SLOPEWASH; sw, Moderate reddish-brown, fine-grained clayey sand to sandy clay with ~5% gravel and cobbles			
5 - 8'	QUATERNARY TERRACE; Qt, Moderate yellowish-brown to moderate reddish-brown, medium- to very coarse-grained, gravelly sand with 10-20% rounded granitic cobbles (cobbles range up to about 10" maximum dimension); friable; damp			No Ground Water No Caving TOTAL DEPTH 8 Ft.

SCALE 1" = 5'

N 47 W



ALLAN E. SEWARD

JOB NO. 98-1571-9

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Trench Log No. 15

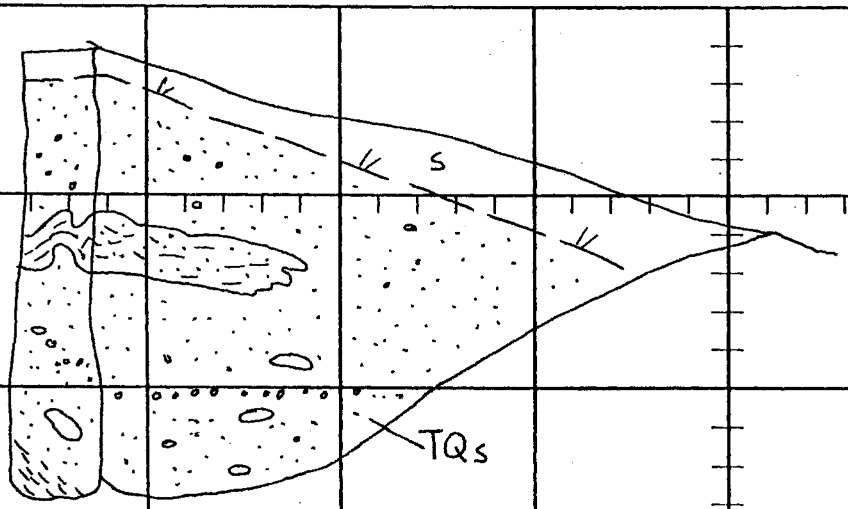
PROJECT Panhandle

DATE 4/4/03

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 12" SOIL; s, Moderate brown to moderate reddish-brown; fine- to medium-grained silty to clayey sand with minor gravel; loose; dry 12" - 12' BEDROCK; TQs, Moderate yellow-brown, medium- to coarse-grained, pebbly to cobbly sandstone and moderate reddish-brown sandy siltstone; deeply weathered; damp; bedding poorly defined	N85E,38NW		No Ground Water No Caving TOTAL DEPTH 12 Ft.

SCALE 1" = 5'

N 80 W



ALLAN E. SEWARD

JOB NO. 98-1571-9
LOGGED BY CJS

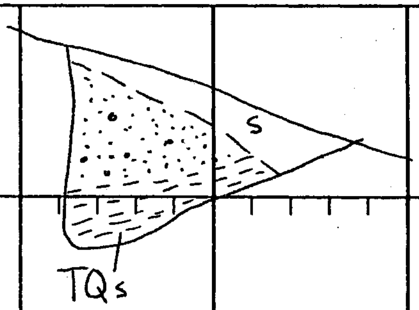
Trench Log No. 16

PROJECT Panhandle
DATE 4/4/03

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 6"	SOIL; s, Light-brown to light yellow-brown; fine- to coarse-grained silty sand with gravel; loose; dry			
6" - 5.5'	BEDROCK; TQs, Light- to moderate-yellow-brown, coarse-grained, pebbly sandstone, and moderate reddish-brown, fine-grained, silty sandstone to sandy silstone; hard to very hard; damp	Due North 4° East		Refusal at 5.5' No Ground Water No Caving
				TOTAL DEPTH 5.5 Ft.

N 70 E

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 98-1571-9

LOGGED BY CJS

Trench Log No. 17

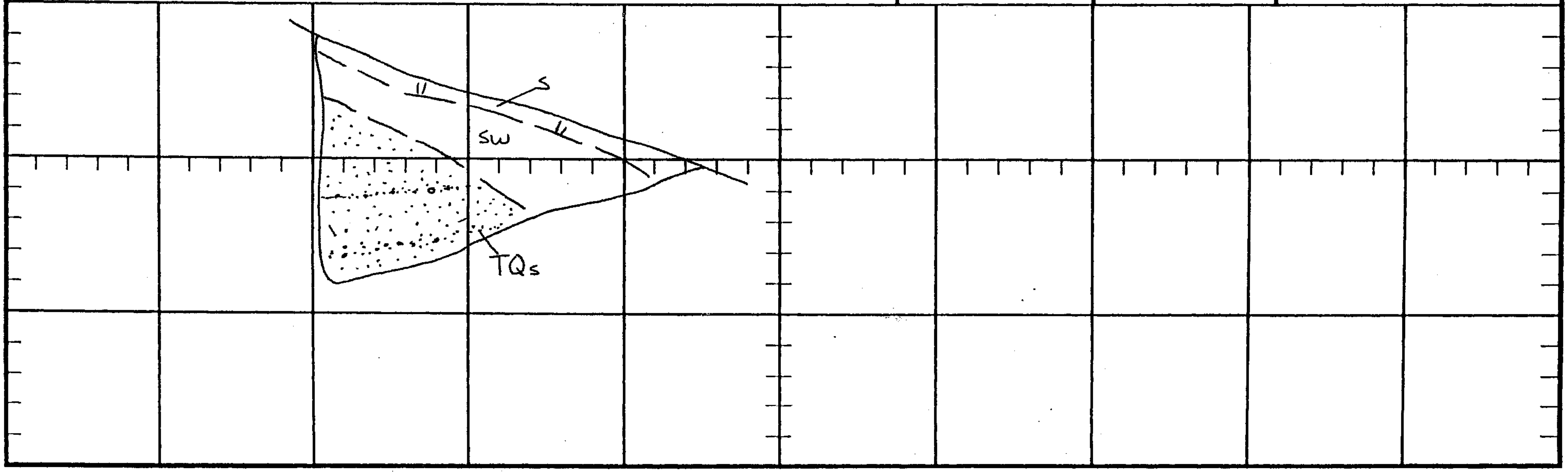
PROJECT Panhandle

DATE 4/4/03

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 12"	SOIL; s, Moderate brown, fine- to medium-grained, silty sand with minor gravels, loose; damp			
12" - 2.5'	SLOPEWASH; sw, Moderate reddish-brown, fine- to medium-grained, silty sand with gravel; moderately dense; damp			
2.5 - 8'	BEDROCK; TQs, Moderate yellow-brown to yellow, medium- to very coarse-grained, pebbly sandstone; hard; damp; bedding defined by pebble lineations	N55W, 9NE		
				No Ground Water No Caving TOTAL DEPTH 8 Ft.

SCALE 1" = 5'

N 37 W



ALLAN E. SEWARD

JOB NO. 98-1571-9

LOGGED BY CJS

Trench Log No. 18

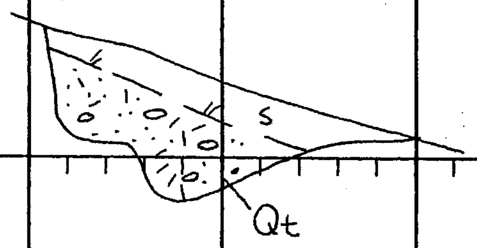
PROJECT Panhandle

DATE 4/4/03

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 12" SOIL; s, Dark-brown, fine-grained, silty to clayey sand with gravel; loose; damp 12" - 5' QUATERNARY TERRACE; Qt, Moderate to dark reddish-brown, medium- to coarse-grained clayey sand with 5-10% rounded granitic and volcanic cobbles; very dense; damp			No Ground Water No Caving TOTAL DEPTH 5 Ft.

SCALE 1" = 5'

N 23 E



ALLAN E. SEWARD

JOB NO. 98-1571-9
LOGGED BY CJS

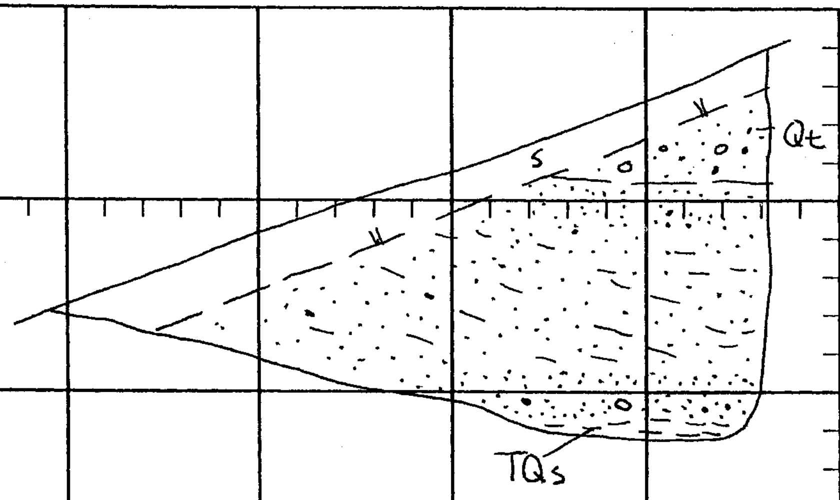
Trench Log No. 19

PROJECT Panhandle
DATE 4/4/03

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 12"	SOIL; s, Light- to moderate-brown, fine- to medium-grained, silty to clayey sand with scattered pebbles and cobbles; loose; dry to damp			
12" - 3'	QUATERNARY TERRACE; Qt, Moderate-brown, fine- to coarse-grained, silty sand with 10% pebbles and cobbles; dense; damp; lower contact approximately horizontal			
3 - 10'	BEDROCK; TQs, Pale greenish-gray, medium-grained, pebbly sandstone and moderate reddish-brown silty sandstone to sandy siltstone; locally clayey; moderately hard; damp	N58W,21NE		No Ground Water No Caving TOTAL DEPTH 10 Ft.

SCALE 1" = 5'

N 55 W



ALLAN E. SEWARD

JOB NO. 98-1571-9

LOGGED BY CJS

Trench Log No. 20

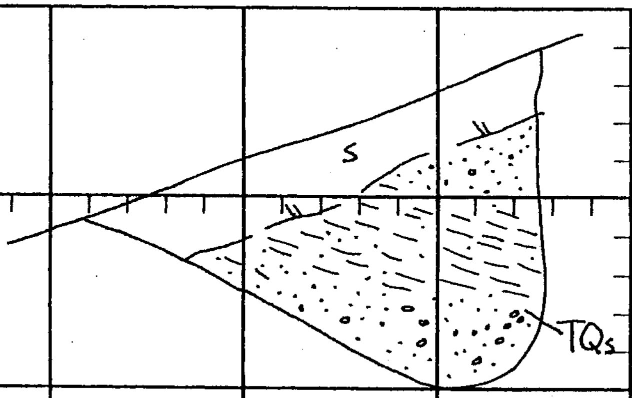
PROJECT Panhandle

DATE 4/4/03

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 1.5'	SOIL; s, Moderate grayish-brown, fine-grained silty sand with pebbles and cobbles; loose; dry			
1.5 - 9'	BEDROCK; TQs, Moderate yellow to yellowish-gray, medium- to coarse-grained, pebbly sandstone and moderate reddish-brown sandy mudstone; moderately hard; damp	N66W,18NE		No Ground Water No Caving
				TOTAL DEPTH 9 Ft.

SCALE 1" = 5'

N 35 W



ALLAN E. SEWARD

JOB NO. 98-1571-9

LOGGED BY CJS

Trench Log No. 21

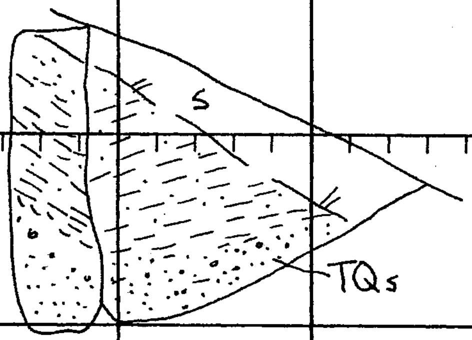
PROJECT Panhandle

DATE 4/4/03

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 6"	SOIL; s, Moderate-brown, fine-grained, silty sand, loose; dry			
6" - 8'	BEDROCK; TQs, Moderate reddish-brown, silty sandstone and greenish-gray, fine- to medium-grained slightly pebbly sandstone; moderately hard; damp	N34W,56NE		No Ground Water No Caving TOTAL DEPTH 8 Ft.

SCALE 1" = 5'

N 32 W



ALLAN E. SEWARD

JOB NO. 98-1571-9

LOGGED BY CJS

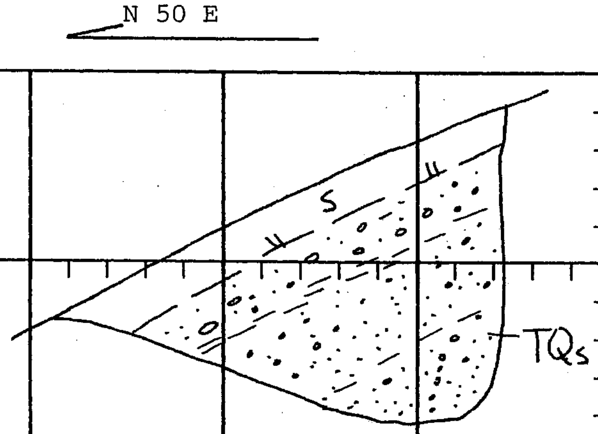
Trench Log No. 22

PROJECT Panhandle

DATE 4/4/03

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 12"	SOIL; s, Moderate brown, fine- to medium-grained, silty sand, with gravel; loose; dry			
12" - 8.5'	BEDROCK; TQs, Moderate grayish-yellow, medium- to coarse-grained sandstone to pebbly sandstone; hard to very hard; damp	N63W,39NE		No Ground Water No Caving TOTAL DEPTH 8.5 Ft.

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 98-1571-9

LOGGED BY CJS

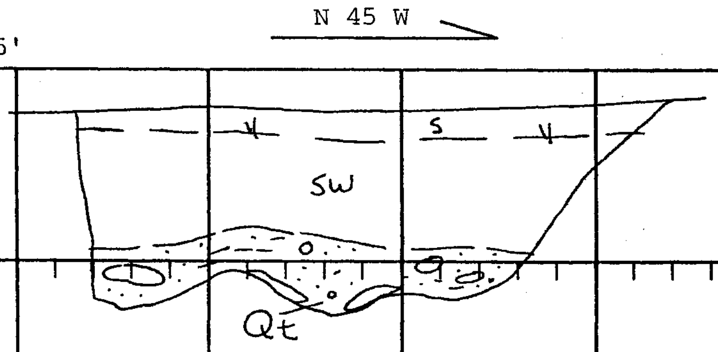
Trench Log No. 23

PROJECT Panhandle

DATE 4/4/03

	LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 12"	SOIL; s, Moderate greyish-brown, fine- to medium-grained, silty sand, loose; dry			
12" - 4'	SLOPEWASH; sw, Moderate reddish-brown, fine- to medium-grained silty sand with minor clay and scattered cobbles; moderately dense; damp to moist			
4 - 5'	QUATERNARY TERRACE; Qt, Moderate-brown, fine- to medium-grained, silty to clayey sand with cobbles and boulders; very dense; damp to moist; refusal on large boulders at 5 ft.			Possibly Qls affected
				Refusal on boulders at 5 ft. No Ground Water No Caving
				TOTAL DEPTH 5 Ft.

SCALE 1" = 5'



ALLAN E. SEWARD

JOB NO. 98-1571-9

LOGGED BY CJS

Trench Log No. 24

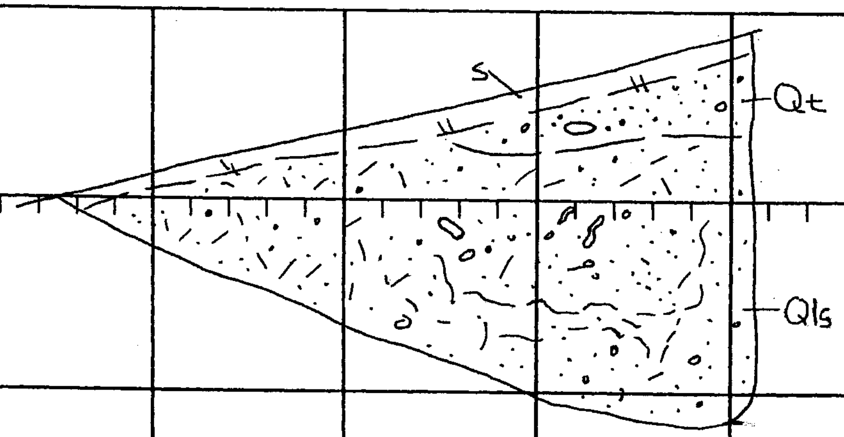
PROJECT Panhandle

DATE 4/4/03

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 6"	<u>SOIL</u>; s, Moderate greyish-brown, fine-grained, silty sand; loose; dry			
6" - 2'	QUATERNARY TERRACE; Qt, Moderate yellow-brown; fine-coarse-grained silty sand with pebbles and cobbles; moderately dense to dense; damp			
2 - 10'	LANDSLIDE DEBRIS; Qls, Pale yellow to pale yellow-brown; fine- to medium-grained silty sandstone; pebbly sandstone and reddish-brown sandy siltstone; highly fractured with mixing of lithologies common; carbonate stringers pervasive; clasts oriented randomly, overall only moderately dense; damp			No Ground Water No Caving TOTAL DEPTH 10 Ft.

SCALE 1" = 5'

N 10 W



ALLAN E. SEWARD

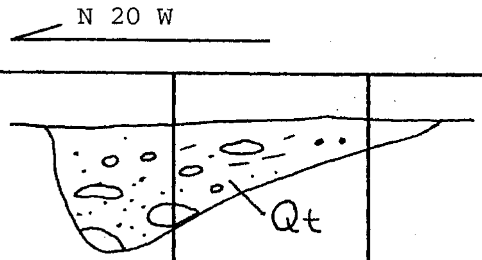
JOB NO. 98-1571-9
LOGGED BY CJS

Trench Log No. 25

PROJECT Panhandle
DATE 4/4/03

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 4'	QUATERNARY TERRACE; Qt, Moderate reddish-brown, fine- to coarse-grained silty to clayey sand with 10-20% rounded granitic cobbles and boulders that range up to 24" maximum dimension; very dense; dry to slightly damp			No Ground Water No Caving TOTAL DEPTH 4 Ft.

SCALE 1" = 5'



JOB NO. 98-1571-9
LOGGED BY CJS

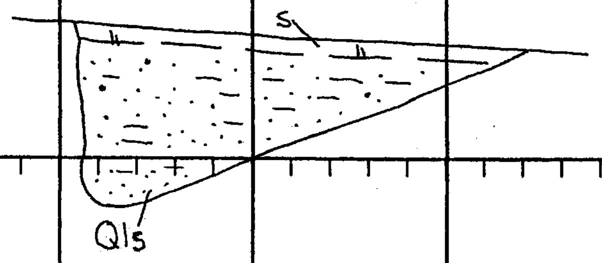
PROJECT Panhandle
DATE 4/4/03

Trench Log No. 26

LITHOLOGY		BEDDING	OTHER	COMMENTS
0 - 6"	<u>SOIL</u>; s, Moderate reddish-brown to moderate yellowish-brown, fine- to medium-grained, silty sand; loose; dry			
6" - 4.5'	<u>LANDSLIDE DEBRIS</u>; Qls, Moderate reddish-brown, sandy mudstone and pale yellowish-gray medium-grained sandstone; contact poorly defined-gradational over 12"; hard to very hard; damp	E-W, 15S (Poor)		No Ground Water No Caving TOTAL DEPTH 4.5 Ft.

SCALE 1" = 5'

N 35 E



ALLAN E. SEWARD

JOB NO. 98-1571-9

LOGGED BY CJS

Trench Log No. 27

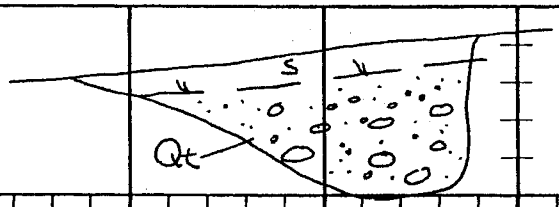
PROJECT Panhandle

DATE 4/4/03

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 12" SOIL; s, Moderate grayish-brown, fine- to medium-grained silty sand; loose; dry 12" - 4' QUATERNARY TERRACE; Qt, Moderate reddish-brown fine- to coarse-grained silty to clayey sand with 10-15% cobbles; dense to very dense; damp			Refusal on cobbles at 4 ft. No Ground Water No Caving TOTAL DEPTH 4 Ft.

SCALE 1" = 5'

N 20 W



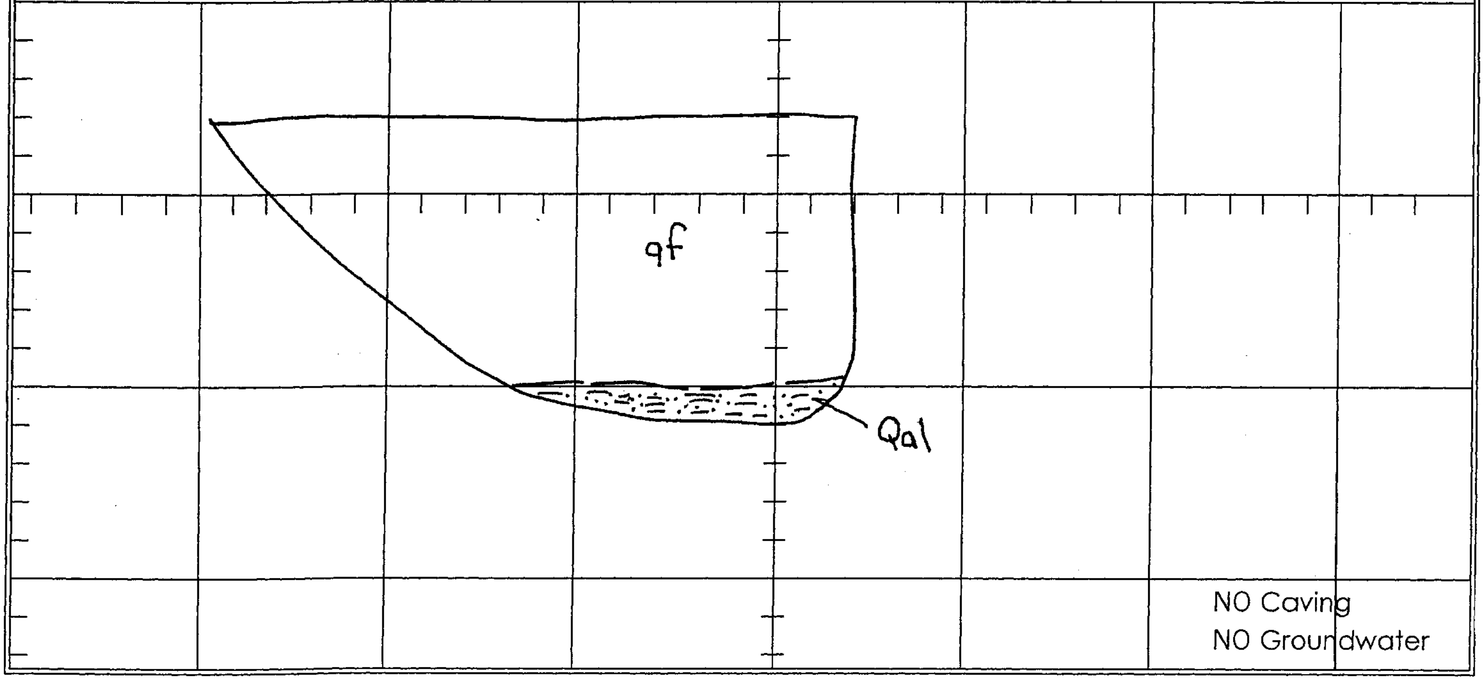
ALLAN E. SEWARD

CLIENT:	Newhall Land	JOB NO:	03-1571-4
PROJECT:	Tentative Tract 53425, River Park City of Santa Clarita, California	DATE:	4/4/03
		LOGGED BY:	VCG
		EXCAVATED:	3/20/2000
EXCAVATION METHOD:	Rubber-Tired Backhoe w/24" Bucket	ELEVATION:	

TRENCH LOG NO. T-28

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0					**ARTIFICIAL FILL; af, (0-7 ft.)** @ 0' Medium to dark-brown fine- to coarse grained silty sand with minor gravel; loose; damp				
5									
					QUATERNARY ALLUVIUM; Qal, (7-8 ft.) @ 7' Light reddish-brown silty sand with scattered pebbles; contact vague and indistinct				
10									
15									
20									

TOTAL DEPTH: 8 feet ←N34W SCALE: 1 inch = 5 feet



NO Caving
NO Groundwater

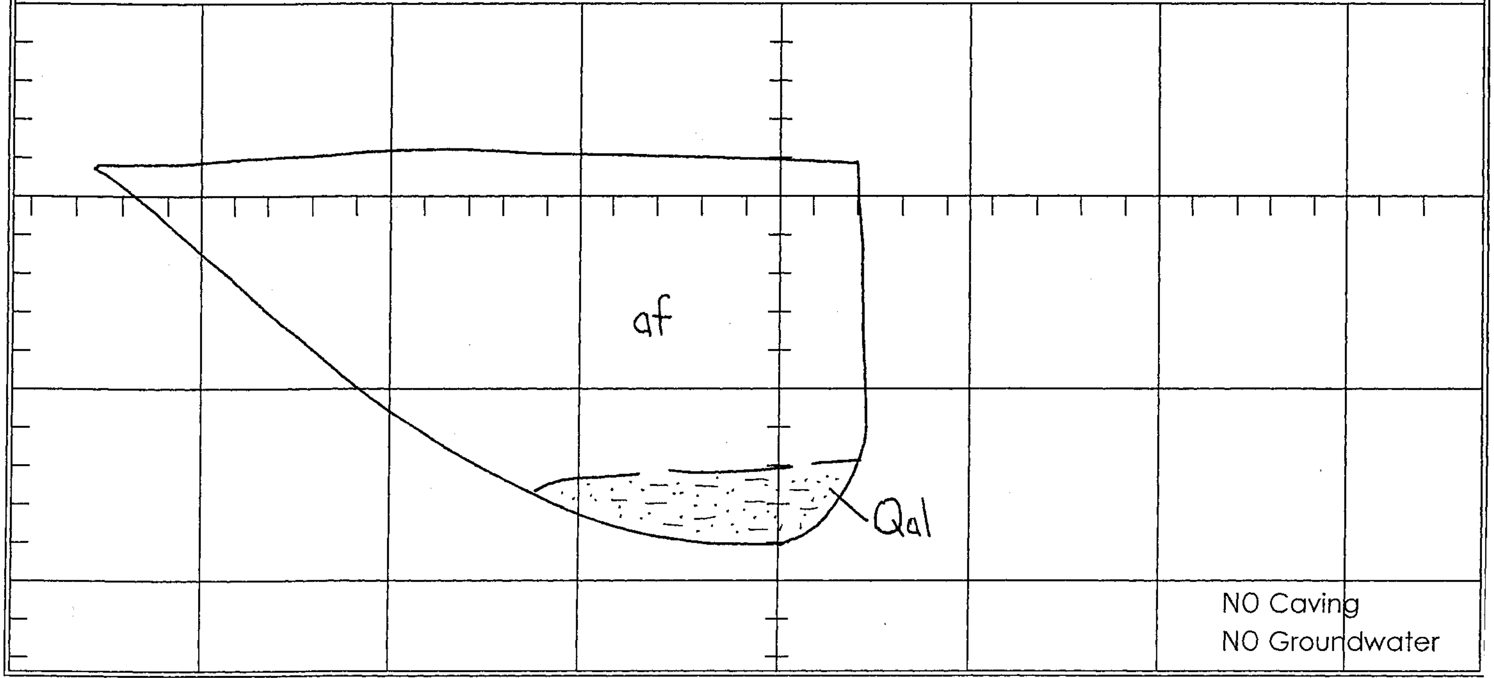
ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Sheet 1 of 1

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: VCG		
	EXCAVATED: 3/20/2000		
EXCAVATION METHOD: Rubber-Tired Backhoe w/24" Bucket	ELEVATION:		

TRENCH LOG NO. T-29

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0					**ARTIFICIAL FILL; af, (0-8 ft.)** @ 0' Medium reddish-brown fine- to coarse grained silty sand; loose; damp				
5									
					QUATERNARY ALLUVIUM; Qal, (8-10 ft.) @ 8' Dark gray to black to light gray sand and silty sand; loose to moderately dense; damp				
10									
15									
20									

TOTAL DEPTH: 10 feet ←N80W SCALE: 1 inch = 5 feet



NO Caving
NO Groundwater

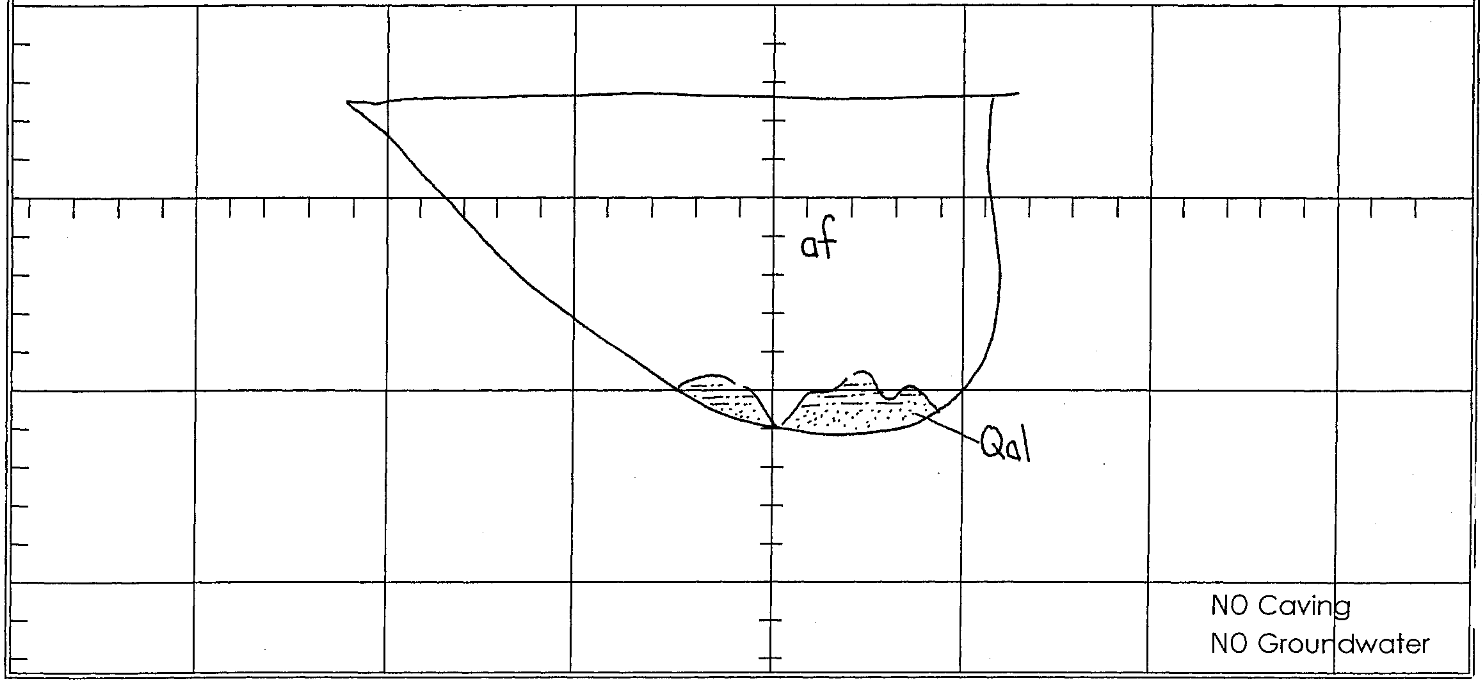
ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Sheet 1 of 1

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: VCG		
	EXCAVATED: 3/20/2000		
EXCAVATION METHOD: Rubber-Tired Backhoe w/24" Bucket	ELEVATION:		

TRENCH LOG NO. T-30

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**<u>ARTIFICIAL FILL</u>; af, (0-8 ft.)** @ 0' Medium- to light reddish-brown to gray fine- to coarse-grained silty sand with scattered pebbles; loose damp				
5									
10					**<u>QUATERNARY ALLUVIUM</u>; Qal, (8-9 ft.)** @ 8' Light gray and tan fine-grained sandy silt and sand; loose; damp <u>COMMENTS</u>: -Contact very irregular between Qal & af				
15									
20									

TOTAL DEPTH: 9 feet ←N73W SCALE: 1 inch = 5 feet



NO Caving
NO Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: VCG		
	EXCAVATED: 3/20/2000		
EXCAVATION METHOD: Rubber-Tired Backhoe w/24" Bucket	ELEVATION:		

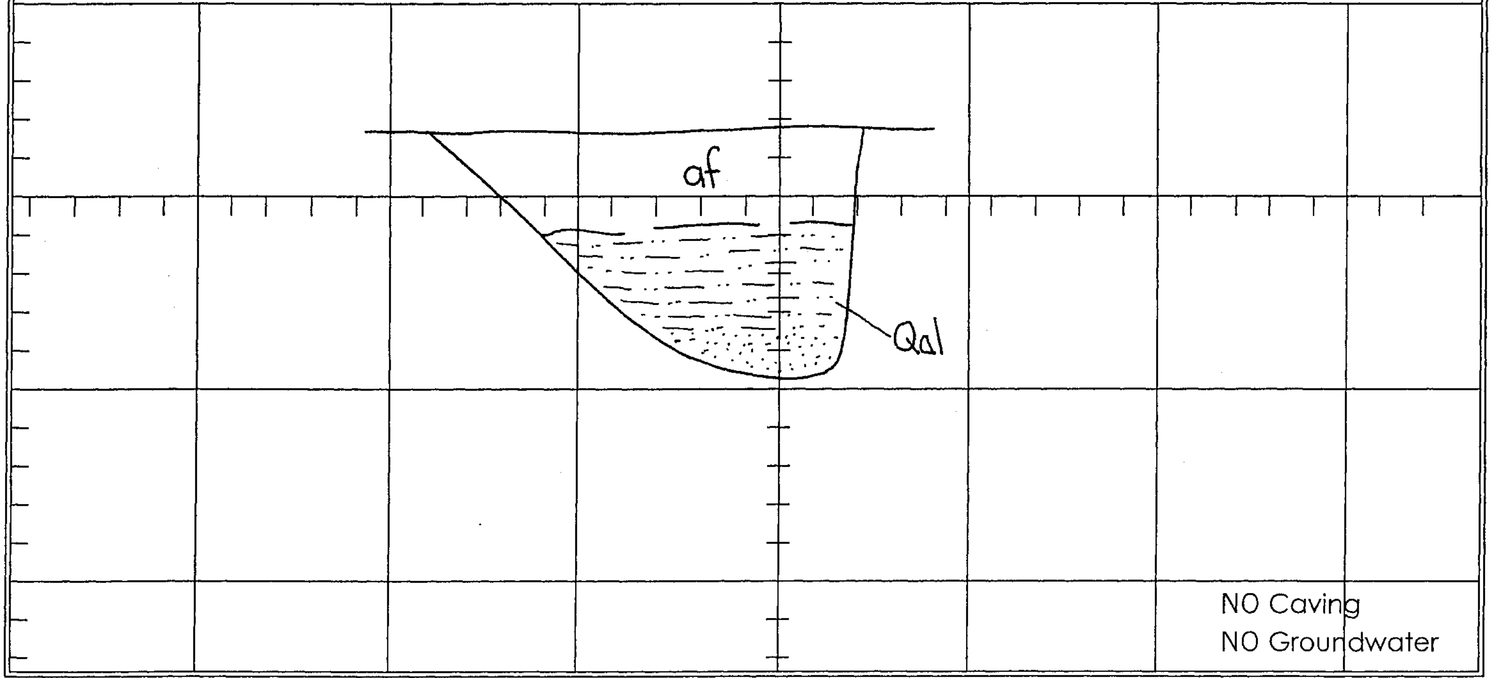
TRENCH LOG NO. T-31

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0					**ARTIFICIAL FILL; af, (0-2.5 ft.)** @ 0' Yellowish-bronw silty sand fine- to coarse-grained; loose; damp **QUATERNARY ALLUVIUM; Qal, (2.5-6 ft.)** @ 2.5' Medium-brown fine-grained sandy silt/silty sand; soft; damp				
5					@ 5' Tan medium- to coarse-grained sand; loose; damp; friable				
10									
15									
20									

TOTAL DEPTH: 6 feet

←N75W

SCALE: 1 inch = 5 feet



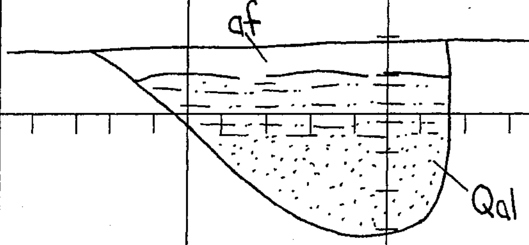
NO Caving
NO Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4	
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03 LOGGED BY: VCG EXCAVATED: 3/20/2000	
EXCAVATION METHOD: Rubber-Tired Backhoe w/24" Bucket	ELEVATION:	

TRENCH LOG NO. T-32

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	LABORATORY TESTS Dry Density (pcf)	LABORATORY TESTS Other Tests
0					**ARTIFICIAL FILL; af, (0-1 ft.)** @ 0' Light reddish-brown fine-grained silty sand; loose; damp **QUATERNARY ALLUVIUM; Qal, (1-5 ft.)** @ 1' Medium- to grayish-brown fine-grained silty sand; loose; damp @ 2.5' Medium-grained sand; friable @ 3.5' - fine-grained sand				
5									
10									
15									
20									

TOTAL DEPTH: 5 feet ←N45W SCALE: 1 inch = 5 feet



NO Caving
NO Groundwater

TRENCH LOG NO. T-33

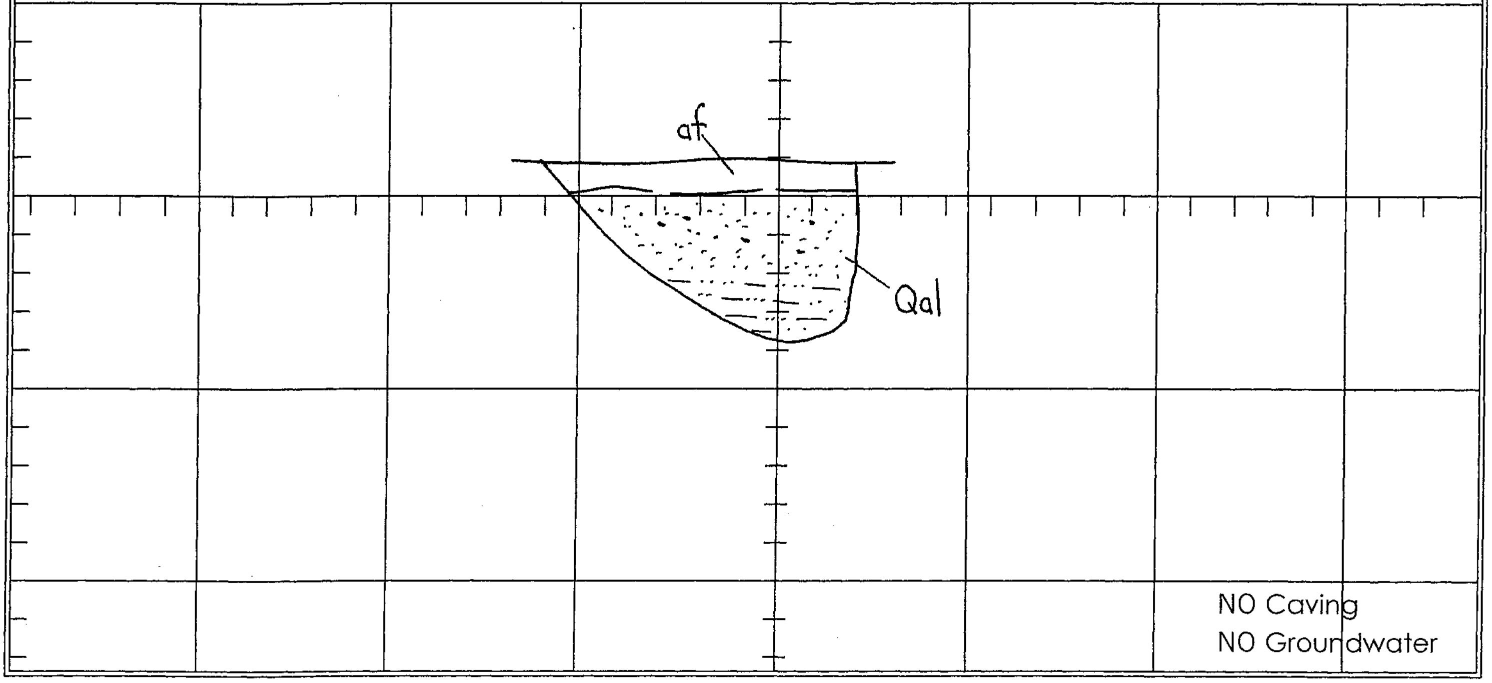
CLIENT: Newhall Land
PROJECT: River Park
Tentative Tract 53425
JOB NO: 03-1571-4
DATE: 4/4/03
LOGGED BY: VCG
EXCAVATED: 3/20/2000
EXCAVATION METHOD: Rubber-Tired Backhoe w/24" Bucket
ELEVATION:

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**<u>ARTIFICIAL FILL</u>; af, (0-1 ft.)** @ 0' Yellowish-brown fine- to coarse-grained silty sand with minor gravel; loose; damp **<u>QUATERNARY ALLUVIUM</u>; Qal, (1-4.5 ft.)** @ 1' Gray to tan medium- to coarse-grained pebbly sand with minor gravel; friable; moderately dense @ 3' Grayish-brown fine-grained silty sand				
5									
10									
15									
20									

TOTAL DEPTH: 5 feet

N45W→

SCALE: 1 inch = 5 feet

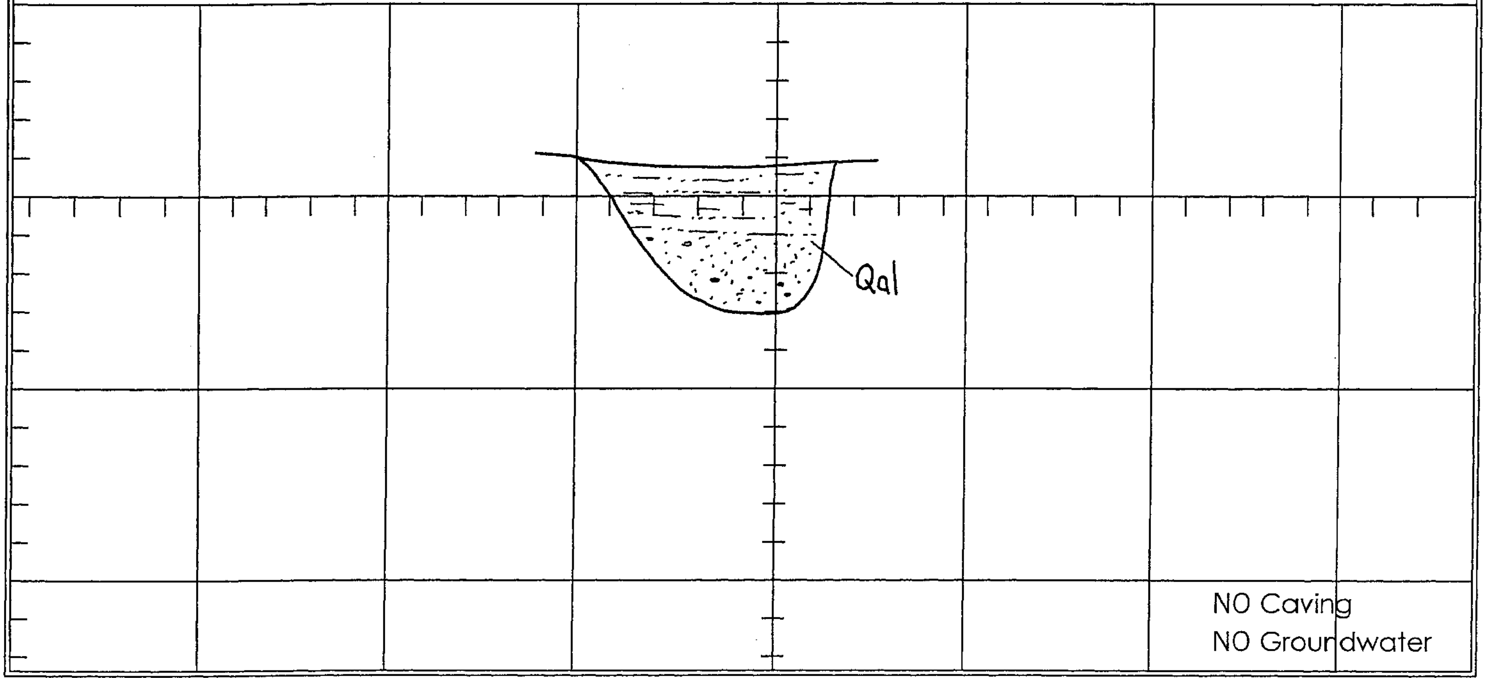


NO Caving
NO Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4	**TRENCH LOG NO.** T-34	
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03 LOGGED BY: VCG EXCAVATED: 3/20/2000		
EXCAVATION METHOD: Rubber-Tired Backhoe w/24" Bucket	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**QUATERNARY ALLUVIUM; Qal, (0-4 ft.)** @ 0' Light-brown fine-grained silty sand with isolated pebbles; loose; dry @ 2' Light-brown to tan medium- to coarse-grained sand and pebbly sand; friable; loose; to moderately dense; damp				
5									
10									
15									
20									

TOTAL DEPTH: 4 feet N40W→ SCALE: 1 inch = 5 feet



NO Caving
NO Groundwater

TRENCH LOG NO. T-35

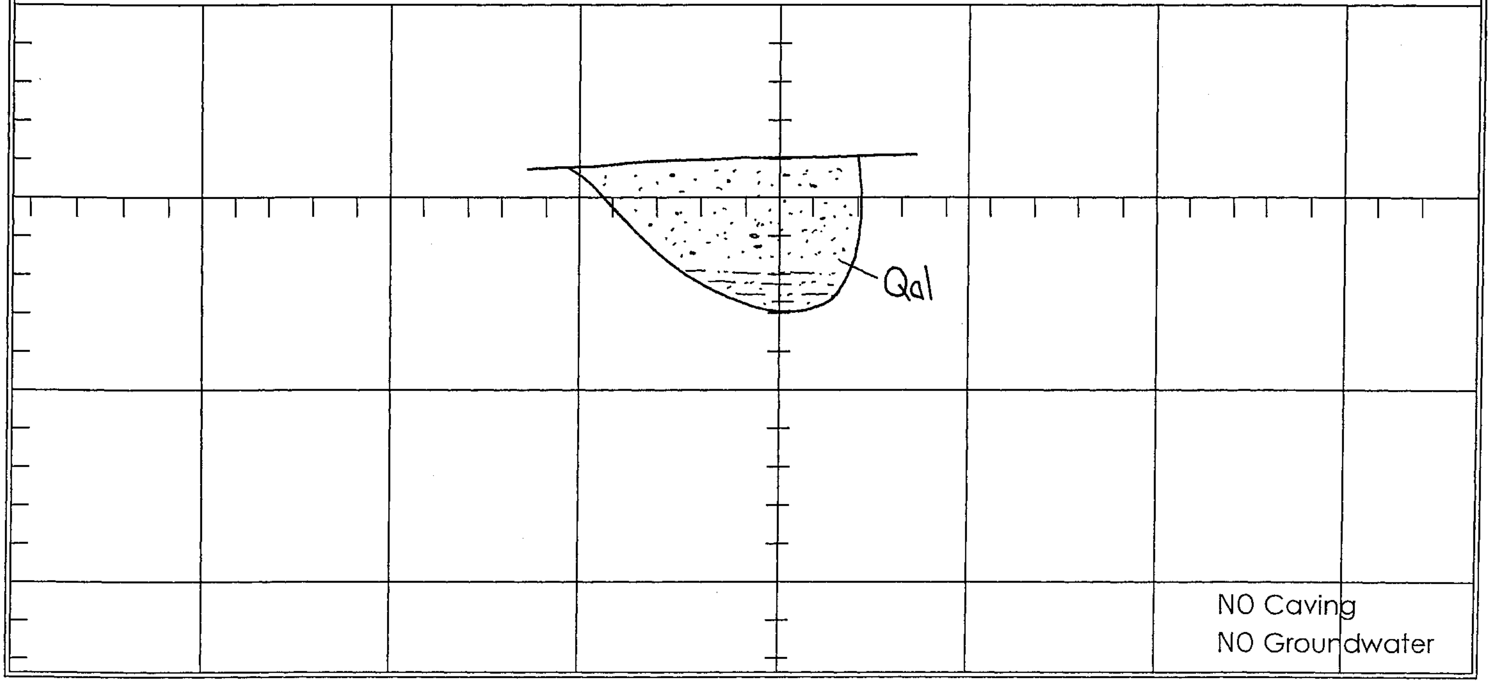
CLIENT:	Newhall Land	JOB NO:	03-1571-4
PROJECT:	River Park Tentative Tract 53425	DATE:	4/4/03
		LOGGED BY:	VCG
		EXCAVATED:	3/20/2000
EXCAVATION METHOD:	Rubber-Tired Backhoe w/24" Bucket	ELEVATION:	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**QUATERNARY ALLUVIUM; Qal, (0-4 ft.)** @ 0' Light-tan to gray fine- to medium-grained sand; loose to moderately dense; friable @ 3' Fine-grained silty sand with isolated pebbles; firm; damp				
5									
10									
15									
20									

TOTAL DEPTH: 4 feet

Due W→

SCALE: 1 inch = 5 feet



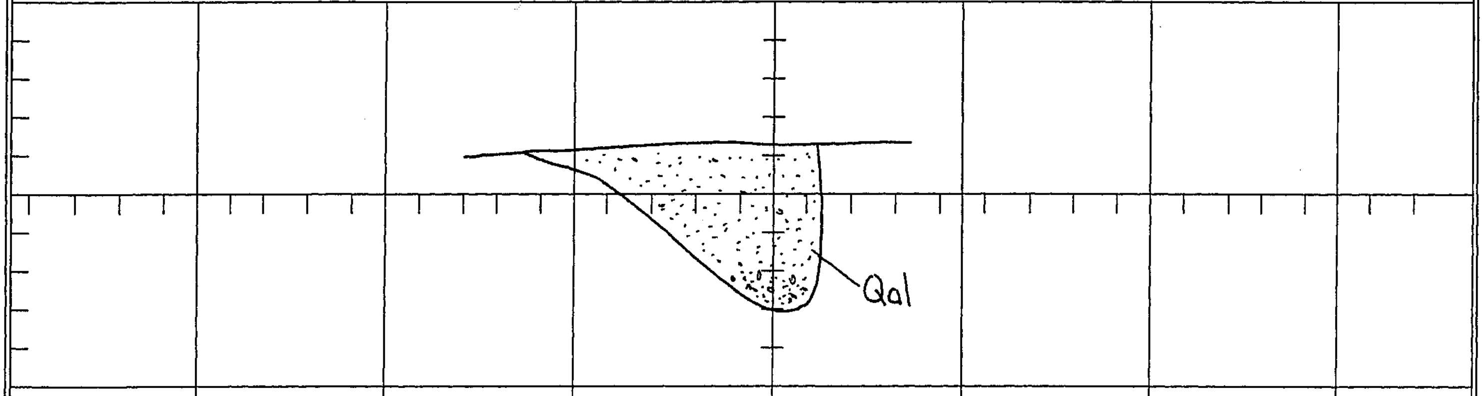
NO Caving
NO Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: VCG		
	EXCAVATED: 3/20/2000		
EXCAVATION METHOD: Rubber-Tired Backhoe w/24" Bucket	ELEVATION:		

TRENCH LOG NO. T-36

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**QUATERNARY ALLUVIUM; Qal, (0-4 ft.)** @ 0' Tan to light brown fine-grained sand; loose to moderately dense; friable; stratified @ 3' - gravelly sand				
5									
10									
15									
20									

TOTAL DEPTH: 4 feet ←N33E SCALE: 1 inch = 5 feet



NO Caving
NO Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

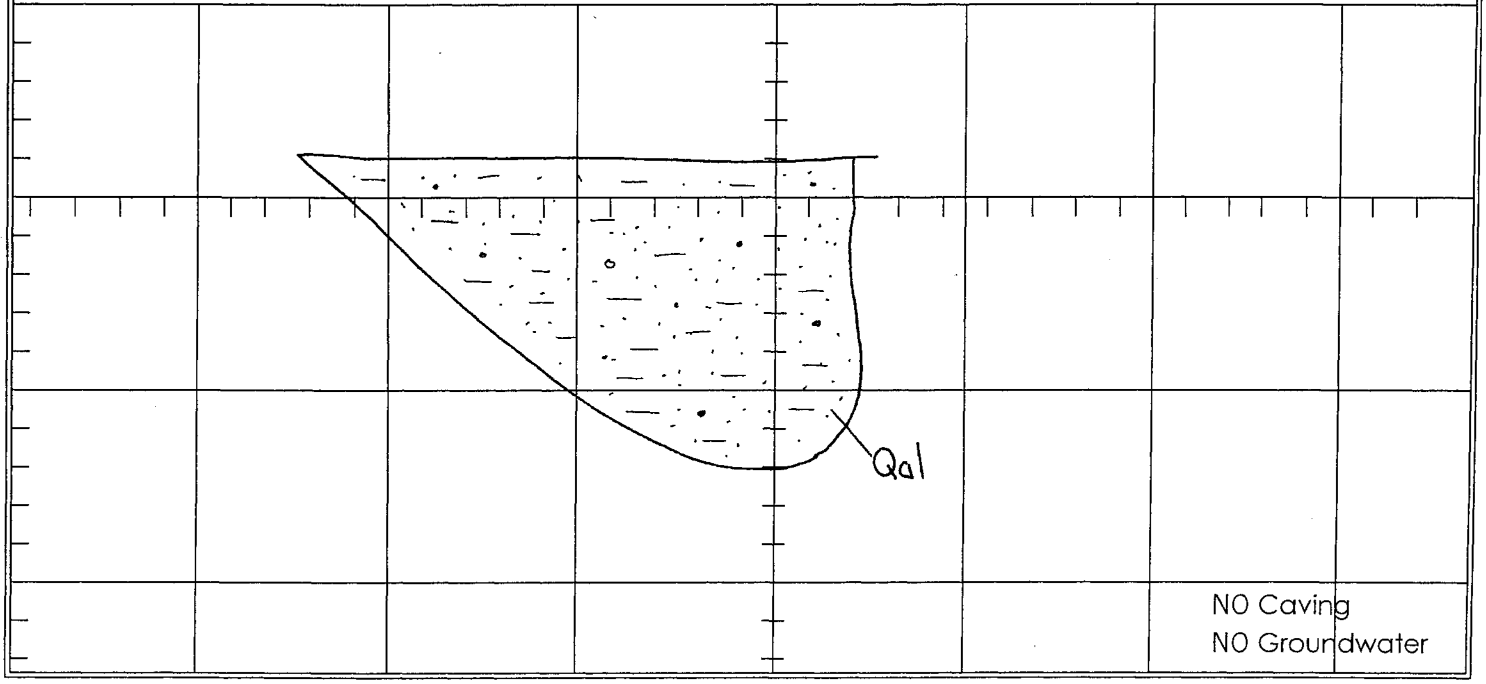
Sheet 1 of 1

CLIENT: Newhall Land
PROJECT: River Park
Tentative Tract 53425
EXCAVATION METHOD: Rubber-Tired Backhoe w/24" Bucket
JOB NO: 03-1571-4
DATE: 4/4/03
LOGGED BY: VCG
EXCAVATED: 3/20/2000
ELEVATION:

TRENCH LOG NO. T-37

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**QUATERNARY ALLUVIUM; Qal, (0-8 ft.)** @ 0' Dark brown silty sand with isolated pebbles; soft; damp to moist; indistinct stratification				
5									
10					COMMENTS: -Only minor stratification present				
15									
20									

TOTAL DEPTH: 8 feet ←N3E SCALE: 1 inch = 5 feet

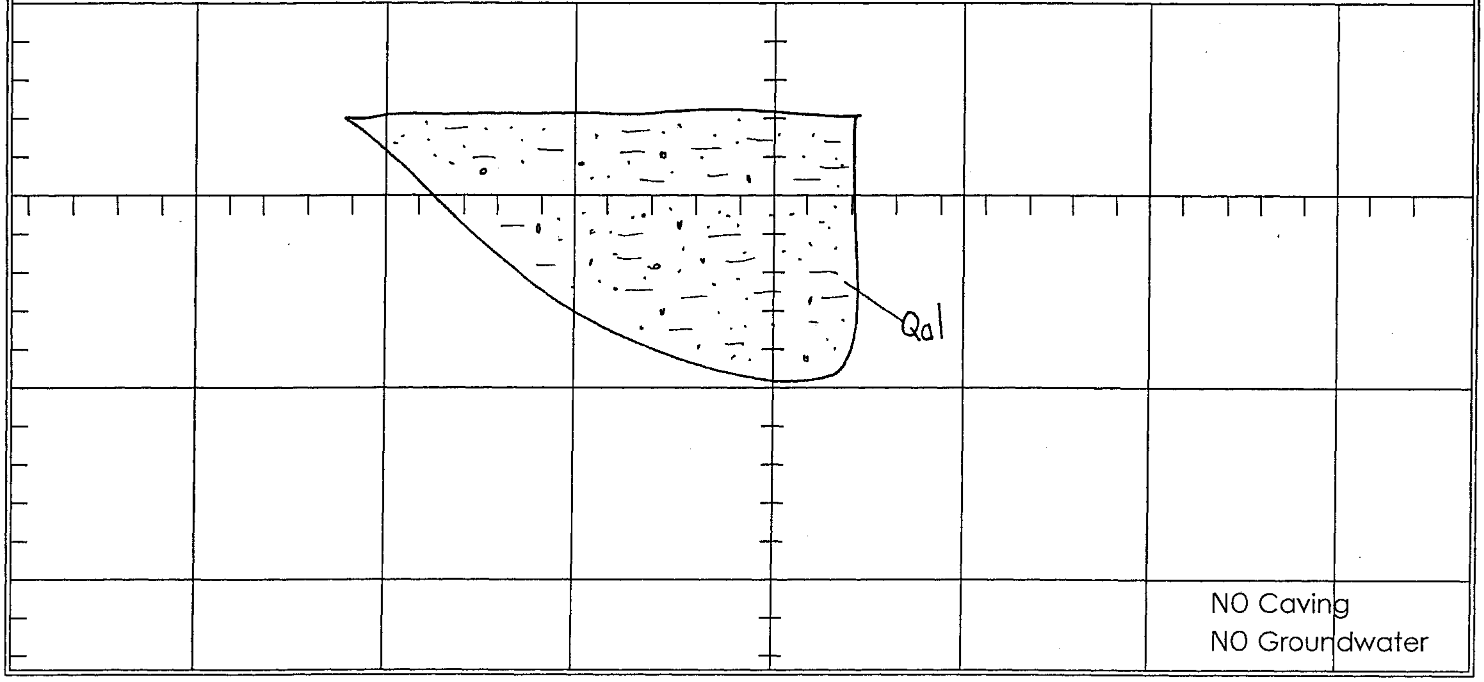


NO Caving
NO Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4		**TRENCH LOG NO.** T-38
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: VCG		
	EXCAVATED: 3/20/2000		
EXCAVATION METHOD: Rubber-Tired Backhoe w/24" Bucket	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**QUATERNARY ALLUVIUM; Qal, (0-7 ft.)** @ 0' Medium- to yellowish-brown fine- to coarse-grained silty pebbly sand; loose; moist; voids to bottom of trench				
5									
10					COMMENTS: -No horizontal stratification present				
15									
20									

TOTAL DEPTH: 7 feet ←N3E SCALE: 1 inch = 5 feet



NO Caving
NO Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Sheet 1 of 1

Appendix 4.1

See Geologic/Geotechnical Maps in Map Box

(DEIR Map 17)

Appendix 4.1

See Geologic/Geotechnical Maps in Map Box

(DEIR Map 18)

TRENCH LOG NO. T-41

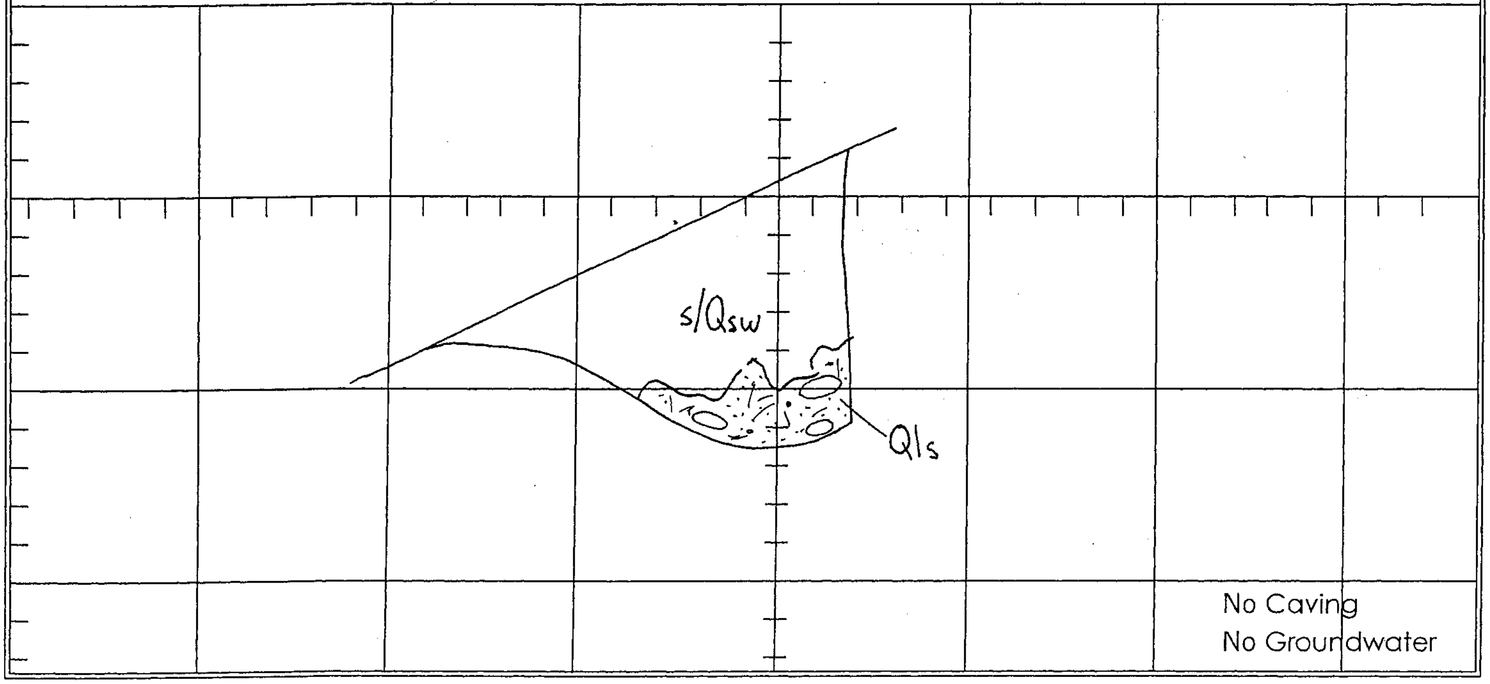
CLIENT:	Newhall Land	JOB NO:	03-1571-4
PROJECT:	River Park Tentative Tract 53425	DATE:	4/4/03
		LOGGED BY:	VCG
		EXCAVATED:	2/21/02
EXCAVATION METHOD:	Track-Mounted Backhoe w/24" Bucket	ELEVATION:	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; s/Qsw, (1-5 ft.)** @ 0' Yellowish-brown fine- to coarse-grained silty sand with scattered pebbles and isolated cobbles; loose; dry to damp				
5					**LANDSLIDE DEBRIS; Qls, (5-7.5 ft.)** @ 5' Medium-brown fine- to coarse-grained pebbly silty sand with cobbles; Qt deposit derived; moderately dense locally but soft zones present; disturbed irregular appearance; cobbles to 10" approximately; voids to 1/8" diameter present				
10					COMMENTS: -Many cobbles and some boulders at the surface to the east (maximum diam. = 2')				
15									
20									

TOTAL DEPTH: 7.5 feet

N13W→

SCALE: 1 inch = 5 feet



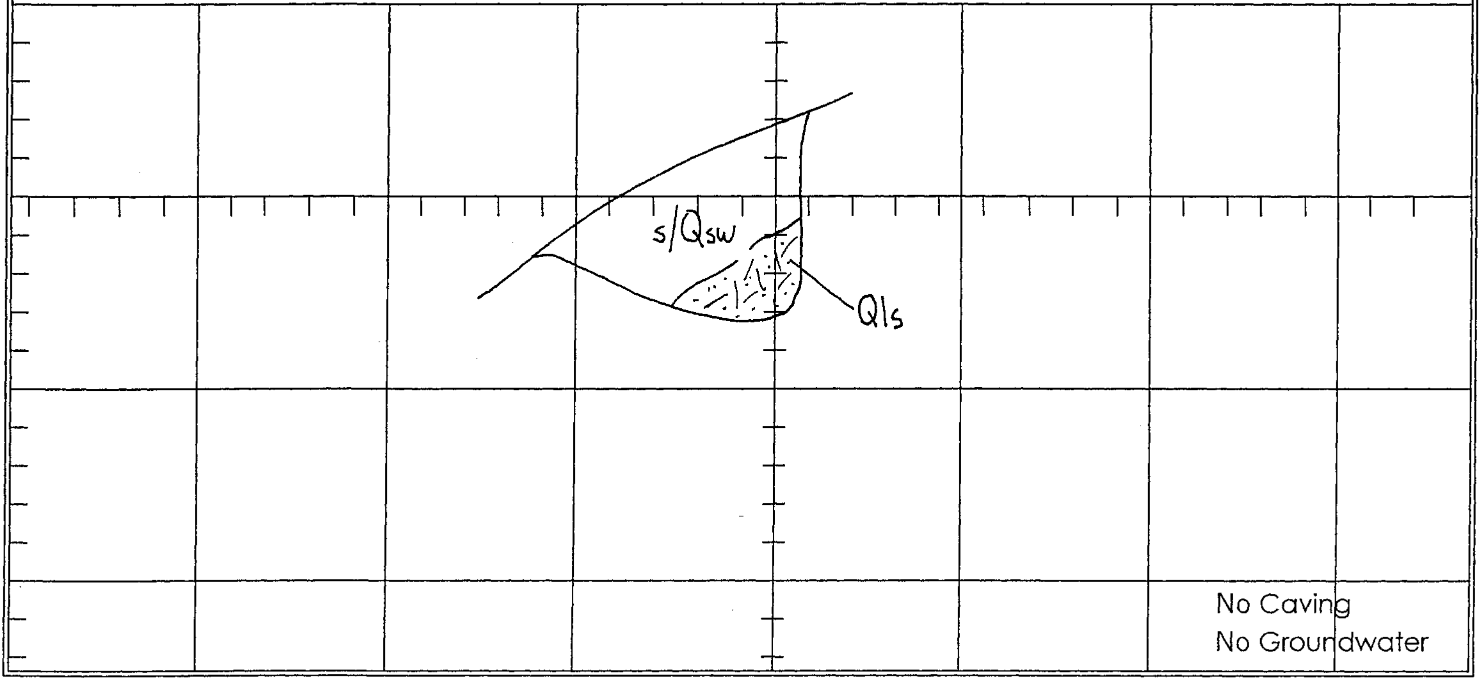
No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03 LOGGED BY: VCG EXCAVATED: 2/21/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:		

TRENCH LOG NO. T-42

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0					**SOIL/SLOPEWASH; s/Qsw, (0-3 ft.)** @ 0' Medium- to yellowish-brown fine- to medium-grained silty sand with isolated cobbles/boulders; loose; dry to damp				
					LANDSLIDE DEBRIS; Qls, (3-5 ft.) @ 3' Light reddish- to yellowish-brown sandy siltstone; disturbed appearance; fractured; bedding indistinct; carbonate on fractured surface; firm; no voids observed; damp				
5									
10					COMMENTS: -Landslide debris TQs derived -Digs easy				
15									
20									

TOTAL DEPTH: 5 feet N73E→ SCALE: 1 inch = 5 feet



No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

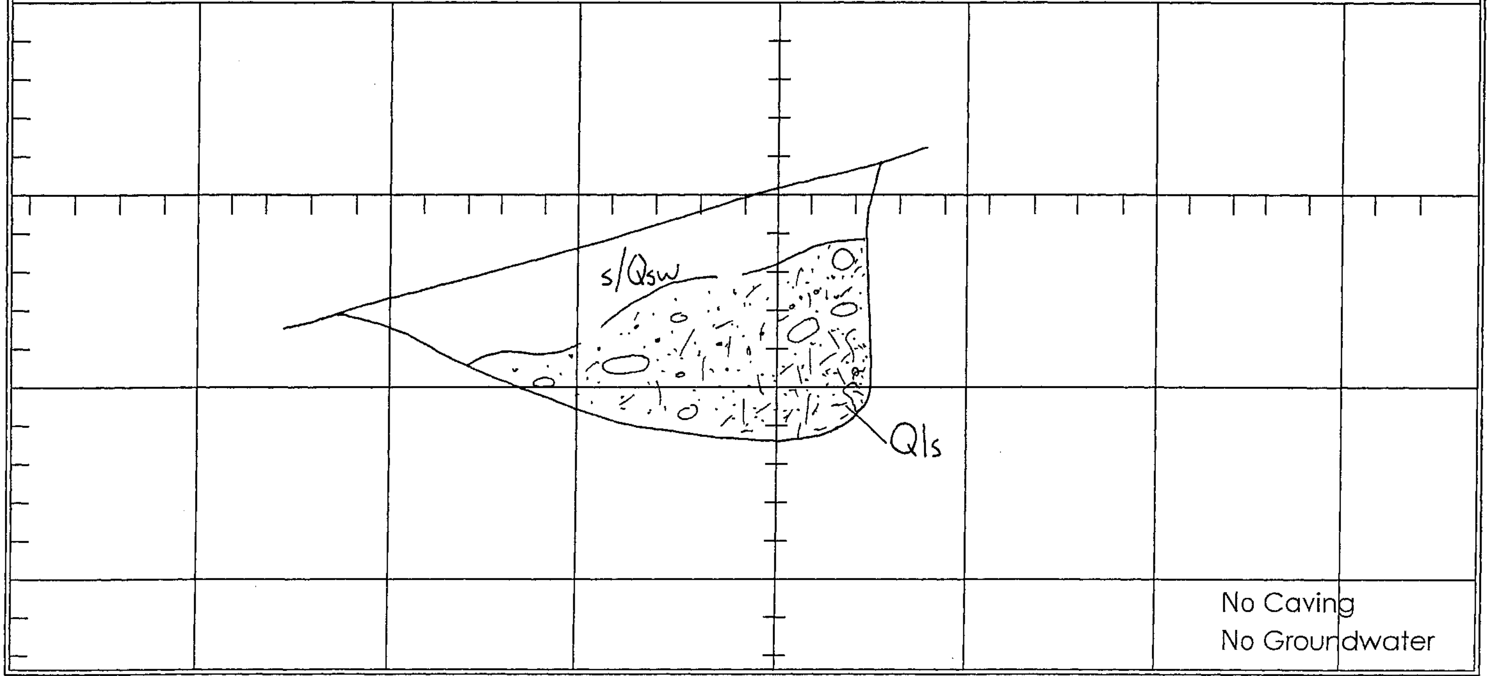
CLIENT: Newhall Land
PROJECT: River Park
Tentative Tract 53425
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket

JOB NO: 03-1571-4
DATE: 4/4/03
LOGGED BY: VCG
EXCAVATED: 2/21/02
ELEVATION:

TRENCH LOG NO. T-43

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; s/Qsw, (0-2.5 ft.)** @ 0' Medium- to yellowish-brown fine- to coarse-grained silty pebbly sand with isolated cobbles; loose; dry; abundant roots **LANDSLIDE DEBRIS; Qls, (2.5-7 ft.)** @ 2.5' Tan to yellowish-brown fine- to coarse-grained cobbly, pebbly sandstone with silt; moderately dense; disturbed and irregular; dry to damp @ 3.5' Medium- to dark brown fractured sandy siltstone; firm to hard; damp; probably slide affected				
5									
10					COMMENTS: -Probably all Qls				
15									
20									

TOTAL DEPTH: 7 feet N13W→ SCALE: 1 inch = 5 feet



No Caving
No Groundwater

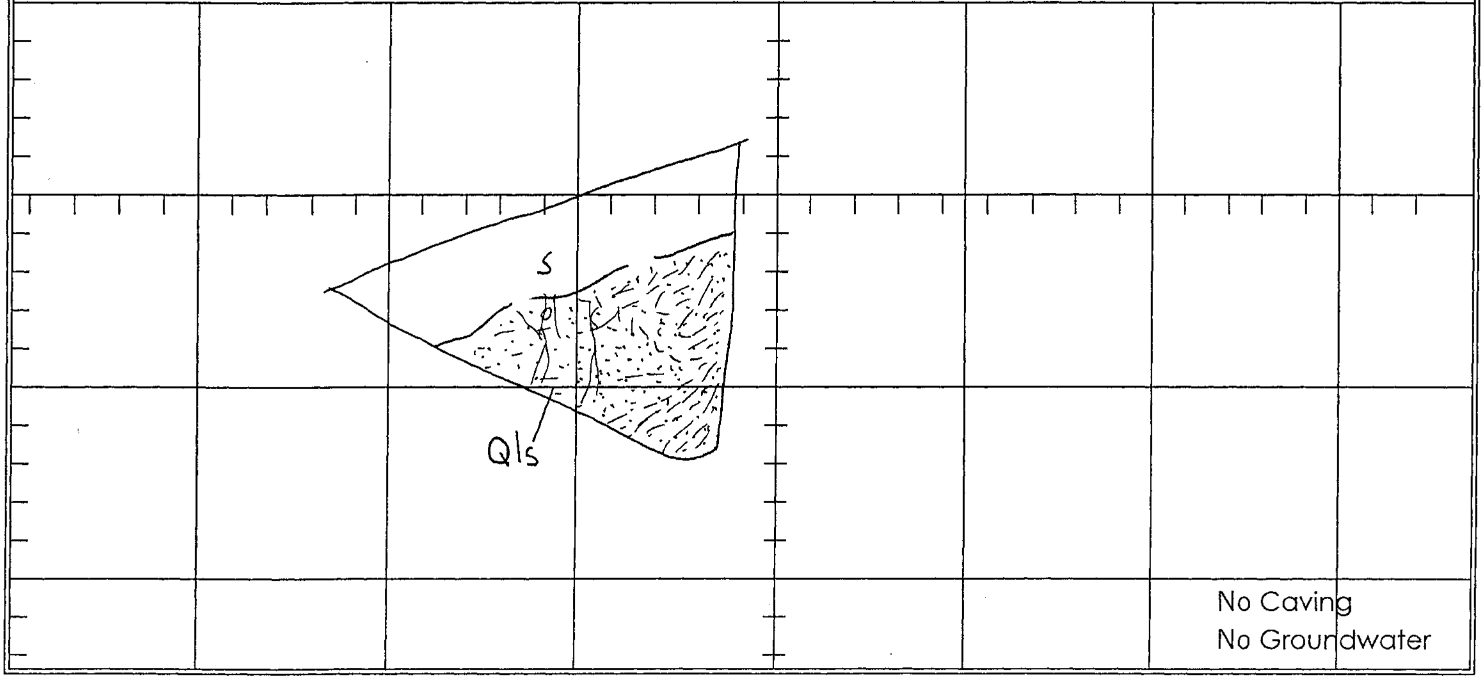
ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Sheet 1 of 1

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: BJS		
	EXCAVATED: 2/21/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:		

TRENCH LOG NO. T-44

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-2.5 ft.)** @ 0' Brown to pale reddish-brown sandy mud with local pebbles and rare cobbles; very stiff; minor roots; clay rinds on clasts **LANDSLIDE; Qls, (2.5-8.5 ft.)** @ 2.5' Disturbed interbed of yellowish-gray sandstone and silty sandstone and light-brown siltstone and sandy siltstone with local pebbles; density varies from loose to moderately hard; damp; weathered fractures; local caliche; sandstone fragmented and almost entirely missing on opposite wall of trench; possible Qosw locally in upper Qls				
5									
10					COMMENTS: -Cobbles and boulder present at surface not at depth				
15									
20									

TOTAL DEPTH: 8.5 feet   N15E→   SCALE: 1 inch = 5 feet



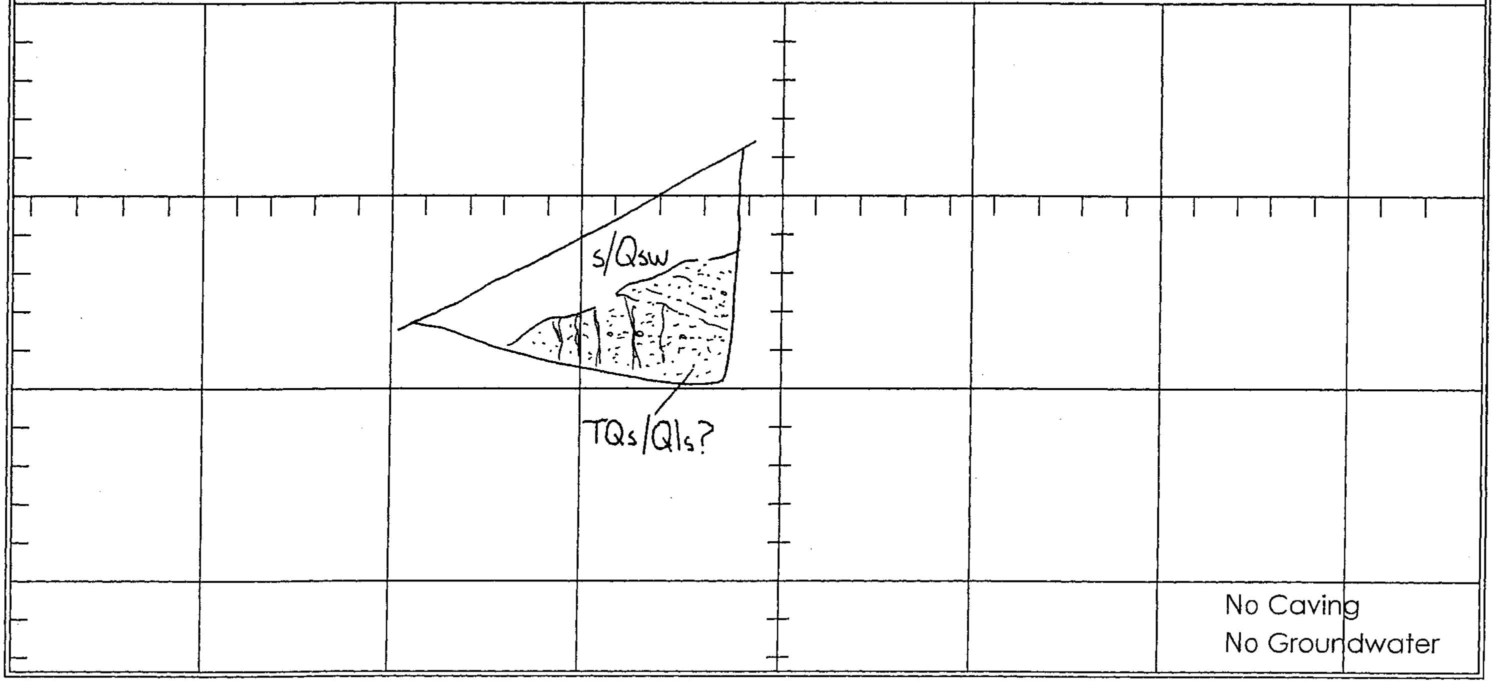
No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.   Sheet 1 of 1

CLIENT: Newhall Land	JOB NO: 03-1571-4	**TRENCH LOG NO. T-45**
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03 LOGGED BY: BJS EXCAVATED: 2/21/02	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**<u>SOIL/SLOPEWASH</u>; s/Qsw, (0-3 ft.)** @ 0' Light-brown pebbly sandy silt with clay; approximately 6" of organic soil at surface; moderately dense to loose; slightly damp; minor roots				
5					**<u>BEDROCK/LANDSLIDE?</u>; TQs/Qls?, (3-6.5 ft.)** @ 3' Light-brown pebbly sandy siltstone overlying light yellowish-gray sandstone and pebbly sandstone; contact irregular but sandstone looks fairly intact; siltstone is moderately dense; sandstone is moderately hard; slightly damp; sandstone is well bedded; weathered fractures	B:N80E,10SE			
10									
15									
20									

TOTAL DEPTH: 6.5 feet ←N86W SCALE: 1 inch = 5 feet



No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

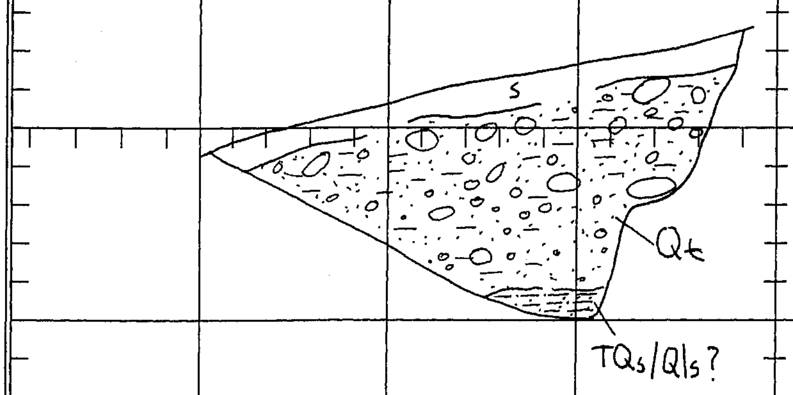
Sheet 1 of 1

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03 LOGGED BY: BJS EXCAVATED: 2/21/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:		

TRENCH LOG NO. T-46

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-1 ft.)** @ 0' Grayish-brown sandy silt with abundant pebbles, cobbles and small boulders; loose to firm; slightly damp **TERRACE DEPOSITS; Qt, (1-7 ft.)** @ 1' Pale reddish-brown to orangish-brown coarse pebbly sand with clay in the matrix and common cobbles and boulders; dense; hard digging; damp; clay rinds on clasts; old soil development in Qt	Apx.B: Horizontal			
5					**BEDROCK/LANDSLIDE?; TQs/Qls?, (7-7.5 ft.)** @ 7' Erosional contact with moderate yellowish-brown siltstone; moderately hard; damp; no bedding				
10									
15									
20									

TOTAL DEPTH: 7.5 feet N21E→ SCALE: 1 inch = 5 feet



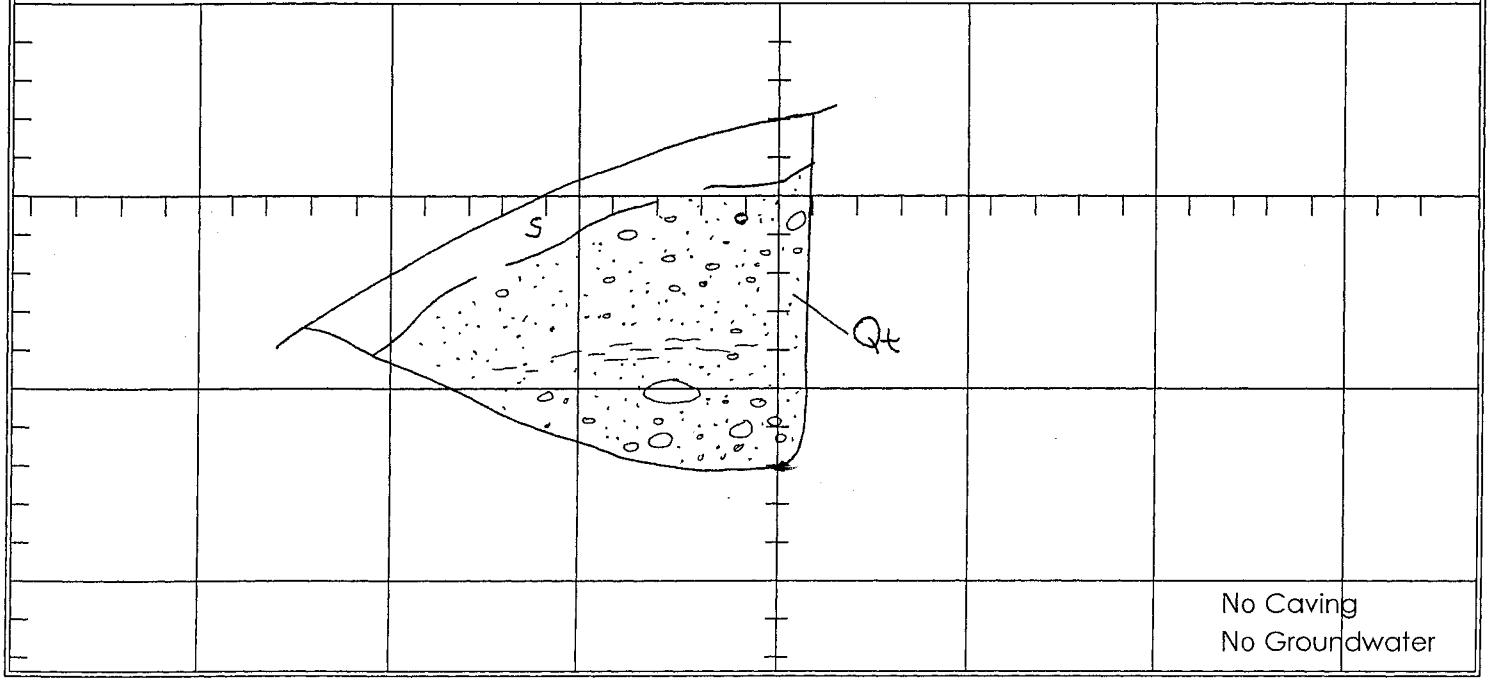
No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Sheet 1 of 1

CLIENT: Newhall Land	JOB NO: 03-1571-4	**TRENCH LOG NO. T-47**
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03 LOGGED BY: VCG EXCAVATED: 2/21/02	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**<u>SOIL</u>; s, (0-1 ft.)** @ 0' Grayish-brown fine- to coarse-grained pebbly, cobbly sand; loose; dry to damp **<u>TERRACE DEPOSITS</u>; Qt, (1-9 ft.)** @ 1' Reddish-brown fine- to coarse-grained sand, pebbly sand with scattered cobbles; minor clay in the matrix; upper 3.5' has				
5					minor soil development; stratification present; lower 3' higher concentration of cobbles and friable				
10					<u>COMMENTS</u>:				
15									
20									

TOTAL DEPTH: 9 feet ←N81W SCALE: 1 inch = 5 feet



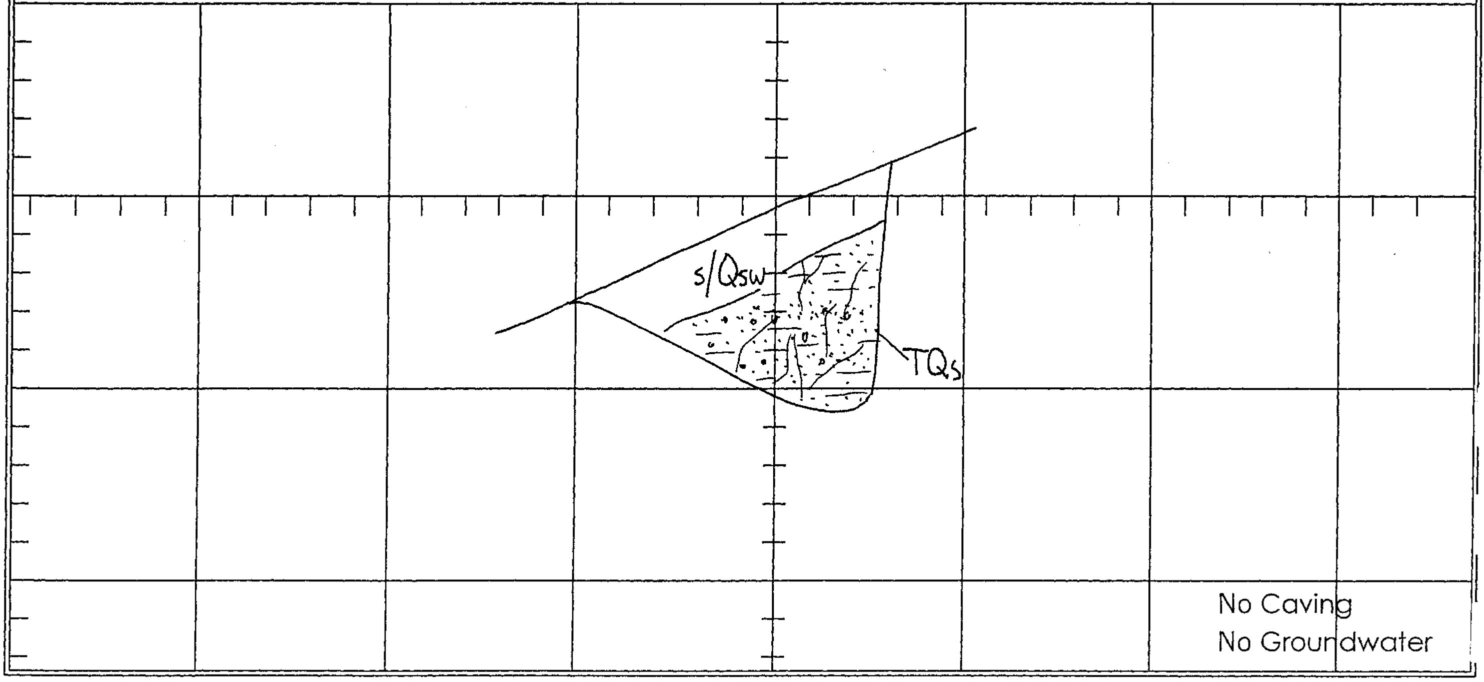
No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: VCG		
	EXCAVATED: 2/21/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:		

TRENCH LOG NO. T-48

							LABORATORY TESTS		
DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; s/Qsw, (0-2 ft.)** @ 0' Moderate to grayish-brown fine- to coarse-grained silty sand with pebbles; loose; dry				
					BEDROCK; TQs, (2-6.5 ft.) @ 2' Light grayish-brown silty sandstone with minor coarse-grained sandstone lenses; moderately dense; dry to damp; randomly oriented fractures lined with carbonate	B:N65W,13SW			
5									
10									
15									
20									

TOTAL DEPTH: 6.5 feet N85E→ SCALE: 1 inch = 5 feet



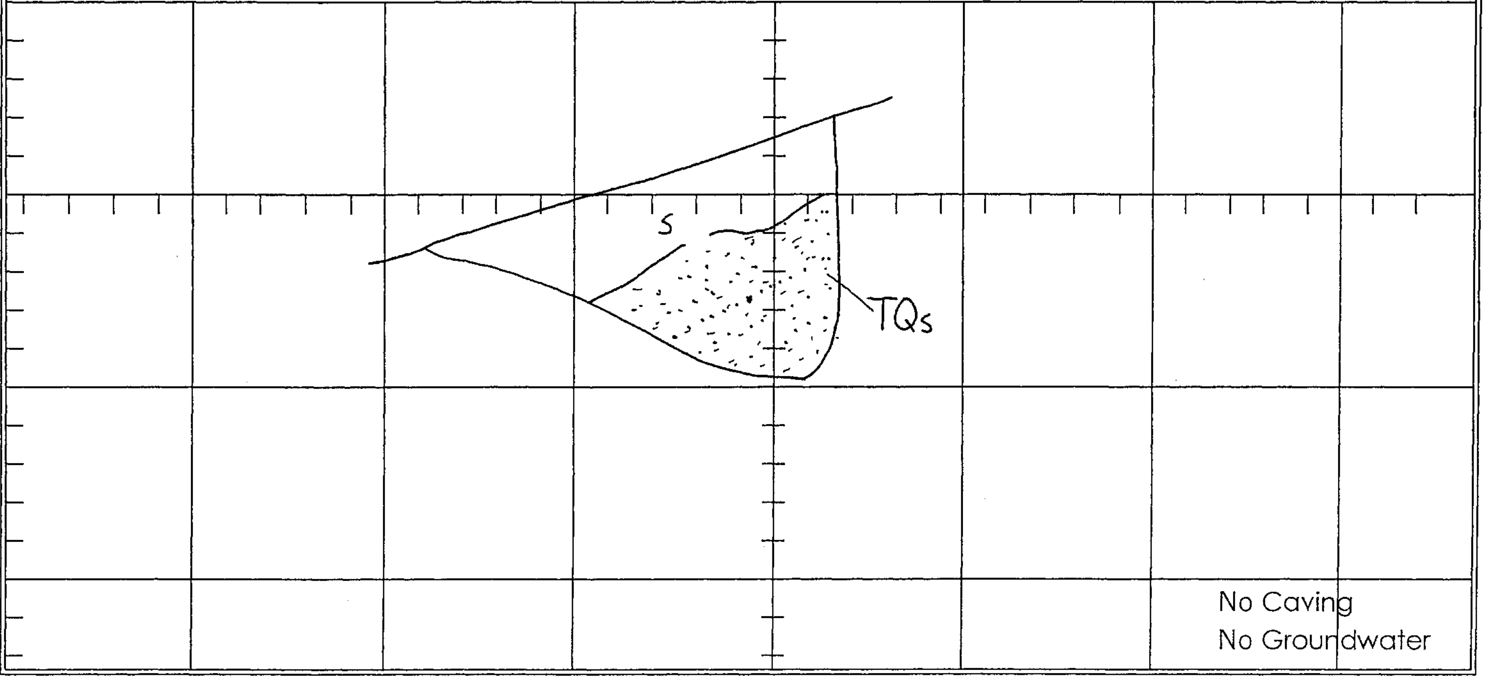
No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: VCG		
	EXCAVATED: 2/21/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:		

TRENCH LOG NO. T-49

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-2 ft.)** @ 0' Light grayish-brown fine- to coarse-grained pebbly silty sand; loose; dry **BEDROCK; TQs, (2-7 ft.)** @ 2' Cream to tan fine- to medium-grained sandstone and pebbly sandstone with minor rust staining parallel to bedding; moderately dense; dry to damp	B:N70W, 25SW			
5									
10					COMMENTS: -Scattered boulders to 3 ft. diameter in vicinity				
15									
20									

TOTAL DEPTH: 7 feet N8E→ SCALE: 1 inch = 5 feet



No Caving
No Groundwater

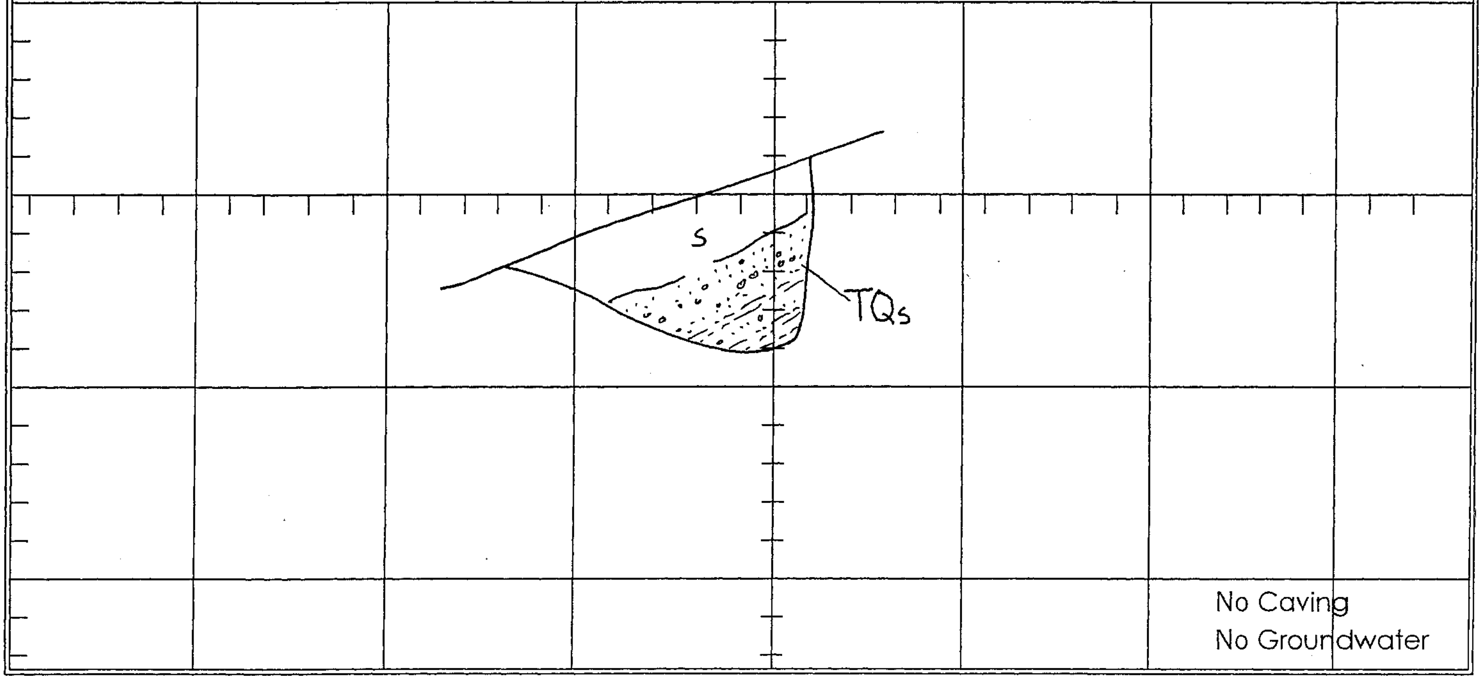
ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Sheet 1 of 1

CLIENT: Newhall Land	JOB NO: 03-1571-4		# TRENCH LOG NO. T-50
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: VCG		
	EXCAVATED: 2/21/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	 Dry Density (pcf)	 Other Tests
0					**<u>SOIL</u>; s, (0-1.5 ft.)** @ 0' Light grayish-brown fine- to coarse-grained pebbly silty sand; loose; dry **<u>BEDROCK</u>; TQs, (1.5-5 ft.)** @ 1.5' Light reddish-brown pebbly sandstone and sandy siltstone with minor fractures; moderately dense/hard; dry				
5									
10					COMMENTS: -Scattered cobbles within soil horizon; structure different from T-9				
15									
20									

TOTAL DEPTH: 5 feet N34E→ SCALE: 1 inch = 5 feet



No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Sheet 1 of 1

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: VCG		
	EXCAVATED: 2/21/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:		

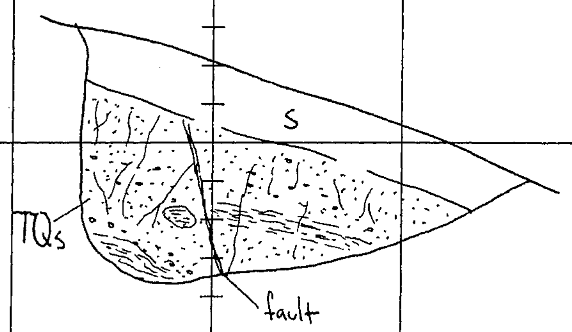
TRENCH LOG NO. T-51

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-1.5 ft.)** @ 0' Light grayish-brown fine- to coarse-grained pebbly silty sand; loose; dry **BEDROCK; TQs, (1.5-6.5 ft.)** @ 1.5' Tan to light yellowish-brown medium- to coarse grained sandstone and pebbly sandstone and light reddish to rusty-brown silty sandstone and siltstone; faulted (minor fault); fractured; moderately dense; dry and gouge consisting of light 1/4"-thick grayish- to reddish-brown silty clay to clayey silt				
5									
10					COMMENTS: -Apparent separation: (13-15") South side up	Tectonic: F:N56W,73SW B:N36W,7SW Approx.			
15									
20									

TOTAL DEPTH: 6.5 feet

←N33E

SCALE: 1 inch = 5 feet



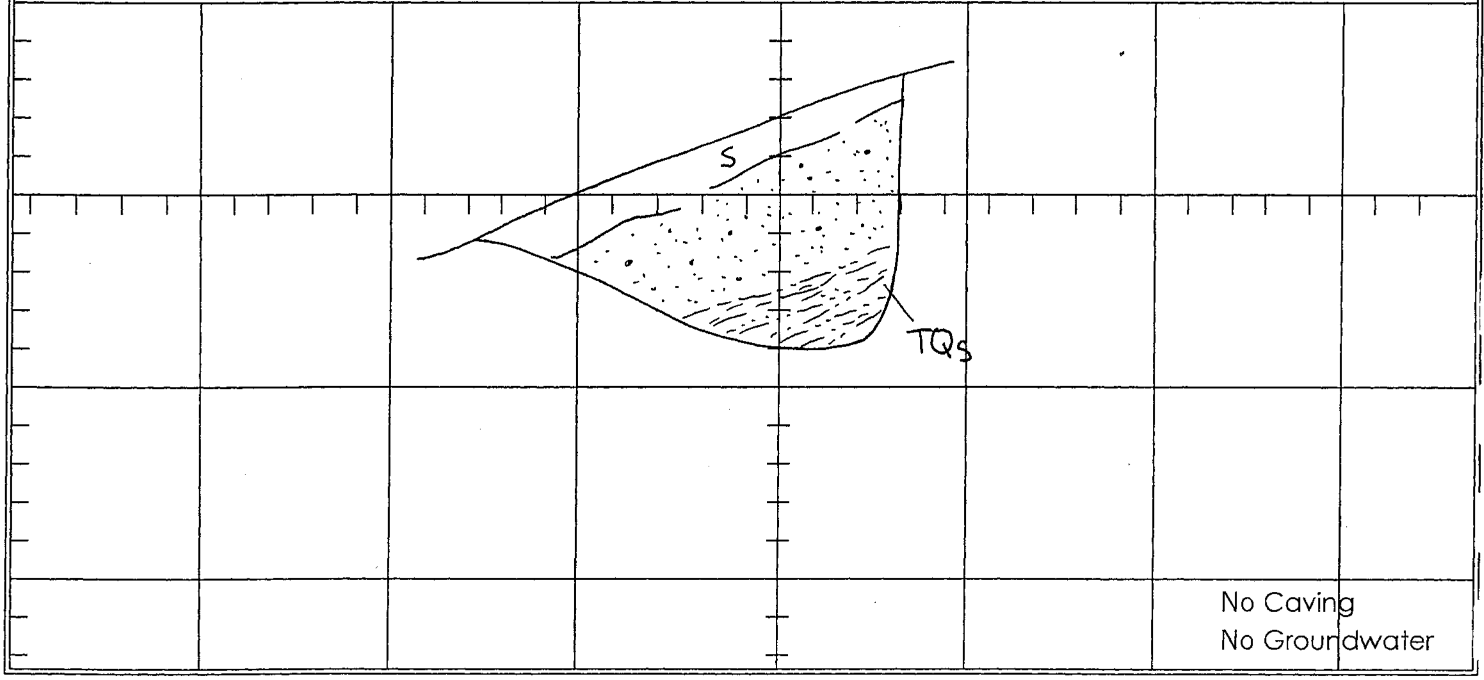
No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03 LOGGED BY: VCG EXCAVATED: 2/21/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:		

TRENCH LOG NO. T-52

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-1 ft.)** @ 0' Light grayish-brown fine- to coarse-grained pebbly silty sand; loose; dry **BEDROCK; TQs, (1-7 ft.)** @ 1' Tan to light yellowish-brown fine- to medium-grained sandstone with scattered pebbles and yellowish-brown sandy siltstone (red bed); moderately dense/hard; dry to damp				
5						B:N35W,22SW B:N47W,20SW			
10									
15									
20									

TOTAL DEPTH: 7 feet N27E→ SCALE: 1 inch = 5 feet



No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

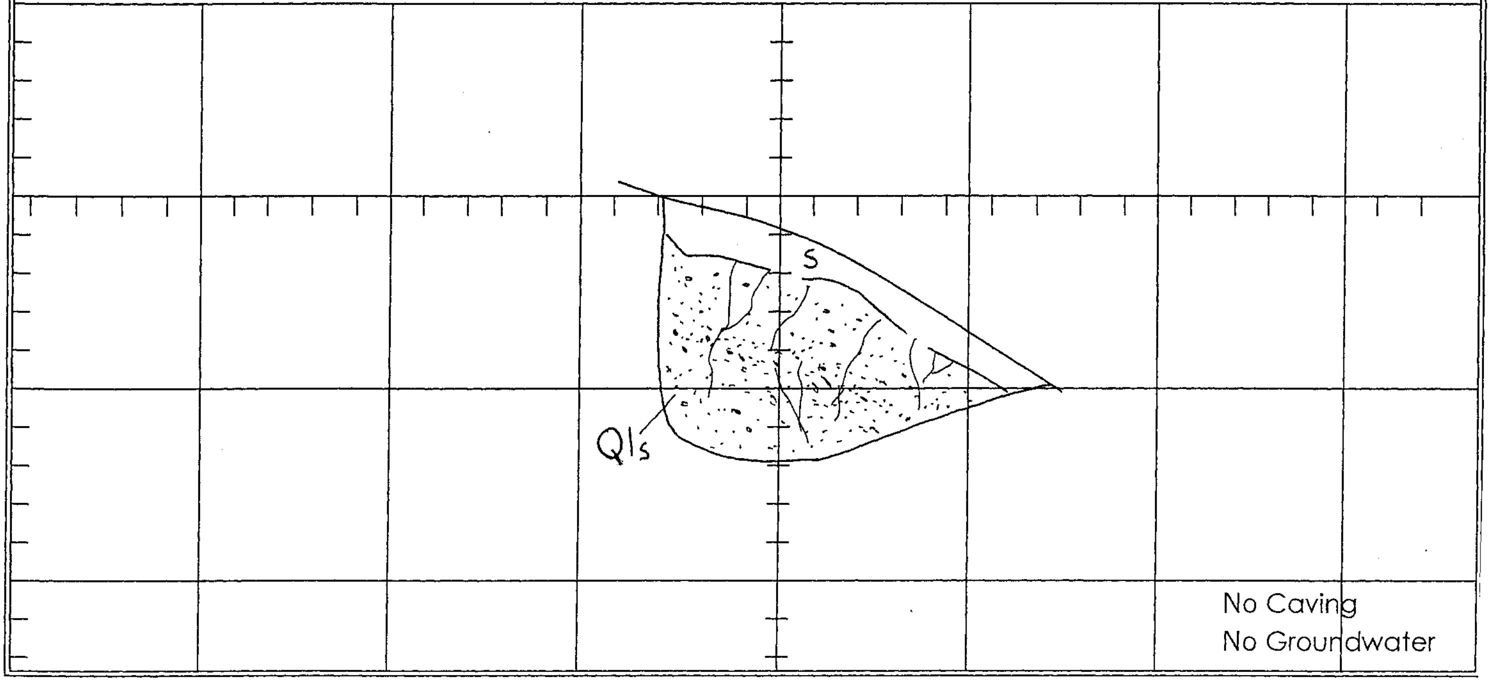
Sheet 1 of 1

CLIENT:	Newhall Land	JOB NO:	03-1571-4
PROJECT:	River Park Tentative Tract 53425	DATE:	4/4/03
		LOGGED BY:	VCG
		EXCAVATED:	2/21/02
EXCAVATION METHOD:	Track-Mounted Backhoe w/24" Bucket	ELEVATION:	

TRENCH LOG NO. T-53

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0 5 10 15 20					**SOIL; s, (0-1 ft.)** @ 0' Grayish-brown silty sand with scattered pebbles; loose; dry **LANDSLIDE; Qls, (1-7 ft.)** @ 1' Tan fine- to coarse-grained sandstone with scattered pebbles; moderately dense; dry; stratigraphy present; some fractures randomly oriented; possibly disturbed	B:N36W,18SW			

TOTAL DEPTH: 7 feet ←N17E SCALE: 1 inch = 5 feet



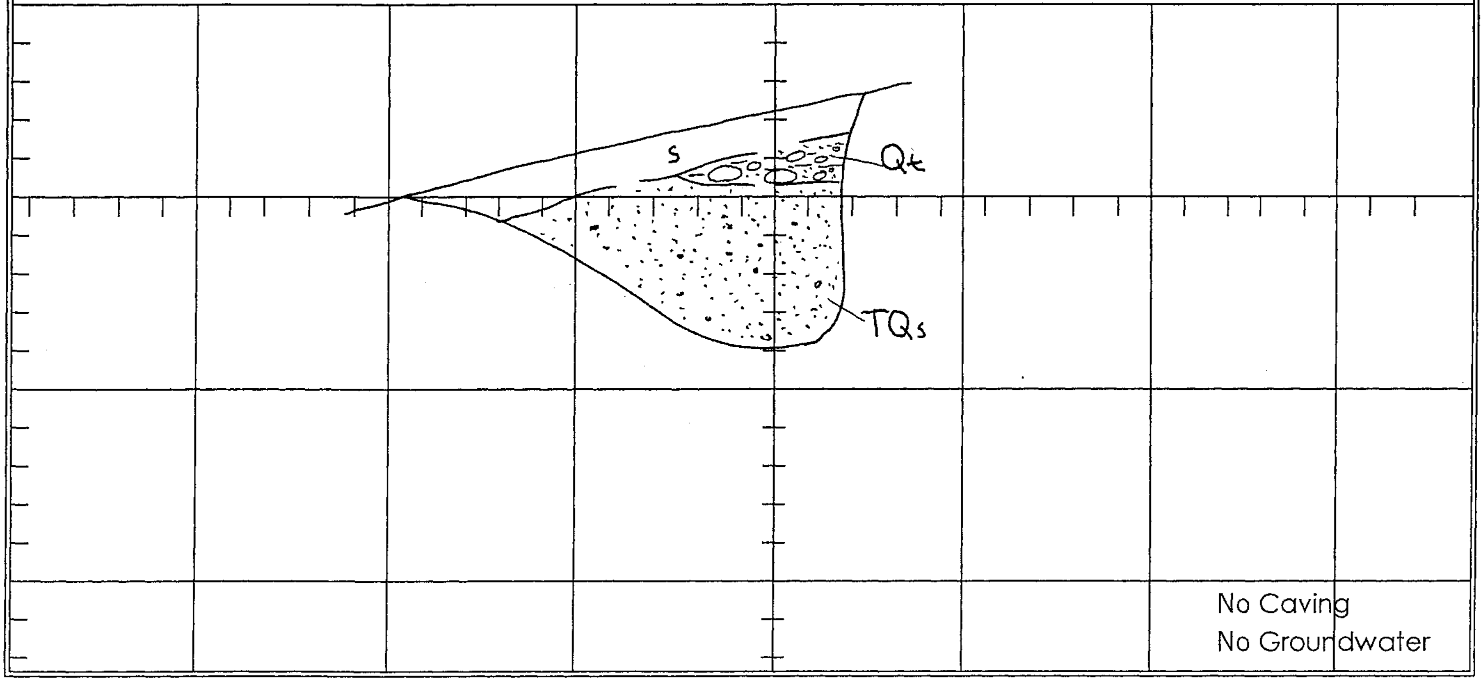
No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4	
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03 LOGGED BY: VCG EXCAVATED: 2/21/02	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:	

TRENCH LOG NO. T-54

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-1 ft.)** @ 0' Gray fine- to coarse-grained pebbly sand; loose; dry **TERRACE DEPOSITS; Qt, (1-2 ft.)** @ 1' Conglomerate with clayey sand matrix; dense; dry **BEDROCK; TQs, (2-6.5 ft.)** @ 2' Tan fine- to coarse-grained sandstone and pebbly sandstone; moderately dense; dry; bedding indistinct				
5					COMMENTS: -High concentration of cobbles	Generally massive B:N53W,12SW Apx.			
10									
15									
20									

TOTAL DEPTH: 6.5 feet N21E→ SCALE: 1 inch = 5 feet



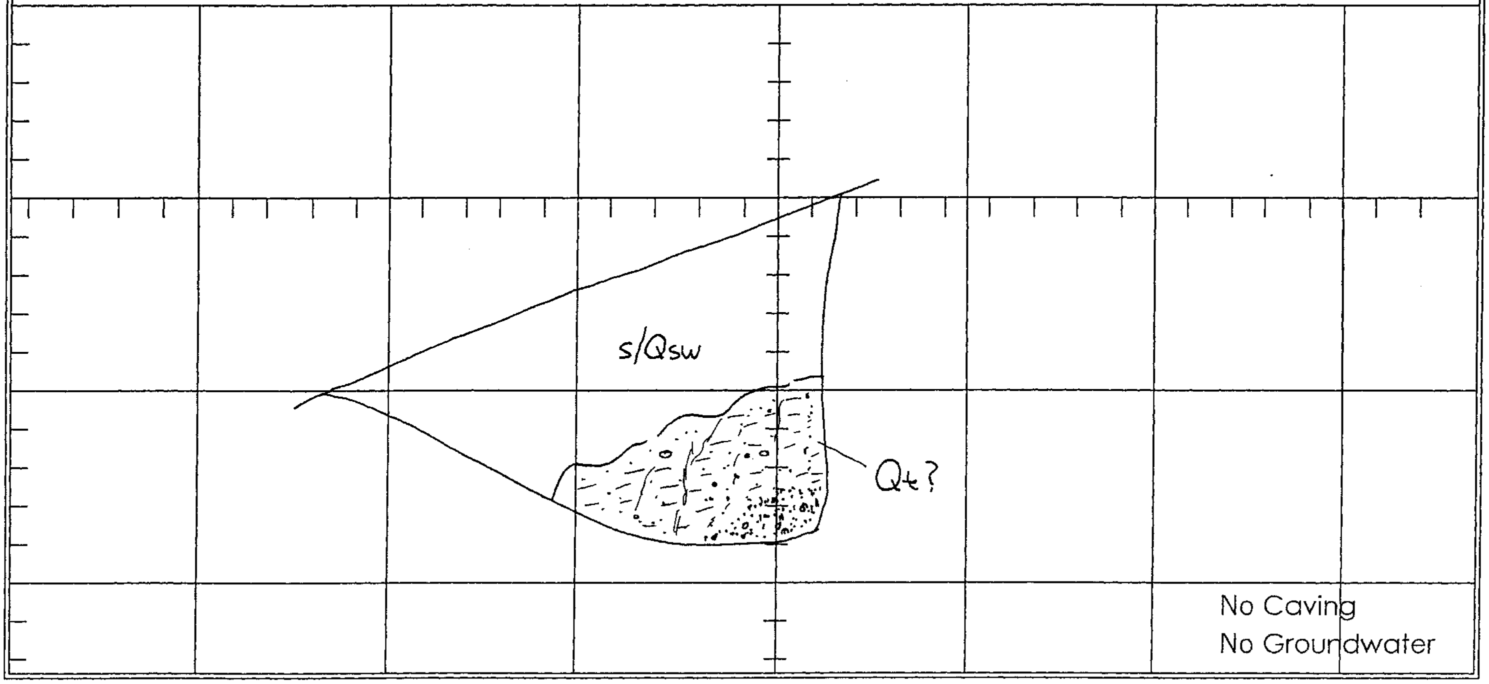
No Caving
No Groundwater

TRENCH LOG NO. T-55

CLIENT: Newhall Land	JOB NO: 03-1571-4	
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03	
	LOGGED BY: VCG	
	EXCAVATED: 2/21/02	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	 Dry Density (pcf)	 Other Tests
0					**<u>SOIL/SLOPEWASH</u>; s/Qsw, (0-4.5 ft.)** @ 0' Grayish-brown fine- to coarse-grained clayey sand with scattered pebbles and cobbles; dry to damp; grades to soft to firm				
5					**<u>TERRACE DEPOSITS?</u>; Qt?, (4.5-9.5 ft.)** @ 4.5' Yellowish-brown clayey sand with gravel and gravelly zone with silty clay matrix; sticky zones; firm; damp; scattered cobbles; indistinct bedding				
10									
15									
20									

TOTAL DEPTH: 9.5 feet N28W→ SCALE: 1 inch = 5 feet

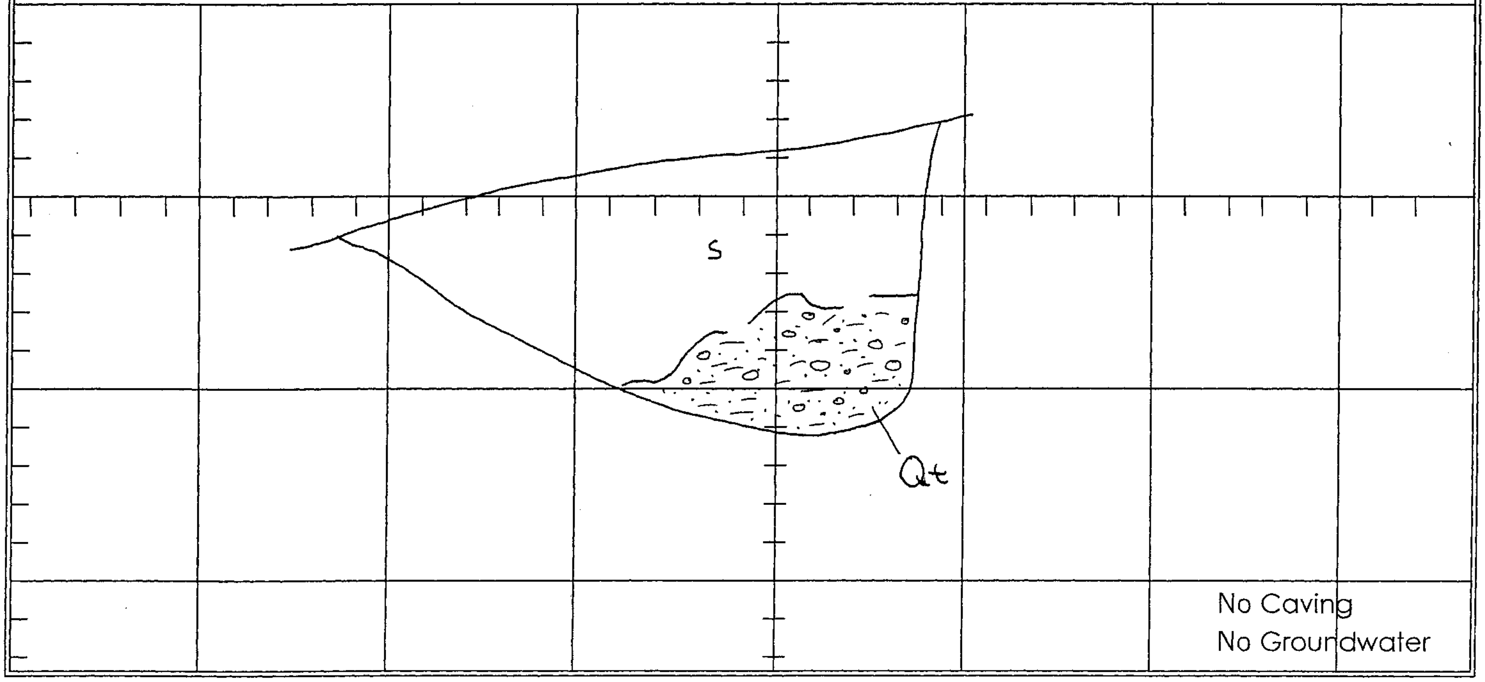


No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4	**TRENCH LOG NO. T-56**
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03 LOGGED BY: VCG EXCAVATED: 2/22/02	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; s/Qsw, (0-5.5 ft.)** @ 0' Medium- to grayish-brown fine-grained silty sand with pebbles; loose; dry to damp				
5					**TERRACE DEPOSITS; Qt, (5.5-7 ft.)** @ 5.5' Yellowish-brown fine- to coarse-grained silty pebbly sand with abundant small cobbles and gravel; faint roughly horizontal stratification; moderately dense; damp				
10									
15									
20									

TOTAL DEPTH: 7 feet N52E→ SCALE: 1 inch = 5 feet



No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Sheet 1 of 1

TRENCH LOG NO. T-57

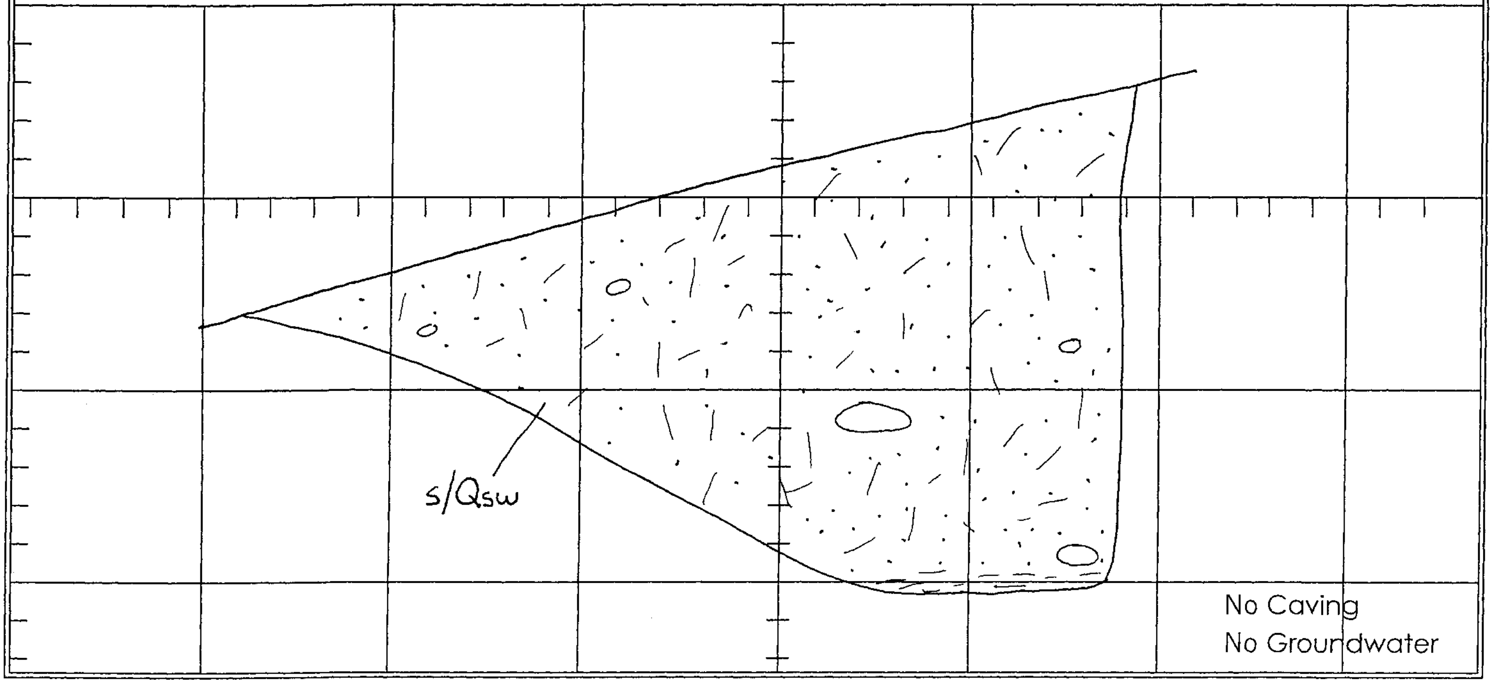
CLIENT:	Newhall Land	JOB NO:	03-1571-4
PROJECT:	River Park Tentative Tract 53425	DATE:	4/4/03
		LOGGED BY:	VCG
		EXCAVATED:	2/22/02
EXCAVATION METHOD:	Track-Mounted Backhoe w/24" Bucket	ELEVATION:	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL/SLOPEWASH; s/Qsw, (0-13.5 ft.)** @ 0' Grayish- to dark brown fine- to coarse-grained silty pebbly sand with scattered small cobbles; loose; dry to damp; uniform texture and lithology; numerous voids/root tubes				
5									
					@ 9' Grades to yellowish-brown				
10									
					@ 13' Fewer root tubes; possibly Qt, no stratification horizons				
15									
20									

TOTAL DEPTH: 13.5 feet

N23E→

SCALE: 1 inch = 5 feet



No Caving
No Groundwater

CLIENT: Newhall Land		JOB NO: 03-1571-4	
PROJECT: River Park Tentative Tract 53425		DATE: 4/4/03	
		LOGGED BY: VCG	
		EXCAVATED: 2/22/02	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket		ELEVATION:	

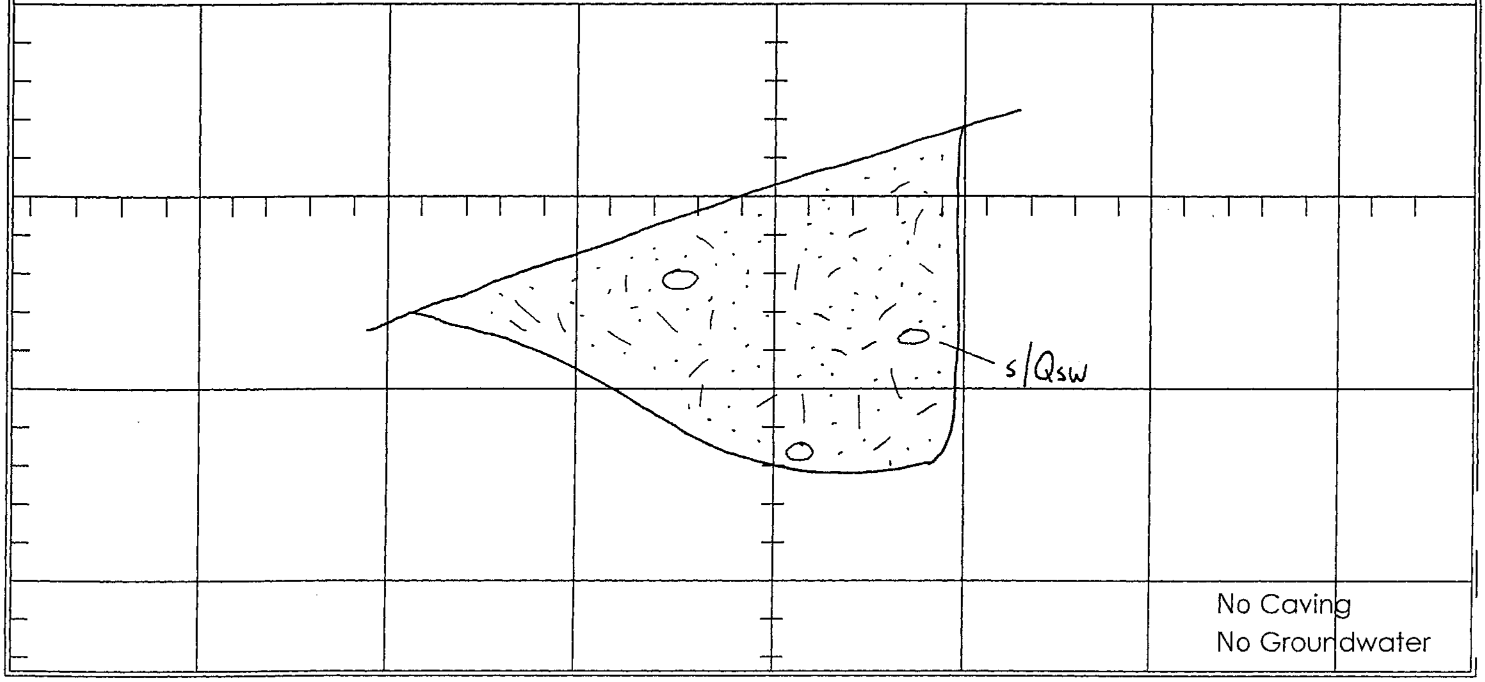
TRENCH LOG NO. T-58

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0 5 10 15 20					**SOIL/SLOPEWASH; s/Qsw, (0-9.5 ft.)** @ 0' Grayish- to reddish-yellowish-brown clayey sand and clayey sandy silt with isolated small cobbles; soft; dry to damp; slightly sticky; no stratigraphic horizons; massive; grayish- from 1.5'; reddish-brown from 1.5 to 6' and yellowish-brown to bottom of trench				

TOTAL DEPTH: 9.5 feet

N17W→

SCALE: 1 inch = 5 feet



No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

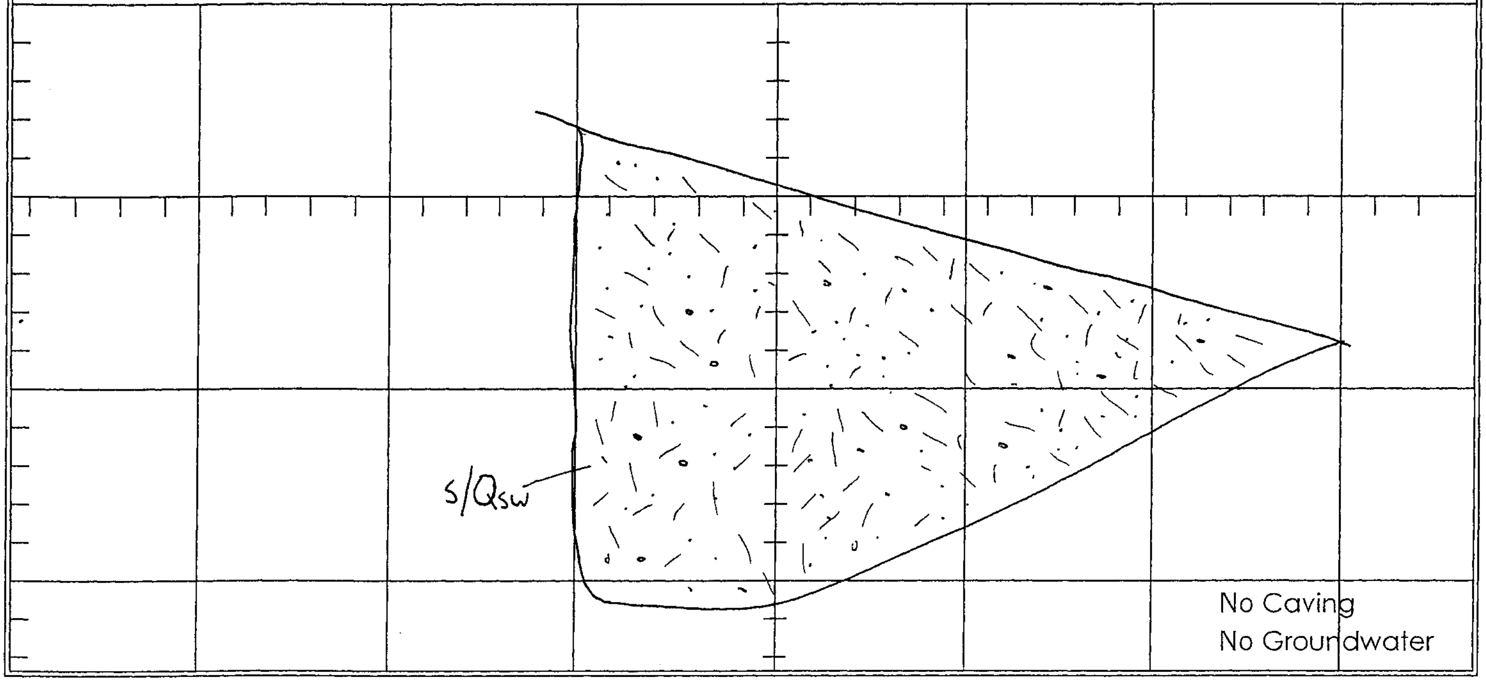
Sheet 1 of 1

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: VCG		
	EXCAVATED: 2/22/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:		

TRENCH LOG NO. T-59

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0					**SOIL/SLOPEWASH; s/Qsw, (0-13 ft.)** @ 0' Grayish-reddish-brown to moderate brown, fine- to coarse-grained pebbly, silty sand and pebbly, sandy silt; loose/soft; dry to damp; voids to bottom of excavation; no stratification				
5									
10									
15					COMMENTS: -Digs very easily -No cobbles				
20									

TOTAL DEPTH: 13 feet ←N2W SCALE: 1 inch = 5 feet



No Caving
No Groundwater

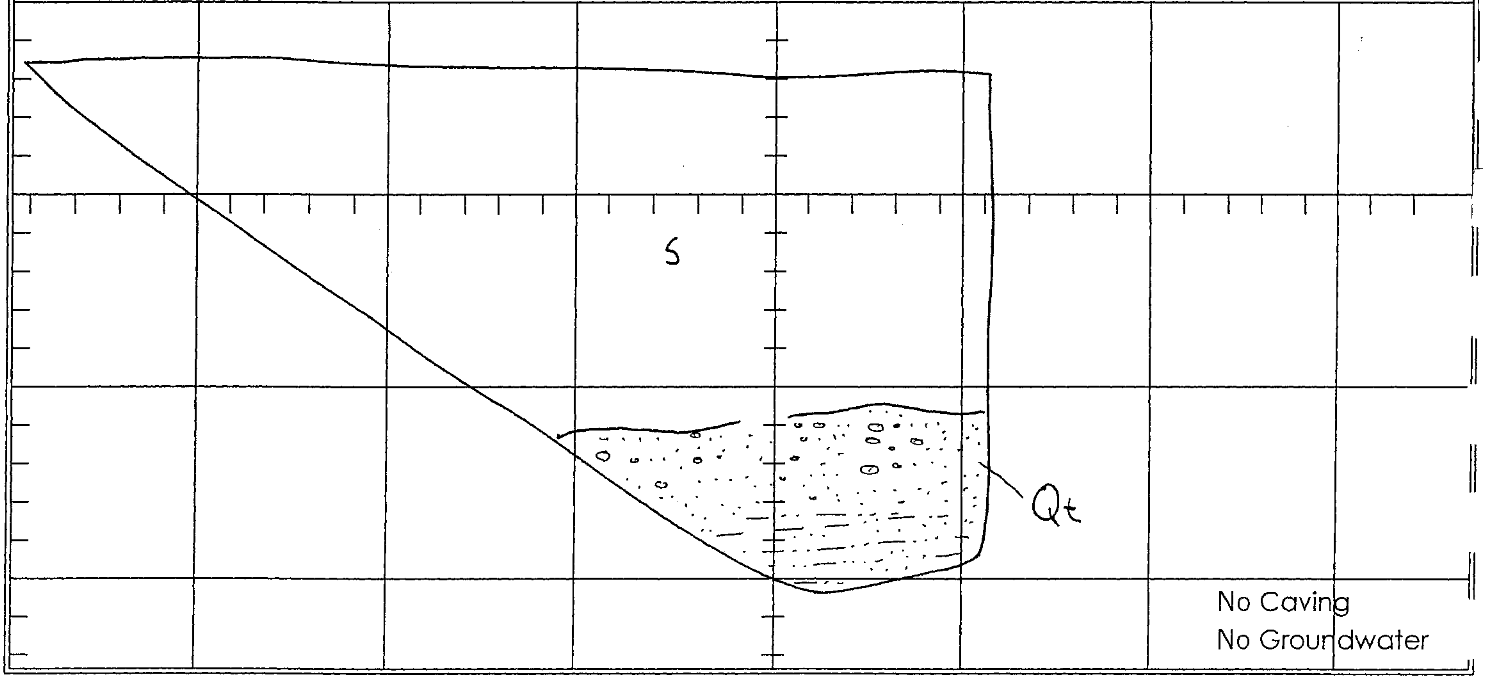
ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Sheet 1 of 1

CLIENT: Newhall Land	JOB NO: 03-1571-4	**TRENCH LOG NO. T-60**
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03 LOGGED BY: VCG EXCAVATED: 2/22/02	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:	

							LABORATORY TESTS		
DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-9 ft.)** @ 0' Grayish-brown fine- to medium-grained silty sand with scattered pebbles and yellowish-brown clayey pebbly silt; loose/soft; dry to damp; voids to 9 ft.				
5									
10					**TERRACE DEPOSITS; Qt, (9-13 ft.)** @ 9' Yellowish-brown medium- to coarse-grained pebbly cobbly sand; moderately dense; damp; crudely stratified COMMENTS: -@ 11' Possibly TQs				
15									
20									

TOTAL DEPTH: 13 feet N86W→ SCALE: 1 inch = 5 feet

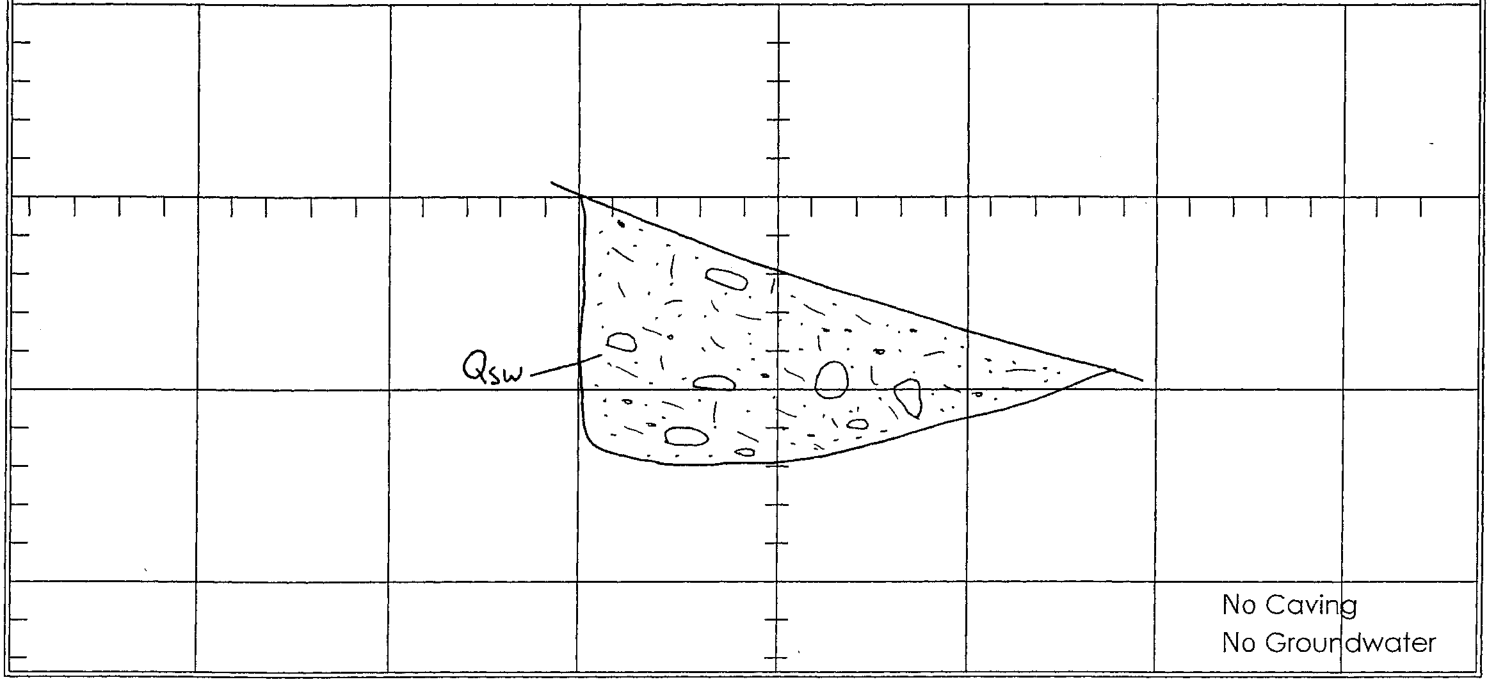


No Caving
No Groundwater

CLIENT:	Newhall Land	JOB NO:	03-1571-4	**TRENCH LOG NO. T-61**
PROJECT:	River Park Tentative Tract 53425	DATE:	4/4/03	
		LOGGED BY:	VCG	
		EXCAVATED:	2/22/02	
EXCAVATION METHOD:	Track-Mounted Backhoe w/24" Bucket	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw, (0-7 ft.)** @ 0' Light-grayish to reddish-brown fine- to coarse-grained silty pebbly sand with abundant cobbles; moderately dense dry; excavation extremely difficult due to small to medium-sized cobbles				
5									
10					COMMENTS: -Unable to get through unit.				
15									
20									

TOTAL DEPTH: 7 feet ←N51E SCALE: 1 inch = 5 feet



No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

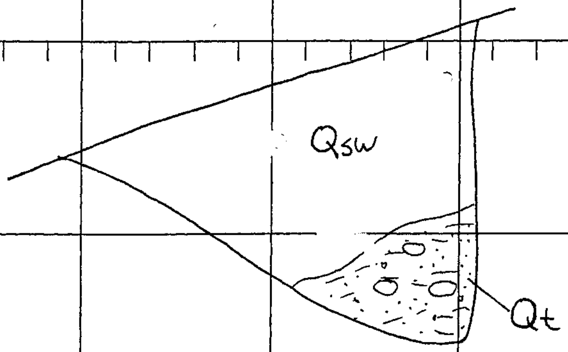
Sheet 1 of 1

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: VCG		
	EXCAVATED: 2/22/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:		

TRENCH LOG NO. T-62

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0					**SLOPEWASH; Qsw, (0-5 ft.)** @ 0' Light-grayish to reddish-brown fine- to coarse-grained silty pebbly sand with abundant cobbles; moderately dense dry; excavation extremely difficult due to small to medium-sized cobbles				
5					**TERRACE DEPOSITS; Qt, (5-7 ft.)** @ 5' Light yellowish-brown fine- to coarse-grained silty pebbly sand with small to medium cobbles; moderately dense; dry to damp; no visible stratification				
10									
15									
20									

TOTAL DEPTH: 7 feet N38E→ SCALE: 1 inch = 5 feet



No Caving
No Groundwater

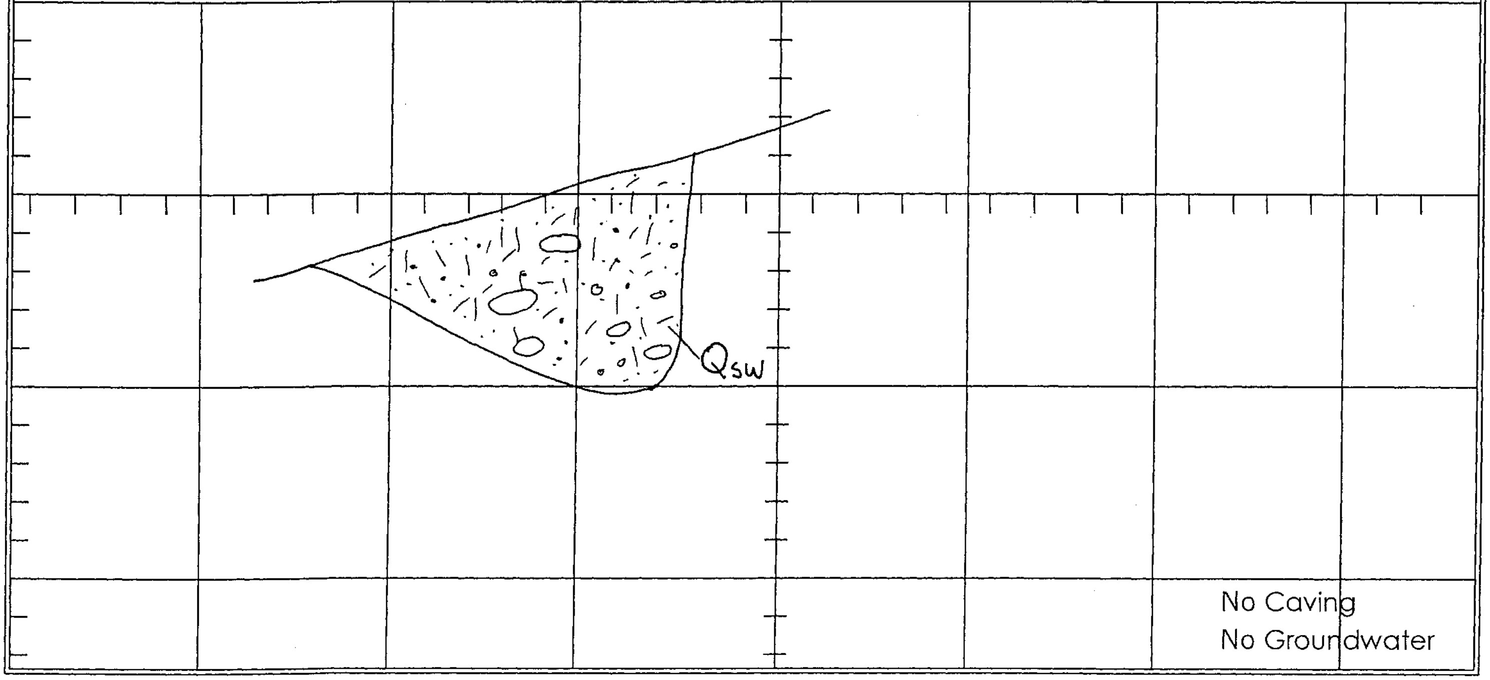
ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Sheet 1 of 1

CLIENT: Newhall Land	JOB NO: 03-1571-4		**TRENCH LOG NO. T-63**
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: VCG		
	EXCAVATED: 2/22/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SLOPEWASH; Qsw, (0-6 ft.)** @ 0' Grayish- to reddish-brown fine- to coarse-grained sandy silt/silty sand with scattered pebbles and cobbles; soft to moderately hard; dry; excavation very difficult due to cobbles				
5									
10									
15									
20									

TOTAL DEPTH: 6 feet N30E→ SCALE: 1 inch = 5 feet



No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

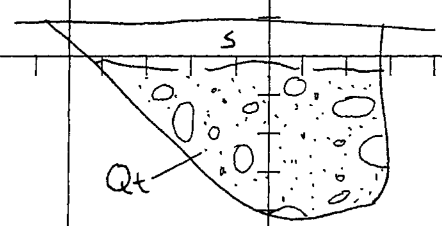
Sheet 1 of 1

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: VCG		
	EXCAVATED: 2/22/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:		

TRENCH LOG NO. T-64

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-1 ft.)** @ 0' Grayish-brown fine- to coarse-grained pebbly sand with silt and scattered cobbles; loose; dry; abundant roots **TERRACE DEPOSITS; Qt, (1-5 ft.)** @ 1' Reddish-brown medium- to coarse-grained pebbly cobbly sand; moderately dense; dry; no visible bedding; excavation very difficult				
5									
10									
15									
20									

TOTAL DEPTH: 5 feet ←N6W SCALE: 1 inch = 5 feet



No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

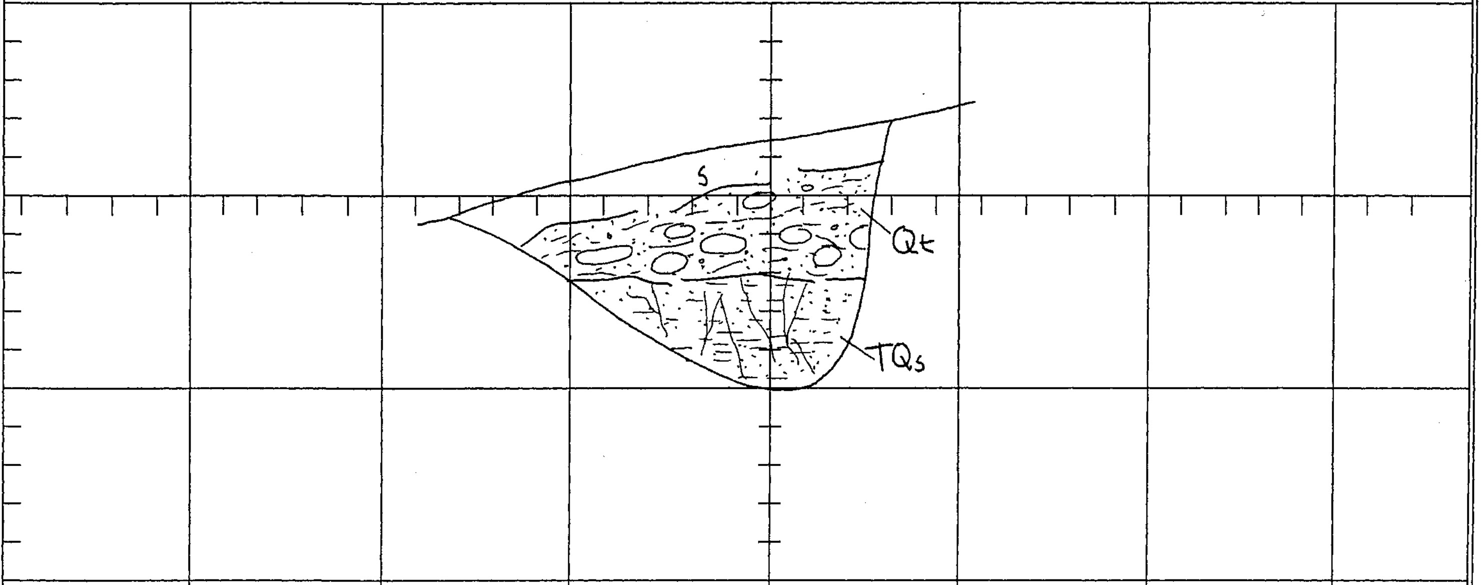
Sheet 1 of 1

TRENCH LOG NO. T-65

CLIENT:	Newhall Land	JOB NO:	03-1571-4
PROJECT:	River Park Tentative Tract 53425	DATE:	4/4/03
		LOGGED BY:	VCG
		EXCAVATED:	2/22/02
EXCAVATION METHOD:	Track-Mounted Backhoe w/24" Bucket	ELEVATION:	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0 5 10 15 20					**SOIL; s, (0-1 ft.)** @ 0' Grayish-brown silty pebbly sand with cobbles; loose; dry **TERRACE DEPOSITS; Qt, (1-3.5 ft.)** @ 1' Reddish-brown clayey silty sand with abundant cobbles; moderately dense; dry **LANDSLIDE DEPOSITS; (3.5-7 ft.)** @ 3.5' Tan sandy siltstone with minor clay; moderately hard; dry to damp; massive; disturbed appearance COMMENTS: -Contact between Qls/Qt horizontal and sharp	Massive			

TOTAL DEPTH: 7 feet N48W→ SCALE: 1 inch = 5 feet

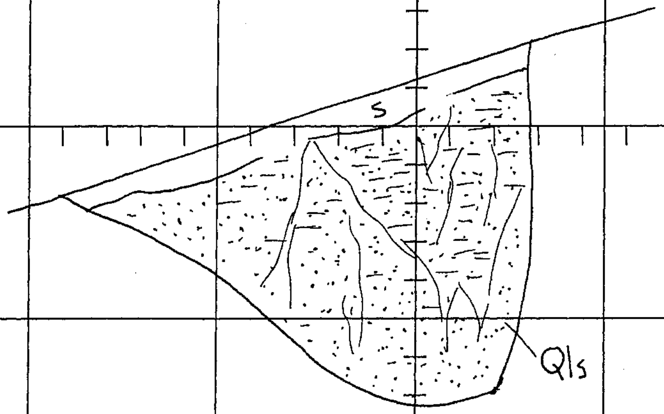


No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4	**TRENCH LOG NO. T-66**
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03 LOGGED BY: VCG EXCAVATED: 2/22/02	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0 5 10 15 20					**<u>SOIL</u>; s, (0-6 in.)** @ 0' Light-reddish brown fine- to coarse-grained silty, pebbly sand; loose; dry **<u>LANDSLIDE DEPOSITS</u>; Qls, (6 in.-9 ft.)** @ 6" Light reddish-brown silty sandstone/sandy siltstone and light-gray to cream fine- to coarse-grained sandstone and pebbly sandstone; moderately dense; slightly fractured; dry to damp; gradational between units; digs hard <u>COMMENTS</u>: -Only extremely vague stratigraphy but seems discontinuous and irregular	Massive/structureless			

TOTAL DEPTH: 7 feet N45W→ SCALE: 1 inch = 5 feet



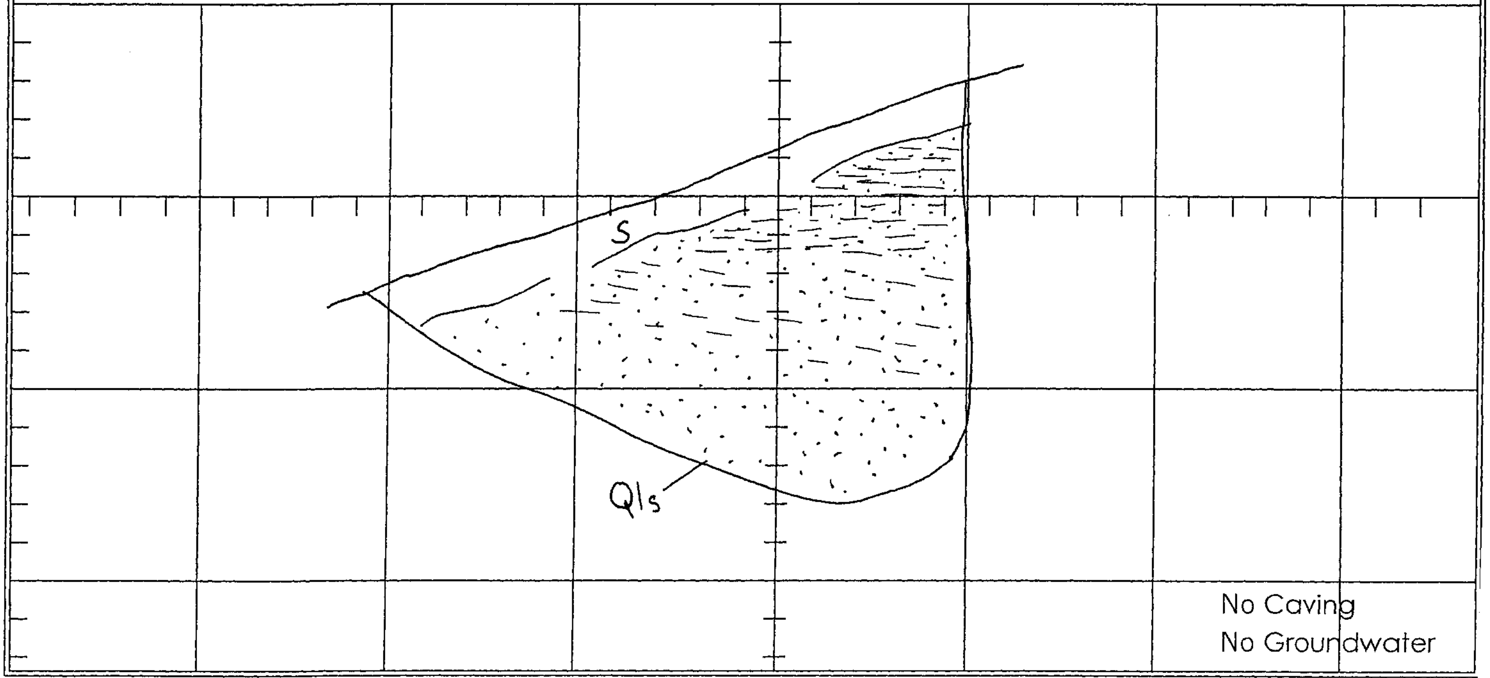
No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: VCG		
	EXCAVATED: 2/22/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:		

TRENCH LOG NO. T-67

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0					**SOIL; s, (0-1 ft.)** @ 0' Light-reddish brown fine- to coarse-grained silty, pebbly sand; loose; dry				
					LANDSLIDE DEPOSITS; (1-9 ft.) @ 1' Reddish-brown siltstone and sandy siltstone; grades to light reddish-brown silty sandstone and light gray coarse-grained sandstone; moderately dense; dry; bedding extremely vague	Apx. B:N78W,10SW			
5									
10									
15									
20									

TOTAL DEPTH: 9 feet N52W→ SCALE: 1 inch = 5 feet



No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: VCG		
	EXCAVATED: 2/22/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION:		

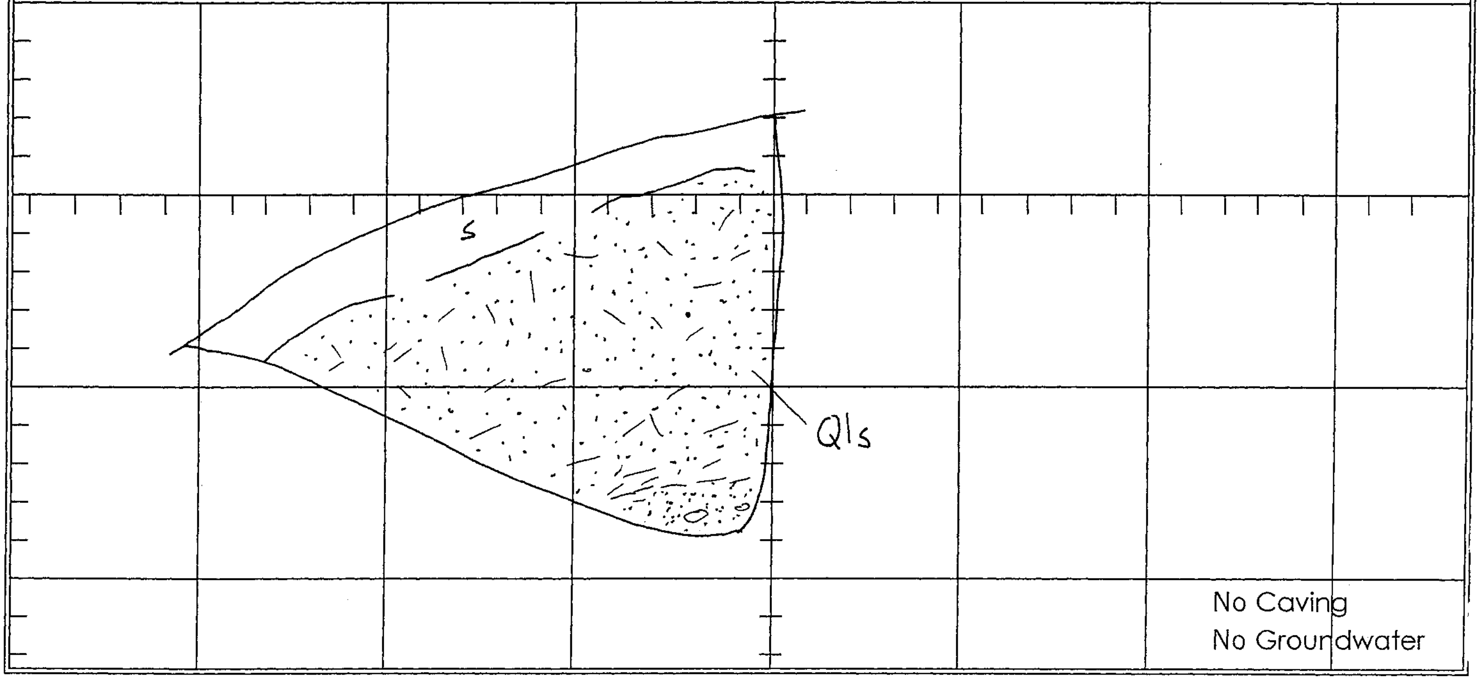
TRENCH LOG NO. T-68

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0					**SOIL; s, (0-1.5 ft.)** @ 0' Grayish-brown fine- to coarse-grained silty sand with pebbles; loose; dry **LANDSLIDE DEPOSITS; Qls, (1.5-11.5 ft.)** @ 1.5' Light yellowish-brown fine-grained silty sandstone and gray friable sandstone with isolated cobbles; loose; lacking sedimentary structures; excavates very easily with the backhoe and with pick				
5									
10					COMMENTS: -Digs very easily				
15									
20									

TOTAL DEPTH: 11.5 feet

N23W→

SCALE: 1 inch = 5 feet



No Caving
No Groundwater

TRENCH LOG NO. T-69

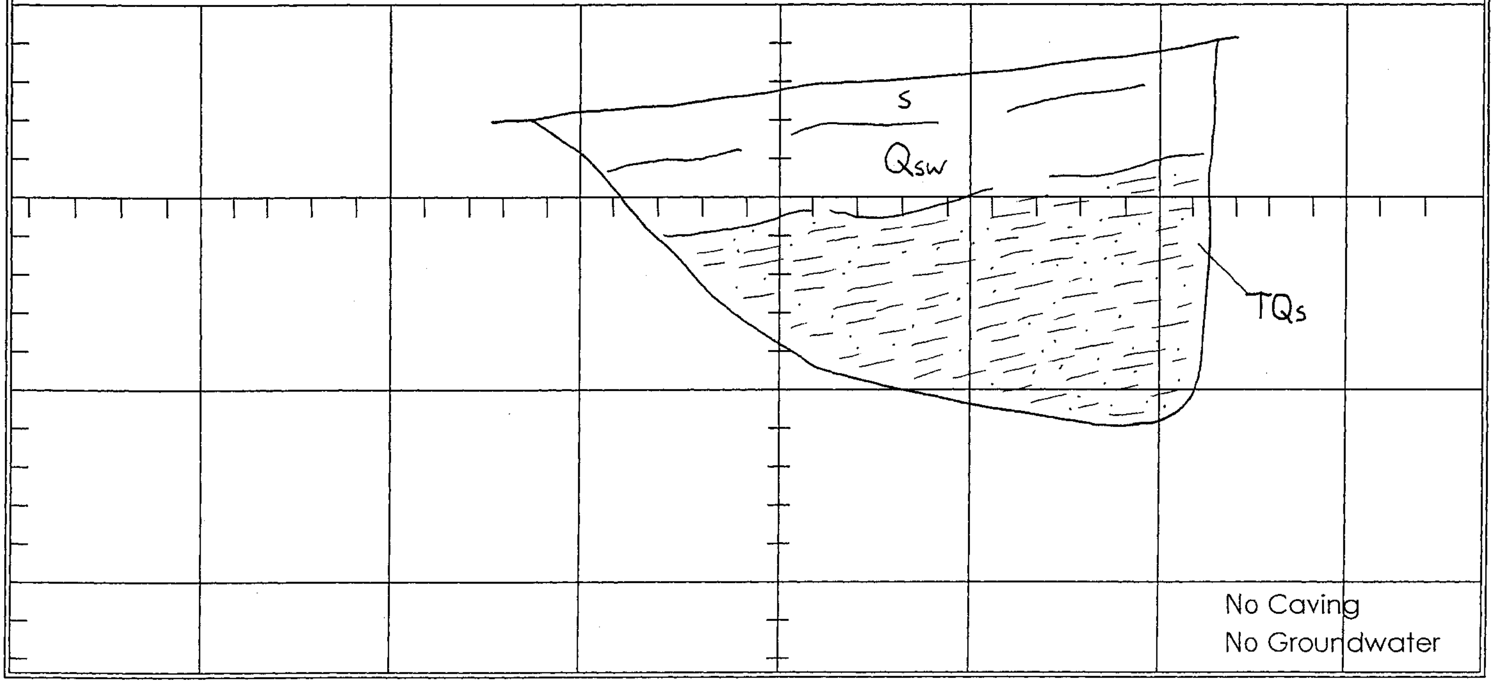
CLIENT: Newhall Land
PROJECT: River Park
Tentative Map Review
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket
JOB NO: 03-1571-4
DATE: 4/4/03
LOGGED BY: CJS
EXCAVATED: 3/5/02
ELEVATION: 1365

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0 5 10 15 20					**SOIL; s, (0-1 ft.)** @ 0' Dark yellowish-brown, fine-grained silty to clayey sand and sandy clay; fine gravel to 1/2"; porous; damp **<u>SLOPEWASH</u>; Qsw, (1-3 ft.)** @ 1' Dark-brown to dark yellowish-brown sandy clay; few rounded granitic cobbles near base of unit; stiff; damp to moist **<u>BEDROCK</u>; TQs, (3-9.5 ft.)** @ 3' Yellowish-brown sandy mudstone; moderately hard; damp; upper 3 ft. weathered with carbonate staining along discontinuous fracture faces; massive; no significant joints or fractures				

TOTAL DEPTH: 9.5 feet

N45E→

SCALE: 1 inch = 5 feet



No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

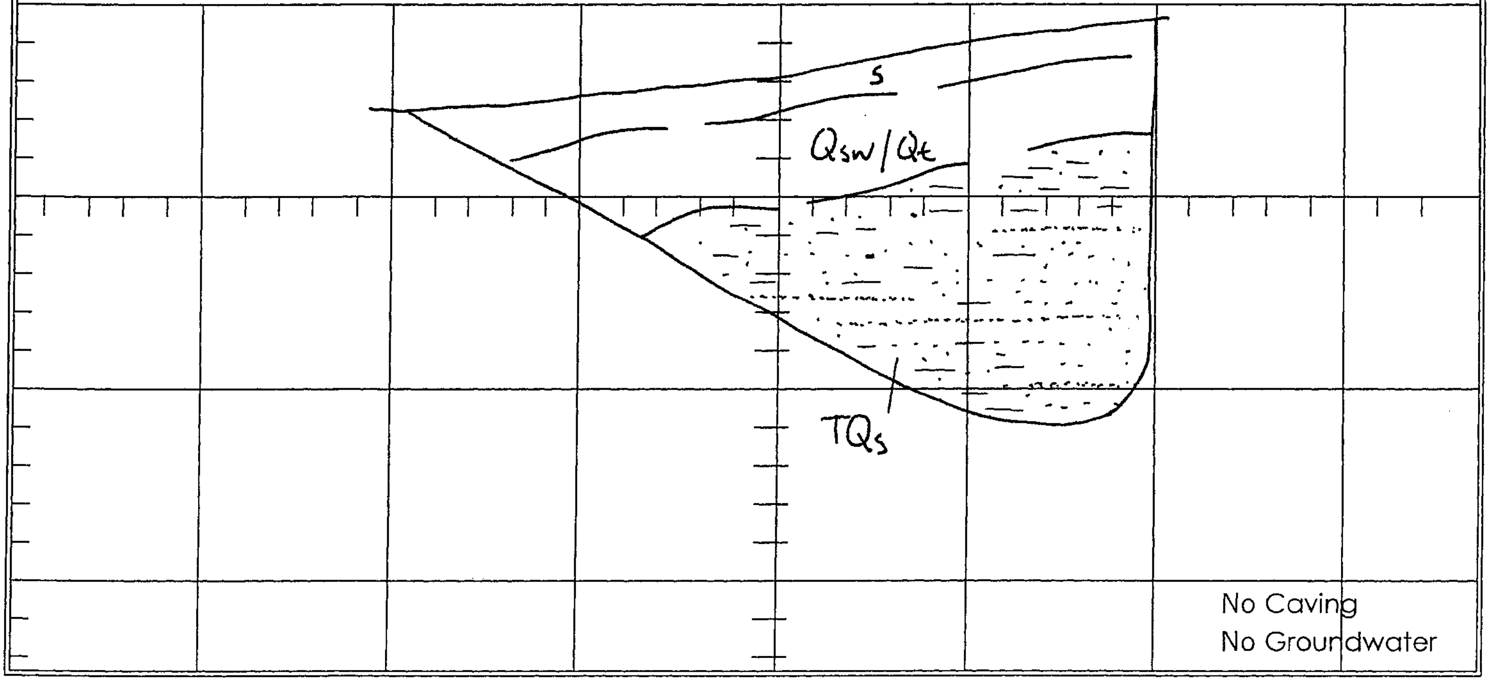
CLIENT: Newhall Land	JOB NO: 03-1571-4	
PROJECT: River Park Tentative Map Review	DATE: 4/4/03 LOGGED BY: CJS EXCAVATED: 3/5/02	# TRENCH LOG NO. T-70
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket	ELEVATION: 1365	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-1 ft.)** @ 0' Yellowish-brown very sandy clay; sand fraction fine- to medium-grained; rare, rounded, granitic pebbles and cobbles; abundant hair-roots; dry to damp **SLOPEWASH/TERRACE DEPOSITS; Qsw/Qt, (1-3 ft.)** @ 1' Dark yellowish-brown sandy clay to clayey sand; sand fraction fine- to coarse-grained; rounded granitic pebbles and cobbles common in lowest 12"; overall stiff to very stiff; damp **BEDROCK?; TQ?, (3-10 ft.)** @ 3' Yellowish-brown to dark yellowish-brown sandy mudstone; locally with mottling of olive brown; moderately hard; damp; vague bedding features defined by subtle variations in sand content; "bedding" features cannot be reliably traced over distances exceeding a few feet	B:N70E,11SE			
5									
10									
15									
20									

TOTAL DEPTH: 10 feet

N30E→

SCALE: 1 inch = 5 feet



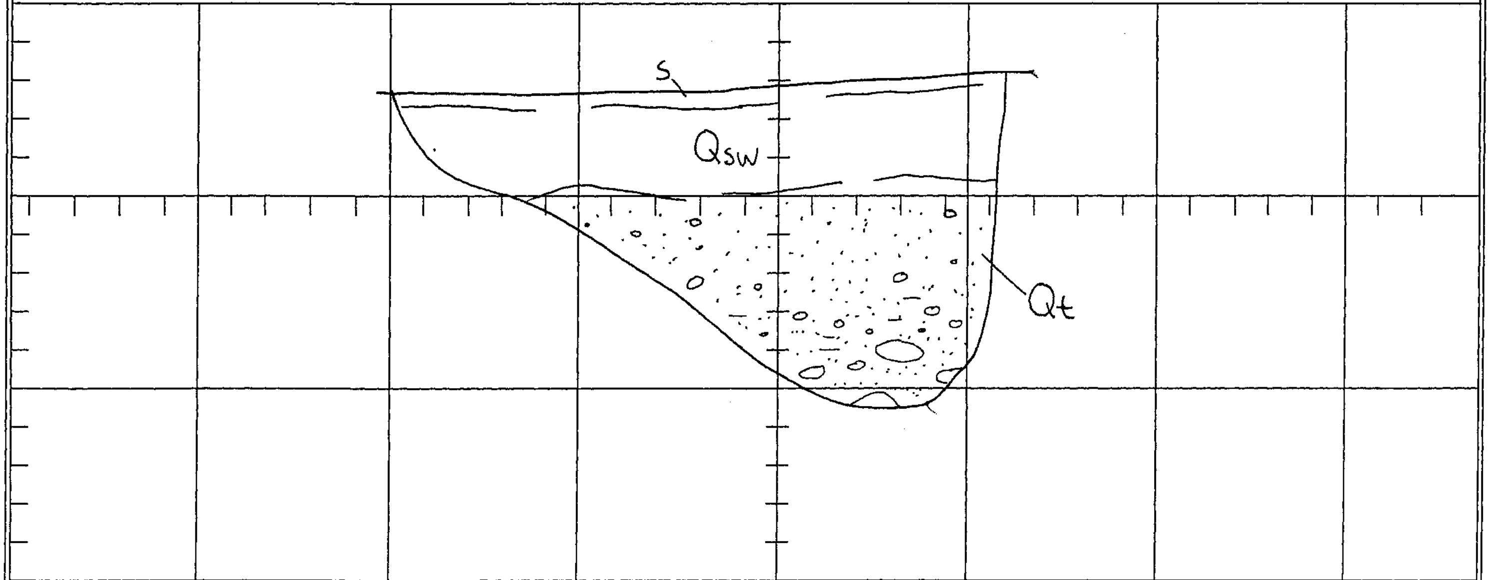
No Caving
No Groundwater

TRENCH LOG NO. T-71

CLIENT:	Newhall Land	JOB NO:	03-1571-4
PROJECT:	River Park Tentative Map Review	DATE:	4/4/03
		LOGGED BY:	CJS
		EXCAVATED:	3/5/02
EXCAVATION METHOD:	Track-Mounted Backhoe w/24" bucket	ELEVATION:	~1417

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0					**<u>SOIL</u>; s, (0-6 in.)** @ 0' Brown to grayish-brown, fine- to medium-grained silty sand; loose; dry to slightly damp; numerous hair-roots **<u>SLOPEWASH</u>; Qsw, (6 in.-3 ft.)** @ 6" Yellowish-brown sandy clay; stiff; damp **<u>TERRACE DEPOSITS</u>; Qt, (3-8.5 ft.)** @ 3' Dark brown (7.5YR 3/4) cobble and boulder conglomerate to cobbly sand; coarser-grained sections are matrix-support with rounded granitic/metamorphic clasts; clasts range 1/2" to 24"; with 2-6" size most common; matrix is fine- to coarse-grained sand with clay; overall dense; damp to moist; excavation is difficult in lower section due to increasing clast size				
5									
10									
15									
20									

TOTAL DEPTH: 8.5 feet ←N80W SCALE: 1 inch = 5 feet

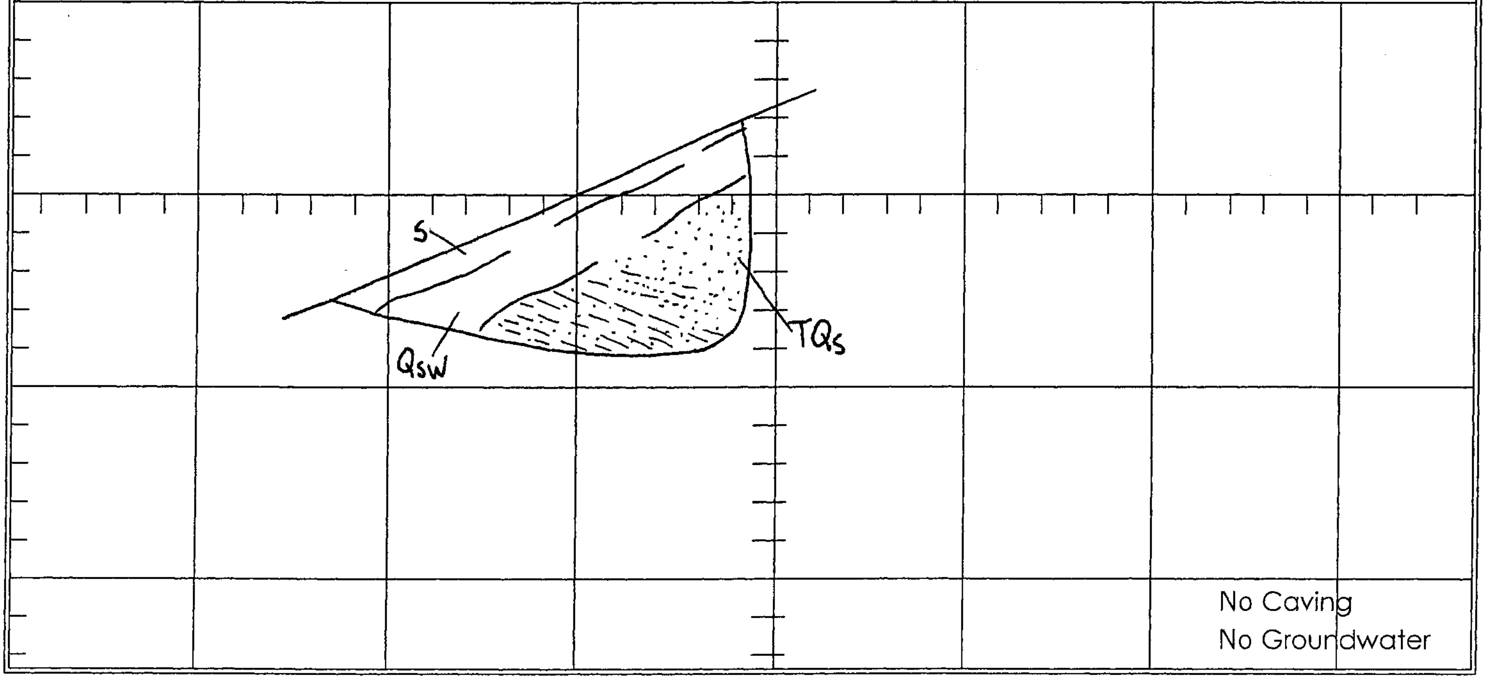


No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4	# TRENCH LOG NO. T-72	
PROJECT: River Park Tentative Map Review	DATE: 4/4/03		
	LOGGED BY: CJS		
	EXCAVATED: 3/5/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket	ELEVATION: 1429		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-6 in.)** @ 0' Yellowish-brown, fine- to medium-grained silty to clayey sand; loose; dry to slightly damp **SLOPEWASH; Qsw, (6 in.-1.5 ft.)** @ 6" Dark yellowish-brown clayey sand with pebbles; stiff; damp to moist				
5					**BEDROCK; TQs, (1.5-6 ft.)** @ 1.5' Grayish-yellow medium- to coarse-grained pebbly sandstone and yellowish-brown very fine-grained silty to clayey sandstone; hard; damp; bedding well-defined by change in lithology	B:N65E,12SE			
10									
15									
20									

TOTAL DEPTH: 6 feet ←N60W SCALE: 1 inch = 5 feet

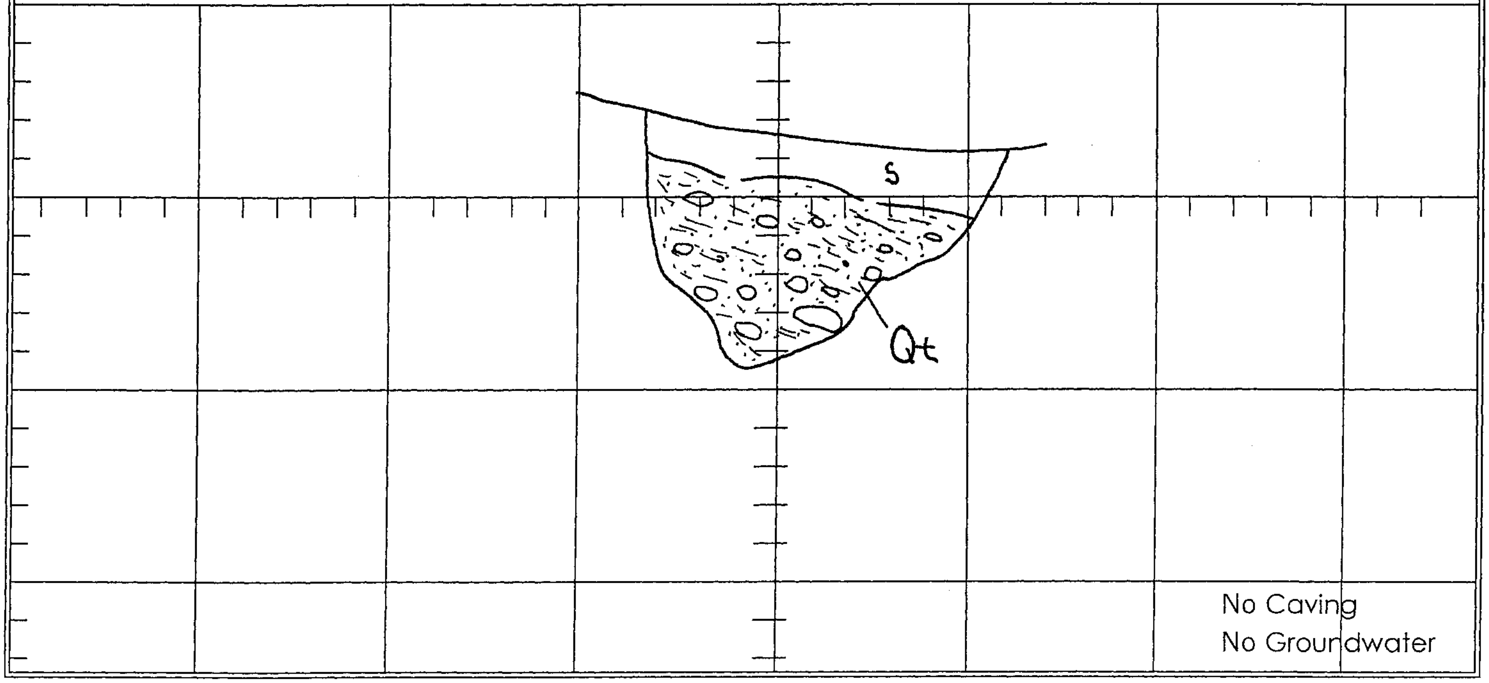


No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4		**TRENCH LOG NO.** T-73
PROJECT: River Park Tentative Map Review	DATE: 4/4/03		
	LOGGED BY: CJS		
	EXCAVATED: 3/5/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket	ELEVATION: ~1429		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**<u>SOIL</u>; s, (0-1 ft.)** @ 0' Brown fine- to medium-grained silty sand; porous; loose; dry to damp; hair-roots common **<u>TERRACE DEPOSITS</u>; Qt, (1-6.5 ft.)** @ 1' Dark brown (7.5YR 3/4) cobble & boulder conglomerate, rounded granitic & metamorphic cobbles and boulders supported in matrix of fine- to coarse-grained clayey sand to sandy clay; clast size ranges 1/2-24" with most between 2-6 inches; overall hard; damp				
5									
10									
15									
20									

TOTAL DEPTH: 6.5 feet N75W→ SCALE: 1 inch = 5 feet

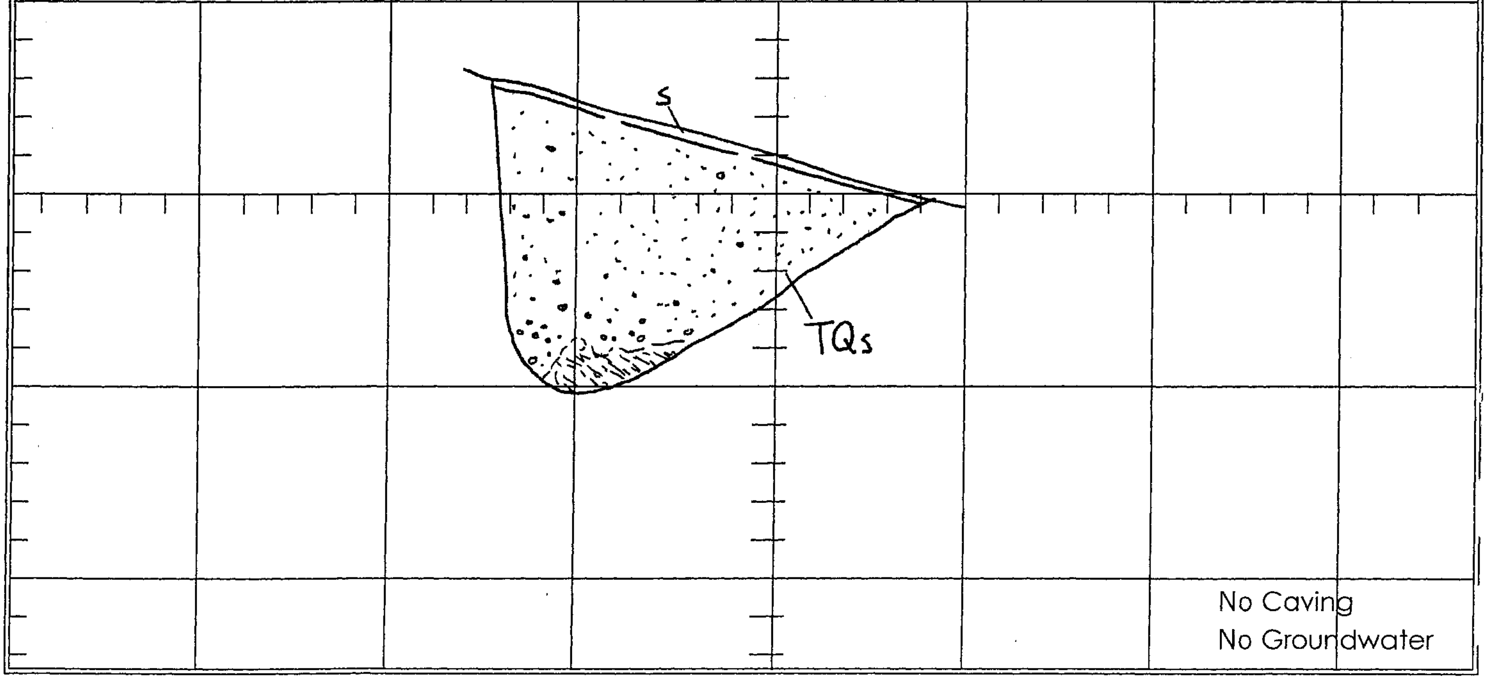


No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4	**TRENCH LOG NO. T-74**
PROJECT: River Park Tentative Map Review	DATE: 4/4/03 LOGGED BY: CJS EXCAVATED: 3/5/02	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket	ELEVATION: ~1335	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-6 in.)** @ 0' Grayish-brown, fine- to medium-grained sand; loose; dry; abundant hair-roots **BEDROCK; TQs, (6 in.-8 ft.)** @ 6" Yellowish-gray, medium- to coarse-grained sandstone and pebbly sandstone and moderate yellowish-brown to moderate reddish-brown mudstone; mudstone contact is deeply channeled where sandstone grades to pebble conglomerate; sandstone is lightly fractured; with solid roots along fractures to a depth of six feet; bedding defined by gradational contact through pebbly sandstone to pebble conglomerate	B:N76E,8SE			
5									
10									
15									
20									

TOTAL DEPTH: 8 feet ←N14E SCALE: 1 inch = 5 feet



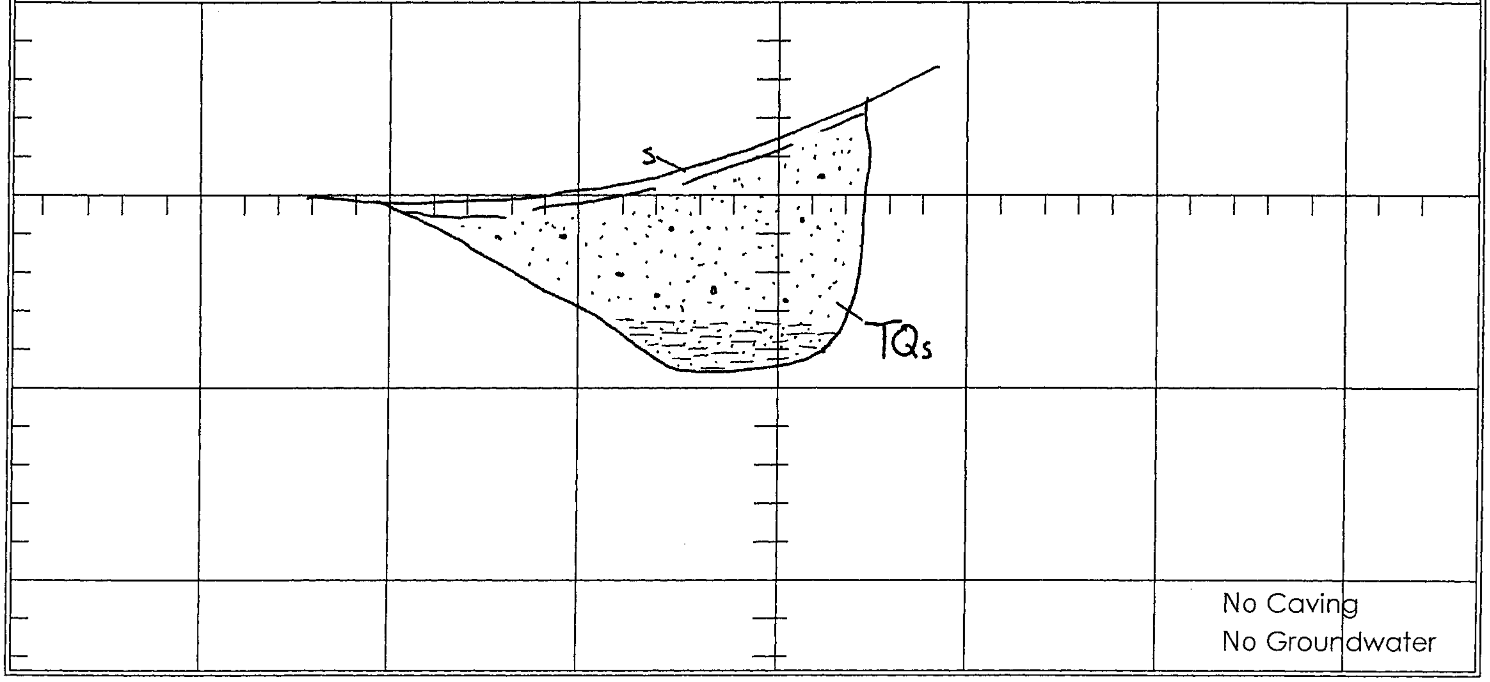
No Caving
No Groundwater

TRENCH LOG NO. T-75

CLIENT:	Newhall Land	JOB NO:	03-1571-4
PROJECT:	River Park Tentative Map Review	DATE:	4/4/03
		LOGGED BY:	CJS
		EXCAVATED:	3/5/02
EXCAVATION METHOD:	Track-Mounted Backhoe w/24" bucket	ELEVATION:	~1310

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**<u>SOIL</u>; s, (0-6 in.)** @ 0' Pale yellowish-gray, fine- to coarse-grained pebbly sand; loose; damp **<u>BEDROCK</u>; TQs, (6 in.-7 ft.)** @ 6" Yellowish-gray, fine- to coarse-grained pebbly sandstone and light yellowish-brown to grayish-brown, sandy mudstone; contact uniform and planar; moderately hard to hard; damp	B:N75W,12SW			
5									
10									
15									
20									

TOTAL DEPTH: 7 feet ←N15W SCALE: 1 inch = 5 feet



No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Map Review	DATE: 4/4/03		
	LOGGED BY: CJS		
	EXCAVATED: 3/5/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket	ELEVATION: ~1285		

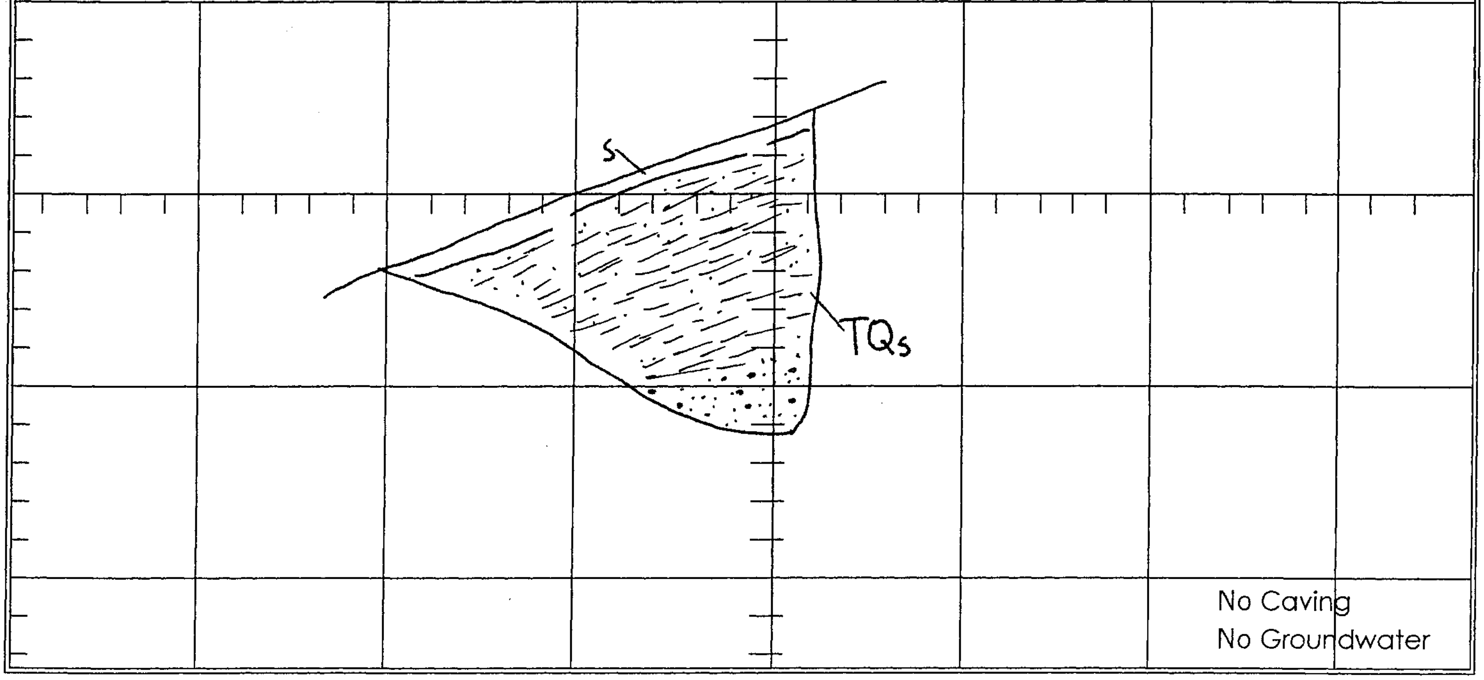
TRENCH LOG NO. T-76

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0					**SOIL; s, (0-8 in.)** @ 0' Yellowish-brown, fine- to medium-grained silty sand; numerous roots; loose; damp **BEDROCK; TQs, (8-8.5 ft.)** @ 8" Moderate reddish-brown sandy mudstone and yellowish-gray fine- to coarse-grained sandstone; moderately hard to hard; damp; bedding on gravel lense at gradational contact				
5									
						B:N65W,8SW			
10									
15									
20									

TOTAL DEPTH: 8.5 feet

N15W→

SCALE: 1 inch = 5 feet



No Caving
No Groundwater

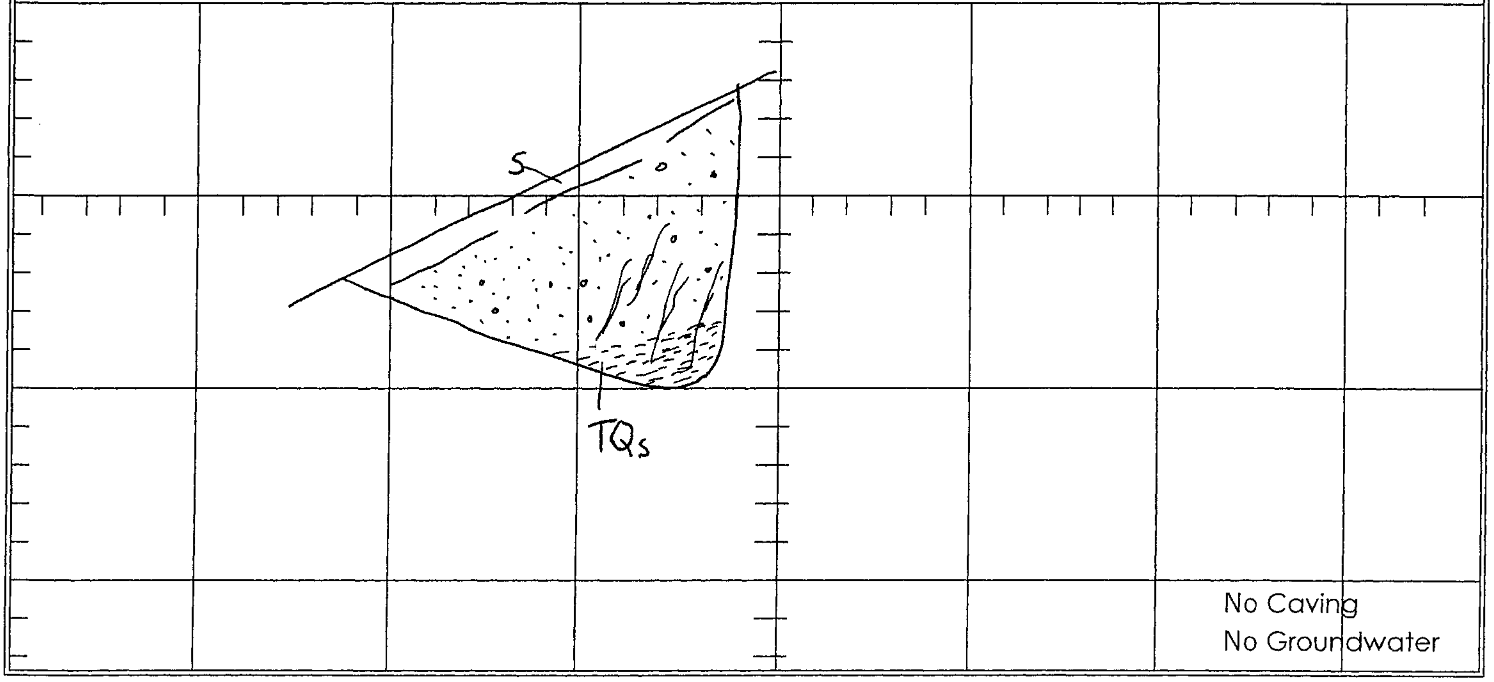
ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

TRENCH LOG NO. T-77

CLIENT:	Newhall Land	JOB NO:	03-1571-4
PROJECT:	River Park Tentative Map Review	DATE:	4/4/03
		LOGGED BY:	CJS
		EXCAVATED:	3/5/02
EXCAVATION METHOD:	Track-Mounted Backhoe w/24" bucket	ELEVATION:	~1315

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0					**<u>SOIL</u>; s, (0-6 in.)** @ 0' Grayish-brown fine- to medium-grained silty sand; abundant hair-roots **<u>BEDROCK</u>; TQs, (6 in.-8 ft.)** @ 6" Yellowish-gray medium- to coarse-grained pebbly sandstone and yellowish-brown sandy siltstone; contact planar and continuous; moderately hard to hard; damp; several carbonate-lined fractures; fractures range up to 3/4" wide; narrower fractures taper closed in both directions; fractures cross-bedding contact without offset				
5									
						B:N60W,12SW			
10						f-N78E,60SE			
15									
20									

TOTAL DEPTH: 8 feet N10W→ SCALE: 1 inch = 5 feet



No Caving
No Groundwater

CLIENT: Newhall Land
PROJECT: River Park
Tentative Map Review
JOB NO: 03-1571-4
DATE: 4/4/03
LOGGED BY: CJS
EXCAVATED: 3/5/02
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket
ELEVATION: ~1300

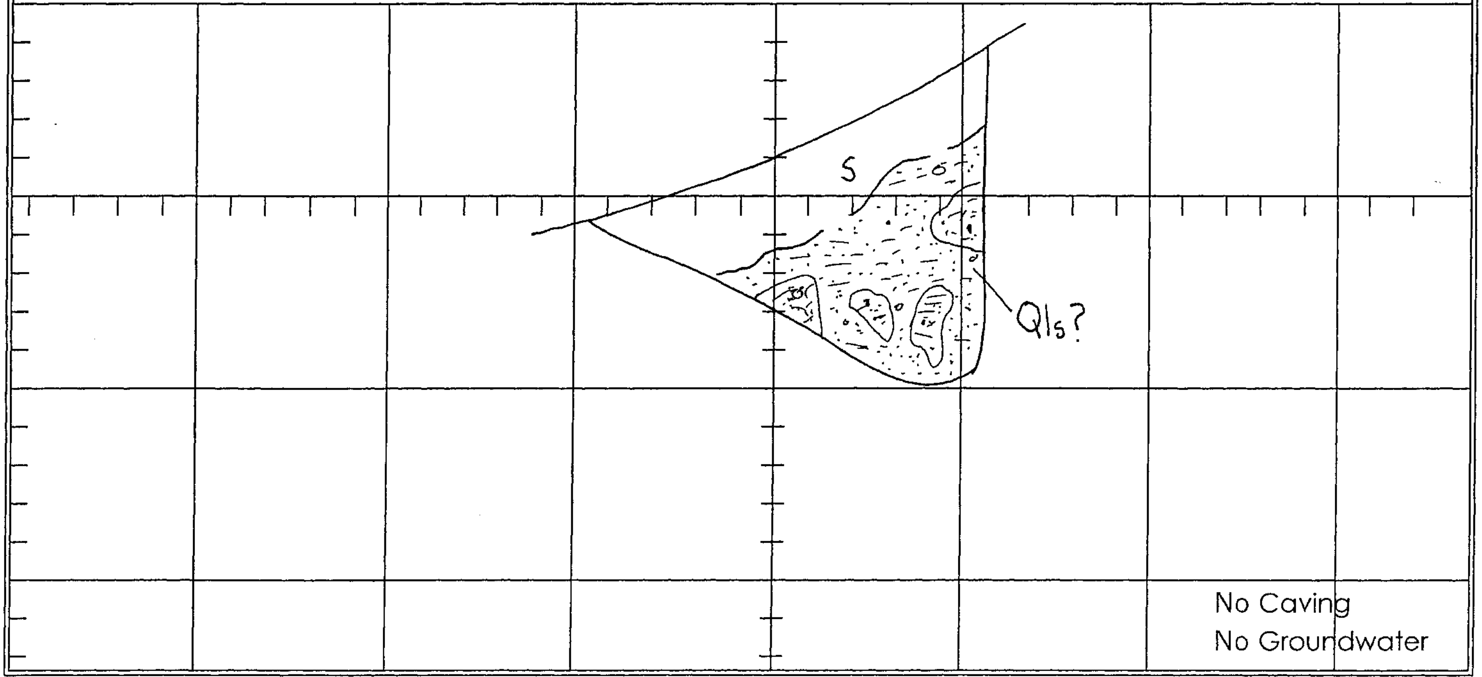
TRENCH LOG NO. T-78

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0					**<u>SOIL</u>; s, (0-2 ft.)** @ 0' Light to moderate grayish-brown fine-grained silty sand with scattered cobbles; loose; dry to damp				
					<u>LANDSLIDE DEBRIS?</u>; Qls?, (2-9 ft.) @ 2' Mixture of sandstone and siltstone fragments in matrix of fine- to medium-grained silty sand; pebbles and cobbles scattered throughout; carbonate occurs locally in stringers and small blebs; no observable structure				
5									
10									
15									
20									

TOTAL DEPTH: 9 feet

Due N→

SCALE: 1 inch = 5 feet

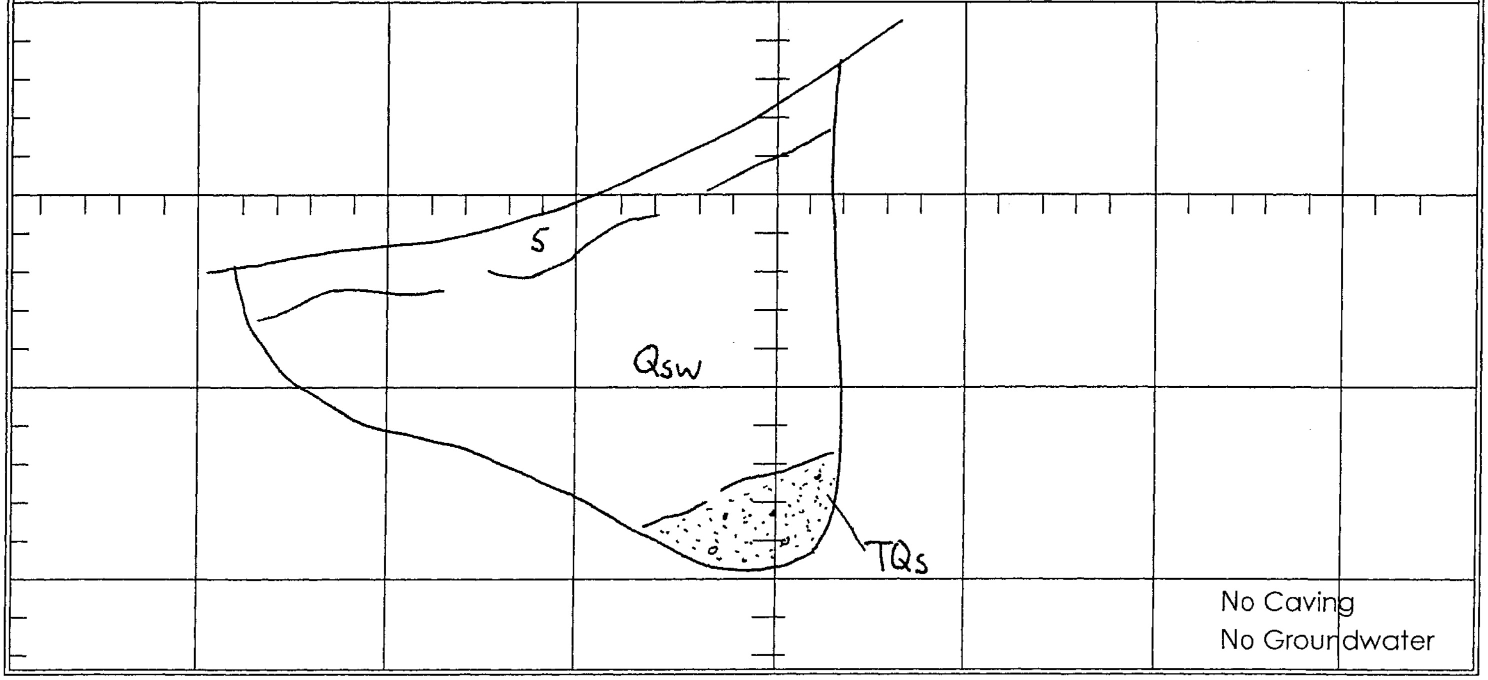


No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4	**TRENCH LOG NO. T-79**
PROJECT: River Park Tentative Map Review	DATE: 4/4/03	
	LOGGED BY: CJS	
	EXCAVATED: 3/5/02	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket	ELEVATION: 1335	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0					**SOIL; s, (0-1 ft.)** @ 0' Yellowish-brown, fine- to coarse-grained silty sand with pebbles; numerous roots; loose; damp; lower contact irregular **SLOPEWASH/WEATHERED BEDROCK; Qsw, (1-10 ft.)** @ 1' Pale reddish-brown to yellowish-gray, mixture of sandstone, siltstone and cobbles in matrix of fine- to coarse-grained, silty sand; loose to moderately dense; damp; no discernible structure; lower contact gradational into bedrock; appearance similar to material identified as Qls in nearby trenches				
5									
10					**BEDROCK; TQs, (10-13 ft.)** @ 10' Yellowish-gray, pebbly sandstone; hard; damp; bedding defined by subtle pebble lineaments	B:N65E,14SE apx.			
15									
20									

TOTAL DEPTH: 13 feet N55W→ SCALE: 1 inch = 5 feet



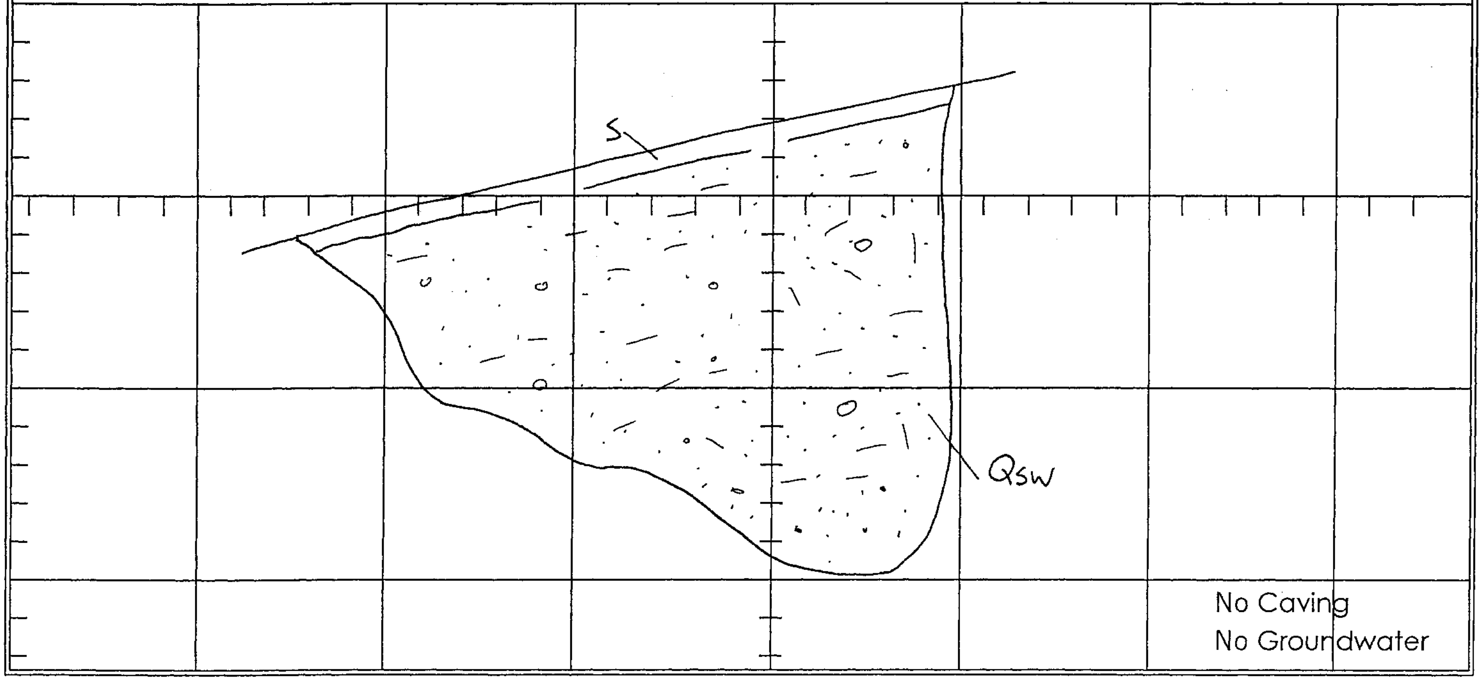
No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: CJS		
	EXCAVATED: 3/5/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1280		

TRENCH LOG NO. T-80

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0 5 10 15 20					**SOIL; s, (0-6 in.)** @ 0' Yellowish-brown fine- to coarse-grained clayey sand with pebbles; loose; dry to slightly damp; numerous roots **SLOPEWASH; Qsw, (6 in.-12 ft.)** @ 6" Yellow-brown to pale reddish-brown fine- to coarse-grained sand with pebbles and cobbles; locally clayey; clast sizes range from 1/2" to 10" with 1-2" most common; fragments of pelona schist common; no discernable structure; possibly weathered Qt? COMMENTS: -Possibly landslide graben or landslide debris				

TOTAL DEPTH: 12 feet N40W→ SCALE: 1 inch = 5 feet



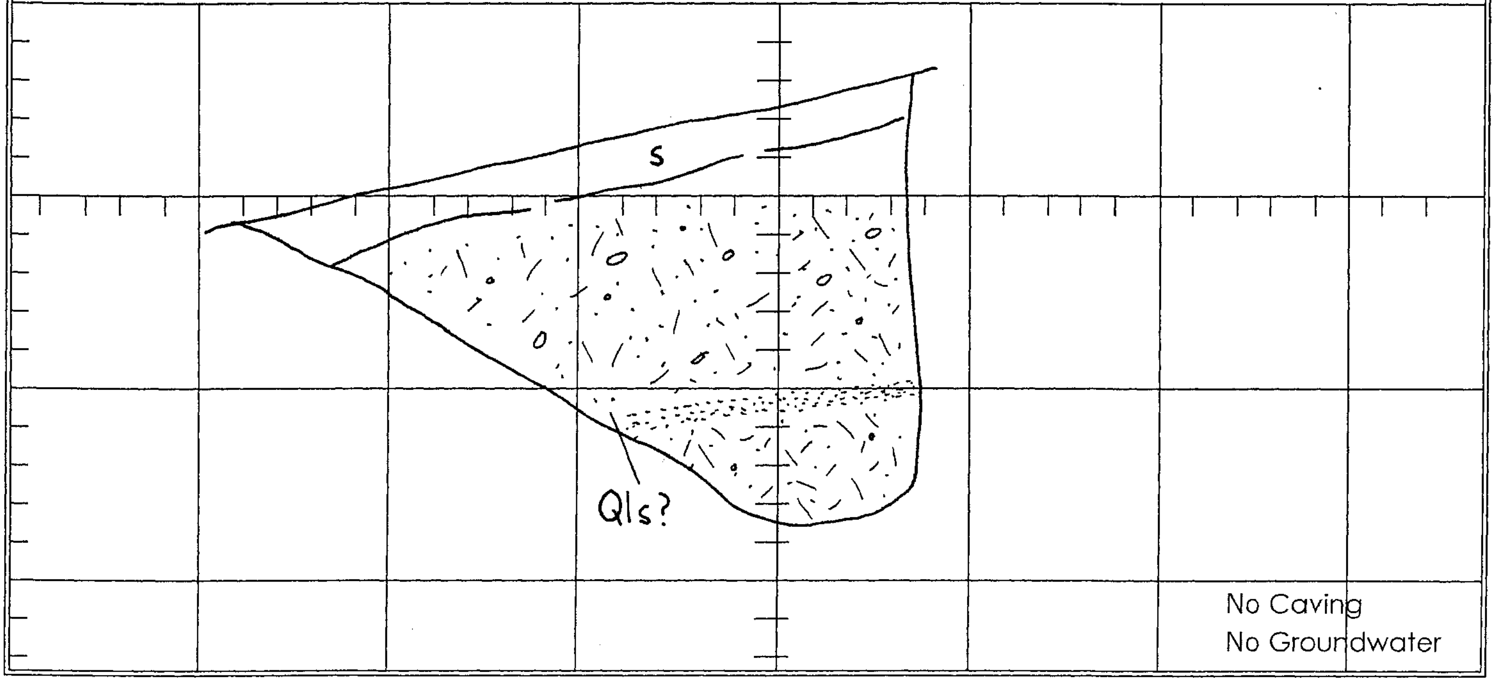
No Caving
No Groundwater

CLIENT:	Newhall Land	JOB NO:	03-1571-4
PROJECT:	River Park Tentative Map Review	DATE:	4/4/03
		LOGGED BY:	CJS
		EXCAVATED:	3/5/02
EXCAVATION METHOD:	Track-Mounted Backhoe w/24" bucket	ELEVATION:	~1280

TRENCH LOG NO. T-81

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**<u>SOIL</u>; s, (0-1 ft.)** @ 0' Yellow-brown, fine- to medium grained silty sand; loose; moist				
					<u>LANDSLIDE DEBRIS?</u>; Qls?, (1-11.5 ft.) @ 1' Yellow-brown to pale reddish-brown, fine- to coarse-grained silty to clayey sand with 5-10% rounded granitic clasts and fragments of pale yellow sandstone; overall moderately dense; damp; @ 8 ft. there is a 6 8" layer of dark brown sandy clay with pebbles that is porous and contains abundant carbonate stringers and charcoal fragments, possible old soil horizon?; orientation of layer noted; material below layer is similar to material above, but contains only trace granitic clasts	C: N5E,14SE			
5									
10									
15									
20									

TOTAL DEPTH: 11.5 feet N10E→ SCALE: 1 inch = 5 feet



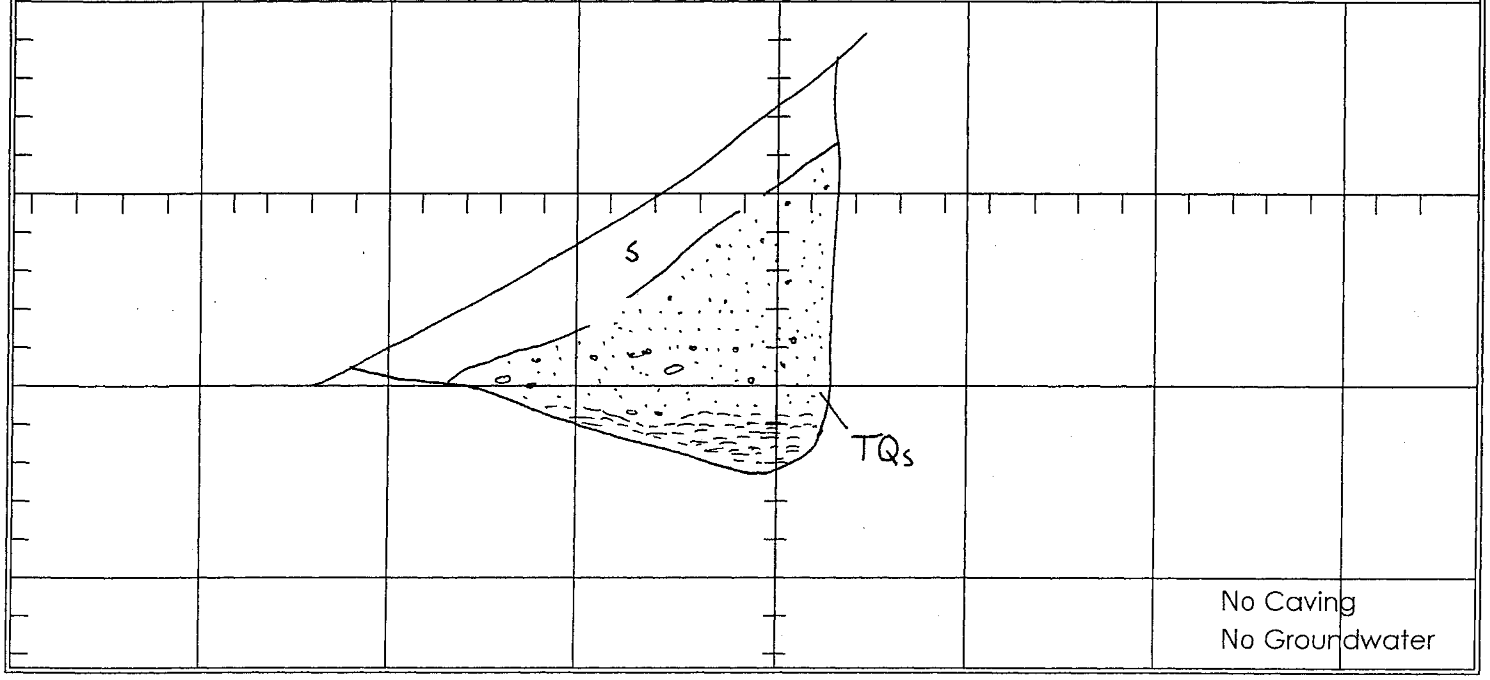
No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California	DATE: 4/4/03		
	LOGGED BY: CJS		
	EXCAVATED: 3/6/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" Bucket	ELEVATION: 1280		

TRENCH LOG NO. T-82

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-1.5 ft.)** @ 0' Moderate yellow-brown fine- to medium-grained silty sand with pebbles; loose; damp **BEDROCK; TQs, (1.5-11 ft.)** @ 1.5' Yellowish-gray, medium- to coarse-grained pebbly sandstone, light yellow-brown, very fine-grained silty sandstone and reddish-brown mudstone; sandstone lightly fractured with carbonate coatings on fracture surfaces; fractures do not extend into adjacent fine-grained units; contacts either very gradational or channelled; dip angle is very low; overall moderately hard; damp				
5									
10						B:N5E,8NW			
15									
20									

TOTAL DEPTH: 11 feet N10W→ SCALE: 1 inch = 5 feet

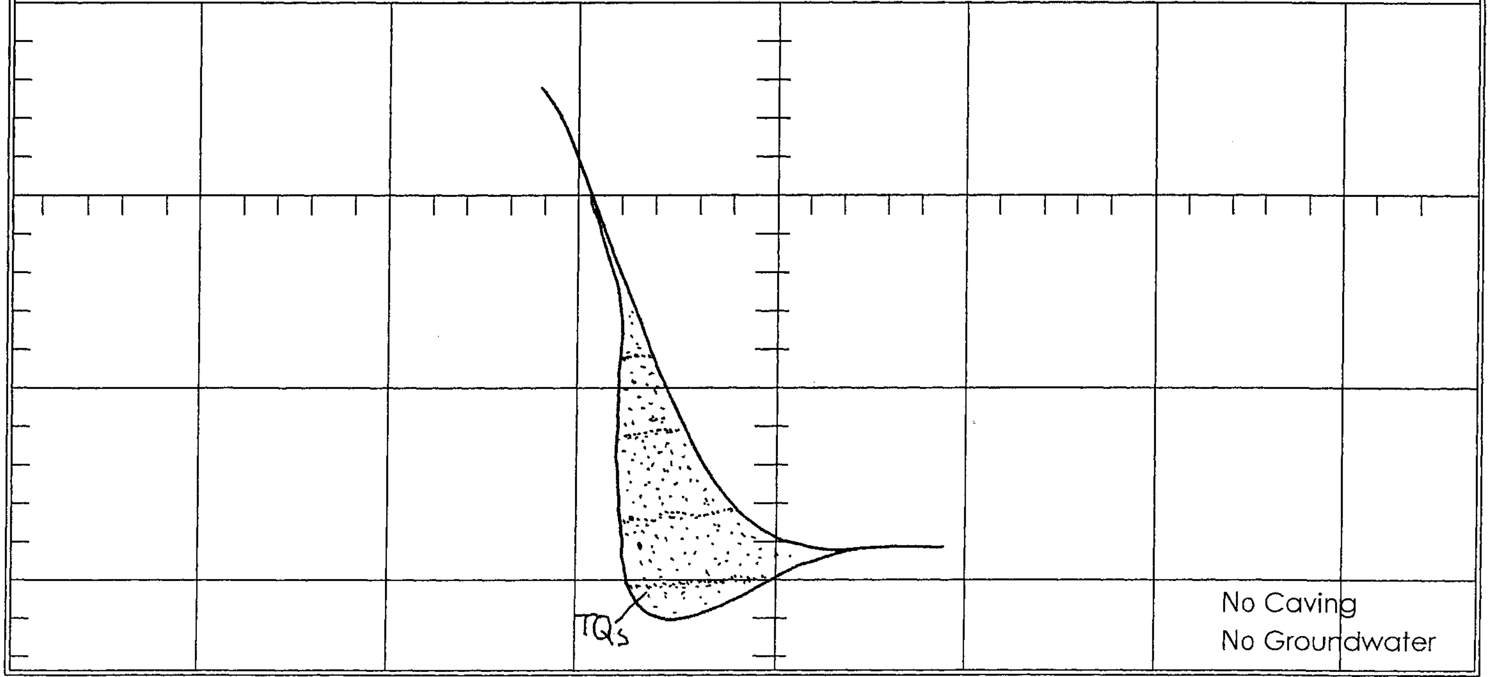


No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4	**TRENCH LOG NO. T-83**	
PROJECT: River Park Tentative Map Review	DATE: 4/4/03		
	LOGGED BY: CJS		
	EXCAVATED: 3/6/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket	ELEVATION: 1280		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQs, (0-8 ft.)** @ 0' Yellowish-brown, medium-grained pebbly sandstone to pebble conglomerate; hard; damp; bedding defined by vague pebble lineaments; dip angles low and variable				
5						B:N40E,8SE			
10					COMMENTS: -Base of Terrace deposits occurs ~15 ft. above stream bed; granitic clasts in Qt range up to 30 inches maximum dimension with 4-8 inches common				
15									
20									

TOTAL DEPTH: 8 feet N78W→ SCALE: 1 inch = 5 feet



No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

TRENCH LOG NO. T-84

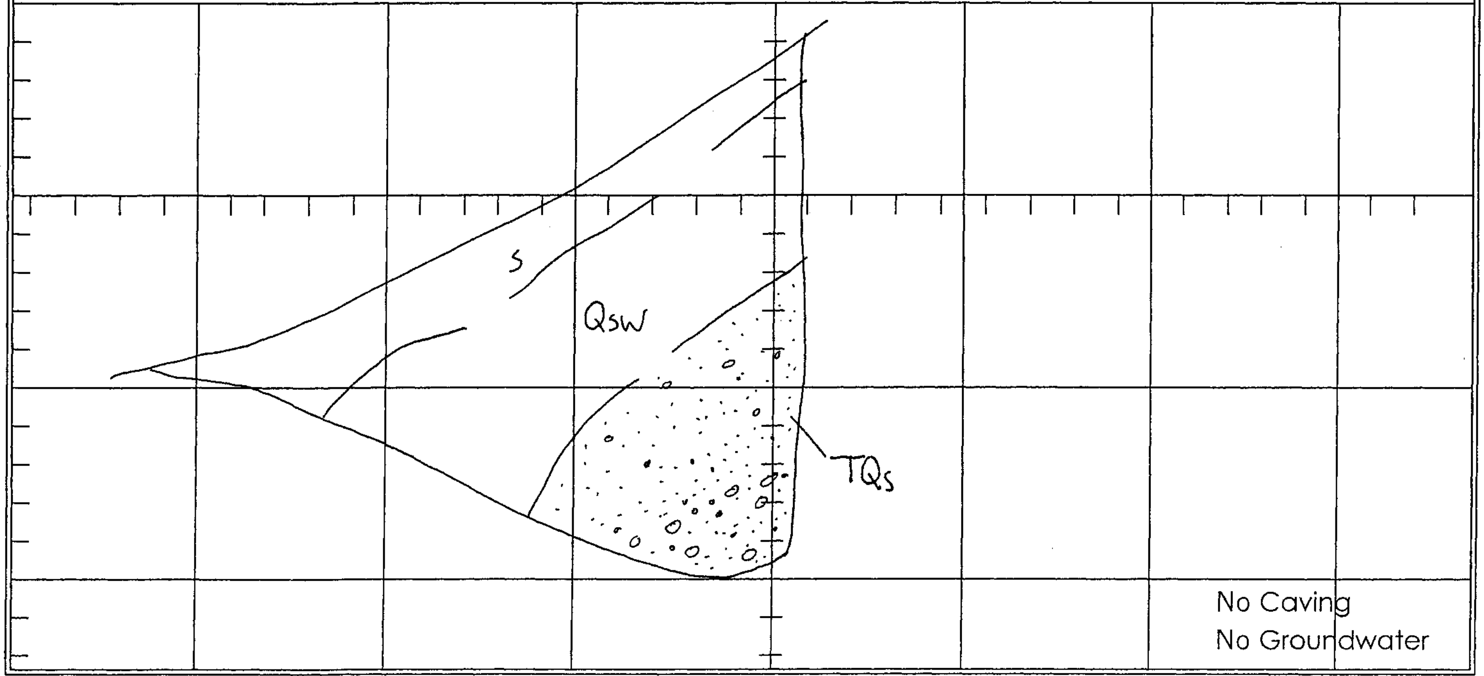
CLIENT:	Newhall Land	JOB NO:	03-1571-4
PROJECT:	River Park Tentative Map Review	DATE:	4/4/03
		LOGGED BY:	CJS
		EXCAVATED:	3/6/02
EXCAVATION METHOD:	Track-Mounted Backhoe w/24" bucket	ELEVATION:	1315

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0					**<u>SOIL</u>; s, (0-1 ft.)** @ 0' Yellowish-brown to light reddish-brown fine-grained clayey sand to sandy clay; abundant roots; loose/soft; damp **<u>SLOPEWASH</u>; Qsw, (1-7 ft.)** @ 1' Reddish yellow-brown, medium-grained silty to clayey sand with 5-10% pebbles and cobbles; loose; damp				
5									
					<u>BEDROCK</u>; TQs, (7-14 ft.) @ 7' Yellowish-gray to yellowish-brown coarse-grained pebbly sandstone to cobble conglomerate; hard; damp; bedding measured along top of cobble unit; possibly channelled contact	B:N60W,24NE			
10									
15									
20									

TOTAL DEPTH: 14 feet

←N15W

SCALE: 1 inch = 5 feet



No Caving
No Groundwater

CLIENT:	Newhall Land	JOB NO:	03-1571-4
PROJECT:	River Park Tentative Map Review	DATE:	4/4/03
		LOGGED BY:	CJS
		EXCAVATED:	3/6/02
EXCAVATION METHOD:	Track-Mounted Backhoe w/24" bucket	ELEVATION:	1358

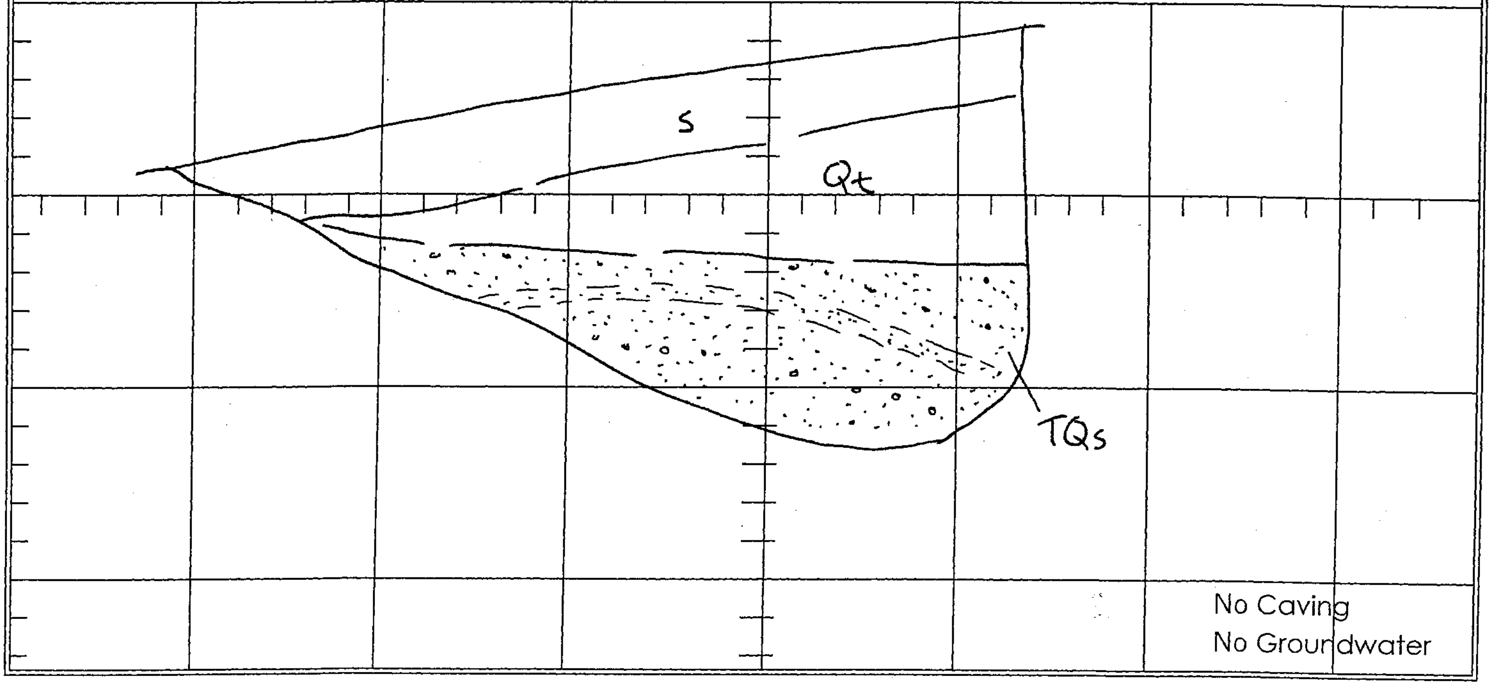
TRENCH LOG NO. T-85

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-1.5 ft.)** @ 0' Yellow-brown, fine- to medium-grained silty sand; loose; dry; numerous roots				
					TERRACE DEPOSITS; Qt, (1.5-6 ft.) @ 1.5' Light-brown to light yellowish-brown, medium-to very coarse-grained pebbly sand with cobbles and boulders; rounded granitic clasts range up to ~18 in. maximum dimension, with 2-6" common; friable; damp; lower contact planar and inclined to northeast				
5						C:N25W,13NE			
					BEDROCK; TQs, (6-10.5 ft.) @ 6' Yellowish-gray to grayish yellow-orange, fine- to coarse-grained sandstone and pebbly sandstone; hard; damp; bedding defined by subtle variations in grain-sized; northerly dip steepens at north end of trench				
10						B:N80W,15NE			
15									
20									

TOTAL DEPTH: 10.5 feet

N10E→

SCALE: 1 inch = 5 feet



No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Map Review	DATE: 4/4/03		
	LOGGED BY: CJS		
	EXCAVATED: 3/6/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket	ELEVATION: 1358		

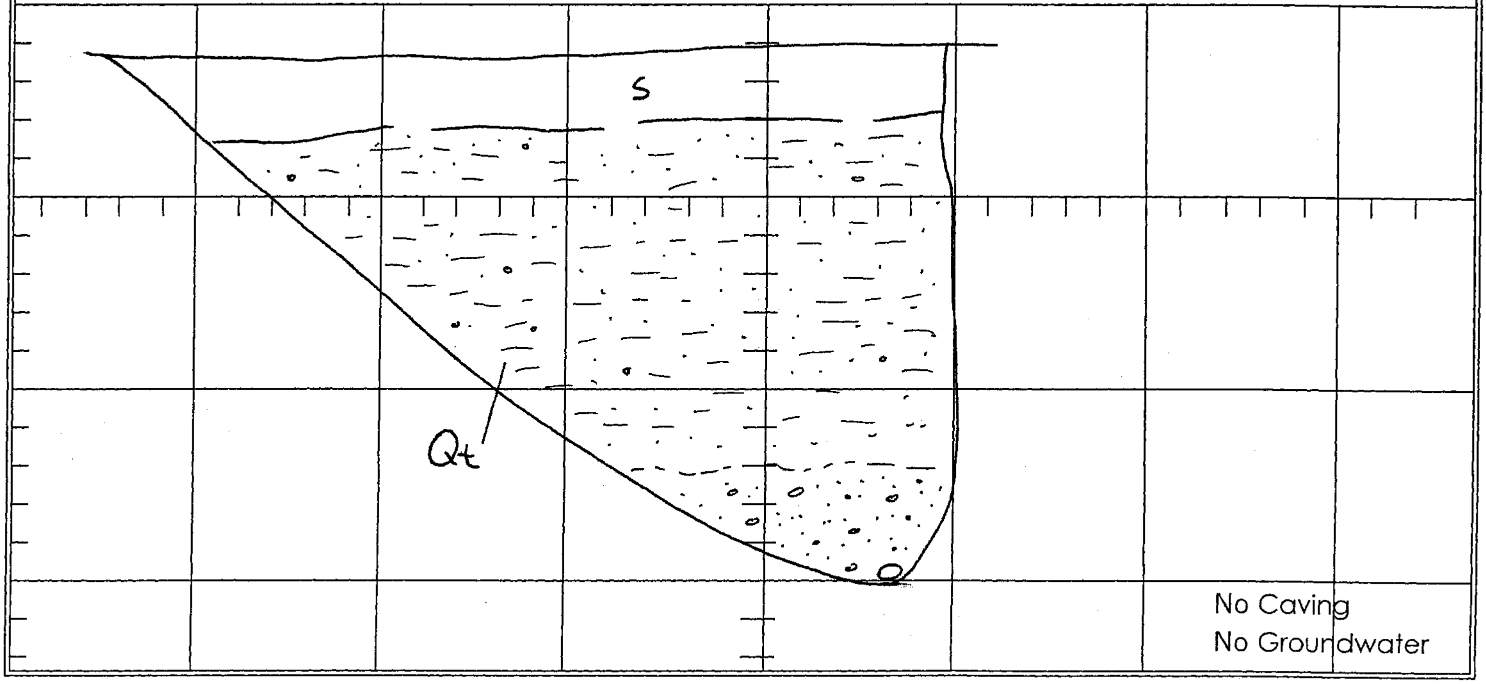
TRENCH LOG NO. T-86

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**<u>SOIL</u>; s, (0-2 ft.)** @ 0' Grayish yellow-brown fine- to medium-grained, silty sand; loose; dry to damp; numerous hair-roots **<u>TERRACE DEPOSITS</u>; Qt, (2-13 ft.)** @ 2' Dark yellowish-brown (10YR 3/6), fine- to coarse-grained clayey sand to sandy clay with isolated pebbles; very stiff/ dense; damp to moist; grades to much less clay and more pebbles at 10 ft.; few cobbles at 13 ft.				
5									
10									
15									
20									

TOTAL DEPTH: 13 feet

Due N→

SCALE: 1 inch = 5 feet

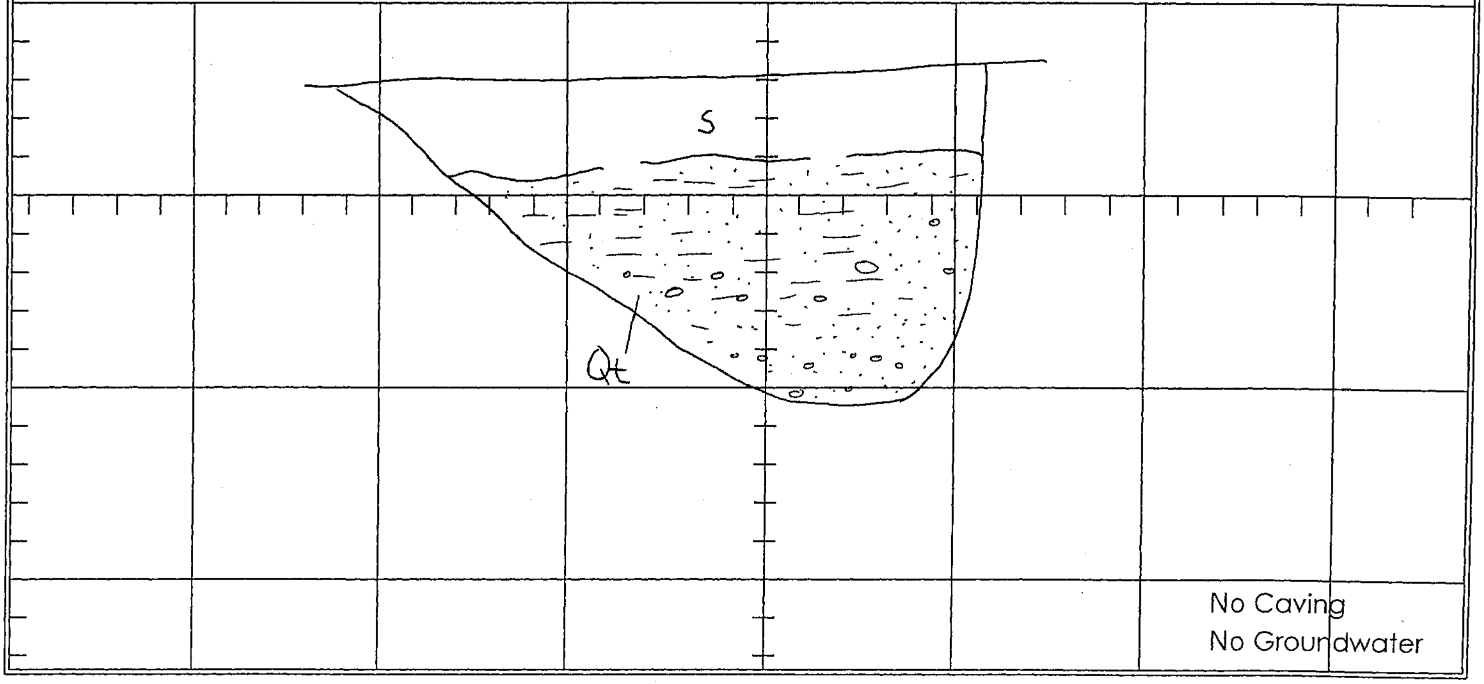


No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4	**TRENCH LOG NO.** T-87	
PROJECT: River Park Tentative Map Review	DATE: 4/4/03		
	LOGGED BY: CJS		
	EXCAVATED: 3/6/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket	ELEVATION: ~1370		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-2 ft.)** @ 0' Yellow reddish-brown, fine- to medium grained silty sand; very porous; loose; dry to slightly damp **TERRACE DEPOSITS; Qt, (2-8.5 ft.)** @ 2' Dark reddish-brown (5YR 3/4) sandy clay; very stiff; damp, at 4.5 ft. grades to granitic pebbles and cobbles; most badly weathered and crushed easily; at 6 ft. grades to cobbly sand; friable; clasts range to ~6 inches				
5									
10									
15									
20									

TOTAL DEPTH: 8.5 feet N20E→ SCALE: 1 inch = 5 feet



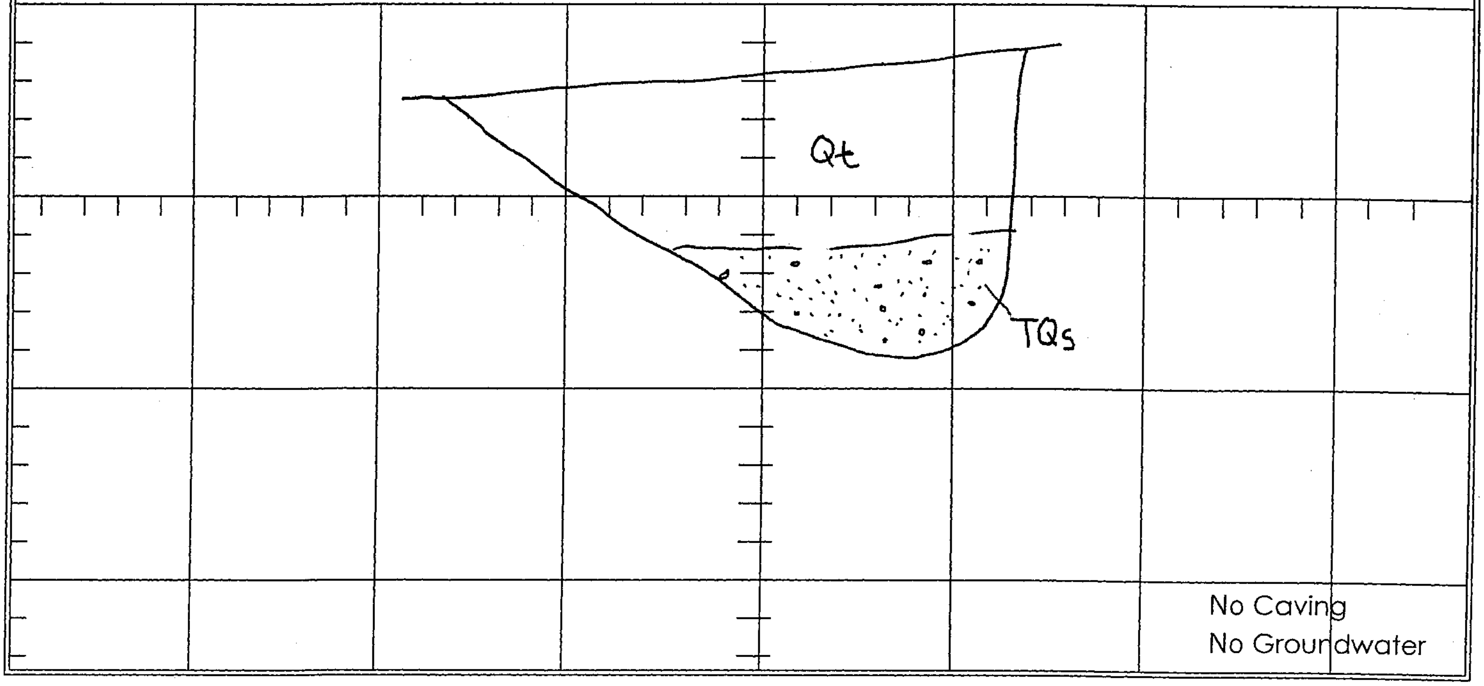
No Caving
No Groundwater

CLIENT: Newhall Land
PROJECT: River Park
Tentative Map Review
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket
JOB NO: 03-1571-4
DATE: 4/4/03
LOGGED BY: CJS
EXCAVATED: 3/6/02
ELEVATION: 1360

TRENCH LOG NO. T-88

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**TERRACE DEPOSITS; Qt, (0-4 ft.)** @ 0' Yellowish-brown to yellowish-gray, medium- to very coarse-grained pebbly sand with cobbles; friable; dry to damp; rounded granitic clasts range up to ~10" maximum dimension with clast sizes 2-6" common; lower contact planar and essentially horizontal				
5					**BEDROCK; TQs, (4-8 ft.)** @ 4' Reddish yellow-brown, fine- to coarse-grained pebbly sandstone; well-cemented; massive; hard to very hard; damp				
10									
15									
20									

TOTAL DEPTH: 8 feet N40E→ SCALE: 1 inch = 5 feet

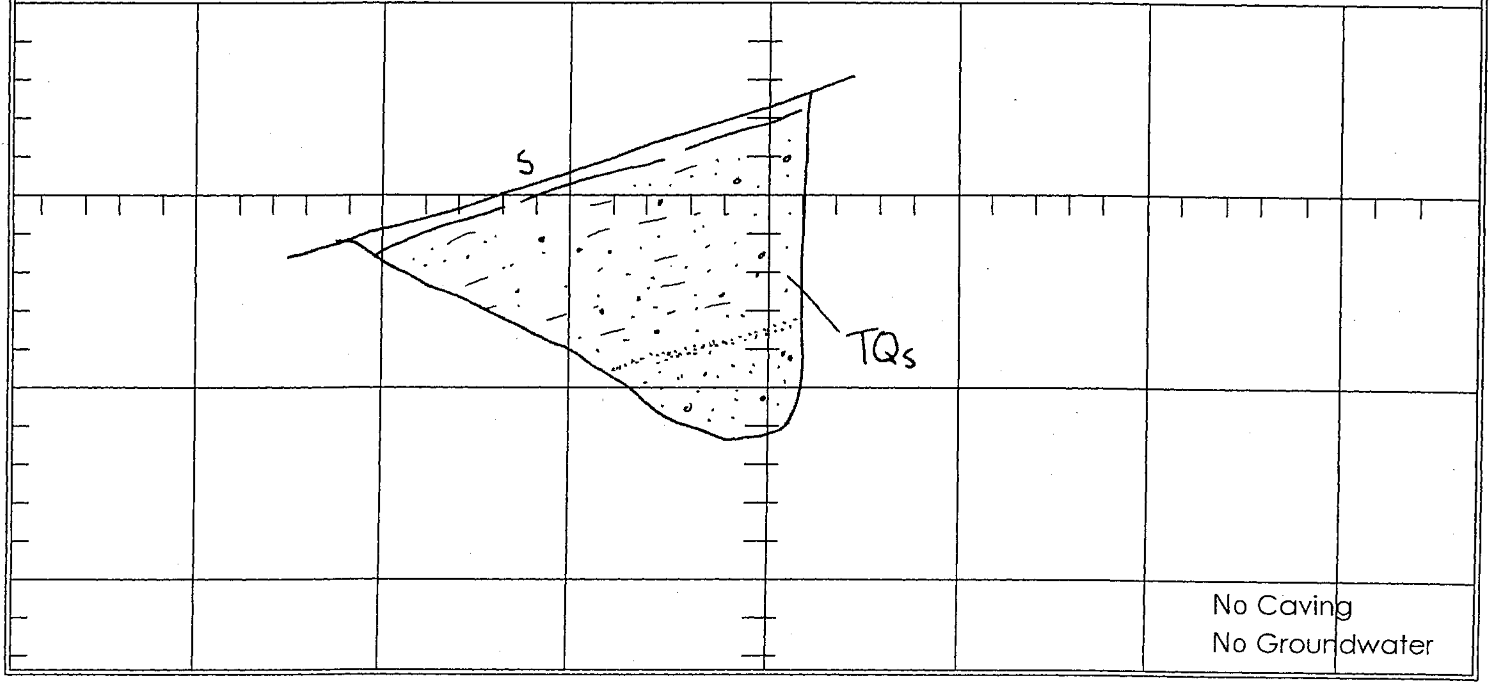


No Caving
No Groundwater

CLIENT: Newhall Land		JOB NO: 03-1571-4	**TRENCH LOG NO. T-89**
PROJECT: River Park Tentative Map Review		DATE: 4/4/03	
		LOGGED BY: CJS	
		EXCAVATED: 3/6/02	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket		ELEVATION: 1330	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-6 in.)** @ 0' Yellow-brown sandy clay to clayey sand; loose; dry to damp **BEDROCK; TQs, (6 in.-8 ft.)** @ 6" Yellow-brown siltstone and yellowish-gray fine- to coarse-grained sandstone with few pebbles; hard; damp; bedding poorly defined due to gradational and channelled contacts	B:N70W,8SW			
5									
10									
15									
20									

TOTAL DEPTH: 8 feet N20E→ SCALE: 1 inch = 5 feet

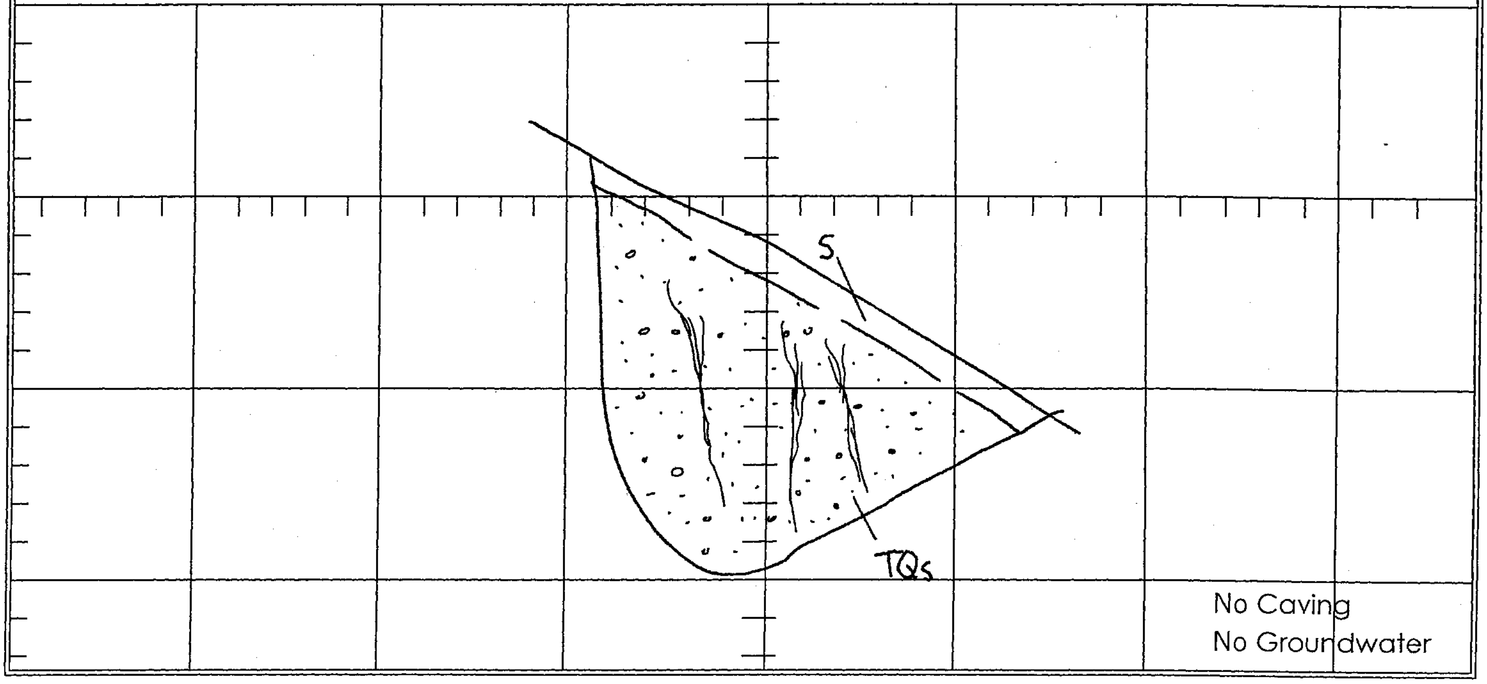


No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4	**TRENCH LOG NO. T-90**
PROJECT: River Park Tentative Map Review	DATE: 4/4/03 LOGGED BY: CJS EXCAVATED: 3/6/02	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket	ELEVATION: 1315	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0					**SOIL; s, (0-8 in.)** @ 0' Yellowish-brown, fine- to medium-grained, clayey sand; loose; damp **BEDROCK; TQs, (8 in.-11 ft.)** @ 8" Yellowish-gray, medium- to coarse-grained pebbly sandstone; moderately hard; damp; several soil-filled, slope-parallel fractures extend to nearly full depth of trench; fractures up to 3/4" wide and taper downward; no obvious displacement	B: Due N, 6 E f: N20E, 85SE			
5									
10									
15									
20									

TOTAL DEPTH: 11 feet ←N60W SCALE: 1 inch = 5 feet



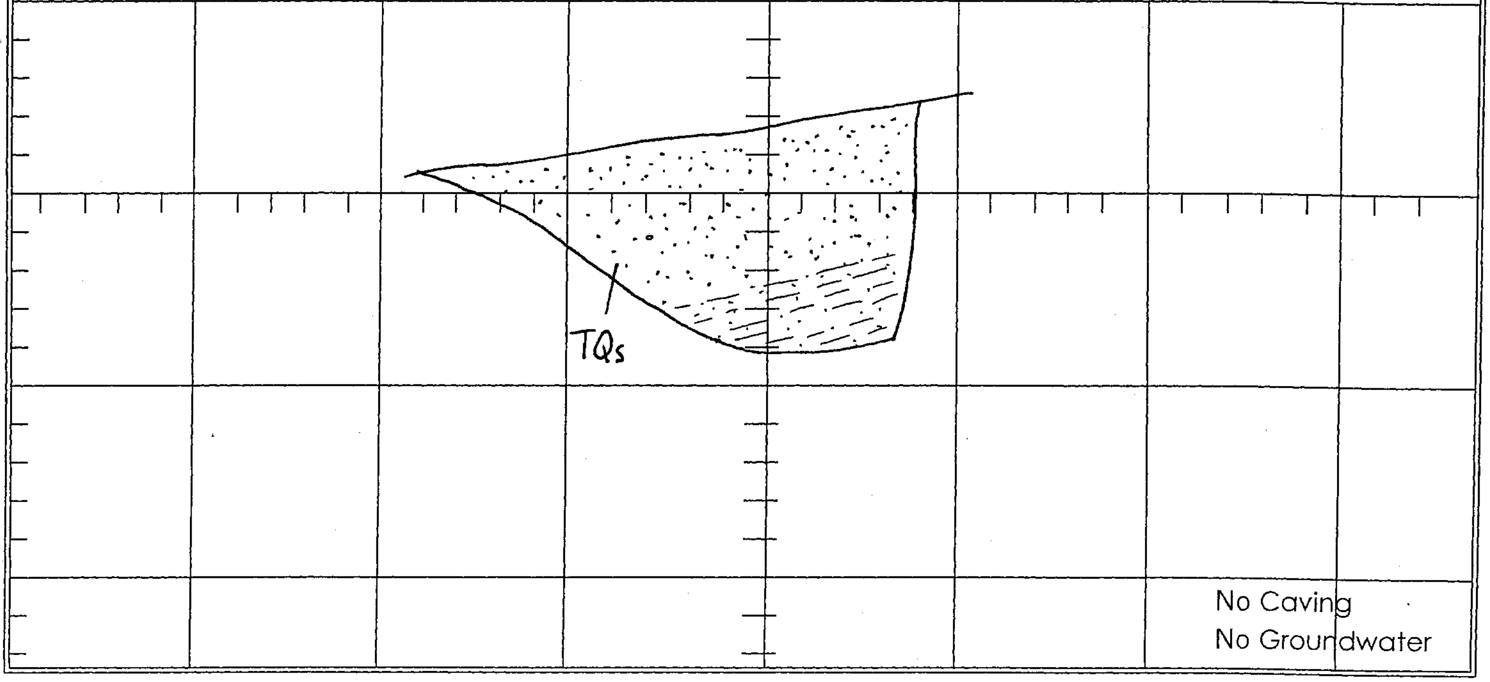
No Caving
No Groundwater

CLIENT:	Newhall Land	JOB NO:	03-1571-4
PROJECT:	River Park Tentative Map Review	DATE:	4/4/03
		LOGGED BY:	CJS
		EXCAVATED:	3/6/02
EXCAVATION METHOD:	Track-Mounted Backhoe w/24" bucket	ELEVATION:	1290

TRENCH LOG NO. T-91

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**BEDROCK; TQs, (0-6 ft.)** @ 0' Yellowish-gray to yellow-brown, medium- to coarse-grained sandstone, and yellow-reddish brown mudstone; moderately hard to hard; damp				
5						B:N43W,5SW			
10									
15									
20									

TOTAL DEPTH: 6 feet N10W→ SCALE: 1 inch = 5 feet



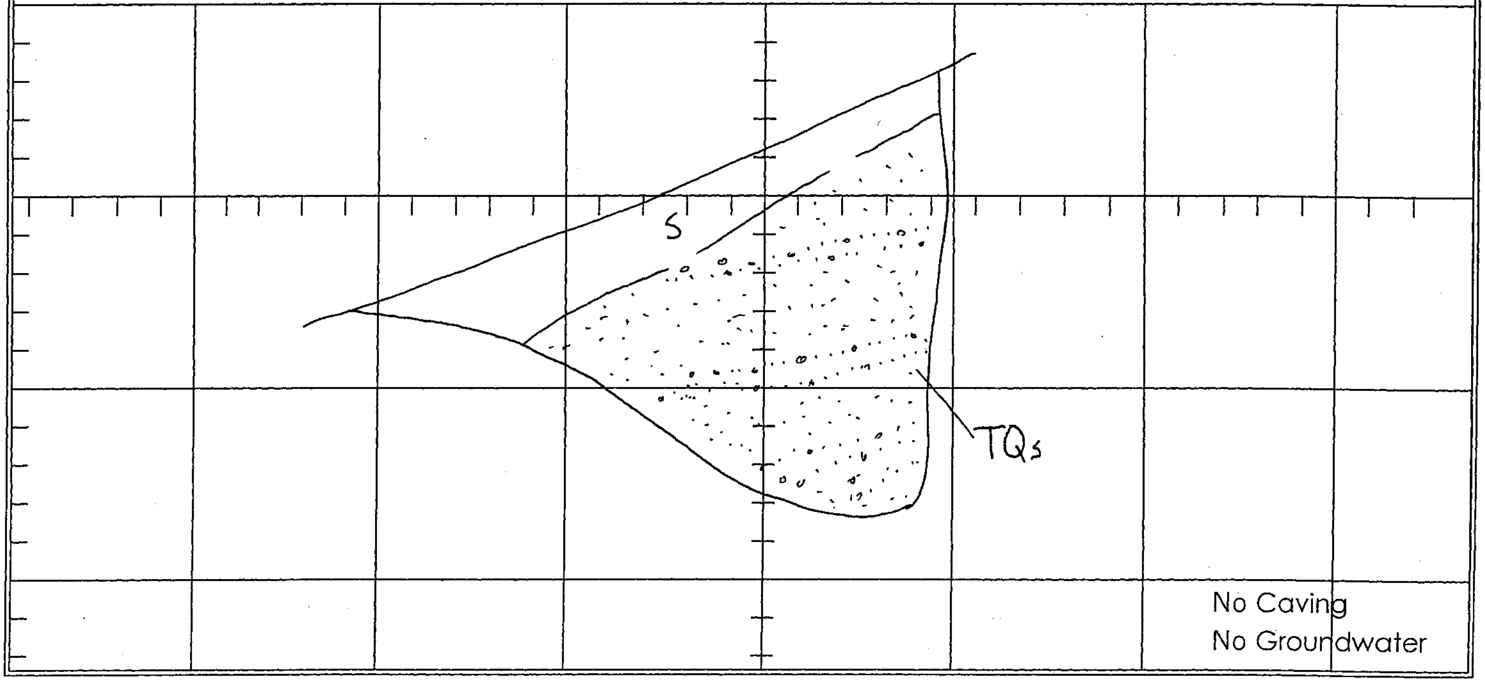
No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Sheet 1 of 1

CLIENT: Newhall Land	JOB NO: 03-1571-4	**TRENCH LOG NO. T-92**
PROJECT: River Park Tentative Map Review	DATE: 4/4/03 LOGGED BY: CJS EXCAVATED: 3/6/02	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket	ELEVATION: 1315	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**<u>SOIL</u>; s, (0-1.5 ft.)** @ 0' Yellowish-brown, fine- to coarse-grained pebbly sand with minor silt and clay; loose; damp; numerous roots **<u>BEDROCK</u>; TQs, (1.5-11.5 ft.)** @ 1.5' Reddish yellow-brown, medium- to coarse-grained pebbly sandstone; moderately hard to hard; damp				
5						B:N55W,13SW			
10									
15									
20									

TOTAL DEPTH: 11.5 feet N40E→ SCALE: 1 inch = 5 feet



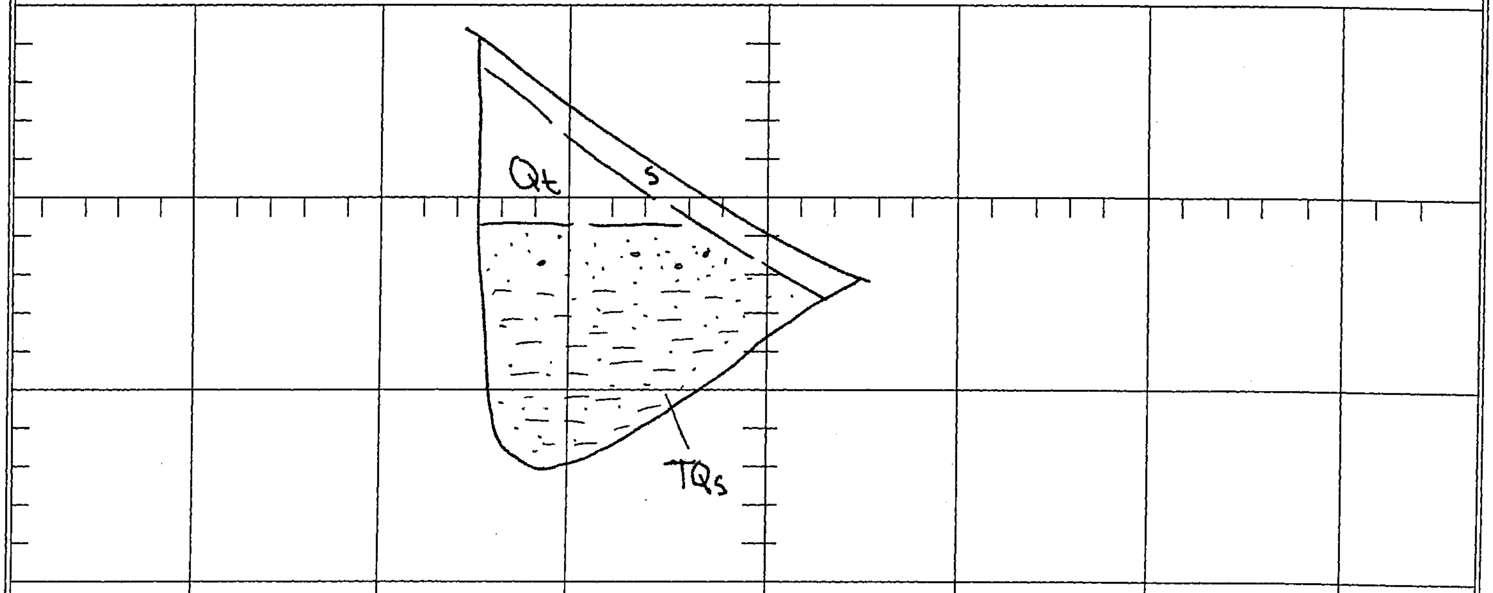
No Caving
No Groundwater

TRENCH LOG NO. T-93

CLIENT:	Newhall Land	JOB NO:	03-1571-4
ROJECT:	River Park Tentative Map Review	DATE:	4/4/03
		LOGGED BY:	CJS
		EXCAVATED:	3/6/02
XCAVATION METHOD:	Track-Mounted Backhoe w/24" bucket	ELEVATION:	1340

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-1 ft.)** @ 0' Reddish-yellow-brown, fine- to coarse-grained clayey sand with pebbles; loose; damp **TERRACE DEPOSITS; Qt, (1-4 ft.)** @ 1' Dark reddish-brown, sandy clay with cobbles and boulders; stiff; damp; clasts range up to 15 inches, 2-8 inches most common				
5					**BEDROCK; TQs, (4-11 ft.)** @ 4' Yellowish-gray, pebbly sandstone and yellow-brown to reddish-brown sandy mudstone; moderately hard; damp	B:N80E,8SE			
10									
15									
20									

TOTAL DEPTH: 11 feet ←N5E SCALE: 1 inch = 5 feet



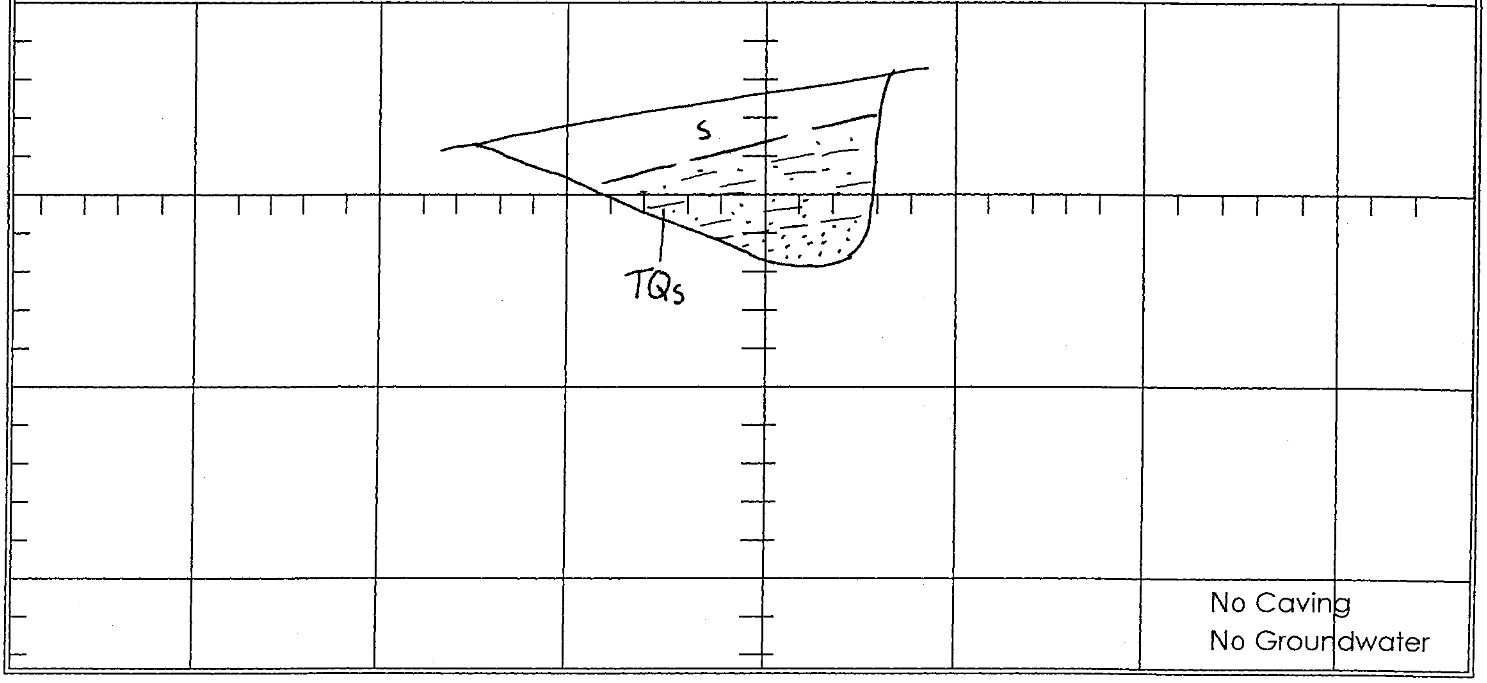
No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4	
PROJECT: River Park Tentative Map Review	DATE: 4/4/03	
	LOGGED BY: CJS	
	EXCAVATED: 3/6/02	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket	ELEVATION: 1345	

TRENCH LOG NO. T-94

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**<u>SOIL</u>; s, (0-1 ft.)** @ 0' Yellow-brown, medium-grained silty sand; loose; damp **<u>BEDROCK</u>; TQs, (1-5 ft.)** @ 1' Moderate reddish-brown sandy mudstone and yellow-gray, fine- to medium-grained sandstone; hard; damp	B:N52W,4SW			
5									
10									
15									
20									

TOTAL DEPTH: 5 feet N10W→ SCALE: 1 inch = 5 feet



No Caving
No Groundwater

CLIENT:	Newhall Land	JOB NO:	03-1571-4
PROJECT:	River Park Tentative Map Review	DATE:	4/4/03
		LOGGED BY:	CJS
		EXCAVATED:	3/6/02
EXCAVATION METHOD:	Track-Mounted Backhoe w/24" bucket	ELEVATION:	1215

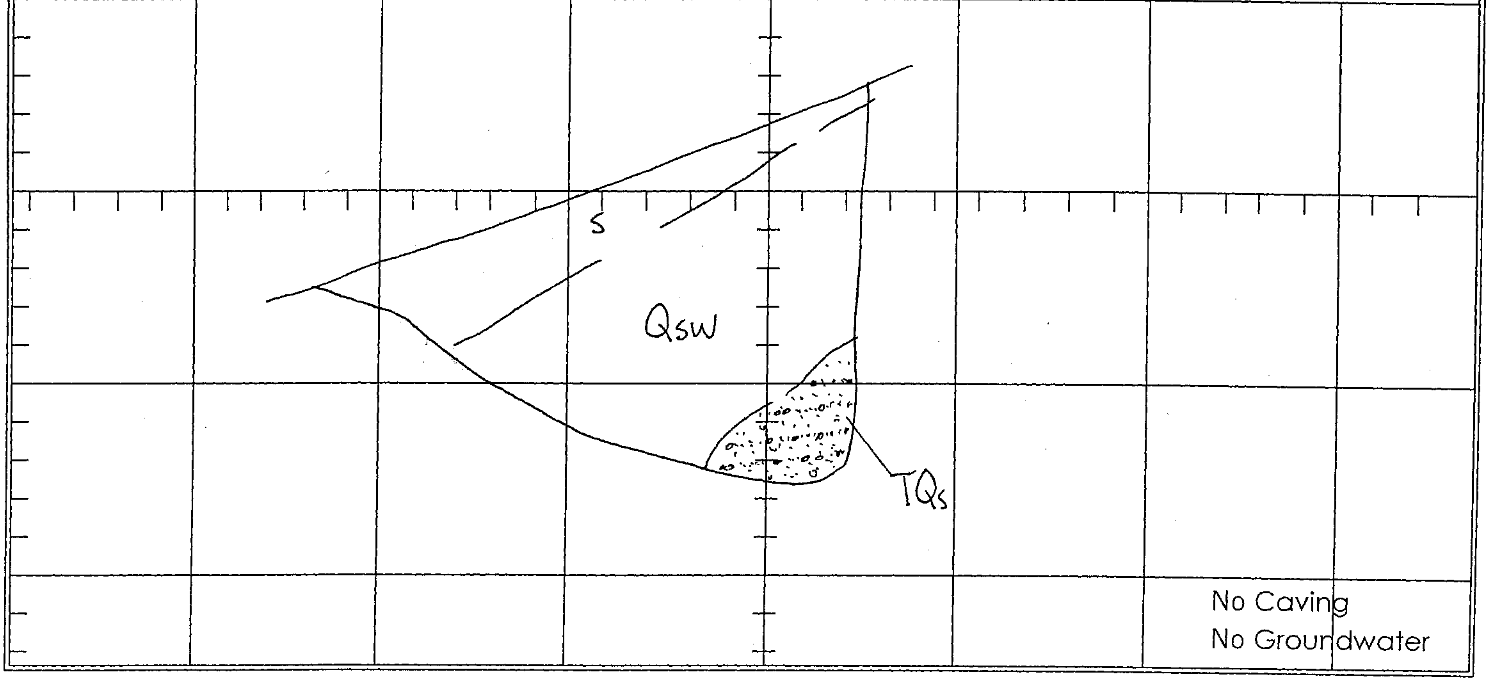
TRENCH LOG NO. T-95

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0 5 10 15 20					**<u>SOIL</u>; s, (0-1 ft.)** @ 0' Yellow-brown, fine- to coarse-grained silty sand with minor clay and trace of pebbles; porous; damp; hair-roots common **<u>SLOPEWASH</u>; Qsw, (1-6.5 ft.)** @ 1' Yellow reddish-brown, fine- to coarse-grained silty sand with pebbles and cobbles; clasts range up to 8", 1-3" most common; excavates easily; overall loose to moderately dense; damp; lower contact gradational into bedrock **<u>BEDROCK</u>; TQs, (6.5-10.5 ft.)** @ 6.5' Yellowish-brown fine- to medium-grained and coarse-grained sandstone; coarser-grained unit locally pebbly; hard to very hard; damp; single, carbonate-lined fracture	B:N60W,9SW f: N40W,58SW			

TOTAL DEPTH: 10.5 feet

Due N→

SCALE: 1 inch = 5 feet



No Caving
No Groundwater

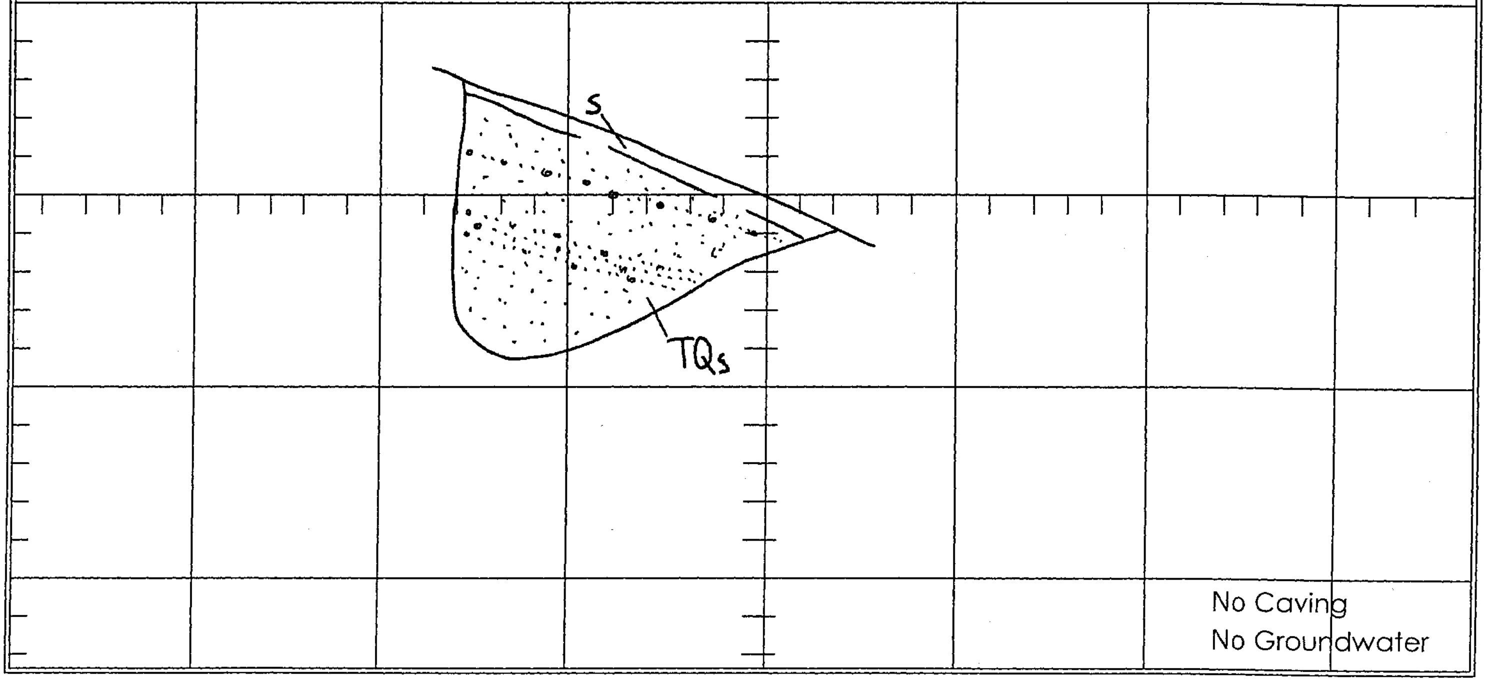
ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Map Review	DATE: 4/4/03 LOGGED BY: CJS EXCAVATED: 3/8/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket	ELEVATION: 1280		

TRENCH LOG NO. T-96

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-6 in.)** @ 0' Yellow-brown, fine- to medium-grained silty sand with minor coarse-grained fraction; loose; damp				
					BEDROCK; TQs, (6 in.-6.5 ft.) @ 6" Yellow-reddish-brown to pale reddish-brown, medium- to coarse-grained sandstone; locally pebbly; hard; damp	E-W, 8S			
5									
10									
15									
20									

TOTAL DEPTH: 6.5 feet ←N75E SCALE: 1 inch = 5 feet



No Caving
No Groundwater

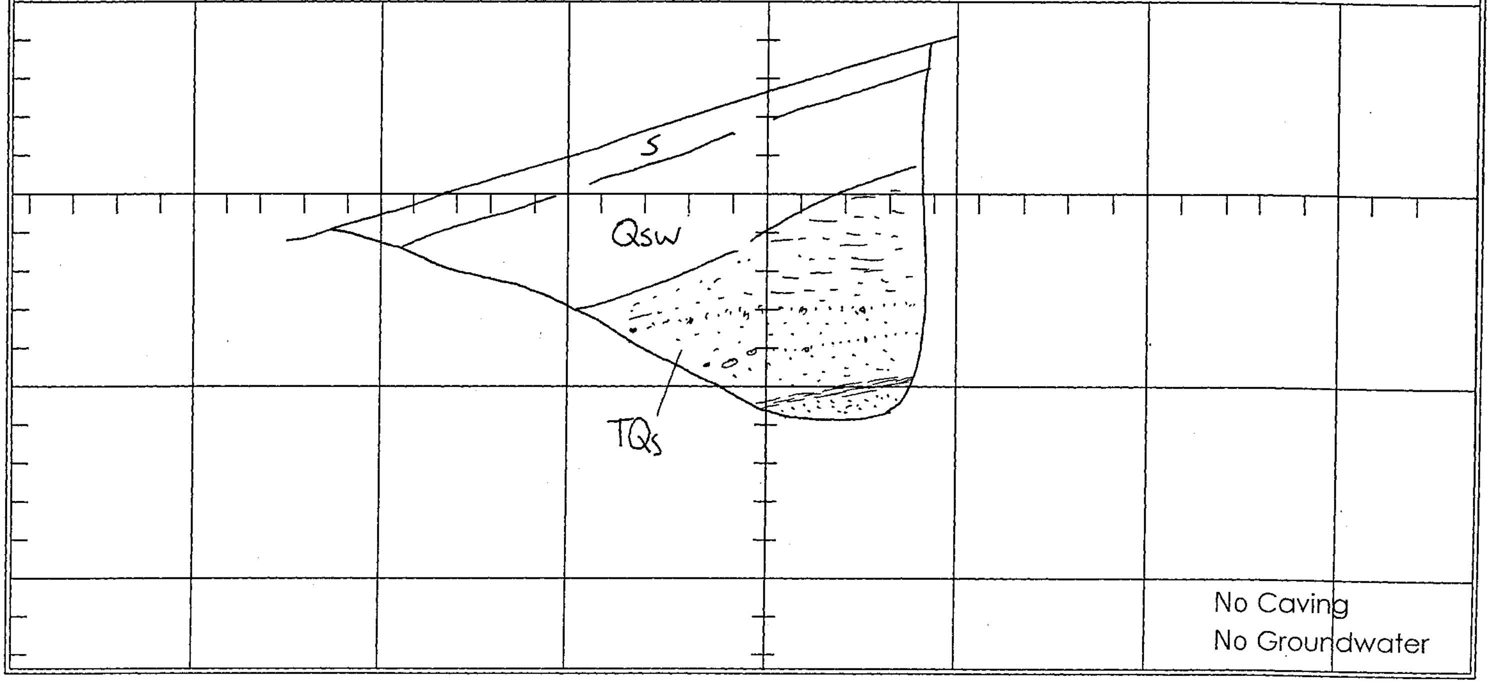
ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

TRENCH LOG NO. T-97

CLIENT: Newhall Land
'ROJECT: River Park
Tentative Map Review
JOB NO: 03-1571-4
DATE: 4/4/03
LOGGED BY: CJS
EXCAVATED: 3/8/02
ELEVATION: 1270
:XCAVATION METHOD: Track-Mounted Backhoe w/24" bucket

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**<u>SOIL</u>; s, (0-8 in.)** @ 0' Yellow reddish-brown, fine- to medium grained silty sand; loose; damp; numerous roots **<u>SLOPEWASH</u>; Qsw, (8 in.-2.5 ft.)** @ 8" Yellow-reddish-brown sandy clay; soft; damp; pockets of clayey sand				
5					**<u>BEDROCK</u>; TQs, (2.5-9.5 ft.)** @ 2.5' Moderate reddish-brown sandy siltstone with interbeds of pale reddish-brown to yellow-brown, medium- to coarse grained sandstone; 1" seam of reddish-brown clayey siltstone at 8.5 ft.; moderately hard; damp	B:N60E, 9SE			
10									
15									
20									

TOTAL DEPTH: 9.5 feet N15W SCALE: 1 inch = 5 feet



No Caving
No Groundwater

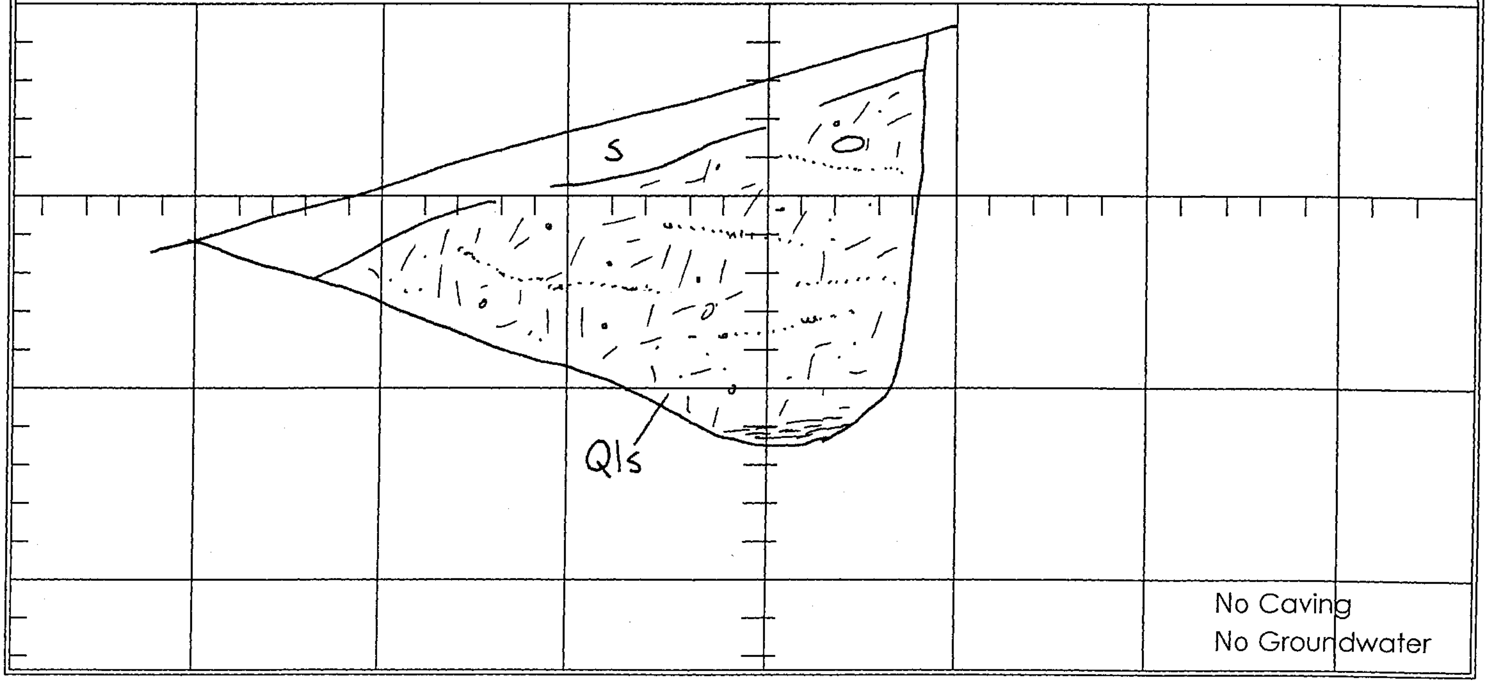
CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Map Review	DATE: 4/4/03	**TRENCH LOG NO. T-98**	
	LOGGED BY: CJS		
	EXCAVATED: 3/8/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket	ELEVATION: 1245		

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-1 ft.)** @ 0' Yellow-brown, fine- to medium-grained silty sand; loose; damp				
					LANDSLIDE DEBRIS; Qls, (1 ft.-10.5 ft.) @ 1' Pale reddish-brown to yellow-brown, sandstone and mudstone; unit boundaries all very gradational; units lenticular and commonly truncated or rotated to orientations inconsistent with regional structure; carbonate common as fracture fillings and disseminated throughout, contributes to overall "punky" rock quality; continuous horizon of reddish-brown, silty claystone at 10 ft.; excavates with "platy" fracture pattern; planar surfaces of excavated fragments commonly striated				
5									
10						SP:N47E,15SE			
15									
20									

TOTAL DEPTH: 10.5 feet

Due N→

SCALE: 1 inch = 5 feet



No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

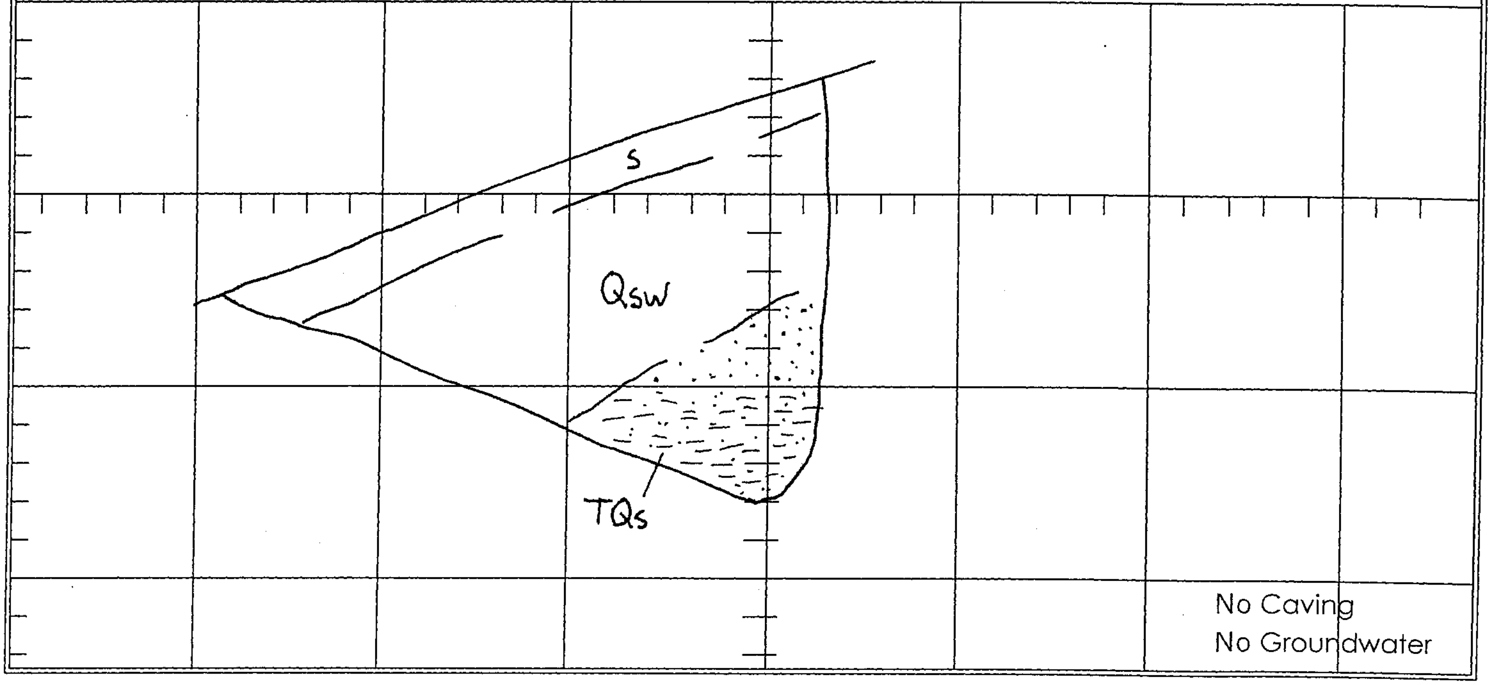
Sheet 1 of 1

CLIENT:	Newhall Land	JOB NO:	03-1571-4
ROJECT:	River Park Tentative Map Review	DATE:	4/4/03
		LOGGED BY:	CJS
		EXCAVATED:	3/8/02
XCAVATION METHOD:	Track-Mounted Backhoe w/24" bucket	ELEVATION:	1245

TRENCH LOG NO. T-99

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-1 ft.)** @ 0' Yellow-brown, fine- to coarse-grained silty sand with pebbles; loose; damp; hair-roots common **SLOPEWASH; Qsw, (1-5.5 ft.)** @ 1' Yellow-reddish-brown, fine- to coarse-grained silty sand with pebbles, cobbles and fragments of sandstone bedrock; moderately dense; damp				
5					**BEDROCK; TQs, (5.5-10 ft.)** @ 5.5' Pale reddish-brown, coarse-grained pebbly sandstone, and moderate reddish-brown sandy mudstone; mudstone grades greater clay content near the bottom of the trench; moderately hard; damp	B:N45E,13SE			
10									
15									
20									

TOTAL DEPTH: 10 feet N30E→ SCALE: 1 inch = 5 feet



No Caving
No Groundwater

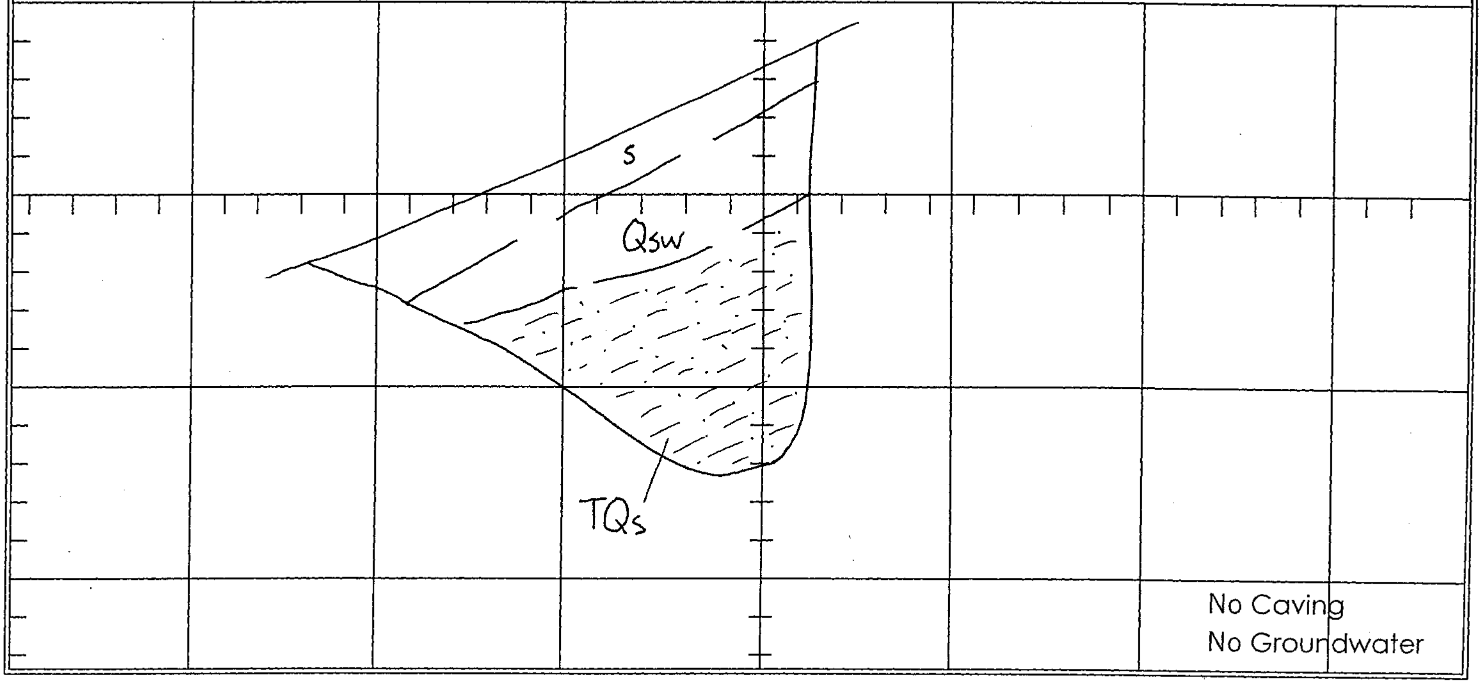
ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT:	Newhall Land	JOB NO:	03-1571-4		
PROJECT:	River Park Tentative Map Review	DATE:	4/4/03		
		LOGGED BY:	CJS		
		EXCAVATED:	3/8/02		
EXCAVATION METHOD:	Track-Mounted Backhoe w/24" bucket	ELEVATION:	1250		

TRENCH LOG NO. T-100

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**<u>SOIL</u>; s, (0-1 ft.)** @ 0' Yellow-brown, fine- to coarse-grained pebbly sand; loose; damp; numerous roots **<u>SLOPEWASH</u>; Qsw, (1-4 ft.)** @ 1' Yellow-reddish-brown, fine- to coarse-grained silty sand with pebbles and rare cobbles; loose to moderately dense; damp; developed on deeply weathered sandstone bed				
5					**<u>BEDROCK</u>; TQs, (4-11.5 ft.)** @ 4' Moderate reddish-brown sandy mudstone, moderately hard to hard; damp; carbonate scattered throughout in pea-sized pods	B:N65E, 13SE			
10									
15									
20									

TOTAL DEPTH: 11.5 feet N80W→ SCALE: 1 inch = 5 feet



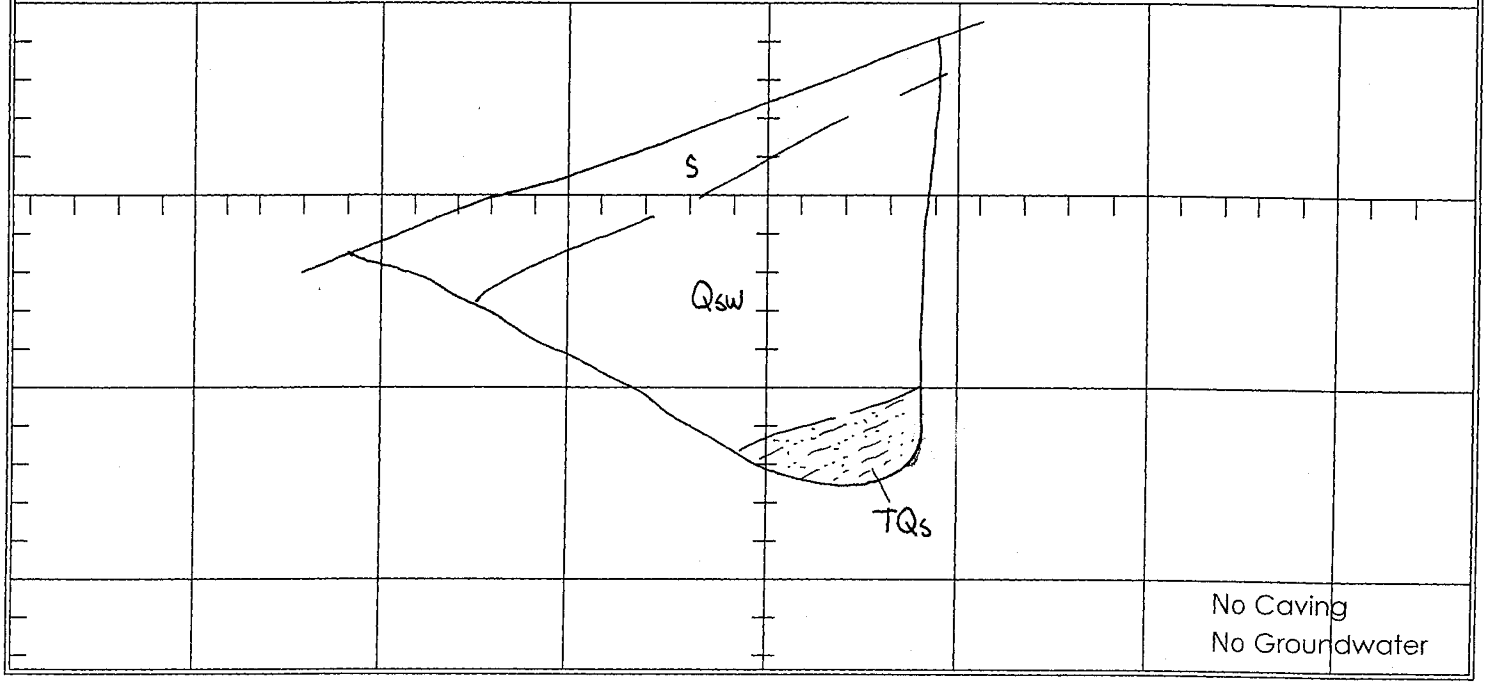
No Caving
No Groundwater

TRENCH LOG NO. T-101

CLIENT:	Newhall Land	JOB NO:	03-1571-4
ROJECT:	River Park Tentative Map Review	DATE:	1/4/03
		LOGGED BY:	CJS
		EXCAVATED:	3/8/02
XCAVATION METHOD:	Track-Mounted Backhoe w/24" bucket	ELEVATION:	1265

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; S, (0-1 ft.)** @ 0' Yellow-brown, fine- to coarse-grained, pebbly sandstone; loose; dry **SLOPEWASH; Qsw, (1-8 ft.)** @ 1' Pale reddish-brown to reddish-yellow-brown, fine to-coarse-grained silty sand with rounded granitic cobbles; moderately dense; damp				
5									
					BEDROCK; TQs, (8-11 ft.) @ 8' Moderate reddish-brown sandy siltstone; hard; damp; massive				
10									
15									
20									

TOTAL DEPTH: 11 feet ←N70W SCALE: 1 inch = 5 feet



No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

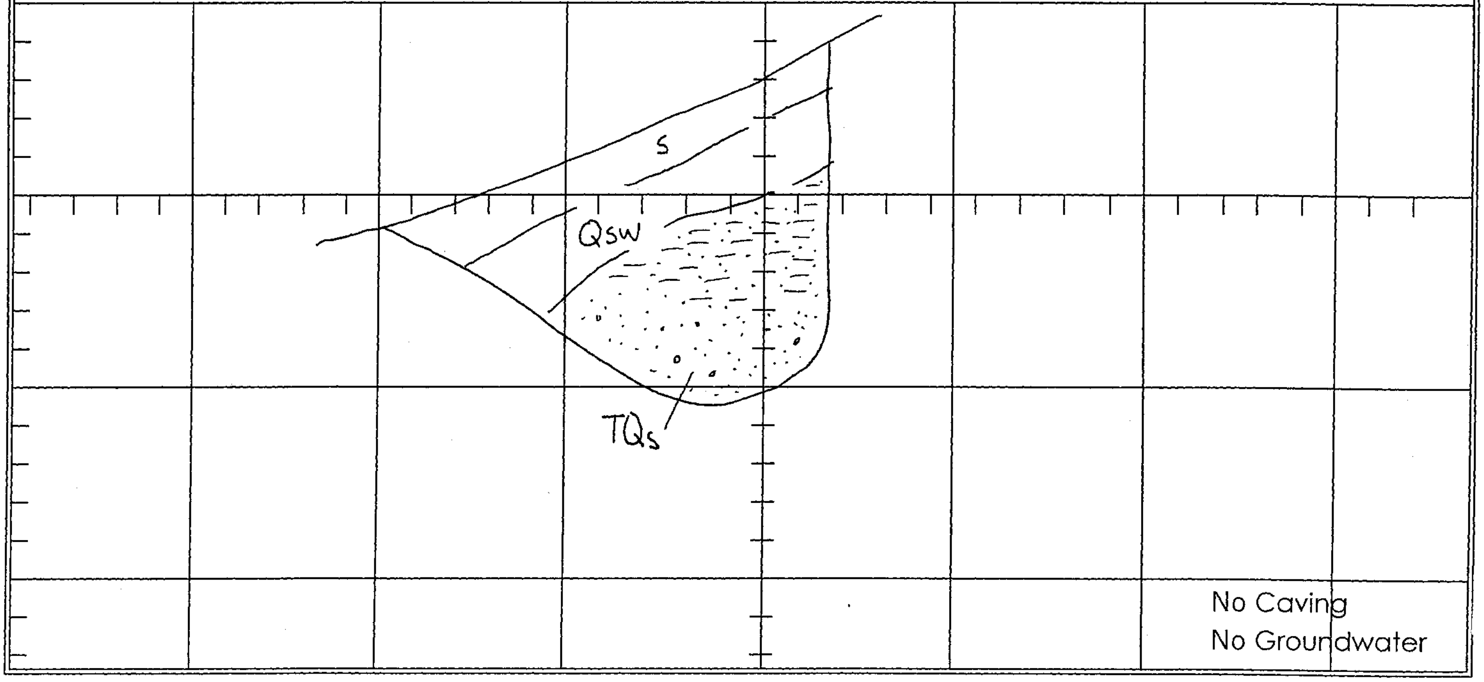
Sheet 1 of 1

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Map Review	DATE: 4/4/03		
	LOGGED BY: CJS		
	EXCAVATED: 3/8/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket	ELEVATION: 1225		

TRENCH LOG NO. T-102

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-1 ft.)** @ 0' Yellow-brown, fine- to medium-grained silty sand with scattered pebbles; loose; dry to damp **SLOPEWASH; Qsw, (1-2.5 ft.)** @ 1' Yellow-brown to reddish-brown, silty to clayey sand; loose; damp				
5					**BEDROCK; TQs, (2.5-9.5 ft.)** @ 2.5' Yellow-brown to moderate reddish-brown sandy siltstone, and pale reddish-brown, medium- to coarse-grained pebbly sandstone; moderately hard to hard; damp	B:N70E,13SE			
10									
15									
20									

TOTAL DEPTH: 9.5 feet ←N85W SCALE: 1 inch = 5 feet



No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Sheet 1 of 1

TRENCH LOG NO. T-103

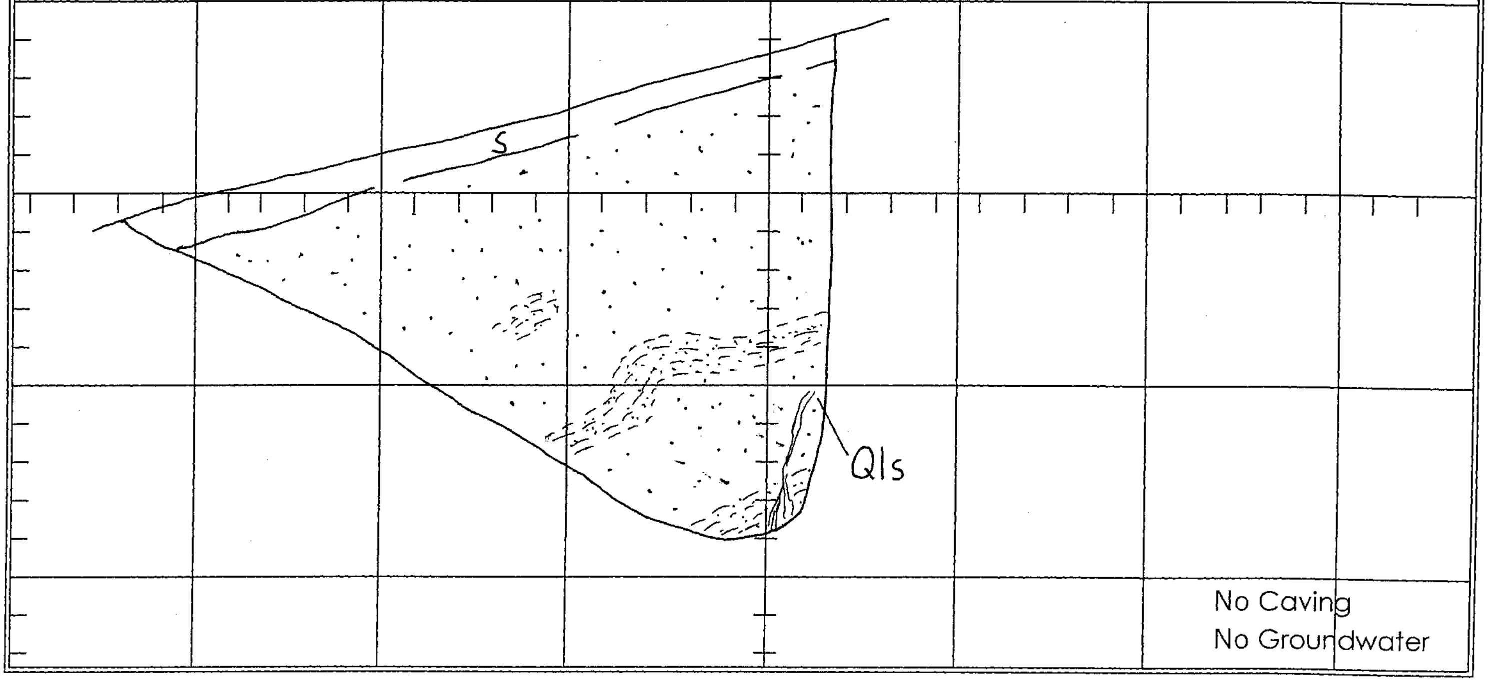
CLIENT:	Newhall Land	JOB NO:	03-1571-4
ROJECT:	River Park Tentative Map Review	DATE:	4/4/03
		LOGGED BY:	CJS
		EXCAVATED:	3/8/02
XCAVATION METHOD:	Track-Mounted Backhoe w/24" bucket	ELEVATION:	1220

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-1 ft.)** @ 0' Brown, fine- to medium-grained silty sand; loose dry to damp; numerous roots **LANDSLIDE DEBRIS; Qls, (1-13 ft.)** @ 12" Fragments of light yellowish-gray, medium-to coarse grained sandstone and reddish-brown mudstone; vaguely bedded, but with truncation of beds and local mixing of lithologies; open fractures in mudstone at 13 ft.; loose to moderately dense; unsafe to enter for closer inspection				
5									
10									
15									
20									

TOTAL DEPTH: 13 feet

N10E→

SCALE: 1 inch = 5 feet



No Caving
No Groundwater

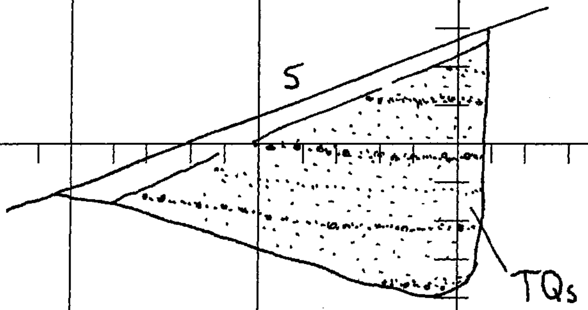
ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Map Review	DATE: 4/4/03		
	LOGGED BY: CJS		
	EXCAVATED: 3/8/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket	ELEVATION: 1220		

TRENCH LOG NO. T-104

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-10 in.)** @ 0' Yellow-brown, fine- to coarse-grained silty sand with pebbles; loose; dry; numerous roots **BEDROCK; TQs, (10 in.-7 ft.)** @ 10" Pale yellow-brown, medium- to coarse-grained pebbly sandstone; hard; damp	B:N80E,15SE			
5									
10									
15									
20									

TOTAL DEPTH: 7 feet N55W→ SCALE: 1 inch = 5 feet



No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

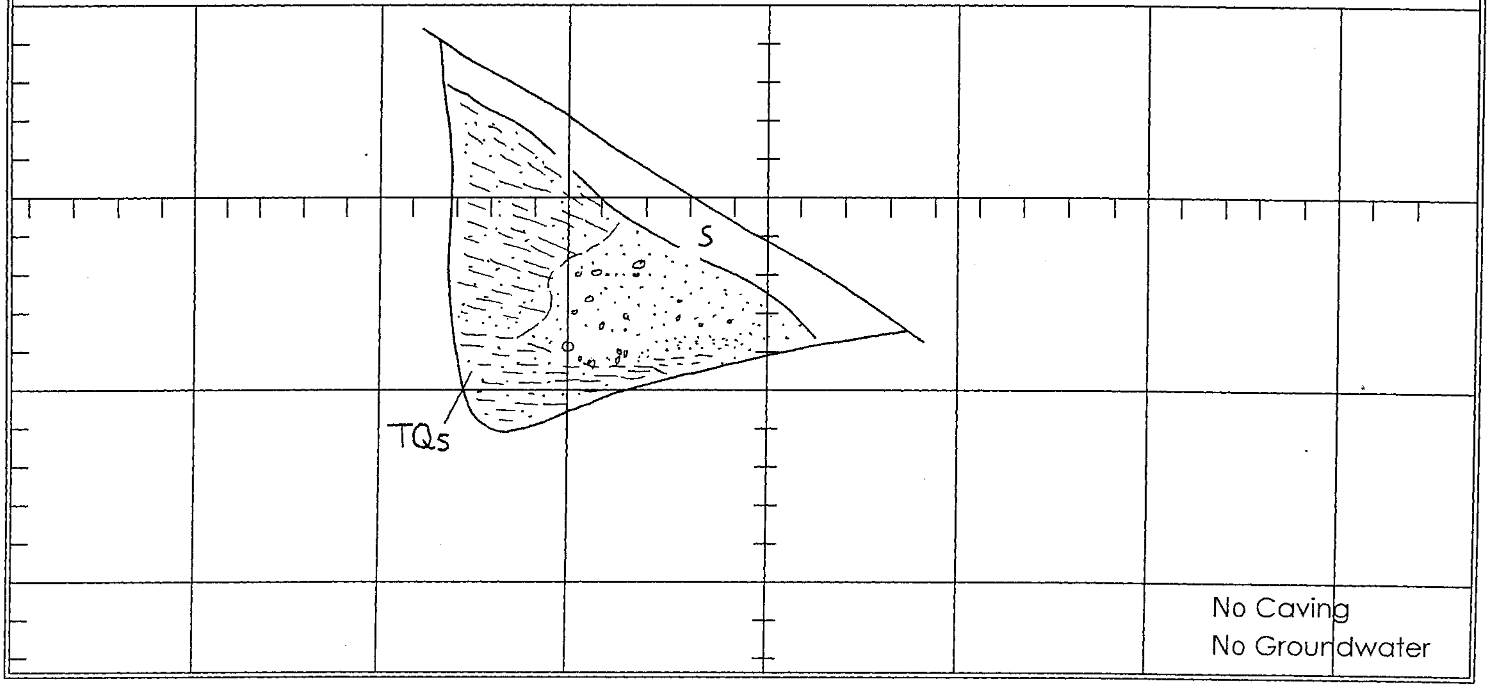
Sheet 1 of 1

CLIENT:	Newhall Land	JOB NO:	03-1571-4
PROJECT:	River Park Tentative Map Review	DATE:	4/4/03
		LOGGED BY:	CJS
		EXCAVATED:	3/8/02
EXCAVATION METHOD:	Track-Mounted Backhoe w/24" bucket	ELEVATION:	1240

TRENCH LOG NO. T-105

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-1 ft.)** @ 0' Yellow-brown, fine- to medium-grained silty sand; loose; dry to damp; numerous roots				
					BEDROCK; TQs, (1-10 ft.) @ 1' Moderate reddish-brown sandy mudstone and yellow-grayish-brown, medium to coarse-grained pebbly sandstone; sandstone is deeply channelled into mudstone; attitude probably not reliable; hard to very hard at bottom of trench; damp; mudstone grades clayey at bottom of trench	B:N55W,27SW			
5									
10									
15									
20									

TOTAL DEPTH: 10 feet ←N70E SCALE: 1 inch = 5 feet



No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Sheet 1 of 1

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Map Review	DATE: 4/4/03		
	LOGGED BY: CJS		
	EXCAVATED: 3/8/02		
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket	ELEVATION: 1245		

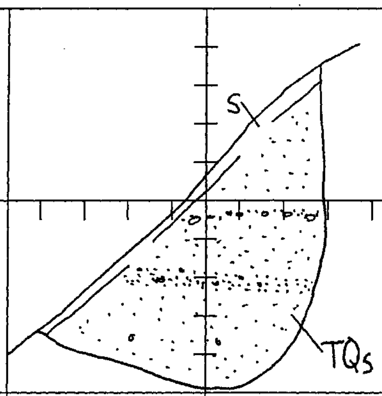
TRENCH LOG NO. T-106

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-1 ft.)** @ 0' Yellow-brown, fine- to coarse-grained silty sand; loose; dry to damp; root mats in upper 6" **BEDROCK; TQs, (1-8 ft.)** @ 1' Pale yellow-gray, fine-to medium-grained sandstone; local pebble lenses; hard; damp	B:N65W, 15SW			
5									
10									
15									
20									

TOTAL DEPTH: 8 feet

N80W→

SCALE: 1 inch = 5 feet



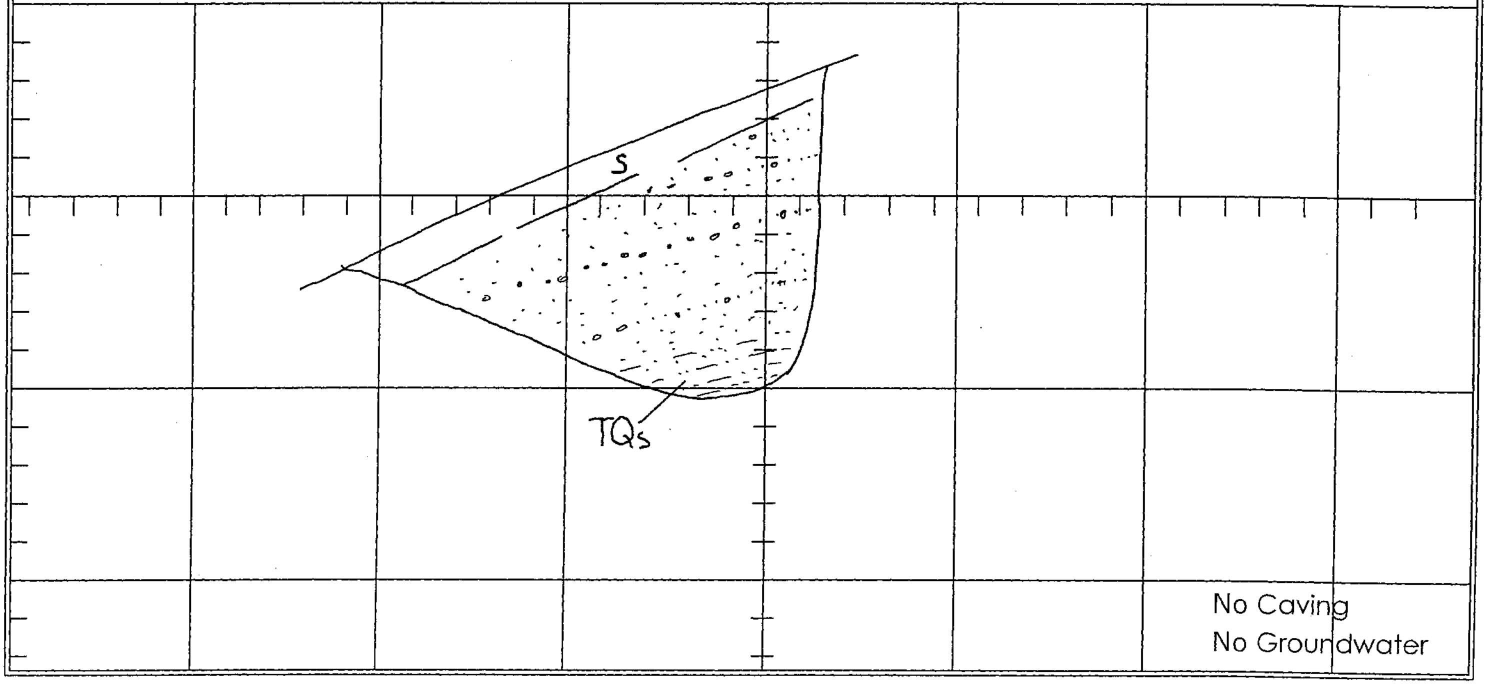
No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4		
ROJECT: River Park Tentative Map Review	DATE: 4/4/03		
	LOGGED BY: CJS		
	EXCAVATED: 3/8/02		
XCAVATION METHOD: Track-Mounted Backhoe w/24" bucket	ELEVATION: 1250		

TRENCH LOG NO. T-107

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-1 ft.)** @ 0' Yellow-brown, fine- to medium-grained silty sand with pebbles; loose; damp; hair-roots common **BEDROCK; TQs, (1-8 ft.)** @ 1' Pale reddish-yellow-brown, medium- to coarse-grained sandstone and pebbly sandstone and moderate reddish-brown, sandy siltstone; hard; damp; strong; cross-bedding in sandstone units				
5									
10									
15									
20									

TOTAL DEPTH: 8 feet N45E→ SCALE: 1 inch = 5 feet



No Caving
No Groundwater

TRENCH LOG NO. T-108

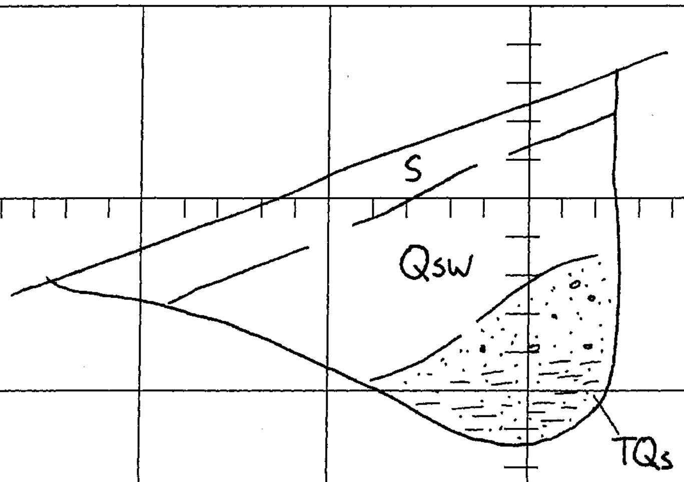
CLIENT:	Newhall Land	JOB NO:	03-1571-4
PROJECT:	River Park Tentative Map Review	DATE:	4/4/03
		LOGGED BY:	CJS
		EXCAVATED:	3/8/02
EXCAVATION METHOD:	Track-Mounted Backhoe w/24" bucket	ELEVATION:	1250

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0					**SOIL; s, (0-1 ft.)** @ 0' Yellow-brown, fine- to medium-grained silty sand; loose; dry to damp; numerous roots **SLOPEWASH; Qsw, (1-5.5 ft.)** @ 1' Light-yellow-brown to reddish-brown, medium-grained silty sand; loose to moderately dense; damp; lower contact gradational				
5					**BEDROCK; TQs, (5.5-9.5 ft)** @ 5.5' Moderate yellow-brown, sandy siltstone with scattered pebbles and moderate reddish-brown siltstone to clayey siltstone; moderately hard; damp	B:N82E,15SE			
10									
15									
20									

TOTAL DEPTH: 9.5 feet

N60W→

SCALE: 1 inch = 5 feet



No Caving
No Groundwater

TRENCH LOG NO. T-109

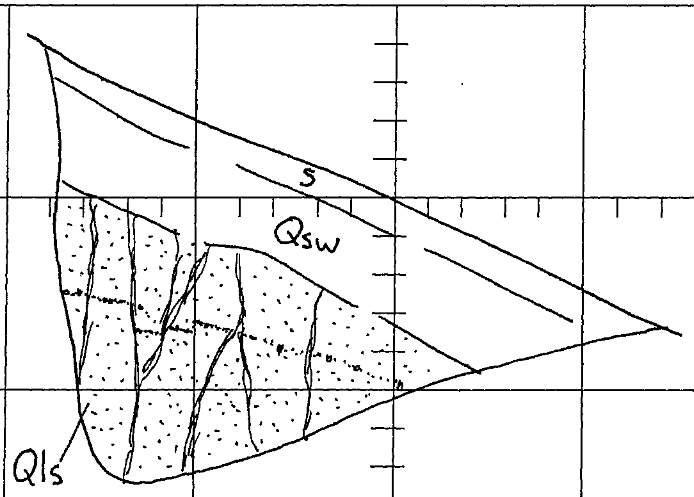
CLIENT:	Newhall Land	JOB NO:	03-1571-4
PROJECT:	River Park Tentative Map Review	DATE:	4/4/03
		LOGGED BY:	CJS
		EXCAVATED:	3/8/02
EXCAVATION METHOD:	Track-Mounted Backhoe w/24" bucket	ELEVATION:	1250

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0					**SOIL; s, (0-1 ft.)** @ 0' Yellow-brown, fine- to coarse-grained, silty sand; loose; dry to damp **SLOPEWASH; Qsw, (1-2.5 ft.)** @ 1' Reddish yellow-brown, fine- to medium-grained slightly silty sand with pebbles; loose; damp				
5					**LANDSLIDE DEBRIS?; Qls?, (2.5-10 ft.)** @ 2.5' Yellowish-gray, medium- to coarse-grained sandstone and pebbly sandstone; slightly to moderately hard; damp; numerous steep-dipping, soil-filled fractures up to 2" wide extend to bottom of trench; bedding offsets up to 6" common across fractures	B:N60W, 13SW f:N10W, N10E Steep dips to east & west			
10									
15									
20									

TOTAL DEPTH: 10 feet

N60W→

SCALE: 1 inch = 5 feet

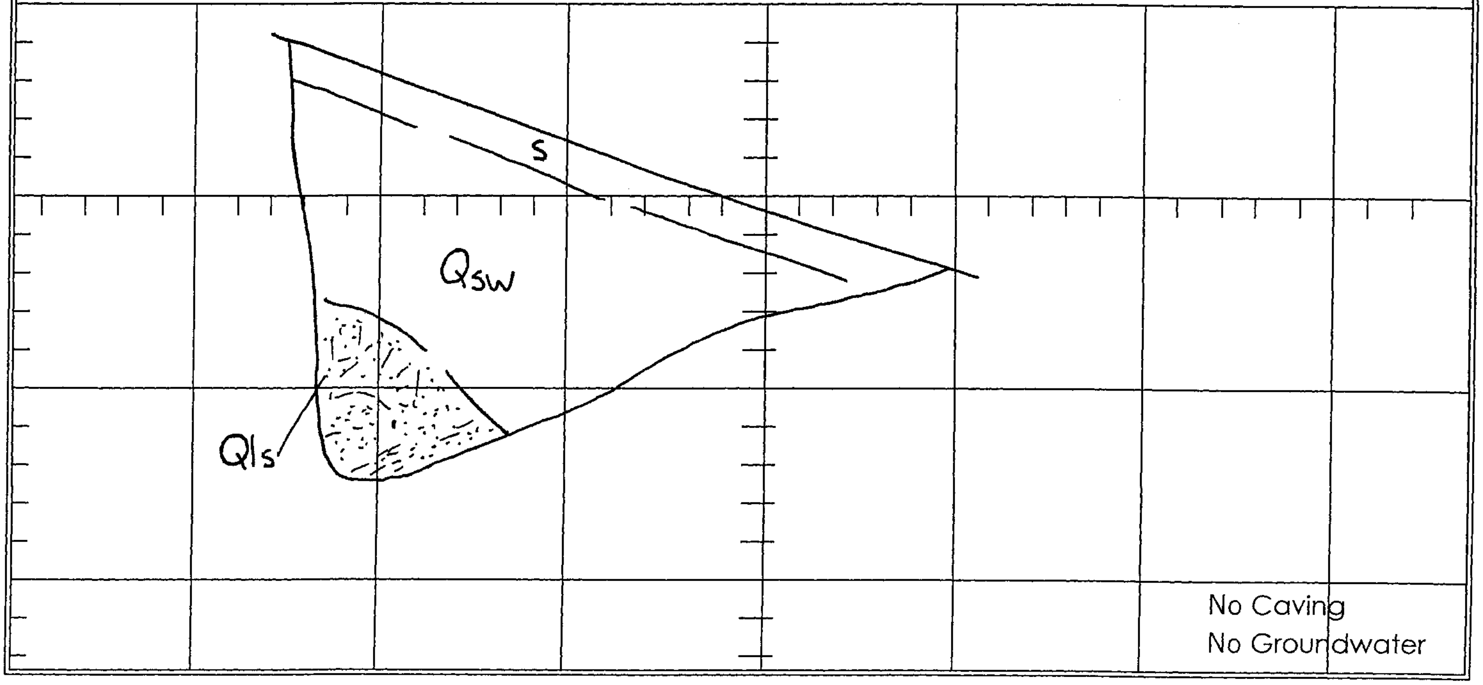


No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4	**TRENCH LOG NO.** T-110
PROJECT: River Park Tentative Map Review	DATE: 4/4/03 LOGGED BY: CJS EXCAVATED: 3/8/02	
EXCAVATION METHOD: Track-Mounted Backhoe w/24" bucket	ELEVATION: 1230	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**SOIL; s, (0-1 ft.)** @ 0' Yellow-brown to dark grayish-brown, clayey sand to sandy clay; firm; dry to damp **SLOPEWASH; Qsw, (1-7 ft.)** @ 1' Reddish-yellow-brown, fine- to medium-grained sand and clayey sand with pebbles; moderately dense; damp; lower contact gradational				
5									
					LANDSLIDE DEBRIS; Qls, (7-11.5 ft.) @ 7' Yellow-reddish-brown, sandy mudstone and yellowish-gray, medium-grained sandstone; sandstone highly weathered with little remaining cementation; units discontinuous; locally juxtaposed across steep dipping zone of very soft rock; overall weak; damp				
10									
15									
20									

TOTAL DEPTH: 11.5 feet N75W→ SCALE: 1 inch = 5 feet



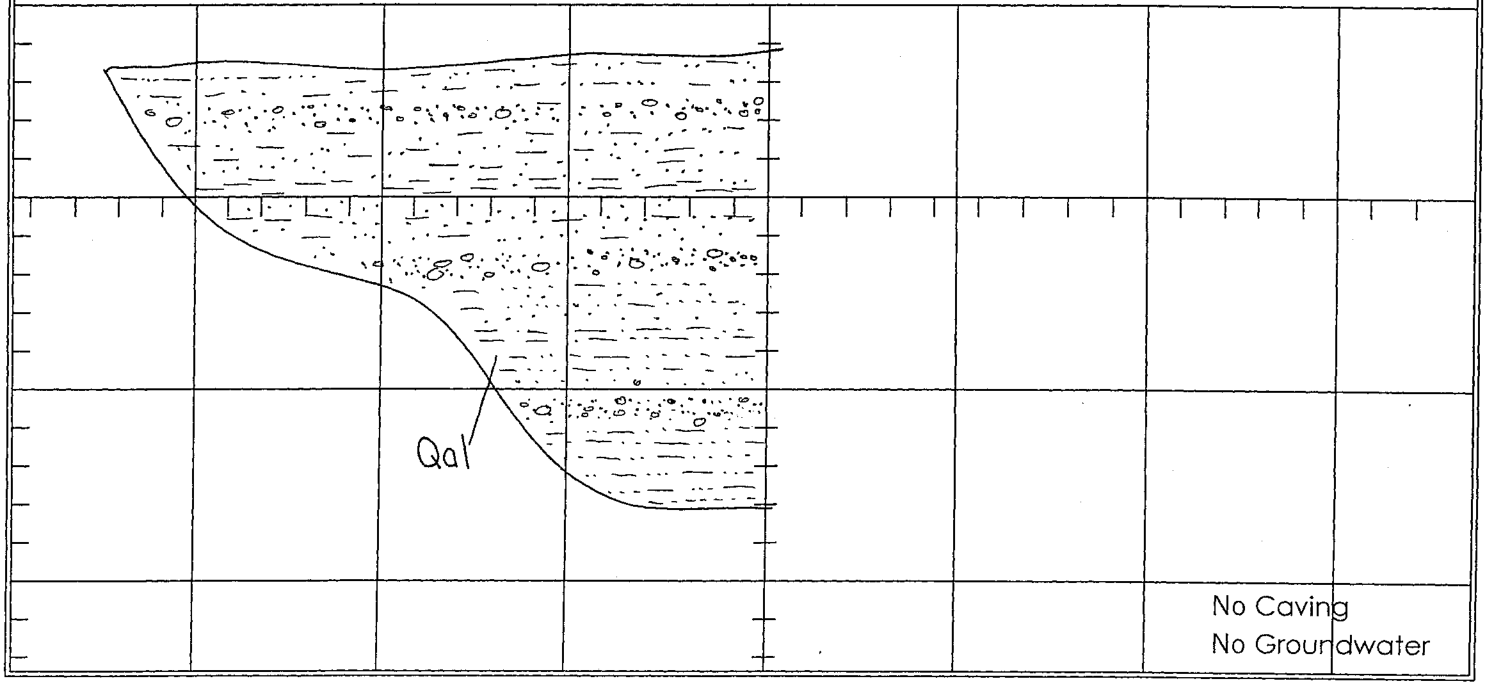
No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: DGG		
	EXCAVATED: 3/12/02		
EXCAVATION METHOD: Rubber-Tired Backhoe w/24" Bucket	ELEVATION:		

TRENCH LOG NO. T-111

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**QUATERNARY ALLVUIUM; Qal, (0-12 ft.)** @ 0' Medium- to grayish- to pale orangish-brown silty sand/sandy silt with interbedded grayish-brown fine- to coarse-grained pebbly sand with scattered pebbles and medium-brown silt; fine-grained beds are soft to stiff; sands are loose and very friable; damp; pinhole voids				
5									
10									
15					COMMENTS: -Surface logged for depths between 6' and 12' -Bottom 2' is silt; stiff-backhoe scraping				
20									

TOTAL DEPTH: 12 feet ←N28E SCALE: 1 inch = 5 feet



No Caving
No Groundwater

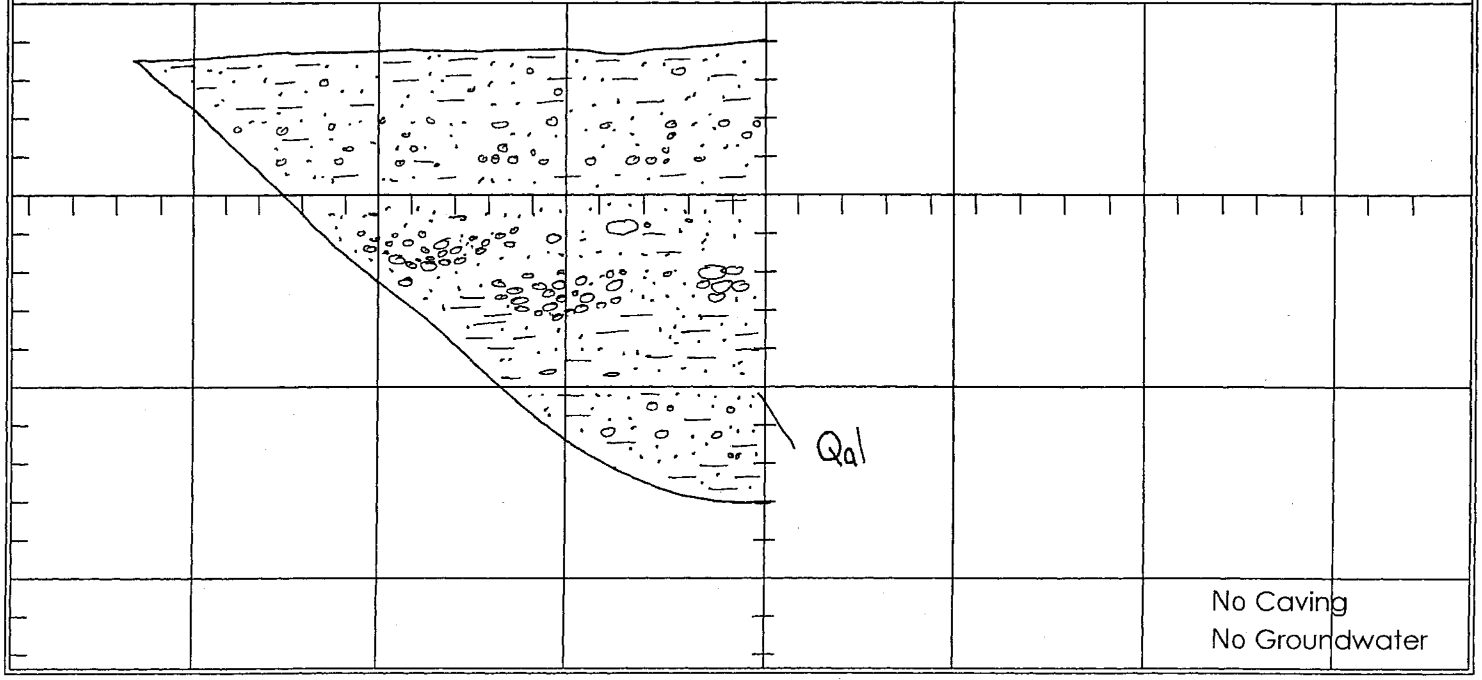
ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

TRENCH LOG NO. T-112

CLIENT:	Newhall Land	JOB NO:	03-1571-4
PROJECT:	River Park Tentative Tract 53425	DATE:	4/4/03
		LOGGED BY:	DGG
		EXCAVATED:	3/12/02
EXCAVATION METHOD:	Rubber-Tired Backhoe w/24" Bucket	ELEVATION:	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**QUATERNARY ALLUVIUM; Qal, (0-12 ft.)** @ 0' Medium-gray to grayish-brown fine- to coarse-grained pebbly sand with scattered cobbles and medium to grayish-brown silt to silty sand/sandy silt; sands are loose and very friable; finer-grained beds are soft to firm; damp; pinhole voids				
5									
10									
					COMMENTS: -Bottom 1.5' firm but not stiff -Surface logged 6-12 ft.				
15									
20									

TOTAL DEPTH: 12 feet ←N26E SCALE: 1 inch = 5 feet



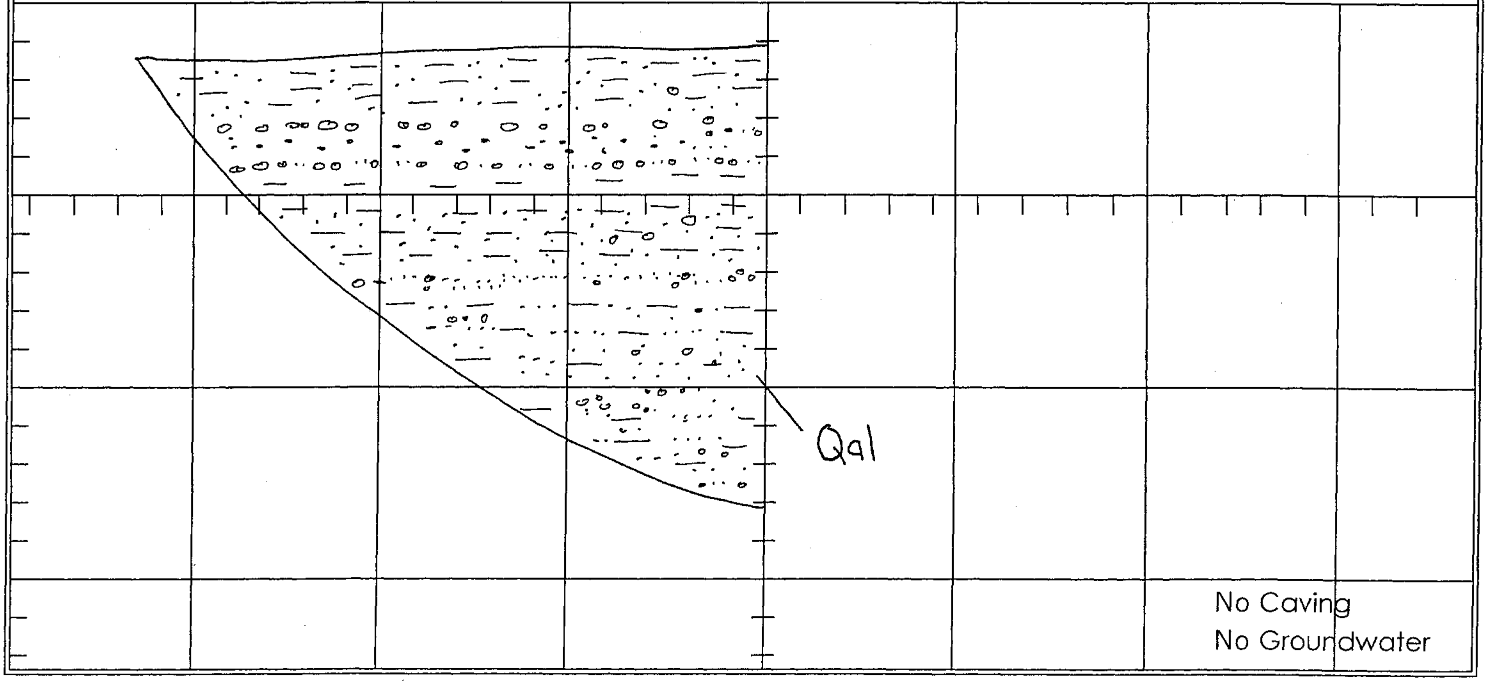
No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: DGG		
	EXCAVATED: 3/12/02		
EXCAVATION METHOD: Rubber-Tired Backhoe w/24" Bucket	ELEVATION:		

TRENCH LOG NO. T-113

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**QUATERNARY ALLUVIUM; Qal, (0-12 ft.)** @ 0' Medium- to grayish-brown silt to sandy silt/silty sand with grayish-brown fine- to medium-grained pebbly sand with few scattered cobbles; fine-grained beds are soft to firm; sands are loose and very friable; damp; pinhole voids				
5									
10									
					COMMENTS: -Bottom 1' firm but not stiff -Surface logged 6-12'				
15									
20									

TOTAL DEPTH: 12 feet N6E→ SCALE: 1 inch = 5 feet



No Caving
No Groundwater

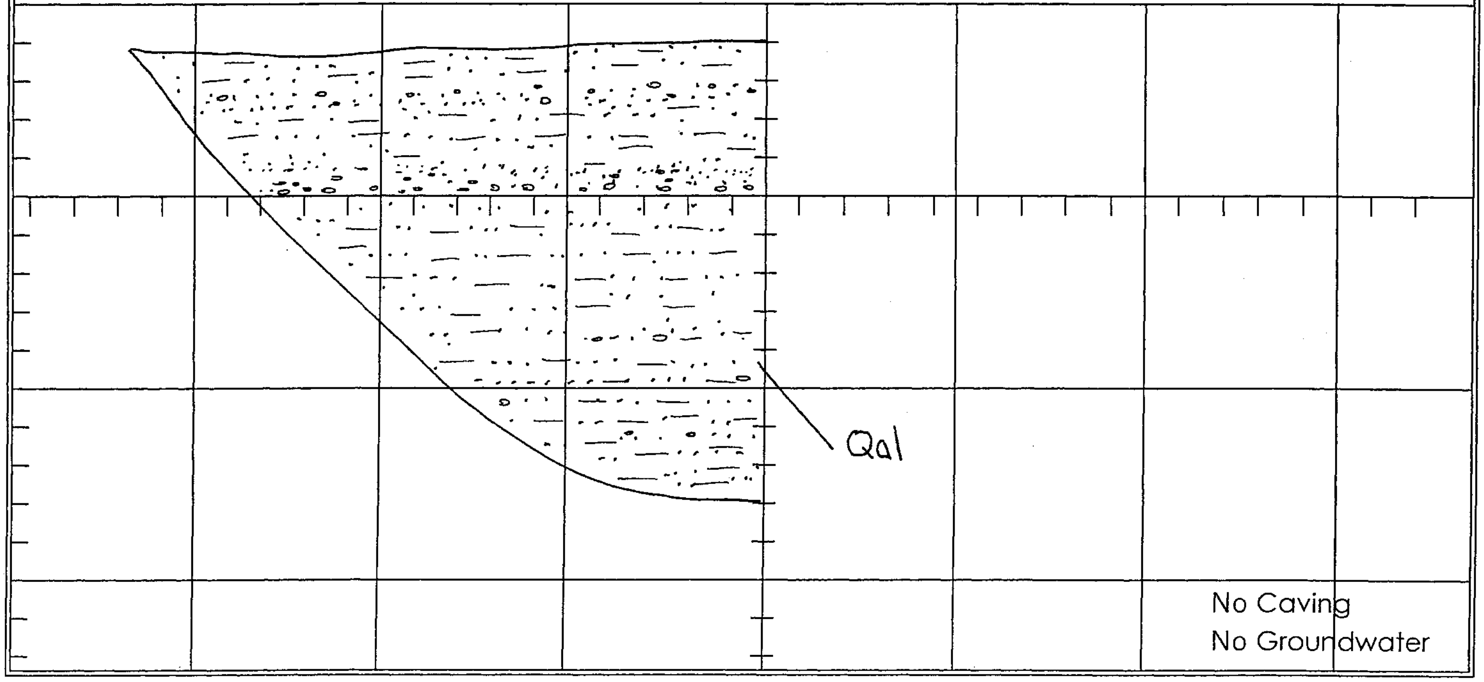
ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Land	JOB NO: 03-1571-4		
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03		
	LOGGED BY: DGG		
	EXCAVATED: 3/12/02		
EXCAVATION METHOD: Rubber-Tired Backhoe w/24" Bucket	ELEVATION:		

TRENCH LOG NO. T-114

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0 5 10 15 20					**QUATERNARY ALLUVIUM; Qal, (0-12 ft.)** @ 0' Medium to grayish-brown silt, silty sand/sandy silt, and fine- to coarse-grained pebbly sand; sands are loose and very friable, finer-grained beds are soft to slightly stiff; damp; pinhole voids; few scattered cobbles COMMENTS: -Bottom 1-1.5' slightly stiff -Surface logged 6-12 ft.				

TOTAL DEPTH: 12 feet ←N30W SCALE: 1 inch = 5 feet



No Caving
No Groundwater

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC. Sheet 1 of 1

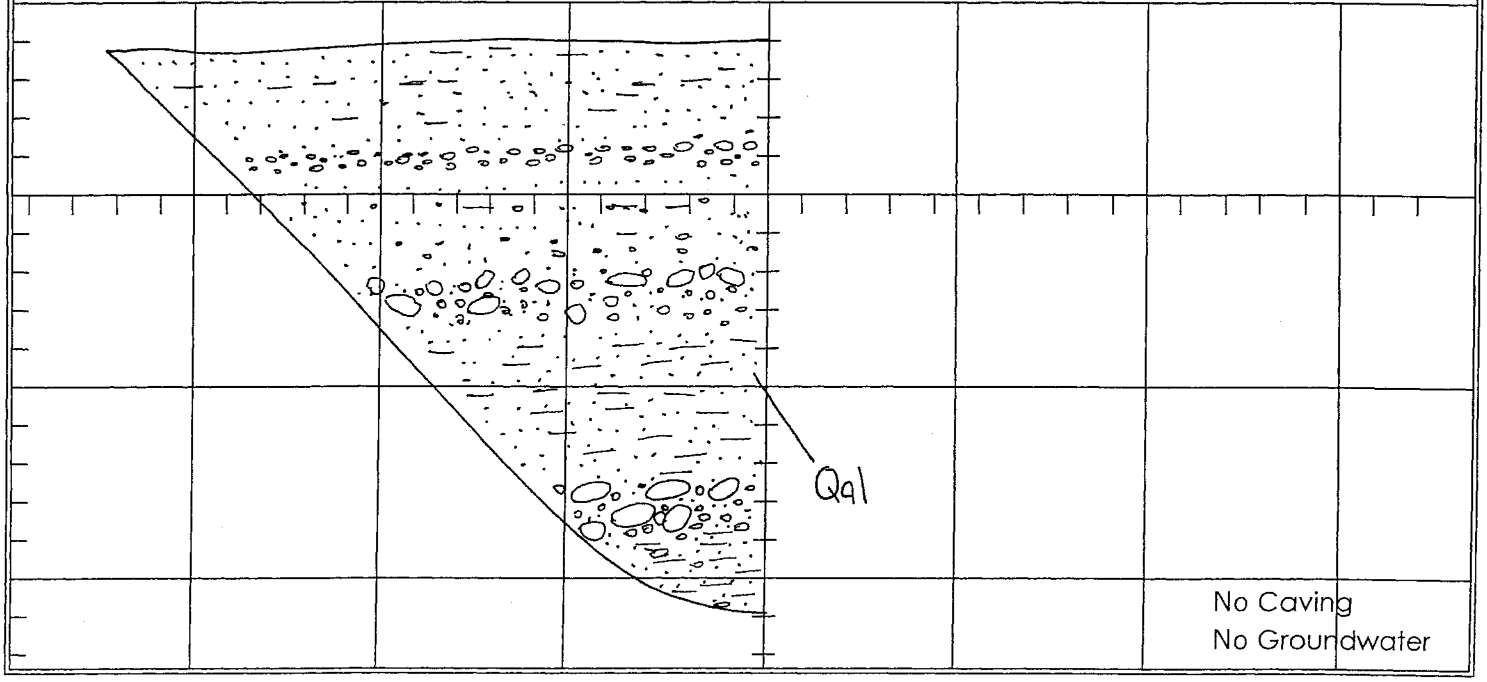
CLIENT:	Newhall Land	JOB NO:	03-1571-4	**TRENCH LOG NO.** T-115	
PROJECT:	River Park Tentative Tract 53425	DATE:	4/4/03		
		LOGGED BY:	DGG		
		EXCAVATED:	3/12/02		
EXCAVATION METHOD:	Rubber-Tired Backhoe w/24" Bucket	ELEVATION:			

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0					**QUATERNARY ALLUVIUM; Qal, (0-15 ft.)** @ 0' Medium to grayish-brown silt to sandy silt/silty sand and medium to grayish-brown fine-to coarse-grained cobbly, pebbly sand with boulders; fine- grained beds are soft to firm; sands are loose to locally moderately dense; damp; voids 1/8" diameter to at least 6 ft.				
5									
10									
15					COMMENTS: -Surface logged 6-15 ft. -Bottom 1' firm to slightly stiff				
20									

TOTAL DEPTH: 15 feet

N5W→

SCALE: 1 inch = 5 feet

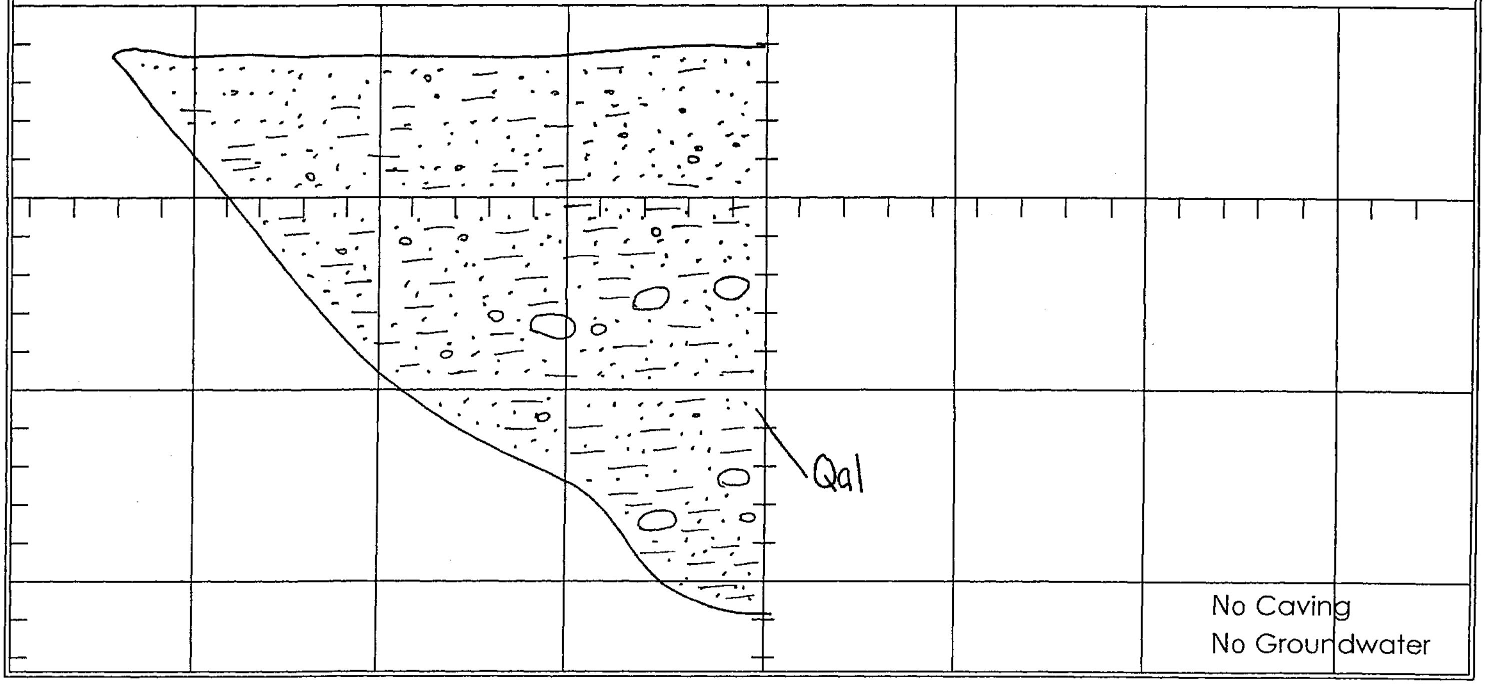


No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4	**TRENCH LOG NO. T-116**
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03 LOGGED BY: DGG EXCAVATED: 3/12/02	
EXCAVATION METHOD: Rubber-Tired Backhoe w/24" Bucket	ELEVATION:	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS		
							Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**QUATERNARY ALLUVIUM; Qal, (0-15 ft.)** @ 0' Medium to grayish-brown silt to silty sand/sandy silt and minor fine- to medium-grained pebbly sand with scattered cobbles and few boulders; soils are loose, fine-grained beds are soft to firm; damp; pinhole voids to at least 6 ft.				
5									
10									
15					COMMENTS: -Surface logged 6-15 ft.				
20									

TOTAL DEPTH: 15 feet N5E→ SCALE: 1 inch = 5 feet



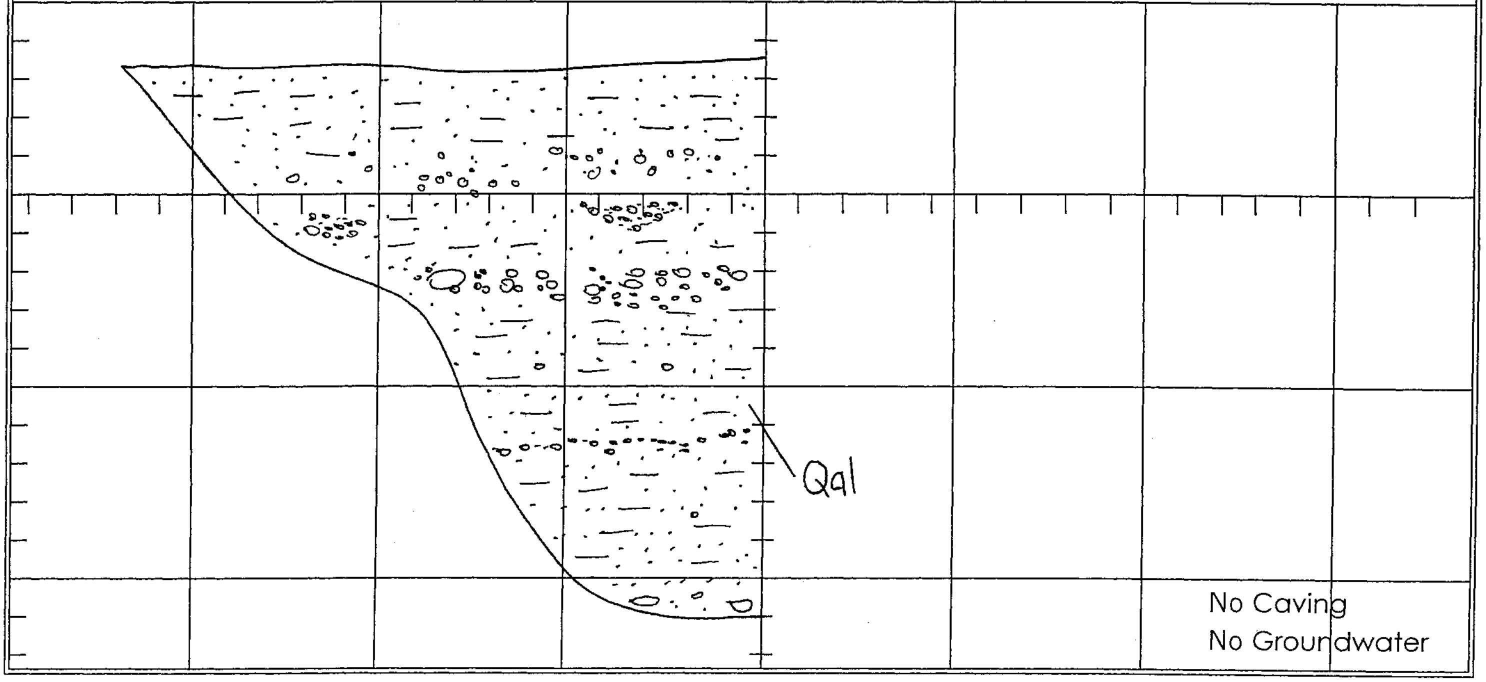
No Caving
No Groundwater

CLIENT:	Newhall Land	JOB NO:	03-1571-4
PROJECT:	River Park Tentative Tract 53425	DATE:	4/4/03
		LOGGED BY:	DGG
		EXCAVATED:	3/12/02
EXCAVATION METHOD:	Rubber-Tired Backhoe w/24" Bucket	ELEVATION:	

TRENCH LOG NO. T-117

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	Other Tests
0					**QUATERNARY ALLUVIUM; Qal, (0-15 ft.)** @ 0' Medium- to grayish-brown silt to sandy silt/silty sand and minor fine- to medium-grained pebbly sand with scattered cobbles and few boulders; sands are loose, fine-grained beds are soft to firm; damp; voids to 1/8" diameter to a least 6 ft.				
5									
10									
15					COMMENTS: -Surface logged 6-15 ft.				
20									

TOTAL DEPTH: 15 feet N14E→ SCALE: 1 inch = 5 feet

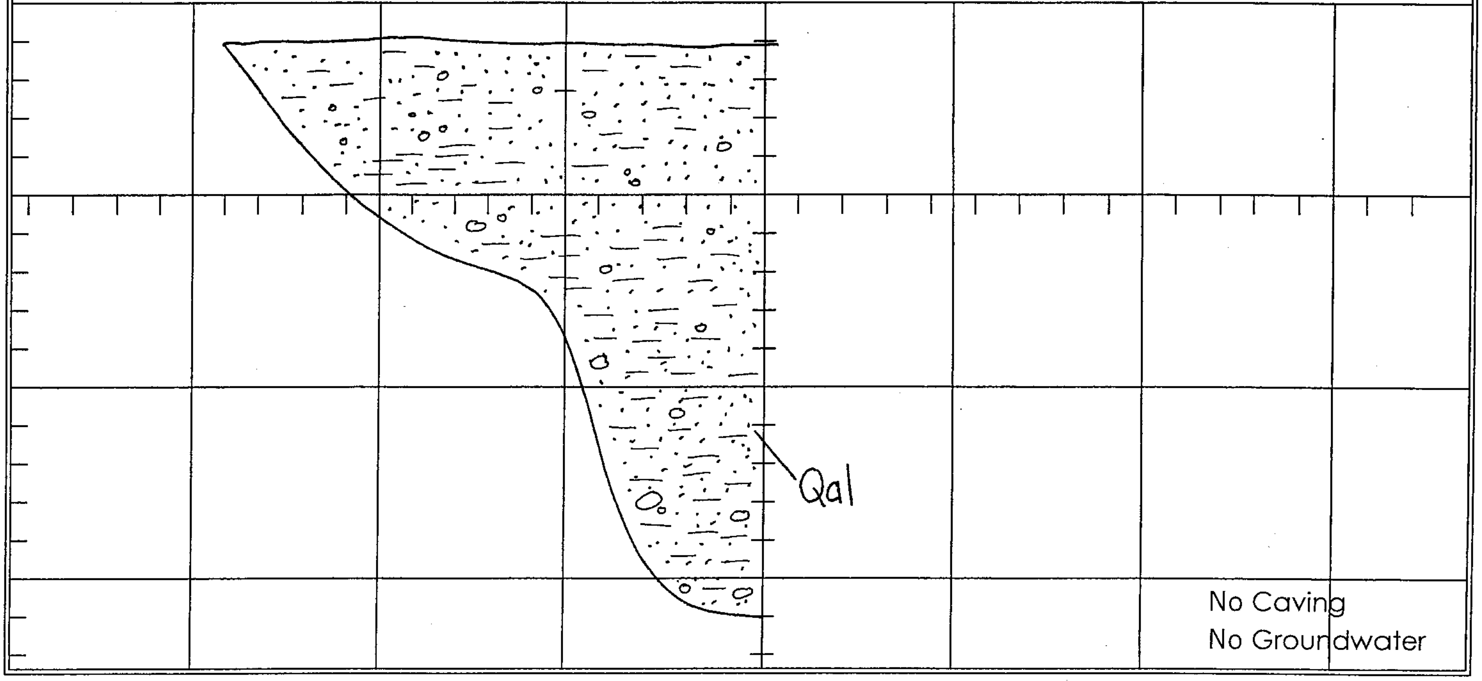


No Caving
No Groundwater

CLIENT: Newhall Land	JOB NO: 03-1571-4	**TRENCH LOG NO. T-118**
PROJECT: River Park Tentative Tract 53425	DATE: 4/4/03	
	LOGGED BY: DGG	
	EXCAVATED: 3/12/02	
EXCAVATION METHOD: Rubber-Tired Backhoe w/24" Bucket	ELEVATION:	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0					**QUATERNARY ALLUVIUM; Qal, (0-15 ft.)** @ 0' Medium- to grayish-brown silt to sandy silt/silty sand to pebbly sand with scattered cobbles; silts are soft to firm, sands are loose; damp; pinhole voids to at least 6 ft.; few boulders				
5									
10									
15					COMMENTS: -Surface logged 6-15 ft.				
20									

TOTAL DEPTH: 15 feet N14W→ SCALE: 1 inch = 5 feet



No Caving
No Groundwater

DRILL HOLE LOG

BORING NO. BA-1

PROJECT: Panhandle
JOB NO.: 98-1571
DATE: 4/4/03
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket-Auger 24"
HAMMER TYPE: Kelly
AVERAGE DROP (in.): 18"
DRIVING WEIGHTS: 0-30-3450, 30-60-2050, 60-90-1140
ELEVATION: 1335
LOGGED BY: CJS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	ATTITUDES	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
					SOIL/COLLUVIUM; (0 - 9 ft.)	
					@ 0' Moderate-reddish-brown, fine- to medium grained silty sand; moderately dense; damp to moist; slightly plastic	
5						
					@ 6' Grades to orange-brown, less silt	
					QUATERNARY TERRACE; Qt, (9 - 22 ft.)	
10					@ 9' Pale to moderate yellow-brown, fine- to coarse- grained sand and gravel with cobbles; very little cohesion; damp; moderate to severe caving	
					@ 13' Difficult drilling due to large cobbles and boulders	
15					@ 15' Switch to coring bucket to remove rocks	
					@ 18' Grades very moist to wet	
20					@ 20' Strong seepage	
					BEDROCK/SAUGUS FORMATION; TQs, (22 - 60 ft.)	
25			B:N63W, 3SW		@ 23' Bottom of Steel Casing - Pale grey to pale yellowish-grey, fine- to medium-grained, slightly silty sandstone with minor gravel; moderately hard; damp	
					@ 25' Grades to light brown and more silt	
		3 5 8			@ 25.3' Interbed of gravelly sandstone - 2 inch thick	@ 27.5' Dry Density = 127pcf M/C = 11.6%
			B:N36W,13SW		@ 26' Grades from light brown to reddish-brown with minor coarse-grained fraction	
30					@ 29' 12" section of moderate reddish-brown, very silty to clayey, very fine-grained sandstone; contacts irregular and only moderately well-defined	
			B:N5E,4NW		@ 33' Grades to yellowish-grey, coarse-grained sandstone and pebbly sandstone; moist to wet with minor seepage below 35 feet	
35			B:N60W,11SW		@ 33.5' Uniform, 2" layer of moderate-brown silty sandstone	
					@ 36' Moderate reddish-brown, silty to clayey sandstone to sandy siltstone; upper contact sharp with only minor channeling	
					@ 38' 12" section very well-cemented sandstone	

DRILL HOLE LOG

BORING NO. BA-1

PROJECT: Panhandle **JOB NO.:** 98-1571
DATE: 4/4/03
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket-Auger 24"
HAMMER TYPE: Kelly **AVERAGE DROP (in.):** 18"
DRIVING WEIGHTS: 0-30-3450, 30-60-2050, 60-90-1140
ELEVATION: 1335 **LOGGED BY:** CJS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40	■	7 29 18	 TQs			@ 39' Pale yellowish-grey, pebbly sandstone	@40' Dry Density = 127p M/C = 7.1%
						@ 41.5' Reddish-brown, medium-grained, silty sandstone, upper contact is gradational and channeled and is marked by a concretion layer about 8" thick	
45						@ 45' Grades to yellowish-grey pebbly sandstone over a distance of about 10 inches	
						@ 47.5' Thin (1-2") lense of moderate reddish-brown silty sandstone	
						@ 49' Grades very moist to wet	
50	■	7 24		B:N80W,11SW		@ 50' Moderate reddish-brown fine- to medium-grained silty to clayey sandstone with minor coarse-grained fraction; upper contact sharp and relatively planar.	@50' Dry Density = 129pcf M/C = 9.2%
						@ 52' 24" interbed of yellow-grey, coarse-grained gravelly sandstone; minor disruption of lower contact with numerous rip-up clasts contained within the grey sandstone	
				B:N59W,7SW			
55						@ 56' Grades slightly more clay	
60						TOTAL DEPTH 60 Feet Seepage in lowermost sections of most all coarse-grained units, with strong seepage at 20 feet near base of terrace Casing set between 5 and 23 feet due to severe caving in friable terrace gravels	
65							
70							
75							

DRILL HOLE LOG

BORING NO. BA-2

PROJECT: Panhandle
JOB NO.: 98-1571
DATE: 4/4/03
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket-Auger 24"
HAMMER TYPE: Kelly
AVERAGE DROP (in.): 18"
DRIVING WEIGHTS: 0-30-3450, 30-60-2050, 60-90-1140
ELEVATION: 1276
LOGGED BY: CJS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	ATTITUDES	USCS SYMBOL	Remarks
5					
10					
15					
20	■	6 12			@20' Dry Density = 134pcf M/C = 7.5%
			B:N75E,16SE		
25			B:N82E,10SE		
			B:N87E,13SE		
			PS:N71E, 22-25SE		
30	■	11 23			@30' Dry Density = 128pcf M/C = 11.1%
			B:N74E,14SE		
35					

Description

Soils: description; consistency/density; moisture; color; other

Bedrock: color, lithology; hardness; moisture; other

SOIL/COLLUVIUM; (0 - 7 ft.)

@ 0' Moderate-reddish-brown, fine- to medium grained silty sand with large cobbles and boulders; dense; damp

QUATERNARY TERRACE; Qt (7 - 20 ft.)

@ 7' Pale to moderate yellow-brown; fine- to coarse- grained sand and gravel with cobbles; very little cohesion; damp; moderate to severe caving; crowd required to advance through cobbles

@ 17' 18-24" boulders require removal by hand

BEDROCK/SAUGUS FORMATION; TQs (20 - 95 ft.)

Pale grey to pale yellowish-grey, fine- and medium- to coarse-grained, pebbly sandstone interbedded with moderate reddish-brown fine- to very fine-grained, silty to locally clayey sandstone; overall unit is unfractured, moderately hard to hard and damp to wet with minor seepage in the lower sections of isolated, coarse-grained sandstone units

@ 20' Bottom of Plastic Casing - yellowish-grey, medium- to coarse-grained, pebbly sandstone; bedding is defined by subtle textural variations, mineral laminations and pebble lineations.

@ 22' Thin interbed of finer-grained, grey sandstone

@ 25.5' 6" cemented zone underlain by uniform, fine-grained sandstone; planar contacts continuous around hole without disruption

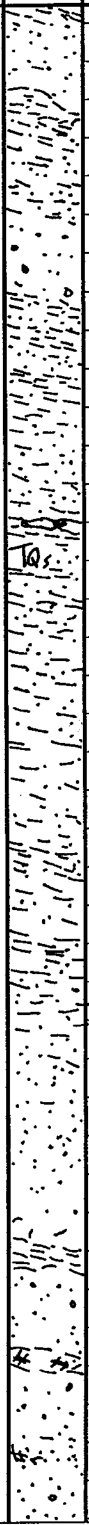
@ 27.5' Grades to moderate reddish-brown, silty to slightly clayey sandstone

@ 29' Poorly defined parting surface in reddish-brown silty to clayey sandstone; surface coated with thin film of clay; no well-defined polish or striations; occurs as very thin discontinuity that can be traced in segments around the hole; no evidence of significant shearing along this surface

DRILL HOLE LOG

BORING NO. BA-2

PROJECT: Panhandle
JOB NO.: 98-1571
DATE: 4/4/03
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket-Auger 24"
HAMMER TYPE: Kelly
AVERAGE DROP (in.): 18"
DRIVING WEIGHTS: 0-30-3450, 30-60-2050, 60-90-1140
ELEVATION: 1276
LOGGED BY: CJS



DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	ATTITUDES	USCS SYMBOL	Remarks
40	■	8 34	B:N68E,13SE		@40′ Dry Density = 131pc M/C = 8.6%
			B:N80W,12SW		
45			B:N68W,15SW		
			B:N70W,15SW		
			B:N74W,14SW		
50	■	9 40			@50′ Dry Density = 131pcf M/C = 9.9%
55					
60					@60′ Dry Density = 116pc M/C = 12.1%
			B:N83W,13SW		
65					
70					
			B:N85E,17SE		
75					
			B:N70W,9SW		

Description

Soils: description; consistency/density; moisture; color; other

Bedrock: color, lithology; hardness; moisture; other

@ 32'	12" interbed of moderate brown, fine-grained sandstone. Grades to yellowish-grey, coarse-grained sandstone and pebbly sandstone; moist to wet with minor seepage below 35 feet
@ 34.5'	Pale yellowish-grey, medium- to coarse-grained, pebbly sandstone
@ 36'	Moderate reddish-brown sandstone
@ 39'	Grades to pale yellowish-grey sandstone
@ 39.5'	2" interbed of moderate reddish-brown sandstone
@ 42.5'	Moderate reddish-brown silty sandstone; upper contact sharp with minor channeling; minor seepage just above this contact
@ 45'	Yellowish-grey pebbly sandstone
@ 47.5'	Upper boundary of sequence of variegated moderate reddish-brown silty sandstone and pale yellow sandstone; lithologies appear to occur as lenticular packages with all contacts gradational over several inches; upper limits marked by clayey sandstone that is fairly continuous
@ 49.5'	Uniform reddish-brown silty sandstone with minor coarse-grained fraction; increasing seepage, but still insufficient to flow on wall of boring
@ 51'	Grades coarser-grained
@ 53'	6" concretion; top of gradational zone similar to unit described at 47.5 feet
@ 55'	Moderate reddish-brown; fine- to medium-grained silty sandstone with minor coarse-grained fraction
@ 58'	Grades finer-grained
@ 61.5'	8" horizon of slightly higher clay content; no shearing or polished surfaces
@ 64'	Bedding defined by minor textural change
@ 67'	Grades to yellowish-grey sandstone
@ 70'	Grades pebbly
@ 72.5'	6" horizon of reddish-brown, fine- to medium-grained, silty sandstone; contact sharp; continuous around hole with minor channeling
@ 74.5'	8" cemented zone
@ 77'	Thin horizon of fine-grained sandstone; grades downward into pebbly sandstone; harder

DRILL HOLE LOG

BORING NO. BA-2

PROJECT: Panhandle **JOB NO.:** 98-1571
DATE: 4/4/03
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket-Auger 24"
HAMMER TYPE: Kelly **AVERAGE DROP (in.):** 18"
DRIVING WEIGHTS: 0-30-3450, 30-60-2050, 60-90-1140
ELEVATION: 1276 **LOGGED BY:** CJS

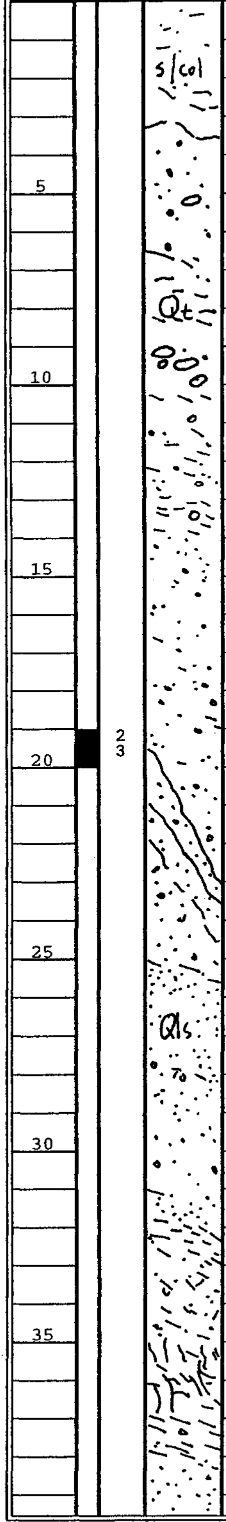
DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES	USCS SYMBOL	**Description** **Soils: description; consistency/density; moisture; color; other** **Bedrock: color, lithology; hardness; moisture; other**	**Remarks**
80							
85				B:N84W,16SW		@ 85' Moderate reddish-brown, fine- to medium-grained sandstone; upper contact lightly channeled, gradational over several inches @ 87' Grades slightly clayey @ 89' Grades less clay	
90						@ 93' Light mottling of pale brown to pale bluish grey	
95						TOTAL DEPTH 95 Feet Isolated minor seepage in lower sections of some coarse-grained bedrock units Casing set bewteen surface and 20 feet due to severe caving in friable terrace gravels Refusal at 95 Feet	
100							
105							
110							
115							

DRILL HOLE LOG

BORING NO. BA-3

PROJECT: Panhandle **JOB NO.:** 98-1571
DATE: 4/4/03
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket-Auger 24"
HAMMER TYPE: Kelly **AVERAGE DROP (in.):** 18"
DRIVING WEIGHTS: 0-30-3450, 30-60-2050, 60-90-1140
ELEVATION: 1296 **LOGGED BY:** CJS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks



ATTITUDES
C:N84E,58SE
B:Due East,14S
B:N70E,16SE
B:N70E,17SE
B:N65E,18SE
B:N76W,13SW

SOIL/COLLUVIUM; (0 - 3 ft.)

@ 0' Moderate-reddish-brown, fine- to medium grained silty to clayey sand; dry to damp; loose; porous; numerous hair roots extend to depth of about 6 inches

QUATERNARY TERRACE/LANDSLIDE GRABEN BACKFILL; Qt/Qls (3 - 23 ft.)

Moderate reddish-brown fine- to coarse-grained, silty to clayey sand with 5 to 15% rounded granitic clasts that range up to about 12" in maximum dimension with 1/2-2 inches typical; very dense; damp

@ 5' Grades coarser-grained and greater percentage of gravel

@ 9' Cobble zone marks transition to moderate brown, fine- to medium-grained silty to slightly clayey sand with scattered granitic clasts up to about 2 inches maximum dimension with 1/4-1/2 inch typical

@ 14' Less silt; color changes to moderate orange-brown; isolated pockets of medium-grained sand

@ 19' "Terrace" material juxtaposed against pale yellow-brown sandstone across steep dipping fracture that extends from 19 to 23 feet

LANDSLIDE DEBRIS; Qls (19 - 66 ft.)

Pale grey to pale yellowish-grey, fine- and medium- to coarse-grained, pebbly sandstone interbedded with moderate reddish-brown fine- to very fine-grained, silty to locally clayey sandstone and siltstone; overall unit is lightly to moderately fractured, moderately hard to hard and damp to wet with minor seepage in fractured, coarse-grained sandstone at 56 feet

@ 19' Pale yellow-brown; fine- to medium-grained, pebbly sandstone; lightly fractured with fractures oriented approximately parallel to contact with overlying terrace; fractures occur up to about 1 inch wide, and are backfilled with pale brown, silty sand; fractures do not offset bedding features in sandstone

@ 21.5' Pebble lineation

@ 25' Light-brown to light greyish-brown, very fine- to medium-grained sandstone; upper contact is distinct and continuous around hole without offset; upper six inches excavates very easily, but is not visibly fractured

@ 28' Pale yellow, medium- to coarse-grained pebbly

Remarks
@19'
Dry Density = 122pcf
M/C = 13%
%Fines = 35

DRILL HOLE LOG

BORING NO. BA-3

PROJECT: Panhandle
JOB NO.: 98-1571
DATE: 4/4/03
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket-Auger 24"
HAMMER TYPE: Kelly
AVERAGE DROP (in.): 18"
DRIVING WEIGHTS: 0-30-3450, 30-60-2050, 60-90-1140
ELEVATION: 1296
LOGGED BY: CJS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES	USCS SYMBOL	Remarks
40						
45				B:N72E,10SE		
50				B:N53W,9SW f:N43E,82NW		
55				B:N60E,37SE		
60				B:N85E,13SE f:N25W,83SW B:Due East,11S		
65				S:N80W,14SW St: S4W SP:N80E,23SE St:S32E P:N86W,11SW B:N86E,7SE		@66' %Fines=98
70						
75				B:N70W,8SW		

Description

Soils: description; consistency/density; moisture; color; other

Bedrock: color, lithology; hardness; moisture; other

sandstone, typical clast size ranges 1/2 - 1 inch with individual clasts of Pelona Schist as large as five inches; contact is planar and continuous around boring without offset

@ 32' Grades through light greyish brown fine- to medium-grained, silty sandstone; uppermost contact is lightly channeled; lower 24" grades to moderate brown, very fine-grained micaceous sandstone that excavates very easily along steep-dipping fractures that can be traced only over distances of a few inches; fracture surfaces commonly are faintly striated; fractures do not offset lithologic contacts, however, rock between 35 and 37 feet has a disturbed appearance

@ 37' Moderate reddish-brown, fine- to coarse-grained, silty to clayey sandstone with scattered gravel

@ 38.5' Grades to pale yellow-brown, medium- to coarse- grained, slightly pebbly sandstone

@ 44' Grades coarser-grained

@ 46' Pale yellow grey, fine- to medium-grained sandstone

@ 49' 6-inch gravel interbed

@ 52' Pale yellow-brown, medium- to coarse-grained, pebbly sandstone; several steep-dipping fractures cross contact without offset, fracture tight; adjacent rock excavates easily

@ 56' 1/4-1 1/2" thick zone of pale-brown, crushed and weathered rock; forms a continuous seam around the boring; adjacent rock within several inches of the feature is soft and excavates easily; no clay or well-developed polished, or striated surfaces; moderate seepage (sufficient just to flow on side of boring) occurs primarily from direction N60W

@ 59' Moderate reddish-brown; fine- to medium-grained silty sandstone with minor coarse-grained fraction; contact sharp and planar, and continuous around boring without offset

@ 60' Steep-dipping fractures; tight; adjacent rock excavates easily

@ 62.5' 8-inch interbed of reddish-brown; clayey siltstone;

@ 64' 1" interbed of moderate reddish-brown; clayey siltstone; overall only slightly plastic; upper surface undulatory and unpolished, but lightly striated; fractures noted at 60 feet extend through both clayey interbeds without offset

@ 65.5' 18" zone of moderate reddish-brown very fine-grained silty to clayey sandstone; numerous polished surfaces; many surfaces polished and planar, but not striated; others undulatory and poorly polished, but with clear striations; in most cases, clay occurs

DRILL HOLE LOG

BORING NO. BA-3

PROJECT: Panhandle
JOB NO.: 98-1571
DATE: 4/4/03
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket-Auger 24"
HAMMER TYPE: Kelly
AVERAGE DROP (in.): 18"
DRIVING WEIGHTS: 0-30-3450, 30-60-2050, 60-90-1140
ELEVATION: 1296
LOGGED BY: CJS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
80 85 90 95 100 105 110 115						as films along thin surfaces, with the exception of a 1/2-1 inch thick seam of highly plastic clay which occurs at a depth of 66 feet; clay seam sampled by driving three rings by hand and collecting a small bag sample; other clay surfaces too thin to sample BEDROCK/SAUGUS FORMATION; TQs (66 - 80 ft.) @ 67.5' Moderate reddish-brown, silty sandstone with minor coarse-grained fraction; contact is distinct and continuous around hole with no offsets; signficant improvement in rock quality @ 72' Grades into pale yellow-brown, medium- to coarse-grained pebbly sandstone; contact is gradational over about 12 inches @ 74' Moderate reddish-brown, fine- to medium-grained, silty sandstone; contact sharp and continuous around hole @ 78' Pale yellow-brown, medium- to coarse-grained sandstone TOTAL DEPTH 80 Feet Moderate seepage at 56 Feet No Caving	

DRILL HOLE LOG

BORING NO. BA-4

PROJECT: Panhandle
JOB NO.: 98-1571
DATE: 4/4/03
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket-Auger 24"
HAMMER TYPE: Kelly
AVERAGE DROP (in.): 18"
DRIVING WEIGHTS: 0-30-3450, 30-60-2050, 60-90-1140
ELEVATION: 1285
LOGGED BY: CJS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks

Depth marks: 5, 10, 15, 20, 25, 30, 35

ATTITUDES:
C:N45W,60SW
B:N80W,14SW
f:N25E,80NW
B:N75W,11SW
f:N8E,81SE
B:N85W,10SW
SP:N78W,12SW
St:S70W

SOIL/COLLUVIUM; (0 - 7 ft.)

@ 0' Moderate-reddish-brown, fine- to medium grained silty to clayey sand with scattered pebbles; dry to damp; loose to moderately dense

QUATERNARY TERRACE/LANDSLIDE GRABEN BACKFILL; Qt/Qls (7 - 23 ft.)

Moderate reddish-brown to yellow orange-brown, fine- to coarse-grained, silty sand with scattered pebbles; poorly cemented; damp to moist; at lower contact, unit is juxtaposed against yellowish-grey, sandstone across steep-dipping contact (fracture?) that extends from 11 feet to 14 feet

LANDSLIDE DEBRIS; Qls (11 - 106.5 ft.)

Pale grey to pale yellowish-grey, fine- and medium- to coarse-grained, pebbly sandstone interbedded with moderate reddish-brown fine- to very fine-grained, silty to locally clayey sandstone and siltstone; overall unit is unfractured to moderately fractured, moderately hard to hard and damp to wet with seepage below approximately 50 feet

@ 11' Pale yellowish-grey; medium- to coarse-grained, pebbly sandstone; lightly fractured with fractures oriented approximately parallel to contact with overlying terrace; fractures occur up to about 1/2 inch wide, and are backfilled with pale brown, silty sand, fractures do not offset bedding features in sandstone
@ 14' 6-inch interbed of uniform, medium- to coarse- grained sandstone
@ 16' Sandstone lightly fractured; fractures backfilled with pale brown mixture of sand and carbonate; carbonate also occurs in sandstone as interstitial material in large, pod-shaped areas
@ 18' Sandstone grades very pebbly
@ 21' Grades downward through 6-inch interbed of light-brown sandstone into moderate reddish-brown, very fine-grained, silty to clayey sandstone and siltstone; contact is crossed by tight fracture without significant offset; fracture pinches closed at 23 feet
@ 25' Grades downward into moderate brown, fine-grained, slightly micaceous, silty sandstone; very lightly fractured; fractures thin, tight and backfilled with carbonate
@ 29.5' Pale yellow-brown, medium- to coarse-grained, pebbly sandstone; upper 12 to 18 inches very well-cemented and hard; upper contact irregular, however, not obviously offset

DRILL HOLE LOG

BORING NO. BA-4

PROJECT:	Panhandle	**JOB NO.:**	98-1571
		DATE:	4/4/03
DRILLING COMPANY/DRILLER:	Tri Valley Drilling		
METHOD OF DRILLING/HOLE DIAMETER (in.)	Bucket-Auger 24"		
HAMMER TYPE:	Kelly	**AVERAGE DROP (in.):**	18"
DRIVING WEIGHTS:	0-30-3450, 30-60-2050, 60-90-1140		
ELEVATION:	1285	**LOGGED BY:**	CJS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES	USCS SYMBOL
40					
				N85W,7SW	
45					
50				B:N82W,14SW	
55					
				B:Due East,11S	
60					
65				B:N80E,19SE f:N78W,Vert.	
70					
75					

Description

Soils: description; consistency/density; moisture; color; other

Bedrock: color, lithology; hardness; moisture; other

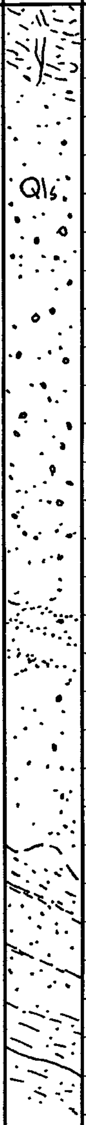
	across fractures
@ 32'	Grades downward into moderate-brown, very fine- grained, silty sandstone with isolated clayey interbeds 1 to 2 inches thick
@ 33.5'	Pale brown to pale yellow-brown, fine- to medium-grained, slightly pebbly sandstone
@ 35.5'	Moderate reddish-brown, very fine-grained, silty to clayey sandstone to siltstone, zone approximately 2 inches below upper contact has sheared/disturbed appearance and is underlain by a polished striated surface, unit grades downward into moderate yellow-brown, medium-coarse-grained sandstone
@ 40'	Grades pebbly
@ 41.5'	6-inch interbed of moderate yellowish-brown, uniform, medium- to coarse-grained sandstone
@ 45'	6-inch thick lense of moderate reddish-brown, silty sandstone; continuous only around 1/2 of boring
@ 48'	Significant increase in moisture; seepage sufficient to mix with slough and form a soft paste on the side of the boring, but does not flow
@ 52'	8-inch interbed of moderate-brown to moderate reddish-brown silty sandstone; fractured; rock excavates easily along fractures; fractures cannot be traced visually into underlying sandstone as distinct features, however, sandstone excavates easily along the downward projections of the fractures, and seepage from these areas is noticeably stronger
@ 59'	Pale yellow-brown to yellow-grey, interbedded fine- to medium-grained, and medium- to coarse-grained sandstone
@ 60'	Seepage pervasive; sufficient to flow on side of boring
@ 65'	Moderate reddish-brown, fine- to medium-grained silty sandstone to siltstone; minor caving along steep-dipping fracture; fracture is slightly open with substantial flow of water
@ 68'	Grades downward into moderate-brown to moderate yellowish-brown, medium- to very coarse-grained pebbly sandstone; locally interbedded with uniform, finer-grained sandstone; fracture noted above continues through this unit, but is not as well-defined as in finer-grained units; overall very hard with bedding poorly defined; lithologies change across gradational contacts
@ 71'	Grades finer-grained
@ 74'	Grades more pebbles

Remarks

DRILL HOLE LOG

BORING NO. BA-4

PROJECT: Panhandle **JOB NO.:** 98-1571
DATE: 4/4/03
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket-Auger 24"
HAMMER TYPE: Kelly **AVERAGE DROP (in.):** 18"
DRIVING WEIGHTS: 0-30-3450, 30-60-2050, 60-90-1140
ELEVATION: 1285 **LOGGED BY:** CJS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
80				B:Due East,11S f:N65W,Vert		@ 79' Moderate-brown to moderate reddish-brown, very fine- to fine-grained sandstone; water flow increases significantly; fracture noted above is well defined and associated with minor caving @ 81' Grades to medium- to very coarse-grained sandstone and pebbly sandstone; no well-defined bedding, no observed fractures, very well cemented	
85						@ 84' 8-inch interbed of very pebbly sandstone; isolated cobbles @ 85' Grades to about 10-15% clasts, clasts range up to about six inches with 1 to 3 inches common	
90							
95				N82E,13SE		@ 96.5' Bedding vaguely defined by stringers of fine-grained sandstone	
100						@ 102' Moderate reddish-brown, fine- to medium-grained, silty to clayey sandstone with isolated interbeds of greater clay content; contact is channeled	
105				B:N86E,13SE		@ 106.5' 1/2-1 inch interbed of moderate reddish-brown, plastic clay; continuous around boring; surface is polished, but without striations	@106' %Fines=98
110							
115						TOTAL DEPTH 115 Feet Moderate to heavy seepage beginning at 52 feet Light caving along fractures Cannot log below 106.5 feet due to standing water	

DRILL HOLE LOG

BORING NO. BA-5

PROJECT: Panhandle
JOB NO.: 98-1571
DATE: 4/4/03
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket-Auger 24"
HAMMER TYPE: Kelly
AVERAGE DROP (in.): 18"
DRIVING WEIGHTS: 0-30-3450, 30-60-2050, 60-90-1140
ELEVATION: 1321
LOGGED BY: CJS

DEPTH (feet)	BLOWS / 6"	ATTITUDES	Remarks
5	5		@5' Dry Density = 116pcf M/C = 6.1% %Fines = 18
15	2 2		@15' Dry Density = 112pcf M/C = 18.2% %Fines = 88
20	2 8		
			Landslide Debris, Qls (23-57')
25			@25' Dry Density = 125pcf M/C = 2.6% %Fines = 2
		B?:N87E,14SE	
		B?:N65W,16SW B:N70W,12SW	
30	6 18		@30' Dry Density = 131pcf M/C = 10.4% %Fines = 25
35			
		B:N83W,14SW	
		B:N70E,9SE	

GRAPHIC LOG

USCS SYMBOL

Description

Soils: description; consistency/density; moisture; color; other

Bedrock: color, lithology; hardness; moisture; other

SOIL, s (0 - 12 inches)
Moderate brown fine- to medium-grained silty to clayey sand with pebbles, cobbles and boulders; clasts range 1/2" to 12" with 1" to 3" typical; damp; loose to moderately dense

LANDSLIDE DEBRIS, Qls (1 - 17 ft.)
Moderate yellowish-brown; fine- to medium-grained sandstone with minor coarse-grained fraction and minor clay and silt binder; interstitial carbonate common; isolated pebbles range up to about 3" maximum dimension, with 1/2" to 1" most common; no continuous bedding features; local soft zones; elongate clasts rotated to random orientations; overall moderately dense to dense and damp

@ 14' Mottled moderate reddish-brown and yellow-brown, very fine- to fine-grained; silty to clayey sandstone; overall chaotic structure; numerous randomly oriented, striated, planar surfaces with polish of clay films; no surfaces observed to be continuous for distances greater than about 12 inches; shearing grades stronger in lower 12 inches of unit with increasing clay content; culminates at lower contact in sheared mixture of reddish-brown clayey sand, sand and gravel; contact is irregular with no well-defined slip surface

QUATERNARY TERRACE; Qt (17 - 23 ft.)
Pale grey to pale yellowish-grey, fine- and medium- to coarse-grained, silty to locally clayey sandstone and siltstone; overall unit is virtually unfractured, moderately hard to hard and damp to wet with seepage below 29.5 feet

@ 23' Moderate reddish-brown, very fine- to fine-grained, silty to clayey sandstone

@ 27' Light greyish yellow pebble conglomerate; virtually no matrix and no cementation; unit is entirely clast-supported with clast sizes ranging from about 1/2 to 6"; most commonly clasts range between 1 and 2 inches; upper and lower contacts appear depositional with no shearing or clay gouge; substantial flow of water entering boring primarily from the direction S65W; section of boring supported by this unit has caved to a diameter of approximately 4.5 feet

@ 29' Pale yellowish-brown to yellowish-grey, medium- to coarse-grained pebbly sandstone; bedding in sandstone poorly defined by pebble and rare mineral lineations; upper contact marked by 6-inch bed of pale yellowish-grey

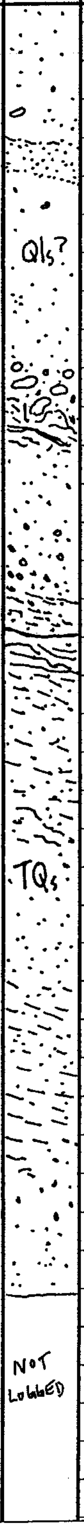
DRILL HOLE LOG

BORING NO. BA-5

PROJECT: Panhandle
JOB NO.: 98-1571
DATE: 4/4/03
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket-Auger 24"
HAMMER TYPE: Kelly
AVERAGE DROP (in.): 18"
DRIVING WEIGHTS: 0-30-3450, 30-60-2050, 60-90-1140
ELEVATION: 1321
LOGGED BY: CJS

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	ATTITUDES	USCS SYMBOL	Remarks
40	■	34 46			@40' Dry Density = 136pcf M/C = 6.8% %Fines = 28
			B:N80E,8SE		
45					
50	■	6 13	SP:N74W,18SW St:S7W		@50' Dry Density = 131pcf M/C = 10.9% %Fines = 46
55			B:N75E,9SE P:N85W,12SW		
60					
65			B:N78E,8SE		
70					
75					

GRAPHIC LOG



Description

Soils: description; consistency/density; moisture; color; other

Bedrock: color, lithology; hardness; moisture; other

sandstone overlying a 2-inch thick bed of moderate reddish-brown silty sandstone
@ 37' Pebble lineations
@ 38.5' 8-inch interbed of moderate reddish-brown silty sandstone
@ 43' 12-inch interbed of uniform, fine- to medium-grained sandstone with vague mineral laminations

@ 50' Moderate reddish-brown, very fine-grained silty sandstone; upper contact channeled by very coarse-grained and cobbly material contained in lower 12-18 inches of overlying unit
@ 50.5' Planar parting surface with very weak polish and clear striations; adjacent rock excavates easily in some locations; no significant clay gouge or polish
@ 51' Grades to yellowish-brown to yellowish-grey fine- to medium-grained sandstone
@ 53' Grades pebbly
@ 55' Moderate reddish-brown, very fine- to fine-grained silty sandstone with clay interbeds
@ 56' 12-inch section of reddish-brown, silty sandstone with series of 1/4-1/2 inch seams of moderate reddish-brown highly plastic clay; numerous undulatory and planar polished surfaces; no clear striations

<u>BEDROCK/SAUGUS FORMATION</u>, TQs (57 - 80 ft.)
Yellowish-grey, medium- to coarse-grained pebbly sandstone interbedded with moderate reddish-brown, fine-grained silty to locally clayey sandstone and siltstone; overall moderately hard to hard and moist
@ 60' Reddish-brown, silty to clayey sandstone grades to moderate yellow-brown, fine- to medium-grained silty sandstone with scattered pebbles
@ 62' Grades medium- to coarse-grained and pebbly
@ 65' Moderate reddish-brown, very fine- to fine-grained silty sandstone with minor coarse-grained fraction
@ 69' Grades downward into moderate yellowish-brown, medium- to coarse-grained pebbly sandstone
@ 73' Rising water surface

DRILL HOLE LOG

BORING NO. BA-5

PROJECT: Panhandle	**JOB NO.:** 98-1571
	DATE: 4/4/03
DRILLING COMPANY/DRILLER: Tri Valley Drilling	
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket-Auger 24"	
HAMMER TYPE: Kelly	**AVERAGE DROP (in.):** 18"
DRIVING WEIGHTS: 0-30-3450, 30-60-2050, 60-90-1140	
ELEVATION: 1321	**LOGGED BY:** CJS

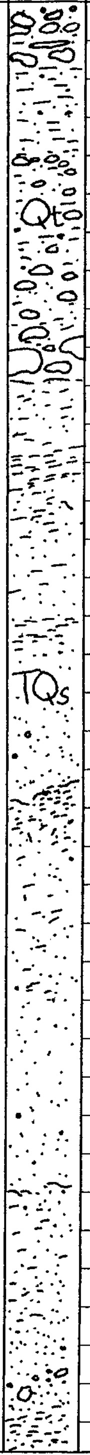
DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES	USCS SYMBOL	**Description** Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
80						TOTAL DEPTH 80 Feet Strong seepage beginning at 29.5 feet Severe caving over intervals 17-22 and 27-30 Casing required between 4 and 24 feet	
85							
90							
95							
100							
105							
110							
115							

DRILL HOLE LOG

CLIENT:	Newhall Land	JOB NO.:	03-1571-4
PROJECT:	Tentative Tract 53425, River Park City of Santa Clarita, California	DATE:	4/4/03
		LOGGED BY:	CJS
DRILLING COMPANY:	Tri-Valley Drilling	DRILLED:	3/18 & 19/02
DRILLING METHOD:	Bucket-Auger (86' Rig)	HOLE DIA:	24"
HAMMER TYPE:	Telescoping Kelly Bar	AVERAGE DROP (in.):	12
DRIVING WEIGHTS:	0-27'=3450 lbs.,27-57'=2050 lbs.,57-87'=1140 lbs.,87-115'-1740	ELEVATION:	1416±

BORING NO. BA-6

GRAPHIC LOG



DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Remarks
	■	P 1 1	117/10.1		
	■	3 3/5"	122/9.7		
5			% Fines=33 Curve D		Bulk Sample @ 5'
	■	2 4	115/8.4		Abundant gravel in sampler tip
	■	4			Clasts in sampler tip
					Changed to "rock bit" at 9:00 a.m., then to coring bucket at 9:20
10					
			B:N66W,12SW		No sample attempted
			B:N80W,13SW		
15					
20	■	6 5/3"			
			% Fines-33.6 LL=29 PI=6 Curve A		Bulk Sample @ 23'
25					
30					
	■	8 23			
35			B:N60W,5SW		
					B: N50W, 5SW

Description

Soils: description; consistency/density; moisture; color; other

Bedrock: color, lithology; hardness; moisture; other

ARTIFICIAL FILL; af, (0-1.5 ft.)

@ 0' Angular fragments of concrete in matrix of light- to medium-brown, fine- to medium-grained silty SAND; fragments range up to about 12" maximum dimension with 1/2" to 4" most common; loose; dry to damp

TERRACE DEPOSITS; Qt, (1.5-10 ft.)

@ 1.5' Moderate to dark reddish-brown sandy clay with gravel; stiff; moist; granitic clasts range up to about 1-inch

@ 4' Matrix of very stiff to hard sandy clay and dense sand

@ 7' Average clast size increases

@ 9' Moderate yellow-brown, medium- to coarse grained gravelly sand; maximum observed clast size 24" with 2-6" most common

BEDROCK/SAUGUS FORMATION; TQs, (10-100 ft.)

@ 10' Moderate reddish-brown to moderate yellowish-brown sandy siltstone to silty sandstone; moderately hard; damp; no fractures; upper contact essentially horizontal

@ 12' Several 1/4" seams of pale brown to pale reddish-brown silty clay to clayey silt; all contacts appear gradational; retrieved small bag sample

@ 13' - grades more sand

@ 17' Pale yellow-gray, fine- to coarse-grained sandstone; locally very well cemented (limey?); locally pebbly; upper contact slightly undulatory

@ 19.5' Grades coarse- to very coarse-grained

@ 21' Moderate reddish-brown siltstone; upper 8" clayey, but without distinct clay seams; contact strongly channeled; minor seepage from the east side of the hole at upper contact

@ 26' Pale yellowish-gray, sandstone and pebbly sandstone; contact undulatory and gradational; near upper contact, water "sweats" from all sides of the hole with strongest accumulation on the east side; seepage increases with depth with strong flow in the lowest one to two feet

@ 31' Reddish-brown siltstone; upper contact very low dip and undulatory; no reliable attitude

@ 32' - grades more sand

@ 34' Grades to pale yellow-gray, medium- to coarse-grained sandstone

@ 36' Lens of coarse gravel

@ 37' Moderate reddish-brown siltstone; clayey in upper few inches

DRILL HOLE LOG

CLIENT:	Newhall Land	JOB NO.:	03-1571-4
PROJECT:	Tentative Tract 53425, River Park City of Santa Clarita, California	DATE:	4/4/03
		LOGGED BY:	CJS
DRILLING COMPANY:	Tri-Valley Drilling	DRILLED:	3/18 & 19/02
DRILLING METHOD:	Bucket-Auger (86' Rig)	HOLE DIA:	24"
HAMMER TYPE:	Telescoping Kelly Bar	AVERAGE DROP (in.):	12
DRIVING WEIGHTS:	0-27'=3450 lbs.,27-57'=2050 lbs.,57-87'=1140 lbs.,87-115'-1740	ELEVATION:	1416±

BORING NO. BA-6

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						@ 39' - grades more sand	
40	■	8 22		% Fines = 69.6 Curve B			Bulk Sample @ 40'
						@ 41' Grades to pale yellow-gray, medium- to coarse-grained sandstone and pebbly sandstone	
			TQs				
45							
				B:N75W,10SW		@ 47' 4" interbed of medium-grained sandstone	
50	■	13 37/1"					
55							
60	■	34 37/1					
				B:N85W,14SW		@ 63' 12" interbed of fine- to medium-grained sandstone	
65			TQs				
70	■	28/3"		B:N55W, 14SW		@ 70' 2" interbed of reddish-brown silty sandstone; top contact channeled; lower contact gradational; attitude on lower contact	
75							

CLIENT: Newhall Land	JOB NO.: 03-1571-4	**DRILL HOLE LOG**
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California	DATE: 4/4/03	
	LOGGED BY: CJS	
DRILLING COMPANY: Tri-Valley Drilling	DRILLED: 3/18 & 19/02	
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"	
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** BA-6
DRIVING WEIGHTS: 0-27'=3450 lbs.,27-57'=2050 lbs.,57-87'=1140 lbs.,87-115'-1740	ELEVATION: 1416±	

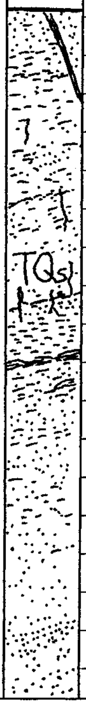
DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
	■	65		125/14.2 B:N65W,10SW % Fines=36.4		@ 77.5' 6" of reddish-brown, clayey, sandy mudstone; non-plastic; grades very sandy downward into pebbly sandstone	
80							
						@ 83' 6" interbed of reddish-brown, clayey siltstone; removed by channel on south side of hole @ 84' 12" rip-up clast of red mudstone	
85						@ 86' 12" interval of very well cemented sandstone	
90	■	21 50/3"		118/6.2 % Fines = 17.2			
						@ 92' Grades very gravelly with cobble-size clasts;	Changed to "rock bit"
95							
100	■	9 50				Total Depth 100 ft. Minor caving in upper 10 ft. Seepage below 21 ft.	
105							
110							

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Land	JOB NO.:	03-1571-4
PROJECT:	Tentative Tract 53425, River Park City of Santa Clarita, California	DATE:	4/4/03
		LOGGED BY:	CJS
DRILLING COMPANY:	Tri-Valley Drilling (Dave)	DRILLED:	3/20/02
DRILLING METHOD:	Bucket-Auger (86' Rig)	HOLE DIA:	24"
HAMMER TYPE:	Telescoping Kelly Bar	AVERAGE DROP (in.):	12
DRIVING WEIGHTS:	0-27'=3450 lbs., 27-57'=2050 lbs., 57-87'=1140 lbs., 87-115=1740	ELEVATION:	1354±

BORING NO. BA-7

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Remarks
	■	2 5				
	■	3 4		122/7.2		
5						
	■	2 2	C	114/9.4 % Fines=65		Difficult drilling; changed to "rock bit" (TQs?)
	■	1 1	A S	103/3.9 % Fines=11		
10	■	2 4	I N G			
15						
				f:Due N,58W		
				% Fines = 14.0		
20	■	2 3		116/8.8		
				B:N40W,7SW		
				B:N70W,5SW		
				B:N40W,6SW		
25						
				(SP?):N65W,10SW		
	■	2 3		B:N60W,10SW % Fines = 74.2 LL=35, PI=13 104/23.5		
30						
				% Fines = 97.5 LL=59, PI=36		
35						
				B:N70W,7SW		

Description

Soils: description; consistency/density; moisture; color; other

Bedrock: color, lithology; hardness; moisture; other

SOIL; s, (0-2.5 ft.)

@ 0' Moderate yellow-brown, fine-grained, silty sand with isolated cobbles; loose; dry to damp; very porous; isolated roots

TERRACE DEPOSITS; Qt, (2.5-17 ft.)

@ 2.5' Moderate reddish-brown to dark brown, sandy clay with gravel; stiff to very stiff; dry to damp

@ 6' Pale yellow-brown, very fine-grained sand

@ 8' Poorly cemented, medium-grained sand

@ 10' Coarse-grained, gravelly sand

@ 12' Cobbles up to 8" maximum dimension

@ 15' Boulders up to 24"

@ 17' Interval from 17 to 19' obscured by casing below casing steep west dipping fracture juxtaposes reddish-brown silty sandstone on east side of hole against light brown to light grayish-brown fine- to medium-grained sandstone on the west; fracture locally tight and lined with pale brown clay; wider section backfilled with coarse rock debris

BEDROCK/SAUGUS FORMATION; TQs, (17-65 ft.)

@ 17' Pale brown, fine- to medium-grained sandstone; vertical features about 1/8" wide and up to about 12" long, defined by subtle consistency and color differences suggest weathered vertical fractures between 22 and 29'

@ 21' Reddish-brown, silty sandstone; contact truncated by fracture that extends to 22'

@ 21.5' Moderate reddish-brown, fine- to medium-grained, clayey sandstone with trace coarse-grained fraction; contact truncated

@ 23.5' Grades downward to pale reddish-brown to pale brown, fine- to medium-grained sandstone and silty sandstone

@ 25' 2" interbed of clayey sandstone

@ 26' Pale brown, very fine-grained sandstone

@ 27.5' 2" interbed of brown, clayey siltstone overlies 6" interbed of well-cemented sandstone

@ 28' Reddish-brown, clayey siltstone to clayey sandstone

@ 29' 1/4- to 1/2" seam of moderate yellow-brown, plastic clay; continuous around hole; excavates easily along polished planar surface; no well-defined striations; underlain by clayey siltstone

@ 31.5' Reddish-brown, fine- to medium-grained, silty sandstone

@ 33' Grades downward into pale yellow-gray, medium-grained, slightly pebbly sandstone; no fractures; moderately hard to hard

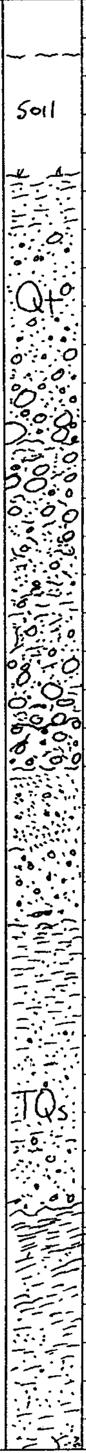
DRILL HOLE LOG

BORING NO. BA-7

CLIENT:	Newhall Land	JOB NO.:	03-1571-4
PROJECT:	Tentative Tract 53425, River Park City of Santa Clarita, California	DATE:	4/4/03
		LOGGED BY:	CJS
DRILLING COMPANY:	Tri-Valley Drilling (Dave)	DRILLED:	3/20/02
DRILLING METHOD:	Bucket-Auger (86' Rig)	HOLE DIA:	24"
HAMMER TYPE:	Telescoping Kelly Bar	AVERAGE DROP (in.):	12
DRIVING WEIGHTS:	0-27'=3450 lbs., 27-57'=2050 lbs., 57-87'=1140 lbs., 87-115=1740	ELEVATION:	1354±

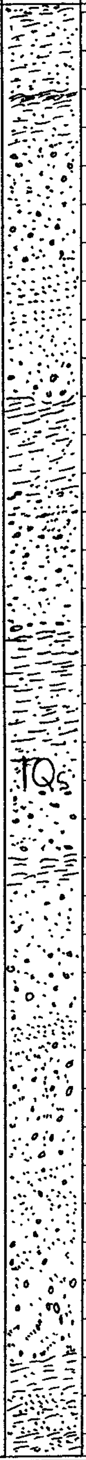
DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						@ 36' 8" interbed of fine- to medium-grained sandstone	
						@ 37' Grades coarser-grained with greater percentage of larger pebbles	
40	■	11 32		118/8.9		@ 40.5' Moderate reddish-brown silty sandstone	
						@ 43' Grades yellowish-gray; no silt	
45			TQs			@ 45' - grades pebbly	
				B:N55W,10SW		@ 48' Moderate brown to moderate yellow-brown, very fine-grained, clayey sandstone to sandy claystone; hard; no fractures	
50	■	24 48/4"		129/10.7 B:N70W,8SW		@ 51' Grades to 12" interbed of yellowish-gray, pebbly sandstone	
55						@ 55' Grades medium-grained	
						@ 59' Grades reddish-brown, silty	
60	■	34 37/1"		113/7.5			
65						Total Depth 65 ft. Severe caving between 10 and 17 feet No Groundwater Logged downhole to 58 ft.	
70							
75							

CLIENT: Newhall Land	JOB NO.: 03-1571-4	**DRILL HOLE LOG**
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California	DATE: 4/4/03	
	LOGGED BY: BJS	
DRILLING COMPANY: Tri-Valley Drilling (Dave)	DRILLED: 3/20/02	
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"	
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** BA-8
DRIVING WEIGHTS: 0-27'=3450 lbs., 27-57'=2050 lbs., 57-87'=1140 lbs., 87-115=1740	ELEVATION: 1320±	



DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				113/6.0 % Fines=38		**SOIL; s, (0-4.0 ft.)** @ 0' Yellowish-brown sandy silt with local pebbles; firm; slightly damp; approximately 2% voids @ 1.5' More clayey; very tight	Drilled on Qt3 surface
5		4 3 4				**TERRACE DEPOSITS; Qt, (4.0-20 ft.)** @ 4.5' Gradational contact with yellowish-gray fine silty sand; dense; slightly damp	
		3 3 2		130/2.2 B: Horizontal % Fines=10		@ 6' Medium- to coarse-grained sand and pebbly sand with local cobbles; dense but moderately friable; moderate bedding with local laminations @ 7' Moderate caving due to friable conditions @ 9' Coarse-grained pebbly sand and gravel beds with cobbles and small boulders (matrix locally light yellowish brown silty clayey sand; no caving; lithologically distinct from he upper Qt.)	@ 7' Pebbles in sample tip @ 10' Bucket & crowd @ 10-11.5' Apx. 25% cobbles and boulders @ 13' cobbles and boulders removed by hand
10							
15				Apx.B: Horizontal		@ 15' Matrix slightly orangish-to reddish-brown; palesol?	
						@ 17' More cobbles; matrix siltier; locally clast supported around cobbles @ 18' - more clay in matrix @ 18.8' 1/32 to 1/2"-thick reddish-brown clay seam; very plastic and moist; clay is irregular around clasts but roughly horizontal overall	
20						**BEDROCK; TQs, (20-100 ft.)** @ 20' Erosional contact with light yellowish-gray sandstone and pebbly sandstone; moderately hard; damp to moist;	
		6 17		131/8.8		@ 22' Start of very slow seepage from coarse units @ 24' Erosional contact with yellowish-brown, slightly clayey, fine-grained sandy siltstone; rip-up clasts above contact	
25						@ 26.5' - grades sandier with pebbles @ 28.5' Yellowish-gray slightly silty sandstone @ 29.5' - grades to pebbly sandstone; minor seepage	
30		15 36		126/8.0 % Fines=28.2		@ 31.5' Erosional contact with pale reddish-brown slightly sandy mudstone; damp	
35						@ 36' Grades into yellowish-gray slightly silty sandstone	

CLIENT: Newhall Land	JOB NO.: 03-1571-4	**DRILL HOLE LOG**
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California	DATE: 4/4/03	
	LOGGED BY: BJS	
DRILLING COMPANY: Tri-Valley Drilling (Dave)	DRILLED: 3/20/02	
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"	
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** BA-8
DRIVING WEIGHTS: 0-27'=3450 lbs., 27-57'=2050 lbs., 57-87'=1140 lbs., 87-115=1740	ELEVATION: 1320±	



DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
					@ 37.5' Yellowish-brown siltstone interbed with small concretions	
40	■	31			@ 40' Yellowish-brown siltstone interbed with small concretions	Drilled to 40' on 4/ 15/02
					@ 41.5' Light yellowish-gray pebbly sandstone; seepage	
			% Fines=25.8 Curve C			@ 43' Bulk sample
45					@ 44.5' Discontinuous laminations	
					@ 46' Laminations; some low angle cross bedding	
					@ 47' Pebbly sandstone	@ 47'-60' Cobbles & boulders periodically fell int hole from Qt and removed
					@ 48' Erosional contact with pale reddish-brown sandy siltstone with pebbles	
50	■	5 20			@ 50.5' Grades into pebbly sandstone; seepage	
					@ 54' Erosional contact with yellowish-brown siltstone	
55						
					@ 57' Grades to sandstone/pebbly sandstone; moderately hard to hard; seepage; bedding is typically vague	
60	■	12 40/4"			@ 60' Thin siltstone interbed	
65			B:N80W,12SW			
70	■	21 46/5"				
					@ 73' Erosional contact with pale reddish-brown siltstone interbedded with fine-grained sandstone and siltstone and local moderate reddish-brown mudstone	
75						

CLIENT: Newhall Land	JOB NO.: 03-1571-4	**DRILL HOLE LOG**
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California	DATE: 4/4/03	
	LOGGED BY: BJS	
DRILLING COMPANY: Tri-Valley Drilling (Dave)	DRILLED: 3/20/02	
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"	
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** BA-8
DRIVING WEIGHTS: 0-27'=3450 lbs., 27-57'=2050 lbs., 57-87'=1140 lbs., 87-115=1740	ELEVATION: 1320±	

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
80	■	17 55/5"				@ 80' Minor clay	
				B:N75W,9SW			
				Sh:N83W,9SW		@ 82.3' 1/4- to 3/4"-thick moderate reddish-brown plastic clay; rock above and below looks undisturbed; polished surface but no distinct striations	
						@ 84' Light-gray sandstone	
85							
						@ 86' Light reddish-brown siltstone	
							@ 87' Stemming (600 lb. stem)
						@ 89' Light-gray, fine-grained sandstone and silty sandstone	
90	■	17 55/5"					
						@ 91.3' Standing water; fine-grained sandstone to bottom per surface log of cuttings	
							@ 94' Crowding, very dense
95							
100	■	40					Backfill Tamped
						Total Depth 100 ft. (Elev. 1220 ft.) Minor Seepage starting at 22 ft. and progressively increases with depth in coarse units; standing water rose from 94.5 ft. at the completion of drilling to 91.3 ft. at the completion of downhole logging -Moderate Caving from 7 to 11.5 ft.	
105							
110							

CLIENT: Newhall Land	JOB NO.: 03-1571-4	**DRILL HOLE LOG**
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California	DATE: 4/4/03	
	LOGGED BY: VCG/DGG	
DRILLING COMPANY: Tri-Valley Drilling (Tony/Mario)	DRILLED: 8/5/02	
DRILLING METHOD: Bucket-Auger (4WD Rig)	HOLE DIA: 24"	
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** BA-9
DRIVING WEIGHTS: 0-24'=3160 lbs., 24-46'=2040 lbs., 46-72'=1120 lbs.	ELEVATION: 1405±	

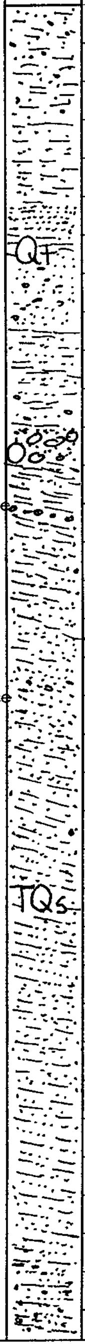
DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
					LANDSLIDE DEBRIS; Qls, (0-33 ft.) @ 0' Casing	Bulk Sample 0-25'
					@ 3' Orangish-brown silt to sandy silt/silty sand with scattered pebbles; firm to medium-dense; damp; locally clayey; derived from Quaternary Terrace deposits	@ 3-26' Landslide affected Qt deposits @ 26-33' landslide affected TQs bedrock bedding generally present within upper 26'
5	■	1 1			@ 5' - soft to firm	
10	■	1 1 2			@ 10' - Small cobbles	
					@ 13' Sandy interbeds; friable; discontinuous; vague; irregular	
15	■	1 2 2				
20	■	1 1 1				@ 22' 24" bucket damaged-change to 18" bucket to continue
					@ 23' Large cobbles and 1 to 2 small boulders	
25						
					@ 26' Mottled orangish- and grayish-brown pebbly sandy siltstone/ silty sandstone; moderately hard; damp; Saugus Formation derived	
30	■	8 10 13				
					@ 31' Patches of reddish-brown siltstone	
			MF:N49W,23SW SS:N18W,30SW		@ 31.5' Minor fractures/faults lined with CaC03; no gouge	@ 31.5' fractures difficult to trace due to coarse-grained bedrock
					@ 33' SLIPSURFACE; Grayish-brown silty sand/sandy silt with minor clay; soft to firm; planar 1/2" thick; unable to get parting; distinct cuts across north dipping "in place" bedrock	
35			B:N62W,52NE		**BEDROCK; TQs, (33.1-50 ft.)** @ 33' Mottled orangish-brown pebbly sandy siltstone/silty sandstone; moderately hard; damp	

CLIENT: Newhall Land	JOB NO.: 03-1571-4	**DRILL HOLE LOG**
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California	DATE: 4/4/03	
	LOGGED BY: VCG/DGG	
DRILLING COMPANY: Tri-Valley Drilling (Tony/Mario)	DRILLED: 8/5/02	
DRILLING METHOD: Bucket-Auger (4WD Rig)	HOLE DIA: 24"	
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** BA-9
DRIVING WEIGHTS: 0-24'=3160 lbs., 24-46'=2040 lbs., 46-72'=1120 lbs.	ELEVATION: 1405±	

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40	■	9 22 bounce					
				B:N77W,55NE B:N50W,54NE		@ 41.5' Mottled orangish- and grayish-brown siltstone, sandy siltstone and pebbly sandy siltstone; moderately hard to hard; damp	@ 42' New 24" bucket- ream to drilled depth
45				B:N73W,52NE			
						@ 47' Minor fault	
50	■	14 29 10/1"					
						Total Depth 50 ft. (Elev. 1355±) No Groundwater No Caving	
55							
60							
65							
70							
75							

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Land	JOB NO.: 03-1571-4	**DRILL HOLE LOG**	
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California	DATE: 4/4/03		
	LOGGED BY: VCG/DGG		
DRILLING COMPANY: Tri-Valley Drilling (Tony/Mario)	DRILLED: 8/6/02		
DRILLING METHOD: Bucket-Auger (4WD Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** BA-10	
DRIVING WEIGHTS: 0-24'=3160 lbs., 24-46'=2040 lbs., 46-72'=1120 lbs.	ELEVATION: 1371±		



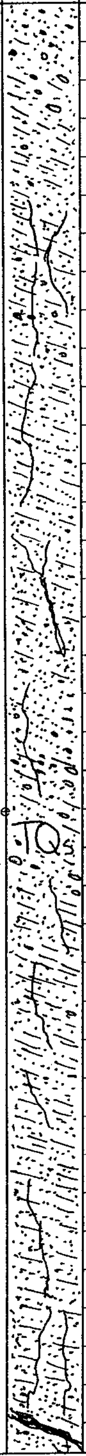
DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
0					**QUATERNARY TERRACE DEPOSITS; Qt, (0-15 ft.)** @ 0' - Casing	@ 0-15' Bulk Sample
3			B:Horizontal		@ 3' Orangish-brown silt; stiff to very stiff; damp; grades to grayish-brown silt; stiff but locally firm; some scattered pebbles	
5	■	1 2 4				
8.5			B:Horizontal		@ 8.5' Pebbly sandy interbed; loose/friable; damp; 3-6" thick @ 9' Olive- to grayish-brown silt to slightly clayey silt; stiff; damp @ 9.5' Orangish-to grayish-brown pebbly sand; loose/friable; damp; cross-bedded	
10	■	2 3 3				
11.5			B:Horizontal		@ 11.5' Olive-gray silt; firm; damp; local Fe02 staining; upper contact erosional @ 12.5' Mottled deep orangish-brown, olive and grayish-brown pebbly/cobbly silty sand/sandy silt; friable; damp @ 13' - Boulders	@ 13' Core bucket and crowding
15	■	4 8 bounce	B:Horizontal B:N84E,13SE		**BEDROCK; TQs, (15-50 ft.)** @ 15' Deep orange siltstone; moderately hard to hard; damp; few scattered pebbles @ 16' Pebbly cobbly interbed @ 16.5' Grades to medium-gray to Fe02 stained pebbly sandy siltstone/silty sandstone; moderately hard; damp @ 19' Grades to fine-grained sandstone	
20	■	5 13 bounce	XB:N85W,25SW B:N84E,12SE		@ 20.5' Pebble conglomerate with silty sand matrix; some cobbles	
25					@ 24.5' Grayish-brown siltstone; moderately hard; damp @ 26' Grades to orangish-brown with scattered pebbles	
27			B:N76W,7SW		@ 28' Grades to grayish-brown with clayey siltstone/silty claystone interbeds; clay is moderately sticky	
30	■	5 8 8				@ 30' Bulk sample
35					@ 36' Orangish- to grayish-brown pebbly silty sandstone/sandy siltstone; moderately hard; damp; locally cobbly	

CLIENT: Newhall Land	JOB NO.: 03-1571-4	**DRILL HOLE LOG**
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California	DATE: 4/4/03	
	LOGGED BY: VCG/DGG	
DRILLING COMPANY: Tri-Valley Drilling (Tony/Mario)	DRILLED: 8/6/02	
DRILLING METHOD: Bucket-Auger (4WD Rig)	HOLE DIA: 24"	
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** BA-10
DRIVING WEIGHTS: 0-24'=3160 lbs., 24-46'=2040 lbs., 46-72'=1120 lbs.	ELEVATION: 1371±	

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40	■	9 20 13/2"					Bulk Sample @ 40
				B:N89E,6SE B:N77W,5SW B:N80E,6SE			
45				B:N65E,6SE B:N82W,6SW B:N64E,8SE			
						@ 46' Large cobbles to small boulders	
50	◸	40/5"					
						Total Depth 50 ft. (Elev. 1321±) No Groundwater No Caving	
55							
60							
65							
70							
75							

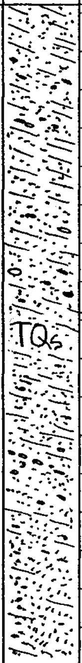
DRILL HOLE LOG

CLIENT: Newhall Land	JOB NO.: 03-1571-4	
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California	DATE: 4/4/03	
	LOGGED BY: DGG	
DRILLING COMPANY: Tri-Valley Drilling (Dave/Abel)	DRILLED: 8/16/02	
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"	
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	BORING NO. BA-11
DRIVING WEIGHTS: 0-27'=3450 lbs., 27-57'=2050 lbs., 57-87'=1140 lbs.	ELEVATION: 1245±	



DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
0						**BEDROCK; TQs, (0-55 ft.)** @ 0' Orangish- to grayish-brown pebbly silty sandstone; moderately hard to hard; damp; moderately friable; very vague bedding	Bulk Sample @ 0-20'
				B/ctc:N62E,33SE		@ 2' Grades to less pebbly @ 2.5' Orangish-brown siltstone; moderately hard to hard; damp; locally sandy; contact is erosional	
5	■	3 5 7				@ 5' Grades to yellowish-gray siltstone to sandy siltstone; moderately hard to hard; damp; vertical caliche-filled fractures; vague bedding	
						@ 8' Discontinuous sandy lenses grading in and out	
10	■	2 4 5		Apx.B: N72E,17SE		@ 11.5' Scattered pebbles	
						@ 13.5' Discontinuous pebbly sandstone lens/interbed @ 14' Orangish-brown siltstone @ 14.5' Medium-gray pebbly silty sandstone; moderately hard; damp; moderately friable; vague bedding	
15				Apx.B:N88E,22SE		@ 18' Grades coarser; erosional @ 19.5'-20.5 - Cobbly	
20	■	7 9/3" Bounce				@ 21' Silty sandstone @ 22' Grades coarser	@ 20' Sampler Tip Blocked @ 21' Core bucket
				Apx.B:N77E,17SE Avg.B:N85E,15SE		@ 23' Orangish- to grayish-brown interbedded siltstone, sandy siltstone, and pebbly silty sandstone; moderately hard; damp; bedding is well defined	
25						@ 26' Mostly coarse-grained	
30	■	10 23 31		Apx.f:N20E,80SE		@ 30' Erosional contact @ 31.5' Erosional contact with grayish-brown siltstone; moderately hard to hard; damp @ 32' - Locally sandy @ 33' - Orangish-brown	
35				B:N70E,17SE		@ 37' Reddish-brown clay to silty clay interbed; moderately sticky/	

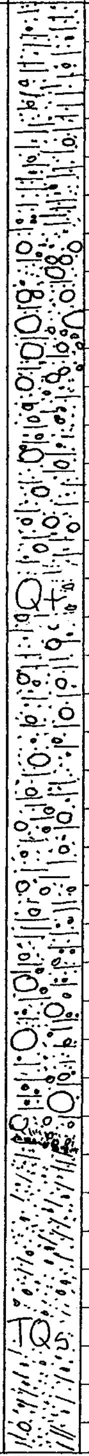
CLIENT: Newhall Land	JOB NO.: 03-1571-4	**DRILL HOLE LOG**	
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California	DATE: 4/4/03		
	LOGGED BY: DGG		
DRILLING COMPANY: Tri-Valley Drilling (Dave/Abel)	DRILLED: 8/16/02		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** BA-11	
DRIVING WEIGHTS: 0-27'=3450 lbs., 27-57'=2050 lbs., 57-87'=1140 lbs.	ELEVATION: 1245±		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			 	Avg.B:N85E,15SE		plastic; 1-1.5"-thick; no parting/striations @ 39' Locally sandy with scattered pebbles	
40	■	9 20 26					
45				Avg.B:E-W,20S		@ 44.5' Large pebble to cobble interbed; erosional	
50	■	10 21 23/2"		Avg.B:N70W,15SW		@ 49.5' Grades to grayish-brown pebbly silty sandstone	@ 50' Crowding
						@ 52' - less pebbly and sandy	
55						Total Depth 55 ft. No Caving No Groundwater	
60							
65							
70							
75							

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT: Newhall Land	JOB NO.: 03-1571-4		
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California	DATE: 4/4/03		
	LOGGED BY: DGG		
DRILLING COMPANY: Tri-Valley Drilling (Dave/Abel)	DRILLED: 8/19-22/02		
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"		
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** BA-12	
DRIVING WEIGHTS: 0-27'=3450 lbs., 27-57'=2050 lbs., 57-87'=1140 lbs.	ELEVATION: 1284		

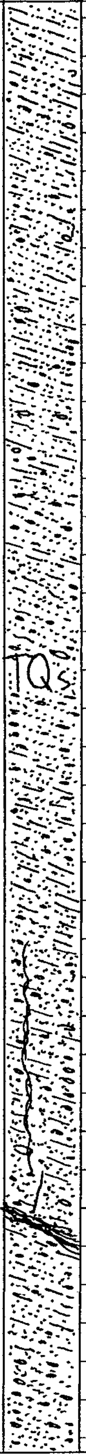


DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
					QUATERNARY TERRACE DEPOSITS; Qt, (0-29 ft.) @ 0' Orangish- to grayish-brown silt with scattered pebbles; moderatly hard; damp; open burrows	Bulk Sample @ 0-20'
5	■	3 4 8				@ 5' Sampler Tip Blocked
					@ 6' Silty sand to sand with pebbles, cobbles and boulders; very friable/loose	@ 7' Core bucket and crowding
10						@ 10' No sample, too cobbly
						@ 12' Core bucket and crowding
15					@ 15'-29' - logged from 15 ft.	@ 16' Core bucket and crowding
20						@ 20' No sample, too cobbly
25						@ 26' Grab bucket alternates with core buckets
					BEDROCK; TQs, (29-115 ft.) @ 29' Grayish-brown siltstone, silty sandstone and pebbly silty sandstone; moderately hard to hard; damp; local concretions; scattered cobbles	
30	■	7 17 23/4"	B:N70W,11SW B:N68W,12SW			
			B:N82W,13SW		@ 33.5' Orangish-brown siltstone to sandy siltstone with scattered pebbles; moderately hard to hard; damp	
35			B:E-W,13S		@ 33.5' Grades to grayish-brown silty sandstone and coarsens to pebbly silty sandstone and pebbly sandstone with cobbles; moderately hard but friable; damp	

CLIENT: Newhall Land	JOB NO.: 03-1571-4	**DRILL HOLE LOG**
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California	DATE: 4/4/03	
	LOGGED BY: DGG	
DRILLING COMPANY: Tri-Valley Drilling (Dave/Abel)	DRILLED: 8/19-22/02	
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"	
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** BA-12
DRIVING WEIGHTS: 0-27'=3450 lbs., 27-57'=2050 lbs., 57-87'=1140 lbs.	ELEVATION: 1284	

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40	■	7 23 37	B/ctc:N85E,15SE		@ 39.5' Orangish- to reddish-brown siltstone to sandy siltstone with scattered pebbles; moderately hard to hard; damp	
					@ 43' Grades to grayish-brown silty sandstone to pebbly silty sandstone with orangish-brown siltstone interbeds	
45						
			B:N80E,14SE			
50						
			B:N70E,12SE			
	■	15 38/4"				
55						
			B:N77E,13SE			
			B:N85W,13SW			
60	■	50/6"				
					@ 63' Orangish- to reddish-brown siltstone rip-ups	
			ctc:N80E,24SE		@ 64' Orangish- to reddish-brown siltstone; erosional upper contact	
65						
					@ 68' Grades to grayish-brown siltstone, silty sandstone and pebbly silty sandstone; locally concretionary	
70	■	40 40/2"	B:N85W,15SW			
			B:N75E,18SE			
75			Avg.B:N75E,17SE		@ 75' Orangish-brown siltstone; moderately hard to hard; damp	

CLIENT: Newhall Land		JOB NO.: 03-1571-4	**DRILL HOLE LOG**
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California		DATE: 4/4/03 LOGGED BY: DGG	
DRILLING COMPANY: Tri-Valley Drilling (Dave/Abel)		DRILLED: 8/19-22/02	
DRILLING METHOD: Bucket-Auger (86' Rig)		HOLE DIA: 24"	
HAMMER TYPE: Telescoping Kelly Bar		AVERAGE DROP (in.): 12	**BORING NO.** BA-12
DRIVING WEIGHTS: 0-27'=3450 lbs., 27-57'=2050 lbs., 57-87'=1140 lbs.		ELEVATION: 1284	



DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			B:N85W,12SW f:N85W,90°		@ 77.5' Grayish sandy interbed	
80	■	31 40/1"	B:N77E,14SE		@ 80' Grades to grayish-brown siltstone, silty sandstone and pebbly silty sandstone	
					@ 83' - moist	
85						
			B:N83W,15SW			
90	■	23 40/3"	B:E-W,12S		@ 90' - wet	@ 90' Seeps
95						
			B:N72E,13SE		@ 98' Orangish-brown siltstone	
100			B:N70E,24SE f:N68W,90		@ 100' Orangish- to grayish-brown siltstone to silty sandstone	
			B:N80W,14SW f:N72W,90		@ 103' Grayish-brown silty sandstone interbed	
105	■	13 50	B:N86W,16SW		@ 104.5' Orangish- to reddish-brown siltstone; damp	
			B:N72W,17SW B:N70W,15SW		@ 107' Reddish-brown clay to silty clay interbed, sticky/plastic; 1/2-1"-thick; parting on bottom surface, no striations @ 108' Grades to grayish-brown silty sandstone; moderately hard; moist; grades coarser to bottom	
110						
					Total Depth 115 ft.	

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

CLIENT: Newhall Land	JOB NO.: 03-1571-4	**DRILL HOLE LOG**
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California	DATE: 4/4/03	
	LOGGED BY: DGG	
DRILLING COMPANY: Tri-Valley Drilling (Dave/Abel)	DRILLED: 8/19-22/02	
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"	
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** BA-12
DRIVING WEIGHTS: 0-27'=3450 lbs., 27-57'=2050 lbs., 57-87'=1140 lbs.	ELEVATION: 1284	

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			▨			Seep: @ 90 ft. Caving 6-10 ft./12-29 ft. Groundwater @ 113 ft.	
115	■	13 55					
120							
125							
130							
135							
140							
145							
150							

CLIENT: Newhall Land	JOB NO.: 03-1571-4	**DRILL HOLE LOG**
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California	DATE: 4/4/03	
	LOGGED BY: DGG	
DRILLING COMPANY: Tri-Valley Drilling (Dave/Abel)	DRILLED: 8/23/02	
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"	
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** BA-13
DRIVING WEIGHTS: 0-27'=3450 lbs., 27-57'=2050 lbs., 57-87'=1140 lbs.	ELEVATION: 1278	

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
0						**BEDROCK; TQs, (0-50 ft.)** @ 0' Orangish-brown siltstone with scattered pebbles; hard; damp	Bulk Sample @ 0-20'
						@ 4' Grades to grayish-brown siltstone to sandy siltstone; hard; damp	
5	■	4 8 14					
						@ 6.5' - concretionary	
10	■	4 5 10				@ 10' Orangish- to grayish-brown	
15							
						@ 18.5-20.5' - concretionary	
20	■	8/4" Bounce				@ 20' Gray silty sandstone to pebbly silty sandstone; moderately hard to hard; moderately friable; damp to moist	
							@ 23' Seeps
25				B/ctc:N60W,7SW		@ 25.5' Concretionary; contact with orangish-brown siltstone	
				B:N70W,7SW		@ 27.5' Grayish-brown pebbly cobbly interbed	
30	■	10 36 Bounce				@ 30' Grades to silty sandstone to pebbly silty sandstone	
						@ 32-35.5' - concretionary	
35				B:N80E,8SE			@ 36' Seeps

CLIENT: Newhall Land	JOB NO.: 03-1571-4	**DRILL HOLE LOG**
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California	DATE: 4/4/03 LOGGED BY: DGG	
DRILLING COMPANY: Tri-Valley Drilling (Dave/Abel)	DRILLED: 8/23/02	
DRILLING METHOD: Bucket-Auger (86' Rig)	HOLE DIA: 24"	
HAMMER TYPE: Telescoping Kelly Bar	AVERAGE DROP (in.): 12	**BORING NO.** BA-13
DRIVING WEIGHTS: 0-27'=3450 lbs., 27-57'=2050 lbs., 57-87'=1140 lbs.	ELEVATION: 1278	

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
				B/ctc: Horizontal		@ 37.5' Reddish- to orangish-brown siltstone	
40	■	6 12 19					
			TQs			@ 43' Grades to grayish- to orangish-brown	
45						@ 46' Gray silty sandstone to pebbly silty sandstone	
50	■	13 50					
						Total Depth 50 ft. Seeps @ 23', 36' Groundwater @ 47' No Caving	
55							
60							
65							
70							
75							

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

BORING NO. BA-3

PROJECT: Castaic Lake Water Agency Road Alignment and Development
JOB NO.: 00-1571C-1
DATE: 3/3/00
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket Auger/24"
HAMMER TYPE: Stem
AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-28'=3450#, 28-57'=2050#, 57-87'=1140#, Stems (30'=600#)
ELEVATION: 1390
LOGGED BY: VCG

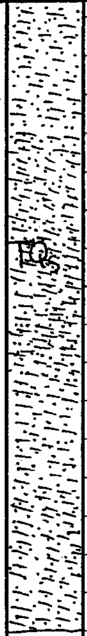
DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
0					LANDSLIDE DEBRIS; Qls (0 - 30 Ft.) @ 0' Jumbled chaotic assemblage of Saugus Formation, Quaternary Terrace material and slopewash lithologies typically composed of fine- to coarse-grained silty pebbly sandstone with isolated cobbles; and medium reddish-brown to light-brown fine- to coarse-grained silty sandstone and sandy siltstone; fractured with downdropped slopewash material; loose to medium dense; damp	
5						@ 4' Bulk Sample
10	■	1 2 3	118/12.7		@ 10' - with some clay	@ 10' % fines=36.3
					@ 13' - with some clay	@ 13' Bulk Sample % fines=37.5
15						
20	■	2 2 3	121/9.0			@ 20' % fines=16.4
						@ 23' Kept 11 rings (Can "A" and Can "B")
25						
					@ 27.8' Seep around entire boring at the base of a pebbly sandstone unit resting upon a silty sandstone unit, very irregular contact	
	■	2 2 3	119/14.7			
					@ 29.5' Seep within fracture	
30			SP:N84E,17SE 110/18.9 SP:N74W,9SW		@ 30' SLIDE PLANE; Reddish-brown sheared zone approximately 1 foot thick composed of clayey siltstone and silty clay and plastic clay; water seeping from fractured and parting surfaces	@ 30' 4 hand driven rings of the slide plane
					BEDROCK; TQs (31 - 55 Ft.) @ 31' Reddish-brown silty sandstone/sandy siltstone; medium dense to dense; damp to moist	@ 34' Bulk Sample (Small Bag)
35					@ 35' Medium- to reddish-brown to gray fine- to coarse-grained silty sandstone and fine- to coarse-grained sandstone	
			B:N77W,9SW			

Allan E. Seward Engineering Geology, Inc.

DRILL HOLE LOG

BORING NO. BA-3

PROJECT: Castaic Lake Water Agency Road Alignment and Development
JOB NO.: 00-1571C-1
DATE: 3/3/00
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket Auger/24"
HAMMER TYPE: Stem
AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-28'=3450#, 28-57'=2050#, 57-87'=1140#, Stems (30'=600#)
ELEVATION: 1390
LOGGED BY: VCG

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
			 			@ 37' Reddish-brown silty sandstone/sandy siltstone; structureless; very dense	
40	■	7 20 37					
45							
				B:N86E,9SE			@ 49' Bulk Sample
50							
55						TOTAL DEPTH 55 Ft. (Elev. 1335) No Caving Seep at 27.8 to 30 Ft. (Elev. 1362.2 - 1360) Slide Plane at 30 Ft. (Elev. 1360)	
60							
65							
70							
75							

DRILL HOLE LOG

BORING NO. BA-4

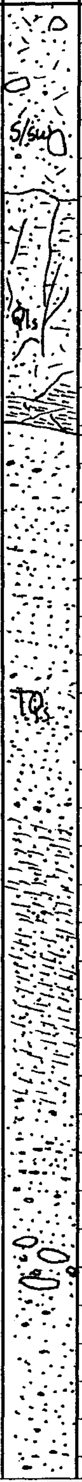
PROJECT: Castaic Lake Water Agency Road Alignment and Development
JOB NO.: 00-1571C-1
DATE: 3/3/00
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket Auger/24"
HAMMER TYPE: Stem
AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-28'=3450#, 28-57'=2050#, 57-87'=1140#, Stems (30'=600#)
ELEVATION: 1394
LOGGED BY: VCG

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
0					LANDSLIDE DEBRIS; Qls (0 - 29 Ft.) @ 0' Jumbled and discontinuous assemblage of Saugus Formation and Quaternary Terrace lithologies, generally non- bedded, loose to medium dense; within a matrix of fine- to coarse-grained pebbly sandstone	
5						
					@ 6' Yellowish-tan fine- to coarse-grained pebbly sandstone; loose	
10	■	2 4 6	119/12.1		@ 10' - with some clay	@ 10' % fines=30.8
15						
					@ 16' - with some clay	@ 16' Bulk Sample % fines=23.3
					@ 19' Reddish-brown claystone to siltstone clasts on eastern wall of boring within fine- to coarse-grained sandstone matrix; moist	
20	■	3 4 7	110/16.9			@ 20' % fines=77.9
	■	3 4 8	114/18.1		@ 24' Clayey siltstone @ 24.5' Slip surface reddish-brown silty clay; plastic; 0.5 - 1.0" thick; moist	@ 24.5' Kept all undisturbed rings (Can "A" & Can "B")
25					@ 24.5 - 29' Moderately fractured	
			SP:N25E,30SE 110/14.4 St:29,S55E		@ 29' SLIDE PLANE; Reddish-brown plastic clay; highly striated; 1/8" thick	@ 29' 4 hand driven ring samples of slide plane LL=51 PI=28
30					BEDROCK; TQs (29 - 50 Ft.) @ 29' Reddish-brown fine- to medium-grained silty sandstone, sandy siltstone with minor clay; moderately dense to dense; moist; seep @ 29 ft.	
35	■	10 36 15/ 1"			@ 35' Gray fine- to coarse-grained pebbly sandstone; very dense	

DRILL HOLE LOG

BORING NO. BA-5

PROJECT: Castaic Lake Water Agency Road Alignment and Development
JOB NO.: 00-1571C-1
DATE: 3/3/00
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket Auger/24"
HAMMER TYPE: Stem
AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-28'=3450#, 28-57'=2050#, 57-87'=1140#, Stems (30'=600#)
ELEVATION: 1360
LOGGED BY: VCG



DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
					SOIL/SLOPEWASH; s/sw (0 - 5 Ft.)	Drilled and logged 9/17/99
					@ 0' Reddish- to medium brown fine- to coarse-grained silty sandstone with isolated pebbles and cobbles; loose to medium dense; dry	
5					LANDSLIDE DEBRIS; Qls (5 - 11 Ft.)	
					@ 5' Yellowish-tan mottled with reddish-brown silty sandstone/sandy siltstone; vertical fractures; generally discontinuous, jumbled and chaotic; loose to medium dense	@ 7' Bulk Sample
					@ 7' - with some clay	% fines=25.5
10	■	2 3 4	115/17.0		@ 10' - yellowish-brown claystone	@ 10' % fines=81.0
			Sp:N55W,7SW		@ 11' SLIDE PLANE; Reddish-brown siltstone with clay; moist; faint striations	
					BEDROCK; TQs, (11 - 49 Ft.)	
					@ 11' Reddish-brown fine- to medium-grained sandstone and pebbly sandstone; moderately dense to dense; damp	
15					@ 13' Grades to a yellowish-tan fine- to coarse-grained sandstone wtih parallel laminations and cross beds with pebble stringers	
20	■	6 13 20/ 4"	B:N77E,7SE 131/9.9		@ 21' Reddish-brown silty sandstone/sandy siltstone with minor clay; very dense	
			B:N62W,8SW			
25						
			B:N79W,11SW		@ 28' Grades to yellowish-tan fine- to coarse-grained sandstone and pebbly sandstone with pebble conglomerate lenses; moist; very dense	
30	■	10 28 40/ 4"	133/8.6			
					@ 32' Scattered cobbles	
35					@ 35' Minor seep	@ 35' Bulk Sample

DRILL HOLE LOG

BORING NO. BA-5

PROJECT: Castaic Lake Water Agency
Road Alignment and Development
JOB NO.: 00-1571C-1
DATE: 3/3/00
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket Auger/24"
HAMMER TYPE: Stem
AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-28'=3450#, 28-57'=2050#, 57-87'=1140#, Stems (30'=600#)
ELEVATION: 1360
LOGGED BY: VCG

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40							
						@ 41-45'Used coring bucket	
				B:N68W,7SW			
45	■	6 20 42				@ 45' Reddish-brown sandy siltstone with minor clay and silty sandstone; very dense; damp	
						TOTAL DEPTH 49 Ft. (Elev. 1311) No Caving Seep @ 35 Ft. (Elev. 1325) Slide Plane @ 11 Ft. (Elev. 1349)	
50							
55							
60							
65							
70							
75							

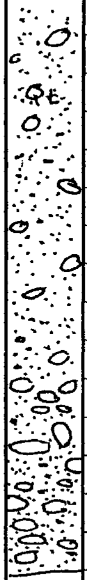
Allan E. Seward Engineering Geology, Inc.

DRILL HOLE LOG

BORING NO. BA-6

PROJECT:	Castaic Lake Water Agency Road Alignment and Development
JOB NO.:	00-1571C-1
DATE:	3/3/00
DRILLING COMPANY/DRILLER:	Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.)	Bucket Auger/24"
HAMMER TYPE:	Stem
AVERAGE DROP (in.):	12"
DRIVING WEIGHTS:	0-28'=3450#, 28-57'=2050#, 57--87'=1140#, Stems (30'-600#)
ELEVATION:	1399
LOGGED BY:	VCG

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
0			Qt			BEDROCK; Qt (0 - 15 Ft.) @ 0' Light reddish-brown fine- to coarse-grained pebbly cobbly sandstone and conglomerate; loose to moderately dense to dense; dry to damp	Surface log Started drilling at 7:00 a.m. Refusal at 2:00 p.m.
6						@ 6' Cobble conglomerate	
8						@ 8-15' Used coring bucket and the rock pick-up buckets	@ 8-14' very difficult drilling
13							@ 13' Bulk Sample
15						TOTAL DEPTH 15 Ft. (Elev. 1384) No Ground Water Caving from 9 - 13 Ft. (Elev. 1390-1386) Refusal at 15 Ft.	

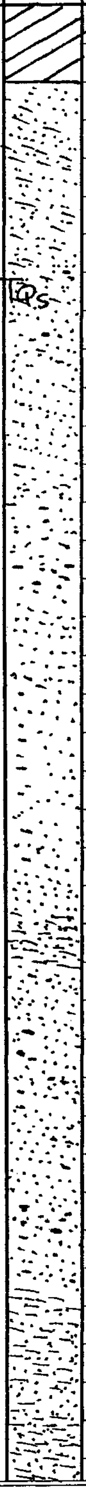


5
10
15
20
25
30
35

DRILL HOLE LOG

BORING NO. BA-7

PROJECT: Castaic Lake Water Agency
Road Alignment and Development
JOB NO.: 00-1571C-1
DATE: 3/3/00
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket Auger/24"
HAMMER TYPE: Stem
AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-28'=3450#, 28-57'=2050#, 57-87'=1140#, Stems (30'-600#)
ELEVATION: 1442
LOGGED BY: VCG



DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	**Description** **Soils: description; consistency/density; moisture; color; other** **Bedrock: color, lithology; hardness; moisture; other**	**Remarks**
					SURFACE CASING (0 - 2 Ft.)	Drilled on 9/20/99
					BEDROCK; TQs (0 - 67 Ft.)	
					@ 2' Light reddish-brown fine- to coarse-grained pebbly sandstone with minor silt; stratified, dry to damp; moderately dense to dense; steeply inclined fractures oriented down slope (parallel to topography) fractures lined with carbonate	
5						
					@ 6' Tan to light brown	
			B:N58E,8SE apx		@ 8' Medium- to coarse-grained pebbly sandstone	
10	■	4 8 11			@ 10' Fine- to coarse-grained sandstone; very dense	@ 10' Bulk Sample
					@ 13' Grades to pebble conglomerate	
15					@ 15' Fine- to coarse-grained sandstone and pebbly sandstone	
			B:N88W,9SW			
20	■	4 7 11			@ 20' Reddish-brown; very dense	
			B:N70E,9SE ex.		@ 23.5' Fine- to medium-grained silty sandsotne	
25					@ 25' Grades to light brown fine- to coarse-grained sandstone	@ 25' Bulk Sample
					@ 27' Pebbly sandstone; non-bedded	
30	■	7 17 33			@ 31.5' Tan to light reddish-brown pebble conglomerate and pebbly sandstone; very dense	
					@ 33.4' Fine- to medium-grained silty sandstone, erosional contact with upper pebbly sandstone unit	
35					@ 36' Sandstone interbed	
			B:N77E,7SE		@ 38' Silty sandstone/sandy siltstone with minor clay, upper contact erosional with pebbly sandstone unit	

DRILL HOLE LOG

BORING NO. BA-7

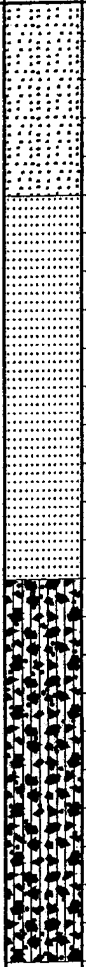
PROJECT: Castaic Lake Water Agency Road Alignment and Development
JOB NO.: 00-1571C-1
DATE: 3/3/00
DRILLING COMPANY/DRILLER: Tri Valley Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Bucket Auger/24"
HAMMER TYPE: Stem
AVERAGE DROP (in.): 12"
DRIVING WEIGHTS: 0-28'=3450#, 28-57'=2050#, 57-87'=1140#, Stems (30'-600#)
ELEVATION: 1442
LOGGED BY: VCG

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
					@ 39' Fine- to coarse-grained sandstone and pebbly sandstone; very dense	
40	■	4 13 19				
			B:N60E,6SE			
45					@ 45.5' Reddish-brown fine- to medium-grained sandy siltstone/silty sandstone @ 46.5' Grades to light brown fine- to coarse-grained sandstone	
50			B:N52E,8SE		@ 49.5' Minor seep @ 49.6' Grades back to sandy siltstone/silty sandstone	
	■	3 7 10			@ 52' - dense	@ 52' Bulk Sample
55	■	5 11 21	B:N79E,8SE		@ 54' Reddish-brown plastic clay 1-1.5" thick	@ 54' Kept all undisturbed California drive rings @ 54' 4 hand driven ring samples LL=50 PI=28
					@ 57' Light reddish-brown sandstone and pebble sandstone	
60					@ 60' Fine- to medium-grained silty sandstone with minor clay, very dense	
65	■	36 180				
			B:N61E,8SE			
70					TOTAL DEPTH 70 Ft. (Elev. 1372) Minor Seep at 49.5 Ft. (Elev. 1392.5) No Caving	
75						

DRILL HOLE LOG

BORING NO. RW-1

PROJECT: Valencia Company
Panhandle
JOB NO.: 00-1571-1
DATE: 8/24/00
4/4/03 Rev.
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Rotary Wash Boring (6")
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1204
LOGGED BY: JML



DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY ALLUVIUM; Qal (0 - 25 Ft.)	Excavated and logged on 3/21/00
		9 16 20		103/14.9	SP	3' Poorly graded sand, medium dense, damp, brownish-gray	
5		10 18 25		117/9.0	SW	@ 5' Well-graded sand with gravel, medium dense, moist, brownish-gray	
		26 40 50/ 2"		114/14.4		@ 8' - dense	% fines=3.0
10		27 42 50/ 2"		122/12.6		@ 10' - dense	% fines=3.8
15		14 18 22			GW-GM	@ 15' Well graded sandy gravel with silt, dense, very moist, grayish-brown	% fines=6.1
20		18 35 50				@ 20' - very dense	% fines=5.7
25		25 30 32			SP	@ 25' Well graded sand with gravel, very dense, very moist, grayish-brown	% fines=10.0
30							
35							

TOTAL DEPTH 25 Ft. (Elev. 1179)
Ground Water @ 14'3" (Elev. 1189.8)
No Caving

DRILL HOLE LOG

BORING NO. RW-2

PROJECT: Valencia Company Panhandle

JOB NO.: 00-1571-1

DATE: 8/24/00 4/4/03- Rev.

DRILLING COMPANY/DRILLER: Valley Well Drilling

METHOD OF DRILLING/HOLE DIAMETER (in.) Rotary Wash Boring (6")

HAMMER TYPE: Downhole **AVERAGE DROP (in.):** 30"

DRIVING WEIGHTS: 140 lbs.

ELEVATION: 1192 **LOGGED BY:** JML

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
					QUATERNARY ALLUVIUM; Qal (0 - 50 Ft.)	Excavated and logged on 3/21/00
	■	5 5 3	117/12.9	SC	@ 2' Clayey sand, loose, very moist, brown	
5	■	5 8 10	120/12.4			
	■	6 7 7	120/13.3			
10	■	9 17 20	121/13.4	SM	@ 10' Silty sand, medium dense, very moist, brown	% fines=27.9
						▽
15	■	7 7 7	107/21.4	SC	@ 15' Clayey sand, loose; very moist to wet, brown	% fines=47.6
20	◣	5 8 14			@ 20' Clayey sand, medium dense, very moist to wet, brown	% fines=32.0
25	◣	6 18 10			@ 25' - with gravel	% fines=30.5
30	◣	6 11 22				% fines=30.8
35	◣	7 16 20		SM-SC	@ 35' Clayey to silty sand, dense, very moist, brown	% fines=25.4

DRILL HOLE LOG

BORING NO. RW-2

PROJECT: Valencia Company
Panhandle
JOB NO.: 00-1571-1
DATE: 8/24/00
4/4/03 Rev.
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Rotary Wash Boring (6")
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1192
LOGGED BY: JML

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	**Description** **Soils: description; consistency/density; moisture; color; other** **Bedrock: color, lithology; hardness; moisture; other**	Remarks
40	◣	12 20 35	▨		SM	@ 40' Silty sand, very dense, very moist, light grayish-brown	% fines=22.8
45	◣	18 38 44	▨			@ 45' - light brownish gray	% fines=22.4
50	◣	50/ 4"				@ 50' - light grayish-brown TOTAL DEPTH 50 Ft. (Elev. 1142) Ground Water @ 14'6" (Elev. 1177.5) No Caving	
55							
60							
65							
70							
75							

DRILL HOLE LOG

BORING NO. RW-3

PROJECT: Valencia Company
Panhandle
JOB NO.: 00-1571-1
DATE: 8/24/00
4/4/03 Rev.
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Rotary Wash Boring (6")
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1192
LOGGED BY: JML

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						ARTIFICIAL FILL; Qal (0 - 7 Ft.)	Excavated and logged on 3/22/00
	■	22 44 50/ 2"		131/8.0	SC	@ 3' Clayey sand, very dense, moist, brown	
5	■	10 11 12		125/7.6		@ 5' - with some gravel, medium dense	
	■	10 14 20				QUATERNARY ALLUVIUM; Qal (7 - 50 Ft.) @ 7' Clayey sand with some gravel, medium dense, moist, brown	% fines=33.0
10							
	■	24 35 45		133/5.3	SM	@ 11' Silty sand with gravel, dense, moist, brown	% fines=14.7
15	◤	10 11 10				@ 15' - medium dense	% fines=17.6
20	■	16 18 28		120/6.9			% fines=15.5
25	◤	10 10 11					% fines=17.8 ▽
30	◤	38 24 16				@ 30' - dense	
35	◤	10 6 9			CL	@ 35' Sandy lean clay, stiff, very moist, reddish-brown	% fines=64.4

DRILL HOLE LOG

BORING NO. RW-3

PROJECT: Valencia Company
Panhandle
JOB NO.: 00-1571-1
DATE: 8/24/00
4/4/03 Rev.
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Rotary Wash Boring (6")
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1192
LOGGED BY: JML

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40	◤	6 12 36	▨			@ 40' - hard	% fines=60.8
45	◤	50/ 4"	▩		SC	@ 45' Clayey sand with some gravel, very dense, very moist, light brown	% fines=24.4
50	◤	50/ 3"				TOTAL DEPTH 50 Ft. (Elev. 1142) Ground Water @ 26'6" (Elev. 1165.5) No Caving	
55							
60							
65							
70							
75							

DRILL HOLE LOG

BORING NO. RW-4

PROJECT: Valencia Company Panhandle
JOB NO.: 00-1571-1
DATE: 8/24/00 4/4/03 Rev.
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Rotary Wash Boring (6")
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1194
LOGGED BY: JML

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						QUATERNARY ALLUVIUM; Qal (0 - 50 Ft.)	Excavated and logged on 3/23/00
		9 8 10		109/8.1	SM	@ 2' Silty sand of organic particle, loose, moist, very dark grayish-brown	
5		3 5 6		100/22.6	ML	@ 4' Sandy silt with organic particles, stiff, very moist, very dark grayish-brown	
		9 10 12		116/8.2	SM	@ 7' Silty sand with organic particles, medium dense, very moist, very dark grayish-brown	
10		9 10 13		110/115			
15		3 5 7		105/20.7	CL	@ 15' Lean clay, stiff, very moist, dark grayish-brown	▽ % fines=60.4
20		5 7 10				@ 20' - with sand, very stiff	% fines=52.4
25		3 5 10				@ 25' - with sand, stiff	% fines=80.8
30		4 6 10				@ 30' - very stiff	% fines=60.0
35		5 6 9				@ 35' - More sandy and very stiff	% fines=56.4

DRILL HOLE LOG

BORING NO. RW-4

PROJECT: Valencia Company
Panhandle
JOB NO.: 00-1571-1
DATE: 8/24/00
4/4/03 Rev.
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Rotary Wash Boring (6")
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1194
LOGGED BY: JML

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40	◤	7 14 22	▨		SC	@ 40' Clayey sand, medium dense, very moist, grayish-brown	% fines=25.4
45	◤	7 12 16	▨			@ 45' - with some gravel	% fines=36.8
50	◤	24 28 38			SW-SM	@ 50' Well graded sand with silt and gravel, very dense, very moist, brownish-gray TOTAL DEPTH 50 Ft. (Elev. 1194) Ground Water @ 15 Ft. (Elev. 1179) No Caving	% fines=24.4
55							
60							
65							
70							
75							

DRILL HOLE LOG

BORING NO. RW-5

PROJECT: Valencia Company
Panhandle
JOB NO.: 00-1571-1
DATE: 8/24/00
4/4/03 Rev.
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Rotary Wash Boring (6")
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1187
LOGGED BY: JML

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						ARTIFICIAL FILL; af (0 - 8 Ft.)	Excavated and logged on 3/24/00
		19 28 30		121/9.2	SM-SC	@ 3' Clayey to silty sand with some gravel, dense, moist, brown to grayish-brown	
5		19 28 32		131/7.9	SC	@ 5' Clayey sand with some gravel, dense, moist, brown to dark grayish-brown	
		10 11 14		107/12.2	SM/ ML	QUATERNARY ALLUVIUM; Qal (8 - 50 Ft.) @ 8' Silty sand to sandy silt, medium dense to very stiff, very moist, dark grayish-brown	
10		10 11 15		108/12.0			% fines=51.2
15		7 12 8					% fines= 36
20		11 13 15				@ 20' No Recovery	
		10 17 18		101/22.2		@ 22' Silty sand to sandy silt, medium dense to very stiff, very moist, dark grayish-brown	
25		5 7 10				@ 25' - very stiff, very moist, dark, grayish-brown	% fines=52.8
30		32 40 42			SM	@ 30' Silty sand, very dense, very moist, dark grayish-brown	% fines=16.3
35		19 28 32			SP-SM	@ 35' Poorly graded sand with silt and gravel, very dense, very moist, brownish-gray	% fines=12.5

DRILL HOLE LOG

BORING NO. RW-5

PROJECT: Valencia Company
Panhandle
JOB NO.: 00-1571-1
DATE: 8/24/00
4/4/03 Rev.
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Rotary Wash Boring (6")
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1187
LOGGED BY: JML

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	**Description** Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40		32 42 46			SM	@ 40' Silty sand with gravel, very dense, very moist, brownish-gray	% fines=13.6
45		20 42 48			ML	@ 45' Sandy silt, very hard, very moist, grayish-brown	% fines=60.3
50		10 14 38				@ 50' Sandy silt, hard, very moist, grayish-brown TOTAL DEPTH 50 Ft. (Elev. 1137) Ground Water @ 23'9" (Elev. 1163.3) No Caving	
55							
60							
65							
70							
75							

DRILL HOLE LOG

BORING NO. RW-6

PROJECT: Valencia Company Panhandle
JOB NO.: 00-1571-1
DATE: 8/24/00 4/4/03 Rev.
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Rotary Wash Boring (6")
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1177
LOGGED BY: DGG

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
					SM	**ARTIFICIAL FILL; af, (0-3 Ft.)** **@ 0' Silty sand; stiff; slightly damp; yellowish-brown**	Drilled on 6/23/00
		13 11 16		107.5/8.91	ML	**QUATERNARY ALLUVIUM; Qal, (3-50 Ft.)** @ 3' Silt, very stiff, slightly damp, medium grayish-brown	% fines=67.5
5							
		5 8 9			SP-SM	@ 6' Fine-grained sand to silty sand; medium-dense moist; medium gray	% fines=6.3
10		7 4 5		95.6/31.1	CL	@ 10' Sandy clay; firm; damp; medium grayish-brown	@ 10' Discontinue from material in tip
15		17 26 30			SP-SM	@ 15' Fine-grained sand to silty sand; very dense; moist; medium-gray	% fines=8.9
20		8 7 10			SM	@ 20' Silty sand; medium dense; moist; medium brown	% fines=41.9
25		17 18 20			SP-SM	@ 25' Fine sand to silty sand; dense; moist; light to medium gray	% fines=15.3
30		10 17 18				@ 30' - same	
35		16 19 18			SW-SM	@ 34' Fine- to coarse-grained sand with silty sand; dense; moist; light gray	% fines=3.4
		19			SP-	@ 38' Fine- to medium-grained sand with silty sand;	

DRILL HOLE LOG

BORING NO. RW-6

PROJECT: Valencia Company
Panhandle
JOB NO.: 00-1571-1
DATE: 8/24/00
4/4/03 Rev.
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Rotary Wash Boring (6")
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1177
LOGGED BY: DGG

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
		23 25			SM	dense; moist; medium gray	
40							
		10 50/ 5"				@ 42' Fine sand to silty sand; very dense; moist; medium to orangish-brown	% fines=19.7
45							
		24 17 25				@ 46' No Recovery	
50		10 27 22			SW-SM	@ 50' Fine- to coarse-grained sand and silty sand; dense; wet; gray	
						TOTAL DEPTH 50 Ft. (Elev. 1127) Ground Water @ 29 Ft. (Elev. 1148) No Caving	
55							
60							
65							
70							
75							

DRILL HOLE LOG

BORING NO. RW-7

PROJECT: Valencia Company Panhandle
JOB NO.: 00-1571-1
DATE: 8/24/00
4/4/03. Rev.
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Rotary Wash Boring (6")
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1188
LOGGED BY: DGG

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
0						QUATERNARY ALLUVIUM; Qal (0 - 50')	Drilled and logged on 6/23/00
5	■	10 21 23		121.2/5.14	SC	@ 5' Clayey sand; medium dense; dry; orangish-to medium-brown	% fines=21.4
10	■	7 10 12		121.1/12.3			% fines=27.3
15	◣	3 5 7			CL	@ 15' Sandy clay; stiff; moist; brown	% fines=56.8
20	■	6 4 6		114.2/17.3			% fines=54.3 ▼
25	◣	4 6 10				@ 25' - very stiff	
30	■	6 5 5		116.4/15.6		@ 30' - stiff	
35	◣	5 4 8					% fines=61.1

Allan E. Seward Engineering Geology, Inc.

DRILL HOLE LOG

BORING NO. RW-7

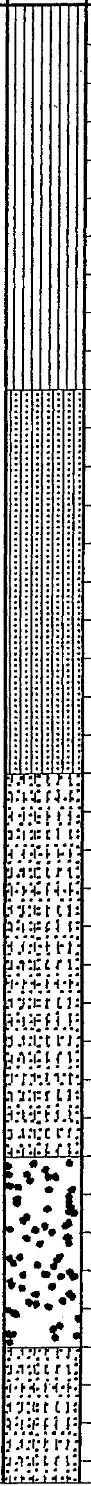
PROJECT: Valencia Company Panhandle
JOB NO.: 00-1571-1
DATE: 8/24/00 4/4/03 Rev.
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Rotary Wash Boring (6")
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1188
LOGGED BY: DGG

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40	◤	5 15 32	▨		SC	@ 40' Clayey sand; dense; moist; medium brown to brownish-gray	% fines=37.9
45	◤	24 50	▨			@ 45' - very dense	% fines=17.9
50	◤	22 17 36				TOTAL DEPTH 50 Ft. (Elev. 1138) Ground Water @ 21 Ft. (Elev. 1167) No Caving	
55							
60							
65							
70							
75							

DRILL HOLE LOG

BORING NO. RW-8

PROJECT: Valencia Company Panhandle
JOB NO.: 00-1571-1
DATE: 8/24/00 4/4/03 Rev.
DRILLING COMPANY/DRILLER: Valley Well Drilling
METHOD OF DRILLING/HOLE DIAMETER (in.) Rotary Wash Boring (6")
HAMMER TYPE: Downhole
AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.
ELEVATION: 1203
LOGGED BY: DGG



DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
					<u>QUATERNARY ALLUVIUM</u>; Qal (0 - 50 Ft.)	Drilled and logged on 6/26/00
5	■	5 5 6	114.6/10.1	ML	@ 5' Silt; stiff; damp; medium brown	
10	■	7 7 8	118.5/11.7	SM	@ 10' Silty sand; loose; stiff; damp; medium brown	% fines=47.2
15	◤	4 4 5				% fines=31.3
20	■	15 23 23	118.1/5.64	SP-SM	@ 20' Silty sand to fine to medium-grained sand with gravel, medium dense; damp; medium brown	% fines=7.6
25	◤	4 8 11				% fines=17.9
30	◤	6 8 25		GM	@ 30' Fine- to medium-grained gravel; medium dense; wet; tan to gray to brownish-gray	% fines=24
35	◤	6 20 21		SP-SM	@ 35' Silty sand to fine- to medium-grained sand; dense; moist; grayish-brown	% fines=14.9

DRILL HOLE LOG

BORING NO. RW-8

PROJECT:	Valencia Company Panhandle	**JOB NO.:**	00-1571-1
		DATE:	8/24/00 4/4/03 Rev.
DRILLING COMPANY/DRILLER:	Valley Well Drilling		
METHOD OF DRILLING/HOLE DIAMETER (in.)	Rotary Wash Boring (6")		
HAMMER TYPE:	Downhole	**AVERAGE DROP (in.):**	30"
DRIVING WEIGHTS:	140 lbs.		
ELEVATION:	1203	**LOGGED BY:**	DGG

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES, DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
40	▼	4 10 22	▨		SM-ML	@ 40' Silty sand to clayey sand/sandy clay; dense; moist; medium brown	% fines=38.3
45	▼	7 21 50/4"	▨		SP-SM	@ 45' Silty sand to fine- to medium-grained sand; very dense; moist; grayish-brown	% fines=20.0
50	▼	50/6"			CL	TOTAL DEPTH 50 Ft. (Elev. 1153) Ground Water @ 29 Ft. (Elev. 1174) No Caving	
55							
60							
65							
70							
75							

DRILL HOLE LOG

CLIENT:	Newhall Land	JOB NO.:	03-1571-4
PROJECT:	Tentative Tract 53425, River Park City of Santa Clarita, California	DATE:	4/4/03
		LOGGED BY:	DGG
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	4/17/02
DRILLING METHOD:	Rotary Wash	HOLE DIA:	(5½" O.D.)
HAMMER TYPE:	Downhole	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs.	ELEVATION	1271

BORING NO. RW-9

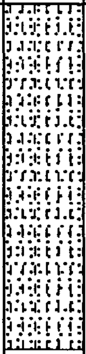
DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal, (0-42 ft.)**				
		3 5 8		SM	@ 3' Silty SAND; loose; moist; medium-brown	5.1	110		
5									
		6 8 12			@ 6' - medium dense	5.8	114	28	
		11 20 30			@ 9' - medium dense	4.5	121		
10									
		12 21 18			@ 12' - with gravel; medium-dense; orangish- to grayish-brown	8.3	131		
15		7 9 14		SM	@ 15' - with gravel; medium-dense; orangish- to grayish-brown			19	
		8 10 17			@ 18' - medium dense; orangish- to grayish-brown				
20									
		8 8 25			@ 21' - dense; orangish-brown			34	
		7 14 20		SM-SC	@ 24' Silty, clayey SAND; dense; moist; medium-brown			42	
25									
		10 26 34		SM	@ 27' Silty SAND with gravel; very dense; moist; orangish-brown				
30		27 30 50		SP-SM	@ 30' Poorly graded SAND with silt and gravel; very dense; moist; orangish-brown				
		13 12 20			@ 33' - dense				
35									
		18 34 50							
					@ 38' - drilling slowed by boulder(?)				

CLIENT: Newhall Land
PROJECT: Tentative Tract 53425, River Park
City of Santa Clarita, California
DRILLING COMPANY: Valley Well Drilling
DRILLING METHOD: Rotary Wash
HAMMER TYPE: Downhole
DRIVING WEIGHTS: 140 lbs.

JOB NO.: 03-1571-4
DATE: 4/4/03
LOGGED BY: DGG
DRILLED: 4/17/02
HOLE DIA: (5½" O.D.)
AVERAGE DROP (in.): 30"
ELEVATION 1271

DRILL HOLE LOG

BORING NO. RW-9

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
		50/3"							
40									
		50/3"			**BEDROCK; TQs, (42-48 ft.)** @ 42' Blocked tip - small recovery; crushed cobble?				
45		50/3"			@ 45' - damp to moist; grayish- to orangish-brown				
		50/4"		SM	@ 48' Silty SAND with gravel; very dense; moist; grayish- to orange-brown				
50									
					Total Depth 48 ft. (Elev. 1223) Groundwater @ 32' (Caved) (Elev. 1239)				
55									
60									
65									
70									
75									

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CLIENT: Newhall Land	JOB NO.: 03-1571-4		
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California	DATE: 4/4/03	**DRILL HOLE LOG**	
	LOGGED BY: DGG		
DRILLING COMPANY: Valley Well Drilling	DRILLED: 4/17/02		
DRILLING METHOD: Rotary Wash	HOLE DIA: (5½" O.D.)	**BORING NO.**	RW-10
HAMMER TYPE: Downhole	AVERAGE DROP (in.): 30"		
DRIVING WEIGHTS: 140 lbs.	ELEVATION 1264		

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal, (0-51 ft.)**				
		6 6 9		SM	@ 3' Silty SAND; loose; moist; medium-brown	8.1	117		
5									
		12 12 12			@ 6' - medium-dense	7.2	117	23	
		7 11 15			@ 9' - medium-dense; orangish-brown	5.8	122		
10									
		14 18 19		SM	@ 12' - medium-dense; orangish-brown	6.4	123	17	
15		7 8 8			@ 15' - no recovery				
		8 9 10		SC	@ 18' Clayey SAND; medium-dense; moist; orangish-brown			40	LL= 28 PI= 13
20									
		8 9 12		SM	@ 21' Silty SAND; medium-dense; moist; orangish-brown				
		7 8 12		SM				33	
25									
		6 9 15							
30		9 10 10							
		5 19 19		SM-SC	@ 33' Silty, clayey SAND; dense; moist; orangish- to grayish-brown				
35									
		12 16 18		SM	@ 36' Silty SAND with gravel; dense; moist; orangish- to grayish-brown			14	

CLIENT: Newhall Land	JOB NO.: 03-1571-4		
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California	DATE: 4/4/03 LOGGED BY: DGG		
DRILLING COMPANY: Valley Well Drilling	DRILLED: 4/17/02		
DRILLING METHOD: Rotary Wash	HOLE DIA: (5½" O.D.)		
HAMMER TYPE: Downhole	AVERAGE DROP (in.): 30"		
DRIVING WEIGHTS: 140 lbs.	ELEVATION 1264		

DRILL HOLE LOG

BORING NO. RW-10

						LABORATORY TESTS			
DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40		14 12 14							
		16 31 30			@ 42' - very dense				
45		22 30 34			@ 45' - very dense; (with no gravel)				
		12 16 14			@ 48' - medium-dense; (with no gravel)				
50									
		10 14 18			@ 51' - (with no gravel) Total Depth 51 ft. (Elev. 1213) Groundwater @ 34 ft. (Caved) (Elev. 1230)			37	
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT:	Newhall Land	JOB NO.:	03-1571-4
PROJECT:	Tentative Tract 53425, River Park City of Santa Clarita, California	DATE:	4/4/03
		LOGGED BY:	DGG
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	4/12/02
DRILLING METHOD:	Hollow-Stem-Auger	HOLE DIA:	8"O.D., 4¼ I.D.
HAMMER TYPE:	Downhole	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs.	ELEVATION	1260

BORING NO. HS-1

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS Moisture Content (%)	 Dry Density (pcf)	 % fines	 Other Tests
0			▨		**QUATERNARY SLOPEWASH; Qsw, (0-6 ft.)**				
	■	9 9 10	▨	SM	@ 3' Silty SAND, fine to coarse; medium-dense; moist; medium to orangish-brown	2.9	110		
5			▨						
	■	10 21 23	▨		**QUATERNARY ALLUVIUM; Qal, (6-32 ft.)** @ 6' Silty SAND; medium-dense; moist; medium to orangish-brown	3.7	114		
10	■	11 15 25	▨		@ 9' - pale orangish-brown	2.8	118		
	■	11 15 20	▨		@ 12' - pale orangish-brown	4.2	127		
15	◪	13 20 20	▨		@ 15' - dense				
20	◪	23 40 30	▨	GP-GM	@ 20' Poorly graded GRAVEL with silt and sand; very dense				
25	◪	14 16 20	▨	SM-SC	@ 25' Silty, clayey SAND; dense; moist; pale orangish brown				
30			▨						
	◪	13 14 20			@ 32' - medium gray Total Depth 32' (Elev. 1228) No Groundwater			42	
35									

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SHEET 1 of 1

CLIENT:	Newhall Land	JOB NO.:	03-1571-4
PROJECT:	Tentative Tract 53425, River Park City of Santa Clarita, California	DATE:	4/4/03
		LOGGED BY:	DGG
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	4/12/02
DRILLING METHOD:	Hollow-Stem-Auger	HOLE DIA:	8"O.D., 4¼ I.D.
HAMMER TYPE:	Downhole	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs.	ELEVATION	1272

DRILL HOLE LOG

BORING NO. HS-2

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS			
						Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal, (0-30 ft.)**				
	■	10 9 10		SM	@ 2' Silty SAND; medium-dense; damp; medium-brown	1.5	100		
5	■	8 10 13			@ 5' - medium to orangish-brown	4.7	115	12	Consol
	■	15 21 23			@ 8' - moist; medium to orangish-brown	2.9	122		
10									
	■	11 11 15		SP-SM	@ 11' Poorly graded SAND with silt; medium-dense; moist; orangish-brown	2.4	127		
15	◣	9 10 10		SM	@ 15' Silty SAND; medium-dense; moist; orangish-brown				
20	◣	9 10 12							
25	◣	10 10 11			@ 25' - medium to orangish-brown			33	
30	◣	12 14 18			@ 30' - dense				
					Total Depth 30 Ft. (Elev. 1242) No Groundwater				
35									

CLIENT:	Newhall Land	JOB NO.:	03-1571-4
PROJECT:	Tentative Tract 53425, River Park City of Santa Clarita, California	DATE:	4/4/03
		LOGGED BY:	DGG
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	4/12/02
DRILLING METHOD:	Hollow-Stem-Auger	HOLE DIA:	8"O.D., 4¼ I.D.
HAMMER TYPE:	Downhole	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs.	ELEVATION	1284

DRILL HOLE LOG

BORING NO. HS-3

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal, (0-55 ft.)**				
	■	7 10 16		SM	@ 3' Silty SAND; medium-dense; moist; medium-brown	2.5	121		
5									
	■	19 28 22			@ 6' - light gray to orangish-brown	1.5	124		
10	■	11 16 21		SP-SM	@ 9' Poorly graded SAND with silt; medium-dense; moist; orangish-brown	2.1	123	8	
	■	15 15 17		SM	@ 12' Silty SAND; medium-dense; moist; orangish-brown	1.9	120	14	
15	◣	11 13 18		SP-SM	@ 15' Poorly graded SAND with silt and gravel; dense; moist; orangish-brown			12	
20	◣	10 15 26		SM	@ 20' Silty SAND; dense; moist; pale orangish-brown				
25	◣	11 12 12			@ 25' - medium-dense				
30	◣	15 13 15		SP-SM	@ 30' Poorly graded SAND with silt; medium-dense; pale orangish-brown				
35	◣	12 27 25		SM	@ 35' Silty SAND; dense; moist; pale orangish-brown				

CLIENT:	Newhall Land	JOB NO.:	03-1571-4
PROJECT:	Tentative Tract 53425, River Park City of Santa Clarita, California	DATE:	4/4/03
		LOGGED BY:	DGG
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	4/12/02
DRILLING METHOD:	Hollow-Stem-Auger	HOLE DIA:	8"O.D., 4¼ I.D.
HAMMER TYPE:	Downhole	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs.	ELEVATION	1284

DRILL HOLE LOG

BORING NO. HS-3

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40	◣	7 12 12			@ 40' - medium-dense				
45	◣	8 9 10			@ 45' - medium-dense; orangish-brown				
					@ 47' - hard drilling (47'-50')				
50	◣	10 9 8		SP-SM	@ 50' Poorly graded SAND with silt; medium-dense; moist; orangish-brown				
55	◣	7 12 13			Total Depth 55 Ft. (Elev. 1229) No Groundwater				
60									
65									
70									
75									

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

DRILL HOLE LOG

CLIENT:	Newhall Land	JOB NO.:	03-1571-4
PROJECT:	Tentative Tract 53425, River Park City of Santa Clarita, California	DATE:	4/4/03
		LOGGED BY:	DGG
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	4/12/02
DRILLING METHOD:	Hollow-Stem-Auger	HOLE DIA:	8"O.D., 4¼ I.D.
HAMMER TYPE:	Downhole	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs.	ELEVATION	1298

BORING NO. HS-4

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS: Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal, (0-30 ft.)**				
		9 10 16		SM	@ 2' Silty SAND; medium-dense; damp; medium to orangish-brown	1.0	100		
5		10 12 17		SM	@ 5' - pale orangish-brown	2.8	102	19	Consol
		12 18 21			@ 8' - pale orangish-brown	2.3	117		
10									
		32 35 38			@ 11' - dense; pale orangish-brown	1.6	127		
15		13 18 15			@ 15' - dense; pale orangish-brown			35	
20		16 16 20		SP-SM	@ 20' Poorly graded SAND with silt and gravel; dense; damp; pale orangish-brown			7	
25		14 19 17		SM	@ 25' Silty SAND; dense; damp; orangish-brown			39	
30		23 28 25		GP-GM	@ 30' Poorly graded GRAVEL with silt and sand; very dense; damp; grayish- to orangish-brown				
					Total Depth 30 feet (Elev. 1268) No Groundwater				
35									

DRILL HOLE LOG

CLIENT:	Newhall Land	JOB NO.:	03-1571-4
PROJECT:	Tentative Tract 53425, River Park City of Santa Clarita, California	DATE:	4/4/03
		LOGGED BY:	DGG
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	4/12/02
DRILLING METHOD:	Hollow-Stem-Auger	HOLE DIA:	8"O.D., 4¼ I.D.
HAMMER TYPE:	Downhole	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs.	ELEVATION	1311

BORING NO. HS-5

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY ALLUVIUM; Qal, (0-50 ft.)**				
	■	14 24 26		SM	@ 3' Silty SAND; medium-dense; moist; medium-brown	2.6	126		
5									
	■	19 20 24			@ 6' - orangish- to medium-brown	6.3	109	19	Consol
	■	9 14 18			@ 9' - orangish- to medium-brown	1.9	115		
10									
	■	12 24 35			@ 12' - dense; orangish- to medium-brown	2.5	124		
15	◣	15 18 20			@ 15' - dense; light gray to pale orangish-brown				
20	◣	11 15 15			@ 20' - light gray to pale orangish-brown				
25	◣	13 16 26			@ 25' - with gravel; dense; light gray to pale orangish-brown				
30	◣	13 17 19			@ 30' - dense; light gray to pale orangish-brown			41	
35	◣	11 10 11			@ 35' - orangish-brown				
					@ 37' - hard drilling				

DRILL HOLE LOG

BORING NO. HS-5

CLIENT:	Newhall Land	JOB NO.:	03-1571-4
PROJECT:	Tentative Tract 53425, River Park City of Santa Clarita, California	DATE:	4/4/03
		LOGGED BY:	DGG
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	4/12/02
DRILLING METHOD:	Hollow-Stem-Auger	HOLE DIA:	8"O.D., 4¼ I.D.
HAMMER TYPE:	Downhole	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs.	ELEVATION	1311

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS			
						Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
40	◣	10 10 15			@ 40' - orangish-brown				
45	◣	13 17 20		SP-SM	@ 45' Poorly graded SAND with silt; dense; damp; orangish-brown				
50	◣	25 26 30			@ 50' - with gravel; very dense Total Depth 50 Ft. (Elev. 1261) No Groundwater				
55									
60									
65									
70									
75									

DRILL HOLE LOG

CLIENT:	Newhall Land	JOB NO.:	03-1571-4
PROJECT:	Tentative Tract 53425, River Park City of Santa Clarita, California	DATE:	4/4/03
		LOGGED BY:	DGG
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	7/30/02
DRILLING METHOD:	Hollow-Stem-Auger	HOLE DIA:	8"O.D., 4¼ I.D.
HAMMER TYPE:	Downhole	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs.	ELEVATION	1251

BORING NO. HS-6

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY SLOPEWASH; Qsw, (0-8 ft.)**				
	■	10 16 20		SM	@ 3' Silty SAND; medium-dense; damp; medium grayish-brown; trace of coarse sand	3.6	107		
5									
	■	9 11 14			@ 6' - with scattered gravel; moist			42	
					QUATERNARY ALLUVIUM; Qal, (8-30 ft.)				
	■	14 17 24		SM	@ 9' Silty SAND; medium-dense; moist; slightly grayish	4.6	116		
10									
	■	15 18 20		SM	@ 12' - moist; grayish- to grayish-brown	4.2	112		Consol
15	◣	13 15 18			@ 15' - dense; moist; orangish- to pinkish- to medium gray (tip blocked)			26	
20	◣	14 20 17			@ 20' - dense; moist; orangish-brown with tan to white particles (tip blocked)				
25	◣	12 20 31			@ 25' - very dense; moist; orangish-brown to medium-gray (tip blocked)				
30	◣	20 50/6"		CL	@ 30' Lean CLAY with sand; hard; moist; orangish-brown				
					Total Depth 30 ft. No Ground Water				
35									

CLIENT:	Newhall Land	JOB NO.:	03-1571-4
PROJECT:	Tentative Tract 53425, River Park City of Santa Clarita, California	DATE:	4/4/03
		LOGGED BY:	DGG
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	7/30/02
DRILLING METHOD:	Hollow-Stem-Auger	HOLE DIA:	8"O.D., 4¼ I.D.
HAMMER TYPE:	Downhole	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs.	ELEVATION	1241

DRILL HOLE LOG

BORING NO. HS-7

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0			▦		**QUATERNARY SLOPEWASH; Qsw, (0-7 ft.)**				
	■	9 9 9	▦	SM	@ 2' Silty SAND; loose; moist; medium grayish-brown	6.3	99		
5	■	5 7 12	▨	CL-ML	@ 5' Sandy silty CLAY; very stiff; moist; grayish-brown			66	
			▨		**QUATERNARY ALLUVIUM; Qal, (7-30 ft.)**				
	■	16 17 18	▦	SM	@ 8' Silty SAND; medium dense; moist; grayish-brown	9.4	115		
10	⧄	6 7 10	▦		@ 11' - no recovery				
	■	5 12 18	▦		@ 12.5' Silty SAND with gravel; medium dense; moist; grayish- to orangish-brown			19	
15	◤	5 9 12	▧	SC	@ 15' Clayey SAND; medium-dense; moist; grayish- to orangish-brown			38	
20	◤	9 9 13	▧	SC				41	LL= 29 PI= 11
25	◤	13 17 25	▧		@ 25' - dense; pale orangish- to orangish-brown				
30	◤	32 50			@ 30' - very dense; pale orangish- to orangish-brown (tip blocked)				
					Total Depth 30 ft. No Ground Water				
35									

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

SHEET 1 of 1

CLIENT:	Newhall Land	JOB NO.:	03-1571-4
PROJECT:	Tentative Tract 53425, River Park City of Santa Clarita, California	DATE:	4/4/03
		LOGGED BY:	DGG
DRILLING COMPANY:	Valley Well Drilling	DRILLED:	7/30/02
DRILLING METHOD:	Hollow-Stem-Auger	HOLE DIA:	8"O.D., 4¼ I.D.
HAMMER TYPE:	Downhole	AVERAGE DROP (in.):	30"
DRIVING WEIGHTS:	140 lbs.	ELEVATION	1252

DRILL HOLE LOG

BORING NO. HS-8

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY SLOPEWASH; Qsw, (0-6 ft.)**				
		7 11 13		SM	@ 3' Silty SAND with scattered gravel; medium-dense; moist; orangish-brown	5.8	100		
5									
		8 30 30		SP-SM	**QUATERNARY ALLUVIUM; Qal, (6-30 ft.)** @ 6' Poorly graded SAND with silt and scattered gravel; dense; moist; orangish-brown	2.5	122	12	
		8 12 30		SM	@ 9' Silty SAND; medium-dense; moist; grayish- to orangish-brown	7.1	116		
10									
		9 12 12						35	
15		6 8 12							
20		7 9 11		SC	@ 20' Clayey SAND; medium-dense; moist; light grayish- to orangish-brown			36	LL= 31 PI= 13
25		7 10 10							
30		17 22 40		SM	@ 30' Silty SAND; very dense; moist; light grayish- to orangish-brown (tip blocked)				
					Total Depth 30 ft. No Ground Water				
35									

DRILL HOLE LOG

BORING NO. HS-9

CLIENT: Newhall Land	JOB NO.: 03-1571-4
PROJECT: Tentative Tract 53425, River Park City of Santa Clarita, California	DATE: 4/4/03 LOGGED BY: DGG
DRILLING COMPANY: Valley Well Drilling	DRILLED: 7/30/02
DRILLING METHOD: Hollow-Stem-Auger	HOLE DIA: 8"O.D., 4¼ I.D.
HAMMER TYPE: Downhole	AVERAGE DROP (in.): 30"
DRIVING WEIGHTS: 140 lbs.	ELEVATION 1255

DEPTH (feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	LABORATORY TESTS Moisture Content (%)	Dry Density (pcf)	% fines	Other Tests
0					**QUATERNARY SLOPEWASH; Qsw, (0-8 ft.)**				
		5 5 6		SM	@ 2' Silty SAND; loose; moist; grayish-brown	4.0	107		
5		6 8 15			@ 5' - medium dense			33	
		12 14 28			**QUATERNARY ALLUVIUM; Qal, (8-30 ft.)** @ 8' - with gravel; medium-dense	2.8	120		
10									
		18 24 25		SP-SM	@ 11' Poorly graded SAND with silt and gravel; medium dense; moist; orangish-brown	3.2	119		
15		12 14 35		SM	@ 15' Silty SAND; dense; moist; pale orangish-brown			36	
20		14 27 40			@ 20' - very dense; grayish-brown (tip blocked)				
25		25 50/5"		ML	@ 25' Sandy SILT; hard; moist; orangish-brown				
30		18 21 35		SM	@ 30' Silty SAND; very dense; moist; orangish-brown				
					Total Depth 30 ft. No Ground Water				
35									

KEY TO SYMBOLS

Strata symbols

Symbol	Description
░	Poorly graded sand
▒	Well graded sand
▓	Well graded gravel with silt
▨	Clayey sand
▥	Silty sand
▩	Poorly graded clayey silty sand
▧	Low plasticity clay
▥	Silt
▦	Well graded sand with silt
▥	Poorly graded silty fine sand
▦	Poorly graded sand with silt
▓	Silty gravel

Misc. Symbols

Symbol	Description
▽	Water table during drilling
C	Depth to caving

Soil Samplers

Symbol	Description
■	California sampler
⧄	No recovery
◪	Standard penetration test

Notes:

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

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

KEY TO SYMBOLS

Symbol	Description
░	EXTRA: medium closely-spaced dots (6)
▤	EXTRA: narrow-spaced horizontal dashed lines (-)
▒	EXTRA: random dot pattern (1)
∨∨∨	EXTRA: regularly spaced "V"'s (<)
▨	EXTRA: very narrow cross-hatching (!)
▤	EXTRA: dashed lines with 3 dots above each dash (.)
⁘	EXTRA: large widely-spaced dots (*)
◣	EXTRA: small filled triangles ([)
△	EXTRA: semi-random triangle pattern (')
≋	EXTRA: zigzag lines (#)
⋎	EXTRA: grass pattern ({)
≈	EXTRA: tilde sign (})
□	EXTRA: randomly arranged square boxes (;)

Symbol	Description
Misc. Symbols	
▼	Water table at boring completion (LWATER)
▽	Water table during drilling (WATER)
Soil Samplers	
◨	Auger (A)
⊠	Bulk sample (B)
■	California sampler (C)
◪	Bulk/Grab sample (F)
◧	Pitcher (L)
▼	Denison (O)
◩	Standard penetration test (P)
⧄	No recovery (X)

CPT INTERPRETATIONS

SOUNDING : CPT-01
PROJECT : AES-PANHANDLE
DATE/TIME: 11-23-98 14:42

PROJECT No.: 98-1571-1
CONE/RIG : 491,#1 JH,GO

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	154.90	1.69	SAND to SILTY SAND	39	62	89		
.300	.98	143.89	1.85	SILTY SAND to SANDY SILT	48	77	87		
.450	1.48	81.50	2.22	SILTY SAND to SANDY SILT	27	43	70		
.600	1.97	51.41	2.02	SANDY SILT to CLAYEY SILT	21	33		3.4	
.750	2.46	25.62	.90	SILTY SAND to SANDY SILT	9	14	37		43.5
.900	2.95	18.04	4.38	CLAY	18	29		1.2	
1.050	3.44	15.95	3.82	CLAY to SILTY CLAY	11	17		1.1	
1.200	3.94	19.76	1.87	SANDY SILT to CLAYEY SILT	8	13		1.6	
1.350	4.43	42.45	1.91	SANDY SILT to CLAYEY SILT	17	27		2.8	
1.500	4.92	33.63	2.35	SANDY SILT to CLAYEY SILT	13	22		2.2	
1.650	5.41	32.50	1.32	SILTY SAND to SANDY SILT	11	17	44		40.5
1.800	5.91	25.75	2.41	CLAYEY SILT to SILTY CLAY	13	21		1.7	
1.950	6.40	58.49	1.28	SILTY SAND to SANDY SILT	19	31	61		43.0
2.100	6.89	67.54	1.58	SILTY SAND to SANDY SILT	23	36	65		43.0
2.250	7.38	51.43	1.91	SILTY SAND to SANDY SILT	17	27	57		42.0
2.400	7.87	48.80	2.11	SANDY SILT to CLAYEY SILT	20	30		3.2	
2.550	8.37	42.15	1.68	SILTY SAND to SANDY SILT	14	21	52		39.5
2.700	8.86	33.40	1.77	SANDY SILT to CLAYEY SILT	13	19		2.6	
2.850	9.35	31.65	1.52	SANDY SILT to CLAYEY SILT	13	18		2.5	
3.000	9.84	28.30	1.70	SANDY SILT to CLAYEY SILT	11	15		2.2	
3.150	10.33	36.26	2.34	SANDY SILT to CLAYEY SILT	15	19		2.4	
3.300	10.83	49.95	2.08	SANDY SILT to CLAYEY SILT	20	26		3.3	
3.450	11.32	63.90	2.03	SILTY SAND to SANDY SILT	21	27	61		40.0
3.600	11.81	67.32	2.12	SILTY SAND to SANDY SILT	22	28	62		40.0
3.750	12.30	67.58	2.68	SANDY SILT to CLAYEY SILT	27	33		4.5	
3.900	12.80	64.58	2.15	SILTY SAND to SANDY SILT	22	26	59		39.5
4.050	13.29	56.77	2.66	SANDY SILT to CLAYEY SILT	23	27		3.7	
4.200	13.78	67.28	1.77	SILTY SAND to SANDY SILT	22	26	60		39.5
4.350	14.27	58.89	2.17	SANDY SILT to CLAYEY SILT	24	27		3.9	
4.500	14.76	116.15	1.14	SAND to SILTY SAND	29	32	74		42.0
4.650	15.26	96.66	.72	SAND to SILTY SAND	24	26	69		41.0
4.800	15.75	31.82	1.92	SANDY SILT to CLAYEY SILT	13	14		2.5	
4.950	16.24	18.65	3.00	CLAYEY SILT to SILTY CLAY	9	10		1.2	
5.100	16.73	10.43	3.93	CLAY	10	11		.6	
5.250	17.22	17.21	2.85	CLAYEY SILT to SILTY CLAY	9	9		1.1	
5.400	17.72	9.82	3.36	CLAY	10	10		.6	
5.550	18.21	6.05	9.42	CLAY	6	6		.3	
5.700	18.70	47.10	3.40	CLAYEY SILT to SILTY CLAY	24	23		2.7	
5.850	19.19	14.45	4.84	CLAY	14	14		.9	
6.000	19.69	16.70	4.79	CLAY	17	16		1.0	
6.150	20.18	94.07	.83	SAND to SILTY SAND	24	23	64		39.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 19.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-01

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	68.30	1.08	SILTY SAND to SANDY SILT	23	22	55		38.0
6.450	21.16	93.75	.92	SAND to SILTY SAND	23	22	64		39.0
6.600	21.65	56.89	2.37	SANDY SILT to CLAYEY SILT	23	22		3.7	
6.750	22.15	32.59	2.79	CLAYEY SILT to SILTY CLAY	16	15		2.1	
6.900	22.64	56.98	1.30	SILTY SAND to SANDY SILT	19	18	49		37.5
7.050	23.13	162.95	.23	SAND	33	30	79		42.0
7.200	23.62	230.74	.26	SAND	46	43	89		43.5
7.350	24.11	95.22	.45	SAND to SILTY SAND	24	22	63		39.0
7.500	24.61	51.20	.82	SILTY SAND to SANDY SILT	17	16	45		36.5
7.650	25.10	19.10	2.04	CLAYEY SILT to SILTY CLAY	10	9		1.4	
7.800	25.59	56.28	2.88	SANDY SILT to CLAYEY SILT	23	21		3.7	
7.950	26.08	16.85	4.33	CLAY	17	15		1.0	
8.100	26.57	16.15	4.09	CLAY	16	15		1.0	
8.250	27.07	15.66	4.66	CLAY	16	14		.9	
8.400	27.56	16.23	4.25	CLAY	16	15		1.0	
8.550	28.05	25.64	6.94	CLAY	26	23		1.4	
8.700	28.54	97.85	4.22	CLAYEY SILT to SILTY CLAY	49	43		5.7	
8.850	29.04	11.30	6.37	CLAY	11	10		.6	
9.000	29.53	21.31	5.44	CLAY	21	19		1.2	
9.150	30.02	62.33	1.75	SILTY SAND to SANDY SILT	21	18	50		37.0
9.300	30.51	137.84	2.17	SILTY SAND to SANDY SILT	46	40	72		40.0
9.450	31.00	164.07	1.83	SILTY SAND to SANDY SILT	55	47	77		41.5
9.600	31.50	166.11	.52	SAND	33	29	77		41.5
9.750	31.99	57.83	2.35	SANDY SILT to CLAYEY SILT	23	20		3.7	
9.900	32.48	12.73	2.83	CLAY to SILTY CLAY	8	7		.7	
10.050	32.97	301.25	*****		0	0			.0

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 19.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

CPT INTERPRETATIONS

SOUNDING : CPT-01A
PROJECT : AES-PANHANDLE
DATE/TIME: 11-24-98 10:20

PROJECT No.: 98-1571-1
CONE/RIG : 468/R#3 KC/MR

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	75.82	1.56	SILTY SAND to SANDY SILT	25	40	68		
.300	.98	114.30	2.75	SANDY SILT to CLAYEY SILT	46	73		6.7	
.450	1.48	89.27	3.28	SANDY SILT to CLAYEY SILT	36	57		5.2	
.600	1.97	63.18	2.28	SANDY SILT to CLAYEY SILT	25	40		4.2	
.750	2.46	32.08	2.21	SANDY SILT to CLAYEY SILT	13	21		2.1	
.900	2.95	31.00	3.10	CLAYEY SILT to SILTY CLAY	16	25		2.1	
1.050	3.44	41.45	3.06	CLAYEY SILT to SILTY CLAY	21	33		2.8	
1.200	3.94	39.69	2.70	SANDY SILT to CLAYEY SILT	16	25		2.6	
1.350	4.43	38.75	3.59	CLAYEY SILT to SILTY CLAY	19	31		2.6	
1.500	4.92	40.77	3.80	CLAYEY SILT to SILTY CLAY	20	33		2.4	
1.650	5.41	54.41	2.87	SANDY SILT to CLAYEY SILT	22	35		3.6	
1.800	5.91	52.98	3.19	SANDY SILT to CLAYEY SILT	21	34		3.5	
1.950	6.40	53.28	3.32	CLAYEY SILT to SILTY CLAY	27	43		3.1	
2.100	6.89	52.73	3.13	SANDY SILT to CLAYEY SILT	21	34		3.5	
2.250	7.38	50.01	3.48	CLAYEY SILT to SILTY CLAY	25	39		2.9	
2.400	7.87	47.18	3.65	CLAYEY SILT to SILTY CLAY	24	36		2.7	
2.550	8.37	45.15	2.17	SANDY SILT to CLAYEY SILT	18	27		3.0	
2.700	8.86	42.77	3.51	CLAYEY SILT to SILTY CLAY	21	31		2.5	
2.850	9.35	35.95	3.48	CLAYEY SILT to SILTY CLAY	18	25		2.4	
3.000	9.84	36.48	2.88	CLAYEY SILT to SILTY CLAY	18	25		2.4	
3.150	10.33	35.44	3.30	CLAYEY SILT to SILTY CLAY	18	24		2.3	
3.300	10.83	48.86	3.44	CLAYEY SILT to SILTY CLAY	24	32		2.8	
3.450	11.32	47.84	3.24	CLAYEY SILT to SILTY CLAY	24	30		3.1	
3.600	11.81	52.43	3.60	CLAYEY SILT to SILTY CLAY	26	33		3.0	
3.750	12.30	62.23	3.66	CLAYEY SILT to SILTY CLAY	31	38		3.6	
3.900	12.80	75.53	3.10	SANDY SILT to CLAYEY SILT	30	36		4.4	
4.050	13.29	51.56	3.78	CLAYEY SILT to SILTY CLAY	26	30		3.0	
4.200	13.78	39.56	5.13	CLAY	40	45		2.3	
4.350	14.27	42.45	4.10	CLAYEY SILT to SILTY CLAY	21	24		2.5	
4.500	14.76	41.07	4.04	CLAYEY SILT to SILTY CLAY	21	23		2.4	
4.650	15.26	45.42	3.06	CLAYEY SILT to SILTY CLAY	23	25		3.0	
4.800	15.75	46.40	2.89	SANDY SILT to CLAYEY SILT	19	20		3.0	
4.950	16.24	30.10	3.36	CLAYEY SILT to SILTY CLAY	15	16		1.9	
5.100	16.73	26.56	3.20	CLAYEY SILT to SILTY CLAY	13	14		1.7	
5.250	17.22	31.61	2.18	SANDY SILT to CLAYEY SILT	13	13		2.0	
5.400	17.72	30.02	2.30	SANDY SILT to CLAYEY SILT	12	12		1.9	
5.550	18.21	10.13	1.48	CLAYEY SILT to SILTY CLAY	5	5		.7	
5.700	18.70	32.12	2.21	SANDY SILT to CLAYEY SILT	13	13		2.1	
5.850	19.19	69.34	1.15	SILTY SAND to SANDY SILT	23	23	56		38.5
6.000	19.69	72.17	2.29	SILTY SAND to SANDY SILT	24	23	57		38.5
6.150	20.18	71.23	2.19	SILTY SAND to SANDY SILT	24	23	56		38.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 19.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-01A

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	137.58	1.51	SAND to SILTY SAND	34	33	75		42.0
6.450	21.16	200.06	1.16	SAND	40	38	86		43.5
6.600	21.65	139.98	1.67	SAND to SILTY SAND	35	33	75		42.0
6.750	22.15	31.04	2.38	SANDY SILT to CLAYEY SILT	12	12		2.0	
6.900	22.64	47.46	1.50	SILTY SAND to SANDY SILT	16	15	44		36.5
7.050	23.13	16.91	3.67	CLAY to SILTY CLAY	11	11		1.0	
7.200	23.62	22.09	4.84	CLAY	22	21		1.4	
7.350	24.11	70.28	1.31	SILTY SAND to SANDY SILT	23	22	55		38.0
7.500	24.61	60.23	2.32	SANDY SILT to CLAYEY SILT	24	22		3.9	
7.650	25.10	74.14	.97	SAND to SILTY SAND	19	17	56		38.0
7.800	25.59	20.71	4.88	CLAY	21	19		1.3	
7.950	26.08	26.39	4.55	CLAY	26	24		1.5	
8.100	26.57	33.38	3.33	CLAYEY SILT to SILTY CLAY	17	15		2.1	
8.250	27.07	15.32	5.16	CLAY	15	14		.9	
8.400	27.56	49.78	2.27	SANDY SILT to CLAYEY SILT	20	18		3.2	
8.550	28.05	165.99	1.56	SAND to SILTY SAND	41	37	78		42.0
8.700	28.54	18.31	5.68	CLAY	18	16		1.1	
8.850	29.04	19.84	5.75	CLAY	20	18		1.1	
9.000	29.53	33.33	4.29	CLAY to SILTY CLAY	22	20		1.9	
9.150	30.02	97.26	1.17	SAND to SILTY SAND	24	21	62		38.5
9.300	30.51	108.48	1.56	SILTY SAND to SANDY SILT	36	31	65		39.0
9.450	31.00	183.94	1.08	SAND	37	32	80		42.0
9.600	31.50	385.36	.53	GRAVELLY SAND to SAND	64	55	100		45.0
9.750	31.99	56.15	3.42	CLAYEY SILT to SILTY CLAY	28	24		3.2	

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 19.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

CPT INTERPRETATIONS

SOUNDING : CPT-02 PROJECT No.: 98-1571-1
PROJECT : AES-PANHANDLE CONE/RIG : 468/R#3 KC/MR
DATE/TIME: 11-24-98 10:48

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	125.75	1.78	SILTY SAND to SANDY SILT	42	67	83		
.300	.98	69.53	2.74	SANDY SILT to CLAYEY SILT	28	44		4.6	
.450	1.48	57.74	.67	SAND to SILTY SAND	14	23	61		48.5
.600	1.97	31.29	2.14	SANDY SILT to CLAYEY SILT	13	20		2.1	
.750	2.46	22.24	2.31	CLAYEY SILT to SILTY CLAY	11	18		1.5	
.900	2.95	14.40	2.48	CLAYEY SILT to SILTY CLAY	7	12		1.1	
1.050	3.44	9.16	2.23	CLAY to SILTY CLAY	6	10		.7	
1.200	3.94	11.81	3.66	CLAY	12	19		.8	
1.350	4.43	7.18	2.81	CLAY	7	11		.6	
1.500	4.92	11.51	2.90	CLAY to SILTY CLAY	8	12		.7	
1.650	5.41	14.40	1.38	SANDY SILT to CLAYEY SILT	6	9		1.1	
1.800	5.91	14.98	1.42	SANDY SILT to CLAYEY SILT	6	10		1.2	
1.950	6.40	10.22	2.13	CLAYEY SILT to SILTY CLAY	5	8		.8	
2.100	6.89	14.68	2.23	CLAYEY SILT to SILTY CLAY	7	12		1.1	
2.250	7.38	50.01	2.38	SANDY SILT to CLAYEY SILT	20	31		3.3	
2.400	7.87	145.65	1.26	SAND to SILTY SAND	36	55	87		46.0
2.550	8.37	50.01	5.39	CLAY	50	74		2.9	
2.700	8.86	18.80	4.55	CLAY	19	27		1.2	
2.850	9.35	18.12	4.42	CLAY	18	25		1.2	
3.000	9.84	46.06	3.60	CLAYEY SILT to SILTY CLAY	23	31		2.7	
3.150	10.33	12.28	5.55	CLAY	12	16		.8	
3.300	10.83	26.28	3.08	CLAYEY SILT to SILTY CLAY	13	17		1.7	
3.450	11.32	46.48	1.75	SILTY SAND to SANDY SILT	15	20	52		38.5
3.600	11.81	42.57	2.13	SANDY SILT to CLAYEY SILT	17	21		2.8	
3.750	12.30	51.26	1.86	SILTY SAND to SANDY SILT	17	21	53		38.5
3.900	12.80	47.33	1.97	SANDY SILT to CLAYEY SILT	19	23		3.1	
4.050	13.29	54.58	2.05	SANDY SILT to CLAYEY SILT	22	26		3.6	
4.200	13.78	22.86	3.57	CLAY to SILTY CLAY	15	18		1.5	
4.350	14.27	15.00	2.79	CLAYEY SILT to SILTY CLAY	8	8		.9	
4.500	14.76	48.14	1.15	SILTY SAND to SANDY SILT	16	18	49		38.0
4.650	15.26	39.30	2.32	SANDY SILT to CLAYEY SILT	16	17		2.6	
4.800	15.75	24.16	2.59	CLAYEY SILT to SILTY CLAY	12	13		1.6	
4.950	16.24	27.24	3.55	CLAYEY SILT to SILTY CLAY	14	14		1.8	
5.100	16.73	13.98	4.26	CLAY	14	15		.9	
5.250	17.22	13.13	4.54	CLAY	13	13		.8	
5.400	17.72	8.84	3.17	CLAY	9	9		.5	
5.550	18.21	28.89	2.95	CLAYEY SILT to SILTY CLAY	14	14		1.9	
5.700	18.70	12.22	4.02	CLAY	12	12		.7	
5.850	19.19	8.63	7.45	CLAY	9	8		.5	
6.000	19.69	228.55	1.39	SAND to SILTY SAND	57	55	90		44.0
6.150	20.18	52.50	2.10	SANDY SILT to CLAYEY SILT	21	20		3.4	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 19.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-02

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	17.21	5.74	CLAY	17	17		1.1	
6.450	21.16	195.94	2.21	SILTY SAND to SANDY SILT	65	62	85		43.0
6.600	21.65	209.18	1.36	SAND to SILTY SAND	52	50	87		43.5
6.750	22.15	165.35	1.16	SAND to SILTY SAND	41	39	80		42.5
6.900	22.64	98.96	1.29	SAND to SILTY SAND	25	23	65		39.5
7.050	23.13	36.29	1.76	SANDY SILT to CLAYEY SILT	15	14		2.8	
7.200	23.62	63.31	1.65	SILTY SAND to SANDY SILT	21	20	52		38.0
7.350	24.11	73.08	.92	SAND to SILTY SAND	18	17	56		38.0
7.500	24.61	27.17	6.81	CLAY	27	25		1.5	
7.650	25.10	203.36	*****		0	0			38.0

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 19.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

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CPT INTERPRETATIONS

SOUNDING : CPT-03
PROJECT : AES-PANHANDLE
DATE/TIME: 11-23-98 14:00

PROJECT No.: 98-1571-1
CONE/RIG : 491,#1 JH,GO

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DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	533.67	1.33	SAND	100	100	100		
.300	.98	67.79	5.11	*VERY STIFF FINE GRAINED	68	100			
.450	1.48	35.22	2.22	SANDY SILT to CLAYEY SILT	14	23		2.3	
.600	1.97	26.15	1.39	SANDY SILT to CLAYEY SILT	10	17		2.1	
.750	2.46	19.50	1.75	SANDY SILT to CLAYEY SILT	8	12		1.5	
.900	2.95	19.80	1.97	CLAYEY SILT to SILTY CLAY	10	16		1.6	
1.050	3.44	16.27	2.53	CLAYEY SILT to SILTY CLAY	8	13		1.1	
1.200	3.94	18.36	2.96	CLAYEY SILT to SILTY CLAY	9	15		1.2	
1.350	4.43	20.97	2.21	CLAYEY SILT to SILTY CLAY	10	17		1.7	
1.500	4.92	15.55	3.05	CLAY to SILTY CLAY	10	17		1.0	
1.650	5.41	14.94	3.63	CLAY to SILTY CLAY	10	16		1.0	
1.800	5.91	15.85	3.92	CLAY to SILTY CLAY	11	17		1.0	
1.950	6.40	19.04	5.00	CLAY	19	30		1.2	
2.100	6.89	10.05	9.61	CLAY	10	16		.6	
2.250	7.38	8.97	11.61	CLAY	9	14		.6	
2.400	7.87	8.92	13.28	CLAY	9	14		.6	
2.550	8.37	13.92	8.07	CLAY	14	21		.9	
2.700	8.86	33.12	1.71	SANDY SILT to CLAYEY SILT	13	19		2.6	
2.850	9.35	32.19	2.44	SANDY SILT to CLAYEY SILT	13	18		2.1	
3.000	9.84	25.49	2.40	CLAYEY SILT to SILTY CLAY	13	17		1.7	
3.150	10.33	22.18	2.45	CLAYEY SILT to SILTY CLAY	11	15		1.4	
3.300	10.83	23.31	2.82	CLAYEY SILT to SILTY CLAY	12	15		1.5	
3.450	11.32	20.50	3.18	CLAYEY SILT to SILTY CLAY	10	13		1.3	
3.600	11.81	18.19	2.76	CLAYEY SILT to SILTY CLAY	9	11		1.2	
3.750	12.30	19.25	2.66	CLAYEY SILT to SILTY CLAY	10	12		1.2	
3.900	12.80	15.85	3.14	CLAY to SILTY CLAY	11	13		1.0	
4.050	13.29	14.81	3.83	CLAY to SILTY CLAY	10	12		.9	
4.200	13.78	14.32	2.80	CLAYEY SILT to SILTY CLAY	7	8		.9	
4.350	14.27	17.08	3.05	CLAYEY SILT to SILTY CLAY	9	10		1.1	
4.500	14.76	18.10	3.65	CLAY to SILTY CLAY	12	13		1.2	
4.650	15.26	35.33	2.29	SANDY SILT to CLAYEY SILT	14	15		2.3	
4.800	15.75	29.76	1.94	SANDY SILT to CLAYEY SILT	12	13		2.3	
4.950	16.24	17.61	3.32	CLAY to SILTY CLAY	12	13		1.1	
5.100	16.73	19.84	2.72	CLAYEY SILT to SILTY CLAY	10	11		1.3	
5.250	17.22	18.27	2.98	CLAYEY SILT to SILTY CLAY	9	10		1.2	
5.400	17.72	14.45	3.44	CLAY to SILTY CLAY	10	10		.9	
5.550	18.21	29.72	1.37	SANDY SILT to CLAYEY SILT	12	12		2.3	
5.700	18.70	27.64	4.00	CLAY to SILTY CLAY	18	19		1.8	
5.850	19.19	68.22	.87	SAND to SILTY SAND	17	18	57		38.5
6.000	19.69	71.21	1.59	SILTY SAND to SANDY SILT	24	24	58		38.5
6.150	20.18	64.48	.80	SAND to SILTY SAND	16	16	55		38.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 15.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-03

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	20.06	4.44	CLAY	20	20		1.3	
6.450	21.16	48.48	1.22	SILTY SAND to SANDY SILT	16	16	46		37.5
6.600	21.65	17.70	4.15	CLAY	18	18		1.1	
6.750	22.15	26.22	3.32	CLAYEY SILT to SILTY CLAY	13	13		1.7	
6.900	22.64	32.02	3.66	CLAYEY SILT to SILTY CLAY	16	16		2.1	
7.050	23.13	23.73	4.19	CLAY to SILTY CLAY	16	16		1.5	
7.200	23.62	38.79	2.79	SANDY SILT to CLAYEY SILT	16	15		2.5	
7.350	24.11	104.82	.93	SAND to SILTY SAND	26	25	68		40.0
7.500	24.61	100.28	.86	SAND to SILTY SAND	25	24	66		39.5
7.650	25.10	110.92	.46	SAND	22	21	69		40.0
7.800	25.59	135.16	1.14	SAND to SILTY SAND	34	32	74		41.5
7.950	26.08	80.79	.38	SAND to SILTY SAND	20	19	59		38.5
8.100	26.57	32.31	1.39	SANDY SILT to CLAYEY SILT	13	12		2.5	
8.250	27.07	45.59	.86	SILTY SAND to SANDY SILT	15	14	43		36.5
8.400	27.56	97.73	.45	SAND to SILTY SAND	24	23	64		39.0
8.550	28.05	9.69	15.82	CLAY	10	9		.5	
8.700	28.54	10.39	4.20	CLAY	10	10		.6	
8.850	29.04	5.14	2.50	CLAY	5	5		.3	
9.000	29.53	11.05	2.65	CLAY to SILTY CLAY	7	7		.8	
9.150	30.02	226.02	.95	SAND	45	41	88		43.5
9.300	30.51	69.53	2.41	SANDY SILT to CLAYEY SILT	28	25		4.5	
9.450	31.00	46.14	2.00	SANDY SILT to CLAYEY SILT	18	17		3.0	
9.600	31.50	51.99	1.75	SILTY SAND to SANDY SILT	17	16	45		36.5
9.750	31.99	46.46	3.22	CLAYEY SILT to SILTY CLAY	23	21		3.0	
9.900	32.48	76.74	1.01	SAND to SILTY SAND	19	17	56		38.0
10.050	32.97	235.07	2.24	SILTY SAND to SANDY SILT	78	70	88		43.5
10.200	33.46	180.39	1.15	SAND to SILTY SAND	45	40	80		42.0
10.350	33.96	263.69	1.84	SAND to SILTY SAND	66	58	91		44.0
10.500	34.45	162.33	.16	SAND	32	28	77		41.5
10.650	34.94	92.10	.89	SAND to SILTY SAND	23	20	61		38.5
10.800	35.43	39.54	2.46	SANDY SILT to CLAYEY SILT	16	14		2.5	
10.950	35.93	76.40	3.32	SANDY SILT to CLAYEY SILT	31	26		4.4	
11.100	36.42	250.63	1.63	SAND to SILTY SAND	63	54	89		43.5
11.250	36.91	392.75	.46	GRAVELLY SAND to SAND	65	56	100		45.0

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 15.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

CPT INTERPRETATIONS

SOUNDING : CPT-03A
PROJECT : AES-PANHANDLE
DATE/TIME: 11-24-98 08:44
PROJECT No.: 98-1571-1
CONE/RIG : 468/R#3 KC/MR

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	182.96	2.88	SILTY SAND to SANDY SILT	61	98	94		
.300	.98	158.95	2.99	SANDY SILT to CLAYEY SILT	64	100		9.3	
.450	1.48	80.77	3.66	CLAYEY SILT to SILTY CLAY	40	65		4.7	
.600	1.97	48.40	3.13	CLAYEY SILT to SILTY CLAY	24	39		3.2	
.750	2.46	23.50	3.24	CLAYEY SILT to SILTY CLAY	12	19		1.6	
.900	2.95	14.68	2.66	CLAYEY SILT to SILTY CLAY	7	12		1.0	
1.050	3.44	15.55	2.26	CLAYEY SILT to SILTY CLAY	8	12		1.2	
1.200	3.94	16.70	2.48	CLAYEY SILT to SILTY CLAY	8	13		1.1	
1.350	4.43	18.06	2.37	CLAYEY SILT to SILTY CLAY	9	14		1.2	
1.500	4.92	15.61	1.67	CLAYEY SILT to SILTY CLAY	8	12		1.2	
1.650	5.41	18.53	1.97	CLAYEY SILT to SILTY CLAY	9	15		1.5	
1.800	5.91	19.99	2.34	CLAYEY SILT to SILTY CLAY	10	16		1.3	
1.950	6.40	23.90	2.13	SANDY SILT to CLAYEY SILT	10	15		1.9	
2.100	6.89	30.64	1.83	SANDY SILT to CLAYEY SILT	12	20		2.4	
2.250	7.38	25.01	2.04	SANDY SILT to CLAYEY SILT	10	16		2.0	
2.400	7.87	29.25	1.88	SANDY SILT to CLAYEY SILT	12	18		2.3	
2.550	8.37	33.69	2.52	SANDY SILT to CLAYEY SILT	13	20		2.2	
2.700	8.86	43.55	2.41	SANDY SILT to CLAYEY SILT	17	25		2.9	
2.850	9.35	50.84	.86	SILTY SAND to SANDY SILT	17	24	57		40.0
3.000	9.84	49.65	2.17	SANDY SILT to CLAYEY SILT	20	27		3.3	
3.150	10.33	43.81	2.63	SANDY SILT to CLAYEY SILT	18	23		2.9	
3.300	10.83	44.30	3.02	CLAYEY SILT to SILTY CLAY	22	29		2.9	
3.450	11.32	66.90	1.12	SILTY SAND to SANDY SILT	22	28	62		40.5
3.600	11.81	120.31	2.12	SILTY SAND to SANDY SILT	40	50	78		43.5
3.750	12.30	100.72	1.24	SAND to SILTY SAND	25	31	73		42.5
3.900	12.80	59.76	2.35	SANDY SILT to CLAYEY SILT	24	28		3.9	
4.050	13.29	13.68	3.26	CLAY to SILTY CLAY	9	11		.9	
4.200	13.78	40.56	1.37	SILTY SAND to SANDY SILT	14	16	45		37.5
4.350	14.27	25.22	1.80	SANDY SILT to CLAYEY SILT	10	11		2.0	
4.500	14.76	14.64	1.93	CLAYEY SILT to SILTY CLAY	7	8		1.1	
4.650	15.26	25.15	1.40	SANDY SILT to CLAYEY SILT	10	11		1.9	
4.800	15.75	19.06	2.98	CLAYEY SILT to SILTY CLAY	10	10		1.2	
4.950	16.24	53.20	1.69	SILTY SAND to SANDY SILT	18	19	51		38.0
5.100	16.73	9.94	2.33	CLAY to SILTY CLAY	7	7		.7	
5.250	17.22	4.08	3.83	CLAY	4	4		.2	
5.400	17.72	13.36	1.37	CLAYEY SILT to SILTY CLAY	7	7		1.0	
5.550	18.21	4.89	2.42	CLAY	5	5		.3	
5.700	18.70	8.29	3.27	CLAY	8	9		.5	
5.850	19.19	8.33	4.55	CLAY	8	9		.5	
6.000	19.69	33.95	1.56	SANDY SILT to CLAYEY SILT	14	14		2.6	
6.150	20.18	11.94	4.71	CLAY	12	12		.7	

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 15.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-03A

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	18.06	3.32	CLAY to SILTY CLAY	12	12		1.1	
6.450	21.16	12.62	3.61	CLAY to SILTY CLAY	8	8		.8	
6.600	21.65	11.00	3.77	CLAY	11	11		.7	
6.750	22.15	6.01	3.82	CLAY	6	6		.3	
6.900	22.64	7.44	3.80	CLAY	7	7		.4	
7.050	23.13	12.15	4.53	CLAY	12	12		.7	
7.200	23.62	24.24	5.31	CLAY	24	24		1.3	
7.350	24.11	9.60	4.99	CLAY	10	9		.6	
7.500	24.61	9.86	3.68	CLAY	10	10		.6	
7.650	25.10	9.88	3.80	CLAY	10	10		.6	
7.800	25.59	13.07	4.13	CLAY	13	13		.8	
7.950	26.08	13.60	3.87	CLAY	14	13		.8	
8.100	26.57	9.88	4.04	CLAY	10	9		.6	
8.250	27.07	11.26	4.84	CLAY	11	11		.7	
8.400	27.56	7.86	3.77	CLAY	8	7		.4	
8.550	28.05	5.99	5.51	CLAY	6	6		.3	
8.700	28.54	45.29	1.98	SANDY SILT to CLAYEY SILT	18	17		2.9	
8.850	29.04	43.21	3.05	CLAYEY SILT to SILTY CLAY	22	20		2.8	
9.000	29.53	19.25	2.92	CLAYEY SILT to SILTY CLAY	10	9		1.2	
9.150	30.02	10.66	6.60	CLAY	11	10		.6	
9.300	30.51	13.77	3.13	CLAY to SILTY CLAY	9	8		.8	
9.450	31.00	24.37	2.19	SANDY SILT to CLAYEY SILT	10	9		1.5	
9.600	31.50	15.59	3.25	CLAY to SILTY CLAY	10	9		.9	
9.750	31.99	9.16	3.02	CLAY to SILTY CLAY	6	5		.5	
9.900	32.48	6.25	3.77	CLAY	6	6		.3	
10.050	32.97	5.65	3.62	CLAY	6	5		.3	
10.200	33.46	5.37	2.96	CLAY	5	5		.3	
10.350	33.96	6.20	3.47	CLAY	6	5		.3	
10.500	34.45	7.46	3.08	CLAY	7	7		.4	
10.650	34.94	8.37	2.92	CLAY to SILTY CLAY	6	5		.4	
10.800	35.43	6.54	2.91	CLAY	7	6		.4	
10.950	35.93	7.14	2.77	CLAY	7	6		.4	
11.100	36.42	5.86	3.29	CLAY	6	5		.3	
11.250	36.91	9.75	2.62	CLAY to SILTY CLAY	7	6		.6	
11.400	37.40	8.77	3.40	CLAY	9	7		.4	
11.550	37.89	9.84	2.95	CLAY to SILTY CLAY	7	6		.5	
11.700	38.39	9.79	3.37	CLAY	10	8		.5	
11.850	38.88	8.14	3.04	CLAY	8	7		.4	
12.000	39.37	7.52	2.86	CLAY	8	6		.4	
12.150	39.86	7.16	3.47	CLAY	7	6		.3	
12.300	40.35	7.50	3.21	CLAY	8	6		.4	
12.450	40.85	8.60	2.53	CLAY to SILTY CLAY	6	5		.5	
12.600	41.34	8.14	4.09	CLAY	8	7		.4	
12.750	41.83	10.79	2.49	CLAY to SILTY CLAY	7	6		.7	
12.900	42.32	10.58	3.31	CLAY to SILTY CLAY	7	6		.6	
13.050	42.81	12.45	4.28	CLAY	12	10		.7	
13.200	43.31	13.32	4.83	CLAY	13	11		.7	
13.350	43.80	90.57	2.21	SILTY SAND to SANDY SILT	30	24	58		38.0
13.500	44.29	95.73	4.32	CLAYEY SILT to SILTY CLAY	48	39		5.5	
13.650	44.78	42.79	4.29	CLAY to SILTY CLAY	29	23		2.4	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 15.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-03A

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	55.81	7.29	CLAY	56	45		3.1	
13.950	45.77	231.87	5.27	*VERY STIFF FINE GRAINED	100	100			
14.100	46.26	116.17	*****		0	0			.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 15.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

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CPT INTERPRETATIONS

SOUNDING : CPT-03B
PROJECT : AES-PANHANDLE
DATE/TIME: 11-24-98 11:30

PROJECT No.: 98-1571-1
CONE/RIG : 468/R#3 KC/MR

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PAGE 1 of 2

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	2.36	48.73	ORGANIC MATERIAL	2	4		.2	
.300	.98	65.01	3.12	SANDY SILT to CLAYEY SILT	26	42		3.8	
.450	1.48	47.44	3.18	CLAYEY SILT to SILTY CLAY	24	38		3.2	
.600	1.97	32.44	2.74	CLAYEY SILT to SILTY CLAY	16	26		2.2	
.750	2.46	26.51	3.09	CLAYEY SILT to SILTY CLAY	13	21		1.8	
.900	2.95	18.65	3.38	CLAY to SILTY CLAY	12	20		1.2	
1.050	3.44	11.58	4.92	CLAY	12	19		.8	
1.200	3.94	12.24	4.82	CLAY	12	20		.8	
1.350	4.43	12.02	4.33	CLAY	12	19		.8	
1.500	4.92	13.36	3.74	CLAY	13	21		.9	
1.650	5.41	5.40	6.30	CLAY	5	9		.3	
1.800	5.91	6.50	3.54	CLAY	7	10		.4	
1.950	6.40	10.75	2.79	CLAY to SILTY CLAY	7	11		.7	
2.100	6.89	22.12	2.22	CLAYEY SILT to SILTY CLAY	11	18		1.4	
2.250	7.38	23.35	2.70	CLAYEY SILT to SILTY CLAY	12	18		1.5	
2.400	7.87	22.80	2.85	CLAYEY SILT to SILTY CLAY	11	17		1.5	
2.550	8.37	26.87	2.53	CLAYEY SILT to SILTY CLAY	13	20		1.8	
2.700	8.86	32.36	2.78	CLAYEY SILT to SILTY CLAY	16	23		2.1	
2.850	9.35	42.11	2.21	SANDY SILT to CLAYEY SILT	17	23		2.8	
3.000	9.84	33.50	3.19	CLAYEY SILT to SILTY CLAY	17	23		2.2	
3.150	10.33	31.59	3.29	CLAYEY SILT to SILTY CLAY	16	21		2.1	
3.300	10.83	27.79	3.60	CLAYEY SILT to SILTY CLAY	14	18		1.8	
3.450	11.32	23.43	4.87	CLAY	23	30		1.3	
3.600	11.81	27.24	3.82	CLAY to SILTY CLAY	18	23		1.8	
3.750	12.30	28.77	3.68	CLAYEY SILT to SILTY CLAY	14	17		1.9	
3.900	12.80	22.09	4.62	CLAY	22	26		1.4	
4.050	13.29	24.20	4.01	CLAY to SILTY CLAY	16	19		1.6	
4.200	13.78	23.09	5.24	CLAY	23	27		1.3	
4.350	14.27	50.07	2.56	SANDY SILT to CLAYEY SILT	20	23		3.3	
4.500	14.76	34.46	2.29	SANDY SILT to CLAYEY SILT	14	15		2.2	
4.650	15.26	28.11	3.98	CLAY to SILTY CLAY	19	20		1.8	
4.800	15.75	31.99	2.38	SANDY SILT to CLAYEY SILT	13	14		2.1	
4.950	16.24	14.02	3.92	CLAY	14	15		.9	
5.100	16.73	5.54	5.42	CLAY	6	6		.3	
5.250	17.22	6.63	6.18	CLAY	7	7		.4	
5.400	17.72	10.88	2.85	CLAY to SILTY CLAY	7	8		.7	
5.550	18.21	5.12	4.30	CLAY	5	5		.3	
5.700	18.70	4.61	3.47	CLAY	5	5		.2	
5.850	19.19	5.88	4.59	CLAY	6	6		.3	
6.000	19.69	10.79	4.54	CLAY	11	11		.6	
6.150	20.18	14.62	3.35	CLAY to SILTY CLAY	10	10		.9	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 15.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-03B

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	7.10	4.79	CLAY	7	7		.4	
6.450	21.16	4.53	6.62	CLAY	5	5		.2	
6.600	21.65	6.73	6.54	CLAY	7	7		.4	
6.750	22.15	27.85	4.56	CLAY to SILTY CLAY	19	18		1.6	
6.900	22.64	25.81	3.18	CLAYEY SILT to SILTY CLAY	13	13		1.6	
7.050	23.13	14.64	4.85	CLAY	15	14		.9	
7.200	23.62	10.01	4.60	CLAY	10	10		.6	
7.350	24.11	13.58	4.27	CLAY	14	13		.8	
7.500	24.61	11.20	5.00	CLAY	11	11		.7	
7.650	25.10	12.45	4.50	CLAY	12	12		.7	
7.800	25.59	34.95	2.17	SANDY SILT to CLAYEY SILT	14	13		2.2	
7.950	26.08	15.49	4.58	CLAY	15	15		.9	
8.100	26.57	9.18	5.99	CLAY	9	9		.5	
8.250	27.07	8.48	5.78	CLAY	8	8		.5	
8.400	27.56	10.77	5.66	CLAY	11	10		.6	
8.550	28.05	15.08	4.58	CLAY	15	14		.9	
8.700	28.54	9.79	4.29	CLAY	10	9		.5	
8.850	29.04	12.26	4.73	CLAY	12	11		.7	
9.000	29.53	11.45	4.10	CLAY	11	11		.7	
9.150	30.02	25.32	4.11	CLAY to SILTY CLAY	17	15		1.6	
9.300	30.51	50.24	1.97	SANDY SILT to CLAYEY SILT	20	18		3.2	
9.450	31.00	60.12	1.75	SILTY SAND to SANDY SILT	20	18	50		37.5
9.600	31.50	67.37	1.53	SILTY SAND to SANDY SILT	22	20	53		38.0
9.750	31.99	72.02	1.18	SILTY SAND to SANDY SILT	24	22	54		38.0
9.900	32.48	55.70	2.69	SANDY SILT to CLAYEY SILT	22	20		3.6	
10.050	32.97	74.08	2.39	SANDY SILT to CLAYEY SILT	30	26		4.8	
10.200	33.46	141.36	1.20	SAND to SILTY SAND	35	31	73		40.5
10.350	33.96	122.67	1.79	SILTY SAND to SANDY SILT	41	36	69		39.5
10.500	34.45	25.43	2.83	CLAYEY SILT to SILTY CLAY	13	11		1.6	
10.650	34.94	15.36	5.60	CLAY	15	13		.9	
10.800	35.43	32.63	3.86	CLAYEY SILT to SILTY CLAY	16	14		1.8	
10.950	35.93	85.43	3.52	SANDY SILT to CLAYEY SILT	34	30		4.9	

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 15.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

CPT INTERPRETATIONS

SOUNDING : CPT-04
PROJECT : AES-PANHANDLE
DATE/TIME: 11-23-98 12:41

PROJECT No.: 98-1571-1
CONE/RIG : 491,#1 JH,GO

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	181.58	1.56	SAND to SILTY SAND	45	73	93		
.300	.98	122.84	2.68	SILTY SAND to SANDY SILT	41	65	82		
.450	1.48	85.15	2.28	SILTY SAND to SANDY SILT	28	45	72		
.600	1.97	36.35	1.76	SANDY SILT to CLAYEY SILT	15	23		2.9	
.750	2.46	21.18	1.74	SANDY SILT to CLAYEY SILT	8	14		1.7	
.900	2.95	17.34	1.92	CLAYEY SILT to SILTY CLAY	9	14		1.4	
1.050	3.44	14.00	2.37	CLAYEY SILT to SILTY CLAY	7	11		1.1	
1.200	3.94	13.49	2.60	CLAYEY SILT to SILTY CLAY	7	11		.9	
1.350	4.43	15.36	1.89	CLAYEY SILT to SILTY CLAY	8	12		1.2	
1.500	4.92	16.17	1.94	CLAYEY SILT to SILTY CLAY	8	13		1.3	
1.650	5.41	17.23	1.75	CLAYEY SILT to SILTY CLAY	9	14		1.4	
1.800	5.91	16.93	2.54	CLAYEY SILT to SILTY CLAY	8	14		1.1	
1.950	6.40	20.67	1.87	SANDY SILT to CLAYEY SILT	8	13		1.6	
2.100	6.89	22.24	1.96	SANDY SILT to CLAYEY SILT	9	14		1.7	
2.250	7.38	19.89	1.69	SANDY SILT to CLAYEY SILT	8	12		1.6	
2.400	7.87	16.57	1.67	SANDY SILT to CLAYEY SILT	7	10		1.3	
2.550	8.37	15.21	1.13	SANDY SILT to CLAYEY SILT	6	9		1.2	
2.700	8.86	18.87	2.06	CLAYEY SILT to SILTY CLAY	9	14		1.5	
2.850	9.35	19.46	1.62	SANDY SILT to CLAYEY SILT	8	11		1.5	
3.000	9.84	18.14	1.93	CLAYEY SILT to SILTY CLAY	9	12		1.4	
3.150	10.33	30.06	1.73	SANDY SILT to CLAYEY SILT	12	16		2.4	
3.300	10.83	56.15	1.69	SILTY SAND to SANDY SILT	19	24	58		39.5
3.450	11.32	46.87	.92	SILTY SAND to SANDY SILT	16	20	52		39.0
3.600	11.81	78.82	1.58	SILTY SAND to SANDY SILT	26	33	67		42.0
3.750	12.30	11.07	6.10	CLAY	11	14		.7	
3.900	12.80	9.88	4.28	CLAY	10	12		.6	
4.050	13.29	10.41	4.31	CLAY	10	13		.6	
4.200	13.78	21.73	2.07	SANDY SILT to CLAYEY SILT	9	11		1.7	
4.350	14.27	23.31	1.12	SANDY SILT to CLAYEY SILT	9	11		1.8	
4.500	14.76	6.65	3.11	CLAY	7	8		.4	
4.650	15.26	26.49	1.44	SANDY SILT to CLAYEY SILT	11	13		2.1	
4.800	15.75	26.53	1.13	SANDY SILT to CLAYEY SILT	11	13		2.1	
4.950	16.24	25.28	2.05	SANDY SILT to CLAYEY SILT	10	12		2.0	
5.100	16.73	27.17	1.88	SANDY SILT to CLAYEY SILT	11	13		2.1	
5.250	17.22	5.67	2.87	CLAY	6	7		.4	
5.400	17.72	16.51	3.78	CLAY to SILTY CLAY	11	13		1.0	
5.550	18.21	24.18	1.60	SANDY SILT to CLAYEY SILT	10	11		1.9	
5.700	18.70	10.39	6.04	CLAY	10	12		.6	
5.850	19.19	19.69	3.30	CLAYEY SILT to SILTY CLAY	10	11		1.2	
6.000	19.69	22.33	3.33	CLAYEY SILT to SILTY CLAY	11	12		1.4	
6.150	20.18	14.45	1.91	CLAYEY SILT to SILTY CLAY	7	8		1.1	

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 11.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-04

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	13.17	3.45	CLAY to SILTY CLAY	9	10		.8	
6.450	21.16	12.81	5.35	CLAY	13	14		.8	
6.600	21.65	12.30	5.38	CLAY	12	13		.7	
6.750	22.15	9.26	4.37	CLAY	9	10		.5	
6.900	22.64	12.24	4.49	CLAY	12	13		.7	
7.050	23.13	10.81	4.47	CLAY	11	11		.6	
7.200	23.62	11.66	7.75	CLAY	12	12		.7	
7.350	24.11	16.97	6.80	CLAY	17	18		1.0	
7.500	24.61	10.94	4.90	CLAY	11	11		.6	
7.650	25.10	13.19	4.73	CLAY	13	14		.8	
7.800	25.59	15.40	5.04	CLAY	15	16		.9	
7.950	26.08	11.85	5.25	CLAY	12	12		.7	
8.100	26.57	15.32	4.71	CLAY	15	16		.9	
8.250	27.07	22.43	4.67	CLAY	22	23		1.4	
8.400	27.56	20.48	5.39	CLAY	20	20		1.1	
8.550	28.05	10.96	4.30	CLAY	11	11		.6	
8.700	28.54	21.52	4.38	CLAY	22	21		1.3	
8.850	29.04	37.37	2.93	CLAYEY SILT to SILTY CLAY	19	18		2.4	
9.000	29.53	31.08	3.02	CLAYEY SILT to SILTY CLAY	16	15		2.0	
9.150	30.02	10.35	5.14	CLAY	10	10		.6	
9.300	30.51	21.07	5.51	CLAY	21	20		1.1	
9.450	31.00	20.63	5.87	CLAY	21	20		1.1	
9.600	31.50	11.13	3.92	CLAY	11	11		.6	
9.750	31.99	13.53	2.98	CLAY to SILTY CLAY	9	9		.8	
9.900	32.48	9.28	2.59	CLAY to SILTY CLAY	6	6		.6	
10.050	32.97	6.90	3.18	CLAY	7	6		.3	
10.200	33.46	9.86	3.09	CLAY to SILTY CLAY	7	6		.5	
10.350	33.96	18.29	3.42	CLAY to SILTY CLAY	12	11		1.1	
10.500	34.45	9.52	4.38	CLAY	10	9		.5	
10.650	34.94	8.69	2.83	CLAY to SILTY CLAY	6	5		.5	
10.800	35.43	7.58	2.49	CLAY to SILTY CLAY	5	5		.5	
10.950	35.93	7.88	3.99	CLAY	8	7		.4	
11.100	36.42	8.18	3.39	CLAY	8	7		.4	
11.250	36.91	10.35	3.72	CLAY	10	9		.6	
11.400	37.40	18.04	5.26	CLAY	18	16		1.1	
11.550	37.89	12.28	7.30	CLAY	12	11		.7	
11.700	38.39	24.22	3.83	CLAY to SILTY CLAY	16	14		1.5	
11.850	38.88	8.48	10.80	CLAY	8	8		.4	
12.000	39.37	7.27	4.69	CLAY	7	6		.3	
12.150	39.86	8.71	4.23	CLAY	9	8		.4	
12.300	40.35	9.84	3.48	CLAY	10	9		.5	
12.450	40.85	9.41	4.97	CLAY	9	8		.5	
12.600	41.34	8.69	5.62	CLAY	9	8		.4	
12.750	41.83	14.15	2.65	CLAYEY SILT to SILTY CLAY	7	6		.8	
12.900	42.32	14.36	4.59	CLAY	14	12		.8	
13.050	42.81	10.41	3.73	CLAY	10	9		.5	
13.200	43.31	13.98	5.62	CLAY	14	12		.8	
13.350	43.80	20.25	6.28	CLAY	20	17		1.0	
13.500	44.29	136.54	1.74	SILTY SAND to SANDY SILT	46	39	71		39.5
13.650	44.78	151.41	1.88	SILTY SAND to SANDY SILT	50	43	74		40.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 11.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-04

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	163.78	2.19	SILTY SAND to SANDY SILT	55	46	76		41.0
13.950	45.77	218.61	2.52	SILTY SAND to SANDY SILT	73	61	84		42.5
14.100	46.26	111.96	4.64	*VERY STIFF FINE GRAINED	100	93			
14.250	46.75	154.26	4.99	*VERY STIFF FINE GRAINED	100	100			
14.400	47.24	188.46	4.54	*VERY STIFF FINE GRAINED	100	100			
14.550	47.74	294.62	5.68	*VERY STIFF FINE GRAINED	100	100			
14.700	48.23	333.95	4.99	*VERY STIFF FINE GRAINED	100	100			

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 11.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

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*                      CPT INTERPRETATIONS                           *
*                                                                    *
*  SOUNDING : CPT-05                      PROJECT No.: 98-1571-1     *
*  PROJECT  : AES-PANHANDLE               CONE/RIG : 491,#1 JH,GO    *
*  DATE/TIME: 11-23-98 11:36                                         *
*                                                                    *
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DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	20.03	1.75	SANDY SILT to CLAYEY SILT	8	13		1.6	
.300	.98	31.89	1.79	SANDY SILT to CLAYEY SILT	13	20		2.5	
.450	1.48	26.39	2.46	CLAYEY SILT to SILTY CLAY	13	21		1.8	
.600	1.97	22.97	3.13	CLAYEY SILT to SILTY CLAY	11	18		1.5	
.750	2.46	21.20	2.17	CLAYEY SILT to SILTY CLAY	11	17		1.7	
.900	2.95	10.88	2.39	CLAYEY SILT to SILTY CLAY	5	9		.9	
1.050	3.44	8.26	4.00	CLAY	8	13		.5	
1.200	3.94	9.24	2.38	CLAY to SILTY CLAY	6	10		.7	
1.350	4.43	6.20	3.55	CLAY	6	10		.4	
1.500	4.92	6.61	4.99	CLAY	7	11		.4	
1.650	5.41	8.69	4.14	CLAY	9	14		.6	
1.800	5.91	4.55	5.05	CLAY	5	7		.3	
1.950	6.40	3.57	5.04	CLAY	4	6		.2	
2.100	6.89	4.06	4.19	CLAY	4	6		.2	
2.250	7.38	4.44	5.18	CLAY	4	7		.3	
2.400	7.87	6.39	4.69	CLAY	6	10		.4	
2.550	8.37	6.10	4.75	CLAY	6	9		.4	
2.700	8.86	6.61	4.84	CLAY	7	9		.4	
2.850	9.35	5.76	4.69	CLAY	6	8		.3	
3.000	9.84	9.60	5.73	CLAY	10	13		.6	
3.150	10.33	19.08	4.77	CLAY	19	25		1.2	
3.300	10.83	30.85	4.51	CLAY to SILTY CLAY	21	27		1.8	
3.450	11.32	38.69	4.70	CLAY to SILTY CLAY	26	33		2.2	
3.600	11.81	26.85	5.18	CLAY	27	34		1.5	
3.750	12.30	18.06	5.65	CLAY	18	23		1.2	
3.900	12.80	17.04	4.28	CLAY	17	21		1.1	
4.050	13.29	16.25	4.55	CLAY	16	20		1.0	
4.200	13.78	16.53	4.90	CLAY	17	20		1.1	
4.350	14.27	16.59	4.82	CLAY	17	20		1.1	
4.500	14.76	14.19	3.88	CLAY	14	17		.9	
4.650	15.26	22.46	6.54	CLAY	22	27		1.3	
4.800	15.75	23.77	6.60	CLAY	24	28		1.3	
4.950	16.24	26.28	5.18	CLAY	26	31		1.5	
5.100	16.73	17.93	4.80	CLAY	18	21		1.1	
5.250	17.22	74.06	1.13	SILTY SAND to SANDY SILT	25	28	62		40.0
5.400	17.72	73.00	1.40	SILTY SAND to SANDY SILT	24	28	62		39.5
5.550	18.21	16.53	3.69	CLAY to SILTY CLAY	11	13		1.0	
5.700	18.70	6.99	3.00	CLAY	7	8		.5	
5.850	19.19	8.03	3.24	CLAY	8	9		.5	
6.000	19.69	10.69	3.18	CLAY to SILTY CLAY	7	8		.6	
6.150	20.18	6.63	2.26	CLAY to SILTY CLAY	4	5		.4	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 11.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-05

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	6.59	3.19	CLAY	7	7		.4	
6.450	21.16	17.89	2.68	CLAYEY SILT to SILTY CLAY	9	10		1.1	
6.600	21.65	12.47	2.65	CLAYEY SILT to SILTY CLAY	6	7		.8	
6.750	22.15	8.80	2.50	CLAY to SILTY CLAY	6	6		.6	
6.900	22.64	9.16	2.73	CLAY to SILTY CLAY	6	7		.6	
7.050	23.13	9.01	2.77	CLAY to SILTY CLAY	6	6		.6	
7.200	23.62	14.55	5.15	CLAY	15	15		.9	
7.350	24.11	27.02	5.03	CLAY	27	28		1.5	
7.500	24.61	10.69	4.02	CLAY	11	11		.6	
7.650	25.10	9.90	4.55	CLAY	10	10		.6	
7.800	25.59	10.73	2.98	CLAY to SILTY CLAY	7	7		.6	
7.950	26.08	8.58	3.50	CLAY	9	9		.5	
8.100	26.57	11.60	4.91	CLAY	12	12		.7	
8.250	27.07	11.11	2.79	CLAY to SILTY CLAY	7	7		.6	
8.400	27.56	9.96	2.71	CLAY to SILTY CLAY	7	7		.7	
8.550	28.05	11.79	3.56	CLAY	12	12		.7	
8.700	28.54	9.43	3.50	CLAY	9	9		.5	
8.850	29.04	8.84	2.71	CLAY to SILTY CLAY	6	6		.6	
9.000	29.53	8.14	2.95	CLAY to SILTY CLAY	5	5		.4	
9.150	30.02	7.31	2.87	CLAY	7	7		.5	
9.300	30.51	8.07	2.97	CLAY	8	8		.4	
9.450	31.00	17.40	4.77	CLAY	17	17		1.0	
9.600	31.50	16.61	6.68	CLAY	17	16		1.0	
9.750	31.99	32.95	5.95	CLAY	33	31		1.8	
9.900	32.48	37.31	6.00	CLAY	37	35		2.1	
10.050	32.97	61.63	3.02	SANDY SILT to CLAYEY SILT	25	23		4.0	
10.200	33.46	41.53	3.95	CLAYEY SILT to SILTY CLAY	21	19		2.3	
10.350	33.96	39.56	4.47	CLAY to SILTY CLAY	26	25		2.2	
10.500	34.45	24.37	5.87	CLAY	24	23		1.3	
10.650	34.94	34.91	3.61	CLAYEY SILT to SILTY CLAY	17	16		2.2	
10.800	35.43	16.72	4.25	CLAY	17	15		1.0	
10.950	35.93	8.46	3.07	CLAY	8	8		.4	
11.100	36.42	14.26	2.81	CLAYEY SILT to SILTY CLAY	7	6		.8	
11.250	36.91	11.39	3.07	CLAY to SILTY CLAY	8	7		.6	
11.400	37.40	9.77	3.28	CLAY to SILTY CLAY	7	6		.5	
11.550	37.89	9.62	2.60	CLAY to SILTY CLAY	6	6		.6	
11.700	38.39	7.82	2.30	CLAY to SILTY CLAY	5	5		.5	
11.850	38.88	7.88	1.90	CLAY to SILTY CLAY	5	5		.5	
12.000	39.37	8.71	3.56	CLAY	9	8		.4	
12.150	39.86	14.77	4.27	CLAY	15	13		.8	
12.300	40.35	10.35	2.90	CLAY to SILTY CLAY	7	6		.5	
12.450	40.85	12.60	5.32	CLAY	13	11		.7	
12.600	41.34	10.62	6.03	CLAY	11	9		.6	
12.750	41.83	23.58	2.04	SANDY SILT to CLAYEY SILT	9	8		1.7	
12.900	42.32	10.01	5.59	CLAY	10	9		.5	
13.050	42.81	35.76	5.34	CLAY	36	31		2.0	
13.200	43.31	18.99	3.95	CLAY to SILTY CLAY	13	11		1.1	
13.350	43.80	17.91	7.20	CLAY	18	15		1.0	
13.500	44.29	80.16	3.82	CLAYEY SILT to SILTY CLAY	40	34		4.6	
13.650	44.78	70.47	3.48	CLAYEY SILT to SILTY CLAY	35	30		4.0	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 11.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-05

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	67.39	4.99	*VERY STIFF FINE GRAINED	67	57			
13.950	45.77	145.02	2.42	SILTY SAND to SANDY SILT	48	40	72		40.0
14.100	46.26	159.04	3.16	SANDY SILT to CLAYEY SILT	64	53		9.2	
14.250	46.75	174.87	1.48	SAND to SILTY SAND	44	36	78		41.5
14.400	47.24	67.86	3.24	SANDY SILT to CLAYEY SILT	27	22		3.8	
14.550	47.74	87.32	5.34	*VERY STIFF FINE GRAINED	87	72			
14.700	48.23	110.81	4.90	*VERY STIFF FINE GRAINED	100	91			
14.850	48.72	91.18	5.79	*VERY STIFF FINE GRAINED	91	74			
15.000	49.21	102.72	7.51	*VERY STIFF FINE GRAINED	100	83			
15.150	49.70	147.52	4.59	*VERY STIFF FINE GRAINED	100	100			
15.300	50.20	131.34	*****		0	0			36.5

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 11.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

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CPT INTERPRETATIONS

SOUNDING : CPT-06
PROJECT : AES-PANHANDLE
DATE/TIME: 11-23-98 09:59

PROJECT No.: 98-1571-1
CONE/RIG : 491,#1 JH,GO

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DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	72.27	1.27	SILTY SAND to SANDY SILT	24	39	67		
.300	.98	59.34	1.59	SILTY SAND to SANDY SILT	20	32	61		
.450	1.48	53.86	2.37	SANDY SILT to CLAYEY SILT	22	34		3.6	
.600	1.97	49.44	4.44	CLAY to SILTY CLAY	33	53		2.9	
.750	2.46	35.76	5.00	CLAY	36	57		2.1	
.900	2.95	19.52	6.43	CLAY	20	31		1.1	
1.050	3.44	109.58	3.94	CLAYEY SILT to SILTY CLAY	55	88		6.4	
1.200	3.94	220.50	1.44	SAND to SILTY SAND	55	88	99		
1.350	4.43	135.20	2.50	SILTY SAND to SANDY SILT	45	72	85		48.0
1.500	4.92	57.04	3.43	CLAYEY SILT to SILTY CLAY	29	46		3.3	
1.650	5.41	42.23	3.81	CLAYEY SILT to SILTY CLAY	21	34		2.5	
1.800	5.91	27.07	2.98	CLAYEY SILT to SILTY CLAY	14	22		1.8	
1.950	6.40	25.22	1.32	SANDY SILT to CLAYEY SILT	10	16		2.0	
2.100	6.89	58.21	1.02	SILTY SAND to SANDY SILT	19	31	61		42.5
2.250	7.38	71.96	1.09	SAND to SILTY SAND	18	28	67		43.0
2.400	7.87	28.21	1.52	SANDY SILT to CLAYEY SILT	11	17		2.2	
2.550	8.37	26.51	1.45	SANDY SILT to CLAYEY SILT	11	16		2.1	
2.700	8.86	27.21	1.18	SANDY SILT to CLAYEY SILT	11	16		2.1	
2.850	9.35	56.66	3.05	SANDY SILT to CLAYEY SILT	23	32		3.7	
3.000	9.84	58.57	.98	SILTY SAND to SANDY SILT	20	27	60		40.5
3.150	10.33	65.35	1.06	SILTY SAND to SANDY SILT	22	29	63		41.0
3.300	10.83	72.70	.84	SAND to SILTY SAND	18	24	65		41.5
3.450	11.32	69.39	.62	SAND to SILTY SAND	17	22	63		40.5
3.600	11.81	90.14	1.47	SILTY SAND to SANDY SILT	30	37	70		42.0
3.750	12.30	64.88	1.42	SILTY SAND to SANDY SILT	22	26	60		39.5
3.900	12.80	35.50	2.69	SANDY SILT to CLAYEY SILT	14	17		2.3	
4.050	13.29	47.27	2.54	SANDY SILT to CLAYEY SILT	19	22		3.1	
4.200	13.78	37.92	1.45	SILTY SAND to SANDY SILT	13	15	43		37.5
4.350	14.27	33.08	2.16	SANDY SILT to CLAYEY SILT	13	15		2.2	
4.500	14.76	24.07	4.93	CLAY	24	27		1.4	
4.650	15.26	35.78	2.42	SANDY SILT to CLAYEY SILT	14	16		2.3	
4.800	15.75	32.87	3.13	CLAYEY SILT to SILTY CLAY	16	18		2.1	
4.950	16.24	31.31	2.39	SANDY SILT to CLAYEY SILT	13	13		2.0	
5.100	16.73	26.87	3.24	CLAYEY SILT to SILTY CLAY	13	14		1.7	
5.250	17.22	32.70	2.10	SANDY SILT to CLAYEY SILT	13	13		2.1	
5.400	17.72	35.92	2.81	CLAYEY SILT to SILTY CLAY	18	18		2.3	
5.550	18.21	55.77	2.07	SANDY SILT to CLAYEY SILT	22	22		3.7	
5.700	18.70	51.75	1.99	SANDY SILT to CLAYEY SILT	21	20		3.4	
5.850	19.19	39.71	2.00	SANDY SILT to CLAYEY SILT	16	15		2.6	
6.000	19.69	42.70	1.89	SANDY SILT to CLAYEY SILT	17	16		2.8	
6.150	20.18	40.81	1.93	SANDY SILT to CLAYEY SILT	16	15		2.6	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 35.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-06

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	37.14	2.16	SANDY SILT to CLAYEY SILT	15	14		2.4	
6.450	21.16	40.83	2.47	SANDY SILT to CLAYEY SILT	16	15		2.6	
6.600	21.65	38.90	1.87	SANDY SILT to CLAYEY SILT	16	14		2.5	
6.750	22.15	56.24	.64	SAND to SILTY SAND	14	13	48		37.0
6.900	22.64	162.31	1.71	SAND to SILTY SAND	41	36	78		42.0
7.050	23.13	43.45	2.11	SANDY SILT to CLAYEY SILT	17	15		2.8	
7.200	23.62	36.94	1.62	SANDY SILT to CLAYEY SILT	15	13		2.9	
7.350	24.11	43.34	2.87	SANDY SILT to CLAYEY SILT	17	15		2.8	
7.500	24.61	43.72	2.02	SANDY SILT to CLAYEY SILT	17	15		2.8	
7.650	25.10	79.20	1.00	SAND to SILTY SAND	20	17	56		38.0
7.800	25.59	51.58	2.75	SANDY SILT to CLAYEY SILT	21	17		3.3	
7.950	26.08	55.62	2.77	SANDY SILT to CLAYEY SILT	22	19		3.6	
8.100	26.57	69.28	1.92	SILTY SAND to SANDY SILT	23	19	51		37.0
8.250	27.07	86.17	2.81	SANDY SILT to CLAYEY SILT	34	28		5.0	
8.400	27.56	52.96	3.36	CLAYEY SILT to SILTY CLAY	26	22		3.0	
8.550	28.05	40.26	2.90	SANDY SILT to CLAYEY SILT	16	13		2.6	
8.700	28.54	74.42	.98	SAND to SILTY SAND	19	15	52		37.0
8.850	29.04	55.53	4.07	CLAYEY SILT to SILTY CLAY	28	22		3.2	
9.000	29.53	35.05	4.27	CLAY to SILTY CLAY	23	18		2.0	
9.150	30.02	31.76	4.63	CLAY to SILTY CLAY	21	16		1.8	
9.300	30.51	38.11	4.70	CLAY to SILTY CLAY	25	20		2.1	
9.450	31.00	93.14	3.17	SANDY SILT to CLAYEY SILT	37	29		5.4	
9.600	31.50	33.35	4.73	CLAY to SILTY CLAY	22	17		1.9	
9.750	31.99	25.83	4.51	CLAY to SILTY CLAY	17	13		1.4	
9.900	32.48	19.57	8.96	CLAY	20	15		1.2	
10.050	32.97	19.46	5.73	CLAY	19	14		1.0	
10.200	33.46	52.43	5.82	CLAY	52	39		3.0	
10.350	33.96	117.57	4.84	*VERY STIFF FINE GRAINED	100	86			
10.500	34.45	121.73	4.30	*VERY STIFF FINE GRAINED	100	88			
10.650	34.94	142.32	5.06	*VERY STIFF FINE GRAINED	100	100			
10.800	35.43	155.98	6.57	*VERY STIFF FINE GRAINED	100	100			
10.950	35.93	177.65	7.01	*VERY STIFF FINE GRAINED	100	100			
11.100	36.42	166.67	7.42	*VERY STIFF FINE GRAINED	100	100			
11.250	36.91	177.76	6.74	*VERY STIFF FINE GRAINED	100	100			
11.400	37.40	167.92	6.71	*VERY STIFF FINE GRAINED	100	100			
11.550	37.89	179.67	5.49	*VERY STIFF FINE GRAINED	100	100			

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 35.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-07
PROJECT : AES-PANHANDLE
DATE/TIME: 11-23-98 09:21

PROJECT No.: 98-1571-1
CONE/RIG : 491,#1 JH,GO

PAGE 1 of 2

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	53.45	1.31	SILTY SAND to SANDY SILT	18	28	58		
.300	.98	32.55	2.64	SANDY SILT to CLAYEY SILT	13	21		2.2	
.450	1.48	41.68	2.09	SANDY SILT to CLAYEY SILT	17	27		2.8	
.600	1.97	24.54	1.30	SANDY SILT to CLAYEY SILT	10	16		2.0	
.750	2.46	16.78	1.49	SANDY SILT to CLAYEY SILT	7	11		1.3	
.900	2.95	71.57	.63	SAND to SILTY SAND	18	29	67		47.0
1.050	3.44	38.50	1.38	SILTY SAND to SANDY SILT	13	21	49		44.0
1.200	3.94	31.72	1.70	SANDY SILT to CLAYEY SILT	13	20		2.5	
1.350	4.43	32.76	1.43	SANDY SILT to CLAYEY SILT	13	21		2.6	
1.500	4.92	34.93	1.23	SILTY SAND to SANDY SILT	12	19	46		42.0
1.650	5.41	56.83	1.07	SILTY SAND to SANDY SILT	19	30	60		43.5
1.800	5.91	68.34	.97	SAND to SILTY SAND	17	27	65		44.0
1.950	6.40	54.56	1.04	SILTY SAND to SANDY SILT	18	29	59		42.5
2.100	6.89	44.81	.89	SILTY SAND to SANDY SILT	15	24	53		41.0
2.250	7.38	43.64	.80	SILTY SAND to SANDY SILT	15	23	53		40.5
2.400	7.87	40.54	1.41	SILTY SAND to SANDY SILT	14	21	50		39.5
2.550	8.37	38.05	.97	SILTY SAND to SANDY SILT	13	19	49		39.0
2.700	8.86	43.72	1.37	SILTY SAND to SANDY SILT	15	21	53		39.5
2.850	9.35	25.81	1.16	SANDY SILT to CLAYEY SILT	10	14		2.0	
3.000	9.84	20.37	2.60	CLAYEY SILT to SILTY CLAY	10	14		1.3	
3.150	10.33	26.15	1.72	SANDY SILT to CLAYEY SILT	10	14		2.0	
3.300	10.83	33.04	1.27	SILTY SAND to SANDY SILT	11	14	43		38.0
3.450	11.32	27.49	1.16	SANDY SILT to CLAYEY SILT	11	14		2.1	
3.600	11.81	31.85	2.76	CLAYEY SILT to SILTY CLAY	16	20		2.1	
3.750	12.30	62.69	2.36	SANDY SILT to CLAYEY SILT	25	30		4.1	
3.900	12.80	43.40	1.61	SILTY SAND to SANDY SILT	14	17	48		38.0
4.050	13.29	43.68	2.11	SANDY SILT to CLAYEY SILT	17	20		2.9	
4.200	13.78	47.50	1.52	SILTY SAND to SANDY SILT	16	18	50		38.0
4.350	14.27	41.81	1.77	SANDY SILT to CLAYEY SILT	17	19		3.3	
4.500	14.76	41.36	2.08	SANDY SILT to CLAYEY SILT	17	18		2.7	
4.650	15.26	43.72	1.60	SILTY SAND to SANDY SILT	15	16	46		37.5
4.800	15.75	38.52	2.80	SANDY SILT to CLAYEY SILT	15	17		2.5	
4.950	16.24	61.21	3.66	CLAYEY SILT to SILTY CLAY	31	32		3.5	
5.100	16.73	151.39	1.74	SAND to SILTY SAND	38	39	80		43.0
5.250	17.22	131.42	1.14	SAND to SILTY SAND	33	34	76		42.0
5.400	17.72	102.38	1.41	SAND to SILTY SAND	26	26	68		40.5
5.550	18.21	90.48	1.68	SILTY SAND to SANDY SILT	30	30	64		39.5
5.700	18.70	248.76	1.60	SAND to SILTY SAND	62	61	93		44.5
5.850	19.19	71.26	2.16	SILTY SAND to SANDY SILT	24	23	56		38.5
6.000	19.69	81.39	2.10	SILTY SAND to SANDY SILT	27	26	60		38.5
6.150	20.18	53.73	1.69	SILTY SAND to SANDY SILT	18	17	48		37.0

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 25.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-07

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	58.06	1.50	SILTY SAND to SANDY SILT	19	18	50		37.5
6.450	21.16	65.01	1.62	SILTY SAND to SANDY SILT	22	20	52		38.0
6.600	21.65	128.02	.93	SAND to SILTY SAND	32	29	72		40.5
6.750	22.15	146.14	1.97	SILTY SAND to SANDY SILT	49	44	75		41.5
6.900	22.64	81.73	1.73	SILTY SAND to SANDY SILT	27	24	58		38.5
7.050	23.13	68.94	1.65	SILTY SAND to SANDY SILT	23	20	53		38.0
7.200	23.62	43.08	3.02	CLAYEY SILT to SILTY CLAY	22	19		2.8	
7.350	24.11	84.43	1.68	SILTY SAND to SANDY SILT	28	24	58		38.0
7.500	24.61	69.39	1.87	SILTY SAND to SANDY SILT	23	20	52		37.5
7.650	25.10	30.61	3.53	CLAYEY SILT to SILTY CLAY	15	13		1.9	
7.800	25.59	17.72	5.81	CLAY	18	15		1.1	
7.950	26.08	182.32	2.42	SILTY SAND to SANDY SILT	61	51	79		42.0
8.100	26.57	202.57	1.72	SAND to SILTY SAND	51	43	82		42.0
8.250	27.07	120.52	.94	SAND to SILTY SAND	30	25	67		39.0
8.400	27.56	88.57	1.13	SAND to SILTY SAND	22	18	58		38.0
8.550	28.05	109.37	2.00	SILTY SAND to SANDY SILT	36	30	64		38.5
8.700	28.54	154.30	2.82	SILTY SAND to SANDY SILT	51	43	74		40.5
8.850	29.04	47.95	2.57	SANDY SILT to CLAYEY SILT	19	16		3.1	
9.000	29.53	13.43	4.24	CLAY	13	11		.8	
9.150	30.02	7.78	3.21	CLAY	8	6		.4	
9.300	30.51	8.73	3.21	CLAY	9	7		.5	
9.450	31.00	8.14	3.19	CLAY	8	7		.4	
9.600	31.50	7.54	3.18	CLAY	8	6		.4	
9.750	31.99	7.95	4.03	CLAY	8	6		.4	
9.900	32.48	6.25	5.12	CLAY	6	5		.3	
10.050	32.97	6.33	4.58	CLAY	6	5		.3	
10.200	33.46	8.35	5.51	CLAY	8	7		.4	
10.350	33.96	6.50	4.46	CLAY	7	5		.3	
10.500	34.45	6.80	5.59	CLAY	7	5		.3	
10.650	34.94	9.26	6.91	CLAY	9	7		.5	
10.800	35.43	6.73	7.73	CLAY	7	5		.3	
10.950	35.93	9.79	5.41	CLAY	10	8		.5	
11.100	36.42	28.64	4.05	CLAY to SILTY CLAY	19	15		1.8	
11.250	36.91	18.76	9.91	CLAY	19	15		1.1	
11.400	37.40	64.73	2.18	SILTY SAND to SANDY SILT	22	17	47		36.0
11.550	37.89	71.19	8.61	*VERY STIFF FINE GRAINED	71	55			
11.700	38.39	124.90	5.71	*VERY STIFF FINE GRAINED	100	96			
11.850	38.88	101.49	5.45	*VERY STIFF FINE GRAINED	100	78			
12.000	39.37	135.05	4.30	*VERY STIFF FINE GRAINED	100	100			
12.150	39.86	333.82	5.76	*VERY STIFF FINE GRAINED	100	100			
12.300	40.35	277.35	6.92	*VERY STIFF FINE GRAINED	100	100			
12.450	40.85	187.95	6.30	*VERY STIFF FINE GRAINED	100	100			
12.600	41.34	180.90	6.45	*VERY STIFF FINE GRAINED	100	100			
12.750	41.83	180.88	5.36	*VERY STIFF FINE GRAINED	100	100			
12.900	42.32	167.83	6.01	*VERY STIFF FINE GRAINED	100	100			
13.050	42.81	319.33	6.11	*VERY STIFF FINE GRAINED	100	100			
13.200	43.31	250.79	6.79	*VERY STIFF FINE GRAINED	100	100			

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 25.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

CPT INTERPRETATIONS

SOUNDING : CPT-08
PROJECT : AES-PANHANDLE
DATE/TIME: 11-23-98 10:37

PROJECT No.: 98-1571-1
CONE/RIG : 491,#1 JH,GO

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	15.23	1.29	SANDY SILT to CLAYEY SILT	6	10		1.2	
.300	.98	8.90	4.17	CLAY	9	14		.6	
.450	1.48	8.01	5.31	CLAY	8	13		.5	
.600	1.97	12.81	4.14	CLAY	13	20		.8	
.750	2.46	13.64	4.66	CLAY	14	22		.9	
.900	2.95	20.93	3.07	CLAYEY SILT to SILTY CLAY	10	17		1.4	
1.050	3.44	18.25	2.11	CLAYEY SILT to SILTY CLAY	9	15		1.4	
1.200	3.94	9.39	5.61	CLAY	9	15		.6	
1.350	4.43	13.09	4.76	CLAY	13	21		.9	
1.500	4.92	14.55	4.21	CLAY	15	23		1.0	
1.650	5.41	12.68	5.97	CLAY	13	20		.8	
1.800	5.91	22.60	3.73	CLAY to SILTY CLAY	15	24		1.5	
1.950	6.40	35.76	1.66	SANDY SILT to CLAYEY SILT	14	23		2.8	
2.100	6.89	34.37	1.97	SANDY SILT to CLAYEY SILT	14	22		2.3	
2.250	7.38	33.63	2.56	SANDY SILT to CLAYEY SILT	13	21		2.2	
2.400	7.87	30.66	3.42	CLAYEY SILT to SILTY CLAY	15	23		2.0	
2.550	8.37	29.91	3.63	CLAYEY SILT to SILTY CLAY	15	22		2.0	
2.700	8.86	22.80	4.03	CLAY to SILTY CLAY	15	22		1.5	
2.850	9.35	10.83	6.07	CLAY	11	15		.7	
3.000	9.84	7.69	6.37	CLAY	8	10		.5	
3.150	10.33	11.30	5.24	CLAY	11	15		.7	
3.300	10.83	22.16	4.11	CLAY to SILTY CLAY	15	19		1.4	
3.450	11.32	29.85	3.06	CLAYEY SILT to SILTY CLAY	15	19		1.9	
3.600	11.81	12.45	5.29	CLAY	12	16		.8	
3.750	12.30	20.82	6.26	CLAY	21	26		1.2	
3.900	12.80	27.75	5.55	CLAY	28	34		1.6	
4.050	13.29	12.07	6.07	CLAY	12	15		.8	
4.200	13.78	26.81	4.46	CLAY to SILTY CLAY	18	22		1.5	
4.350	14.27	56.17	1.70	SILTY SAND to SANDY SILT	19	23	56		39.0
4.500	14.76	36.29	2.19	SANDY SILT to CLAYEY SILT	15	17		2.4	
4.650	15.26	11.66	5.32	CLAY	12	14		.7	
4.800	15.75	15.15	7.07	CLAY	15	18		1.0	
4.950	16.24	21.86	6.71	CLAY	22	26		1.2	
5.100	16.73	39.20	2.57	SANDY SILT to CLAYEY SILT	16	18		2.6	
5.250	17.22	31.55	1.68	SANDY SILT to CLAYEY SILT	13	15		2.4	
5.400	17.72	10.03	4.88	CLAY	10	11		.6	
5.550	18.21	21.24	4.53	CLAY	21	24		1.3	
5.700	18.70	48.80	1.86	SILTY SAND to SANDY SILT	16	18	50		38.0
5.850	19.19	21.05	4.18	CLAY to SILTY CLAY	14	16		1.3	
6.000	19.69	15.36	6.80	CLAY	15	17		1.0	
6.150	20.18	16.04	7.59	CLAY	16	18		1.0	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 11.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-08

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	18.74	6.18	CLAY	19	21		1.0	
6.450	21.16	15.47	7.62	CLAY	15	17		1.0	
6.600	21.65	29.47	4.45	CLAY to SILTY CLAY	20	21		1.7	
6.750	22.15	27.75	5.48	CLAY	28	30		1.6	
6.900	22.64	11.09	6.50	CLAY	11	12		.7	
7.050	23.13	14.38	7.74	CLAY	14	15		.9	
7.200	23.62	20.56	6.36	CLAY	21	22		1.1	
7.350	24.11	25.83	4.91	CLAY	26	27		1.4	
7.500	24.61	53.28	2.69	SANDY SILT to CLAYEY SILT	21	22		3.5	
7.650	25.10	39.41	3.19	CLAYEY SILT to SILTY CLAY	20	20		2.5	
7.800	25.59	45.46	4.17	CLAYEY SILT to SILTY CLAY	23	23		2.6	
7.950	26.08	98.75	1.46	SILTY SAND to SANDY SILT	33	34	67		40.0
8.100	26.57	125.51	1.13	SAND to SILTY SAND	31	32	74		42.0
8.250	27.07	133.35	1.72	SILTY SAND to SANDY SILT	44	45	75		42.0
8.400	27.56	122.46	1.59	SAND to SILTY SAND	31	31	73		41.5
8.550	28.05	47.59	1.69	SILTY SAND to SANDY SILT	16	16	46		37.0
8.700	28.54	9.33	3.01	CLAY to SILTY CLAY	6	6		.5	
8.850	29.04	9.67	5.21	CLAY	10	10		.5	
9.000	29.53	26.79	5.22	CLAY	27	26		1.5	
9.150	30.02	10.49	3.44	CLAY	10	10		.6	
9.300	30.51	11.64	4.64	CLAY	12	11		.7	
9.450	31.00	15.32	4.01	CLAY	15	15		.9	
9.600	31.50	8.99	4.51	CLAY	9	9		.5	
9.750	31.99	14.60	4.85	CLAY	15	14		.9	
9.900	32.48	14.00	4.00	CLAY	14	13		.8	
10.050	32.97	22.24	4.22	CLAY to SILTY CLAY	15	14		1.4	
10.200	33.46	20.67	5.01	CLAY	21	19		1.3	
10.350	33.96	22.22	6.52	CLAY	22	21		1.2	
10.500	34.45	25.77	5.32	CLAY	26	24		1.4	
10.650	34.94	22.94	7.27	CLAY	23	21		1.2	
10.800	35.43	36.09	5.82	CLAY	36	33		2.0	
10.950	35.93	31.29	5.14	CLAY	31	29		1.7	
11.100	36.42	41.72	5.11	CLAY	42	38		2.3	
11.250	36.91	90.74	2.21	SILTY SAND to SANDY SILT	30	27	61		38.5
11.400	37.40	76.25	1.71	SILTY SAND to SANDY SILT	25	23	56		38.0
11.550	37.89	33.31	4.20	CLAY to SILTY CLAY	22	20		1.8	
11.700	38.39	12.47	2.99	CLAY to SILTY CLAY	8	7		.7	
11.850	38.88	12.94	3.65	CLAY to SILTY CLAY	9	8		.7	
12.000	39.37	21.95	4.86	CLAY	22	19		1.3	
12.150	39.86	34.86	6.26	CLAY	35	31		1.9	
12.300	40.35	13.43	8.29	CLAY	13	12		.7	
12.450	40.85	14.49	6.06	CLAY	14	13		.8	
12.600	41.34	15.02	4.83	CLAY	15	13		.8	
12.750	41.83	25.98	3.78	CLAY to SILTY CLAY	17	15		1.6	
12.900	42.32	34.84	4.78	CLAY	35	30		1.9	
13.050	42.81	10.69	6.06	CLAY	11	9		.6	
13.200	43.31	13.94	5.22	CLAY	14	12		.8	
13.350	43.80	16.51	4.92	CLAY	17	14		.9	
13.500	44.29	17.99	5.76	CLAY	18	15		1.0	
13.650	44.78	17.82	6.15	CLAY	18	15		1.0	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 11.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-08

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	22.07	5.33	CLAY	22	19		1.2	
13.950	45.77	20.23	4.93	CLAY	20	17		1.2	
14.100	46.26	16.91	4.85	CLAY	17	14		1.0	
14.250	46.75	15.02	5.49	CLAY	15	12		.8	
14.400	47.24	29.13	5.37	CLAY	29	24		1.6	
14.550	47.74	63.10	5.70	CLAY	63	52		3.6	
14.700	48.23	29.81	6.66	CLAY	30	24		1.6	
14.850	48.72	35.71	3.46	CLAYEY SILT to SILTY CLAY	18	15		2.2	
15.000	49.21	22.22	6.16	CLAY	22	18		1.1	
15.150	49.70	46.25	7.03	CLAY	46	37		2.6	
15.300	50.20	66.92	.60	SAND to SILTY SAND	17	13	49		36.5
15.450	50.69	31.53	5.72	CLAY	32	25		1.7	

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 11.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

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*                                                                      *
*                      CPT INTERPRETATIONS                             *
*                                                                      *
*  SOUNDING : CPT-09                    PROJECT No.: 98-1571-1         *
*  PROJECT  : AES-PANHANDLE             CONE/RIG : 491,#1 JH,GO        *
*  DATE/TIME: 11-23-98 07:45                                           *
*                                                                      *
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DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	178.69	.68	SAND	36	57	93		
.300	.98	356.89	2.19	SAND to SILTY SAND	89	100	100		
.450	1.48	550.28	2.62	*SAND to CLAYEY SAND	100	100			
.600	1.97	383.66	2.75	*SAND to CLAYEY SAND	100	100			
.750	2.46	220.61	2.29	SILTY SAND to SANDY SILT	74	100	99		
.900	2.95	191.25	2.81	SILTY SAND to SANDY SILT	64	100	95		
1.050	3.44	273.82	1.15	SAND	55	88	100		
1.200	3.94	265.88	1.61	SAND to SILTY SAND	66	100	100		
1.350	4.43	219.35	1.42	SAND to SILTY SAND	55	88	99		49.5
1.500	4.92	192.10	1.46	SAND to SILTY SAND	48	77	95		48.5
1.650	5.41	150.26	1.22	SAND to SILTY SAND	38	60	88		47.0
1.800	5.91	55.58	2.36	SANDY SILT to CLAYEY SILT	22	36		3.7	
1.950	6.40	19.74	3.95	CLAY to SILTY CLAY	13	21		1.3	
2.100	6.89	29.02	1.93	SANDY SILT to CLAYEY SILT	12	18		2.3	
2.250	7.38	33.33	1.71	SANDY SILT to CLAYEY SILT	13	20		2.6	
2.400	7.87	72.36	2.85	SANDY SILT to CLAYEY SILT	29	42		4.8	
2.550	8.37	70.26	2.06	SILTY SAND to SANDY SILT	23	33	66		42.0
2.700	8.86	60.23	1.48	SILTY SAND to SANDY SILT	20	28	61		41.0
2.850	9.35	64.07	1.59	SILTY SAND to SANDY SILT	21	29	62		41.0
3.000	9.84	94.50	1.07	SAND to SILTY SAND	24	31	73		42.5
3.150	10.33	140.28	.92	SAND to SILTY SAND	35	45	84		44.0
3.300	10.83	162.95	1.06	SAND to SILTY SAND	41	51	87		44.5
3.450	11.32	165.39	.92	SAND	33	40	87		44.5
3.600	11.81	230.12	.73	SAND	46	55	96		46.0
3.750	12.30	199.87	1.47	SAND to SILTY SAND	50	58	91		45.0
3.900	12.80	194.77	2.05	SILTY SAND to SANDY SILT	65	74	90		44.5
4.050	13.29	215.44	1.56	SAND to SILTY SAND	54	60	92		45.0
4.200	13.78	243.47	1.02	SAND	49	54	95		45.5
4.350	14.27	285.91	.77	SAND	57	62	99		46.0
4.500	14.76	394.35	.84	SAND	79	84	100		47.0
4.650	15.26	334.46	.55	GRAVELLY SAND to SAND	56	58	100		46.0
4.800	15.75	360.38	2.01	SAND to SILTY SAND	90	93	100		46.5
4.950	16.24	299.00	.67	SAND	60	61	99		45.5
5.100	16.73	336.05	.67	SAND	67	68	100		46.0
5.250	17.22	344.70	.54	GRAVELLY SAND to SAND	57	58	100		46.0
5.400	17.72	526.09	.77	GRAVELLY SAND to SAND	88	88	100		
5.550	18.21	494.83	.76	GRAVELLY SAND to SAND	82	82	100		47.0
5.700	18.70	389.12	.49	GRAVELLY SAND to SAND	65	64	100		46.5
5.850	19.19	260.08	.51	SAND	52	51	94		44.5
6.000	19.69	157.08	1.01	SAND to SILTY SAND	39	38	79		42.5
6.150	20.18	184.43	.91	SAND	37	36	84		43.0

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-09

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	112.75	1.51	SAND to SILTY SAND	28	27	69		40.0
6.450	21.16	133.99	.83	SAND to SILTY SAND	33	32	74		41.5
6.600	21.65	142.04	1.81	SILTY SAND to SANDY SILT	47	45	76		42.0
6.750	22.15	168.75	.83	SAND	34	32	80		42.5
6.900	22.64	228.06	.84	SAND	46	43	89		44.0
7.050	23.13	283.87	.74	SAND	57	53	95		44.5
7.200	23.62	294.77	.85	SAND	59	55	96		44.5
7.350	24.11	245.51	.66	SAND	49	45	90		44.0
7.500	24.61	244.27	.43	SAND	49	45	90		44.0
7.650	25.10	238.39	.37	SAND	48	43	89		43.5
7.800	25.59	150.37	.81	SAND	30	27	76		41.5
7.950	26.08	116.85	.45	SAND	23	21	68		39.5
8.100	26.57	91.54	.44	SAND to SILTY SAND	23	20	61		38.5
8.250	27.07	120.16	1.58	SAND to SILTY SAND	30	27	69		39.5
8.400	27.56	187.34	.65	SAND	37	33	81		42.5
8.550	28.05	249.07	.42	SAND	50	44	89		43.5
8.700	28.54	284.23	.53	SAND	57	50	93		44.0
8.850	29.04	259.29	.48	SAND	52	45	90		43.5
9.000	29.53	283.72	.63	SAND	57	49	93		44.0
9.150	30.02	350.09	1.40	SAND	70	60	99		44.5
9.300	30.51	334.97	.84	SAND	67	57	97		44.5
9.450	31.00	242.70	.70	SAND	49	41	88		43.0
9.600	31.50	246.35	.73	SAND	49	42	88		43.0
9.750	31.99	250.58	.82	SAND	50	42	88		43.0
9.900	32.48	313.83	1.31	SAND	63	53	95		44.0
10.050	32.97	371.85	.77	SAND	74	62	99		44.5
10.200	33.46	555.34	.79	GRAVELLY SAND to SAND	93	77	100		
10.350	33.96	447.25	2.22	SAND to SILTY SAND	100	92	100		45.5
10.500	34.45	249.33	1.39	SAND to SILTY SAND	62	51	88		43.0
10.650	34.94	223.90	.35	SAND	45	37	84		42.5
10.800	35.43	151.56	.47	SAND	30	25	73		40.0
10.950	35.93	264.84	.53	SAND	53	43	89		43.0
11.100	36.42	138.47	.51	SAND	28	22	70		39.5
11.250	36.91	170.64	.32	SAND	34	27	76		40.5
11.400	37.40	204.57	.36	SAND	41	33	81		42.0
11.550	37.89	254.09	.93	SAND	51	40	87		42.5
11.700	38.39	252.01	.24	GRAVELLY SAND to SAND	42	33	87		42.5
11.850	38.88	234.14	.68	SAND	47	37	85		42.5
12.000	39.37	92.18	.73	SAND to SILTY SAND	23	18	58		38.0
12.150	39.86	76.18	.66	SAND to SILTY SAND	19	15	52		37.0
12.300	40.35	166.11	1.16	SAND to SILTY SAND	42	32	74		40.0
12.450	40.85	179.94	.68	SAND	36	28	77		40.5
12.600	41.34	183.83	.98	SAND	37	28	77		40.5
12.750	41.83	271.81	2.28	SILTY SAND to SANDY SILT	91	70	88		42.5
12.900	42.32	161.46	1.55	SAND to SILTY SAND	40	31	73		39.5
13.050	42.81	19.38	3.30	CLAYEY SILT to SILTY CLAY	10	7		1.1	
13.200	43.31	39.90	2.63	SANDY SILT to CLAYEY SILT	16	12		2.5	
13.350	43.80	75.59	2.62	SANDY SILT to CLAYEY SILT	30	23		4.9	
13.500	44.29	72.89	2.47	SANDY SILT to CLAYEY SILT	29	22		4.7	
13.650	44.78	82.90	2.06	SILTY SAND to SANDY SILT	28	21	53		37.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-09

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	140.75	1.53	SAND to SILTY SAND	35	26	68		39.0
13.950	45.77	219.82	1.05	SAND	44	33	81		41.5
14.100	46.26	203.10	.86	SAND	41	30	79		40.5
14.250	46.75	126.68	.81	SAND to SILTY SAND	32	23	65		38.5
14.400	47.24	65.88	1.55	SILTY SAND to SANDY SILT	22	16	46		36.0
14.550	47.74	61.27	3.26	SANDY SILT to CLAYEY SILT	25	18		3.4	
14.700	48.23	266.20	.50	SAND	53	39	86		42.0
14.850	48.72	428.70	1.05	SAND	86	62	100		44.0
15.000	49.21	395.30	.53	GRAVELLY SAND to SAND	66	48	97		44.0
15.150	49.70	300.30	.65	SAND	60	43	89		42.5
15.300	50.20	371.78	.62	GRAVELLY SAND to SAND	62	45	95		43.5

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

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*                     CPT INTERPRETATIONS                         *
*                                                                 *
*  SOUNDING : CPT-10                   PROJECT No.: 98-1571-1     *
*  PROJECT  : AES-PANHANDLE            CONE/RIG : 491,#1 JH,GO    *
*  DATE/TIME: 11-23-98 08:35                                      *
*                                                                 *
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                                                     PAGE 1 of 3

DEPTH   DEPTH      TIP     FRICTION      SOIL BEHAVIOR TYPE        N(60)  N1(60)   Dr    Su      PHI
                RESISTANCE  RATIO
 (m)     (ft)     (tsf)      (%)                                                   (%)  (tsf) (Degrees)
-----   -----  ----------  --------  --------------------------    -----  ------   ---  ----- ---------
 .150     .49    186.51     2.95     SILTY SAND to SANDY SILT        62      99     94
 .300     .98    164.90     2.44     SILTY SAND to SANDY SILT        55      88     91
 .450    1.48    132.65     3.20     SANDY SILT to CLAYEY SILT       53      85          7.8
 .600    1.97    135.92     3.23     SANDY SILT to CLAYEY SILT       54      87          8.0
 .750    2.46    154.17     4.63    *VERY STIFF FINE GRAINED        100     100
 .900    2.95    208.88     3.81    *SAND to CLAYEY SAND            100     100
1.050    3.44    195.81     3.24     SANDY SILT to CLAYEY SILT       78     100         11.5
1.200    3.94    158.51     1.86     SILTY SAND to SANDY SILT        53      84     90            49.0
1.350    4.43    127.94     2.66     SILTY SAND to SANDY SILT        43      68     83            47.5
1.500    4.92     61.50     1.37     SILTY SAND to SANDY SILT        21      33     62            44.0
1.650    5.41     58.74     2.24     SANDY SILT to CLAYEY SILT       23      38          3.9
1.800    5.91     47.08     1.60     SILTY SAND to SANDY SILT        16      25     55            42.5
1.950    6.40     31.40     1.39     SANDY SILT to CLAYEY SILT       13      20          2.5
2.100    6.89     26.53     2.04     SANDY SILT to CLAYEY SILT       11      17          2.1
2.250    7.38     25.28     1.53     SANDY SILT to CLAYEY SILT       10      16          2.0
2.400    7.87     31.93     1.75     SANDY SILT to CLAYEY SILT       13      19          2.5
2.550    8.37     78.33     2.50     SANDY SILT to CLAYEY SILT       31      46          5.2
2.700    8.86     58.21     1.97     SILTY SAND to SANDY SILT        19      28     61            41.5
2.850    9.35     61.86     2.13     SILTY SAND to SANDY SILT        21      29     63            41.5
3.000    9.84     70.11     1.58     SILTY SAND to SANDY SILT        23      32     66            42.0
3.150   10.33     85.23     1.96     SILTY SAND to SANDY SILT        28      38     70            42.5
3.300   10.83     48.25     1.38     SILTY SAND to SANDY SILT        16      21     54            39.0
3.450   11.32     35.95     1.93     SANDY SILT to CLAYEY SILT       14      18          2.4
3.600   11.81     39.28     2.67     SANDY SILT to CLAYEY SILT       16      19          2.6
3.750   12.30     44.32     1.51     SILTY SAND to SANDY SILT        15      18     49            38.5
3.900   12.80     43.74     2.40     SANDY SILT to CLAYEY SILT       17      21          2.9
4.050   13.29     46.65     1.70     SILTY SAND to SANDY SILT        16      18     50            38.0
4.200   13.78     39.45     2.04     SANDY SILT to CLAYEY SILT       16      18          2.6
4.350   14.27     40.83     1.58     SILTY SAND to SANDY SILT        14      15     45            37.5
4.500   14.76     38.24     1.80     SANDY SILT to CLAYEY SILT       15      17          3.0
4.650   15.26     35.76     1.92     SANDY SILT to CLAYEY SILT       14      16          2.3
4.800   15.75     29.40     2.08     SANDY SILT to CLAYEY SILT       12      13          1.9
4.950   16.24     30.34     2.13     SANDY SILT to CLAYEY SILT       12      13          2.0
5.100   16.73     35.95     1.66     SANDY SILT to CLAYEY SILT       14      15          2.8
5.250   17.22     28.98     3.30     CLAYEY SILT to SILTY CLAY       14      15          1.9
5.400   17.72     50.92     1.83     SILTY SAND to SANDY SILT        17      17     48            37.5
5.550   18.21    115.10     1.98     SILTY SAND to SANDY SILT        38      38     71            41.0
5.700   18.70    119.08     1.74     SILTY SAND to SANDY SILT        40      39     72            41.0
5.850   19.19     88.99     1.28     SAND to SILTY SAND              22      22     63            39.0
6.000   19.69     63.05     1.38     SILTY SAND to SANDY SILT        21      20     53            38.0
6.150   20.18     35.97     2.40     SANDY SILT to CLAYEY SILT       14      14          2.3
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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 25.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE
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HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-10

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	44.55	1.36	SILTY SAND to SANDY SILT	15	14	42		36.5
6.450	21.16	46.93	1.24	SILTY SAND to SANDY SILT	16	15	43		36.5
6.600	21.65	46.29	1.24	SILTY SAND to SANDY SILT	15	14	42		36.0
6.750	22.15	32.59	2.21	SANDY SILT to CLAYEY SILT	13	12		2.1	
6.900	22.64	19.61	3.50	CLAY to SILTY CLAY	13	12		1.2	
7.050	23.13	22.82	3.07	CLAYEY SILT to SILTY CLAY	11	10		1.4	
7.200	23.62	51.79	5.38	CLAY	52	45		3.0	
7.350	24.11	103.12	2.24	SILTY SAND to SANDY SILT	34	30	64		39.0
7.500	24.61	117.97	2.24	SILTY SAND to SANDY SILT	39	34	67		39.5
7.650	25.10	140.02	2.08	SILTY SAND to SANDY SILT	47	40	72		40.0
7.800	25.59	57.15	.90	SILTY SAND to SANDY SILT	19	16	46		36.5
7.950	26.08	67.20	1.51	SILTY SAND to SANDY SILT	22	19	51		37.0
8.100	26.57	22.77	4.22	CLAY to SILTY CLAY	15	13		1.4	
8.250	27.07	57.42	1.72	SILTY SAND to SANDY SILT	19	16	46		36.5
8.400	27.56	31.76	3.03	CLAYEY SILT to SILTY CLAY	16	13		2.0	
8.550	28.05	29.53	4.04	CLAY to SILTY CLAY	20	16		1.6	
8.700	28.54	117.00	2.13	SILTY SAND to SANDY SILT	39	32	66		39.0
8.850	29.04	65.41	1.45	SILTY SAND to SANDY SILT	22	18	49		37.0
9.000	29.53	34.46	4.04	CLAY to SILTY CLAY	23	19		1.9	
9.150	30.02	51.62	2.81	SANDY SILT to CLAYEY SILT	21	17		3.3	
9.300	30.51	138.81	1.45	SAND to SILTY SAND	35	28	70		39.5
9.450	31.00	81.18	1.79	SILTY SAND to SANDY SILT	27	22	55		37.5
9.600	31.50	110.47	.69	SAND to SILTY SAND	28	22	64		38.5
9.750	31.99	123.90	1.60	SAND to SILTY SAND	31	25	67		39.0
9.900	32.48	99.11	1.62	SILTY SAND to SANDY SILT	33	27	60		38.0
10.050	32.97	72.57	1.85	SILTY SAND to SANDY SILT	24	19	51		37.0
10.200	33.46	98.96	1.38	SAND to SILTY SAND	25	20	60		38.0
10.350	33.96	131.80	4.10	*VERY STIFF FINE GRAINED	100	100			
10.500	34.45	80.01	2.14	SILTY SAND to SANDY SILT	27	21	54		37.5
10.650	34.94	121.52	.93	SAND to SILTY SAND	30	24	66		38.5
10.800	35.43	163.56	1.54	SAND to SILTY SAND	41	32	74		40.0
10.950	35.93	127.15	1.05	SAND to SILTY SAND	32	25	67		39.0
11.100	36.42	84.79	.88	SAND to SILTY SAND	21	17	55		37.5
11.250	36.91	76.16	1.70	SILTY SAND to SANDY SILT	25	20	52		37.0
11.400	37.40	65.54	1.59	SILTY SAND to SANDY SILT	22	17	48		36.5
11.550	37.89	86.68	2.02	SILTY SAND to SANDY SILT	29	22	55		37.5
11.700	38.39	93.86	.85	SAND to SILTY SAND	23	18	58		38.0
11.850	38.88	98.38	.80	SAND to SILTY SAND	25	19	59		38.0
12.000	39.37	45.10	2.85	SANDY SILT to CLAYEY SILT	18	14		2.9	
12.150	39.86	53.28	1.85	SILTY SAND to SANDY SILT	18	14	41		34.5
12.300	40.35	91.10	.61	SAND to SILTY SAND	23	17	56		37.5
12.450	40.85	146.61	1.66	SAND to SILTY SAND	37	28	70		39.0
12.600	41.34	136.73	.68	SAND	27	21	68		39.0
12.750	41.83	103.48	.99	SAND to SILTY SAND	26	19	60		38.0
12.900	42.32	70.45	1.33	SILTY SAND to SANDY SILT	23	18	49		36.5
13.050	42.81	47.40	5.01	CLAY	47	35		2.6	
13.200	43.31	67.92	3.09	SANDY SILT to CLAYEY SILT	27	20		3.9	
13.350	43.80	104.52	1.10	SAND to SILTY SAND	26	19	60		38.0
13.500	44.29	161.95	1.93	SILTY SAND to SANDY SILT	54	40	72		39.5
13.650	44.78	91.40	1.82	SILTY SAND to SANDY SILT	30	22	56		37.5

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 25.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-10

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	86.34	1.08	SAND to SILTY SAND	22	16	54		37.0
13.950	45.77	49.82	2.67	SANDY SILT to CLAYEY SILT	20	15		3.2	
14.100	46.26	159.55	.87	SAND	32	23	71		39.0
14.250	46.75	133.12	1.53	SAND to SILTY SAND	33	24	66		38.5
14.400	47.24	137.79	1.42	SAND to SILTY SAND	34	25	67		38.5
14.550	47.74	285.06	2.61	SILTY SAND to SANDY SILT	95	69	88		42.5
14.700	48.23	160.21	2.99	SANDY SILT to CLAYEY SILT	64	46		9.3	
14.850	48.72	150.18	3.72	SANDY SILT to CLAYEY SILT	60	43		8.7	
15.000	49.21	144.04	3.24	SANDY SILT to CLAYEY SILT	58	41		8.3	
15.150	49.70	371.13	*****		0	0			.0

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 110 pcf
ASSUMED DEPTH OF WATER TABLE = 25.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

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*                                                                    *
*                       CPT INTERPRETATIONS                          *
*                                                                    *
*  SOUNDING : CPT-11                      PROJECT No.: 00-1571-1     *
*  PROJECT  : AES/PANHANDLE               CONE/RIG : 722/BH.GO/R#3   *
*  DATE/TIME: 04-04-00 12:28                                         *
*                                                                    *
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DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	100.21	2.38	SILTY SAND to SANDY SILT	33	53	76		
.300	.98	98.43	4.43	*VERY STIFF FINE GRAINED	98	100			
.450	1.48	81.77	4.86	*VERY STIFF FINE GRAINED	82	100			
.600	1.97	131.97	3.36	SANDY SILT to CLAYEY SILT	53	84		7.8	
.750	2.46	79.24	6.07	*VERY STIFF FINE GRAINED	79	100			
.900	2.95	85.81	3.95	CLAYEY SILT to SILTY CLAY	43	69		5.0	
1.050	3.44	86.34	3.53	SANDY SILT to CLAYEY SILT	35	55		5.1	
1.200	3.94	98.13	3.70	CLAYEY SILT to SILTY CLAY	49	78		5.8	
1.350	4.43	109.86	3.44	SANDY SILT to CLAYEY SILT	44	70		6.4	
1.500	4.92	115.23	3.51	SANDY SILT to CLAYEY SILT	46	74		6.8	
1.650	5.41	139.39	1.32	SAND to SILTY SAND	35	56	86		46.5
1.800	5.91	93.84	4.58	*VERY STIFF FINE GRAINED	94	100			
1.950	6.40	101.64	4.90	*VERY STIFF FINE GRAINED	100	100			
2.100	6.89	125.15	3.81	SANDY SILT to CLAYEY SILT	50	78		7.3	
2.250	7.38	135.71	3.14	SANDY SILT to CLAYEY SILT	54	82		8.0	
2.400	7.87	109.11	2.93	SANDY SILT to CLAYEY SILT	44	63		6.4	
2.550	8.37	61.89	3.25	SANDY SILT to CLAYEY SILT	25	35		3.6	
2.700	8.86	45.93	3.03	SANDY SILT to CLAYEY SILT	18	25		3.0	
2.850	9.35	40.79	3.31	CLAYEY SILT to SILTY CLAY	20	27		2.7	
3.000	9.84	36.16	3.84	CLAYEY SILT to SILTY CLAY	18	24		2.1	
3.150	10.33	55.62	2.12	SANDY SILT to CLAYEY SILT	22	28		3.7	
3.300	10.83	74.36	1.13	SILTY SAND to SANDY SILT	25	31	65		41.0
3.450	11.32	39.22	4.51	CLAY to SILTY CLAY	26	32		2.3	
3.600	11.81	42.02	3.71	CLAYEY SILT to SILTY CLAY	21	25		2.4	
3.750	12.30	45.00	3.44	CLAYEY SILT to SILTY CLAY	23	26		2.6	
3.900	12.80	46.80	3.65	CLAYEY SILT to SILTY CLAY	23	27		2.7	
4.050	13.29	47.89	3.70	CLAYEY SILT to SILTY CLAY	24	27		2.8	
4.200	13.78	49.56	3.49	CLAYEY SILT to SILTY CLAY	25	27		2.9	
4.350	14.27	51.71	3.52	CLAYEY SILT to SILTY CLAY	26	28		3.0	
4.500	14.76	31.76	5.16	CLAY	32	34		1.8	
4.650	15.26	22.39	3.31	CLAYEY SILT to SILTY CLAY	11	12		1.4	
4.800	15.75	54.60	3.63	CLAYEY SILT to SILTY CLAY	27	28		3.2	
4.950	16.24	59.87	3.57	CLAYEY SILT to SILTY CLAY	30	30		3.5	
5.100	16.73	56.68	3.46	CLAYEY SILT to SILTY CLAY	28	28		3.3	
5.250	17.22	77.56	2.91	SANDY SILT to CLAYEY SILT	31	31		4.5	
5.400	17.72	96.24	2.20	SILTY SAND to SANDY SILT	32	31	65		39.5
5.550	18.21	32.59	5.43	CLAY	33	31		1.9	
5.700	18.70	17.91	2.23	CLAYEY SILT to SILTY CLAY	9	8		1.3	
5.850	19.19	18.82	2.28	CLAYEY SILT to SILTY CLAY	9	9		1.4	
6.000	19.69	18.87	2.91	CLAYEY SILT to SILTY CLAY	9	9		1.2	
6.150	20.18	14.60	2.12	CLAYEY SILT to SILTY CLAY	7	7		1.1	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 25.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-11

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	16.40	2.80	CLAYEY SILT to SILTY CLAY	8	7		1.0	
6.450	21.16	15.59	4.49	CLAY	16	14		1.0	
6.600	21.65	15.15	2.97	CLAYEY SILT to SILTY CLAY	8	7		.9	
6.750	22.15	13.68	3.07	CLAY to SILTY CLAY	9	8		.8	
6.900	22.64	14.91	2.55	CLAYEY SILT to SILTY CLAY	7	6		.9	
7.050	23.13	21.29	3.99	CLAY to SILTY CLAY	14	12		1.3	
7.200	23.62	33.69	3.41	CLAYEY SILT to SILTY CLAY	17	14		2.2	
7.350	24.11	53.18	3.31	CLAYEY SILT to SILTY CLAY	27	22		3.0	
7.500	24.61	106.61	2.54	SILTY SAND to SANDY SILT	36	29	63		38.5
7.650	25.10	82.15	1.97	SILTY SAND to SANDY SILT	27	22	55		38.0
7.800	25.59	21.86	6.63	CLAY	22	18		1.2	
7.950	26.08	33.12	4.08	CLAY to SILTY CLAY	22	18		1.9	
8.100	26.57	38.92	3.60	CLAYEY SILT to SILTY CLAY	19	16		2.5	
8.250	27.07	51.69	3.31	CLAYEY SILT to SILTY CLAY	26	21		2.9	
8.400	27.56	27.13	5.42	CLAY	27	22		1.5	
8.550	28.05	19.50	7.44	CLAY	20	15		1.2	
8.700	28.54	48.50	4.10	CLAYEY SILT to SILTY CLAY	24	19		2.8	
8.850	29.04	45.08	4.13	CLAYEY SILT to SILTY CLAY	23	18		2.5	
9.000	29.53	32.63	3.49	CLAYEY SILT to SILTY CLAY	16	13		2.1	
9.150	30.02	76.78	2.93	SANDY SILT to CLAYEY SILT	31	24		4.4	
9.300	30.51	116.93	2.92	SANDY SILT to CLAYEY SILT	47	36		6.8	
9.450	31.00	120.12	2.98	SANDY SILT to CLAYEY SILT	48	37		7.0	
9.600	31.50	104.67	2.89	SANDY SILT to CLAYEY SILT	42	32		6.0	
9.750	31.99	106.35	2.00	SILTY SAND to SANDY SILT	35	27	61		38.0
9.900	32.48	147.57	2.22	SILTY SAND to SANDY SILT	49	38	70		39.0
10.050	32.97	183.36	1.13	SAND to SILTY SAND	46	35	76		40.5
10.200	33.46	201.06	2.16	SILTY SAND to SANDY SILT	67	51	79		41.0
10.350	33.96	271.95	2.80	SILTY SAND to SANDY SILT	91	68	88		42.5
10.500	34.45	305.78	1.55	SAND to SILTY SAND	76	57	91		43.0
10.650	34.94	325.30	1.15	SAND	65	49	92		43.5
10.800	35.43	335.09	.50	GRAVELLY SAND to SAND	56	42	93		43.5
10.950	35.93	279.84	.58	SAND	56	42	88		42.5
11.100	36.42	260.65	.83	SAND	52	39	86		42.0
11.250	36.91	305.59	1.22	SAND	61	45	90		43.0
11.400	37.40	339.94	1.00	SAND	68	50	93		43.5
11.550	37.89	290.37	.46	SAND	58	42	89		42.5
11.700	38.39	162.42	.23	SAND	32	24	72		39.0
11.850	38.88	121.92	1.53	SAND to SILTY SAND	30	22	63		38.0
12.000	39.37	52.22	3.10	SANDY SILT to CLAYEY SILT	21	15		3.3	
12.150	39.86	41.75	4.62	CLAY to SILTY CLAY	28	20		2.3	
12.300	40.35	88.78	1.72	SILTY SAND to SANDY SILT	30	21	54		37.0
12.450	40.85	127.58	2.09	SILTY SAND to SANDY SILT	43	30	64		38.5
12.600	41.34	113.94	2.45	SILTY SAND to SANDY SILT	38	27	61		38.0
12.750	41.83	104.16	1.56	SILTY SAND to SANDY SILT	35	25	58		37.5
12.900	42.32	129.95	2.62	SILTY SAND to SANDY SILT	43	31	65		38.5
13.050	42.81	114.98	2.98	SANDY SILT to CLAYEY SILT	46	32		6.6	
13.200	43.31	53.98	3.30	CLAYEY SILT to SILTY CLAY	27	19		3.0	
13.350	43.80	43.11	3.90	CLAYEY SILT to SILTY CLAY	22	15		2.4	
13.500	44.29	43.98	4.05	CLAYEY SILT to SILTY CLAY	22	15		2.4	
13.650	44.78	21.82	6.69	CLAY	22	15		1.1	

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 25.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-11

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	118.16	2.40	SILTY SAND to SANDY SILT	39	27	61		38.0
13.950	45.77	143.32	2.41	SILTY SAND to SANDY SILT	48	33	67		38.5
14.100	46.26	36.50	6.96	CLAY	37	25		2.0	
14.250	46.75	50.99	3.82	CLAYEY SILT to SILTY CLAY	25	17		2.8	
14.400	47.24	42.40	5.17	CLAY	42	29		2.3	
14.550	47.74	50.39	4.88	CLAY to SILTY CLAY	34	23		2.8	
14.700	48.23	18.04	5.93	CLAY	18	12		1.0	
14.850	48.72	50.37	4.29	CLAYEY SILT to SILTY CLAY	25	17		2.8	
15.000	49.21	43.98	5.28	CLAY	44	30		2.4	
15.150	49.70	42.02	4.81	CLAY to SILTY CLAY	28	19		2.3	
15.300	50.20	18.93	5.97	CLAY	19	13		.9	
15.450	50.69	18.12	5.85	CLAY	18	12		1.0	
15.600	51.18	31.89	5.24	CLAY	32	21		1.7	
15.750	51.67	21.39	5.70	CLAY	21	14		1.1	
15.900	52.17	18.42	7.00	CLAY	18	12		1.0	
16.050	52.66	107.10	3.07	SANDY SILT to CLAYEY SILT	43	28		6.1	
16.200	53.15	107.31	3.27	SANDY SILT to CLAYEY SILT	43	28		6.1	
16.350	53.64	95.47	3.12	SANDY SILT to CLAYEY SILT	38	25		5.4	
16.500	54.13	40.90	6.50	CLAY	41	27		2.2	
16.650	54.63	81.47	2.14	SILTY SAND to SANDY SILT	27	18	49		36.0
16.800	55.12	106.88	1.27	SAND to SILTY SAND	27	17	57		37.0
16.950	55.61	46.36	8.50	CLAY	46	30		2.5	
17.100	56.10	289.06	2.40	SILTY SAND to SANDY SILT	96	62	85		41.5
17.250	56.59	404.76	1.62	SAND to SILTY SAND	100	65	94		43.0
17.400	57.09	343.17	1.99	SAND to SILTY SAND	86	55	90		42.0
17.550	57.58	364.33	2.48	SILTY SAND to SANDY SILT	100	78	91		42.5
17.700	58.07	330.04	2.48	SILTY SAND to SANDY SILT	100	70	88		42.0
17.850	58.56	397.77	1.62	SAND to SILTY SAND	99	63	94		42.5
18.000	59.06	350.20	2.05	SAND to SILTY SAND	88	56	90		42.0
18.150	59.55	358.46	2.11	SAND to SILTY SAND	90	57	90		42.0
18.300	60.04	379.05	1.78	SAND to SILTY SAND	95	60	92		42.5

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 25.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-12
PROJECT : AES/PANHANDLE
DATE/TIME: 04-04-00 08:45

PROJECT No.: 00-1571-1
CONE/RIG : 722/BH.GO/R#3

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	63.22	3.01	SANDY SILT to CLAYEY SILT	25	40		4.2	
.300	.98	38.79	4.51	CLAY to SILTY CLAY	26	41		2.3	
.450	1.48	48.18	5.42	CLAY	48	77		2.8	
.600	1.97	57.40	2.07	SANDY SILT to CLAYEY SILT	23	37		3.8	
.750	2.46	58.76	4.08	CLAYEY SILT to SILTY CLAY	29	47		3.4	
.900	2.95	27.92	5.66	CLAY	28	45		1.6	
1.050	3.44	31.17	6.13	CLAY	31	50		1.8	
1.200	3.94	43.40	5.28	CLAY	43	69		2.5	
1.350	4.43	53.09	4.16	CLAYEY SILT to SILTY CLAY	27	42		3.1	
1.500	4.92	46.27	5.30	CLAY	46	74		2.7	
1.650	5.41	56.62	4.72	CLAY to SILTY CLAY	38	60		3.3	
1.800	5.91	66.43	4.46	CLAYEY SILT to SILTY CLAY	33	53		3.9	
1.950	6.40	70.45	4.94	*VERY STIFF FINE GRAINED	70	100			
2.100	6.89	71.89	5.06	*VERY STIFF FINE GRAINED	72	100			
2.250	7.38	59.29	5.01	CLAY to SILTY CLAY	40	59		3.5	
2.400	7.87	63.31	4.23	CLAYEY SILT to SILTY CLAY	32	46		3.7	
2.550	8.37	69.32	4.28	CLAYEY SILT to SILTY CLAY	35	49		4.0	
2.700	8.86	68.20	3.39	SANDY SILT to CLAYEY SILT	27	37		4.0	
2.850	9.35	82.32	2.26	SILTY SAND to SANDY SILT	27	37	70		42.5
3.000	9.84	85.36	4.46	CLAYEY SILT to SILTY CLAY	43	56		5.0	
3.150	10.33	71.45	4.98	*VERY STIFF FINE GRAINED	71	91			
3.300	10.83	98.87	3.21	SANDY SILT to CLAYEY SILT	40	49		5.8	
3.450	11.32	103.16	4.38	*VERY STIFF FINE GRAINED	100	100			
3.600	11.81	92.10	4.58	*VERY STIFF FINE GRAINED	92	100			
3.750	12.30	74.91	4.61	CLAY to SILTY CLAY	50	58		4.4	
3.900	12.80	115.81	3.56	SANDY SILT to CLAYEY SILT	46	53		6.8	
4.050	13.29	141.11	3.15	SANDY SILT to CLAYEY SILT	56	63		8.3	
4.200	13.78	95.33	3.35	SANDY SILT to CLAYEY SILT	38	42		5.6	
4.350	14.27	72.78	3.15	SANDY SILT to CLAYEY SILT	29	31		4.2	
4.500	14.76	46.99	2.15	SANDY SILT to CLAYEY SILT	19	20		3.1	
4.650	15.26	99.83	2.11	SILTY SAND to SANDY SILT	33	35	68		40.5
4.800	15.75	83.28	3.39	SANDY SILT to CLAYEY SILT	33	34		4.8	
4.950	16.24	58.68	3.68	CLAYEY SILT to SILTY CLAY	29	30		3.4	
5.100	16.73	39.66	4.29	CLAY to SILTY CLAY	26	26		2.3	
5.250	17.22	41.98	4.17	CLAY to SILTY CLAY	28	28		2.4	
5.400	17.72	52.43	3.64	CLAYEY SILT to SILTY CLAY	26	25		3.0	
5.550	18.21	65.77	2.87	SANDY SILT to CLAYEY SILT	26	25		4.3	
5.700	18.70	67.01	2.54	SANDY SILT to CLAYEY SILT	27	25		4.4	
5.850	19.19	80.22	2.62	SANDY SILT to CLAYEY SILT	32	30		5.3	
6.000	19.69	72.13	2.94	SANDY SILT to CLAYEY SILT	29	27		4.2	
6.150	20.18	58.00	3.64	CLAYEY SILT to SILTY CLAY	29	26		3.3	

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 27.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-12

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	71.96	2.97	SANDY SILT to CLAYEY SILT	29	26		4.2	
6.450	21.16	125.62	3.10	SANDY SILT to CLAYEY SILT	50	45		7.3	
6.600	21.65	167.01	2.56	SILTY SAND to SANDY SILT	56	49	78		42.0
6.750	22.15	107.54	3.51	SANDY SILT to CLAYEY SILT	43	37		6.2	
6.900	22.64	73.29	3.42	SANDY SILT to CLAYEY SILT	29	25		4.2	
7.050	23.13	61.38	3.81	CLAYEY SILT to SILTY CLAY	31	26		3.5	
7.200	23.62	18.76	3.14	CLAYEY SILT to SILTY CLAY	9	8		1.2	
7.350	24.11	16.89	2.78	CLAYEY SILT to SILTY CLAY	8	7		1.0	
7.500	24.61	22.77	3.86	CLAY to SILTY CLAY	15	12		1.4	
7.650	25.10	18.82	4.73	CLAY	19	15		1.2	
7.800	25.59	42.70	3.26	CLAYEY SILT to SILTY CLAY	21	17		2.7	
7.950	26.08	28.32	5.51	CLAY	28	23		1.6	
8.100	26.57	21.65	4.71	CLAY	22	17		1.3	
8.250	27.07	18.95	3.59	CLAY to SILTY CLAY	13	10		1.2	
8.400	27.56	16.12	3.60	CLAY to SILTY CLAY	11	8		1.0	
8.550	28.05	14.47	3.94	CLAY	14	11		.9	
8.700	28.54	15.87	3.40	CLAY to SILTY CLAY	11	8		.9	
8.850	29.04	16.23	4.44	CLAY	16	13		1.0	
9.000	29.53	47.80	4.35	CLAY to SILTY CLAY	32	24		2.7	
9.150	30.02	20.50	4.39	CLAY	21	16		1.2	
9.300	30.51	50.69	2.51	SANDY SILT to CLAYEY SILT	20	15		3.3	
9.450	31.00	30.64	5.19	CLAY	31	23		1.7	
9.600	31.50	15.89	2.96	CLAYEY SILT to SILTY CLAY	8	6		.9	
9.750	31.99	14.26	2.81	CLAYEY SILT to SILTY CLAY	7	5		.8	
9.900	32.48	14.40	3.13	CLAY to SILTY CLAY	10	7		.8	
10.050	32.97	15.30	3.33	CLAY to SILTY CLAY	10	8		.9	
10.200	33.46	14.47	3.46	CLAY to SILTY CLAY	10	7		.8	
10.350	33.96	42.26	3.19	CLAYEY SILT to SILTY CLAY	21	16		2.7	
10.500	34.45	21.69	4.75	CLAY	22	16		1.3	
10.650	34.94	60.06	3.96	CLAYEY SILT to SILTY CLAY	30	22		3.4	
10.800	35.43	204.76	1.01	SAND	41	30	79		40.5
10.950	35.93	203.31	1.25	SAND to SILTY SAND	51	37	78		40.5
11.100	36.42	214.40	1.80	SAND to SILTY SAND	54	39	80		41.0
11.250	36.91	247.42	1.57	SAND to SILTY SAND	62	45	84		42.0
11.400	37.40	243.51	1.20	SAND	49	35	83		42.0
11.550	37.89	142.94	1.36	SAND to SILTY SAND	36	26	68		38.5
11.700	38.39	51.90	4.35	CLAY to SILTY CLAY	35	25		2.9	
11.850	38.88	23.43	4.18	CLAY to SILTY CLAY	16	11		1.4	
12.000	39.37	23.62	2.03	SANDY SILT to CLAYEY SILT	9	7		1.7	
12.150	39.86	114.15	2.57	SILTY SAND to SANDY SILT	38	27	61		38.0
12.300	40.35	24.39	2.87	CLAYEY SILT to SILTY CLAY	12	9		1.5	
12.450	40.85	45.15	3.48	CLAYEY SILT to SILTY CLAY	23	16		2.5	
12.600	41.34	58.70	3.65	CLAYEY SILT to SILTY CLAY	29	21		3.3	
12.750	41.83	25.60	6.29	CLAY	26	18		1.4	
12.900	42.32	16.76	3.10	CLAYEY SILT to SILTY CLAY	8	6		.9	
13.050	42.81	25.03	6.11	CLAY	25	17		1.3	
13.200	43.31	37.16	5.46	CLAY	37	26		2.0	
13.350	43.80	22.24	6.79	CLAY	22	15		1.2	
13.500	44.29	74.59	2.41	SANDY SILT to CLAYEY SILT	30	21		4.8	
13.650	44.78	80.67	1.75	SILTY SAND to SANDY SILT	27	18	50		36.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 27.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-12

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	34.50	5.42	CLAY	35	24		1.9	
13.950	45.77	21.61	3.98	CLAY to SILTY CLAY	14	10		1.3	
14.100	46.26	15.57	4.05	CLAY	16	11		.9	
14.250	46.75	17.44	4.99	CLAY	17	12		1.0	
14.400	47.24	16.53	4.11	CLAY	17	11		.9	
14.550	47.74	14.87	3.03	CLAY to SILTY CLAY	10	7		.8	
14.700	48.23	13.58	3.39	CLAY to SILTY CLAY	9	6		.7	
14.850	48.72	12.94	3.17	CLAY to SILTY CLAY	9	6		.7	
15.000	49.21	17.00	3.76	CLAY to SILTY CLAY	11	8		.9	
15.150	49.70	61.46	2.38	SANDY SILT to CLAYEY SILT	25	16		3.9	
15.300	50.20	53.39	*****		0	0			.0

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 27.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

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*                      CPT INTERPRETATIONS                          *
*                                                                   *
*  SOUNDING : CPT-13                      PROJECT No.: 00-1571-1    *
*  PROJECT  : AES/PANHANDLE               CONE/RIG : 722/BH.GO/R#3  *
*  DATE/TIME: 04-05-00 12:34                                        *
*                                                                   *
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                                                        PAGE 1 of 2

DEPTH   DEPTH     TIP     FRICTION      SOIL BEHAVIOR TYPE      N(60)   N1(60)   Dr     Su       PHI
               RESISTANCE  RATIO
 (m)     (ft)    (tsf)      (%)                                                 (%)   (tsf)  (Degrees)
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 .150     .49     92.63     1.49    SILTY SAND to SANDY SILT     31      49      74
 .300     .98    107.60     3.53    SANDY SILT to CLAYEY SILT    43      69             6.3
 .450    1.48     86.96     3.35    SANDY SILT to CLAYEY SILT    35      56             5.1
 .600    1.97     90.33     3.45    SANDY SILT to CLAYEY SILT    36      58             5.3
 .750    2.46    118.84     3.32    SANDY SILT to CLAYEY SILT    48      76             7.0
 .900    2.95    160.33     3.41    SANDY SILT to CLAYEY SILT    64     100             9.4
1.050    3.44    123.77     4.10   *VERY STIFF FINE GRAINED     100     100
1.200    3.94     77.76     4.78   *VERY STIFF FINE GRAINED      78     100
1.350    4.43     73.34     2.88    SANDY SILT to CLAYEY SILT    29      47             4.9
1.500    4.92     69.83     1.30    SILTY SAND to SANDY SILT     23      37      66             44.5
1.650    5.41     71.13     1.14    SILTY SAND to SANDY SILT     24      38      67             44.0
1.800    5.91     63.52     1.50    SILTY SAND to SANDY SILT     21      34      63             43.0
1.950    6.40     77.93     1.21    SILTY SAND to SANDY SILT     26      42      69             44.0
2.100    6.89    108.09     1.50    SAND to SILTY SAND           27      42      79             45.0
2.250    7.38     57.19     1.75    SILTY SAND to SANDY SILT     19      29      60             42.0
2.400    7.87    119.44      .98    SAND to SILTY SAND           30      43      81             44.5
2.550    8.37    153.90      .83    SAND                         31      43      89             45.5
2.700    8.86     48.20     3.20    CLAYEY SILT to SILTY CLAY    24      33             3.2
2.850    9.35     34.14     3.10    CLAYEY SILT to SILTY CLAY    17      23             2.2
3.000    9.84     25.81     3.45    CLAYEY SILT to SILTY CLAY    13      17             1.7
3.150   10.33      9.86     5.78    CLAY                         10      13              .6
3.300   10.83     10.73     4.38    CLAY                         11      13              .7
3.450   11.32     11.88     4.12    CLAY                         12      14              .7
3.600   11.81     32.87     1.95    SANDY SILT to CLAYEY SILT    13      16             2.6
3.750   12.30     27.60     2.75    CLAYEY SILT to SILTY CLAY    14      16             1.8
3.900   12.80     69.90     1.44    SILTY SAND to SANDY SILT     23      27      60             39.5
4.050   13.29     52.52      .82    SILTY SAND to SANDY SILT     18      20      52             38.5
4.200   13.78     18.02     4.61    CLAY                         18      20             1.1
4.350   14.27    107.03     1.40    SAND to SILTY SAND           27      29      71             41.5
4.500   14.76    140.98     1.74    SILTY SAND to SANDY SILT     47      50      79             42.5
4.650   15.26    155.79     1.51    SAND to SILTY SAND           39      41      81             43.0
4.800   15.75    171.53     1.68    SAND to SILTY SAND           43      44      83             43.5
4.950   16.24    180.43     1.62    SAND to SILTY SAND           45      46      84             43.5
5.100   16.73    218.89     1.22    SAND                         44      44      89             44.0
5.250   17.22    225.62     1.15    SAND                         45      44      90             44.0
5.400   17.72    231.02     1.49    SAND to SILTY SAND           58      56      90             44.0
5.550   18.21    255.07     1.05    SAND                         51      49      93             44.5
5.700   18.70    258.32     1.05    SAND                         52      49      93             44.5
5.850   19.19    214.08     1.22    SAND to SILTY SAND           54      50      87             43.5
6.000   19.69    158.49      .83    SAND                         32      29      78             42.0
6.150   20.18     88.48      .40    SAND to SILTY SAND           22      20      61             38.5
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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 20.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE
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SOUNDING : CPT-13

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	31.57	2.15	SANDY SILT to CLAYEY SILT	13	11		2.0	
6.450	21.16	73.23	.85	SAND to SILTY SAND	18	16	55		38.0
6.600	21.65	47.99	.71	SILTY SAND to SANDY SILT	16	14	43		36.0
6.750	22.15	41.62	2.23	SANDY SILT to CLAYEY SILT	17	15		2.7	
6.900	22.64	46.84	3.22	CLAYEY SILT to SILTY CLAY	23	21		3.0	
7.050	23.13	36.18	4.04	CLAY to SILTY CLAY	24	21		2.0	
7.200	23.62	143.11	1.56	SAND to SILTY SAND	36	31	73		40.5
7.350	24.11	184.49	1.22	SAND to SILTY SAND	46	40	81		42.0
7.500	24.61	211.49	1.39	SAND to SILTY SAND	53	46	84		42.5
7.650	25.10	197.56	1.70	SAND to SILTY SAND	49	43	82		42.5
7.800	25.59	180.54	1.60	SAND to SILTY SAND	45	39	79		42.0
7.950	26.08	193.52	1.22	SAND to SILTY SAND	48	41	81		42.0
8.100	26.57	244.27	.98	SAND	49	41	88		43.0
8.250	27.07	248.88	.80	SAND	50	42	88		43.0
8.400	27.56	210.20	.72	SAND	42	35	83		42.5
8.550	28.05	178.05	.84	SAND	36	30	78		41.5
8.700	28.54	160.10	1.75	SAND to SILTY SAND	40	33	75		40.5
8.850	29.04	172.72	1.43	SAND to SILTY SAND	43	36	77		41.0
9.000	29.53	170.32	1.00	SAND	34	28	77		41.0
9.150	30.02	185.08	.64	SAND	37	30	79		41.5
9.300	30.51	249.01	.84	SAND	50	41	87		43.0
9.450	31.00	458.61	1.22	SAND	92	74	100		45.5
9.600	31.50	393.71	.58	GRAVELLY SAND to SAND	66	53	100		44.5
9.750	31.99	267.20	.93	SAND	53	43	89		43.0
9.900	32.48	130.95	2.23	SILTY SAND to SANDY SILT	44	35	68		39.0
10.050	32.97	191.46	.57	SAND	38	31	79		41.5
10.200	33.46	219.67	.58	SAND	44	35	83		42.0
10.350	33.96	187.76	.46	SAND	38	30	78		41.0
10.500	34.45	222.92	1.51	SAND to SILTY SAND	56	44	83		42.0
10.650	34.94	183.11	.34	SAND	37	29	77		41.0
10.800	35.43	144.97	.49	SAND	29	23	70		39.5
10.950	35.93	138.62	.66	SAND	28	22	69		39.0
11.100	36.42	160.97	.81	SAND	32	25	73		39.5
11.250	36.91	156.26	.28	SAND	31	24	72		39.5
11.400	37.40	123.07	.50	SAND	25	19	65		38.5
11.550	37.89	149.22	1.08	SAND to SILTY SAND	37	28	71		39.0
11.700	38.39	137.62	.44	SAND	28	21	68		39.0
11.850	38.88	137.24	.66	SAND	27	21	68		39.0
12.000	39.37	148.10	.29	SAND	30	22	70		39.0
12.150	39.86	128.23	.49	SAND	26	19	66		38.5
12.300	40.35	123.62	.40	SAND	25	18	65		38.5
12.450	40.85	96.26	.62	SAND to SILTY SAND	24	18	57		37.5
12.600	41.34	86.98	.70	SAND to SILTY SAND	22	16	54		37.0
12.750	41.83	121.07	.59	SAND	24	18	64		38.5
12.900	42.32	96.39	1.11	SAND to SILTY SAND	24	18	57		37.5
13.050	42.81	89.95	1.20	SAND to SILTY SAND	22	17	55		37.0
13.200	43.31	169.89	1.02	SAND	34	25	73		39.5
13.350	43.80	285.85	1.42	SAND to SILTY SAND	71	52	88		42.5
13.500	44.29	326.30	1.90	SAND to SILTY SAND	82	59	92		43.0

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 20.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

CPT INTERPRETATIONS

SOUNDING : CPT-14 PROJECT No.: 00-1571-1
PROJECT : AES/PANHANDLE CONE/RIG : 722/BH.GO/R#3
DATE/TIME: 04-04-00 07:57

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	39.37	1.90	SANDY SILT to CLAYEY SILT	16	25		2.6	
.300	.98	49.29	2.58	SANDY SILT to CLAYEY SILT	20	32		3.3	
.450	1.48	34.35	3.36	CLAYEY SILT to SILTY CLAY	17	27		2.3	
.600	1.97	23.09	3.13	CLAYEY SILT to SILTY CLAY	12	18		1.5	
.750	2.46	16.61	2.57	CLAYEY SILT to SILTY CLAY	8	13		1.1	
.900	2.95	18.36	2.48	CLAYEY SILT to SILTY CLAY	9	15		1.2	
1.050	3.44	19.97	2.90	CLAYEY SILT to SILTY CLAY	10	16		1.3	
1.200	3.94	27.87	3.86	CLAY to SILTY CLAY	19	30		1.8	
1.350	4.43	61.38	3.24	SANDY SILT to CLAYEY SILT	25	39		3.6	
1.500	4.92	48.91	2.63	SANDY SILT to CLAYEY SILT	20	31		3.2	
1.650	5.41	53.35	2.37	SANDY SILT to CLAYEY SILT	21	34		3.5	
1.800	5.91	65.12	2.32	SANDY SILT to CLAYEY SILT	26	42		4.3	
1.950	6.40	62.67	2.44	SANDY SILT to CLAYEY SILT	25	40		4.2	
2.100	6.89	58.59	2.26	SANDY SILT to CLAYEY SILT	23	36		3.9	
2.250	7.38	50.88	3.19	CLAYEY SILT to SILTY CLAY	25	38		3.4	
2.400	7.87	58.23	2.75	SANDY SILT to CLAYEY SILT	23	34		3.9	
2.550	8.37	78.99	2.15	SILTY SAND to SANDY SILT	26	37	70		42.5
2.700	8.86	102.97	1.70	SILTY SAND to SANDY SILT	34	47	77		43.5
2.850	9.35	150.63	.67	SAND	30	40	87		45.0
3.000	9.84	138.58	2.88	SANDY SILT to CLAYEY SILT	55	72		8.1	
3.150	10.33	65.69	1.67	SILTY SAND to SANDY SILT	22	28	62		40.5
3.300	10.83	30.42	3.84	CLAYEY SILT to SILTY CLAY	15	19		2.0	
3.450	11.32	46.44	1.96	SANDY SILT to CLAYEY SILT	19	23		3.1	
3.600	11.81	44.32	2.72	SANDY SILT to CLAYEY SILT	18	21		2.9	
3.750	12.30	40.45	1.72	SANDY SILT to CLAYEY SILT	16	19		3.2	
3.900	12.80	32.25	2.56	SANDY SILT to CLAYEY SILT	13	15		2.1	
4.050	13.29	24.35	2.57	CLAYEY SILT to SILTY CLAY	12	14		1.6	
4.200	13.78	21.63	3.33	CLAYEY SILT to SILTY CLAY	11	12		1.4	
4.350	14.27	49.71	1.78	SILTY SAND to SANDY SILT	17	18	49		38.0
4.500	14.76	83.68	1.35	SILTY SAND to SANDY SILT	28	30	64		39.5
4.650	15.26	31.72	1.11	SILTY SAND to SANDY SILT	11	11	35		36.0
4.800	15.75	8.24	3.33	CLAY	8	9		.5	
4.950	16.24	23.58	2.54	CLAYEY SILT to SILTY CLAY	12	12		1.5	
5.100	16.73	44.55	.95	SILTY SAND to SANDY SILT	15	15	45		37.0
5.250	17.22	11.28	2.93	CLAY to SILTY CLAY	8	8		.7	
5.400	17.72	8.18	4.00	CLAY	8	8		.5	
5.550	18.21	9.52	5.44	CLAY	10	10		.6	
5.700	18.70	8.35	1.85	CLAYEY SILT to SILTY CLAY	4	4		.6	
5.850	19.19	5.57	2.88	CLAY	6	6		.4	
6.000	19.69	25.03	2.28	SANDY SILT to CLAYEY SILT	10	10		1.6	
6.150	20.18	60.36	2.19	SANDY SILT to CLAYEY SILT	24	24		3.9	

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-14

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	22.05	2.97	CLAYEY SILT to SILTY CLAY	11	11		1.4	
6.450	21.16	50.18	1.54	SILTY SAND to SANDY SILT	17	16	46		37.0
6.600	21.65	87.40	1.99	SILTY SAND to SANDY SILT	29	28	62		39.0
6.750	22.15	71.00	.93	SAND to SILTY SAND	18	17	56		38.0
6.900	22.64	32.82	1.12	SILTY SAND to SANDY SILT	11	10	33		34.0
7.050	23.13	16.08	4.16	CLAY	16	15		1.0	
7.200	23.62	21.27	3.50	CLAY to SILTY CLAY	14	13		1.3	
7.350	24.11	7.52	1.75	CLAY to SILTY CLAY	5	5		.5	
7.500	24.61	9.52	1.84	CLAYEY SILT to SILTY CLAY	5	4		.6	
7.650	25.10	24.43	4.53	CLAY	24	22		1.3	
7.800	25.59	8.41	4.48	CLAY	8	8		.5	
7.950	26.08	7.12	2.57	CLAY to SILTY CLAY	5	4		.4	
8.100	26.57	7.90	3.49	CLAY	8	7		.4	
8.250	27.07	10.11	4.03	CLAY	10	9		.6	
8.400	27.56	14.30	3.80	CLAY to SILTY CLAY	10	8		.8	
8.550	28.05	21.71	6.03	CLAY	22	19		1.2	
8.700	28.54	13.98	5.54	CLAY	14	12		.8	
8.850	29.04	10.03	4.45	CLAY	10	9		.6	
9.000	29.53	9.09	6.75	CLAY	9	8		.5	
9.150	30.02	41.38	3.56	CLAYEY SILT to SILTY CLAY	21	18		2.3	
9.300	30.51	30.19	3.56	CLAYEY SILT to SILTY CLAY	15	13		1.9	
9.450	31.00	8.48	3.56	CLAY	8	7		.4	
9.600	31.50	15.19	5.79	CLAY	15	13		.9	
9.750	31.99	25.85	5.66	CLAY	26	22		1.4	
9.900	32.48	18.31	5.68	CLAY	18	15		1.1	
10.050	32.97	18.87	5.94	CLAY	19	16		1.0	
10.200	33.46	24.98	7.04	CLAY	25	21		1.4	
10.350	33.96	25.43	6.28	CLAY	25	21		1.4	
10.500	34.45	14.68	6.91	CLAY	15	12		.8	
10.650	34.94	42.53	4.52	CLAY to SILTY CLAY	28	23		2.4	
10.800	35.43	30.32	6.78	CLAY	30	25		1.7	
10.950	35.93	22.90	6.68	CLAY	23	19		1.2	
11.100	36.42	42.04	4.59	CLAY to SILTY CLAY	28	23		2.3	
11.250	36.91	41.41	4.76	CLAY to SILTY CLAY	28	22		2.3	
11.400	37.40	57.55	4.35	CLAYEY SILT to SILTY CLAY	29	23		3.3	
11.550	37.89	64.20	3.72	CLAYEY SILT to SILTY CLAY	32	26		3.6	
11.700	38.39	50.20	3.92	CLAYEY SILT to SILTY CLAY	25	20		2.8	
11.850	38.88	38.16	7.02	CLAY	38	30		2.1	
12.000	39.37	83.60	2.30	SILTY SAND to SANDY SILT	28	22	55		37.5
12.150	39.86	121.71	3.21	SANDY SILT to CLAYEY SILT	49	38		7.0	
12.300	40.35	107.52	3.43	SANDY SILT to CLAYEY SILT	43	34		6.2	
12.450	40.85	77.93	1.54	SILTY SAND to SANDY SILT	26	20	53		37.0
12.600	41.34	110.75	3.35	SANDY SILT to CLAYEY SILT	44	34		6.4	
12.750	41.83	89.84	2.36	SILTY SAND to SANDY SILT	30	23	57		37.5
12.900	42.32	80.60	4.81	*VERY STIFF FINE GRAINED	81	62			
13.050	42.81	113.26	1.40	SAND to SILTY SAND	28	22	63		38.5
13.200	43.31	94.92	2.74	SANDY SILT to CLAYEY SILT	38	29		5.4	
13.350	43.80	116.76	1.27	SAND to SILTY SAND	29	22	64		38.5
13.500	44.29	81.24	3.27	SANDY SILT to CLAYEY SILT	32	25		4.6	
13.650	44.78	91.40	4.32	CLAYEY SILT to SILTY CLAY	46	34		5.2	

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-14

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	190.88	2.38	SILTY SAND to SANDY SILT	64	48	77		40.5
13.950	45.77	107.97	3.10	SANDY SILT to CLAYEY SILT	43	32		6.2	
14.100	46.26	120.16	2.66	SILTY SAND to SANDY SILT	40	30	64		38.5
14.250	46.75	138.49	3.73	SANDY SILT to CLAYEY SILT	55	41		8.0	
14.400	47.24	236.20	1.22	SAND	47	35	83		42.0
14.550	47.74	208.94	1.19	SAND	42	31	79		41.0
14.700	48.23	173.38	1.05	SAND to SILTY SAND	43	32	74		39.5
14.850	48.72	151.75	1.22	SAND to SILTY SAND	38	28	70		39.0
15.000	49.21	44.51	5.41	CLAY	45	32		2.4	
15.150	49.70	39.94	5.68	CLAY	40	29		2.2	
15.300	50.20	65.58	2.42	SANDY SILT to CLAYEY SILT	26	19		4.2	

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

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*                       CPT INTERPRETATIONS                          *
*                                                                    *
*   SOUNDING : CPT-15                  PROJECT No.: 00-1571-1        *
*   PROJECT  : AES/PANHANDLE           CONE/RIG : 722/BH.GO/R#3      *
*   DATE/TIME: 04-04-00 09:24                                        *
*                                                                    *
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DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	60.78	2.85	SANDY SILT to CLAYEY SILT	24	39		4.1	
.300	.98	56.57	4.09	CLAYEY SILT to SILTY CLAY	28	45		3.3	
.450	1.48	81.75	1.98	SILTY SAND to SANDY SILT	27	44	71		
.600	1.97	123.75	1.31	SAND to SILTY SAND	31	49	82		
.750	2.46	101.27	2.29	SILTY SAND to SANDY SILT	34	54	77		48.5
.900	2.95	155.66	1.40	SAND to SILTY SAND	39	62	89		49.5
1.050	3.44	200.66	2.15	SILTY SAND to SANDY SILT	67	100	96		
1.200	3.94	125.30	1.85	SILTY SAND to SANDY SILT	42	67	83		47.5
1.350	4.43	135.01	1.74	SILTY SAND to SANDY SILT	45	72	85		47.5
1.500	4.92	143.08	1.72	SAND to SILTY SAND	36	57	87		47.0
1.650	5.41	243.38	.61	SAND	49	78	100		49.0
1.800	5.91	311.66	1.20	SAND	62	100	100		49.5
1.950	6.40	232.01	1.35	SAND to SILTY SAND	58	93	100		48.0
2.100	6.89	223.62	1.15	SAND	45	70	99		47.5
2.250	7.38	223.50	.85	SAND	45	67	99		47.5
2.400	7.87	246.12	.94	SAND	49	72	100		47.5
2.550	8.37	257.27	.66	SAND	51	73	100		47.5
2.700	8.86	270.17	.39	SAND	54	74	100		47.5
2.850	9.35	366.71	2.76	*SAND to CLAYEY SAND	100	100			
3.000	9.84	211.96	2.82	SILTY SAND to SANDY SILT	71	92	96		46.0
3.150	10.33	101.30	.58	SAND to SILTY SAND	25	32	74		43.0
3.300	10.83	27.00	2.88	CLAYEY SILT to SILTY CLAY	14	17		1.8	
3.450	11.32	13.58	2.84	CLAY to SILTY CLAY	9	11		.9	
3.600	11.81	10.75	3.03	CLAY to SILTY CLAY	7	9		.7	
3.750	12.30	12.66	4.62	CLAY	13	15		.8	
3.900	12.80	9.45	6.49	CLAY	9	11		.6	
4.050	13.29	29.85	2.14	SANDY SILT to CLAYEY SILT	12	13		1.9	
4.200	13.78	21.03	3.58	CLAY to SILTY CLAY	14	15		1.3	
4.350	14.27	6.84	4.06	CLAY	7	7		.4	
4.500	14.76	9.41	4.22	CLAY	9	10		.6	
4.650	15.26	30.87	.96	SILTY SAND to SANDY SILT	10	11	35		36.0
4.800	15.75	26.19	1.59	SANDY SILT to CLAYEY SILT	10	11		2.0	
4.950	16.24	15.13	4.83	CLAY	15	16		.9	
5.100	16.73	21.33	3.31	CLAYEY SILT to SILTY CLAY	11	11		1.4	
5.250	17.22	8.77	9.97	CLAY	9	9		.5	
5.400	17.72	106.35	1.06	SAND to SILTY SAND	27	27	69		40.5
5.550	18.21	259.91	2.00	SAND to SILTY SAND	65	65	94		45.0
5.700	18.70	277.24	.85	SAND	55	55	96		45.0
5.850	19.19	355.53	.94	SAND	71	70	100		46.0
6.000	19.69	312.47	1.09	SAND	62	61	99		45.5
6.150	20.18	244.42	1.18	SAND	49	48	92		44.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-15

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	307.77	.82	SAND	62	60	98		45.0
6.450	21.16	389.76	1.01	SAND	78	75	100		46.0
6.600	21.65	284.13	1.33	SAND	57	54	96		45.0
6.750	22.15	228.38	.29	SAND	46	43	89		44.0
6.900	22.64	30.10	3.97	CLAY to SILTY CLAY	20	19		1.9	
7.050	23.13	43.76	1.11	SILTY SAND to SANDY SILT	15	14	41		36.0
7.200	23.62	39.37	.59	SILTY SAND to SANDY SILT	13	12	38		36.0
7.350	24.11	37.16	1.42	SILTY SAND to SANDY SILT	12	11	36		35.0
7.500	24.61	56.51	1.73	SILTY SAND to SANDY SILT	19	17	48		37.0
7.650	25.10	102.63	1.28	SAND to SILTY SAND	26	24	65		39.0
7.800	25.59	119.80	.65	SAND	24	22	69		40.0
7.950	26.08	193.90	.90	SAND	39	35	83		42.5
8.100	26.57	388.89	.71	SAND	78	70	100		45.5
8.250	27.07	298.96	.72	SAND	60	54	95		44.5
8.400	27.56	241.55	1.25	SAND	48	43	89		43.5
8.550	28.05	235.31	1.39	SAND to SILTY SAND	59	52	88		43.5
8.700	28.54	218.38	.91	SAND	44	38	86		43.0
8.850	29.04	222.50	1.45	SAND to SILTY SAND	56	49	86		43.0
9.000	29.53	348.54	.95	SAND	70	61	99		45.0
9.150	30.02	314.10	.64	SAND	63	54	96		44.5
9.300	30.51	256.85	.76	SAND	51	44	90		43.5
9.450	31.00	304.44	.84	SAND	61	52	94		44.0
9.600	31.50	263.33	.67	SAND	53	45	90		43.5
9.750	31.99	226.19	.22	SAND	45	38	86		42.5
9.900	32.48	215.29	.33	SAND	43	36	84		42.5
10.050	32.97	244.46	.43	SAND	49	41	88		43.0
10.200	33.46	214.55	.36	SAND	43	36	84		42.5
10.350	33.96	84.41	.57	SAND to SILTY SAND	21	18	57		38.0
10.500	34.45	92.01	2.18	SILTY SAND to SANDY SILT	31	25	59		38.0
10.650	34.94	210.79	.41	SAND	42	35	83		42.0
10.800	35.43	230.65	.72	SAND	46	38	85		42.5
10.950	35.93	333.16	.50	GRAVELLY SAND to SAND	56	45	96		44.0
11.100	36.42	360.48	.77	SAND	72	59	98		44.5
11.250	36.91	417.04	.62	GRAVELLY SAND to SAND	70	56	100		45.0
11.400	37.40	363.10	.36	GRAVELLY SAND to SAND	61	49	98		44.5
11.550	37.89	380.47	.56	GRAVELLY SAND to SAND	63	51	99		44.5
11.700	38.39	317.10	.34	GRAVELLY SAND to SAND	53	42	94		44.0
11.850	38.88	350.14	.59	GRAVELLY SAND to SAND	58	46	96		44.0
12.000	39.37	508.81	.85	GRAVELLY SAND to SAND	85	67	100		45.5
12.150	39.86	495.77	.77	GRAVELLY SAND to SAND	83	65	100		45.5
12.300	40.35	542.70	.61	GRAVELLY SAND to SAND	90	71	100		
12.450	40.85	464.20	.46	GRAVELLY SAND to SAND	77	60	100		45.0
12.600	41.34	489.65	.52	GRAVELLY SAND to SAND	82	63	100		45.5
12.750	41.83	457.10	.42	GRAVELLY SAND to SAND	76	59	100		45.0
12.900	42.32	400.57	.60	GRAVELLY SAND to SAND	67	51	99		44.5
13.050	42.81	287.12	.48	SAND	57	44	90		43.0
13.200	43.31	191.67	.54	SAND	38	29	78		40.5
13.350	43.80	214.91	1.38	SAND to SILTY SAND	54	41	81		41.5
13.500	44.29	222.54	.88	SAND	45	34	82		42.0
13.650	44.78	182.98	1.07	SAND	37	28	76		40.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-15

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	153.90	.49	SAND	31	23	71		39.0
13.950	45.77	91.50	1.89	SILTY SAND to SANDY SILT	31	23	56		37.5
14.100	46.26	48.59	3.05	SANDY SILT to CLAYEY SILT	19	14		3.1	
14.250	46.75	15.72	5.46	CLAY	16	12		.9	
14.400	47.24	43.53	3.76	CLAYEY SILT to SILTY CLAY	22	16		2.4	
14.550	47.74	15.74	5.49	CLAY	16	12		.9	
14.700	48.23	24.26	7.05	CLAY	24	18		1.3	
14.850	48.72	84.00	2.46	SANDY SILT to CLAYEY SILT	34	25		5.4	
15.000	49.21	33.06	4.50	CLAY to SILTY CLAY	22	16		1.8	
15.150	49.70	9.52	2.53	CLAY to SILTY CLAY	6	5		.5	
15.300	50.20	9.45	5.38	CLAY	9	7		.4	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-16
PROJECT : AES/PANHANDLE
DATE/TIME: 04-04-00 10:16
PROJECT No.: 00-1571-1
CONE/RIG : 722/BH.GO/R#3

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	51.58	2.53	SANDY SILT to CLAYEY SILT	21	33		3.4	
.300	.98	24.05	4.28	CLAY to SILTY CLAY	16	26		1.6	
.450	1.48	15.68	6.56	CLAY	16	25		1.0	
.600	1.97	69.17	1.94	SILTY SAND to SANDY SILT	23	37	66		48.0
.750	2.46	98.79	1.90	SILTY SAND to SANDY SILT	33	53	76		48.5
.900	2.95	165.84	1.31	SAND to SILTY SAND	41	66	91		
1.050	3.44	185.81	1.30	SAND to SILTY SAND	46	74	94		
1.200	3.94	221.33	1.28	SAND to SILTY SAND	55	88	99		
1.350	4.43	218.52	1.60	SAND to SILTY SAND	55	87	99		49.5
1.500	4.92	179.56	1.45	SAND to SILTY SAND	45	72	93		48.0
1.650	5.41	187.55	.88	SAND	38	60	94		48.0
1.800	5.91	115.78	1.56	SAND to SILTY SAND	29	46	81		46.0
1.950	6.40	125.43	.98	SAND to SILTY SAND	31	50	83		46.0
2.100	6.89	105.74	1.04	SAND to SILTY SAND	26	41	78		44.5
2.250	7.38	129.59	3.00	SANDY SILT to CLAYEY SILT	52	78		7.6	
2.400	7.87	141.60	1.31	SAND to SILTY SAND	35	52	86		45.5
2.550	8.37	151.69	.28	SAND	30	43	88		45.5
2.700	8.86	101.93	1.35	SAND to SILTY SAND	25	35	77		43.5
2.850	9.35	155.13	1.34	SAND to SILTY SAND	39	52	88		45.0
3.000	9.84	224.43	1.78	SAND to SILTY SAND	56	73	98		46.5
3.150	10.33	282.81	2.00	SAND to SILTY SAND	71	90	100		47.0
3.300	10.83	286.91	.97	SAND	57	71	100		47.0
3.450	11.32	368.09	.80	SAND	74	89	100		47.5
3.600	11.81	377.10	.32	GRAVELLY SAND to SAND	63	75	100		47.5
3.750	12.30	266.71	.90	SAND	53	62	99		46.0
3.900	12.80	270.55	1.54	SAND to SILTY SAND	68	77	99		46.0
4.050	13.29	282.77	1.70	SAND to SILTY SAND	71	79	100		46.0
4.200	13.78	200.85	.79	SAND	40	44	90		44.5
4.350	14.27	119.67	.61	SAND	24	26	74		42.0
4.500	14.76	35.16	1.11	SILTY SAND to SANDY SILT	12	13	39		36.5
4.650	15.26	11.28	1.66	CLAYEY SILT to SILTY CLAY	6	6		.8	
4.800	15.75	12.66	2.18	CLAYEY SILT to SILTY CLAY	6	7		.9	
4.950	16.24	62.65	.98	SILTY SAND to SANDY SILT	21	22	55		38.5
5.100	16.73	9.77	3.53	CLAY	10	10		.6	
5.250	17.22	19.29	1.68	SANDY SILT to CLAYEY SILT	8	8		1.5	
5.400	17.72	7.97	3.98	CLAY	8	8		.5	
5.550	18.21	17.72	2.70	CLAYEY SILT to SILTY CLAY	9	9		1.1	
5.700	18.70	169.81	1.01	SAND	34	34	82		43.0
5.850	19.19	251.64	1.01	SAND	50	50	93		44.5
6.000	19.69	240.77	1.60	SAND to SILTY SAND	60	60	92		44.5
6.150	20.18	241.94	.83	SAND	48	48	92		44.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 14.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-16

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	225.36	.77	SAND	45	44	90		44.0
6.450	21.16	151.18	.82	SAND	30	29	78		42.0
6.600	21.65	212.11	.94	SAND	42	41	87		43.5
6.750	22.15	149.35	.45	SAND	30	29	77		42.0
6.900	22.64	120.54	.52	SAND	24	23	71		40.5
7.050	23.13	118.50	.54	SAND	24	22	70		40.5
7.200	23.62	139.58	1.55	SAND to SILTY SAND	35	33	75		41.5
7.350	24.11	286.53	1.44	SAND to SILTY SAND	72	67	95		44.5
7.500	24.61	266.86	.89	SAND	53	50	93		44.0
7.650	25.10	282.11	.19	GRAVELLY SAND to SAND	47	43	94		44.5
7.800	25.59	138.77	.89	SAND to SILTY SAND	35	32	74		41.0
7.950	26.08	32.53	1.30	SILTY SAND to SANDY SILT	11	10	32		33.5
8.100	26.57	30.91	.63	SILTY SAND to SANDY SILT	10	9	30		33.0
8.250	27.07	23.05	1.60	SANDY SILT to CLAYEY SILT	9	8		1.7	
8.400	27.56	44.23	1.05	SILTY SAND to SANDY SILT	15	13	40		36.0
8.550	28.05	96.88	2.28	SILTY SAND to SANDY SILT	32	29	63		39.0
8.700	28.54	194.05	1.35	SAND to SILTY SAND	49	43	82		42.5
8.850	29.04	320.97	.53	GRAVELLY SAND to SAND	53	47	97		44.5
9.000	29.53	326.15	.81	SAND	65	57	97		44.5
9.150	30.02	314.85	.76	SAND	63	55	96		44.5
9.300	30.51	366.20	.50	GRAVELLY SAND to SAND	61	53	100		45.0
9.450	31.00	362.90	.31	GRAVELLY SAND to SAND	60	52	100		45.0
9.600	31.50	354.77	.30	GRAVELLY SAND to SAND	59	51	99		45.0
9.750	31.99	214.04	.37	SAND	43	37	84		42.5
9.900	32.48	184.32	.26	SAND	37	31	80		42.0
10.050	32.97	167.69	.16	SAND	34	28	77		41.5
10.200	33.46	65.84	3.62	CLAYEY SILT to SILTY CLAY	33	28		3.8	
10.350	33.96	89.38	2.14	SILTY SAND to SANDY SILT	30	25	59		38.0
10.500	34.45	70.64	2.93	SANDY SILT to CLAYEY SILT	28	24		4.0	
10.650	34.94	68.09	1.75	SILTY SAND to SANDY SILT	23	19	51		37.0
10.800	35.43	60.23	1.64	SILTY SAND to SANDY SILT	20	17	47		36.5
10.950	35.93	25.15	4.44	CLAY to SILTY CLAY	17	14		1.4	
11.100	36.42	26.83	2.75	CLAYEY SILT to SILTY CLAY	13	11		1.6	
11.250	36.91	44.87	3.80	CLAYEY SILT to SILTY CLAY	22	18		2.5	
11.400	37.40	208.94	.72	SAND	42	34	82		42.0
11.550	37.89	216.06	.70	SAND	43	35	83		42.0
11.700	38.39	221.77	.48	SAND	44	36	83		42.0
11.850	38.88	168.60	1.16	SAND to SILTY SAND	42	34	75		40.5
12.000	39.37	253.83	1.11	SAND	51	40	87		42.5
12.150	39.86	429.42	2.00	SAND to SILTY SAND	100	85	100		45.0
12.300	40.35	405.35	.99	SAND	81	64	100		44.5
12.450	40.85	375.33	.60	GRAVELLY SAND to SAND	63	49	98		44.5
12.600	41.34	342.70	.41	GRAVELLY SAND to SAND	57	45	95		44.0
12.750	41.83	313.17	.29	GRAVELLY SAND to SAND	52	41	92		43.5
12.900	42.32	336.39	.36	GRAVELLY SAND to SAND	56	43	94		44.0
13.050	42.81	358.17	.79	SAND	72	55	96		44.0
13.200	43.31	417.78	.89	SAND	84	64	100		44.5
13.350	43.80	571.80	1.31	SAND	100	87	100		
13.500	44.29	571.27	1.06	SAND	100	87	100		
13.650	44.78	529.78	.63	GRAVELLY SAND to SAND	88	67	100		

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 14.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-16

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	386.12	.34	GRAVELLY SAND to SAND	64	49	98		44.0
13.950	45.77	324.13	.41	GRAVELLY SAND to SAND	54	41	92		43.5
14.100	46.26	273.57	.36	GRAVELLY SAND to SAND	46	34	88		42.5
14.250	46.75	253.56	.37	SAND	51	38	85		42.0
14.400	47.24	76.50	1.52	SILTY SAND to SANDY SILT	26	19	51		36.5
14.550	47.74	21.18	4.16	CLAY to SILTY CLAY	14	10		1.2	
14.700	48.23	65.82	1.85	SILTY SAND to SANDY SILT	22	16	46		36.0
14.850	48.72	44.49	3.51	CLAYEY SILT to SILTY CLAY	22	16		2.4	
15.000	49.21	27.19	5.34	CLAY	27	20		1.4	
15.150	49.70	35.31	4.63	CLAY to SILTY CLAY	24	17		1.9	
15.300	50.20	36.20	5.89	CLAY	36	26		2.0	

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 14.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

CPT INTERPRETATIONS

SOUNDING : CPT-17
PROJECT : AES/PANHANDLE
DATE/TIME: 04-04-00 06:57
PROJECT No.: 00-1571-1
CONE/RIG : 722/BH.GO/R#3

PAGE 1 of 2

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	67.07	2.91	SANDY SILT to CLAYEY SILT	27	43		4.5	
.300	.98	37.88	3.46	CLAYEY SILT to SILTY CLAY	19	30		2.5	
.450	1.48	19.76	3.80	CLAY to SILTY CLAY	13	21		1.3	
.600	1.97	12.92	3.33	CLAY to SILTY CLAY	9	14		.9	
.750	2.46	13.00	3.08	CLAY to SILTY CLAY	9	14		.9	
.900	2.95	13.15	3.57	CLAY to SILTY CLAY	9	14		.9	
1.050	3.44	9.54	1.36	CLAYEY SILT to SILTY CLAY	5	8		.7	
1.200	3.94	12.43	4.99	CLAY	12	20		.8	
1.350	4.43	18.78	3.35	CLAY to SILTY CLAY	13	20		1.2	
1.500	4.92	27.49	3.53	CLAYEY SILT to SILTY CLAY	14	22		1.8	
1.650	5.41	21.56	4.92	CLAY	22	34		1.4	
1.800	5.91	20.27	5.67	CLAY	20	32		1.2	
1.950	6.40	19.35	6.25	CLAY	19	31		1.1	
2.100	6.89	18.99	5.16	CLAY	19	30		1.2	
2.250	7.38	17.93	5.35	CLAY	18	27		1.2	
2.400	7.87	15.15	7.00	CLAY	15	22		1.0	
2.550	8.37	13.81	6.23	CLAY	14	19		.9	
2.700	8.86	18.89	5.56	CLAY	19	26		1.2	
2.850	9.35	45.53	4.00	CLAYEY SILT to SILTY CLAY	23	30		2.6	
3.000	9.84	67.05	1.95	SILTY SAND to SANDY SILT	22	29	63		41.0
3.150	10.33	83.24	1.60	SILTY SAND to SANDY SILT	28	35	69		42.0
3.300	10.83	55.96	2.16	SANDY SILT to CLAYEY SILT	22	28		3.7	
3.450	11.32	40.41	4.36	CLAY to SILTY CLAY	27	33		2.3	
3.600	11.81	45.87	2.53	SANDY SILT to CLAYEY SILT	18	22		3.0	
3.750	12.30	28.55	4.62	CLAY	29	33		1.6	
3.900	12.80	24.24	4.25	CLAY to SILTY CLAY	16	18		1.6	
4.050	13.29	30.00	3.43	CLAYEY SILT to SILTY CLAY	15	17		1.9	
4.200	13.78	46.12	1.67	SILTY SAND to SANDY SILT	15	17	48		38.0
4.350	14.27	13.38	5.75	CLAY	13	14		.8	
4.500	14.76	8.12	4.43	CLAY	8	9		.5	
4.650	15.26	4.38	5.02	CLAY	4	5		.2	
4.800	15.75	5.93	6.58	CLAY	6	6		.3	
4.950	16.24	7.27	4.95	CLAY	7	8		.4	
5.100	16.73	7.88	8.38	CLAY	8	8		.5	
5.250	17.22	27.04	3.14	CLAYEY SILT to SILTY CLAY	14	14		1.7	
5.400	17.72	11.15	7.09	CLAY	11	11		.7	
5.550	18.21	11.66	5.40	CLAY	12	12		.7	
5.700	18.70	34.08	3.02	CLAYEY SILT to SILTY CLAY	17	17		2.2	
5.850	19.19	59.49	1.36	SILTY SAND to SANDY SILT	20	20	52		38.0
6.000	19.69	69.36	1.28	SILTY SAND to SANDY SILT	23	23	56		38.5
6.150	20.18	99.36	1.72	SILTY SAND to SANDY SILT	33	33	66		39.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 14.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-17

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	86.72	2.14	SILTY SAND to SANDY SILT	29	28	62		39.0
6.450	21.16	52.64	1.41	SILTY SAND to SANDY SILT	18	17	48		37.5
6.600	21.65	39.66	.88	SILTY SAND to SANDY SILT	13	13	39		36.0
6.750	22.15	11.73	3.24	CLAY to SILTY CLAY	8	7		.7	
6.900	22.64	4.70	2.98	CLAY	5	4		.3	
7.050	23.13	6.90	2.46	CLAY to SILTY CLAY	5	4		.4	
7.200	23.62	7.33	7.37	CLAY	7	7		.4	
7.350	24.11	11.13	5.39	CLAY	11	10		.6	
7.500	24.61	46.46	1.79	SILTY SAND to SANDY SILT	15	14	43		36.5
7.650	25.10	14.87	2.89	CLAYEY SILT to SILTY CLAY	7	7		.9	
7.800	25.59	5.80	2.76	CLAY	6	5		.3	
7.950	26.08	4.42	15.38	ORGANIC MATERIAL	4	4		.3	
8.100	26.57	28.51	3.23	CLAYEY SILT to SILTY CLAY	14	13		1.8	
8.250	27.07	9.58	7.41	CLAY	10	9		.5	
8.400	27.56	18.06	3.38	CLAY to SILTY CLAY	12	11		1.1	
8.550	28.05	5.80	6.72	CLAY	6	5		.3	
8.700	28.54	7.50	7.73	CLAY	8	7		.4	
8.850	29.04	7.56	5.29	CLAY	8	7		.4	
9.000	29.53	8.31	7.34	CLAY	8	7		.4	
9.150	30.02	13.28	6.02	CLAY	13	12		.8	
9.300	30.51	17.31	6.01	CLAY	17	15		1.0	
9.450	31.00	27.17	3.64	CLAYEY SILT to SILTY CLAY	14	12		1.7	
9.600	31.50	42.34	2.50	SANDY SILT to CLAYEY SILT	17	15		2.7	
9.750	31.99	326.43	.22	GRAVELLY SAND to SAND	54	46	96		44.5
9.900	32.48	197.77	1.83	SAND to SILTY SAND	49	42	82		42.0
10.050	32.97	14.72	5.23	CLAY	15	12		.8	
10.200	33.46	21.90	7.72	CLAY	22	18		1.3	
10.350	33.96	42.64	4.62	CLAY to SILTY CLAY	28	24		2.4	
10.500	34.45	44.13	4.44	CLAY to SILTY CLAY	29	24		2.5	
10.650	34.94	135.97	4.77	*VERY STIFF FINE GRAINED	100	100			
10.800	35.43	77.12	6.95	*VERY STIFF FINE GRAINED	77	64			
10.950	35.93	68.51	5.81	*VERY STIFF FINE GRAINED	69	56			
11.100	36.42	69.49	6.48	*VERY STIFF FINE GRAINED	69	57			
11.250	36.91	71.87	8.00	*VERY STIFF FINE GRAINED	72	58			
11.400	37.40	76.99	5.73	*VERY STIFF FINE GRAINED	77	62			
11.550	37.89	103.42	6.76	*VERY STIFF FINE GRAINED	100	83			
11.700	38.39	124.66	6.55	*VERY STIFF FINE GRAINED	100	100			
11.850	38.88	118.38	6.45	*VERY STIFF FINE GRAINED	100	94			
12.000	39.37	71.23	7.02	*VERY STIFF FINE GRAINED	71	57			
12.150	39.86	104.63	6.39	*VERY STIFF FINE GRAINED	100	83			
12.300	40.35	80.50	6.57	*VERY STIFF FINE GRAINED	81	63			
12.450	40.85	112.02	4.26	*VERY STIFF FINE GRAINED	100	88			
12.600	41.34	115.30	4.79	*VERY STIFF FINE GRAINED	100	90			

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 14.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

CPT INTERPRETATIONS

SOUNDING : CPT-18 PROJECT No.: 00-1571-1
PROJECT : AES/PANHANDLE CONE/RIG : 473/BH,GO/R#3
DATE/TIME: 04-03-00 16:19

PAGE 1 of 3

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	54.94	1.65	SILTY SAND to SANDY SILT	18	29	59		
.300	.98	69.45	2.49	SANDY SILT to CLAYEY SILT	28	44		4.6	
.450	1.48	57.72	2.42	SANDY SILT to CLAYEY SILT	23	37		3.8	
.600	1.97	66.50	1.61	SILTY SAND to SANDY SILT	22	35	65		48.0
.750	2.46	102.82	1.66	SILTY SAND to SANDY SILT	34	55	77		48.5
.900	2.95	93.39	2.33	SILTY SAND to SANDY SILT	31	50	74		47.5
1.050	3.44	66.90	2.48	SANDY SILT to CLAYEY SILT	27	43		4.4	
1.200	3.94	29.02	4.04	CLAY to SILTY CLAY	19	31		1.9	
1.350	4.43	49.88	2.07	SANDY SILT to CLAYEY SILT	20	32		3.3	
1.500	4.92	43.02	2.36	SANDY SILT to CLAYEY SILT	17	28		2.8	
1.650	5.41	27.43	4.17	CLAY to SILTY CLAY	18	29		1.6	
1.800	5.91	28.64	4.49	CLAY to SILTY CLAY	19	31		1.7	
1.950	6.40	31.91	4.47	CLAY to SILTY CLAY	21	34		1.9	
2.100	6.89	19.72	6.18	CLAY	20	31		1.1	
2.250	7.38	16.89	5.54	CLAY	17	25		1.1	
2.400	7.87	11.79	4.29	CLAY	12	17		.8	
2.550	8.37	9.86	4.19	CLAY	10	14		.6	
2.700	8.86	13.24	3.73	CLAY	13	18		.8	
2.850	9.35	15.34	3.94	CLAY	15	20		1.0	
3.000	9.84	9.82	4.34	CLAY	10	13		.6	
3.150	10.33	10.92	4.39	CLAY	11	14		.7	
3.300	10.83	16.12	4.46	CLAY	16	20		1.0	
3.450	11.32	24.39	3.88	CLAY to SILTY CLAY	16	20		1.6	
3.600	11.81	31.31	4.19	CLAY to SILTY CLAY	21	25		1.8	
3.750	12.30	28.02	3.98	CLAY to SILTY CLAY	19	22		1.8	
3.900	12.80	31.91	4.38	CLAY to SILTY CLAY	21	24		1.8	
4.050	13.29	24.58	4.01	CLAY to SILTY CLAY	16	18		1.6	
4.200	13.78	19.04	3.61	CLAY to SILTY CLAY	13	14		1.2	
4.350	14.27	18.89	4.39	CLAY	19	20		1.2	
4.500	14.76	15.17	4.24	CLAY	15	16		1.0	
4.650	15.26	13.64	3.60	CLAY to SILTY CLAY	9	10		.8	
4.800	15.75	15.15	3.35	CLAY to SILTY CLAY	10	11		.9	
4.950	16.24	24.26	4.53	CLAY	24	25		1.4	
5.100	16.73	22.01	4.75	CLAY	22	23		1.4	
5.250	17.22	36.80	2.84	CLAYEY SILT to SILTY CLAY	18	19		2.4	
5.400	17.72	17.78	5.12	CLAY	18	18		1.1	
5.550	18.21	69.79	1.10	SILTY SAND to SANDY SILT	23	23	57		38.5
5.700	18.70	29.04	3.72	CLAYEY SILT to SILTY CLAY	15	14		1.9	
5.850	19.19	33.91	2.34	SANDY SILT to CLAYEY SILT	14	13		2.2	
6.000	19.69	19.86	4.16	CLAY to SILTY CLAY	13	13		1.2	
6.150	20.18	6.50	3.51	CLAY	7	6		.4	

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-18

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	5.06	3.13	CLAY	5	5		.3	
6.450	21.16	4.70	3.38	CLAY	5	5		.2	
6.600	21.65	6.33	4.55	CLAY	6	6		.3	
6.750	22.15	9.14	5.89	CLAY	9	9		.5	
6.900	22.64	13.34	3.98	CLAY	13	13		.8	
7.050	23.13	7.78	2.35	CLAY to SILTY CLAY	5	5		.5	
7.200	23.62	9.01	2.84	CLAY to SILTY CLAY	6	6		.6	
7.350	24.11	10.47	3.71	CLAY	10	10		.6	
7.500	24.61	9.45	2.94	CLAY to SILTY CLAY	6	6		.5	
7.650	25.10	10.98	3.10	CLAY to SILTY CLAY	7	7		.6	
7.800	25.59	9.28	2.84	CLAY to SILTY CLAY	6	6		.5	
7.950	26.08	6.52	3.46	CLAY	7	6		.3	
8.100	26.57	7.63	2.73	CLAY to SILTY CLAY	5	5		.5	
8.250	27.07	8.67	3.77	CLAY	9	8		.5	
8.400	27.56	9.39	5.30	CLAY	9	8		.5	
8.550	28.05	11.90	4.05	CLAY	12	11		.7	
8.700	28.54	16.76	4.90	CLAY	17	15		1.0	
8.850	29.04	16.08	4.89	CLAY	16	14		1.0	
9.000	29.53	28.00	4.98	CLAY	28	24		1.5	
9.150	30.02	15.64	3.49	CLAY to SILTY CLAY	10	9		.9	
9.300	30.51	13.53	3.57	CLAY to SILTY CLAY	9	8		.8	
9.450	31.00	17.12	5.68	CLAY	17	15		1.0	
9.600	31.50	19.67	3.17	CLAYEY SILT to SILTY CLAY	10	8		1.2	
9.750	31.99	17.02	3.28	CLAY to SILTY CLAY	11	10		1.0	
9.900	32.48	27.62	4.70	CLAY	28	23		1.5	
10.050	32.97	21.48	4.10	CLAY to SILTY CLAY	14	12		1.3	
10.200	33.46	34.03	4.82	CLAY	34	28		1.9	
10.350	33.96	40.37	5.14	CLAY	40	34		2.3	
10.500	34.45	66.88	2.51	SANDY SILT to CLAYEY SILT	27	22		4.3	
10.650	34.94	67.88	1.95	SILTY SAND to SANDY SILT	23	19	50		37.0
10.800	35.43	102.65	1.38	SAND to SILTY SAND	26	21	62		38.5
10.950	35.93	144.72	1.21	SAND to SILTY SAND	36	30	72		39.5
11.100	36.42	93.03	2.27	SILTY SAND to SANDY SILT	31	25	59		38.0
11.250	36.91	77.80	1.89	SILTY SAND to SANDY SILT	26	21	54		37.5
11.400	37.40	41.32	2.79	SANDY SILT to CLAYEY SILT	17	13		2.6	
11.550	37.89	32.36	9.25	CLAY	32	26		1.8	
11.700	38.39	91.48	2.26	SILTY SAND to SANDY SILT	30	24	58		38.0
11.850	38.88	145.51	1.47	SAND to SILTY SAND	36	29	71		39.5
12.000	39.37	213.74	1.05	SAND	43	34	82		42.0
12.150	39.86	92.67	1.88	SILTY SAND to SANDY SILT	31	24	58		38.0
12.300	40.35	41.09	2.85	SANDY SILT to CLAYEY SILT	16	13		2.6	
12.450	40.85	16.27	2.00	CLAYEY SILT to SILTY CLAY	8	6		1.1	
12.600	41.34	10.28	1.42	CLAYEY SILT to SILTY CLAY	5	4		.6	
12.750	41.83	12.83	1.58	CLAYEY SILT to SILTY CLAY	6	5		.8	
12.900	42.32	11.43	2.87	CLAY to SILTY CLAY	8	6		.6	
13.050	42.81	8.46	2.48	CLAY to SILTY CLAY	6	4		.5	
13.200	43.31	11.00	1.83	CLAYEY SILT to SILTY CLAY	6	4		.7	
13.350	43.80	11.28	3.44	CLAY to SILTY CLAY	8	6		.6	
13.500	44.29	126.45	3.29	SANDY SILT to CLAYEY SILT	51	38		7.3	
13.650	44.78	184.30	4.64	*VERY STIFF FINE GRAINED	100	100			

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-18

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	188.74	5.57	*VERY STIFF FINE GRAINED	100	100			
13.950	45.77	300.72	4.26	*SAND to CLAYEY SAND	100	100			
14.100	46.26	286.87	5.18	*VERY STIFF FINE GRAINED	100	100			
14.250	46.75	294.64	5.66	*VERY STIFF FINE GRAINED	100	100			
14.400	47.24	279.26	3.73	*SAND to CLAYEY SAND	100	100			
14.550	47.74	273.00	5.12	*VERY STIFF FINE GRAINED	100	100			
14.700	48.23	342.00	4.73	*VERY STIFF FINE GRAINED	100	100			
14.850	48.72	342.59	5.66	*VERY STIFF FINE GRAINED	100	100			
15.000	49.21	395.98	*****		0	0			

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

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*                     CPT INTERPRETATIONS                            *
*                                                                    *
*   SOUNDING : CPT-19 SEIS               PROJECT No.: 00-1571-1      *
*   PROJECT  : AES/PANHANDLE             CONE/RIG : 722/BH.GO/R#3    *
*   DATE/TIME: 04-05-00 14:09                                        *
*                                                                    *
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                                                          PAGE 1 of 3

DEPTH    DEPTH     TIP      FRICTION    SOIL BEHAVIOR TYPE     N(60)  N1(60)   Dr    Su       PHI
                RESISTANCE   RATIO
 (m)      (ft)    (tsf)       (%)                                              (%)  (tsf)  (Degrees)
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 .150      .49    157.36      1.56    SAND to SILTY SAND           39      63   89
 .300      .98    176.27      3.01    SILTY SAND to SANDY SILT     59      94   93
 .450     1.48     85.85      4.15    CLAYEY SILT to SILTY CLAY    43      69         5.0
 .600     1.97     69.53      4.00    CLAYEY SILT to SILTY CLAY    35      56         4.1
 .750     2.46     67.09      2.86    SANDY SILT to CLAYEY SILT    27      43         4.5
 .900     2.95     76.42      2.98    SANDY SILT to CLAYEY SILT    31      49         4.5
1.050     3.44     41.83      3.35    CLAYEY SILT to SILTY CLAY    21      33         2.8
1.200     3.94     69.15      1.08    SILTY SAND to SANDY SILT     23      37   66             45.5
1.350     4.43     31.80      2.64    CLAYEY SILT to SILTY CLAY    16      25         2.1
1.500     4.92     32.36      2.66    CLAYEY SILT to SILTY CLAY    16      26         2.1
1.650     5.41     36.80      2.80    SANDY SILT to CLAYEY SILT    15      24         2.4
1.800     5.91     32.06      3.06    CLAYEY SILT to SILTY CLAY    16      26         2.1
1.950     6.40     23.86      3.48    CLAYEY SILT to SILTY CLAY    12      19         1.6
2.100     6.89     14.32      4.82    CLAY                         14      22          .9
2.250     7.38     17.21      3.89    CLAY to SILTY CLAY           11      17         1.1
2.400     7.87     40.15      4.13    CLAY to SILTY CLAY           27      39         2.3
2.550     8.37     25.92      5.71    CLAY                         26      37         1.5
2.700     8.86     60.80      2.66    SANDY SILT to CLAYEY SILT    24      33         4.0
2.850     9.35     45.51      3.89    CLAYEY SILT to SILTY CLAY    23      30         2.6
3.000     9.84     46.16      3.44    CLAYEY SILT to SILTY CLAY    23      30         2.7
3.150    10.33     45.08      3.13    CLAYEY SILT to SILTY CLAY    23      29         3.0
3.300    10.83     43.83      3.33    CLAYEY SILT to SILTY CLAY    22      27         2.9
3.450    11.32     32.48      4.62    CLAY to SILTY CLAY           22      26         1.9
3.600    11.81     30.74      2.96    CLAYEY SILT to SILTY CLAY    15      18         2.0
3.750    12.30     25.03      4.55    CLAY                         25      29         1.4
3.900    12.80     19.95      5.41    CLAY                         20      23         1.1
4.050    13.29      9.77      5.83    CLAY                         10      11          .6
4.200    13.78      7.07      5.09    CLAY                          7       8          .4
4.350    14.27      8.33      5.40    CLAY                          8       9          .5
4.500    14.76      7.82      5.75    CLAY                          8       8          .5
4.650    15.26      9.28      4.96    CLAY                          9      10          .6
4.800    15.75     11.79      5.17    CLAY                         12      12          .7
4.950    16.24     14.40      7.01    CLAY                         14      15          .9
5.100    16.73     31.63      5.06    CLAY                         32      32         1.8
5.250    17.22     19.82      7.27    CLAY                         20      20         1.3
5.400    17.72     50.92      2.10    SANDY SILT to CLAYEY SILT    20      21         3.3
5.550    18.21     34.57      3.38    CLAYEY SILT to SILTY CLAY    17      17         2.2
5.700    18.70     31.53      4.66    CLAY to SILTY CLAY           21      21         1.8
5.850    19.19     14.02      5.78    CLAY                         14      14          .9
6.000    19.69     30.59      2.94    CLAYEY SILT to SILTY CLAY    15      15         2.0
6.150    20.18     42.40      2.62    SANDY SILT to CLAYEY SILT    17      17         2.7
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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE
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HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	13.55	6.05	CLAY	14	13		.8	
6.450	21.16	14.51	6.62	CLAY	15	14		.9	
6.600	21.65	14.40	6.53	CLAY	14	14		.9	
6.750	22.15	20.18	3.22	CLAYEY SILT to SILTY CLAY	10	10		1.3	
6.900	22.64	21.14	2.89	CLAYEY SILT to SILTY CLAY	11	10		1.3	
7.050	23.13	17.25	3.54	CLAY to SILTY CLAY	12	11		1.1	
7.200	23.62	17.04	4.46	CLAY	17	16		1.0	
7.350	24.11	26.09	2.80	CLAYEY SILT to SILTY CLAY	13	12		1.6	
7.500	24.61	38.56	1.76	SANDY SILT to CLAYEY SILT	15	14		3.0	
7.650	25.10	59.38	1.48	SILTY SAND to SANDY SILT	20	18	50		37.5
7.800	25.59	21.24	5.04	CLAY	21	19		1.2	
7.950	26.08	12.41	7.01	CLAY	12	11		.7	
8.100	26.57	40.68	2.56	SANDY SILT to CLAYEY SILT	16	15		2.6	
8.250	27.07	22.16	6.27	CLAY	22	20		1.2	
8.400	27.56	26.51	5.09	CLAY	27	24		1.5	
8.550	28.05	34.25	4.38	CLAY to SILTY CLAY	23	20		1.9	
8.700	28.54	136.48	1.92	SILTY SAND to SANDY SILT	45	40	72		40.5
8.850	29.04	132.50	2.80	SILTY SAND to SANDY SILT	44	39	71		40.0
9.000	29.53	156.70	1.44	SAND to SILTY SAND	39	34	76		41.0
9.150	30.02	61.78	2.36	SANDY SILT to CLAYEY SILT	25	21		4.0	
9.300	30.51	27.66	3.62	CLAYEY SILT to SILTY CLAY	14	12		1.7	
9.450	31.00	18.02	3.55	CLAY to SILTY CLAY	12	10		1.1	
9.600	31.50	7.67	4.04	CLAY	8	7		.4	
9.750	31.99	7.18	4.18	CLAY	7	6		.4	
9.900	32.48	9.28	3.56	CLAY	9	8		.5	
10.050	32.97	13.00	3.54	CLAY to SILTY CLAY	9	7		.7	
10.200	33.46	13.49	3.34	CLAY to SILTY CLAY	9	8		.8	
10.350	33.96	14.91	3.55	CLAY to SILTY CLAY	10	8		.9	
10.500	34.45	29.83	4.96	CLAY	30	25		1.6	
10.650	34.94	15.59	6.74	CLAY	16	13		.9	
10.800	35.43	20.40	8.33	CLAY	20	17		1.2	
10.950	35.93	34.71	6.51	CLAY	35	28		1.9	
11.100	36.42	17.72	5.87	CLAY	18	14		1.0	
11.250	36.91	14.81	5.87	CLAY	15	12		.8	
11.400	37.40	55.79	1.58	SILTY SAND to SANDY SILT	19	15	44		36.0
11.550	37.89	165.22	1.47	SAND to SILTY SAND	41	33	75		40.5
11.700	38.39	169.53	2.12	SILTY SAND to SANDY SILT	57	45	76		40.5
11.850	38.88	98.36	1.84	SILTY SAND to SANDY SILT	33	26	60		38.0
12.000	39.37	26.15	2.60	CLAYEY SILT to SILTY CLAY	13	10		1.6	
12.150	39.86	23.71	3.67	CLAY to SILTY CLAY	16	12		1.4	
12.300	40.35	14.66	8.59	CLAY	15	11		.8	
12.450	40.85	97.68	2.16	SILTY SAND to SANDY SILT	33	25	59		38.0
12.600	41.34	99.96	1.99	SILTY SAND to SANDY SILT	33	26	60		38.0
12.750	41.83	69.98	2.19	SILTY SAND to SANDY SILT	23	18	49		36.5
12.900	42.32	55.28	3.04	SANDY SILT to CLAYEY SILT	22	17		3.5	
13.050	42.81	12.83	5.22	CLAY	13	10		.7	
13.200	43.31	12.75	2.43	CLAYEY SILT to SILTY CLAY	6	5		.8	
13.350	43.80	18.46	6.28	CLAY	18	14		1.1	
13.500	44.29	18.21	5.82	CLAY	18	14		1.0	
13.650	44.78	14.55	3.78	CLAY to SILTY CLAY	10	7		.8	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-19 SEIS

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	14.60	4.66	CLAY	15	11		.8	
13.950	45.77	16.68	4.74	CLAY	17	12		.9	
14.100	46.26	11.68	4.02	CLAY	12	9		.6	
14.250	46.75	24.11	2.99	CLAYEY SILT to SILTY CLAY	12	9		1.4	
14.400	47.24	24.09	11.79	CLAY	24	18		1.4	
14.550	47.74	88.74	2.97	SANDY SILT to CLAYEY SILT	35	26		5.1	
14.700	48.23	262.90	2.77	SILTY SAND to SANDY SILT	88	64	86		42.0
14.850	48.72	392.71	3.66	*SAND to CLAYEY SAND	100	100			
15.000	49.21	496.60	1.66	SAND to SILTY SAND	100	90	100		45.0
15.150	49.70	602.65	2.41	*SAND to CLAYEY SAND	100	100			
15.300	50.20	594.43	*****		0	0			

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

CPT INTERPRETATIONS

SOUNDING : CPT-20
PROJECT : AES/PANHANDLE
DATE/TIME: 04-04-00 11:08

PROJECT No.: 00-1571-1
CONE/RIG : 722/BH.GO/R#3

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	22.33	.85	SANDY SILT to CLAYEY SILT	9	14		1.8	
.300	.98	36.18	1.13	SILTY SAND to SANDY SILT	12	19	47		48.0
.450	1.48	22.80	3.55	CLAY to SILTY CLAY	15	24		1.5	
.600	1.97	73.78	.81	SAND to SILTY SAND	18	29	68		48.0
.750	2.46	56.07	1.44	SILTY SAND to SANDY SILT	19	30	60		46.5
.900	2.95	36.56	1.72	SANDY SILT to CLAYEY SILT	15	23		2.9	
1.050	3.44	31.31	1.25	SILTY SAND to SANDY SILT	10	17	43		42.5
1.200	3.94	28.47	1.51	SANDY SILT to CLAYEY SILT	11	18		2.3	
1.350	4.43	23.99	2.00	SANDY SILT to CLAYEY SILT	10	15		1.9	
1.500	4.92	53.39	1.12	SILTY SAND to SANDY SILT	18	28	58		43.0
1.650	5.41	73.61	.52	SAND to SILTY SAND	18	29	68		44.0
1.800	5.91	72.30	.73	SAND to SILTY SAND	18	29	67		44.0
1.950	6.40	119.69	1.05	SAND to SILTY SAND	30	48	81		45.5
2.100	6.89	164.12	.90	SAND	33	51	91		46.5
2.250	7.38	134.80	.82	SAND to SILTY SAND	34	51	85		45.5
2.400	7.87	189.46	.93	SAND	38	55	95		46.5
2.550	8.37	285.49	.92	SAND	57	81	100		48.0
2.700	8.86	279.69	1.15	SAND	56	77	100		47.5
2.850	9.35	270.98	.84	SAND	54	72	100		47.0
3.000	9.84	142.77	2.15	SILTY SAND to SANDY SILT	48	62	85		44.5
3.150	10.33	333.10	1.45	SAND	67	85	100		47.5
3.300	10.83	375.18	1.20	SAND	75	93	100		48.0
3.450	11.32	317.52	.96	SAND	64	77	100		47.0
3.600	11.81	235.60	.74	SAND	47	56	96		46.0
3.750	12.30	261.67	.74	SAND	52	61	99		46.0
3.900	12.80	190.44	1.00	SAND	38	43	89		44.5
4.050	13.29	81.56	1.02	SAND to SILTY SAND	20	23	64		40.0
4.200	13.78	74.95	1.97	SILTY SAND to SANDY SILT	25	27	61		39.5
4.350	14.27	73.29	.89	SAND to SILTY SAND	18	20	60		39.0
4.500	14.76	66.90	.93	SAND to SILTY SAND	17	18	57		38.5
4.650	15.26	107.99	.21	SAND	22	23	71		41.5
4.800	15.75	112.34	2.14	SILTY SAND to SANDY SILT	37	39	71		41.5
4.950	16.24	128.38	1.26	SAND to SILTY SAND	32	33	75		42.0
5.100	16.73	83.68	2.31	SILTY SAND to SANDY SILT	28	29	63		39.5
5.250	17.22	105.44	1.16	SAND to SILTY SAND	26	27	69		40.5
5.400	17.72	171.83	2.06	SILTY SAND to SANDY SILT	57	58	83		43.0
5.550	18.21	171.57	.67	SAND	34	34	83		43.0
5.700	18.70	200.91	1.12	SAND	40	40	87		43.5
5.850	19.19	158.44	.85	SAND	32	31	80		42.5
6.000	19.69	161.72	.61	SAND	32	32	80		42.5
6.150	20.18	177.05	.62	SAND	35	35	83		43.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-20

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	171.32	.78	SAND	34	33	82		42.5
6.450	21.16	200.34	.52	SAND	40	39	86		43.5
6.600	21.65	186.06	.26	SAND	37	36	84		43.0
6.750	22.15	220.10	.61	SAND	44	42	88		43.5
6.900	22.64	232.40	.65	SAND	46	44	90		44.0
7.050	23.13	192.80	.62	SAND	39	36	84		43.0
7.200	23.62	191.88	.39	SAND	38	36	84		43.0
7.350	24.11	188.34	.46	SAND	38	35	83		42.5
7.500	24.61	135.73	.44	SAND	27	25	73		41.0
7.650	25.10	135.67	.26	SAND	27	25	73		41.0
7.800	25.59	164.29	.74	SAND	33	30	79		42.0
7.950	26.08	156.11	.32	SAND	31	28	77		42.0
8.100	26.57	171.74	.32	SAND	34	31	79		42.0
8.250	27.07	219.27	.99	SAND	44	39	86		43.0
8.400	27.56	255.04	1.77	SAND to SILTY SAND	64	57	90		44.0
8.550	28.05	277.37	.56	SAND	55	49	93		44.0
8.700	28.54	175.67	.23	SAND	35	31	79		42.0
8.850	29.04	91.86	.66	SAND to SILTY SAND	23	20	61		38.5
9.000	29.53	47.10	2.10	SANDY SILT to CLAYEY SILT	19	16		3.0	
9.150	30.02	72.02	1.07	SAND to SILTY SAND	18	16	53		38.0
9.300	30.51	51.77	2.24	SANDY SILT to CLAYEY SILT	21	18		3.3	
9.450	31.00	22.77	3.51	CLAYEY SILT to SILTY CLAY	11	10		1.4	
9.600	31.50	13.02	4.22	CLAY	13	11		.7	
9.750	31.99	41.77	1.48	SILTY SAND to SANDY SILT	14	12	37		34.5
9.900	32.48	36.48	2.06	SANDY SILT to CLAYEY SILT	15	12		2.3	
10.050	32.97	11.94	3.69	CLAY	12	10		.7	
10.200	33.46	21.71	3.96	CLAY to SILTY CLAY	14	12		1.3	
10.350	33.96	26.92	3.23	CLAYEY SILT to SILTY CLAY	13	11		1.7	
10.500	34.45	14.89	6.45	CLAY	15	12		.9	
10.650	34.94	67.01	1.54	SILTY SAND to SANDY SILT	22	18	50		37.0
10.800	35.43	51.26	2.11	SANDY SILT to CLAYEY SILT	21	17		3.3	
10.950	35.93	46.10	3.21	CLAYEY SILT to SILTY CLAY	23	19		2.9	
11.100	36.42	21.56	5.52	CLAY	22	18		1.1	
11.250	36.91	20.99	4.19	CLAY to SILTY CLAY	14	11		1.3	
11.400	37.40	26.05	3.84	CLAY to SILTY CLAY	17	14		1.6	
11.550	37.89	40.83	1.32	SILTY SAND to SANDY SILT	14	11	35		33.0
11.700	38.39	30.30	4.36	CLAY to SILTY CLAY	20	16		1.6	
11.850	38.88	42.96	4.66	CLAY to SILTY CLAY	29	23		2.4	
12.000	39.37	173.02	1.12	SAND to SILTY SAND	43	34	76		40.5
12.150	39.86	183.22	.57	SAND	37	29	77		41.0
12.300	40.35	63.93	1.30	SILTY SAND to SANDY SILT	21	17	47		36.5
12.450	40.85	20.46	3.32	CLAYEY SILT to SILTY CLAY	10	8		1.2	
12.600	41.34	13.34	2.55	CLAYEY SILT to SILTY CLAY	7	5		.9	
12.750	41.83	11.26	8.97	CLAY	11	9		.6	
12.900	42.32	108.11	1.29	SAND to SILTY SAND	27	21	62		38.0
13.050	42.81	125.83	1.12	SAND to SILTY SAND	31	24	66		38.5
13.200	43.31	76.99	1.61	SILTY SAND to SANDY SILT	26	20	52		37.0
13.350	43.80	41.30	4.48	CLAY to SILTY CLAY	28	21		2.3	
13.500	44.29	31.95	5.20	CLAY	32	24		1.7	
13.650	44.78	21.97	4.14	CLAY to SILTY CLAY	15	11		1.3	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-20

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	46.80	3.63	CLAYEY SILT to SILTY CLAY	23	18		2.6	
13.950	45.77	17.95	5.01	CLAY	18	13		1.0	
14.100	46.26	97.26	1.42	SILTY SAND to SANDY SILT	32	24	58		38.0
14.250	46.75	48.88	3.76	CLAYEY SILT to SILTY CLAY	24	18		2.7	
14.400	47.24	18.10	3.87	CLAY to SILTY CLAY	12	9		1.0	
14.550	47.74	18.70	2.78	CLAYEY SILT to SILTY CLAY	9	7		1.1	
14.700	48.23	19.21	3.02	CLAYEY SILT to SILTY CLAY	10	7		1.1	
14.850	48.72	43.93	5.42	CLAY	44	32		2.4	
15.000	49.21	57.89	5.61	CLAY	58	42		3.2	
15.150	49.70	64.29	4.67	CLAY to SILTY CLAY	43	31		3.6	
15.300	50.20	32.63	*****		0	0			

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

CPT INTERPRETATIONS

SOUNDING : CPT-21
PROJECT : AES/PANHANDLE
DATE/TIME: 04-03-00 15:23

PROJECT No.: 00-1571-1
CONE/RIG : 473/BH,GO/R#3

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	25.56	.63	SILTY SAND to SANDY SILT	9	14	37		49.5
.300	.98	85.51	.92	SAND to SILTY SAND	21	34	72		
.450	1.48	150.88	.94	SAND to SILTY SAND	38	60	88		
.600	1.97	172.89	1.24	SAND to SILTY SAND	43	69	92		
.750	2.46	151.65	.65	SAND	30	49	88		
.900	2.95	108.45	.49	SAND	22	35	79		48.0
1.050	3.44	93.43	.69	SAND to SILTY SAND	23	37	74		47.0
1.200	3.94	98.72	.81	SAND to SILTY SAND	25	39	76		46.5
1.350	4.43	221.50	1.14	SAND	44	71	99		49.5
1.500	4.92	168.75	.51	SAND	34	54	91		48.0
1.650	5.41	237.13	.19	SAND	47	76	100		49.0
1.800	5.91	208.35	.79	SAND	42	67	97		48.0
1.950	6.40	188.93	.49	SAND	38	60	95		47.0
2.100	6.89	191.76	.36	SAND	38	60	95		47.0
2.250	7.38	188.57	.48	SAND	38	57	95		46.5
2.400	7.87	200.81	.56	SAND	40	58	96		46.5
2.550	8.37	181.01	.41	SAND	36	51	93		46.0
2.700	8.86	130.76	1.14	SAND to SILTY SAND	33	45	84		44.5
2.850	9.35	70.15	1.51	SILTY SAND to SANDY SILT	23	31	65		41.5
3.000	9.84	155.15	.75	SAND	31	40	87		45.0
3.150	10.33	156.98	.82	SAND	31	40	87		44.5
3.300	10.83	142.40	1.19	SAND to SILTY SAND	36	44	83		44.0
3.450	11.32	130.08	.70	SAND	26	32	80		43.5
3.600	11.81	132.48	.56	SAND	26	32	80		43.5
3.750	12.30	142.74	.86	SAND to SILTY SAND	36	42	82		44.0
3.900	12.80	171.57	1.25	SAND to SILTY SAND	43	50	87		44.5
4.050	13.29	186.53	.41	SAND	37	43	89		44.5
4.200	13.78	157.85	.58	SAND	32	36	84		44.0
4.350	14.27	149.75	.87	SAND	30	34	82		43.5
4.500	14.76	134.86	.28	SAND	27	30	79		43.0
4.650	15.26	176.91	.79	SAND	35	40	87		44.0
4.800	15.75	137.33	.58	SAND	27	30	79		43.0
4.950	16.24	135.75	.95	SAND to SILTY SAND	34	37	78		43.0
5.100	16.73	94.26	.37	SAND to SILTY SAND	24	26	68		41.0
5.250	17.22	75.78	.84	SAND to SILTY SAND	19	20	61		39.5
5.400	17.72	131.91	.36	SAND	26	28	77		42.5
5.550	18.21	191.61	.29	SAND	38	41	87		44.0
5.700	18.70	245.72	.27	SAND	49	52	94		45.0
5.850	19.19	194.50	.30	SAND	39	41	87		44.0
6.000	19.69	252.28	.52	SAND	50	52	95		45.0
6.150	20.18	259.14	.29	GRAVELLY SAND to SAND	43	45	95		45.0

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 11.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	238.66	.70	SAND	48	49	93		44.5
6.450	21.16	234.67	.48	SAND	47	48	92		44.5
6.600	21.65	209.30	.44	SAND	42	42	88		44.0
6.750	22.15	217.93	.44	SAND	44	44	89		44.0
6.900	22.64	229.59	.24	SAND	46	46	91		44.0
7.050	23.13	223.60	.25	SAND	45	44	90		44.0
7.200	23.62	216.70	.42	SAND	43	43	89		44.0
7.350	24.11	248.56	.33	SAND	50	48	92		44.5
7.500	24.61	248.01	.77	SAND	50	48	92		44.5
7.650	25.10	197.70	.49	SAND	40	38	85		43.5
7.800	25.59	274.46	.72	SAND	55	52	95		44.5
7.950	26.08	326.36	.30	GRAVELLY SAND to SAND	54	52	99		45.5
8.100	26.57	310.58	.26	GRAVELLY SAND to SAND	52	49	98		45.0
8.250	27.07	258.91	.44	SAND	52	49	92		44.0
8.400	27.56	278.31	.69	SAND	56	52	94		44.5
8.550	28.05	323.77	1.81	SAND to SILTY SAND	81	75	98		45.0
8.700	28.54	222.18	.46	SAND	44	41	87		43.5
8.850	29.04	139.20	1.04	SAND to SILTY SAND	35	32	74		41.0
9.000	29.53	212.15	.43	SAND	42	39	86		43.0
9.150	30.02	233.65	.45	SAND	47	42	88		43.5
9.300	30.51	241.28	.40	SAND	48	43	89		43.5
9.450	31.00	190.88	.43	SAND	38	34	82		42.5
9.600	31.50	89.40	1.48	SILTY SAND to SANDY SILT	30	26	60		38.5
9.750	31.99	158.51	.91	SAND	32	28	77		41.5
9.900	32.48	209.20	1.69	SAND to SILTY SAND	52	46	84		42.5
10.050	32.97	281.35	1.34	SAND	56	49	93		44.0
10.200	33.46	301.21	.79	SAND	60	52	95		44.0
10.350	33.96	279.24	.49	SAND	56	48	92		44.0
10.500	34.45	266.09	.88	SAND	53	46	91		43.5
10.650	34.94	216.06	.37	SAND	43	37	85		42.5
10.800	35.43	211.70	.94	SAND	42	36	84		42.5
10.950	35.93	218.14	1.01	SAND	44	37	85		42.5
11.100	36.42	205.93	1.00	SAND	41	35	83		42.5
11.250	36.91	299.66	.70	SAND	60	50	93		44.0
11.400	37.40	342.55	.52	GRAVELLY SAND to SAND	57	48	97		44.5
11.550	37.89	316.99	.51	GRAVELLY SAND to SAND	53	44	95		44.0
11.700	38.39	338.88	.19	GRAVELLY SAND to SAND	56	47	96		44.5
11.850	38.88	340.41	.35	GRAVELLY SAND to SAND	57	47	96		44.5
12.000	39.37	343.10	.45	GRAVELLY SAND to SAND	57	47	97		44.0
12.150	39.86	344.25	.47	GRAVELLY SAND to SAND	57	47	97		44.0
12.300	40.35	366.24	.56	GRAVELLY SAND to SAND	61	49	98		44.5
12.450	40.85	364.75	.52	GRAVELLY SAND to SAND	61	49	98		44.5
12.600	41.34	351.26	.69	SAND	70	56	97		44.0
12.750	41.83	331.72	.34	GRAVELLY SAND to SAND	55	44	95		44.0
12.900	42.32	293.50	1.59	SAND to SILTY SAND	73	58	91		43.5
13.050	42.81	324.56	.57	GRAVELLY SAND to SAND	54	43	94		44.0
13.200	43.31	241.47	.60	SAND	48	38	85		42.5
13.350	43.80	216.25	.30	SAND	43	34	82		42.0
13.500	44.29	267.32	.46	SAND	53	42	88		43.0
13.650	44.78	288.04	.47	SAND	58	45	90		43.0

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 11.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-21

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	269.79	.34	GRAVELLY SAND to SAND	45	35	88		42.5
13.950	45.77	412.26	2.10	SAND to SILTY SAND	100	80	100		44.5
14.100	46.26	411.96	1.12	SAND	82	63	100		44.5
14.250	46.75	358.44	.61	GRAVELLY SAND to SAND	60	46	96		44.0
14.400	47.24	421.90	.73	GRAVELLY SAND to SAND	70	54	100		44.5
14.550	47.74	396.60	.97	SAND	79	60	99		44.0
14.700	48.23	451.92	.65	GRAVELLY SAND to SAND	75	57	100		44.5
14.850	48.72	475.35	.60	GRAVELLY SAND to SAND	79	60	100		45.0
15.000	49.21	508.86	1.22	SAND	100	76	100		45.0

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 11.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

CPT INTERPRETATIONS

SOUNDING : CPT-22
PROJECT : AES/PANHANDLE
DATE/TIME: 04-03-00 14:59
PROJECT No.: 00-1571-1
CONE/RIG : 473/BH,GO/R#3

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	26.36	1.02	SILTY SAND to SANDY SILT	9	14	38		
.300	.98	47.10	1.57	SILTY SAND to SANDY SILT	16	25	55		49.0
.450	1.48	26.70	1.87	SANDY SILT to CLAYEY SILT	11	17		2.1	
.600	1.97	19.06	2.12	CLAYEY SILT to SILTY CLAY	10	15		1.5	
.750	2.46	16.83	1.35	SANDY SILT to CLAYEY SILT	7	11		1.3	
.900	2.95	68.30	1.56	SILTY SAND to SANDY SILT	23	36	65		46.5
1.050	3.44	46.19	1.31	SILTY SAND to SANDY SILT	15	25	54		44.0
1.200	3.94	34.76	3.15	CLAYEY SILT to SILTY CLAY	17	28		2.3	
1.350	4.43	66.73	1.05	SILTY SAND to SANDY SILT	22	36	65		44.5
1.500	4.92	113.23	.84	SAND to SILTY SAND	28	45	80		46.5
1.650	5.41	111.26	1.25	SAND to SILTY SAND	28	44	79		46.0
1.800	5.91	29.15	2.27	SANDY SILT to CLAYEY SILT	12	19		1.9	
1.950	6.40	14.98	3.58	CLAY to SILTY CLAY	10	16		1.0	
2.100	6.89	62.14	1.23	SILTY SAND to SANDY SILT	21	32	63		42.5
2.250	7.38	80.96	.60	SAND to SILTY SAND	20	30	70		43.5
2.400	7.87	109.71	1.02	SAND to SILTY SAND	27	40	79		44.5
2.550	8.37	140.47	.74	SAND	28	40	86		45.0
2.700	8.86	156.43	.74	SAND	31	43	89		45.5
2.850	9.35	110.22	1.20	SAND to SILTY SAND	28	37	78		43.5
3.000	9.84	147.80	.78	SAND	30	38	86		44.5
3.150	10.33	111.66	.65	SAND to SILTY SAND	28	35	77		43.0
3.300	10.83	46.74	1.01	SILTY SAND to SANDY SILT	16	19	51		38.5
3.450	11.32	51.54	.79	SILTY SAND to SANDY SILT	17	21	54		38.5
3.600	11.81	44.25	.68	SILTY SAND to SANDY SILT	15	18	49		38.0
3.750	12.30	21.01	1.38	SANDY SILT to CLAYEY SILT	8	10		1.6	
3.900	12.80	14.96	2.10	CLAYEY SILT to SILTY CLAY	7	9		1.1	
4.050	13.29	27.04	1.41	SANDY SILT to CLAYEY SILT	11	12		2.1	
4.200	13.78	41.83	.98	SILTY SAND to SANDY SILT	14	15	45		37.5
4.350	14.27	30.72	2.15	SANDY SILT to CLAYEY SILT	12	13		2.0	
4.500	14.76	13.49	2.37	CLAYEY SILT to SILTY CLAY	7	7		1.0	
4.650	15.26	51.54	.69	SILTY SAND to SANDY SILT	17	19	50		38.0
4.800	15.75	65.18	.62	SAND to SILTY SAND	16	17	57		38.5
4.950	16.24	63.82	1.22	SILTY SAND to SANDY SILT	21	23	56		38.5
5.100	16.73	94.31	.83	SAND to SILTY SAND	24	25	67		40.0
5.250	17.22	91.03	.64	SAND to SILTY SAND	23	24	66		40.0
5.400	17.72	40.45	.69	SILTY SAND to SANDY SILT	13	14	42		36.5
5.550	18.21	28.13	2.90	CLAYEY SILT to SILTY CLAY	14	14		1.8	
5.700	18.70	151.48	.62	SAND	30	31	79		42.5
5.850	19.19	231.44	1.24	SAND	46	47	91		44.5
6.000	19.69	236.99	1.11	SAND	47	48	92		44.5
6.150	20.18	274.29	1.62	SAND to SILTY SAND	69	68	96		45.0

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 13.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-22

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	458.93	1.19	SAND	92	91	100		47.0
6.450	21.16	474.40	1.01	SAND	95	93	100		47.0
6.600	21.65	388.14	1.13	SAND	78	76	100		46.0
6.750	22.15	396.28	.50	GRAVELLY SAND to SAND	66	64	100		46.0
6.900	22.64	372.85	.41	GRAVELLY SAND to SAND	62	60	100		46.0
7.050	23.13	380.94	.40	GRAVELLY SAND to SAND	63	61	100		46.0
7.200	23.62	420.88	.40	GRAVELLY SAND to SAND	70	67	100		46.5
7.350	24.11	372.42	.37	GRAVELLY SAND to SAND	62	59	100		46.0
7.500	24.61	321.33	.43	GRAVELLY SAND to SAND	54	50	99		45.0
7.650	25.10	312.49	.73	SAND	62	58	98		45.0
7.800	25.59	352.30	.66	SAND	70	65	100		45.5
7.950	26.08	465.96	.46	GRAVELLY SAND to SAND	78	72	100		46.5
8.100	26.57	395.92	.33	GRAVELLY SAND to SAND	66	61	100		46.0
8.250	27.07	230.19	.49	SAND	46	42	88		43.5
8.400	27.56	283.58	.97	SAND	57	51	94		44.5
8.550	28.05	223.13	.55	SAND	45	40	87		43.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 13.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

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CPT INTERPRETATIONS

SOUNDING : CPT-23
PROJECT : AES/PANHANDLE
DATE/TIME: 04-03-00 11:14

PROJECT No.: 00-1571-1
CONE/RIG : 473/BH,GO/R#3

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PAGE 1 of 3

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	62.99	1.79	SILTY SAND to SANDY SILT	21	34	63		
.300	.98	70.13	.87	SAND to SILTY SAND	18	28	66		
.450	1.48	47.57	1.11	SILTY SAND to SANDY SILT	16	25	55		47.5
.600	1.97	90.57	.79	SAND to SILTY SAND	23	36	73		49.0
.750	2.46	113.36	.52	SAND	23	36	80		49.0
.900	2.95	142.55	.78	SAND	29	46	86		49.0
1.050	3.44	94.45	.93	SAND to SILTY SAND	24	38	75		47.0
1.200	3.94	60.04	.57	SAND to SILTY SAND	15	24	62		44.5
1.350	4.43	26.98	1.22	SANDY SILT to CLAYEY SILT	11	17		2.1	
1.500	4.92	16.83	1.70	CLAYEY SILT to SILTY CLAY	8	13		1.3	
1.650	5.41	13.70	1.99	CLAYEY SILT to SILTY CLAY	7	11		1.1	
1.800	5.91	6.20	3.43	CLAY	6	10		.4	
1.950	6.40	20.03	3.50	CLAY to SILTY CLAY	13	21		1.3	
2.100	6.89	21.50	3.51	CLAY to SILTY CLAY	14	22		1.4	
2.250	7.38	38.54	1.93	SANDY SILT to CLAYEY SILT	15	23		2.5	
2.400	7.87	55.28	1.53	SILTY SAND to SANDY SILT	18	27	59		41.0
2.550	8.37	71.45	3.89	CLAYEY SILT to SILTY CLAY	36	50		4.2	
2.700	8.86	108.52	1.35	SAND to SILTY SAND	27	37	78		44.0
2.850	9.35	114.51	2.44	SILTY SAND to SANDY SILT	38	51	79		44.0
3.000	9.84	103.14	1.04	SAND to SILTY SAND	26	34	75		43.0
3.150	10.33	94.71	.87	SAND to SILTY SAND	24	30	72		42.5
3.300	10.83	93.05	.75	SAND to SILTY SAND	23	29	71		42.0
3.450	11.32	50.73	.78	SILTY SAND to SANDY SILT	17	21	53		38.5
3.600	11.81	25.66	1.95	SANDY SILT to CLAYEY SILT	10	12		2.0	
3.750	12.30	21.69	1.69	SANDY SILT to CLAYEY SILT	9	10		1.7	
3.900	12.80	38.41	1.44	SILTY SAND to SANDY SILT	13	15	43		37.5
4.050	13.29	16.68	3.01	CLAYEY SILT to SILTY CLAY	8	9		1.1	
4.200	13.78	24.22	2.31	CLAYEY SILT to SILTY CLAY	12	13		1.6	
4.350	14.27	31.21	1.70	SANDY SILT to CLAYEY SILT	12	13		2.4	
4.500	14.76	57.25	1.20	SILTY SAND to SANDY SILT	19	20	53		38.0
4.650	15.26	132.72	.47	SAND	27	28	76		42.5
4.800	15.75	135.05	1.71	SILTY SAND to SANDY SILT	45	46	76		42.0
4.950	16.24	171.17	1.57	SAND to SILTY SAND	43	43	83		43.0
5.100	16.73	174.78	1.34	SAND to SILTY SAND	44	44	83		43.0
5.250	17.22	381.17	.97	SAND	76	75	100		46.0
5.400	17.72	388.14	1.06	SAND	78	76	100		46.0
5.550	18.21	363.65	.64	GRAVELLY SAND to SAND	61	59	100		46.0
5.700	18.70	380.47	.67	GRAVELLY SAND to SAND	63	61	100		46.0
5.850	19.19	296.45	.73	SAND	59	57	97		45.0
6.000	19.69	179.39	1.21	SAND to SILTY SAND	45	43	82		42.5
6.150	20.18	343.95	.55	GRAVELLY SAND to SAND	57	54	100		45.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 17.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-23

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	261.76	.62	SAND	52	49	93		44.0
6.450	21.16	176.44	.63	SAND	35	33	81		42.5
6.600	21.65	122.18	1.28	SAND to SILTY SAND	31	28	70		40.0
6.750	22.15	150.80	.81	SAND	30	28	76		42.0
6.900	22.64	129.68	.88	SAND to SILTY SAND	32	30	72		40.5
7.050	23.13	162.61	.94	SAND	33	30	78		42.0
7.200	23.62	183.05	.88	SAND	37	33	81		42.5
7.350	24.11	152.71	1.32	SAND to SILTY SAND	38	34	76		41.5
7.500	24.61	118.04	.60	SAND	24	21	68		39.5
7.650	25.10	52.79	.93	SILTY SAND to SANDY SILT	18	16	45		36.5
7.800	25.59	36.77	1.54	SANDY SILT to CLAYEY SILT	15	13		2.8	
7.950	26.08	136.41	.83	SAND to SILTY SAND	34	30	72		40.5
8.100	26.57	171.53	.79	SAND	34	30	79		42.0
8.250	27.07	185.34	.54	SAND	37	32	81		42.0
8.400	27.56	227.19	.72	SAND	45	39	86		43.0
8.550	28.05	237.79	.89	SAND	48	41	87		43.0
8.700	28.54	240.85	.32	SAND	48	41	88		43.0
8.850	29.04	190.91	.44	SAND	38	32	81		42.0
9.000	29.53	194.43	.41	SAND	39	33	81		42.0
9.150	30.02	229.78	.59	SAND	46	39	86		42.5
9.300	30.51	206.16	.38	SAND	41	35	83		42.5
9.450	31.00	256.62	.29	GRAVELLY SAND to SAND	43	36	89		43.0
9.600	31.50	242.13	.40	SAND	48	40	87		43.0
9.750	31.99	205.18	.88	SAND	41	34	82		42.0
9.900	32.48	213.96	1.18	SAND	43	35	83		42.0
10.050	32.97	252.86	.67	SAND	51	41	88		43.0
10.200	33.46	261.59	.76	SAND	52	43	89		43.0
10.350	33.96	256.68	1.00	SAND	51	42	88		43.0
10.500	34.45	268.85	.52	SAND	54	43	89		43.0
10.650	34.94	263.03	.52	SAND	53	42	88		43.0
10.800	35.43	304.71	.73	SAND	61	49	92		43.5
10.950	35.93	307.16	.34	GRAVELLY SAND to SAND	51	41	93		43.5
11.100	36.42	321.73	.41	GRAVELLY SAND to SAND	54	42	94		44.0
11.250	36.91	286.72	.52	SAND	57	45	90		43.0
11.400	37.40	282.73	.49	SAND	57	44	90		43.0
11.550	37.89	303.33	1.01	SAND	61	47	92		43.5
11.700	38.39	274.57	.76	SAND	55	43	89		43.0
11.850	38.88	63.03	3.66	CLAYEY SILT to SILTY CLAY	32	24		3.6	
12.000	39.37	42.32	5.13	CLAY	42	33		2.4	
12.150	39.86	134.97	1.90	SILTY SAND to SANDY SILT	45	35	68		39.0
12.300	40.35	249.88	.89	SAND	50	38	86		42.5
12.450	40.85	215.23	1.23	SAND to SILTY SAND	54	41	81		41.5
12.600	41.34	286.19	1.36	SAND	57	43	89		43.0
12.750	41.83	385.87	.94	SAND	77	58	98		44.0
12.900	42.32	273.97	.54	SAND	55	41	88		42.5
13.050	42.81	295.83	1.13	SAND	59	44	90		43.0
13.200	43.31	252.98	.86	SAND	51	38	85		42.0
13.350	43.80	264.92	.68	SAND	53	39	86		42.5
13.500	44.29	335.54	.76	SAND	67	50	93		43.5
13.650	44.78	354.00	.73	SAND	71	52	94		43.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 17.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-23

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	328.36	.44	GRAVELLY SAND to SAND	55	40	92		43.0
13.950	45.77	307.35	.43	GRAVELLY SAND to SAND	51	38	90		43.0
14.100	46.26	270.57	.44	SAND	54	39	86		42.0
14.250	46.75	265.96	.60	SAND	53	39	86		42.0
14.400	47.24	299.59	.59	SAND	60	43	89		42.5
14.550	47.74	308.03	.32	GRAVELLY SAND to SAND	51	37	90		42.5
14.700	48.23	382.45	.56	GRAVELLY SAND to SAND	64	46	96		43.5
14.850	48.72	436.13	.28	GRAVELLY SAND to SAND	73	52	100		44.0
15.000	49.21	238.94	1.57	SAND to SILTY SAND	60	43	82		41.5
15.150	49.70	26.19	11.71	CLAY	26	19		1.5	
15.300	50.20	153.94	3.36	SANDY SILT to CLAYEY SILT	62	44		8.9	

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 17.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

CPT INTERPRETATIONS

SOUNDING : CPT-24 PROJECT No.: 00-1571-1
PROJECT : AES/PANHANDLE CONE/RIG : 473/BH,GO/R#3
DATE/TIME: 04-03-00 13:51

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	147.33	1.24	SAND to SILTY SAND	37	59	87		
.300	.98	107.84	1.62	SILTY SAND to SANDY SILT	36	57	78		
.450	1.48	63.08	1.55	SILTY SAND to SANDY SILT	21	34	63		48.5
.600	1.97	54.98	1.00	SILTY SAND to SANDY SILT	18	29	59		47.0
.750	2.46	127.58	1.25	SAND to SILTY SAND	32	51	83		49.5
.900	2.95	136.33	1.18	SAND to SILTY SAND	34	55	85		49.0
1.050	3.44	163.08	1.14	SAND to SILTY SAND	41	65	90		49.0
1.200	3.94	144.95	.99	SAND to SILTY SAND	36	58	87		48.0
1.350	4.43	129.17	1.07	SAND to SILTY SAND	32	52	84		47.0
1.500	4.92	157.13	1.40	SAND to SILTY SAND	39	63	89		47.5
1.650	5.41	148.12	.84	SAND	30	47	88		47.0
1.800	5.91	205.20	1.40	SAND to SILTY SAND	51	82	97		48.0
1.950	6.40	155.58	1.23	SAND to SILTY SAND	39	62	89		46.5
2.100	6.89	134.20	1.71	SILTY SAND to SANDY SILT	45	70	85		46.0
2.250	7.38	124.07	1.23	SAND to SILTY SAND	31	47	83		45.0
2.400	7.87	124.26	1.13	SAND to SILTY SAND	31	45	83		45.0
2.550	8.37	115.74	.57	SAND	23	33	81		44.5
2.700	8.86	148.76	1.04	SAND to SILTY SAND	37	51	87		45.0
2.850	9.35	187.91	1.53	SAND to SILTY SAND	47	63	93		46.0
3.000	9.84	189.63	1.17	SAND to SILTY SAND	47	62	93		46.0
3.150	10.33	171.81	1.40	SAND to SILTY SAND	43	55	89		45.0
3.300	10.83	281.35	.99	SAND	56	70	100		46.5
3.450	11.32	334.07	1.46	SAND	67	81	100		47.0
3.600	11.81	368.43	1.09	SAND	74	88	100		47.5
3.750	12.30	284.43	.97	SAND	57	66	100		46.5
3.900	12.80	245.40	1.08	SAND	49	56	96		45.5
4.050	13.29	259.34	.77	SAND	52	58	98		46.0
4.200	13.78	358.23	2.23	SAND to SILTY SAND	90	98	100		46.5
4.350	14.27	366.71	1.39	SAND	73	79	100		46.5
4.500	14.76	262.33	1.10	SAND	52	56	96		45.5
4.650	15.26	195.35	.55	SAND	39	41	88		44.0
4.800	15.75	191.67	.47	SAND	38	40	87		44.0
4.950	16.24	160.70	1.34	SAND to SILTY SAND	40	42	82		43.0
5.100	16.73	120.80	.43	SAND	24	25	73		42.0
5.250	17.22	53.54	.54	SAND to SILTY SAND	13	14	50		38.0
5.400	17.72	13.32	1.65	CLAYEY SILT to SILTY CLAY	7	7		1.0	
5.550	18.21	5.35	6.17	CLAY	5	5		.3	
5.700	18.70	25.68	.62	SILTY SAND to SANDY SILT	9	9	28		33.0
5.850	19.19	105.46	.59	SAND to SILTY SAND	26	26	68		40.0
6.000	19.69	191.99	.36	SAND	38	38	85		43.5
6.150	20.18	167.79	1.41	SAND to SILTY SAND	42	41	81		42.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 14.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-24

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	295.96	1.94	SAND to SILTY SAND	74	72	97		45.0
6.450	21.16	294.73	1.45	SAND to SILTY SAND	74	72	97		45.0
6.600	21.65	207.54	.72	SAND	42	40	87		43.5
6.750	22.15	204.86	.68	SAND	41	39	86		43.5
6.900	22.64	274.12	.51	SAND	55	52	94		44.5
7.050	23.13	305.88	.72	SAND	61	58	97		45.0
7.200	23.62	339.47	.99	SAND	68	64	100		45.5
7.350	24.11	224.52	.32	SAND	45	42	88		43.5
7.500	24.61	167.18	.71	SAND	33	31	80		42.0
7.650	25.10	284.21	.67	SAND	57	52	95		44.5
7.800	25.59	390.39	.88	SAND	78	72	100		46.0
7.950	26.08	383.81	.49	GRAVELLY SAND to SAND	64	58	100		45.5
8.100	26.57	397.96	1.01	SAND	80	72	100		46.0
8.250	27.07	443.51	.70	GRAVELLY SAND to SAND	74	67	100		46.0
8.400	27.56	372.70	.30	GRAVELLY SAND to SAND	62	56	100		45.5
8.550	28.05	391.71	.27	GRAVELLY SAND to SAND	65	58	100		45.5
8.700	28.54	367.56	.47	GRAVELLY SAND to SAND	61	54	100		45.0
8.850	29.04	363.86	.23	GRAVELLY SAND to SAND	61	53	100		45.0
9.000	29.53	334.35	.26	GRAVELLY SAND to SAND	56	49	98		44.5
9.150	30.02	467.66	.42	GRAVELLY SAND to SAND	78	68	100		46.0
9.300	30.51	391.90	.34	GRAVELLY SAND to SAND	65	57	100		45.5
9.450	31.00	345.55	.25	GRAVELLY SAND to SAND	58	50	98		44.5
9.600	31.50	322.98	.22	GRAVELLY SAND to SAND	54	46	96		44.5
9.750	31.99	363.05	.53	GRAVELLY SAND to SAND	61	52	99		45.0
9.900	32.48	358.82	.25	GRAVELLY SAND to SAND	60	51	99		44.5
10.050	32.97	432.25	.45	GRAVELLY SAND to SAND	72	61	100		45.5
10.200	33.46	459.27	.49	GRAVELLY SAND to SAND	77	64	100		46.0
10.350	33.96	422.71	.54	GRAVELLY SAND to SAND	70	59	100		45.5
10.500	34.45	427.36	.25	GRAVELLY SAND to SAND	71	59	100		45.5
10.650	34.94	185.25	.82	SAND	37	31	79		42.0
10.800	35.43	22.43	4.90	CLAY	22	18		1.2	
10.950	35.93	6.27	.32	SENSITIVE FINE GRAINED	3	3		.4	
11.100	36.42	136.18	1.23	SAND to SILTY SAND	34	28	70		39.5
11.250	36.91	160.42	2.36	SILTY SAND to SANDY SILT	53	43	75		40.5
11.400	37.40	406.05	1.48	SAND	81	66	100		45.0
11.550	37.89	358.48	.37	GRAVELLY SAND to SAND	60	48	97		44.5
11.700	38.39	230.23	.28	SAND	46	37	85		42.5
11.850	38.88	132.29	1.01	SAND to SILTY SAND	33	26	69		39.0
12.000	39.37	477.58	1.33	SAND	96	76	100		45.5
12.150	39.86	335.73	2.10	SAND to SILTY SAND	84	66	95		44.0
12.300	40.35	394.54	1.10	SAND	79	62	99		44.5
12.450	40.85	431.21	.52	GRAVELLY SAND to SAND	72	56	100		45.0
12.600	41.34	430.70	.74	GRAVELLY SAND to SAND	72	56	100		45.0
12.750	41.83	472.68	.91	SAND	95	73	100		45.0
12.900	42.32	541.93	.95	SAND	100	84	100		
13.050	42.81	570.64	1.07	SAND	100	88	100		
13.200	43.31	504.78	.65	GRAVELLY SAND to SAND	84	65	100		45.5
13.350	43.80	461.82	.47	GRAVELLY SAND to SAND	77	59	100		45.0
13.500	44.29	352.58	.23	GRAVELLY SAND to SAND	59	45	95		44.0
13.650	44.78	137.79	2.08	SILTY SAND to SANDY SILT	46	35	68		39.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 14.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-24

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	85.70	2.56	SANDY SILT to CLAYEY SILT	34	26		5.5	
13.950	45.77	93.46	1.19	SAND to SILTY SAND	23	18	57		37.5
14.100	46.26	211.87	*****		0	0			42.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 14.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

CPT INTERPRETATIONS

SOUNDING : CPT-25　　PROJECT No.: 00-1571-1
PROJECT : AES/PANHANDLE　　CONE/RIG : 473/BH,GO/R#3
DATE/TIME: 04-03-00 10:34

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	15.98	.75	SANDY SILT to CLAYEY SILT	6	10		1.6	
.300	.98	26.53	.90	SILTY SAND to SANDY SILT	9	14	38		47.0
.450	1.48	45.02	1.04	SILTY SAND to SANDY SILT	15	24	53		47.5
.600	1.97	53.77	.37	SAND to SILTY SAND	13	21	59		47.0
.750	2.46	24.81	1.41	SANDY SILT to CLAYEY SILT	10	16		2.0	
.900	2.95	19.04	2.10	CLAYEY SILT to SILTY CLAY	10	15		1.5	
1.050	3.44	17.17	2.50	CLAYEY SILT to SILTY CLAY	9	14		1.1	
1.200	3.94	11.47	3.92	CLAY	11	18		.7	
1.350	4.43	22.50	2.09	SANDY SILT to CLAYEY SILT	9	14		1.8	
1.500	4.92	34.44	2.00	SANDY SILT to CLAYEY SILT	14	22		2.3	
1.650	5.41	34.82	1.98	SANDY SILT to CLAYEY SILT	14	22		2.3	
1.800	5.91	40.11	2.12	SANDY SILT to CLAYEY SILT	16	26		2.7	
1.950	6.40	37.99	2.42	SANDY SILT to CLAYEY SILT	15	24		2.5	
2.100	6.89	27.98	3.07	CLAYEY SILT to SILTY CLAY	14	22		1.8	
2.250	7.38	27.53	3.63	CLAYEY SILT to SILTY CLAY	14	21		1.8	
2.400	7.87	34.27	1.37	SILTY SAND to SANDY SILT	11	17	46		38.5
2.550	8.37	130.04	1.15	SAND to SILTY SAND	33	46	84		44.5
2.700	8.86	114.87	1.24	SAND to SILTY SAND	29	39	80		44.0
2.850	9.35	57.38	1.90	SILTY SAND to SANDY SILT	19	26	59		40.0
3.000	9.84	84.47	1.15	SAND to SILTY SAND	21	27	70		42.0
3.150	10.33	89.53	1.23	SAND to SILTY SAND	22	28	71		42.0
3.300	10.83	125.13	.74	SAND to SILTY SAND	31	39	80		43.5
3.450	11.32	65.43	1.12	SILTY SAND to SANDY SILT	22	26	60		39.5
3.600	11.81	50.01	1.34	SILTY SAND to SANDY SILT	17	20	52		38.5
3.750	12.30	50.95	1.37	SILTY SAND to SANDY SILT	17	20	52		38.5
3.900	12.80	52.73	1.21	SILTY SAND to SANDY SILT	18	20	53		38.5
4.050	13.29	17.85	3.19	CLAYEY SILT to SILTY CLAY	9	10		1.1	
4.200	13.78	14.64	3.35	CLAY to SILTY CLAY	10	11		.9	
4.350	14.27	24.71	2.71	CLAYEY SILT to SILTY CLAY	12	14		1.6	
4.500	14.76	94.48	.86	SAND to SILTY SAND	24	26	68		41.0
4.650	15.26	123.75	.86	SAND to SILTY SAND	31	34	76		42.5
4.800	15.75	76.91	1.33	SILTY SAND to SANDY SILT	26	28	62		39.5
4.950	16.24	121.39	1.85	SILTY SAND to SANDY SILT	40	44	75		42.0
5.100	16.73	318.12	.93	SAND	64	68	100		46.0
5.250	17.22	258.02	.84	SAND	52	55	96		45.5
5.400	17.72	225.03	.57	SAND	45	47	92		44.5
5.550	18.21	227.19	.52	SAND	45	48	92		44.5
5.700	18.70	229.81	.18	SAND	46	48	92		44.5
5.850	19.19	210.79	.35	SAND	42	43	89		44.0
6.000	19.69	236.05	.87	SAND	47	48	92		44.5
6.150	20.18	229.59	.55	SAND	46	47	91		44.5

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 12.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-25

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	205.01	.69	SAND	41	41	88		44.0
6.450	21.16	227.51	.74	SAND	46	46	91		44.0
6.600	21.65	249.01	.57	SAND	50	49	93		44.5
6.750	22.15	217.16	.37	SAND	43	43	89		44.0
6.900	22.64	267.09	.50	SAND	53	52	95		44.5
7.050	23.13	320.44	.62	SAND	64	62	100		45.5
7.200	23.62	279.37	1.06	SAND	56	54	95		45.0
7.350	24.11	386.06	.84	SAND	77	74	100		46.0
7.500	24.61	472.00	.96	SAND	94	90	100		46.5
7.650	25.10	360.50	.88	SAND	72	68	100		46.0
7.800	25.59	321.92	.31	GRAVELLY SAND to SAND	54	51	99		45.0
7.950	26.08	284.38	.70	SAND	57	53	95		44.5
8.100	26.57	280.28	.64	SAND	56	52	94		44.5
8.250	27.07	231.80	.52	SAND	46	43	89		43.5
8.400	27.56	295.41	.86	SAND	59	54	96		44.5
8.550	28.05	205.71	2.00	SILTY SAND to SANDY SILT	69	63	85		43.0
8.700	28.54	243.44	.15	GRAVELLY SAND to SAND	41	37	90		44.0
8.850	29.04	296.66	1.18	SAND	59	54	95		44.5
9.000	29.53	324.17	.77	SAND	65	58	98		45.0
9.150	30.02	368.02	.36	GRAVELLY SAND to SAND	61	55	100		45.5
9.300	30.51	403.42	.75	SAND	81	72	100		45.5
9.450	31.00	298.45	.47	GRAVELLY SAND to SAND	50	44	95		44.5
9.600	31.50	333.69	.52	GRAVELLY SAND to SAND	56	49	98		44.5
9.750	31.99	242.25	.53	SAND	48	42	88		43.5
9.900	32.48	126.02	1.92	SILTY SAND to SANDY SILT	42	36	70		39.5
10.050	32.97	87.76	1.33	SILTY SAND to SANDY SILT	29	25	59		38.5
10.200	33.46	74.04	2.77	SANDY SILT to CLAYEY SILT	30	25		4.8	
10.350	33.96	54.54	2.44	SANDY SILT to CLAYEY SILT	22	19		3.5	
10.500	34.45	84.41	2.54	SANDY SILT to CLAYEY SILT	34	29		5.5	
10.650	34.94	83.66	2.09	SILTY SAND to SANDY SILT	28	24	57		38.0
10.800	35.43	149.05	1.34	SAND to SILTY SAND	37	31	73		40.5
10.950	35.93	245.31	.99	SAND	49	41	88		43.0
11.100	36.42	251.86	.94	SAND	50	42	88		43.0
11.250	36.91	248.05	1.29	SAND	50	41	88		43.0
11.400	37.40	282.66	.83	SAND	57	47	91		43.5
11.550	37.89	289.29	.39	GRAVELLY SAND to SAND	48	40	92		43.5
11.700	38.39	112.39	1.19	SAND to SILTY SAND	28	23	65		38.5
11.850	38.88	260.80	.84	SAND	52	42	89		43.0
12.000	39.37	433.44	.90	SAND	87	70	100		45.0
12.150	39.86	433.61	.80	SAND	87	70	100		45.0
12.300	40.35	365.67	.44	GRAVELLY SAND to SAND	61	49	98		44.5
12.450	40.85	433.84	.42	GRAVELLY SAND to SAND	72	58	100		45.0
12.600	41.34	382.22	.81	SAND	76	61	99		44.5
12.750	41.83	343.04	.75	SAND	69	54	96		44.0
12.900	42.32	309.32	.50	GRAVELLY SAND to SAND	52	41	93		43.5
13.050	42.81	397.75	.36	GRAVELLY SAND to SAND	66	52	100		44.5
13.200	43.31	255.41	.49	SAND	51	40	87		42.5
13.350	43.80	51.96	2.37	SANDY SILT to CLAYEY SILT	21	16		3.3	
13.500	44.29	56.72	2.33	SANDY SILT to CLAYEY SILT	23	18		3.6	
13.650	44.78	88.19	1.09	SAND to SILTY SAND	22	17	56		37.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 12.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-25

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	98.26	.62	SAND to SILTY SAND	25	19	59		38.0
13.950	45.77	23.58	3.39	CLAYEY SILT to SILTY CLAY	12	9		1.4	
14.100	46.26	20.40	3.82	CLAY to SILTY CLAY	14	10		1.2	
14.250	46.75	17.46	2.41	CLAYEY SILT to SILTY CLAY	9	7		1.0	
14.400	47.24	19.21	2.50	CLAYEY SILT to SILTY CLAY	10	7		1.1	
14.550	47.74	21.05	3.42	CLAYEY SILT to SILTY CLAY	11	8		1.2	
14.700	48.23	18.55	3.50	CLAY to SILTY CLAY	12	9		1.0	
14.850	48.72	15.78	2.72	CLAYEY SILT to SILTY CLAY	8	6		.9	
15.000	49.21	17.19	3.84	CLAY to SILTY CLAY	11	9		.9	
15.150	49.70	16.51	2.79	CLAYEY SILT to SILTY CLAY	8	6		.9	
15.300	50.20	17.74	*****		0	0			.0

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 12.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : SDF-26
PROJECT : AES/PANHANDLE
DATE/TIME: 04-04-00 13:33

PROJECT No.: 00-1571-1
CONE/RIG : 722/BH.GO/R#3

PAGE 1 of 2

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	67.64	2.00	SILTY SAND to SANDY SILT	23	36	65		
.300	.98	124.77	3.08	SANDY SILT to CLAYEY SILT	50	80		7.3	
.450	1.48	104.04	3.09	SANDY SILT to CLAYEY SILT	42	67		6.1	
.600	1.97	54.05	4.82	CLAY to SILTY CLAY	36	58		3.2	
.750	2.46	38.56	4.93	CLAY	39	62		2.3	
.900	2.95	40.15	4.23	CLAY to SILTY CLAY	27	43		2.4	
1.050	3.44	34.57	4.30	CLAY to SILTY CLAY	23	37		2.0	
1.200	3.94	32.21	3.02	CLAYEY SILT to SILTY CLAY	16	26		2.1	
1.350	4.43	40.24	3.26	CLAYEY SILT to SILTY CLAY	20	32		2.7	
1.500	4.92	36.39	3.39	CLAYEY SILT to SILTY CLAY	18	29		2.4	
1.650	5.41	32.33	3.70	CLAYEY SILT to SILTY CLAY	16	26		2.1	
1.800	5.91	87.72	.96	SAND to SILTY SAND	22	35	73		44.5
1.950	6.40	189.59	.60	SAND	38	61	95		47.5
2.100	6.89	93.88	1.51	SILTY SAND to SANDY SILT	31	49	75		44.0
2.250	7.38	36.39	2.25	SANDY SILT to CLAYEY SILT	15	22		2.4	
2.400	7.87	23.41	4.54	CLAY	23	34		1.5	
2.550	8.37	30.36	3.11	CLAYEY SILT to SILTY CLAY	15	21		2.0	
2.700	8.86	34.27	3.32	CLAYEY SILT to SILTY CLAY	17	24		2.2	
2.850	9.35	17.12	4.44	CLAY	17	23		1.1	
3.000	9.84	12.39	4.82	CLAY	12	16		.8	
3.150	10.33	20.61	3.80	CLAY to SILTY CLAY	14	17		1.3	
3.300	10.83	41.62	2.45	SANDY SILT to CLAYEY SILT	17	21		2.7	
3.450	11.32	65.46	1.72	SILTY SAND to SANDY SILT	22	26	60		39.5
3.600	11.81	133.04	1.51	SAND to SILTY SAND	33	40	80		43.5
3.750	12.30	186.64	1.89	SAND to SILTY SAND	47	54	89		44.5
3.900	12.80	272.53	1.44	SAND to SILTY SAND	68	78	99		46.0
4.050	13.29	215.63	1.22	SAND to SILTY SAND	54	60	92		45.0
4.200	13.78	201.83	1.01	SAND	40	44	90		44.5
4.350	14.27	202.89	1.06	SAND	41	44	89		44.5
4.500	14.76	208.90	.98	SAND	42	44	90		44.5
4.650	15.26	248.01	.91	SAND	50	52	94		45.0
4.800	15.75	249.35	1.18	SAND	50	51	94		45.0
4.950	16.24	223.20	1.59	SAND to SILTY SAND	56	57	90		44.0
5.100	16.73	267.34	1.86	SAND to SILTY SAND	67	67	95		45.0
5.250	17.22	322.09	1.84	SAND to SILTY SAND	81	79	100		45.5
5.400	17.72	372.15	1.95	SAND to SILTY SAND	93	90	100		46.0
5.550	18.21	407.03	1.16	SAND	81	78	100		46.0
5.700	18.70	301.72	1.28	SAND	60	57	97		45.0
5.850	19.19	178.99	1.09	SAND to SILTY SAND	45	42	82		42.5
6.000	19.69	32.65	3.69	CLAYEY SILT to SILTY CLAY	16	15		2.1	
6.150	20.18	26.85	3.52	CLAYEY SILT to SILTY CLAY	13	12		1.7	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 25.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : SDF-26

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	64.46	1.85	SILTY SAND to SANDY SILT	21	19	51		37.5
6.450	21.16	84.60	1.87	SILTY SAND to SANDY SILT	28	25	59		38.5
6.600	21.65	86.89	2.45	SILTY SAND to SANDY SILT	29	25	59		38.5
6.750	22.15	138.43	1.99	SILTY SAND to SANDY SILT	46	40	72		40.0
6.900	22.64	278.18	2.15	SAND to SILTY SAND	70	60	92		44.0
7.050	23.13	241.09	1.32	SAND to SILTY SAND	60	51	87		43.0
7.200	23.62	250.24	.72	SAND	50	42	88		43.0
7.350	24.11	262.56	.78	SAND	53	44	89		43.0
7.500	24.61	246.08	1.35	SAND to SILTY SAND	62	51	87		43.0
7.650	25.10	251.79	1.04	SAND	50	41	88		43.0
7.800	25.59	213.49	1.96	SAND to SILTY SAND	53	43	83		42.0
7.950	26.08	314.66	2.07	SAND to SILTY SAND	79	64	94		44.0
8.100	26.57	234.99	.58	SAND	47	38	85		42.5
8.250	27.07	198.07	3.57	*SAND to CLAYEY SAND	99	79			
8.400	27.56	233.84	2.11	SILTY SAND to SANDY SILT	78	62	85		42.5
8.550	28.05	73.25	.87	SAND to SILTY SAND	18	15	51		37.0
8.700	28.54	89.95	3.30	SANDY SILT to CLAYEY SILT	36	28		5.2	
8.850	29.04	132.89	1.16	SAND to SILTY SAND	33	26	68		39.0
9.000	29.53	138.86	.73	SAND	28	22	69		39.0
9.150	30.02	186.47	1.12	SAND to SILTY SAND	47	36	78		41.0
9.300	30.51	313.08	2.67	SILTY SAND to SANDY SILT	100	81	92		43.5
9.450	31.00	282.34	2.06	SAND to SILTY SAND	71	55	89		43.0
9.600	31.50	234.44	1.51	SAND to SILTY SAND	59	45	84		42.0
9.750	31.99	328.27	1.46	SAND to SILTY SAND	82	63	93		43.5
9.900	32.48	377.46	.74	SAND	75	58	97		44.0
10.050	32.97	325.83	.88	SAND	65	50	93		43.5
10.200	33.46	275.16	.55	SAND	55	42	88		42.5
10.350	33.96	138.90	.67	SAND	28	21	68		39.0
10.500	34.45	84.70	1.32	SILTY SAND to SANDY SILT	28	21	54		37.0
10.650	34.94	9.54	3.11	CLAY to SILTY CLAY	6	5		.5	
10.800	35.43	8.07	1.54	CLAYEY SILT to SILTY CLAY	4	3		.5	
10.950	35.93	4.23	4.37	CLAY	4	3		.1	
11.100	36.42	21.65	1.23	SANDY SILT to CLAYEY SILT	9	6		1.6	
11.250	36.91	16.25	5.61	CLAY	16	12		.9	
11.400	37.40	40.96	1.73	SANDY SILT to CLAYEY SILT	16	12		3.1	
11.550	37.89	192.97	1.06	SAND	39	28	77		40.0
11.700	38.39	437.03	1.06	SAND	87	64	100		44.5
11.850	38.88	554.72	1.60	SAND	100	80	100		
12.000	39.37	492.71	1.43	SAND	99	71	100		44.5

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 25.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

CPT INTERPRETATIONS

SOUNDING : CPT-27
PROJECT : AES/PANHANDLE
DATE/TIME: 04-03-00 09:57

PROJECT No.: 00-1571-1
CONE/RIG : 473/BH,GO/R#3

PAGE 1 of 3

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	13.15	.25	SANDY SILT to CLAYEY SILT	5	8		1.3	
.300	.98	30.00	.52	SILTY SAND to SANDY SILT	10	16	42		47.5
.450	1.48	52.71	.88	SILTY SAND to SANDY SILT	18	28	58		48.0
.600	1.97	36.39	.69	SILTY SAND to SANDY SILT	12	19	47		45.5
.750	2.46	18.84	1.06	SANDY SILT to CLAYEY SILT	8	12		1.5	
.900	2.95	17.85	1.18	SANDY SILT to CLAYEY SILT	7	11		1.4	
1.050	3.44	21.92	1.66	SANDY SILT to CLAYEY SILT	9	14		1.7	
1.200	3.94	19.27	1.82	SANDY SILT to CLAYEY SILT	8	12		1.5	
1.350	4.43	22.33	1.92	SANDY SILT to CLAYEY SILT	9	14		1.8	
1.500	4.92	28.89	1.66	SANDY SILT to CLAYEY SILT	12	18		2.3	
1.650	5.41	40.37	1.61	SILTY SAND to SANDY SILT	13	22	50		41.5
1.800	5.91	41.11	1.47	SILTY SAND to SANDY SILT	14	22	51		41.0
1.950	6.40	36.01	2.44	SANDY SILT to CLAYEY SILT	14	23		2.4	
2.100	6.89	40.09	1.38	SILTY SAND to SANDY SILT	13	21	50		39.5
2.250	7.38	43.55	1.56	SILTY SAND to SANDY SILT	15	22	53		40.0
2.400	7.87	43.59	1.75	SANDY SILT to CLAYEY SILT	17	25		3.4	
2.550	8.37	49.29	1.70	SILTY SAND to SANDY SILT	16	23	56		40.0
2.700	8.86	54.15	1.30	SILTY SAND to SANDY SILT	18	25	58		40.0
2.850	9.35	83.39	1.23	SAND to SILTY SAND	21	28	70		42.5
3.000	9.84	43.04	1.82	SANDY SILT to CLAYEY SILT	17	22		2.8	
3.150	10.33	42.45	1.77	SANDY SILT to CLAYEY SILT	17	22		3.3	
3.300	10.83	43.15	1.69	SILTY SAND to SANDY SILT	14	18	49		38.5
3.450	11.32	33.89	2.31	SANDY SILT to CLAYEY SILT	14	16		2.2	
3.600	11.81	34.33	2.22	SANDY SILT to CLAYEY SILT	14	16		2.2	
3.750	12.30	33.23	1.38	SILTY SAND to SANDY SILT	11	13	40		37.0
3.900	12.80	26.15	2.27	SANDY SILT to CLAYEY SILT	10	12		1.7	
4.050	13.29	20.35	2.85	CLAYEY SILT to SILTY CLAY	10	11		1.3	
4.200	13.78	23.62	1.75	SANDY SILT to CLAYEY SILT	9	10		1.8	
4.350	14.27	37.69	1.39	SILTY SAND to SANDY SILT	13	14	41		37.0
4.500	14.76	57.87	3.39	CLAYEY SILT to SILTY CLAY	29	31		3.4	
4.650	15.26	252.43	.91	SAND	50	53	95		45.0
4.800	15.75	357.34	.81	SAND	71	74	100		46.5
4.950	16.24	302.19	.81	SAND	60	62	100		46.0
5.100	16.73	249.63	.77	SAND	50	51	94		45.0
5.250	17.22	233.93	.69	SAND	47	48	92		44.5
5.400	17.72	177.61	.27	SAND	36	36	84		43.5
5.550	18.21	76.38	.24	SAND to SILTY SAND	19	19	59		39.0
5.700	18.70	63.44	.39	SAND to SILTY SAND	16	16	54		38.0
5.850	19.19	127.30	.84	SAND to SILTY SAND	32	31	74		41.5
6.000	19.69	179.92	.47	SAND	36	35	83		43.0
6.150	20.18	166.05	.67	SAND	33	32	81		42.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-27

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	129.89	.55	SAND	26	25	74		41.5
6.450	21.16	142.89	1.13	SAND to SILTY SAND	36	34	76		42.0
6.600	21.65	83.30	1.48	SILTY SAND to SANDY SILT	28	27	60		39.0
6.750	22.15	135.88	.82	SAND to SILTY SAND	34	32	74		41.5
6.900	22.64	159.19	1.04	SAND to SILTY SAND	40	38	79		42.0
7.050	23.13	194.94	.99	SAND	39	37	84		43.0
7.200	23.62	163.63	1.03	SAND to SILTY SAND	41	38	79		42.0
7.350	24.11	172.23	2.34	SILTY SAND to SANDY SILT	57	53	80		42.5
7.500	24.61	150.73	.28	SAND	30	28	76		42.0
7.650	25.10	27.43	3.06	CLAYEY SILT to SILTY CLAY	14	13		1.7	
7.800	25.59	36.80	1.01	SILTY SAND to SANDY SILT	12	11	36		34.5
7.950	26.08	67.77	1.20	SILTY SAND to SANDY SILT	23	20	53		38.0
8.100	26.57	145.08	1.01	SAND to SILTY SAND	36	33	75		41.0
8.250	27.07	150.09	.87	SAND	30	27	75		41.5
8.400	27.56	89.80	.88	SAND to SILTY SAND	22	20	61		38.5
8.550	28.05	65.90	.73	SAND to SILTY SAND	16	15	52		37.5
8.700	28.54	32.53	2.51	SANDY SILT to CLAYEY SILT	13	11		2.1	
8.850	29.04	15.89	4.36	CLAY	16	14		.9	
9.000	29.53	44.30	2.55	SANDY SILT to CLAYEY SILT	18	15		2.8	
9.150	30.02	62.42	2.45	SANDY SILT to CLAYEY SILT	25	22		4.0	
9.300	30.51	170.96	.48	SAND	34	29	78		42.0
9.450	31.00	166.58	.61	SAND	33	29	77		41.5
9.600	31.50	174.04	.57	SAND	35	30	78		42.0
9.750	31.99	213.94	1.48	SAND to SILTY SAND	53	45	84		42.5
9.900	32.48	215.40	.53	SAND	43	36	84		42.5
10.050	32.97	246.89	.66	SAND	49	41	88		43.0
10.200	33.46	258.12	.60	SAND	52	43	89		43.0
10.350	33.96	262.56	.61	SAND	53	44	89		43.5
10.500	34.45	280.94	.51	SAND	56	46	91		43.5
10.650	34.94	263.92	.45	SAND	53	43	89		43.0
10.800	35.43	232.44	.23	SAND	46	38	85		42.5
10.950	35.93	151.16	.26	SAND	30	25	73		40.0
11.100	36.42	40.15	3.47	CLAYEY SILT to SILTY CLAY	20	16		2.5	
11.250	36.91	59.32	3.49	CLAYEY SILT to SILTY CLAY	30	24		3.4	
11.400	37.40	98.49	2.31	SILTY SAND to SANDY SILT	33	26	60		38.0
11.550	37.89	86.85	1.76	SILTY SAND to SANDY SILT	29	23	57		38.0
11.700	38.39	167.30	2.26	SILTY SAND to SANDY SILT	56	44	75		40.5
11.850	38.88	215.44	1.10	SAND	43	34	82		42.0
12.000	39.37	389.84	1.01	SAND	78	62	99		44.5
12.150	39.86	599.63	1.51	SAND	100	94	100		
12.300	40.35	503.61	.72	GRAVELLY SAND to SAND	84	66	100		45.5
12.450	40.85	416.23	.35	GRAVELLY SAND to SAND	69	54	100		44.5
12.600	41.34	379.24	.43	GRAVELLY SAND to SAND	63	49	98		44.0
12.750	41.83	378.75	.39	GRAVELLY SAND to SAND	63	49	98		44.0
12.900	42.32	384.53	.35	GRAVELLY SAND to SAND	64	49	98		44.0
13.050	42.81	433.84	.58	GRAVELLY SAND to SAND	72	55	100		44.5
13.200	43.31	633.22	.69	GRAVELLY SAND to SAND	100	81	100		
13.350	43.80	647.86	.71	GRAVELLY SAND to SAND	100	82	100		
13.500	44.29	637.47	.96	GRAVELLY SAND to SAND	100	80	100		
13.650	44.78	693.62	.54	GRAVELLY SAND to SAND	100	87	100		

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-27

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	623.03	.58	GRAVELLY SAND to SAND	100	78	100		
13.950	45.77	606.37	.75	GRAVELLY SAND to SAND	100	76	100		
14.100	46.26	419.95	.68	GRAVELLY SAND to SAND	70	52	100		44.5
14.250	46.75	391.46	.91	SAND	78	58	98		44.0
14.400	47.24	390.76	.39	GRAVELLY SAND to SAND	65	48	97		44.0
14.550	47.74	421.82	.48	GRAVELLY SAND to SAND	70	52	99		44.0
14.700	48.23	410.58	.24	GRAVELLY SAND to SAND	68	50	99		44.0
14.850	48.72	379.39	.34	GRAVELLY SAND to SAND	63	46	96		44.0
15.000	49.21	211.15	.12	SAND	42	31	79		40.5
15.150	49.70	207.82	.18	SAND	42	30	79		40.5
15.300	50.20	299.70	.22	GRAVELLY SAND to SAND	50	36	89		42.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-28
PROJECT : AES/PANHANDLE
DATE/TIME: 04-03-00 12:22
PROJECT No.: 00-1571-1
CONE/RIG : 473/BH,GO/R#3

PAGE 1 of 3

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	9.84	.85	CLAYEY SILT to SILTY CLAY	5	8		1.0	
.300	.98	24.41	1.27	SANDY SILT to CLAYEY SILT	10	16		1.9	
.450	1.48	22.60	2.14	SANDY SILT to CLAYEY SILT	9	14		1.8	
.600	1.97	24.45	1.82	SANDY SILT to CLAYEY SILT	10	16		1.9	
.750	2.46	40.68	1.36	SILTY SAND to SANDY SILT	14	22	51		45.0
.900	2.95	37.37	1.60	SANDY SILT to CLAYEY SILT	15	24		3.0	
1.050	3.44	103.12	1.37	SAND to SILTY SAND	26	41	77		47.5
1.200	3.94	116.38	.93	SAND to SILTY SAND	29	47	81		47.5
1.350	4.43	107.29	1.07	SAND to SILTY SAND	27	43	78		46.5
1.500	4.92	114.04	.81	SAND to SILTY SAND	29	46	80		46.5
1.650	5.41	162.67	1.30	SAND to SILTY SAND	41	65	90		47.5
1.800	5.91	136.58	2.85	SILTY SAND to SANDY SILT	46	73	85		46.5
1.950	6.40	140.73	3.84	*SAND to CLAYEY SAND	70	100			
2.100	6.89	89.93	2.33	SILTY SAND to SANDY SILT	30	47	73		44.0
2.250	7.38	222.94	3.51	*SAND to CLAYEY SAND	100	100			
2.400	7.87	211.98	.63	SAND	42	62	98		47.0
2.550	8.37	264.58	1.61	SAND to SILTY SAND	66	93	100		47.5
2.700	8.86	174.44	1.65	SAND to SILTY SAND	44	60	92		46.0
2.850	9.35	180.52	.85	SAND	36	48	92		46.0
3.000	9.84	199.57	.61	SAND	40	52	94		46.0
3.150	10.33	263.03	1.77	SAND to SILTY SAND	66	84	100		46.5
3.300	10.83	157.89	.77	SAND	32	39	86		44.5
3.450	11.32	58.59	1.66	SILTY SAND to SANDY SILT	20	24	57		39.0
3.600	11.81	18.80	3.22	CLAYEY SILT to SILTY CLAY	9	11		1.2	
3.750	12.30	14.91	2.39	CLAYEY SILT to SILTY CLAY	7	9		1.1	
3.900	12.80	35.29	1.16	SILTY SAND to SANDY SILT	12	13	41		37.0
4.050	13.29	24.43	2.62	CLAYEY SILT to SILTY CLAY	12	14		1.6	
4.200	13.78	74.97	.86	SAND to SILTY SAND	19	21	61		39.5
4.350	14.27	56.19	1.44	SILTY SAND to SANDY SILT	19	20	53		38.5
4.500	14.76	33.86	1.88	SANDY SILT to CLAYEY SILT	14	14		2.6	
4.650	15.26	35.44	1.94	SANDY SILT to CLAYEY SILT	14	15		2.3	
4.800	15.75	50.18	1.31	SILTY SAND to SANDY SILT	17	17	48		37.5
4.950	16.24	28.57	2.40	SANDY SILT to CLAYEY SILT	11	12		1.8	
5.100	16.73	30.38	2.56	SANDY SILT to CLAYEY SILT	12	12		2.0	
5.250	17.22	51.07	1.57	SILTY SAND to SANDY SILT	17	17	48		37.5
5.400	17.72	27.81	3.69	CLAYEY SILT to SILTY CLAY	14	14		1.8	
5.550	18.21	41.60	1.79	SANDY SILT to CLAYEY SILT	17	17		3.2	
5.700	18.70	19.16	3.99	CLAY to SILTY CLAY	13	13		1.2	
5.850	19.19	89.78	1.32	SAND to SILTY SAND	22	22	63		39.0
6.000	19.69	109.07	1.44	SAND to SILTY SAND	27	27	69		40.0
6.150	20.18	111.30	1.48	SAND to SILTY SAND	28	27	69		40.0

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	93.26	1.70	SILTY SAND to SANDY SILT	31	30	64		39.0
6.450	21.16	129.13	1.89	SILTY SAND to SANDY SILT	43	41	73		41.0
6.600	21.65	254.13	2.45	SILTY SAND to SANDY SILT	85	81	92		44.0
6.750	22.15	231.23	.25	SAND	46	44	89		44.0
6.900	22.64	140.66	.30	SAND	28	26	75		41.5
7.050	23.13	135.67	.51	SAND	27	25	74		41.0
7.200	23.62	150.35	.61	SAND	30	28	76		42.0
7.350	24.11	149.16	.98	SAND to SILTY SAND	37	34	76		42.0
7.500	24.61	173.12	1.38	SAND to SILTY SAND	43	40	80		42.5
7.650	25.10	176.63	1.40	SAND to SILTY SAND	44	40	81		42.5
7.800	25.59	194.11	.81	SAND	39	35	83		42.5
7.950	26.08	194.39	.36	SAND	39	35	83		42.5
8.100	26.57	207.99	.69	SAND	42	37	85		43.0
8.250	27.07	196.54	1.60	SAND to SILTY SAND	49	44	83		42.5
8.400	27.56	238.05	.84	SAND	48	42	88		43.5
8.550	28.05	159.25	.86	SAND	32	28	77		41.5
8.700	28.54	82.30	.86	SAND to SILTY SAND	21	18	58		38.0
8.850	29.04	16.44	2.89	CLAYEY SILT to SILTY CLAY	8	7		1.0	
9.000	29.53	21.99	2.94	CLAYEY SILT to SILTY CLAY	11	10		1.3	
9.150	30.02	7.80	6.54	CLAY	8	7		.4	
9.300	30.51	12.64	3.42	CLAY to SILTY CLAY	8	7		.7	
9.450	31.00	62.97	7.68	CLAY	63	54		3.6	
9.600	31.50	314.04	2.33	SILTY SAND to SANDY SILT	100	89	95		44.0
9.750	31.99	285.81	1.01	SAND	57	48	92		44.0
9.900	32.48	314.61	.76	SAND	63	53	95		44.0
10.050	32.97	291.29	.84	SAND	58	49	92		44.0
10.200	33.46	330.00	.96	SAND	66	55	96		44.0
10.350	33.96	343.21	.76	SAND	69	57	97		44.5
10.500	34.45	422.77	1.58	SAND to SILTY SAND	100	87	100		45.0
10.650	34.94	411.36	.74	GRAVELLY SAND to SAND	69	56	100		45.0
10.800	35.43	374.82	.65	GRAVELLY SAND to SAND	62	51	99		44.5
10.950	35.93	375.71	1.61	SAND to SILTY SAND	94	76	99		44.5
11.100	36.42	414.10	1.36	SAND	83	67	100		45.0
11.250	36.91	413.83	1.36	SAND	83	67	100		45.0
11.400	37.40	377.75	.75	SAND	76	60	99		44.5
11.550	37.89	354.68	.86	SAND	71	57	97		44.0
11.700	38.39	345.27	.75	SAND	69	55	96		44.0
11.850	38.88	279.75	.48	SAND	56	44	90		43.0
12.000	39.37	285.68	.95	SAND	57	45	90		43.0
12.150	39.86	67.11	2.71	SANDY SILT to CLAYEY SILT	27	21		4.3	
12.300	40.35	59.83	2.89	SANDY SILT to CLAYEY SILT	24	19		3.8	
12.450	40.85	117.53	3.95	CLAYEY SILT to SILTY CLAY	59	46		6.8	
12.600	41.34	128.53	1.92	SILTY SAND to SANDY SILT	43	33	67		39.0
12.750	41.83	82.98	1.64	SILTY SAND to SANDY SILT	28	21	54		37.5
12.900	42.32	21.65	18.76	CLAY	22	17		1.3	
13.050	42.81	229.44	1.00	SAND	46	35	83		42.0
13.200	43.31	212.04	1.55	SAND to SILTY SAND	53	40	81		41.5
13.350	43.80	208.60	.74	SAND	42	32	80		41.5
13.500	44.29	257.89	.92	SAND	52	39	86		42.5
13.650	44.78	283.30	.96	SAND	57	43	89		42.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-28

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	313.15	.74	SAND	63	47	91		43.0
13.950	45.77	317.80	1.42	SAND	64	47	92		43.0
14.100	46.26	246.18	1.54	SAND to SILTY SAND	62	46	84		42.0
14.250	46.75	375.44	.92	SAND	75	56	96		44.0
14.400	47.24	367.92	.41	GRAVELLY SAND to SAND	61	45	96		43.5
14.550	47.74	136.12	1.09	SAND to SILTY SAND	34	25	67		38.5
14.700	48.23	97.68	.73	SAND to SILTY SAND	24	18	57		37.5
14.850	48.72	111.20	.71	SAND to SILTY SAND	28	20	61		38.0
15.000	49.21	196.45	.80	SAND	39	28	77		40.0
15.150	49.70	66.77	3.12	SANDY SILT to CLAYEY SILT	27	19		3.8	
15.300	50.20	50.90	5.26	CLAY	51	37		2.8	

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 15.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

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*                       CPT INTERPRETATIONS                           *
*                                                                     *
*   SOUNDING : CPT-29                    PROJECT No.: 00-1571-1       *
*   PROJECT  : AES/PANHANDLE             CONE/RIG : 473/BH,GO/R#3     *
*   DATE/TIME: 04-03-00 09:18                                         *
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DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	40.39	1.28	SILTY SAND to SANDY SILT	13	22	50		
.300	.98	40.66	1.69	SANDY SILT to CLAYEY SILT	16	26		3.2	
.450	1.48	29.53	1.14	SILTY SAND to SANDY SILT	10	16	41		46.0
.600	1.97	30.32	.89	SILTY SAND to SANDY SILT	10	16	42		44.5
.750	2.46	48.14	.69	SILTY SAND to SANDY SILT	16	26	55		46.0
.900	2.95	23.20	2.87	CLAYEY SILT to SILTY CLAY	12	19		1.5	
1.050	3.44	12.51	3.82	CLAY	13	20		.8	
1.200	3.94	15.95	2.54	CLAYEY SILT to SILTY CLAY	8	13		1.0	
1.350	4.43	37.05	1.20	SILTY SAND to SANDY SILT	12	20	48		42.0
1.500	4.92	27.49	2.06	SANDY SILT to CLAYEY SILT	11	18		2.2	
1.650	5.41	30.51	.98	SILTY SAND to SANDY SILT	10	16	42		39.5
1.800	5.91	27.62	2.23	SANDY SILT to CLAYEY SILT	11	18		1.8	
1.950	6.40	47.31	1.36	SILTY SAND to SANDY SILT	16	25	55		41.5
2.100	6.89	56.26	1.09	SILTY SAND to SANDY SILT	19	29	60		42.0
2.250	7.38	68.98	1.24	SILTY SAND to SANDY SILT	23	35	66		42.5
2.400	7.87	96.49	1.04	SAND to SILTY SAND	24	35	75		44.0
2.550	8.37	172.47	1.27	SAND to SILTY SAND	43	61	92		46.0
2.700	8.86	158.17	.81	SAND	32	43	89		45.5
2.850	9.35	155.53	.59	SAND	31	42	88		45.0
3.000	9.84	156.66	.62	SAND	31	41	87		45.0
3.150	10.33	130.29	1.11	SAND to SILTY SAND	33	41	81		44.0
3.300	10.83	159.63	.72	SAND	32	40	87		44.5
3.450	11.32	226.72	.87	SAND	45	55	96		46.0
3.600	11.81	181.90	.50	SAND	36	43	89		44.5
3.750	12.30	158.44	.99	SAND to SILTY SAND	40	46	85		44.0
3.900	12.80	167.58	1.62	SAND to SILTY SAND	42	48	86		44.0
4.050	13.29	236.92	1.04	SAND	47	53	95		45.5
4.200	13.78	189.19	.90	SAND	38	42	88		44.0
4.350	14.27	204.04	.71	SAND	41	44	90		44.5
4.500	14.76	182.73	.64	SAND	37	39	86		44.0
4.650	15.26	166.69	1.07	SAND to SILTY SAND	42	44	83		43.5
4.800	15.75	207.41	.79	SAND	41	44	89		44.0
4.950	16.24	219.20	2.63	SILTY SAND to SANDY SILT	73	76	91		44.5
5.100	16.73	176.27	.84	SAND	35	36	84		43.5
5.250	17.22	143.95	.45	SAND	29	30	78		42.5
5.400	17.72	160.50	1.31	SAND to SILTY SAND	40	41	81		43.0
5.550	18.21	170.28	.42	SAND	34	34	83		43.0
5.700	18.70	172.42	.73	SAND	34	35	83		43.0
5.850	19.19	157.66	1.02	SAND to SILTY SAND	39	39	80		42.5
6.000	19.69	175.78	.32	SAND	35	35	83		43.0
6.150	20.18	207.71	.21	SAND	42	41	87		44.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 14.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-29

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	240.72	.30	SAND	48	47	91		44.0
6.450	21.16	271.11	.66	SAND	54	53	95		44.5
6.600	21.65	278.01	.34	GRAVELLY SAND to SAND	46	45	95		44.5
6.750	22.15	251.75	.58	SAND	50	48	92		44.5
6.900	22.64	228.79	1.09	SAND	46	44	89		44.0
7.050	23.13	317.59	.79	SAND	64	60	98		45.0
7.200	23.62	259.23	.68	SAND	52	49	92		44.0
7.350	24.11	242.11	.55	SAND	48	45	90		44.0
7.500	24.61	224.05	.91	SAND	45	42	88		43.5
7.650	25.10	188.21	.59	SAND	38	35	83		42.5
7.800	25.59	83.22	.98	SAND to SILTY SAND	21	19	59		38.5
7.950	26.08	97.00	.92	SAND to SILTY SAND	24	22	63		39.0
8.100	26.57	108.01	.44	SAND	22	20	66		39.5
8.250	27.07	143.17	.61	SAND	29	26	74		41.0
8.400	27.56	156.62	.96	SAND to SILTY SAND	39	35	77		41.5
8.550	28.05	179.60	1.00	SAND	36	32	80		42.0
8.700	28.54	143.34	1.01	SAND to SILTY SAND	36	32	74		41.0
8.850	29.04	123.62	.61	SAND	25	22	69		39.5
9.000	29.53	146.97	.40	SAND	29	26	74		41.0
9.150	30.02	92.41	.72	SAND to SILTY SAND	23	20	61		38.5
9.300	30.51	157.79	2.24	SILTY SAND to SANDY SILT	53	46	76		41.0
9.450	31.00	149.84	.59	SAND	30	26	74		40.5
9.600	31.50	196.17	1.66	SAND to SILTY SAND	49	42	82		42.0
9.750	31.99	395.17	.54	GRAVELLY SAND to SAND	66	56	100		45.0
9.900	32.48	338.20	.91	SAND	68	57	97		44.5
10.050	32.97	287.53	.18	GRAVELLY SAND to SAND	48	40	92		44.0
10.200	33.46	264.41	.29	GRAVELLY SAND to SAND	44	37	90		43.5
10.350	33.96	283.62	.31	GRAVELLY SAND to SAND	47	40	92		43.5
10.500	34.45	329.83	.80	SAND	66	55	96		44.0
10.650	34.94	350.26	.36	GRAVELLY SAND to SAND	58	48	97		44.5
10.800	35.43	356.13	.36	GRAVELLY SAND to SAND	59	49	98		44.5
10.950	35.93	368.55	.27	GRAVELLY SAND to SAND	61	50	99		44.5
11.100	36.42	364.11	.30	GRAVELLY SAND to SAND	61	50	98		44.5
11.250	36.91	382.15	.70	SAND	76	62	99		44.5
11.400	37.40	403.72	.53	GRAVELLY SAND to SAND	67	54	100		45.0
11.550	37.89	365.20	.42	GRAVELLY SAND to SAND	61	49	98		44.5
11.700	38.39	344.00	.56	GRAVELLY SAND to SAND	57	46	96		44.0
11.850	38.88	341.79	.73	SAND	68	55	96		44.0
12.000	39.37	384.08	1.39	SAND	77	61	99		44.5
12.150	39.86	363.84	.51	GRAVELLY SAND to SAND	61	48	97		44.0
12.300	40.35	338.13	.75	SAND	68	53	95		44.0
12.450	40.85	374.63	.68	SAND	75	59	98		44.5
12.600	41.34	295.03	.19	GRAVELLY SAND to SAND	49	38	91		43.0
12.750	41.83	213.49	.47	SAND	43	33	81		42.0
12.900	42.32	125.81	.86	SAND to SILTY SAND	31	24	66		38.5
13.050	42.81	113.68	2.07	SILTY SAND to SANDY SILT	38	29	63		38.5
13.200	43.31	83.09	3.69	CLAYEY SILT to SILTY CLAY	42	32		4.7	
13.350	43.80	198.38	3.29	SANDY SILT to CLAYEY SILT	79	61		11.5	
13.500	44.29	49.33	4.40	CLAY to SILTY CLAY	33	25		2.7	
13.650	44.78	67.01	2.11	SILTY SAND to SANDY SILT	22	17	48		36.0

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 14.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-29

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	34.82	5.45	CLAY	35	26		1.9	
13.950	45.77	124.66	1.88	SILTY SAND to SANDY SILT	42	31	65		38.5
14.100	46.26	222.14	.97	SAND	44	33	82		41.5
14.250	46.75	190.27	.79	SAND	38	28	77		40.5
14.400	47.24	83.39	3.65	CLAYEY SILT to SILTY CLAY	42	31		4.7	
14.550	47.74	36.99	5.04	CLAY	37	27		2.0	
14.700	48.23	39.86	7.50	CLAY	40	29		2.2	
14.850	48.72	93.46	4.55	*VERY STIFF FINE GRAINED	93	69			
15.000	49.21	149.88	3.46	SANDY SILT to CLAYEY SILT	60	44		8.6	
15.150	49.70	78.84	3.47	SANDY SILT to CLAYEY SILT	32	23		4.5	
15.300	50.20	39.26	6.66	CLAY	39	28		2.1	

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 14.5 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

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*                                                                    *
*                       CPT INTERPRETATIONS                          *
*                                                                    *
*  SOUNDING : CPT-30                    PROJECT No.: 00-1571-1       *
*  PROJECT  : AES/PANHANDLE             CONE/RIG : 473/BH,GO/R#3     *
*  DATE/TIME: 04-03-00 08:53                                         *
*                                                                    *
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                                                          PAGE 1 of 2

DEPTH   DEPTH      TIP     FRICTION      SOIL BEHAVIOR TYPE      N(60)   N1(60)   Dr     Su       PHI
                RESISTANCE  RATIO
 (m)     (ft)     (tsf)      (%)                                                  (%)   (tsf)  (Degrees)
-----   -----   ---------- --------   -------------------------  -----   ------   ---   -----  ---------
 .150     .49      18.16     1.79     SANDY SILT to CLAYEY SILT     7      12            1.5
 .300     .98      25.22     1.87     SANDY SILT to CLAYEY SILT    10      16            2.0
 .450    1.48      31.74     2.15     SANDY SILT to CLAYEY SILT    13      20            2.1
 .600    1.97      20.97     1.77     SANDY SILT to CLAYEY SILT     8      13            1.7
 .750    2.46      21.56     1.53     SANDY SILT to CLAYEY SILT     9      14            1.7
 .900    2.95      19.06     1.10     SANDY SILT to CLAYEY SILT     8      12            1.5
1.050    3.44      15.68     1.39     SANDY SILT to CLAYEY SILT     6      10            1.2
1.200    3.94      48.16     1.46     SILTY SAND to SANDY SILT     16      26      55               44.0
1.350    4.43      35.95     3.28     CLAYEY SILT to SILTY CLAY    18      29            2.4
1.500    4.92      31.68     3.52     CLAYEY SILT to SILTY CLAY    16      25            2.1
1.650    5.41      28.57     2.44     SANDY SILT to CLAYEY SILT    11      18            1.9
1.800    5.91      67.45     2.14     SILTY SAND to SANDY SILT     22      36      65               43.5
1.950    6.40      28.04     4.09     CLAY to SILTY CLAY           19      30            1.8
2.100    6.89      29.57     2.79     CLAYEY SILT to SILTY CLAY    15      23            1.9
2.250    7.38      26.07     4.34     CLAY to SILTY CLAY           17      26            1.5
2.400    7.87      25.47     4.41     CLAY to SILTY CLAY           17      25            1.5
2.550    8.37      30.23     4.60     CLAY to SILTY CLAY           20      28            1.7
2.700    8.86      38.07     3.16     CLAYEY SILT to SILTY CLAY    19      26            2.5
2.850    9.35      31.61     4.52     CLAY to SILTY CLAY           21      28            1.8
3.000    9.84      20.88     5.03     CLAY                         21      27            1.4
3.150   10.33      25.56     5.33     CLAY                         26      32            1.5
3.300   10.83      26.11     6.20     CLAY                         26      32            1.5
3.450   11.32      32.97     5.11     CLAY                         33      40            1.9
3.600   11.81      21.90     5.91     CLAY                         22      26            1.2
3.750   12.30      32.55     5.75     CLAY                         33      38            1.9
3.900   12.80      29.93     5.85     CLAY                         30      34            1.7
4.050   13.29      30.47     6.11     CLAY                         30      34            1.7
4.200   13.78      45.36     6.32     CLAY                         45      50            2.6
4.350   14.27      63.80     6.73     CLAY                         64      69            3.7
4.500   14.76      63.18     5.73     CLAY                         63      67            3.7
4.650   15.26     101.06     5.20    *VERY STIFF FINE GRAINED     100     100
4.800   15.75      95.33     6.17    *VERY STIFF FINE GRAINED      95      98
4.950   16.24      99.79     6.62    *VERY STIFF FINE GRAINED     100     100
5.100   16.73     111.66     5.70    *VERY STIFF FINE GRAINED     100     100
5.250   17.22     103.40     5.97    *VERY STIFF FINE GRAINED     100     100
5.400   17.72      80.41     6.63    *VERY STIFF FINE GRAINED      80      78
5.550   18.21      85.26     6.29    *VERY STIFF FINE GRAINED      85      82
5.700   18.70     102.48     6.05    *VERY STIFF FINE GRAINED     100      97
5.850   19.19     133.80     5.80    *VERY STIFF FINE GRAINED     100     100
6.000   19.69      83.05     6.56    *VERY STIFF FINE GRAINED      83      76
6.150   20.18     205.73     5.76    *VERY STIFF FINE GRAINED     100     100
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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 22.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE
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HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-30

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	439.96	4.35	*SAND to CLAYEY SAND	100	100			

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 22.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

CPT INTERPRETATIONS

SOUNDING : CPT-31A
PROJECT : RIVER PARK
DATE/TIME: 03-11-02 08:55
PROJECT No.: 02-1571-4
CONE/RIG : 471/GO-KP/R#4

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	20.01	.90	SANDY SILT to CLAYEY SILT	8	13		1.6	
.300	.98	45.42	1.06	SILTY SAND to SANDY SILT	15	24	54		49.0
.450	1.48	87.80	.85	SAND to SILTY SAND	22	35	73		
.600	1.97	48.95	1.04	SILTY SAND to SANDY SILT	16	26	56		46.5
.750	2.46	43.13	.83	SILTY SAND to SANDY SILT	14	23	52		45.5
.900	2.95	20.63	1.11	SANDY SILT to CLAYEY SILT	8	13		1.6	
1.050	3.44	35.01	1.57	SANDY SILT to CLAYEY SILT	14	22		2.8	
1.200	3.94	29.19	2.06	SANDY SILT to CLAYEY SILT	12	19		1.9	
1.350	4.43	30.85	.94	SILTY SAND to SANDY SILT	10	16	43		41.0
1.500	4.92	52.09	1.79	SILTY SAND to SANDY SILT	17	28	58		43.0
1.650	5.41	80.14	.80	SAND to SILTY SAND	20	32	70		44.5
1.800	5.91	65.03	1.52	SILTY SAND to SANDY SILT	22	35	64		43.5
1.950	6.40	74.72	1.55	SILTY SAND to SANDY SILT	25	40	68		43.5
2.100	6.89	66.58	1.64	SILTY SAND to SANDY SILT	22	35	65		42.5
2.250	7.38	60.74	1.51	SILTY SAND to SANDY SILT	20	30	62		42.0
2.400	7.87	47.04	1.47	SILTY SAND to SANDY SILT	16	23	55		40.0
2.550	8.37	116.55	2.32	SILTY SAND to SANDY SILT	39	55	81		44.5
2.700	8.86	95.01	1.13	SAND to SILTY SAND	24	33	75		43.0
2.850	9.35	149.84	2.17	SILTY SAND to SANDY SILT	50	67	87		45.0
3.000	9.84	110.56	1.49	SAND to SILTY SAND	28	36	77		43.5
3.150	10.33	115.87	1.07	SAND to SILTY SAND	29	37	78		43.5
3.300	10.83	110.98	1.33	SAND to SILTY SAND	28	34	76		43.0
3.450	11.32	80.26	1.25	SILTY SAND to SANDY SILT	27	32	66		41.0
3.600	11.81	78.97	1.29	SILTY SAND to SANDY SILT	26	31	65		40.5
3.750	12.30	87.93	1.46	SILTY SAND to SANDY SILT	29	34	68		41.5
3.900	12.80	93.54	1.46	SILTY SAND to SANDY SILT	31	36	69		41.5
4.050	13.29	96.81	1.55	SILTY SAND to SANDY SILT	32	36	69		41.5
4.200	13.78	88.53	1.38	SILTY SAND to SANDY SILT	30	32	66		40.5
4.350	14.27	97.36	2.17	SILTY SAND to SANDY SILT	32	35	68		41.0
4.500	14.76	74.85	1.55	SILTY SAND to SANDY SILT	25	27	60		39.0
4.650	15.26	94.11	2.39	SILTY SAND to SANDY SILT	31	33	66		40.0
4.800	15.75	55.77	5.11	CLAY to SILTY CLAY	37	38		3.2	
4.950	16.24	54.98	5.27	CLAY	55	56		3.2	
5.100	16.73	61.36	2.22	SANDY SILT to CLAYEY SILT	25	24		4.0	
5.250	17.22	67.71	2.38	SANDY SILT to CLAYEY SILT	27	27		4.4	
5.400	17.72	77.50	4.03	CLAYEY SILT to SILTY CLAY	39	38		4.5	
5.550	18.21	155.13	1.80	SILTY SAND to SANDY SILT	52	49	78		42.0
5.700	18.70	163.14	1.67	SAND to SILTY SAND	41	39	79		42.5
5.850	19.19	160.19	3.30	SANDY SILT to CLAYEY SILT	64	60		9.4	
6.000	19.69	147.59	2.32	SILTY SAND to SANDY SILT	49	45	76		41.5
6.150	20.18	176.14	2.02	SILTY SAND to SANDY SILT	59	53	80		42.5

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 32.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-31A

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	121.29	2.25	SILTY SAND to SANDY SILT	40	36	69		39.5
6.450	21.16	92.61	4.64	*VERY STIFF FINE GRAINED	93	82			
6.600	21.65	84.75	4.59	*VERY STIFF FINE GRAINED	85	74			
6.750	22.15	91.12	5.04	*VERY STIFF FINE GRAINED	91	79			
6.900	22.64	81.50	3.34	SANDY SILT to CLAYEY SILT	33	28		4.7	
7.050	23.13	99.21	2.68	SANDY SILT to CLAYEY SILT	40	34		5.8	
7.200	23.62	77.25	1.85	SILTY SAND to SANDY SILT	26	22	55		38.0
7.350	24.11	74.34	1.82	SILTY SAND to SANDY SILT	25	21	53		37.5
7.500	24.61	101.19	1.63	SILTY SAND to SANDY SILT	34	28	62		38.5
7.650	25.10	110.58	1.81	SILTY SAND to SANDY SILT	37	30	64		38.5
7.800	25.59	111.13	1.92	SILTY SAND to SANDY SILT	37	30	64		38.5
7.950	26.08	107.41	2.77	SANDY SILT to CLAYEY SILT	43	34		6.2	
8.100	26.57	121.14	3.62	SANDY SILT to CLAYEY SILT	48	38		7.0	
8.250	27.07	74.10	5.41	*VERY STIFF FINE GRAINED	74	58			
8.400	27.56	163.48	2.94	SILTY SAND to SANDY SILT	54	42	74		40.0
8.550	28.05	116.38	5.31	*VERY STIFF FINE GRAINED	100	90			
8.700	28.54	283.89	2.18	SAND to SILTY SAND	71	54	89		43.0
8.850	29.04	368.72	4.15	*SAND to CLAYEY SAND	100	100			

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 32.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

CPT INTERPRETATIONS

SOUNDING : CPT-32B
PROJECT : RIVER PARK
DATE/TIME: 03-11-02 11:03
PROJECT No.: 02-1571-4
CONE/RIG : 471/GO-KP/R#4

PAGE 1 of 2

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	15.25	3.74	CLAY to SILTY CLAY	10	16		1.0	
.300	.98	25.68	4.71	CLAY	26	41		1.5	
.450	1.48	47.38	2.83	SANDY SILT to CLAYEY SILT	19	30		3.2	
.600	1.97	27.32	2.89	CLAYEY SILT to SILTY CLAY	14	22		1.8	
.750	2.46	24.86	3.38	CLAYEY SILT to SILTY CLAY	12	20		1.6	
.900	2.95	31.85	3.08	CLAYEY SILT to SILTY CLAY	16	25		2.1	
1.050	3.44	37.82	3.44	CLAYEY SILT to SILTY CLAY	19	30		2.5	
1.200	3.94	42.02	2.90	SANDY SILT to CLAYEY SILT	17	27		2.8	
1.350	4.43	33.31	4.47	CLAY to SILTY CLAY	22	36		1.9	
1.500	4.92	41.43	2.82	SANDY SILT to CLAYEY SILT	17	27		2.7	
1.650	5.41	37.16	4.39	CLAY to SILTY CLAY	25	40		2.2	
1.800	5.91	93.18	2.12	SILTY SAND to SANDY SILT	31	50	74		45.0
1.950	6.40	58.76	3.30	CLAYEY SILT to SILTY CLAY	29	47		3.4	
2.100	6.89	34.71	3.08	CLAYEY SILT to SILTY CLAY	17	27		2.3	
2.250	7.38	46.04	3.87	CLAYEY SILT to SILTY CLAY	23	35		2.7	
2.400	7.87	64.46	2.23	SANDY SILT to CLAYEY SILT	26	38		4.3	
2.550	8.37	56.34	1.33	SILTY SAND to SANDY SILT	19	27	60		41.0
2.700	8.86	72.42	1.02	SAND to SILTY SAND	18	25	67		42.0
2.850	9.35	109.58	1.32	SAND to SILTY SAND	27	37	78		43.5
3.000	9.84	113.87	2.85	SANDY SILT to CLAYEY SILT	46	59		6.7	
3.150	10.33	89.48	2.12	SILTY SAND to SANDY SILT	30	38	71		42.0
3.300	10.83	105.67	2.73	SANDY SILT to CLAYEY SILT	42	52		6.2	
3.450	11.32	82.49	1.22	SAND to SILTY SAND	21	25	67		41.5
3.600	11.81	70.36	.74	SAND to SILTY SAND	18	21	62		40.0
3.750	12.30	85.23	1.82	SILTY SAND to SANDY SILT	28	33	67		41.0
3.900	12.80	57.21	1.01	SILTY SAND to SANDY SILT	19	22	55		38.5
4.050	13.29	56.28	1.01	SILTY SAND to SANDY SILT	19	21	54		38.5
4.200	13.78	53.56	1.81	SILTY SAND to SANDY SILT	18	20	52		38.0
4.350	14.27	43.11	.70	SILTY SAND to SANDY SILT	14	16	45		37.5
4.500	14.76	56.62	.81	SILTY SAND to SANDY SILT	19	20	52		38.0
4.650	15.26	56.45	1.36	SILTY SAND to SANDY SILT	19	20	52		38.0
4.800	15.75	75.14	.87	SAND to SILTY SAND	19	19	60		39.0
4.950	16.24	76.06	1.05	SAND to SILTY SAND	19	19	59		39.0
5.100	16.73	64.18	1.06	SILTY SAND to SANDY SILT	21	21	54		38.0
5.250	17.22	60.42	.74	SAND to SILTY SAND	15	15	52		38.0
5.400	17.72	70.58	.95	SAND to SILTY SAND	18	17	56		38.5
5.550	18.21	83.83	1.09	SAND to SILTY SAND	21	20	61		39.0
5.700	18.70	96.39	1.67	SILTY SAND to SANDY SILT	32	30	64		39.0
5.850	19.19	128.47	.77	SAND to SILTY SAND	32	30	72		40.5
6.000	19.69	183.26	1.07	SAND	37	34	82		42.5
6.150	20.18	240.30	2.32	SILTY SAND to SANDY SILT	80	73	89		43.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 32.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-32B

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	115.34	2.05	SILTY SAND to SANDY SILT	38	35	68		39.5
6.450	21.16	72.95	1.25	SILTY SAND to SANDY SILT	24	22	55		38.0
6.600	21.65	62.14	.89	SAND to SILTY SAND	16	14	50		37.0
6.750	22.15	77.46	1.25	SILTY SAND to SANDY SILT	26	22	56		38.0
6.900	22.64	109.09	.78	SAND to SILTY SAND	27	23	65		39.0
7.050	23.13	74.27	.81	SAND to SILTY SAND	19	16	54		37.5
7.200	23.62	55.92	1.34	SILTY SAND to SANDY SILT	19	16	45		36.5
7.350	24.11	44.61	3.65	CLAYEY SILT to SILTY CLAY	22	19		2.5	
7.500	24.61	263.24	.76	SAND	53	43	89		43.0
7.650	25.10	153.41	1.12	SAND to SILTY SAND	38	31	73		40.0
7.800	25.59	103.46	.88	SAND to SILTY SAND	26	21	62		38.5
7.950	26.08	86.59	.64	SAND to SILTY SAND	22	17	56		38.0
8.100	26.57	65.31	1.07	SILTY SAND to SANDY SILT	22	17	48		36.5
8.250	27.07	74.38	1.20	SILTY SAND to SANDY SILT	25	19	52		37.0
8.400	27.56	160.78	2.66	SILTY SAND to SANDY SILT	54	42	73		39.5
8.550	28.05	73.17	.90	SAND to SILTY SAND	18	14	51		36.5
8.700	28.54	91.76	2.92	SANDY SILT to CLAYEY SILT	37	28		5.3	
8.850	29.04	130.08	.65	SAND	26	20	67		38.5
9.000	29.53	57.55	.76	SAND to SILTY SAND	14	11	43		35.0
9.150	30.02	79.46	1.25	SILTY SAND to SANDY SILT	26	20	52		37.0
9.300	30.51	107.65	.42	SAND	22	16	60		38.0
9.450	31.00	109.30	2.53	SILTY SAND to SANDY SILT	36	27	61		38.0
9.600	31.50	149.16	1.08	SAND to SILTY SAND	37	27	69		39.0

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 32.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

CPT INTERPRETATIONS

SOUNDING : CPT-33
PROJECT : RIVER PARK
DATE/TIME: 03-11-02 13:45
PROJECT No.: 02-1571-4
CONE/RIG : 471/GO-KP/R#4

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	.32	3.13	ORGANIC MATERIAL	0	1		.0	
.300	.98	29.15	.03	SILTY SAND to SANDY SILT	10	16	41		47.5
.450	1.48	36.60	.55	SILTY SAND to SANDY SILT	12	20	48		46.5
.600	1.97	27.68	1.23	SANDY SILT to CLAYEY SILT	11	18		2.2	
.750	2.46	29.45	1.22	SILTY SAND to SANDY SILT	10	16	41		43.5
.900	2.95	36.46	1.81	SANDY SILT to CLAYEY SILT	15	23		2.9	
1.050	3.44	44.47	1.57	SILTY SAND to SANDY SILT	15	24	53		44.0
1.200	3.94	36.84	1.06	SILTY SAND to SANDY SILT	12	20	48		42.5
1.350	4.43	27.77	1.33	SANDY SILT to CLAYEY SILT	11	18		2.2	
1.500	4.92	25.52	1.06	SANDY SILT to CLAYEY SILT	10	16		2.0	
1.650	5.41	38.58	1.22	SILTY SAND to SANDY SILT	13	21	49		41.0
1.800	5.91	46.74	2.14	SANDY SILT to CLAYEY SILT	19	30		3.1	
1.950	6.40	90.04	1.61	SILTY SAND to SANDY SILT	30	48	73		44.5
2.100	6.89	98.32	1.27	SAND to SILTY SAND	25	38	76		44.5
2.250	7.38	98.15	1.55	SILTY SAND to SANDY SILT	33	49	76		44.0
2.400	7.87	64.92	1.20	SILTY SAND to SANDY SILT	22	31	64		42.0
2.550	8.37	57.96	.72	SAND to SILTY SAND	14	20	61		41.0
2.700	8.86	54.17	.76	SILTY SAND to SANDY SILT	18	25	58		40.0
2.850	9.35	50.88	1.12	SILTY SAND to SANDY SILT	17	23	56		39.5
3.000	9.84	52.47	1.20	SILTY SAND to SANDY SILT	17	23	56		39.5
3.150	10.33	65.37	2.33	SANDY SILT to CLAYEY SILT	26	33		4.3	
3.300	10.83	44.21	1.95	SANDY SILT to CLAYEY SILT	18	22		2.9	
3.450	11.32	70.15	1.21	SILTY SAND to SANDY SILT	23	28	62		40.0
3.600	11.81	148.86	1.49	SAND to SILTY SAND	37	44	83		44.0
3.750	12.30	130.10	1.11	SAND to SILTY SAND	33	38	79		43.0
3.900	12.80	106.10	1.09	SAND to SILTY SAND	27	30	72		42.0
4.050	13.29	81.24	1.48	SILTY SAND to SANDY SILT	27	30	64		40.0
4.200	13.78	68.90	1.39	SILTY SAND to SANDY SILT	23	25	59		39.0
4.350	14.27	58.61	1.84	SILTY SAND to SANDY SILT	20	21	54		38.5
4.500	14.76	59.42	2.29	SANDY SILT to CLAYEY SILT	24	25		3.9	
4.650	15.26	50.52	2.57	SANDY SILT to CLAYEY SILT	20	21		3.3	
4.800	15.75	44.49	2.58	SANDY SILT to CLAYEY SILT	18	18		2.9	
4.950	16.24	43.66	2.59	SANDY SILT to CLAYEY SILT	17	18		2.8	
5.100	16.73	47.25	2.75	SANDY SILT to CLAYEY SILT	19	19		3.1	
5.250	17.22	31.31	5.49	CLAY	31	31		1.8	
5.400	17.72	51.82	2.72	SANDY SILT to CLAYEY SILT	21	20		3.4	
5.550	18.21	48.88	2.66	SANDY SILT to CLAYEY SILT	20	19		3.2	
5.700	18.70	50.73	2.76	SANDY SILT to CLAYEY SILT	20	19		3.3	
5.850	19.19	52.41	2.86	SANDY SILT to CLAYEY SILT	21	20		3.4	
6.000	19.69	63.80	2.52	SANDY SILT to CLAYEY SILT	26	23		4.2	
6.150	20.18	81.30	1.28	SILTY SAND to SANDY SILT	27	25	58		38.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 34.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-33

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	46.89	4.05	CLAYEY SILT to SILTY CLAY	23	21		2.7	
6.450	21.16	54.58	3.76	CLAYEY SILT to SILTY CLAY	27	24		3.1	
6.600	21.65	83.81	2.53	SANDY SILT to CLAYEY SILT	34	29		5.5	
6.750	22.15	93.48	2.48	SILTY SAND to SANDY SILT	31	27	61		38.5
6.900	22.64	87.02	2.21	SILTY SAND to SANDY SILT	29	25	59		38.0
7.050	23.13	75.87	2.62	SANDY SILT to CLAYEY SILT	30	26		5.0	
7.200	23.62	66.54	3.05	SANDY SILT to CLAYEY SILT	27	22		3.8	
7.350	24.11	75.42	2.03	SILTY SAND to SANDY SILT	25	21	54		37.5
7.500	24.61	79.22	2.59	SANDY SILT to CLAYEY SILT	32	26		5.2	
7.650	25.10	130.63	1.34	SAND to SILTY SAND	33	27	69		39.0
7.800	25.59	134.08	1.07	SAND to SILTY SAND	34	27	69		39.5
7.950	26.08	66.11	2.86	SANDY SILT to CLAYEY SILT	26	21		4.3	
8.100	26.57	34.65	5.02	CLAY	35	27		1.9	
8.250	27.07	31.06	5.02	CLAY	31	24		1.7	
8.400	27.56	58.19	3.44	CLAYEY SILT to SILTY CLAY	29	23		3.3	
8.550	28.05	277.52	1.17	SAND	56	43	89		43.0
8.700	28.54	134.52	1.43	SAND to SILTY SAND	34	26	68		39.0
8.850	29.04	77.71	2.03	SILTY SAND to SANDY SILT	26	20	52		37.0
9.000	29.53	107.27	2.07	SILTY SAND to SANDY SILT	36	27	61		38.0
9.150	30.02	60.25	4.25	CLAYEY SILT to SILTY CLAY	30	22		3.4	
9.300	30.51	126.73	1.36	SAND to SILTY SAND	32	23	65		38.5
9.450	31.00	74.40	3.40	SANDY SILT to CLAYEY SILT	30	22		4.3	
9.600	31.50	44.06	1.88	SANDY SILT to CLAYEY SILT	18	13		2.8	
9.750	31.99	39.45	4.03	CLAYEY SILT to SILTY CLAY	20	14		2.2	
9.900	32.48	50.07	3.40	CLAYEY SILT to SILTY CLAY	25	18		2.8	
10.050	32.97	69.28	1.34	SILTY SAND to SANDY SILT	23	16	47		36.0
10.200	33.46	99.85	2.03	SILTY SAND to SANDY SILT	33	23	57		37.5
10.350	33.96	111.26	1.63	SILTY SAND to SANDY SILT	37	26	60		38.0
10.500	34.45	128.38	1.50	SAND to SILTY SAND	32	22	64		38.0
10.650	34.94	96.66	1.50	SILTY SAND to SANDY SILT	32	22	56		37.0
10.800	35.43	85.85	1.82	SILTY SAND to SANDY SILT	29	20	52		36.5
10.950	35.93	104.72	1.86	SILTY SAND to SANDY SILT	35	24	58		37.5
11.100	36.42	140.22	1.47	SAND to SILTY SAND	35	24	66		38.5
11.250	36.91	167.43	1.18	SAND to SILTY SAND	42	29	71		39.0
11.400	37.40	171.32	1.73	SAND to SILTY SAND	43	29	72		39.0
11.550	37.89	144.89	1.07	SAND to SILTY SAND	36	25	67		38.5
11.700	38.39	156.66	1.40	SAND to SILTY SAND	39	27	69		38.5
11.850	38.88	169.75	1.18	SAND to SILTY SAND	42	29	71		39.0
12.000	39.37	148.71	1.38	SAND to SILTY SAND	37	25	67		38.5
12.150	39.86	191.69	1.39	SAND to SILTY SAND	48	32	74		39.0
12.300	40.35	119.01	1.81	SILTY SAND to SANDY SILT	40	27	61		37.5
12.450	40.85	131.14	1.30	SAND to SILTY SAND	33	22	63		38.0
12.600	41.34	93.50	2.87	SANDY SILT to CLAYEY SILT	37	25		5.4	
12.750	41.83	79.35	3.96	CLAYEY SILT to SILTY CLAY	40	26		4.5	
12.900	42.32	192.50	*****		0	0			39.5

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 34.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

CPT INTERPRETATIONS

SOUNDING : CPT-34A
PROJECT : RIVER PARK
DATE/TIME: 03-11-02 12:39

PROJECT No.: 02-1571-4
CONE/RIG : 471/GO-KP/R#4

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	13.55	-.07		0	0			
.300	.98	28.17	.04	SILTY SAND to SANDY SILT	9	15	40		47.0
.450	1.48	42.32	.02	SAND to SILTY SAND	11	17	52		47.0
.600	1.97	36.63	.16	SILTY SAND to SANDY SILT	12	20	48		45.5
.750	2.46	22.09	.23	SILTY SAND to SANDY SILT	7	12	33		42.5
.900	2.95	37.39	.94	SILTY SAND to SANDY SILT	12	20	48		44.0
1.050	3.44	46.57	.77	SILTY SAND to SANDY SILT	16	25	54		44.0
1.200	3.94	68.54	.54	SAND to SILTY SAND	17	27	66		45.5
1.350	4.43	77.18	.91	SAND to SILTY SAND	19	31	69		45.5
1.500	4.92	84.04	1.23	SAND to SILTY SAND	21	34	71		45.0
1.650	5.41	96.05	1.74	SILTY SAND to SANDY SILT	32	51	75		45.5
1.800	5.91	95.01	1.43	SILTY SAND to SANDY SILT	32	51	75		45.0
1.950	6.40	107.50	2.47	SILTY SAND to SANDY SILT	36	57	78		45.0
2.100	6.89	81.50	2.05	SILTY SAND to SANDY SILT	27	42	70		43.5
2.250	7.38	89.46	1.89	SILTY SAND to SANDY SILT	30	45	73		44.0
2.400	7.87	106.33	1.34	SAND to SILTY SAND	27	39	78		44.0
2.550	8.37	119.14	1.23	SAND to SILTY SAND	30	42	81		44.5
2.700	8.86	120.22	1.47	SAND to SILTY SAND	30	41	81		44.0
2.850	9.35	114.40	1.42	SAND to SILTY SAND	29	38	79		44.0
3.000	9.84	117.70	1.37	SAND to SILTY SAND	29	38	79		43.5
3.150	10.33	108.43	1.28	SAND to SILTY SAND	27	34	76		43.0
3.300	10.83	127.30	.95	SAND to SILTY SAND	32	39	80		43.5
3.450	11.32	136.86	1.29	SAND to SILTY SAND	34	42	82		44.0
3.600	11.81	156.87	1.26	SAND to SILTY SAND	39	47	85		44.0
3.750	12.30	141.41	1.65	SAND to SILTY SAND	35	41	81		43.5
3.900	12.80	144.78	1.69	SAND to SILTY SAND	36	41	81		43.5
4.050	13.29	172.61	1.32	SAND to SILTY SAND	43	48	86		44.0
4.200	13.78	181.22	1.07	SAND	36	40	87		44.0
4.350	14.27	159.59	1.82	SILTY SAND to SANDY SILT	53	57	83		43.5
4.500	14.76	208.60	1.11	SAND	42	44	90		44.5
4.650	15.26	211.79	1.12	SAND	42	44	90		44.5
4.800	15.75	249.88	1.44	SAND to SILTY SAND	62	64	94		45.0
4.950	16.24	234.12	1.06	SAND	47	47	92		44.5
5.100	16.73	208.16	1.04	SAND	42	42	88		44.0
5.250	17.22	205.44	1.25	SAND to SILTY SAND	51	51	87		43.5
5.400	17.72	245.63	1.18	SAND	49	48	92		44.5
5.550	18.21	238.30	1.38	SAND to SILTY SAND	60	57	91		44.0
5.700	18.70	194.50	.94	SAND	39	37	84		43.0
5.850	19.19	238.77	1.11	SAND	48	45	90		44.0
6.000	19.69	206.67	1.78	SAND to SILTY SAND	52	48	85		43.0
6.150	20.18	216.53	1.79	SAND to SILTY SAND	54	49	86		43.0

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 34.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-34A

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	287.00	1.57	SAND to SILTY SAND	72	64	94		44.5
6.450	21.16	156.85	1.80	SILTY SAND to SANDY SILT	52	46	76		41.5
6.600	21.65	168.20	1.61	SAND to SILTY SAND	42	37	78		42.0
6.750	22.15	220.63	1.47	SAND to SILTY SAND	55	48	86		43.0
6.900	22.64	275.84	1.33	SAND	55	47	92		44.0
7.050	23.13	321.54	1.83	SAND to SILTY SAND	80	68	96		44.5
7.200	23.62	245.10	1.22	SAND	49	41	88		43.0
7.350	24.11	320.48	1.56	SAND to SILTY SAND	80	67	95		44.0
7.500	24.61	283.51	.95	SAND	57	47	91		43.5
7.650	25.10	147.50	1.58	SAND to SILTY SAND	37	30	72		39.5
7.800	25.59	196.73	1.18	SAND to SILTY SAND	49	40	80		42.0
7.950	26.08	240.75	1.25	SAND	48	38	86		42.5
8.100	26.57	235.22	1.93	SAND to SILTY SAND	59	47	85		42.5
8.250	27.07	247.99	1.16	SAND	50	39	86		42.5
8.400	27.56	231.23	1.31	SAND to SILTY SAND	58	45	84		42.0
8.550	28.05	252.69	1.24	SAND	51	39	86		42.5
8.700	28.54	308.11	.99	SAND	62	47	92		43.0
8.850	29.04	295.24	1.19	SAND	59	45	90		43.0
9.000	29.53	327.13	1.13	SAND	65	49	93		43.5
9.150	30.02	361.74	1.26	SAND	72	54	95		44.0
9.300	30.51	245.02	1.04	SAND	49	36	84		42.0
9.450	31.00	316.10	1.02	SAND	63	46	91		43.0
9.600	31.50	313.38	1.25	SAND	63	46	91		43.0
9.750	31.99	377.07	1.29	SAND	75	54	96		43.5
9.900	32.48	398.09	1.32	SAND	80	57	97		44.0
10.050	32.97	368.26	1.29	SAND	74	52	95		43.5
10.200	33.46	315.53	1.14	SAND	63	45	90		42.5
10.350	33.96	312.64	1.46	SAND to SILTY SAND	78	55	89		42.5
10.500	34.45	408.64	1.48	SAND	82	57	97		43.5
10.650	34.94	232.55	.75	SAND	47	32	81		41.0
10.800	35.43	116.46	1.58	SILTY SAND to SANDY SILT	39	27	61		38.0
10.950	35.93	78.20	1.14	SAND to SILTY SAND	20	14	49		36.0
11.100	36.42	79.16	1.69	SILTY SAND to SANDY SILT	26	18	50		36.0
11.250	36.91	124.43	1.46	SAND to SILTY SAND	31	21	62		38.0
11.400	37.40	96.03	1.55	SILTY SAND to SANDY SILT	32	22	55		37.0
11.550	37.89	78.22	1.69	SILTY SAND to SANDY SILT	26	18	49		36.0
11.700	38.39	94.73	1.77	SILTY SAND to SANDY SILT	32	21	54		36.5
11.850	38.88	76.52	1.75	SILTY SAND to SANDY SILT	26	17	48		36.0
12.000	39.37	73.23	2.09	SILTY SAND to SANDY SILT	24	16	47		35.5
12.150	39.86	105.50	2.18	SILTY SAND to SANDY SILT	35	24	57		37.0
12.300	40.35	152.41	1.25	SAND to SILTY SAND	38	26	68		38.5
12.450	40.85	151.54	1.68	SAND to SILTY SAND	38	25	67		38.5
12.600	41.34	95.41	1.40	SILTY SAND to SANDY SILT	32	21	54		36.5
12.750	41.83	98.98	2.51	SILTY SAND to SANDY SILT	33	22	55		36.5
12.900	42.32	202.42	1.19	SAND to SILTY SAND	51	34	75		39.5
13.050	42.81	190.88	1.39	SAND to SILTY SAND	48	32	74		39.0
13.200	43.31	103.21	1.98	SILTY SAND to SANDY SILT	34	23	56		37.0
13.350	43.80	142.66	1.44	SAND to SILTY SAND	36	23	65		38.0
13.500	44.29	122.24	1.46	SAND to SILTY SAND	31	20	61		37.5
13.650	44.78	97.81	2.03	SILTY SAND to SANDY SILT	33	21	54		36.5

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 34.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-34A

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	138.79	1.51	SAND to SILTY SAND	35	23	64		38.0
13.950	45.77	113.77	1.38	SAND to SILTY SAND	28	18	58		37.0
14.100	46.26	77.93	2.18	SILTY SAND to SANDY SILT	26	17	47		35.5
14.250	46.75	72.38	3.79	CLAYEY SILT to SILTY CLAY	36	23		4.1	
14.400	47.24	150.07	1.81	SILTY SAND to SANDY SILT	50	32	66		38.0
14.550	47.74	174.06	1.73	SAND to SILTY SAND	44	28	70		38.5
14.700	48.23	149.56	2.61	SILTY SAND to SANDY SILT	50	32	66		38.0
14.850	48.72	312.53	1.14	SAND	63	40	87		42.0
15.000	49.21	310.79	1.48	SAND to SILTY SAND	78	49	86		41.5
15.150	49.70	297.77	*****		0	0			.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 34.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

CPT INTERPRETATIONS

SOUNDING : CPT-35A
PROJECT : RIVER PARK
DATE/TIME: 03-11-02 15:29

PROJECT No.: 02-1571-4
CONE/RIG : 471/GO-KP/R#4

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	21.78	1.93	SANDY SILT to CLAYEY SILT	9	14		1.7	
.300	.98	21.78	1.97	SANDY SILT to CLAYEY SILT	9	14		1.7	
.450	1.48	19.31	1.61	SANDY SILT to CLAYEY SILT	8	12		1.5	
.600	1.97	54.98	.33	SAND to SILTY SAND	14	22	59		47.0
.750	2.46	100.83	1.62	SILTY SAND to SANDY SILT	34	54	77		48.5
.900	2.95	48.03	1.10	SILTY SAND to SANDY SILT	16	26	55		45.0
1.050	3.44	33.65	1.31	SILTY SAND to SANDY SILT	11	18	45		42.5
1.200	3.94	41.89	1.31	SILTY SAND to SANDY SILT	14	22	51		43.0
1.350	4.43	79.18	1.78	SILTY SAND to SANDY SILT	26	42	70		45.5
1.500	4.92	101.19	1.32	SAND to SILTY SAND	25	40	77		46.0
1.650	5.41	95.13	.62	SAND to SILTY SAND	24	38	75		45.5
1.800	5.91	111.49	.90	SAND to SILTY SAND	28	45	79		45.5
1.950	6.40	99.62	1.25	SAND to SILTY SAND	25	40	76		44.5
2.100	6.89	81.54	1.25	SILTY SAND to SANDY SILT	27	42	70		43.5
2.250	7.38	85.55	.88	SAND to SILTY SAND	21	32	72		43.5
2.400	7.87	103.93	1.50	SILTY SAND to SANDY SILT	35	50	77		44.0
2.550	8.37	118.21	1.07	SAND to SILTY SAND	30	42	81		44.5
2.700	8.86	76.23	.72	SAND to SILTY SAND	19	26	68		42.0
2.850	9.35	85.72	1.61	SILTY SAND to SANDY SILT	29	38	71		42.5
3.000	9.84	69.22	.95	SAND to SILTY SAND	17	23	64		41.0
3.150	10.33	97.34	.38	SAND to SILTY SAND	24	31	73		42.5
3.300	10.83	92.95	1.44	SILTY SAND to SANDY SILT	31	38	71		42.0
3.450	11.32	92.92	1.28	SAND to SILTY SAND	23	28	70		42.0
3.600	11.81	95.92	1.63	SILTY SAND to SANDY SILT	32	38	71		42.0
3.750	12.30	92.46	1.02	SAND to SILTY SAND	23	27	69		41.5
3.900	12.80	166.30	2.72	SILTY SAND to SANDY SILT	55	63	85		44.0
4.050	13.29	120.86	1.16	SAND to SILTY SAND	30	34	76		42.5
4.200	13.78	133.14	1.37	SAND to SILTY SAND	33	37	78		42.5
4.350	14.27	134.76	1.28	SAND to SILTY SAND	34	36	78		42.5
4.500	14.76	135.58	1.56	SAND to SILTY SAND	34	36	77		42.5
4.650	15.26	147.27	1.53	SAND to SILTY SAND	37	38	79		42.5
4.800	15.75	129.53	1.37	SAND to SILTY SAND	32	33	75		42.0
4.950	16.24	187.04	1.19	SAND to SILTY SAND	47	47	85		43.5
5.100	16.73	218.74	1.03	SAND	44	44	89		44.0
5.250	17.22	141.79	1.82	SILTY SAND to SANDY SILT	47	46	77		42.0
5.400	17.72	158.44	1.59	SAND to SILTY SAND	40	38	79		42.5
5.550	18.21	155.34	1.13	SAND to SILTY SAND	39	37	78		42.0
5.700	18.70	159.46	1.14	SAND to SILTY SAND	40	38	79		42.0
5.850	19.19	176.78	1.02	SAND	35	33	81		42.5
6.000	19.69	170.64	1.22	SAND to SILTY SAND	43	39	80		42.0
6.150	20.18	161.29	1.05	SAND to SILTY SAND	40	37	78		42.0

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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 55.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

SOUNDING : CPT-35A

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	143.47	1.32	SAND to SILTY SAND	36	32	74		41.0
6.450	21.16	130.44	2.32	SILTY SAND to SANDY SILT	43	39	71		40.0
6.600	21.65	143.81	1.28	SAND to SILTY SAND	36	32	74		40.5
6.750	22.15	173.23	1.06	SAND to SILTY SAND	43	38	79		42.0
6.900	22.64	226.45	1.57	SAND to SILTY SAND	57	49	86		43.0
7.050	23.13	243.34	1.10	SAND	49	41	88		43.0
7.200	23.62	210.68	.54	SAND	42	35	83		42.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 55.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

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*                     CPT INTERPRETATIONS                        *
*                                                                 *
*  SOUNDING : CPT-36                  PROJECT No.: 02-1571-4      *
*  PROJECT  : RIVER PARK              CONE/RIG : 471/GO-KP/R#4    *
*  DATE/TIME: 03-12-02 11:26                                      *
*                                                                 *
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                                                        PAGE 1 of 2

DEPTH   DEPTH     TIP    FRICTION     SOIL BEHAVIOR TYPE      N(60)  N1(60)   Dr    Su      PHI
                RESISTANCE RATIO
 (m)    (ft)     (tsf)     (%)                                               (%)  (tsf)  (Degrees)
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 .150     .49      7.33      .82   SENSITIVE FINE GRAINED         4      6              .7
 .300     .98     28.09      .99   SILTY SAND to SANDY SILT       9     15     40            47.0
 .450    1.48     54.41     1.02   SILTY SAND to SANDY SILT      18     29     59            48.0
 .600    1.97     49.84      .79   SILTY SAND to SANDY SILT      17     27     56            46.5
 .750    2.46     66.96     1.94   SILTY SAND to SANDY SILT      22     36     65            47.0
 .900    2.95     76.84     1.51   SILTY SAND to SANDY SILT      26     41     69            46.5
1.050    3.44    123.50      .68   SAND                          25     40     82            48.0
1.200    3.94    116.80      .99   SAND to SILTY SAND            29     47     81            47.5
1.350    4.43    113.13     1.90   SILTY SAND to SANDY SILT      38     60     80            46.5
1.500    4.92    109.22      .68   SAND to SILTY SAND            27     44     79            46.0
1.650    5.41    101.95      .73   SAND to SILTY SAND            25     41     77            45.5
1.800    5.91    130.61      .87   SAND to SILTY SAND            33     52     84            46.0
1.950    6.40    187.34     2.66   SILTY SAND to SANDY SILT      62    100     94            47.0
2.100    6.89    289.80     1.84   SAND to SILTY SAND            72    100    100            48.5
2.250    7.38    209.11     1.37   SAND to SILTY SAND            52     79     97            47.0
2.400    7.87    159.40     1.80   SAND to SILTY SAND            40     58     90            46.0
2.550    8.37    168.43      .80   SAND                          34     48     91            46.0
2.700    8.86    138.88      .97   SAND to SILTY SAND            35     48     85            45.0
2.850    9.35    147.29      .85   SAND                          29     39     86            45.0
3.000    9.84    154.87      .90   SAND                          31     40     87            45.0
3.150   10.33    227.91      .95   SAND                          46     58     97            46.0
3.300   10.83    190.50      .94   SAND                          38     47     92            45.5
3.450   11.32    261.35      .59   SAND                          52     63    100            46.5
3.600   11.81    264.90      .76   SAND                          53     63    100            46.0
3.750   12.30    196.77      .84   SAND                          39     46     91            45.0
3.900   12.80    160.76      .87   SAND                          32     37     84            44.0
4.050   13.29    132.06     1.03   SAND to SILTY SAND            33     37     78            43.0
4.200   13.78    222.09     1.31   SAND to SILTY SAND            56     61     93            45.0
4.350   14.27    233.48     1.09   SAND                          47     50     93            45.0
4.500   14.76    272.80     1.01   SAND                          55     58     97            45.5
4.650   15.26    298.96      .95   SAND                          60     62    100            46.0
4.800   15.75    210.47     1.91   SAND to SILTY SAND            53     54     89            44.0
4.950   16.24    219.23     2.09   SILTY SAND to SANDY SILT      73     74     90            44.0
5.100   16.73    211.64     2.49   SILTY SAND to SANDY SILT      71     70     88            44.0
5.250   17.22    176.86     1.94   SILTY SAND to SANDY SILT      59     58     83            43.0
5.400   17.72    149.67     1.41   SAND to SILTY SAND            37     36     78            42.0
5.550   18.21    153.43     2.66   SILTY SAND to SANDY SILT      51     49     78            42.0
5.700   18.70    119.27     2.88   SANDY SILT to CLAYEY SILT     48     45           6.9
5.850   19.19    142.06     2.04   SILTY SAND to SANDY SILT      47     44     75            41.5
6.000   19.69    173.17     1.87   SAND to SILTY SAND            43     40     80            42.5
6.150   20.18    250.82     1.22   SAND                          50     46     91            44.0
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*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 36.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE
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HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-36

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	250.56	1.07	SAND	50	45	90		44.0
6.450	21.16	257.40	1.13	SAND	51	46	91		44.0
6.600	21.65	193.75	1.23	SAND to SILTY SAND	48	42	82		42.5
6.750	22.15	172.51	1.28	SAND to SILTY SAND	43	37	79		42.0
6.900	22.64	156.98	1.02	SAND to SILTY SAND	39	34	76		41.0
7.050	23.13	122.03	1.74	SILTY SAND to SANDY SILT	41	35	68		39.5
7.200	23.62	147.61	2.30	SILTY SAND to SANDY SILT	49	41	73		40.0
7.350	24.11	219.63	2.23	SILTY SAND to SANDY SILT	73	61	84		42.5

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 36.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

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CPT INTERPRETATIONS

SOUNDING : CPT-37
PROJECT : RIVER PARK
DATE/TIME: 03-12-02 12:45

PROJECT No.: 02-1571-4
CONE/RIG : 471/GO-KP/R#4

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PAGE 1 of 2

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	11.71	.77	SANDY SILT to CLAYEY SILT	5	7		1.2	
.300	.98	62.46	1.10	SILTY SAND to SANDY SILT	21	33	63		
.450	1.48	97.36	1.11	SAND to SILTY SAND	24	39	76		
.600	1.97	109.26	1.29	SAND to SILTY SAND	27	44	79		
.750	2.46	88.82	1.54	SILTY SAND to SANDY SILT	30	47	73		48.0
.900	2.95	90.57	1.55	SILTY SAND to SANDY SILT	30	48	73		47.5
1.050	3.44	96.24	1.47	SILTY SAND to SANDY SILT	32	51	75		47.0
1.200	3.94	113.55	2.15	SILTY SAND to SANDY SILT	38	61	80		47.0
1.350	4.43	177.20	2.84	SILTY SAND to SANDY SILT	59	94	93		48.5
1.500	4.92	155.98	1.02	SAND to SILTY SAND	39	62	89		47.5
1.650	5.41	165.37	1.83	SAND to SILTY SAND	41	66	91		47.5
1.800	5.91	154.83	1.49	SAND to SILTY SAND	39	62	89		47.0
1.950	6.40	164.56	2.85	SILTY SAND to SANDY SILT	55	88	91		46.5
2.100	6.89	156.19	1.04	SAND to SILTY SAND	39	61	89		46.5
2.250	7.38	170.11	.71	SAND	34	51	92		46.5
2.400	7.87	214.04	.95	SAND	43	62	98		47.0
2.550	8.37	183.26	.91	SAND	37	52	94		46.0
2.700	8.86	149.33	.74	SAND	30	41	88		45.0
2.850	9.35	130.59	.69	SAND	26	35	83		44.5
3.000	9.84	114.96	.77	SAND to SILTY SAND	29	37	79		43.5
3.150	10.33	121.58	2.17	SILTY SAND to SANDY SILT	41	51	79		43.5
3.300	10.83	143.74	1.79	SILTY SAND to SANDY SILT	48	59	84		44.0
3.450	11.32	146.42	1.50	SAND to SILTY SAND	37	44	83		44.0
3.600	11.81	245.08	.55	SAND	49	58	98		46.0
3.750	12.30	313.59	.87	SAND	63	73	100		46.5
3.900	12.80	145.55	1.68	SAND to SILTY SAND	36	42	82		43.5
4.050	13.29	135.41	1.45	SAND to SILTY SAND	34	38	79		43.0
4.200	13.78	139.79	.63	SAND	28	31	79		43.0
4.350	14.27	139.75	1.17	SAND to SILTY SAND	35	38	79		43.0
4.500	14.76	151.39	1.06	SAND to SILTY SAND	38	40	81		43.0
4.650	15.26	289.55	2.21	SILTY SAND to SANDY SILT	97	100	99		45.5
4.800	15.75	253.30	1.11	SAND	51	52	94		45.0
4.950	16.24	241.30	.78	SAND	48	49	93		44.5
5.100	16.73	258.25	2.74	SILTY SAND to SANDY SILT	86	86	94		44.5
5.250	17.22	205.82	1.19	SAND to SILTY SAND	51	51	87		43.5
5.400	17.72	223.64	1.12	SAND	45	43	89		44.0
5.550	18.21	166.33	1.34	SAND to SILTY SAND	42	40	80		42.5
5.700	18.70	150.77	1.61	SAND to SILTY SAND	38	36	77		42.0
5.850	19.19	143.23	2.28	SILTY SAND to SANDY SILT	48	44	75		41.5
6.000	19.69	106.71	2.45	SILTY SAND to SANDY SILT	36	33	66		39.5
6.150	20.18	119.78	1.91	SILTY SAND to SANDY SILT	40	36	69		40.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 37.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-37

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	196.20	2.56	SILTY SAND to SANDY SILT	65	59	83		42.5
6.450	21.16	201.34	1.64	SAND to SILTY SAND	50	45	84		42.5
6.600	21.65	177.20	1.27	SAND to SILTY SAND	44	39	80		42.0
6.750	22.15	152.96	1.24	SAND to SILTY SAND	38	33	75		41.0
6.900	22.64	188.53	1.47	SAND to SILTY SAND	47	40	81		42.0
7.050	23.13	181.92	1.30	SAND to SILTY SAND	45	39	79		42.0
7.200	23.62	187.83	1.28	SAND to SILTY SAND	47	39	80		42.0
7.350	24.11	202.23	1.27	SAND to SILTY SAND	51	42	82		42.0
7.500	24.61	179.35	1.05	SAND	36	30	78		41.5
7.650	25.10	96.56	1.47	SILTY SAND to SANDY SILT	32	26	60		38.0
7.800	25.59	64.75	2.30	SANDY SILT to CLAYEY SILT	26	21		4.2	
7.950	26.08	87.57	1.35	SILTY SAND to SANDY SILT	29	23	57		38.0
8.100	26.57	99.68	1.62	SILTY SAND to SANDY SILT	33	26	60		38.0
8.250	27.07	94.14	1.33	SAND to SILTY SAND	24	18	58		38.0
8.400	27.56	143.61	1.81	SILTY SAND to SANDY SILT	48	37	70		39.0
8.550	28.05	95.64	1.40	SILTY SAND to SANDY SILT	32	25	58		38.0
8.700	28.54	196.30	1.15	SAND	39	30	79		41.0
8.850	29.04	284.02	1.14	SAND	57	43	89		43.0
9.000	29.53	303.35	2.22	SAND to SILTY SAND	76	57	91		43.0
9.150	30.02	462.22	1.91	SAND to SILTY SAND	100	86	100		44.5
9.300	30.51	393.20	1.69	SAND to SILTY SAND	98	73	98		44.0
9.450	31.00	424.92	1.21	SAND	85	62	100		44.0
9.600	31.50	342.62	1.12	SAND	69	50	93		43.0
9.750	31.99	339.22	2.41	SILTY SAND to SANDY SILT	100	82	93		43.0
9.900	32.48	291.90	1.31	SAND	58	42	88		42.5
10.050	32.97	338.30	1.09	SAND	68	48	92		43.0
10.200	33.46	329.44	1.09	SAND	66	46	91		43.0
10.350	33.96	286.68	1.05	SAND	57	40	87		42.0
10.500	34.45	272.74	1.08	SAND	55	38	85		42.0
10.650	34.94	252.39	1.20	SAND	50	35	83		41.5
10.800	35.43	289.12	1.37	SAND	58	40	87		42.0
10.950	35.93	368.85	1.33	SAND	74	50	93		43.0
11.100	36.42	356.17	1.45	SAND	71	48	92		43.0
11.250	36.91	364.14	1.37	SAND	73	49	93		43.0
11.400	37.40	304.80	1.25	SAND	61	41	87		42.0
11.550	37.89	299.91	1.31	SAND	60	40	87		42.0
11.700	38.39	300.83	1.03	SAND	60	40	87		42.0
11.850	38.88	370.85	1.35	SAND	74	49	93		43.0
12.000	39.37	383.24	1.19	SAND	77	51	94		43.0
12.150	39.86	341.91	1.44	SAND	68	45	90		42.5
12.300	40.35	373.08	1.42	SAND	75	49	93		42.5
12.450	40.85	275.80	1.58	SAND to SILTY SAND	69	45	84		41.0
12.600	41.34	316.40	1.58	SAND to SILTY SAND	79	52	88		42.0
12.750	41.83	375.46	1.15	SAND	75	49	93		42.5

---

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 120 pcf
ASSUMED DEPTH OF WATER TABLE = 37.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Appendix B

APPENDIX B

GEOTECHNICAL LABORATORY INVESTIGATION

1. General

a. The purpose of the laboratory investigation was to evaluate the geotechnical engineering characteristics of the various materials encountered during the field investigation. The investigation program was carried out employing, wherever practical, currently accepted test procedures of the American Society of Testing and Materials (ASTM) and California Test Standards.

b. Relatively undisturbed ring samples and bag samples were obtained during the course of the field investigation. Laboratory sample identification is by project name and number, drill hole number or trench number and depth.

c. Geotechnical laboratory testing is classified in two major subgroups:
   - Index Properties Tests, and
   - Geotechnical Engineering Properties Tests

d. We also performed soluble chloride and sulfate contents, resistivity and pH tests to evaluate the corrosivity potential of onsite soils and bedrock.

2. Index Properties Tests

The following Index Properties test were performed on native soils collected during the field exploration.

TEST TYPE	NO. OF TESTS PERFORMED	TESTING STANDARD
Moisture Content & Unit Weight	103	ASTM D 2216 (Water Content)
Percent-Finer Than #200 Sieve	100	ASTM D 1140
Particle-size Analysis	20	ASTM D 422 and D 1140
Atterberg Limits	19	ASTM D 4318
Expansion Index	5	ASTM D 4829
Sulfate-Content	5	EPA Standard 9056
Chloride-Content	5	EPA Standard 9056
Resistivity	5	California Test Method 532
pH	5	--

APPENDIX B

The purpose of each test is briefly described below.

a. The in-situ water content and dry unit weight of native soils provided an indication of their strength before additional testing was performed. These data, in conjunction with field blow count data, served in the selection of samples for additional testing. Test results are presented on the Drill Hole Logs within **Appendix A**.

b. Minus No. 200 wash-sieve analyses were performed on selected samples to evaluate only the percentage of fine particles smaller than 75 microns within the soil. These tests were conducted to aid in classifying the soils in accordance with the Unified Soil Classification System (USCS). Test results are presented on the Drill Hole Logs within **Appendix A**, and in other test reports within **this Appendix**. In addition, shallow bedrock samples were tested for their percentages of fines. The following results were obtained:

SAMPLE	DESCRIPTION	% FINES
T-31 @ 1′	Clayey Sandstone Bedding	30
T-32 @ 1′	TQs Siltstone Red Bed	70
T-34 @ 1′	TQs-Qt weathered	46

c. Complete mechanical particle-size analyses of soil fractions larger and smaller than 75 microns (No. 200 sieve) were conducted to aid in classifying the soils in accordance with the Unified Soil Classification System (USCS). Test results are presented on **Figures B1.1 through B1.5** within **this Appendix**.

d. Liquid and plastic limit tests (Atterberg limits) were conducted on selected samples to aid in classifying the soils in accordance with USCS (by evaluating soil plasticity). Test results are presented on the Drill Hole Logs and on **Figures B2.1 through B2.5** within **this Appendix.**

e. Expansion Index Tests provided an index to the expansion potential of soils when inundated with water. This test method controls variables that influence the expansive characteristics of soils. Results are summarized below:

APPENDIX B

SAMPLES	ROCK OR USCS	Expansion Index (UBC)	Expansion Classification (UBC)
BA-6 @ 5′	SM	18	Very Low
BA-6 @ 23′	SM	61	Medium
T-31 @ 1′	TQs Clayey Sandstone	41	Low
T-32 @ 1′	TQs-Siltstone "Red Bed"	26	Low
T-34 @ 1′	TQs-Qt Weathered	45	Low

f. Soluble sulfates and chloride contents, resistivity and pH tests were conducted to access the potential corrosive effects of soils on concrete, ferrous and non-ferrous metals. Test results are presented on **Table B1** within **this Appendix**.

3. Geotechnical Engineering Properties Tests

The following Geotechnical Engineering Property Tests were performed on bulk samples or relatively undisturbed ring samples, as applicable, collected at this site.

TEST TYPE	TEST NO.	TESTING STANDARD
Compaction	6	ASTM D 1557-91
Consolidation	7	ASTM D 2435
Direct Shear	19	ASTM D 3080

The purpose of each test is briefly described below.

a. Compaction tests were performed on selected samples to assess the moisture-density relationship of materials that may be used for recompaction at removal areas. Test results are presented on **Figures B3.1 through B3.6** within **this Appendix.**

b. One-dimensional consolidation tests were performed on selected ring samples to assess the soils compressibility characteristics by subjecting the specimens to loads ranging from 120 psf to 19,200 psf, and with the addition of water at loads near the overburden pressure. Tests results are plotted on **Figures B4.1 through B4.7** within **this Appendix.**

APPENDIX B

c. Direct shear tests were performed on relatively undisturbed or remolded test specimens using a displacement-controlled direct shear machine. Samples were tested at normal pressures ranging from approximately **1000 psf to 8000 psf** in order to define both the peak and residual shear strength parameters. Each sample was consolidated under the normal load at saturated conditions and then sheared horizontally at a controlled displacement rate until a residual strength was attained. For remolded specimens, passing no. 4 sieve material was used. Test results are plotted on **Figures B5.1 through B5.19** within **this Appendix**.

The following attachments completed this Appendix

LABORATORY TEST RESULTS

• Corrosion Test Results on Soil Samples	Table B1
• Summary of Shear Strength Test Data	Table B2
• Particle Size Distribution Test Report	Figure B1.1 thru B1.5
• Liquid and Plastic Limits Test Report	Figure B2.1 thru B2.5
• Compaction Test Reports	Figure B3.1 thru B3.6
• Consolidation Test Reports	Figure B4.1 thru B4.7
• Direct Shear Test Results	Figure B5.1 thru B5.19

APPENDIX B

CORROSION TEST RESULTS ON SOIL SAMPLES

Sample Location	T-31 @ 1'	T-32 @ 1'	T-34 @ 1'	HS-3 @ 3'	HS-4 @ 2'	BA-6 @ 6'	BA-6 @ 23'
Bedrock or Soil Type (USCS)	TQs - Clayey Sandstone	TQs - Siltstone	Weathered TQs-Qt	SM	SM	SM	SM

Resistivity (Ω - cm)	1034	1067	1534	-	-	1129	970
Corrosivity Potential[1]	Corrosive	Corrosive	Corrosive	-	-	Corrosive	Severely Corrosive

Chemical Analyses

pH	7.4	6.8	6.6	6.8	7.0	-	-
Chloride Cl (ppm)	60	ND	ND	4.5	3.6	-	-
Sulfate SO_4 (%)	0.003	ND	ND	ND	ND	-	-
Concrete exposure to sulfate[2]	Negligible	Negligible	Negligible	Negligible	Negligible	-	-

ND = not detected

---

[1] Per County of Los Angeles Classification

[2] Per 1997 UBC – Table 19-A-4

APPENDIX B

SUMMARY OF SHEAR STRENGTH TEST DATA

MATERIAL	BORING OR TEST PIT NO.	FIG. NO.	PEAK		RESIDUAL		UNIT WT. (PCF)
			COHESION (psf)	PHI ϕ	COHESION (psf)	PHI ϕ	
Landslide Debris (Qls)	BA-7 @ 20'	B5.1	489	40.4°	189	35.9°	131
Landslide Plane (Qls)	BA-3 @ 30'*	B5.2	775	15.5°	318	8.5°	131
	BA-4 @ 24'*	B5.3	1633	11.0°	603	9.5°	131
Bedrock (TQs) Along Siltsone Bedding	BA-1 @ 47'*	B5.4	1982	24.3°	479	19.4°	128
Bedrock (TQs) Along Claystone Bedding	BA-7 @ 50'	B5.5	2622	33.5°	0	30.0°	140
	BA-7 @ 54'*	B5.6	467	16.0°	265	14.7°	131
Bedrock (TQs) Cross-Bedding	BA-5 @ 30'*	B5.7	334	49.0°	295	32.0°	140
	BA-6 @ 77'	B5.8	1758	31.1°	313	31.0°	139
	BA-7 @ 40'	B5.9	178	40.5°	280	30.5°	127
	BA-8 @ 30'	B5.10	444	40.0°	307	31.7°	131
Compacted Fill (Cef)	BA-6 @ 5'	B5.11	204	27.3°	126	28.2°	122
	BA-6 @ 23'	B5.12	282	30.8°	114	30.5°	129
	BA-6 @ 40'	B5.13	294	23.9°	144	24.7°	117
	BA-8 @ 43'	B5.14	48	31.6°	36	31.0°	126
	T-12 & T-28*	B5.15	429	31.1°	259	30.5°	117
Alluvium (Qal)	RW-10 @ 12'	B5.16	956	31.1°	348	30.2°	128
Terrace Deposits (Qt)	BA-6 @ 4'	B5.17	33	42.3°	0	32.0°	134
	BA-7 @ 8'	B5.18	0	34.0°	168	27.7°	121
	BA-8 @ 4'	B5.19	420	28.6°	109	30.6°	126

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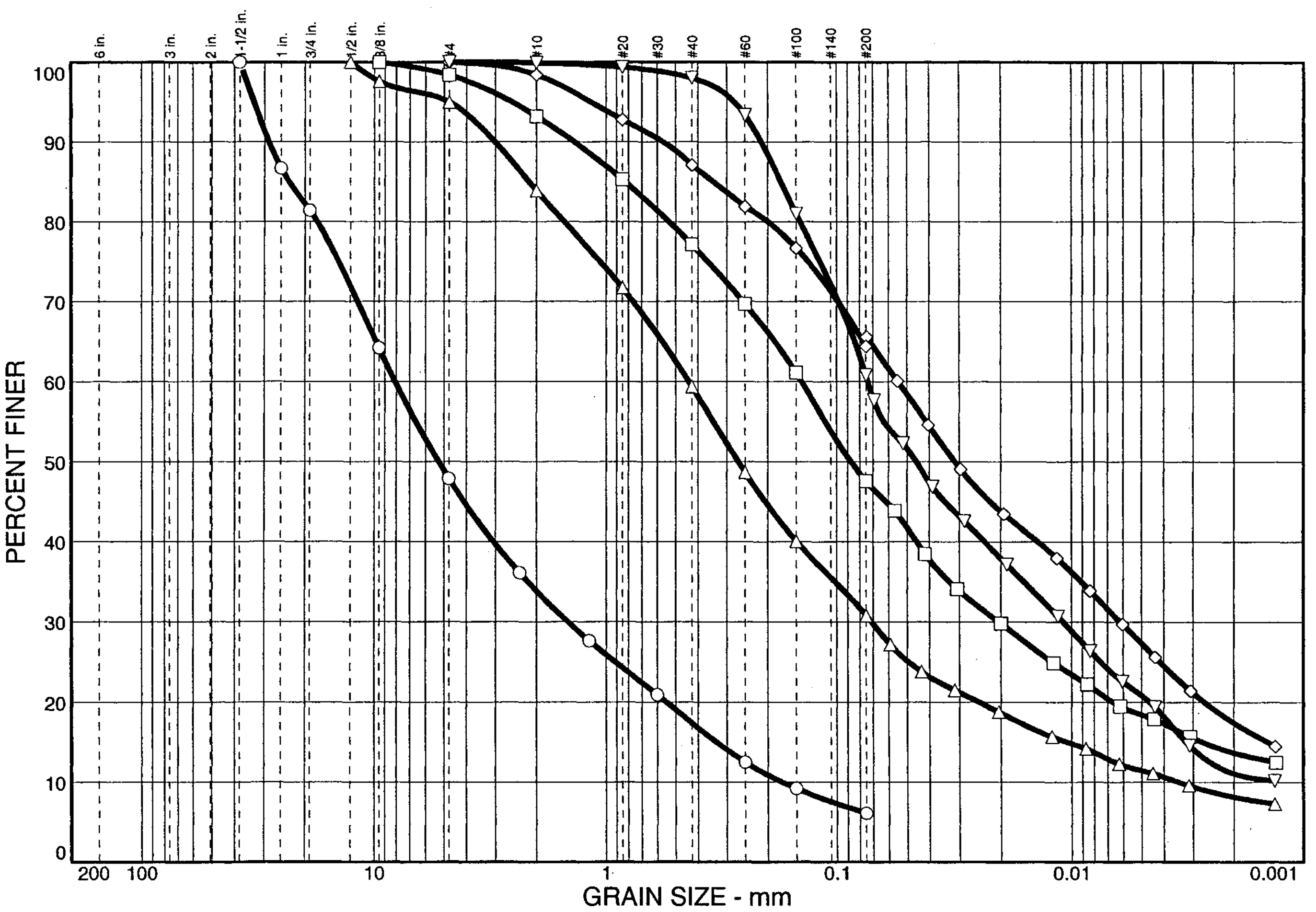
* Note: Taken from previous investigations performed on this site for Castaic Lake Water Agency (CLWA), see References for citations of reports prepared for CLWA.

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	18.6	33.5	14.1	16.4	11.3	6.1	
□	0.0	0.0	1.6	5.2	16.1	29.5	29.1	18.5
△	0.0	0.0	5.0	11.1	24.5	28.6	19.3	11.5
◇	0.0	0.0	0.0	1.6	11.3	22.7	37.1	27.3
▽	0.0	0.0	0.0	0.1	1.9	37.2	40.0	20.8

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	RW-1	1	15'	Grayish-brown well-graded gravel with silt and sand	GW-GM
□	RW-2	1	15'	Brown clayey sand	SC
△	RW-2	2	30'	Brown clayey sand	SC
◇	RW-3	2	35'	Reddish brown sandy lean clay	CL
▽	RW-3	3	40'	Sandy lean clay	CL

PARTICLE SIZE DISTRIBUTION TEST REPORT

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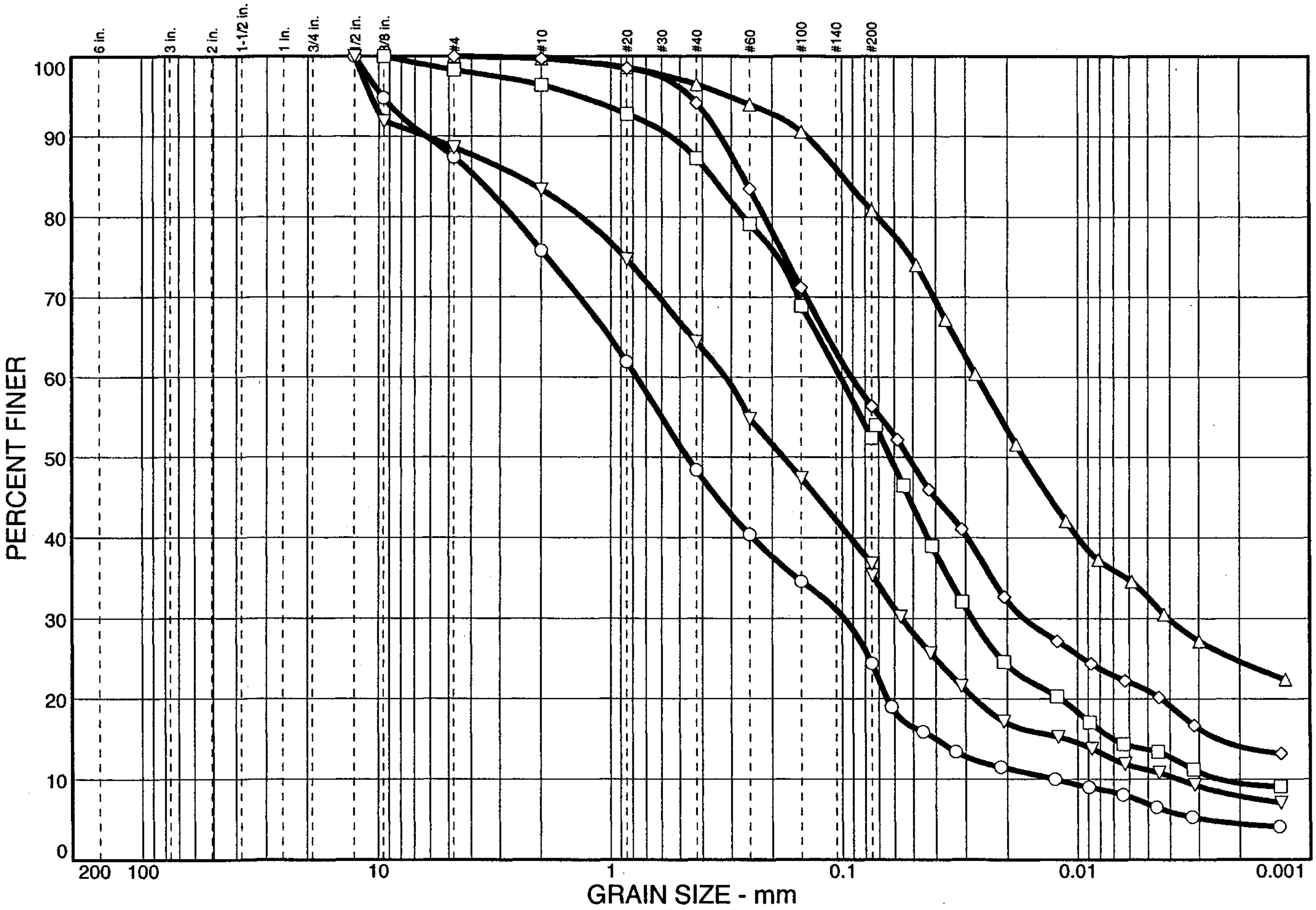
ENGINEERING GEOLOGY, INC.

Client: Newhall Land

Project: Tentative Tract 53425, River Park
City of Santa Clarita, California

Project No.: 03-1571-4 **Figure** B1.1

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	12.6	11.6	27.4	24.0	17.5	6.9
□	0.0	0.0	1.7	1.9	9.1	34.9	38.7	13.7
△	0.0	0.0	0.0	0.3	3.2	15.7	48.1	32.7
◇	0.0	0.0	0.0	0.3	5.5	37.8	35.4	21.0
▽	0.0	0.0	11.4	5.2	19.0	27.6	25.7	11.1

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	RW-3	4	45'	Light brown clayey sand w/little gravel	SC
□	RW-4	2	20'	Sandy lean clay	CL
△	RW-4	3	25'	Grayish brown lean clay w/sand	CL
◇	RW-4	4	35'	Grayish brown sandy lean clay	CL
▽	RW-4	5	45'	Grayish brown clayey sand w/little gravel	SC

PARTICLE SIZE DISTRIBUTION TEST REPORT

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

Client: Newhall Land

Project: Tentative Tract 53425, River Park
City of Santa Clarita, California

Project No.: 03-1571-4 **Figure** B1.2

PARTICLE SIZE DISTRIBUTION TEST REPORT

	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	1.6	10.8	51.5	27.9	8.2
□	0.0	0.0	0.0	0.2	2.2	44.8	38.5	14.3

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	RW-5	1	15'	Silty sand	SM
□	RW-5	2	25'	Dark grayish brown sandy silt	ML

PARTICLE SIZE DISTRIBUTION TEST REPORT

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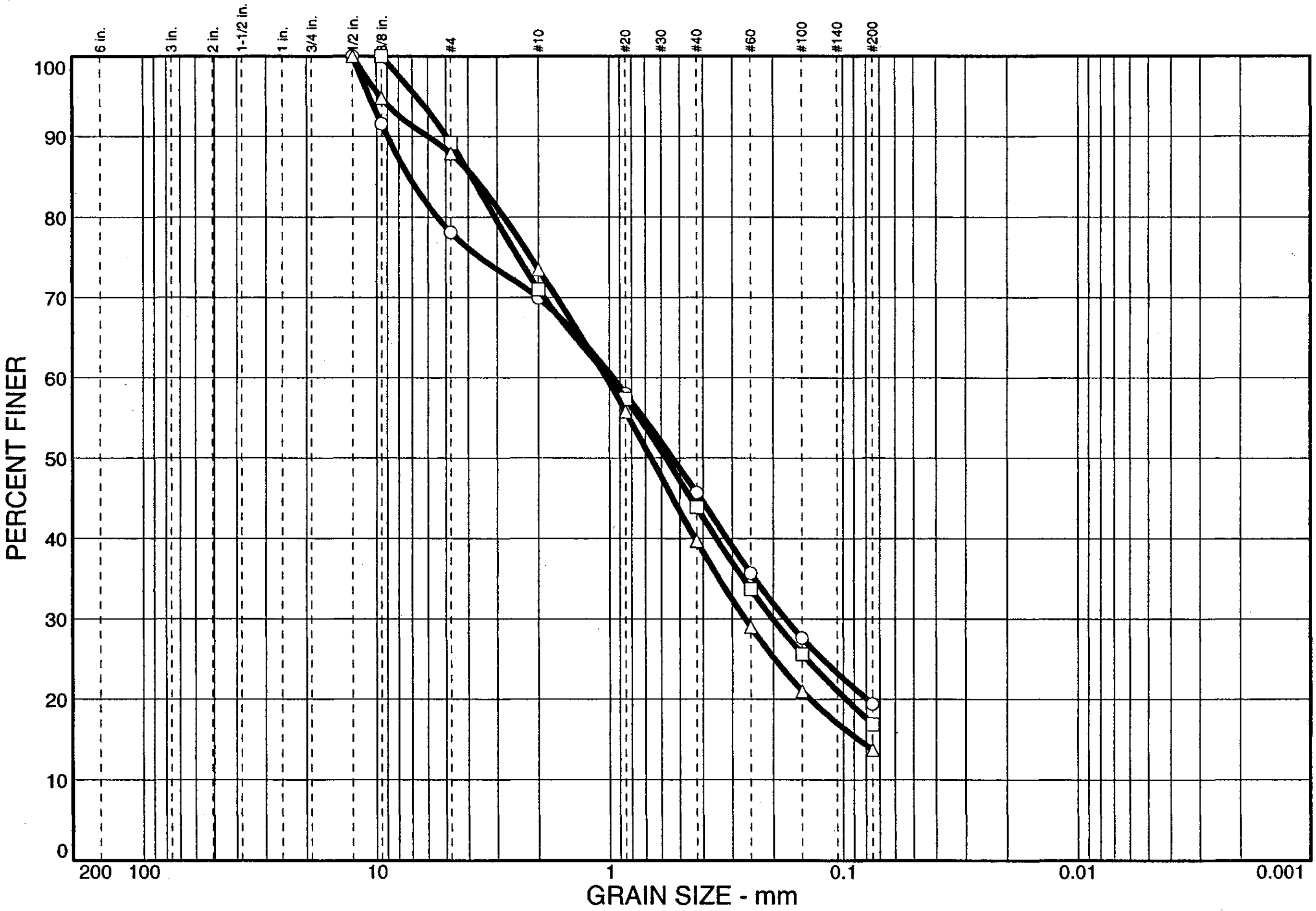
Client: Newhall Land
Project: Tentative Tract 53425, River Park
City of Santa Clarita, California
Project No.: 03-1571-4 **Figure** B1.3

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	21.9	8.2	24.2	26.3	19.4	
□	0.0	0.0	10.8	18.2	27.1	27.0	16.9	
△	0.0	0.0	12.1	14.4	33.8	26.0	13.7	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	RW-9		15	Silty sand with gravel	SM
□	RW-10		12	Silty sand	SM
△	RW-10		36	Silty sand	SM

PARTICLE SIZE DISTRIBUTION TEST REPORT

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Project No.: 03-1571-4 **Figure** B1.4

PARTICLE SIZE DISTRIBUTION TEST REPORT

	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	5.1	12.6	40.9	29.1	12.3	
□	0.0	0.0	4.7	11.9	39.0	32.5	11.9	
△	0.0	0.0	16.9	17.9	37.9	20.3	7.0	
◇	0.0	0.0	1.0	4.6	30.5	35.7	28.2	
▽	0.0	2.2	8.5	6.4	26.2	30.9	25.8	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
○	HS-2		5	Silty sand	SM
□	HS-3		15	Poorly graded sand with silt	SP-SM
△	HS-4		20	Poorly-graded sand with silt and gravel	SP-SM
◇	BA-8		30	Silty sand	SM
▽	BA-8		43	Silty sand	SM

PARTICLE SIZE DISTRIBUTION TEST REPORT

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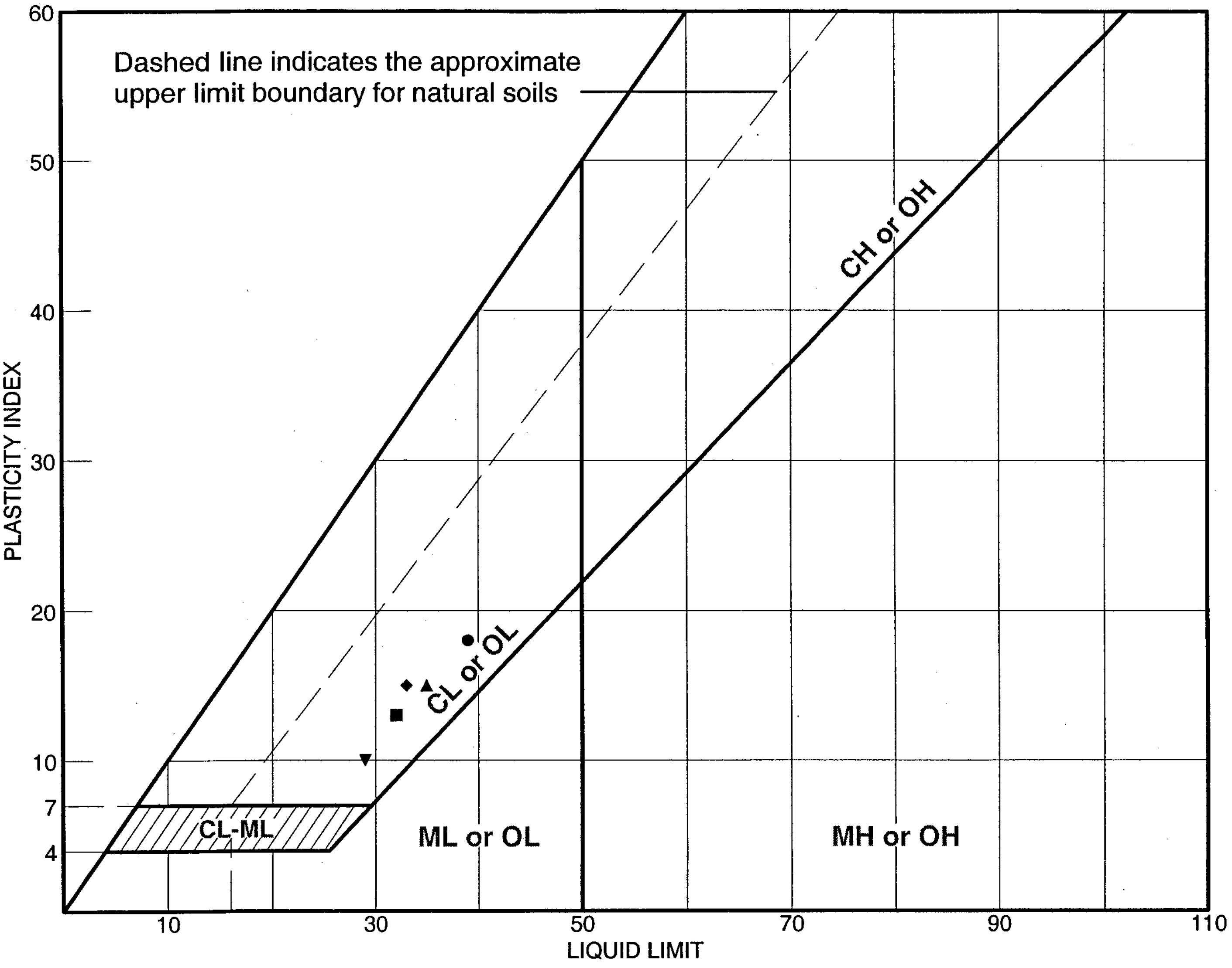
Client: Newhall Land
Project: Tentative Tract 53425, River Park
City of Santa Clarita, California
Project No.: 03-1571-4 **Figure** B1.5

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	RW-2	1	15'		21	39	18	SC
■	RW-3	1	8'		19	32	13	SC
▲	RW-3	2	35'		20	35	15	CL
◆	RW-3	3	40'		18	33	15	CL
▼	RW-3	4	45'		19	29	10	SC

LIQUID AND PLASTIC LIMITS TEST REPORT

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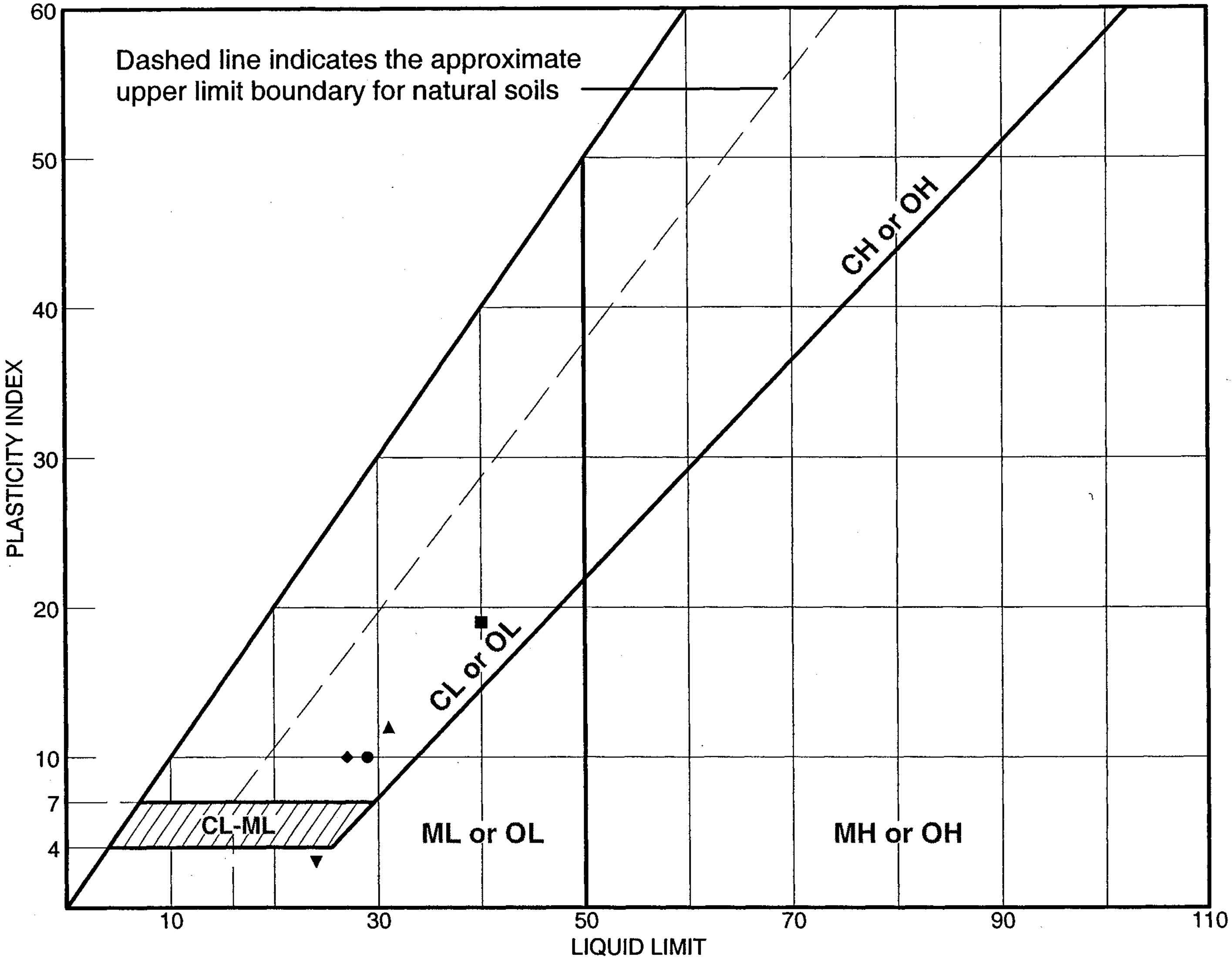
ENGINEERING GEOLOGY, INC.

Client: Newhall Land

Project: Tentative Tract 53425, River Park
City of Santa Clarita, California

Project No.: 03-1571-4 **Figure** B2.1

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	RW-4	2	20'		19	29	10	CL
■	RW-4	3	25'		21	40	19	CL
▲	RW-4	4	35'		19	31	12	CL
◆	RW-4	5	45'		17	27	10	SC
▼	RW-5	2	25'		21	24	3	ML

LIQUID AND PLASTIC LIMITS TEST REPORT

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

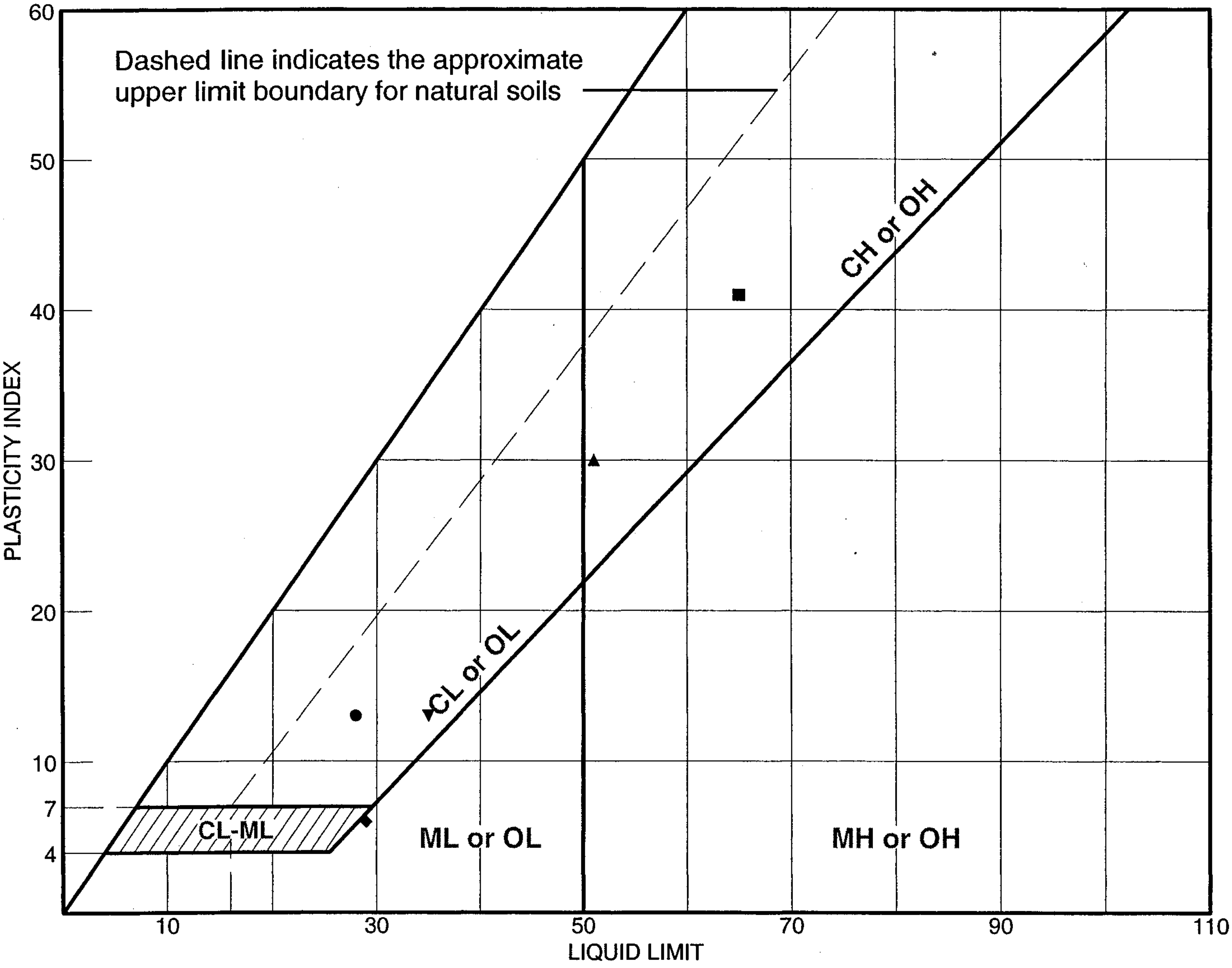
Client: Newhall Land

Project: Tentative Tract 53425, River Park
City of Santa Clarita, California

Project No.: 03-1571-4

Figure B2.2

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

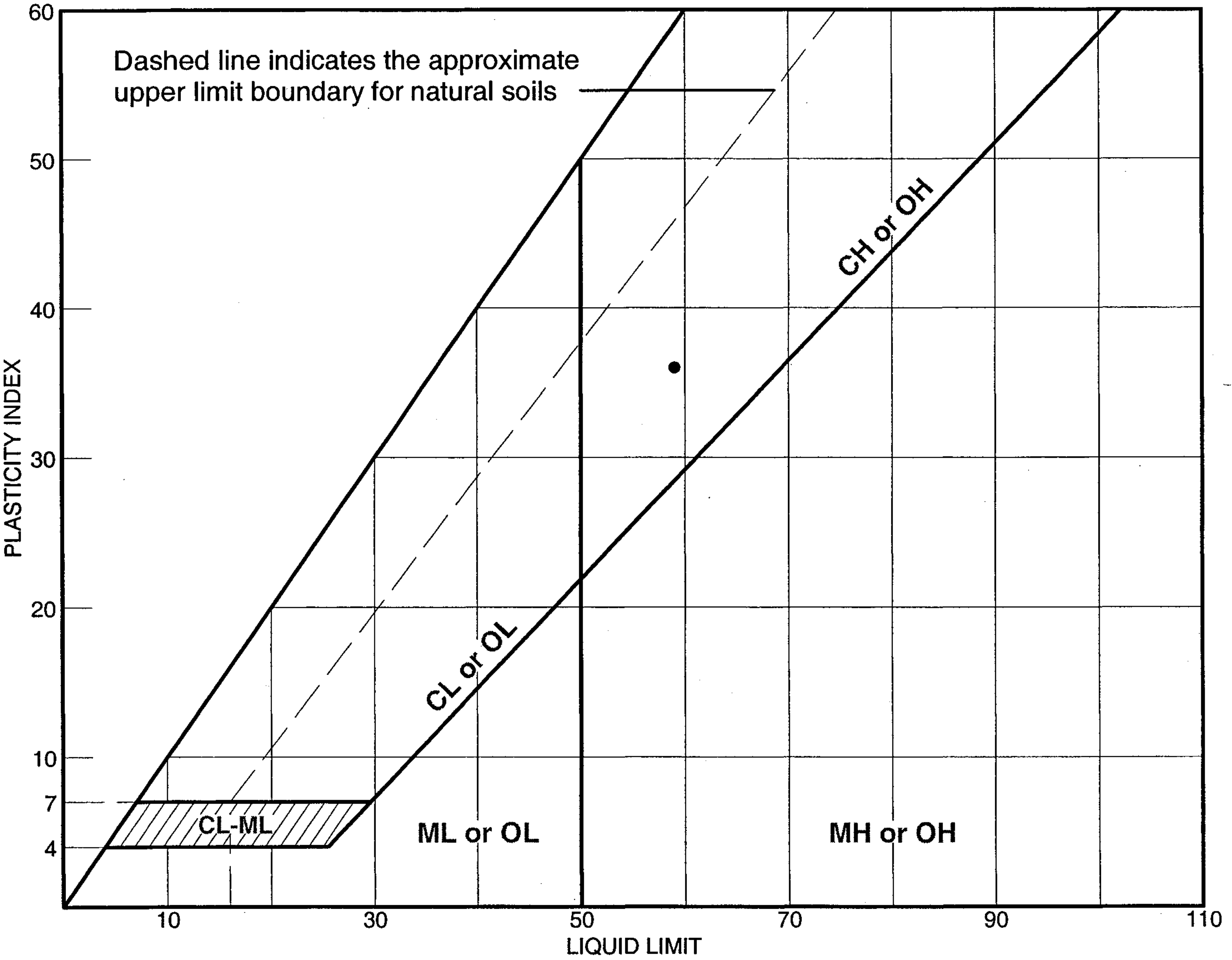
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	RW-10		18		15	28	13	SC
■	BA-3		66		24	65	41	CH
▲	BA-4		106		21	51	30	CH
◆	BA-6		23		23	29	6	SM
▼	BA-7		28		22	35	13	CL

LIQUID AND PLASTIC LIMITS TEST REPORT

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Client: Newhall Land
Project: Tentative Tract 53425, River Park
City of Santa Clarita, California
Project No.: 03-1571-4
Figure B2.3

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	BA-7		29		23	59	36	CH

LIQUID AND PLASTIC LIMITS TEST REPORT

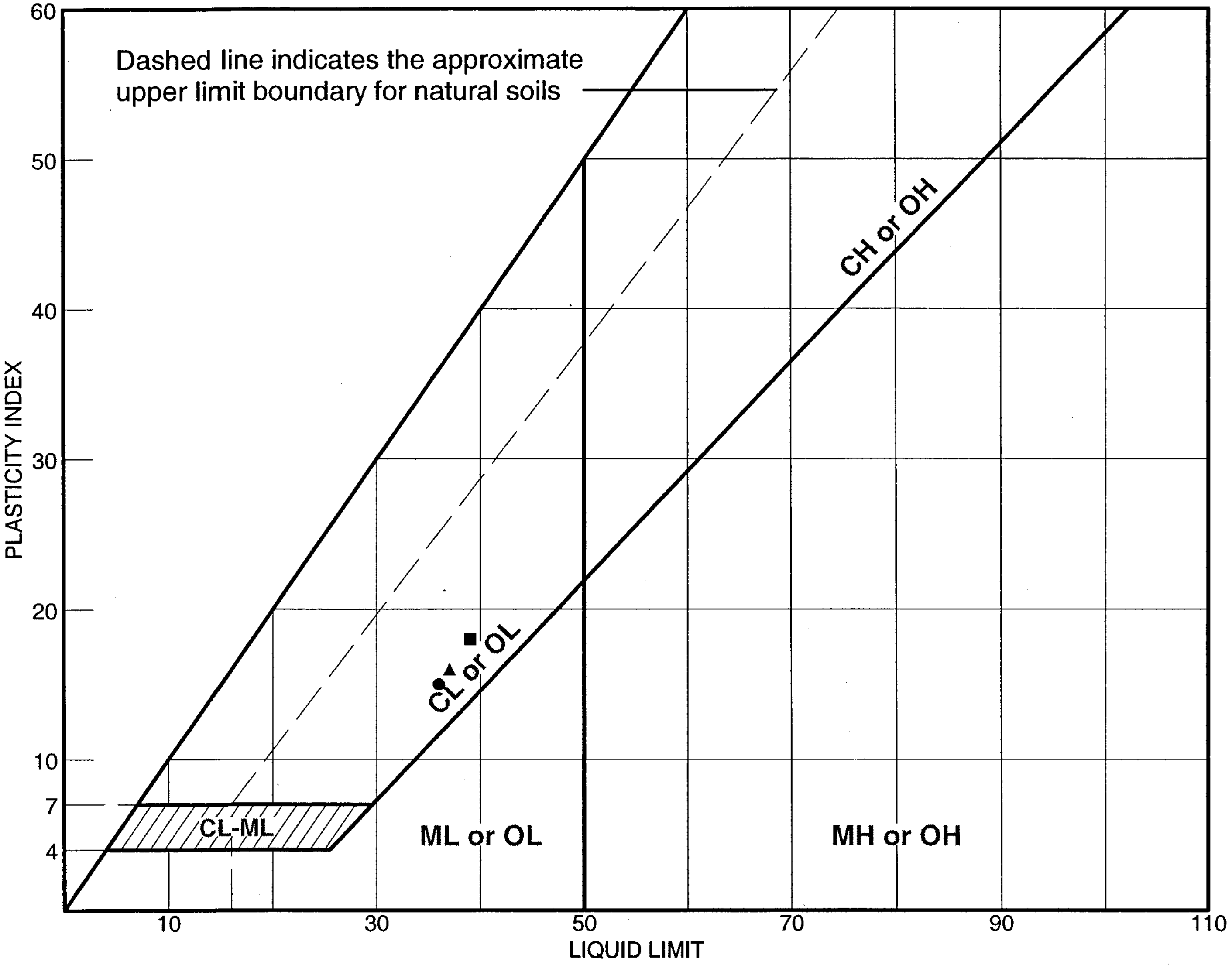
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.

Client: Newhall Land

Project: Tentative Tract 53425, River Park
City of Santa Clarita, California

Project No.: 03-1571-4 **Figure** B2.4

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●		T-31	1'		21	36	15	SC
■		T-32	1'		21	39	18	CL
▲		T-34	1'		21	37	16	CL

LIQUID AND PLASTIC LIMITS TEST REPORT

ALLAN E. SEWARD

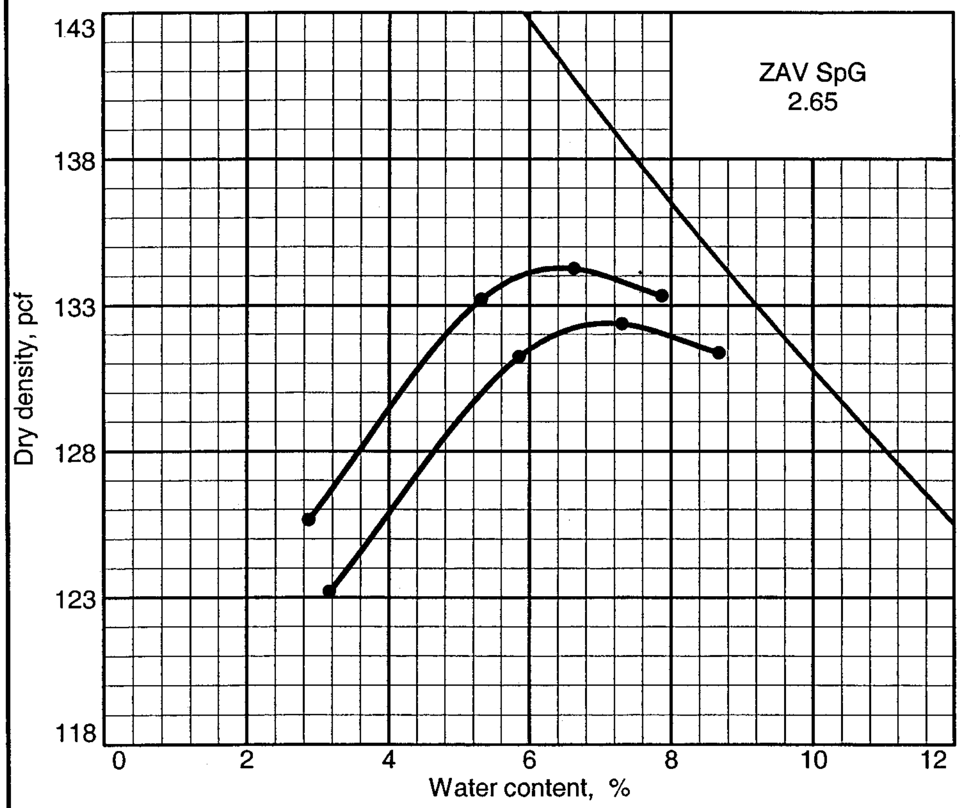
ENGINEERING GEOLOGY, INC.

Client: Newhall Land

Project: Tentative Tract 53425, River Park
City of Santa Clarita, California

Project No.: 03-1571-4 **Figure** B2.5

COMPACTION TEST REPORT



Curve No.
A

Test Specification:
ASTM D 1557-91 Procedure A Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL	29	**PI**	6
%>No.4	9.3	**%<#200**	33.6
USCS	SM	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.70	9.10	9.20	9.23		
WM	4.47	4.47	4.47	4.47		
WW + T #1	456.25	485.08	527.42	542.19		
WD + T #1	443.25	460.02	493.70	501.50		
TARE #1	32.10	31.80	32.29	32.43		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	2.9	5.3	6.6	7.9		
DRY DENSITY	125.7	133.2	134.3	133.3		

TEST RESULTS

Maximum dry density = 134.5 pcf

Optimum moisture = 6.5 %

Material Description

Yellowish-brown silty SAND w/trace of gravel

Project No. 03-1571-4 **Client:** Newhall Land
Project: Tentative Tract 53425, River Park
City of Santa Clarita, California
● **Source:** BA-6 **Elev./Depth:** 23

Remarks:

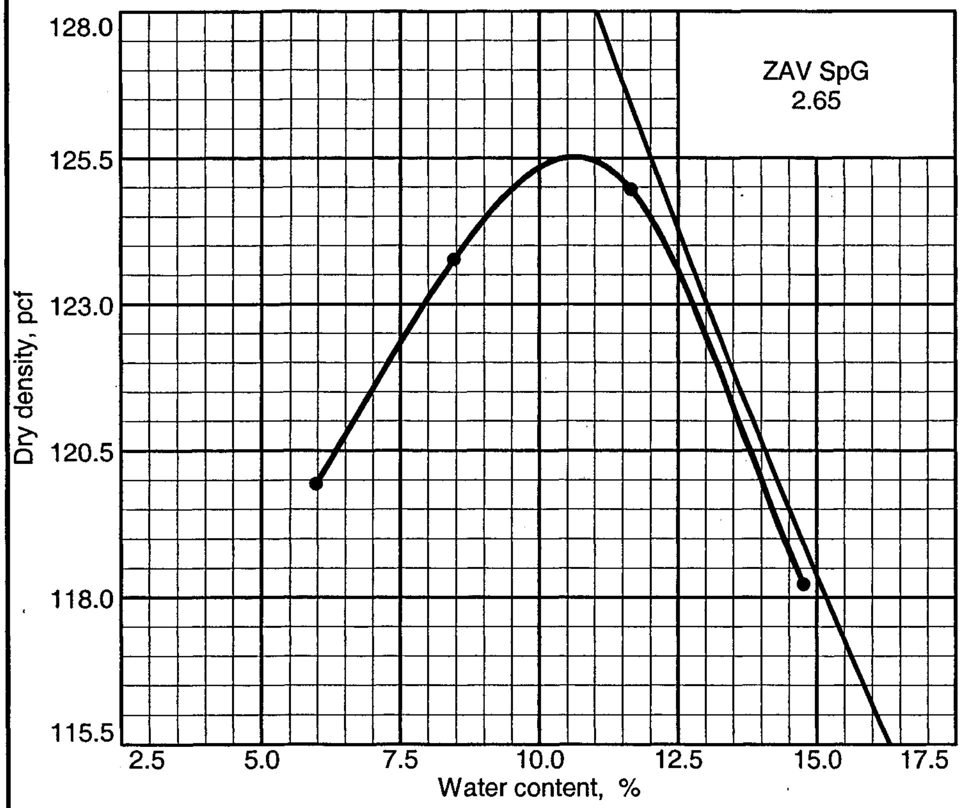
Bedrock (TQs)

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.1

COMPACTION TEST REPORT



Curve No.
B

Test Specification:
ASTM D 1557-91 Procedure A Modified

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	0.6	**%<#200**	69.6
USCS	CL	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.70	8.94	9.12	8.99		
WM	4.47	4.47	4.47	4.47		
WW + T #1	422.21	441.82	463.74	488.74		
WD + T #1	400.24	409.67	418.67	430.05		
TARE #1	32.08	29.57	31.69	32.39		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	6.0	8.5	11.6	14.8		
DRY DENSITY	119.9	123.8	125.0	118.2		

TEST RESULTS

Maximum dry density = 125.5 pcf

Optimum moisture = 10.5 %

Material Description

Reddish-brown sandy lean CLAY

Project No. 03-1571-4 **Client:** Newhall Land
Project: Tentative Tract 53425, River Park
City of Santa Clarita, California
● **Source:** BA-6 **Elev./Depth:** 40

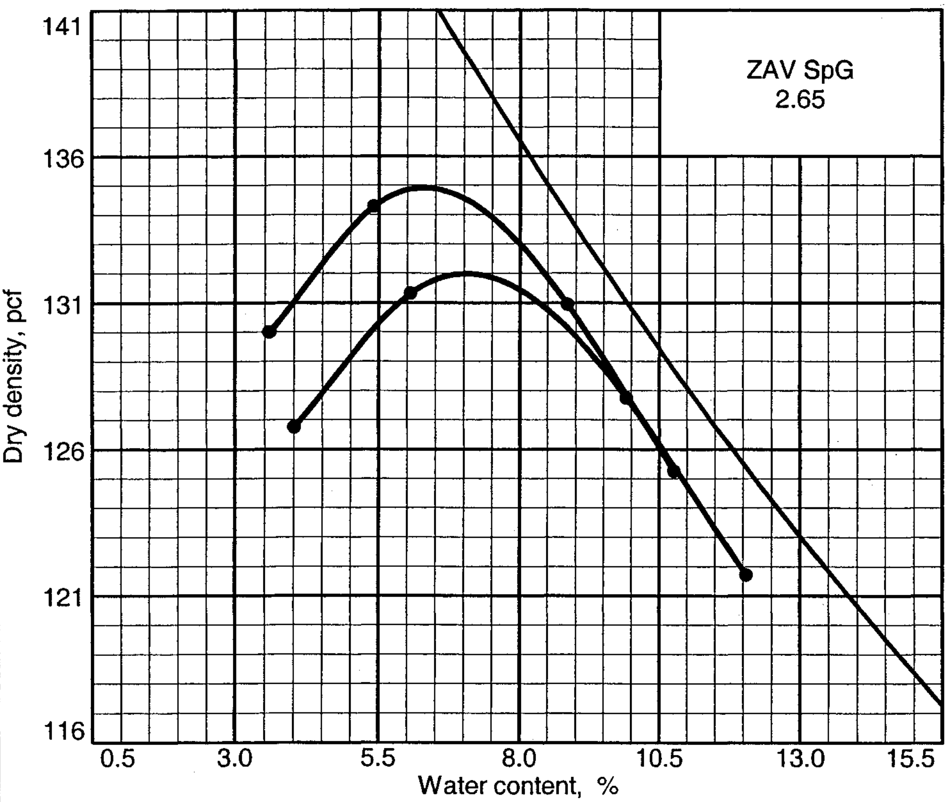
Remarks:
Bedrock (TQs)

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.2

COMPACTION TEST REPORT



Curve No.
C

Test Specification:
ASTM D 1557-00 Method A Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM ______ **Sp.G.** 2.65
LL ______ **PI** ______
%>No.4 10.7 **%<#200** 25.8
USCS SM **AASHTO** ______

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.86	9.11	9.15	9.01		
WM	4.47	4.47	4.47	4.47		
WW + T #1	418.74	435.10	453.38	470.14		
WD + T #1	403.75	412.04	415.29	422.78		
TARE #1	29.41	31.35	31.03	30.00		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	3.6	5.4	8.9	10.8		
DRY DENSITY	130.0	134.3	130.9	125.3		

TEST RESULTS

Maximum dry density = 135 pcf

Optimum moisture = 6.5 %

Material Description

Silty sand

Project No. 03-1571-4 **Client:** Newhall Land
Project: Tentative Tract 53425, River Park
City of Santa Clarita, California
● **Source:** BA-8 **Elev./Depth:** 43

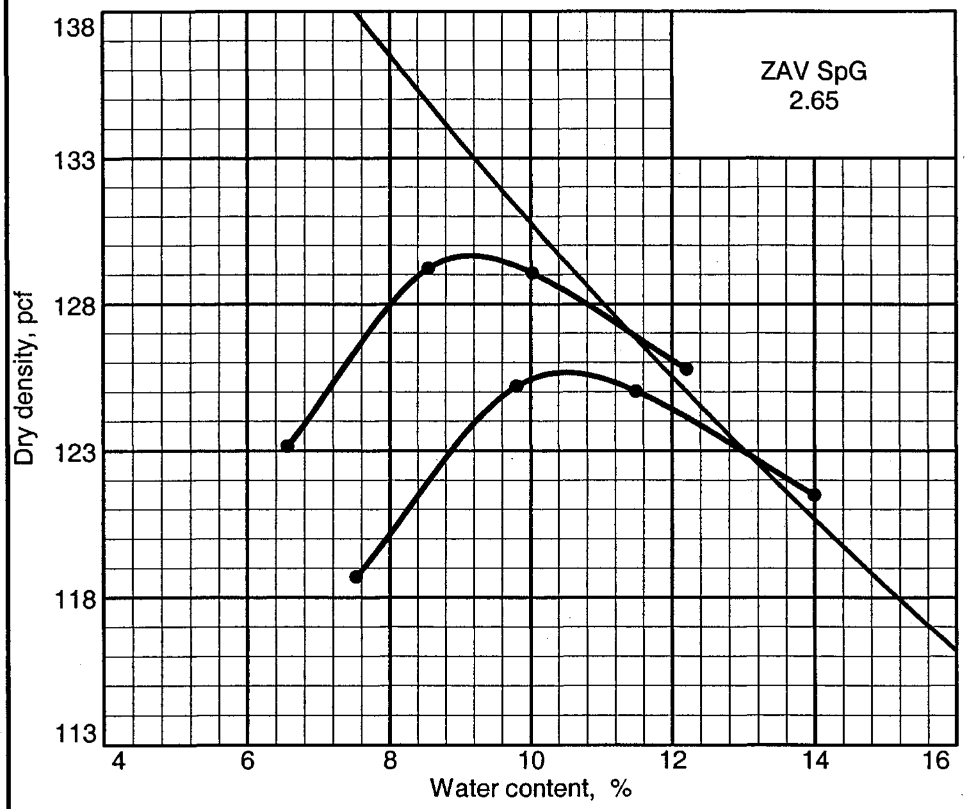
Remarks:
Bedrock (TQs)

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.3

COMPACTION TEST REPORT



Curve No.
D

Test Specification:
ASTM D 1557-00 Method A Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	12.8	**%<#200**	32.9
USCS	SM	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.72	9.05	9.11	9.08		
WM	4.47	4.47	4.47	4.47		
WW + T #1	414.15	425.77	439.99	455.88		
WD + T #1	387.25	390.63	397.87	403.78		
TARE #1	29.80	32.20	31.44	31.48		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	6.6	8.5	10.0	12.2		
DRY DENSITY	123.2	129.2	129.1	125.8		

TEST RESULTS

Maximum dry density = 129.5 pcf

Optimum moisture = 9 %

Material Description

Reddish-brown silty sand

Project No. 03-1571-4 **Client:** Newhall Land
Project: Tentative Tract 53425, River Park
City of Santa Clarita, California
● **Source:** BA-6 **Elev./Depth:** 5

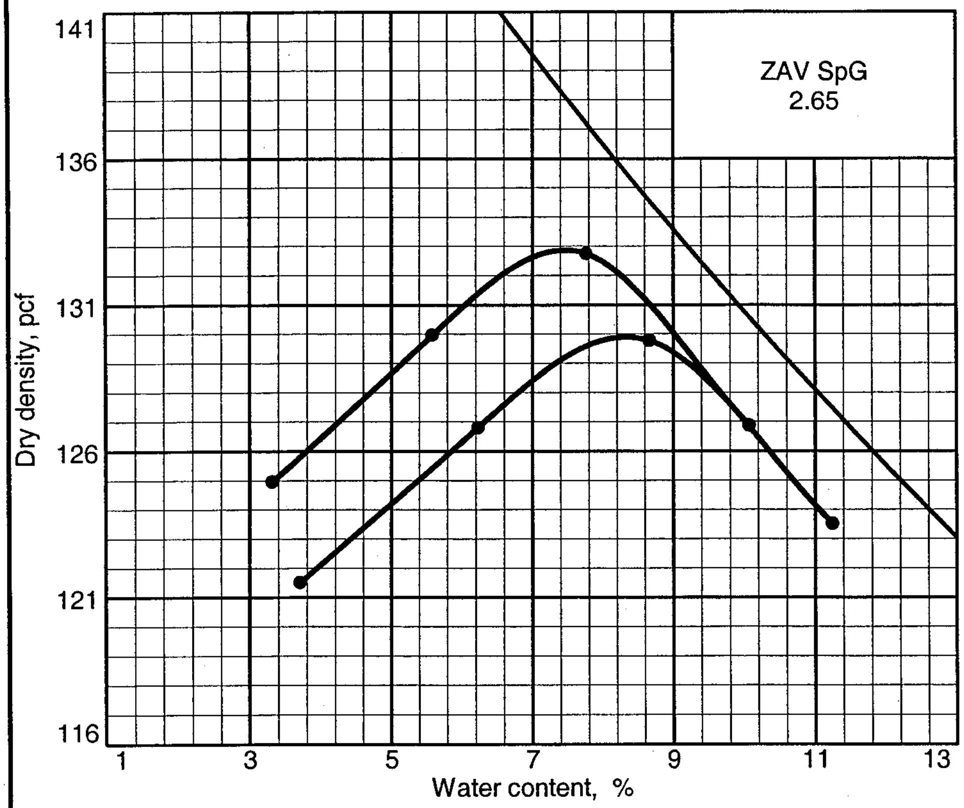
Remarks:
Terrace Deposits (Qt)

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.4

COMPACTION TEST REPORT



Curve No.
E

Test Specification:
ASTM D 1557-91 Procedure A Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	10.4	**%<#200**	32.8
USCS	SC-SM	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.69	8.98	9.19	9.07		
WM	4.49	4.49	4.49	4.49		
WW + T #1	208.69	216.58	225.70	234.35		
WD + T #1	202.32	205.60	210.24	213.94		
TARE #1	30.18	29.36	31.76	32.37		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	3.3	5.6	7.8	10.1		
DRY DENSITY	125.0	130.0	132.7	126.9		

TEST RESULTS

Maximum dry density = 133 pcf

Optimum moisture = 7.5 %

Material Description

Yellowish-brown silty, clayey sand

Project No. 03-1571-4 **Client:** Newhall Land
Project: Tentative Tract 53425, River Park
City of Santa Clarita, California
● **Source:** **Sample No.:** E

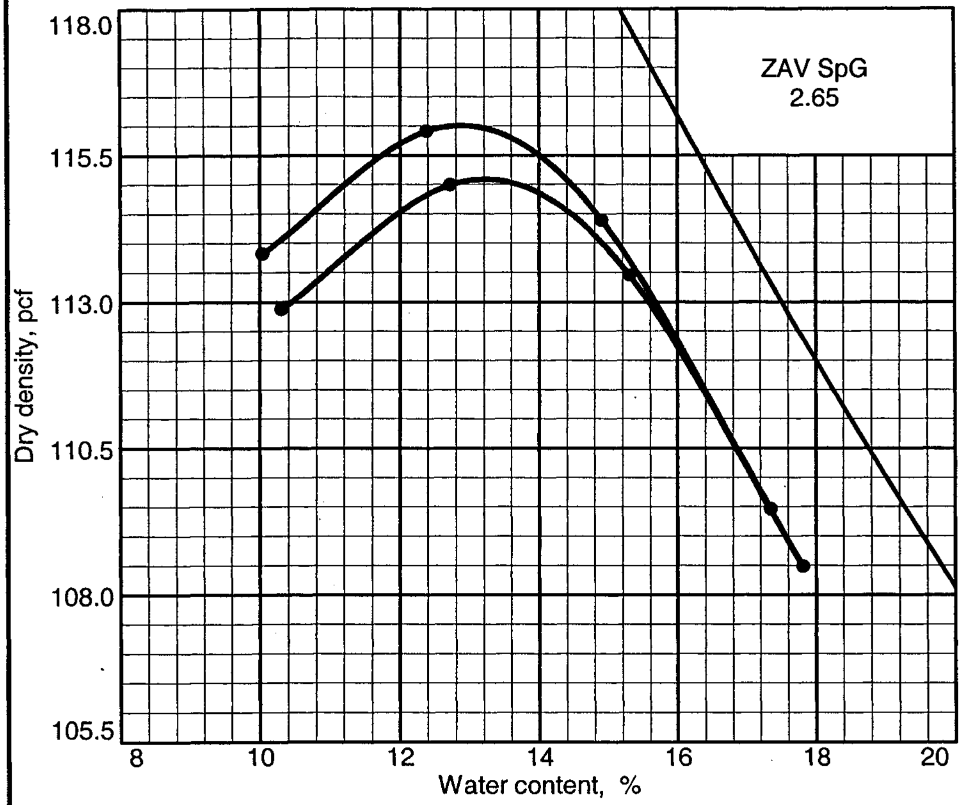
Remarks:
Alluvium (Qal)

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Figure B3.5

COMPACTION TEST REPORT



Curve No.
F

Test Specification:
ASTM D 1557-91 Procedure A Modified
Oversize correction applied to each point

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: .03333 cu.ft.
Test Performed on Material Passing No.4 **Sieve**

Soil Data

NM		**Sp.G.**	2.65
LL		**PI**	
%>No.4	2.6	**%<#200**	71.2
USCS	CL	**AASHTO**	

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.64	8.81	8.85	8.75		
WM	4.49	4.49	4.49	4.49		
WW + T #1	207.50	216.54	226.40	233.41		
WD + T #1	191.12	195.65	200.65	202.92		
TARE #1	32.16	31.33	32.35	31.78		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	10.0	12.4	14.9	17.4		
DRY DENSITY	113.8	115.9	114.4	109.5		

TEST RESULTS

Maximum dry density = 116 pcf

Optimum moisture = 13 %

Material Description

Very dark grayish brown lean clay with sand

Project No. 03-1571-4 **Client:** Newhall Land
Project: Tentative Tract 53425, River Park
City of Santa Clarita, California
● **Source:** **Sample No.:** F

COMPACTION TEST REPORT

ALLAN E. SEWARD ENGINEERING GEOLOGY, INC.

Remarks:
Alluvium (Qal)

Figure B3.6

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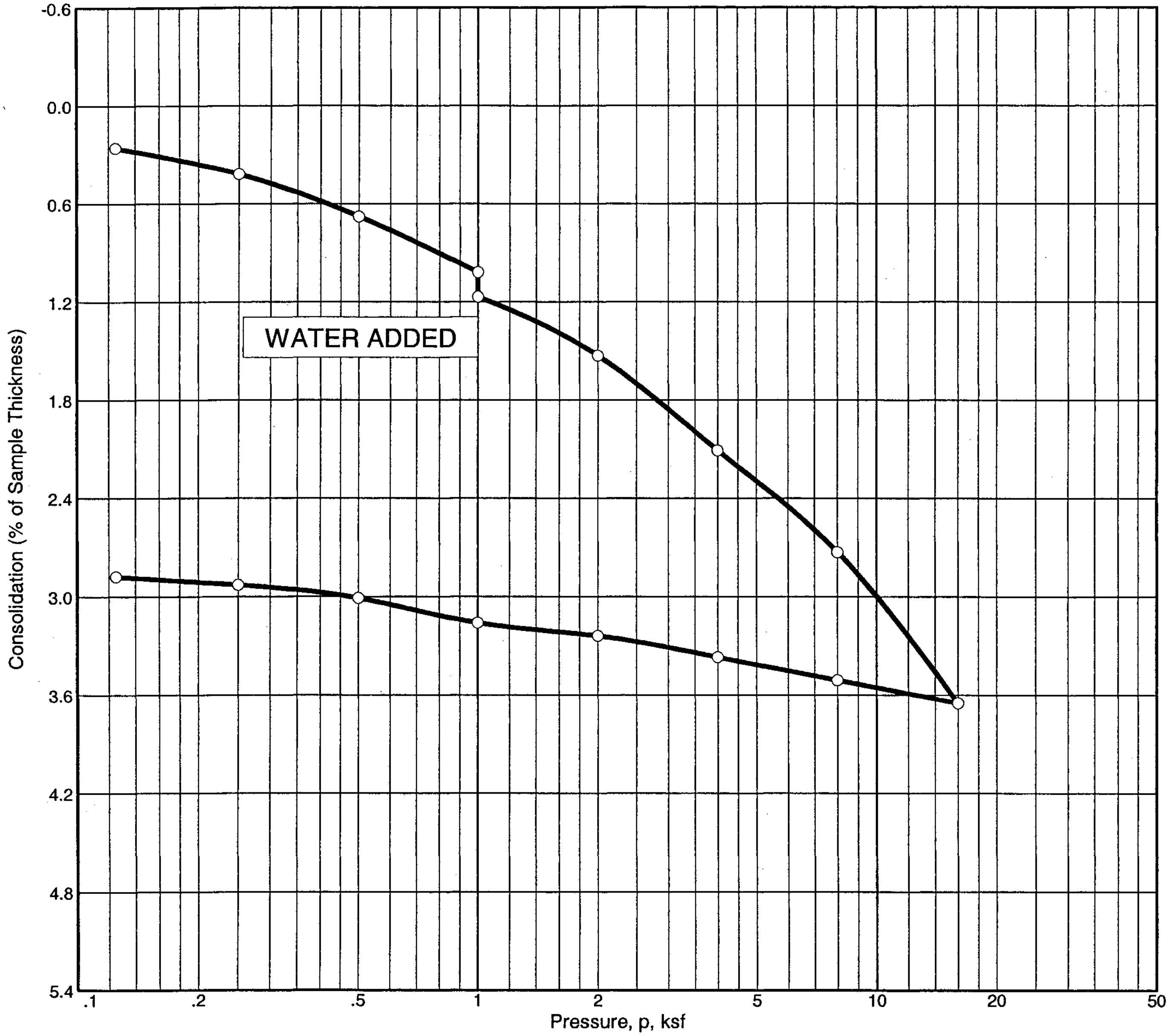
DATE

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	117.9	10.8	71.0	1.000	0.403	2.65	0.04	0.60	4.09	SW
FINAL	121.4	14.0	100.0	0.971	0.362					

Source: RW-1 **Sample No.:** 2 **Elev./Depth:** 5'-6.5'
Material Description: Well-graded sand with gravel
Remarks:

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ENGINEERING GEOLOGY, INC.

Client: Newhall Land
Project: Tentative Tract 53425, River Park
City of Santa Clarita, California
Job No.: 03-1571-4 **Figure** B4.1

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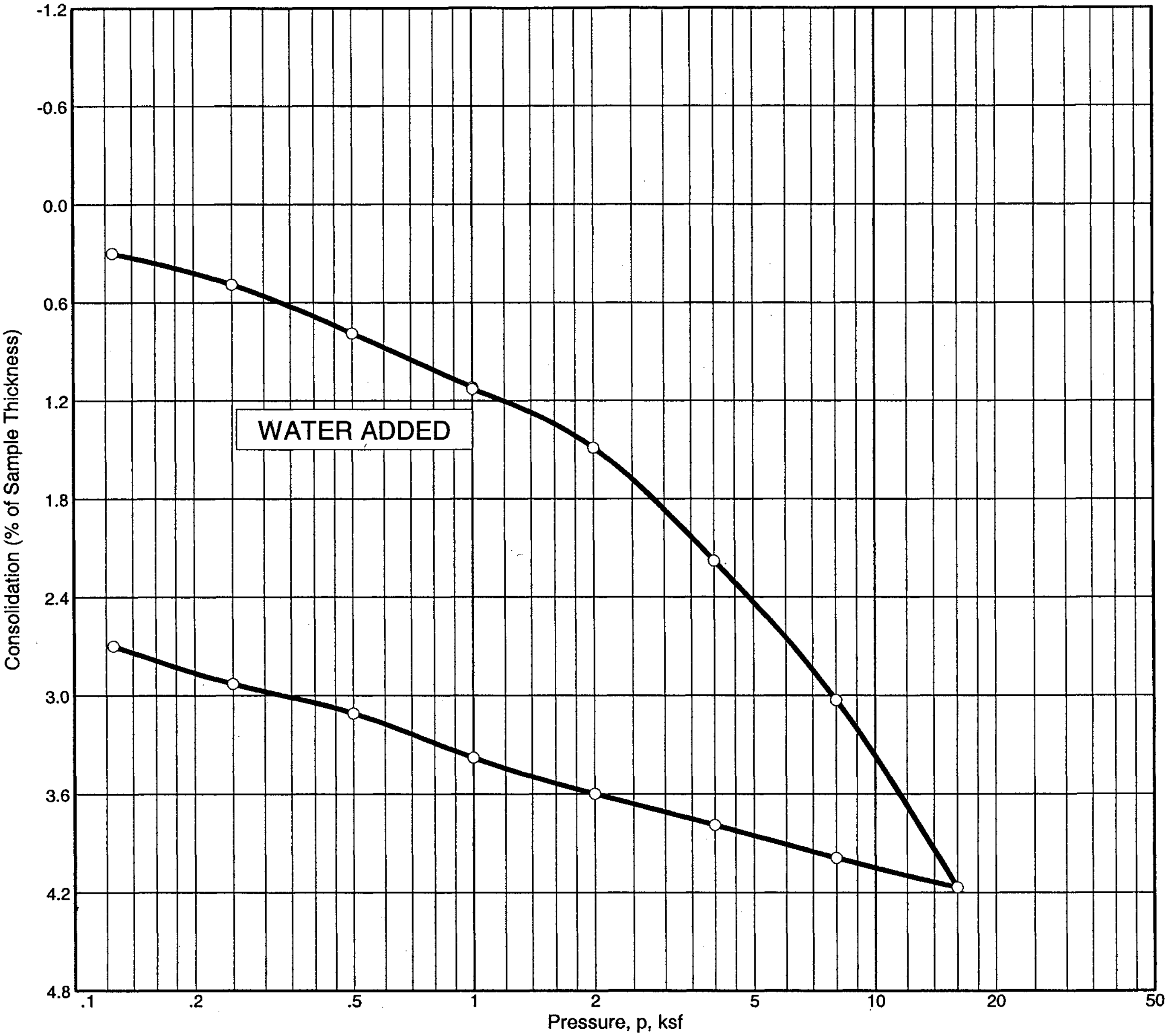
CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	106.1	20.3	96.3	1.000	0.559	2.65	0.06	0.48	3.75	ML
FINAL	109.1	22.8	100.0	0.973	0.517					

Source: RW-4 **Sample No.:** 1 **Elev./Depth:** 4'-5.5'
Material Description: Sandy silt with organic particles
Remarks:

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

Client: Newhall Land
Project: Tentative Tract 53425, River Park
City of Santa Clarita, California
Job No.: 03-1571-4 **Figure** B4.2

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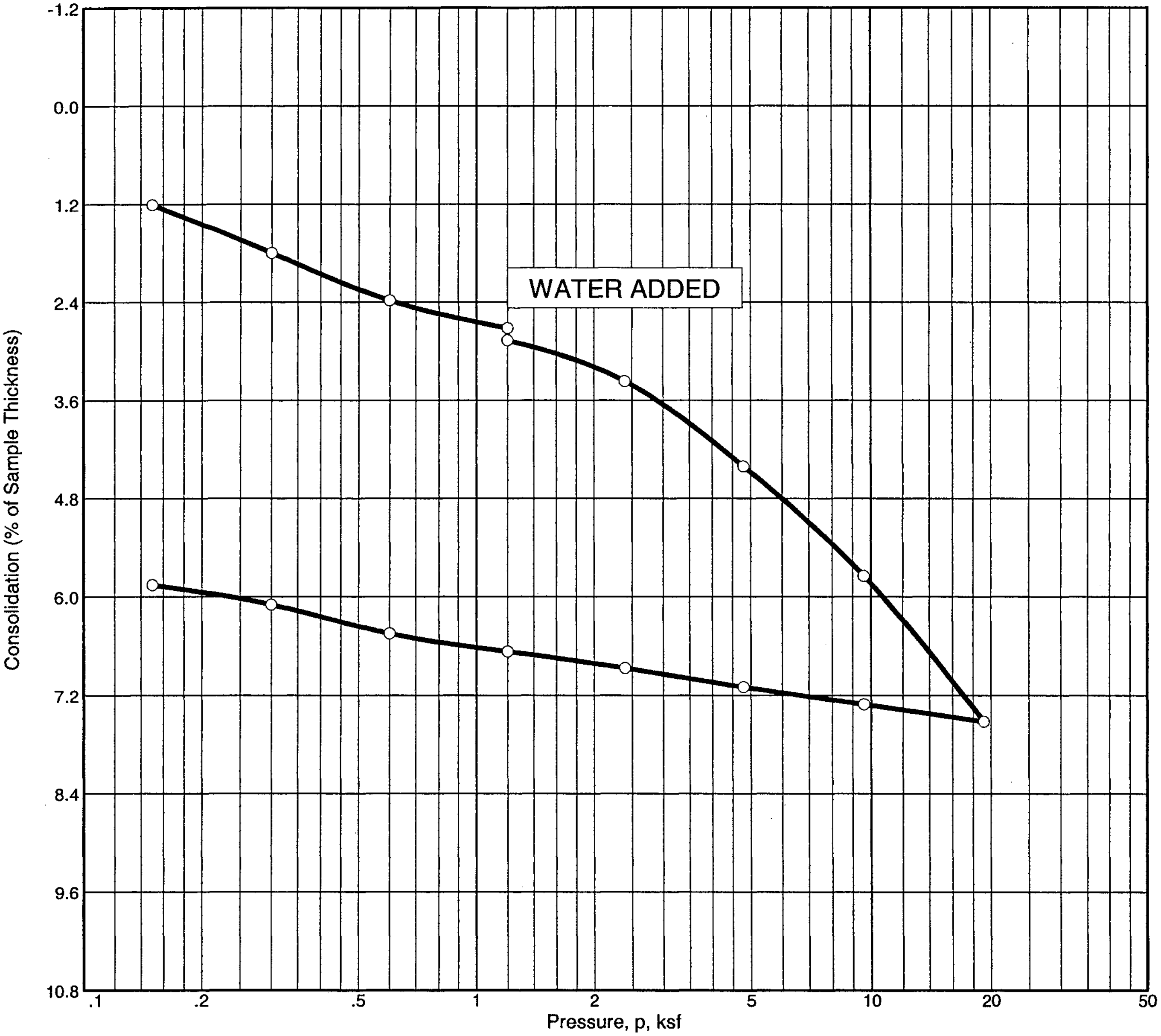
DATE

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	116.4	14.7	92.3	1.000	0.421	2.65	0.08	1.20	4.46	SC
FINAL	123.7	14.1	100.0	0.941	0.338					

Source: RW-7 **Sample No.:** 1 **Elev./Depth:** 10'
Material Description: Clayey sand
Remarks:

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ENGINEERING GEOLOGY, INC.

Client: Newhall Land
Project: Tentative Tract 53425, River Park
City of Santa Clarita, California
Job No.: 03-1571-4 **Figure** B4.3

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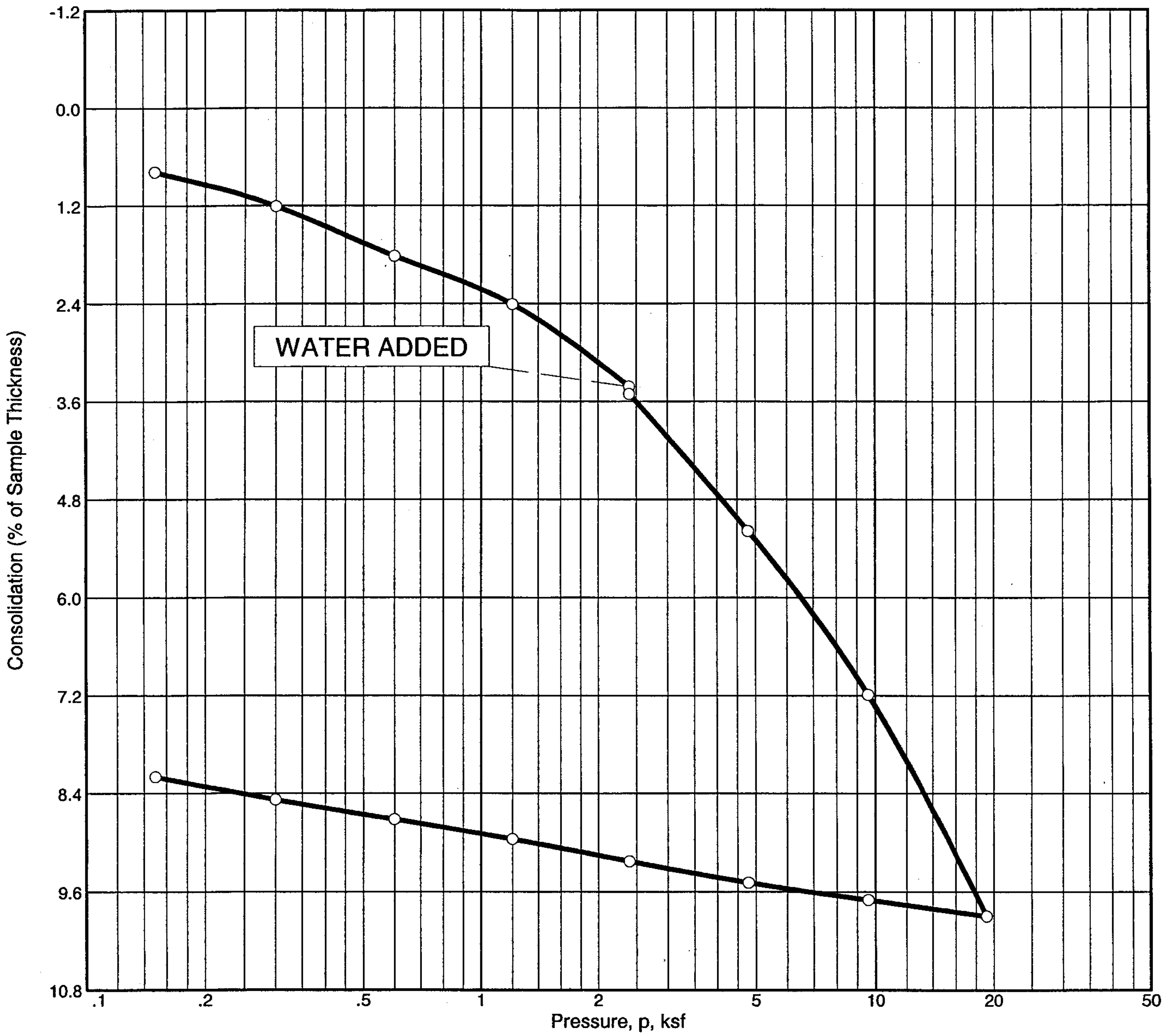
DRAWN BY	DATE

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	118.5	14.2	94.9	1.000	0.396	2.65	0.13	2.40	3.41	CL
FINAL	129.1	14.6	100.0	0.918	0.282					

Source: RW-7 **Sample No.:** 2 **Elev./Depth:** 20'
Material Description: Sandy clay
Remarks:

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ENGINEERING GEOLOGY, INC.

Client: Newhall Land
Project: Tentative Tract 53425, River Park
City of Santa Clarita, California
Job No.: 03-1571-4 **Figure** B4.4

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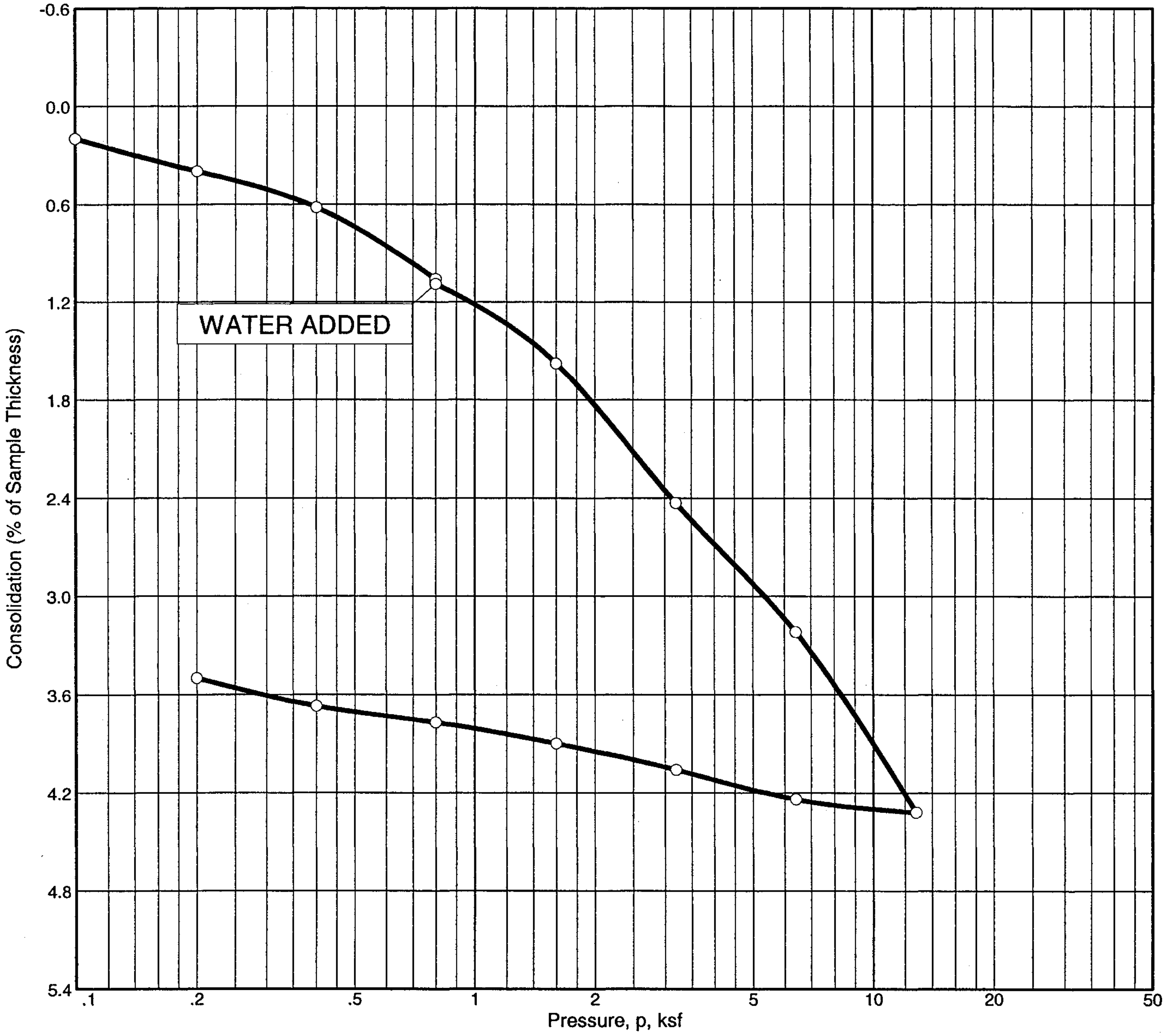
DRAWN BY
DATE

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	114.9	4.7	28.4	1.000	0.440	2.65	0.05	0.60	2.88	SM
FINAL	119.1	14.3	97.2	0.965	0.389					

Source: HS-2 **Elev./Depth:** 5
Material Description: Silty sand
Remarks:

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

Client: Newhall Land
Project: Tentative Tract 53425, River Park
City of Santa Clarita, California
Job No.: 03-1571-4 **Figure** B4.5

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CONSOLIDATION TEST REPORT

SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	101.5	2.8	11.8	1.000	0.630	2.65	0.12	0.60	0.52	SM
FINAL	114.1	16.7	98.2	0.889	0.450					

Source: HS-4 **Elev./Depth:** 5
Material Description: Silty sand
Remarks:

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

Client: Newhall Land
Project: Tentative Tract 53425, River Park
City of Santa Clarita, California
Job No.: 03-1571-4 **Figure** B4.6

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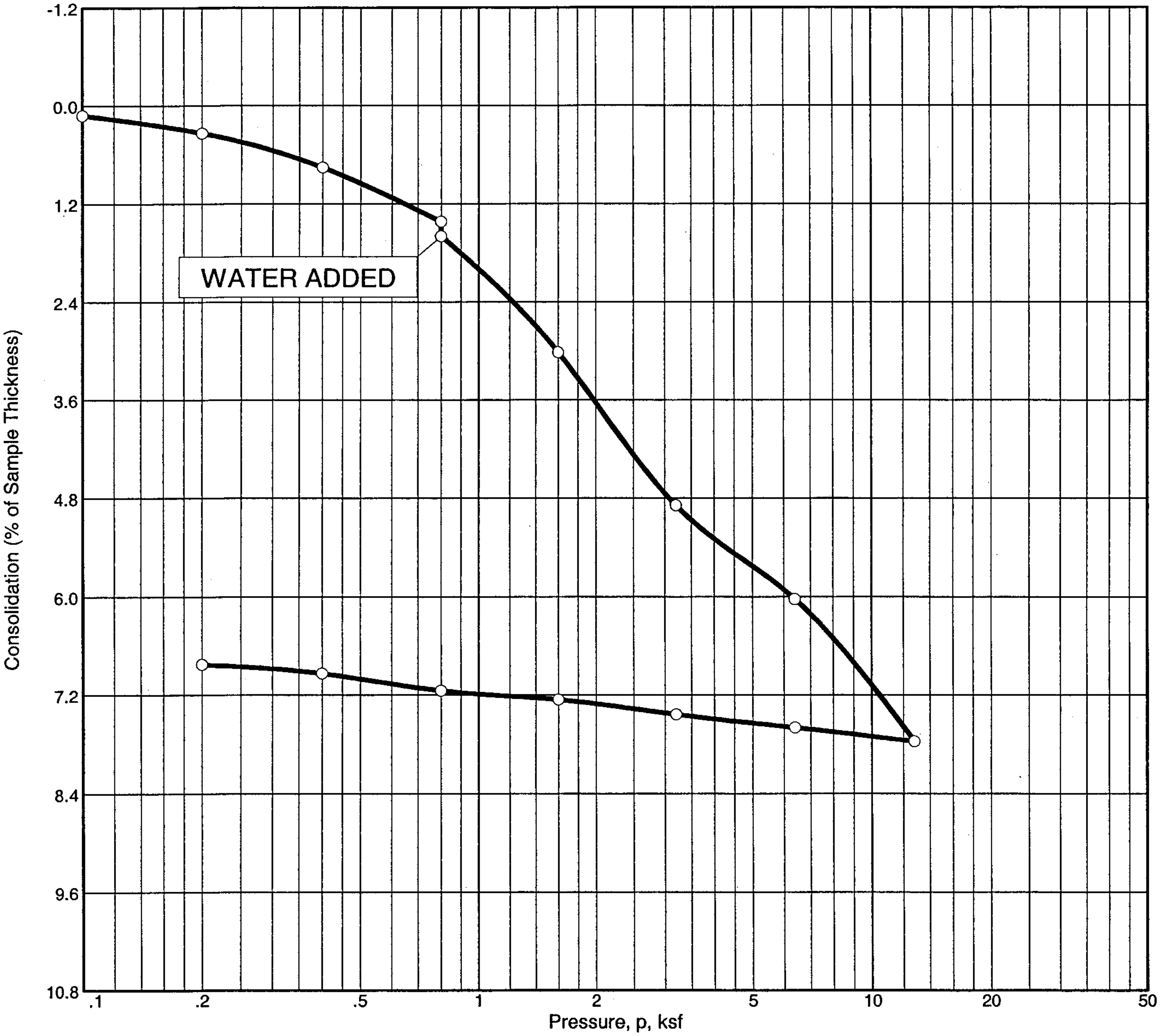
DRAWN BY | DATE

CONSOLIDATION TEST REPORT



SUMMARY OF TEST RESULTS

	DRY DENSITY (pcf)	MOISTURE CONTENT, (%)	SATURATION (%)	HEIGHT (in.)	VOID RATIO	SPECIFIC GRAVITY	C_c	P'_o (ksf)	P_c (ksf)	USCS
INITIAL	108.9	6.3	32.1	1.000	0.520	2.65	0.09	0.72	5.30	SM
FINAL	116.8	15.0	95.7	0.932	0.416					

Source: HS-5

Elev./Depth: 6

Material Description: Silty sand

Remarks:

ALLAN E. SEWARD

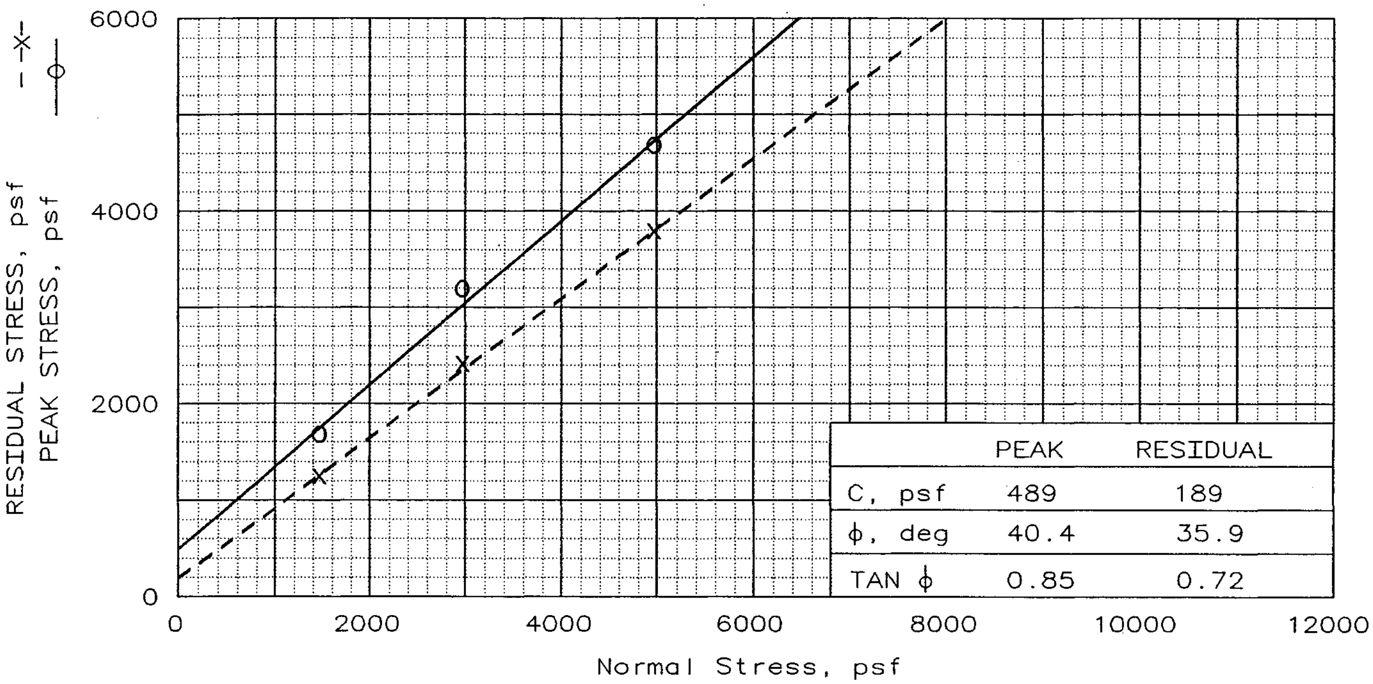
ENGINEERING GEOLOGY, INC.

Client: Newhall Land

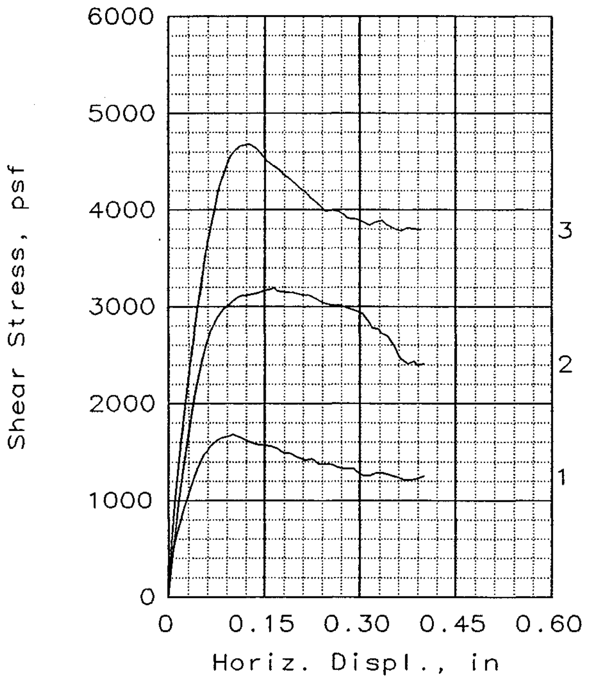
Project: Tentative Tract 53425, River Park
City of Santa Clarita, California

Job No.: 03-1571-4

Figure B4.7



	PEAK	RESIDUAL
C, psf	489	189
ϕ, deg	40.4	35.9
TAN ϕ	0.85	0.72



SAMPLE No:		1	2	3
INITIAL	WATER CONTENT, %	6.9	8.0	11.6
	DRY DENSITY, pcf	116.8	118.0	114.2
	SATURATION, %	44.3	52.6	68.4
	VOID RATIO	0.416	0.403	0.448
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	14.5	14.1	14.4
	DRY DENSITY, pcf	118.6	120.2	118.5
	SATURATION, %	97.2	99.4	96.4
	VOID RATIO	0.394	0.376	0.396
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.98	0.98	0.96
NORMAL STRESS, psf		1500	3000	5000
PEAK STRESS, psf		1680	3192	4680
DISPLACEMENT, in		0.10	0.17	0.13
RESIDUAL STRESS, psf		1248	2412	3792
DISPLACEMENT, in		0.40	0.40	0.40
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Poorly graded SAND (SP)

SPECIFIC GRAVITY= 2.65
REMARKS: Landslide debris (Qls)

% Fines=14

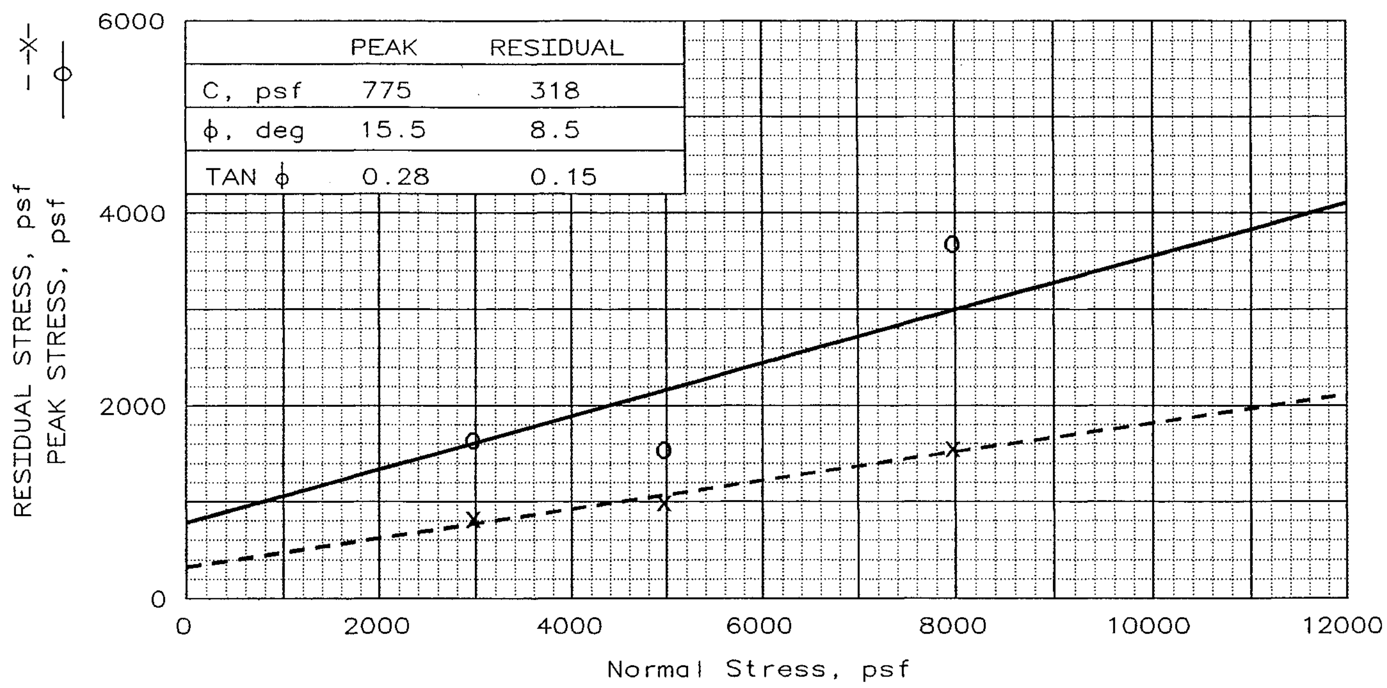
Fig. No.: B5.1

CLIENT: Newhall Land

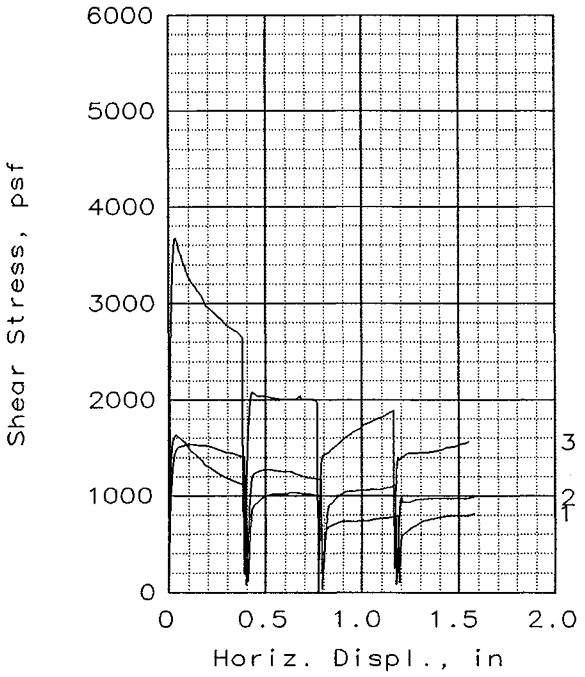
PROJECT: Tentative Tract 53425
River Park
SAMPLE LOCATION: BA-7 @ 20 ft.

PROJ. NO.: 03-1571-4 DATE: 4/4/03

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.



	PEAK	RESIDUAL
C, psf	775	318
φ, deg	15.5	8.5
TAN φ	0.28	0.15



SAMPLE No:		1	2	3
INITIAL	WATER CONTENT, %	19.1	19.6	18.0
	DRY DENSITY, pcf	109.9	108.9	111.9
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.505	0.519	0.478
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	16.1	10.1	10.4
	DRY DENSITY, pcf	115.9	130.3	129.6
	SATURATION, %	99.9	99.8	99.9
	VOID RATIO	0.427	0.270	0.277
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.95	0.84	0.86
NORMAL STRESS, psf		3000	5000	8000
PEAK STRESS, psf		1632	1536	3672
DISPLACEMENT, in		0.04	0.09	0.04
RESIDUAL STRESS, psf		816	984	1548
DISPLACEMENT, in		1.58	1.58	1.54
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty Clay (CL)

SPECIFIC GRAVITY= 2.65
REMARKS: Basal Landslide Plane
Hand-driven rings

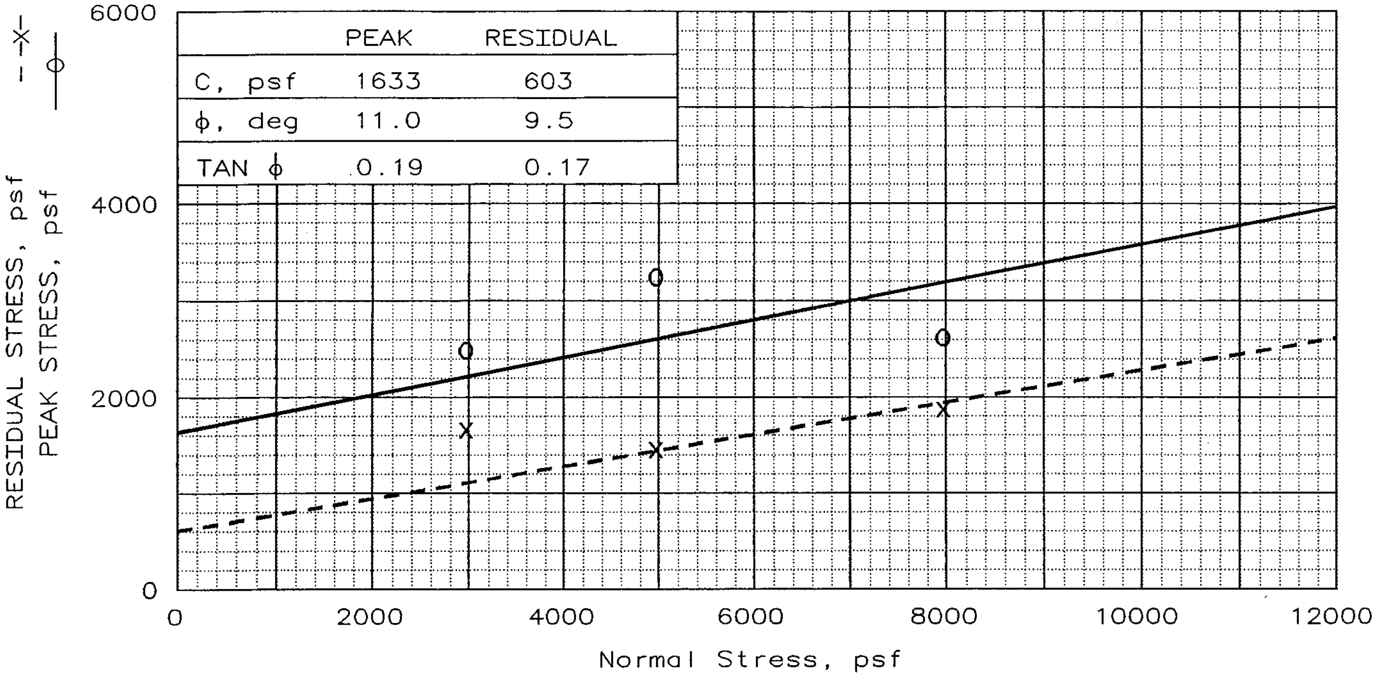
Fig. No.: B5.2

CLIENT: Castaic Lake Water Agency

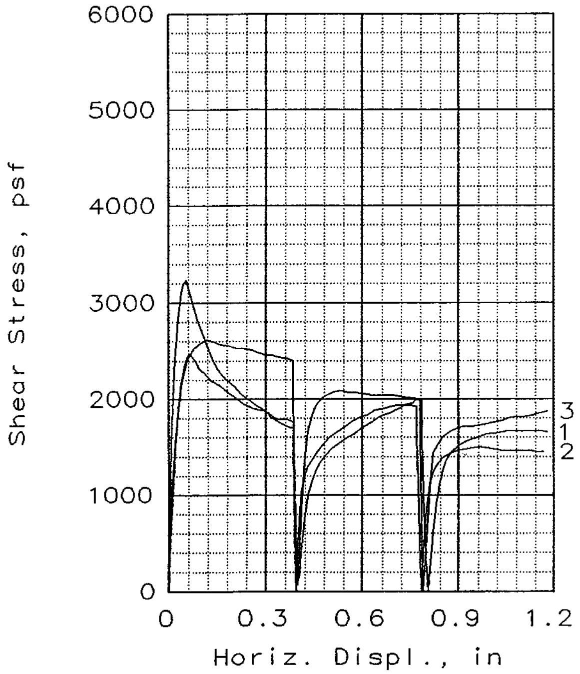
PROJECT: Castaic Lake Water Agency,
Road Alignment and Development
SAMPLE LOCATION: BA-3 @ 30 ft.

PROJ. NO.: 00-1571C-1 DATE: 3/3/00

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.



	PEAK	RESIDUAL
C, psf	1633	603
ϕ, deg	11.0	9.5
TAN ϕ	0.19	0.17



	SAMPLE No:	1	2	3
INITIAL	WATER CONTENT, %	13.8	13.3	16.2
	DRY DENSITY, pcf	111.3	111.0	108.7
	SATURATION, %	74.9	71.9	82.5
	VOID RATIO	0.487	0.491	0.522
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	17.7	17.7	18.1
	DRY DENSITY, pcf	111.3	112.7	111.8
	SATURATION, %	96.2	100.0	99.7
	VOID RATIO	0.487	0.468	0.480
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	0.98	0.97
	NORMAL STRESS, psf	3000	5000	8000
	PEAK STRESS, psf	2484	3240	2616
	DISPLACEMENT, in	0.07	0.06	0.12
	RESIDUAL STRESS, psf	1656	1452	1872
	DISPLACEMENT, in	1.18	1.17	1.18
	Strain rate, in/min	0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Fat Clay (CH)

LL= 51 PL= 23 PI= 28
SPECIFIC GRAVITY= 2.65
REMARKS: Basal Landslide Plane
Hand-driven rings
-#200 = 89.3%

Fig. No.: B5.3

CLIENT: Castaic Lake Water Agency

PROJECT: Castaic Lake Water Agency
Road Alignment and Development
SAMPLE LOCATION: BA-4 @ 29 ft.

PROJ. NO.: 00-1571C-1 DATE: 3/3/00

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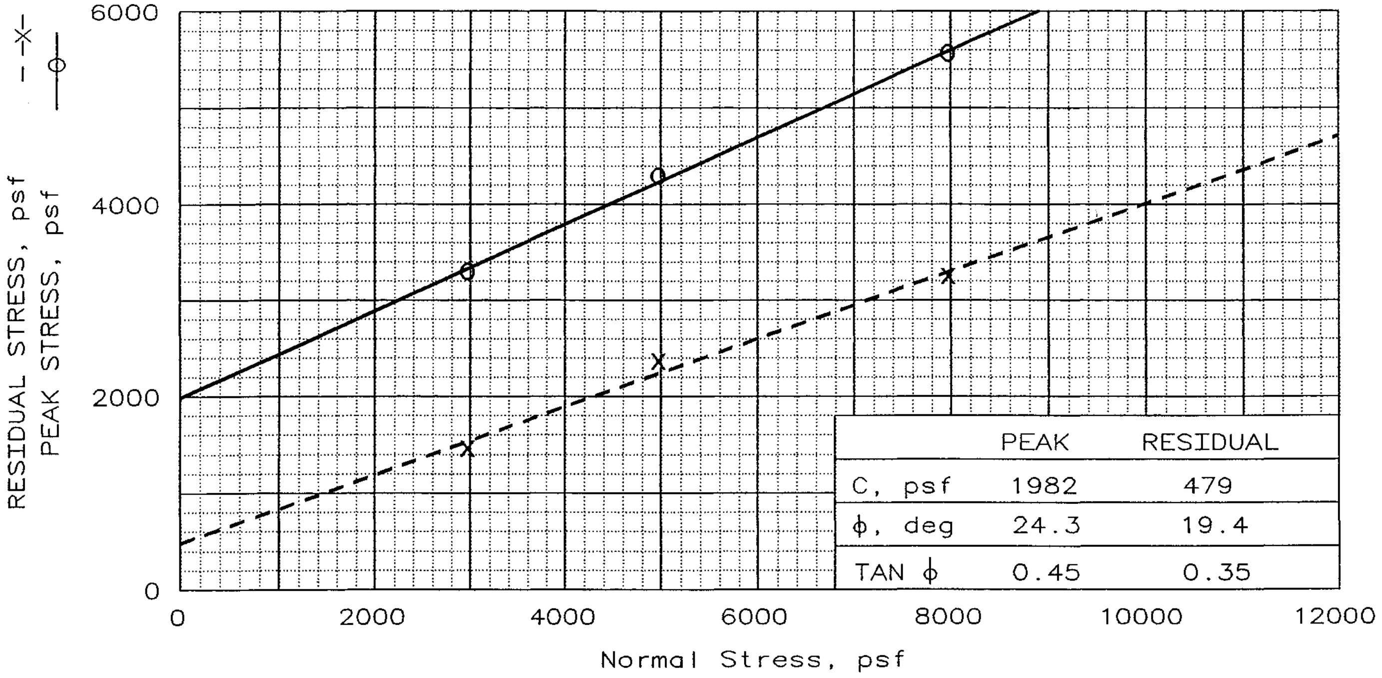
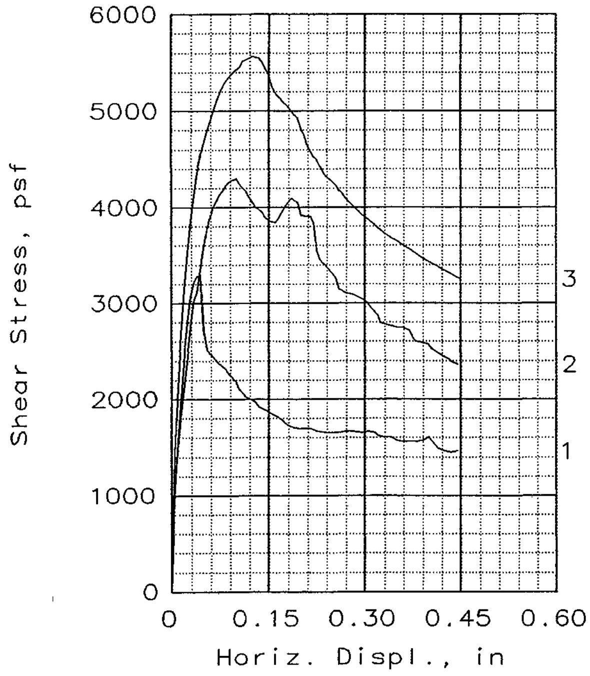


	PEAK	RESIDUAL
C, psf	1982	479
ϕ, deg	24.3	19.4
TAN ϕ	0.45	0.35



	SAMPLE No:	1	2	3
INITIAL	WATER CONTENT, %	14.4	14.4	14.6
	DRY DENSITY, pcf	112.2	111.7	111.8
	SATURATION, %	80.1	79.6	80.6
	VOID RATIO	0.475	0.481	0.480
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	15.5	13.2	8.2
	DRY DENSITY, pcf	117.1	122.7	135.8
	SATURATION, %	99.6	100.0	99.7
	VOID RATIO	0.413	0.349	0.218
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.96	0.91	0.82
NORMAL STRESS, psf		3000	5000	8000
PEAK STRESS, psf		3300	4296	5567
DISPLACEMENT, in		0.05	0.10	0.13
RESIDUAL STRESS, psf		1464	2364	3252
DISPLACEMENT, in		0.45	0.45	0.45
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Sandy SILTSTONE

SPECIFIC GRAVITY= 2.65
REMARKS: Bedrock (TQs) along
siltstone bedding
Hand-driven rings
-#200 = 90.6%
Fig. No.: B5.4

CLIENT: Castaic Lake Water Agency

PROJECT: Castaic Lake Water Agency,
Road Alignment and Development
SAMPLE LOCATION: BA-1 @ 47 ft.

PROJ. NO.: 00-1571C-1 DATE: 3/3/00

DIRECT SHEAR TEST REPORT
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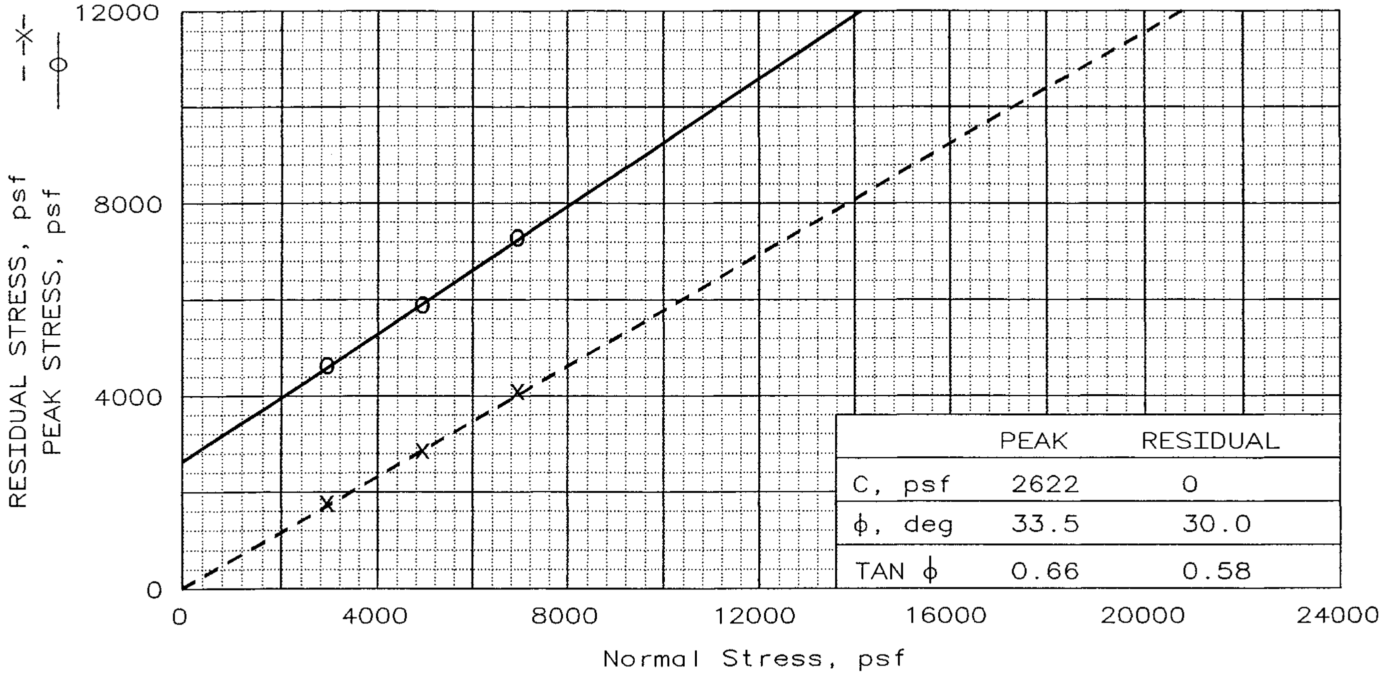
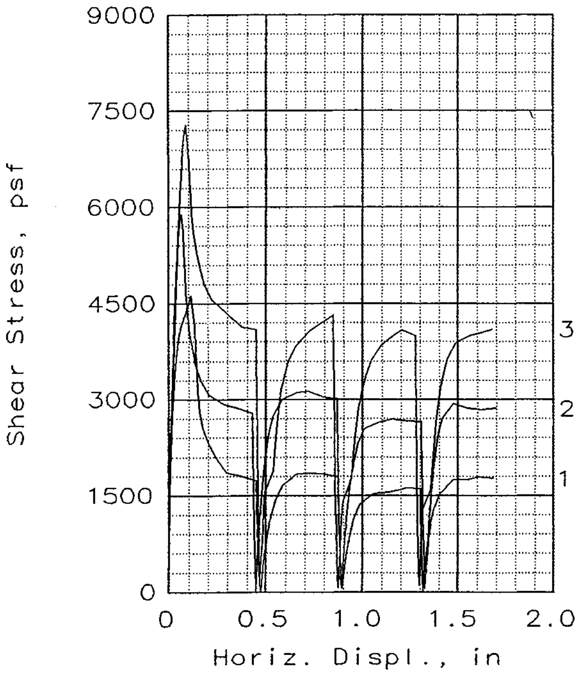


	PEAK	RESIDUAL
C, psf	2622	0
ϕ, deg	33.5	30.0
TAN ϕ	0.66	0.58



SAMPLE No:		1	2	3
INITIAL	WATER CONTENT, %	11.0	10.3	10.7
	DRY DENSITY, pcf	128.9	130.3	126.5
	SATURATION, %	103.1	101.6	91.8
	VOID RATIO	0.283	0.269	0.308
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	10.4	9.5	8.7
	DRY DENSITY, pcf	129.7	132.0	134.3
	SATURATION, %	99.9	99.6	99.3
	VOID RATIO	0.275	0.253	0.232
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.94
NORMAL STRESS, psf		3000	5000	7000
PEAK STRESS, psf		4632	5891	7283
DISPLACEMENT, in		0.12	0.07	0.09
RESIDUAL STRESS, psf		1764	2856	4092
DISPLACEMENT, in		1.69	1.70	1.68
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed
DESCRIPTION: Sandy CLAYSTONE

SPECIFIC GRAVITY= 2.65
REMARKS: Bedrock (TQs) along claystone bedding

Fig. No.: B5.5

CLIENT: Newhall Land

PROJECT: Tentative Tract 53425
River Park
SAMPLE LOCATION: BA-7 @ 50 ft.

PROJ. NO.: 02-1571-4 DATE: 11/14/02

DIRECT SHEAR TEST REPORT
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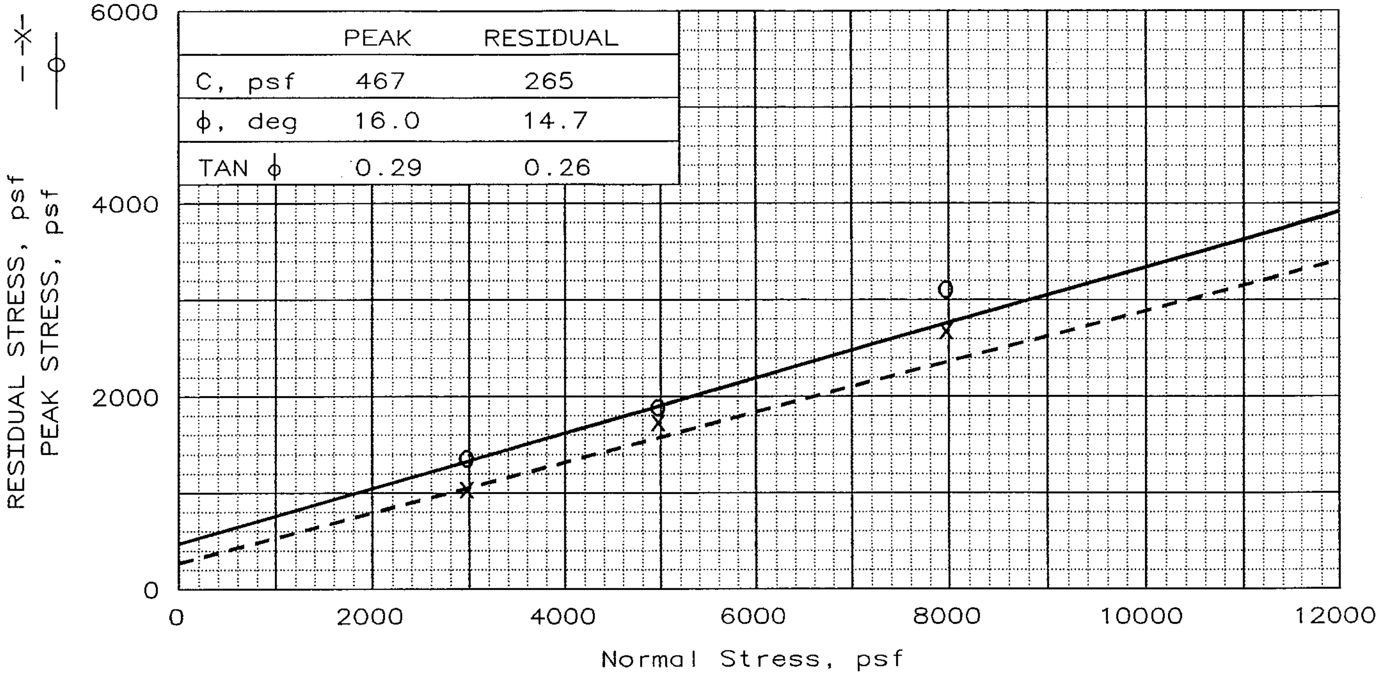
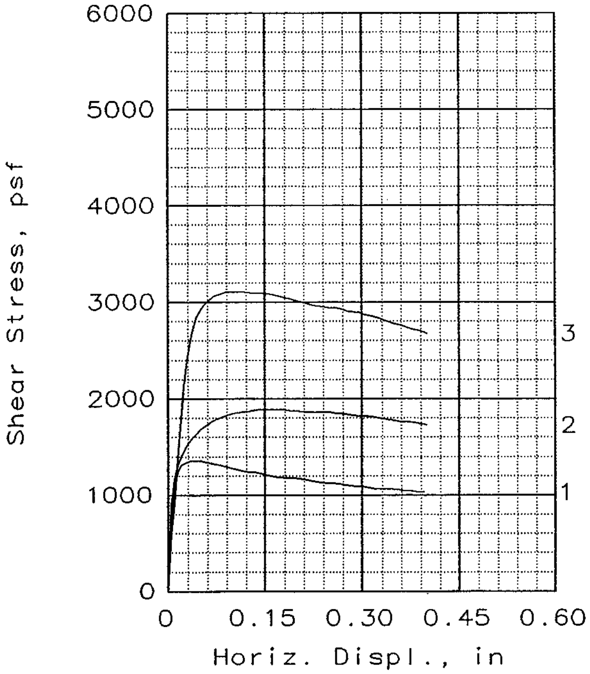


	PEAK	RESIDUAL
C, psf	467	265
ϕ, deg	16.0	14.7
TAN ϕ	0.29	0.26



	SAMPLE No:	1	2	3
INITIAL	WATER CONTENT, %	19.5	18.9	18.1
	DRY DENSITY, pcf	108.8	110.1	111.4
	SATURATION, %	99.2	99.9	98.7
	VOID RATIO	0.521	0.502	0.485
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	18.7	17.6	16.0
	DRY DENSITY, pcf	109.8	112.7	116.1
	SATURATION, %	97.5	99.8	99.6
	VOID RATIO	0.507	0.468	0.425
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.98	0.96
NORMAL STRESS, psf		3000	5000	8000
PEAK STRESS, psf		1356	1884	3108
DISPLACEMENT, in		0.04	0.14	0.09
RESIDUAL STRESS, psf		1032	1728	2676
DISPLACEMENT, in		0.40	0.40	0.40
Strain rate, in/min		0.0050	0.0050	0.0050

SAMPLE TYPE: Undisturbed

DESCRIPTION: CLAYSTONE (Lean to Fat Clay) (CL/CH)

LL= 50 PL= 22 PI= 28

SPECIFIC GRAVITY= 2.65

REMARKS: Bedrock (TQs) along claystone bedding
Hand-driven rings
-#200 = 96.9%

Fig. No.: B5.6

CLIENT: Castaic Lake Water Agency

PROJECT: Castaic Lake Water Agency
Road Alignment and Development

SAMPLE LOCATION: BA-7 @ 54'

PROJ. NO.: 00-1571C-1 DATE: 3/3/00

DIRECT SHEAR TEST REPORT

ALLAN E. SEWARD
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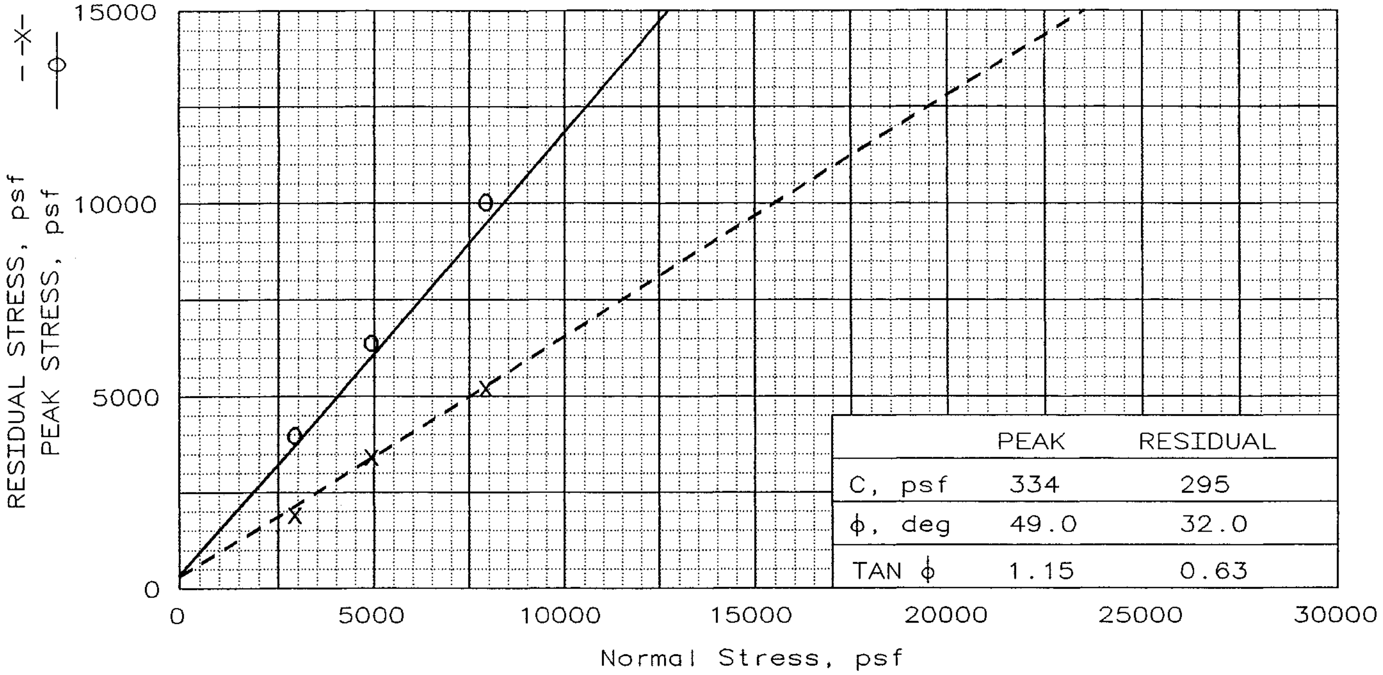
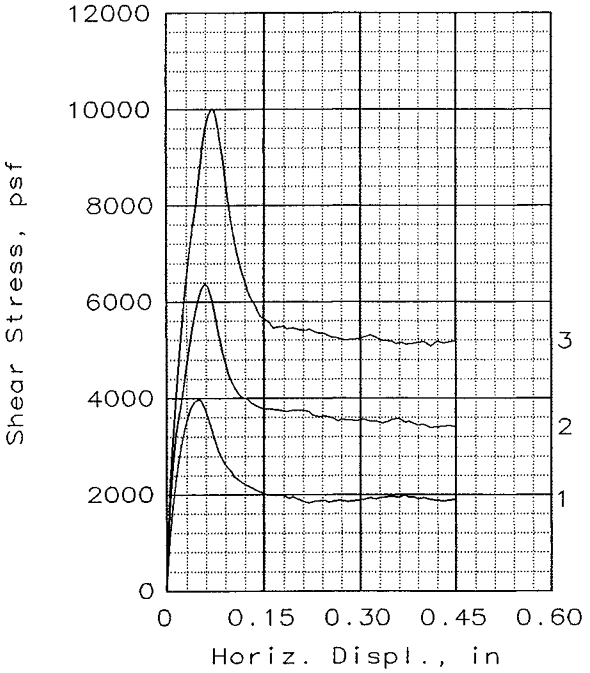


	PEAK	RESIDUAL
C, psf	334	295
ϕ, deg	49.0	32.0
TAN ϕ	1.15	0.63



	SAMPLE No:	1	2	3
INITIAL	WATER CONTENT, %	7.5	6.7	7.4
	DRY DENSITY, pcf	130.0	131.9	131.3
	SATURATION, %	72.5	68.1	75.8
	VOID RATIO	0.272	0.264	0.260
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	10.2	9.4	9.0
	DRY DENSITY, pcf	130.2	133.3	133.5
	SATURATION, %	100.0	99.7	99.6
	VOID RATIO	0.271	0.250	0.240
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	0.99	0.98
	NORMAL STRESS, psf	3000	5000	8000
	PEAK STRESS, psf	3972	6371	10019
	DISPLACEMENT, in	0.05	0.06	0.07
	RESIDUAL STRESS, psf	1908	3408	5196
	DISPLACEMENT, in	0.45	0.45	0.45
	Strain rate, in/min	0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: SANDSTONE

SPECIFIC GRAVITY= 2.65
REMARKS: Bedrock (TQs)
Cross-bedding

Fig. No.: B5.7

CLIENT: Castaic Lake Water Agency

PROJECT: Castaic Lake Water Agency
Road Alignment and Development
SAMPLE LOCATION: BA-5 @ 30 ft.

PROJ. NO.: 00-1571C-1 DATE: 3/3/00

DIRECT SHEAR TEST REPORT
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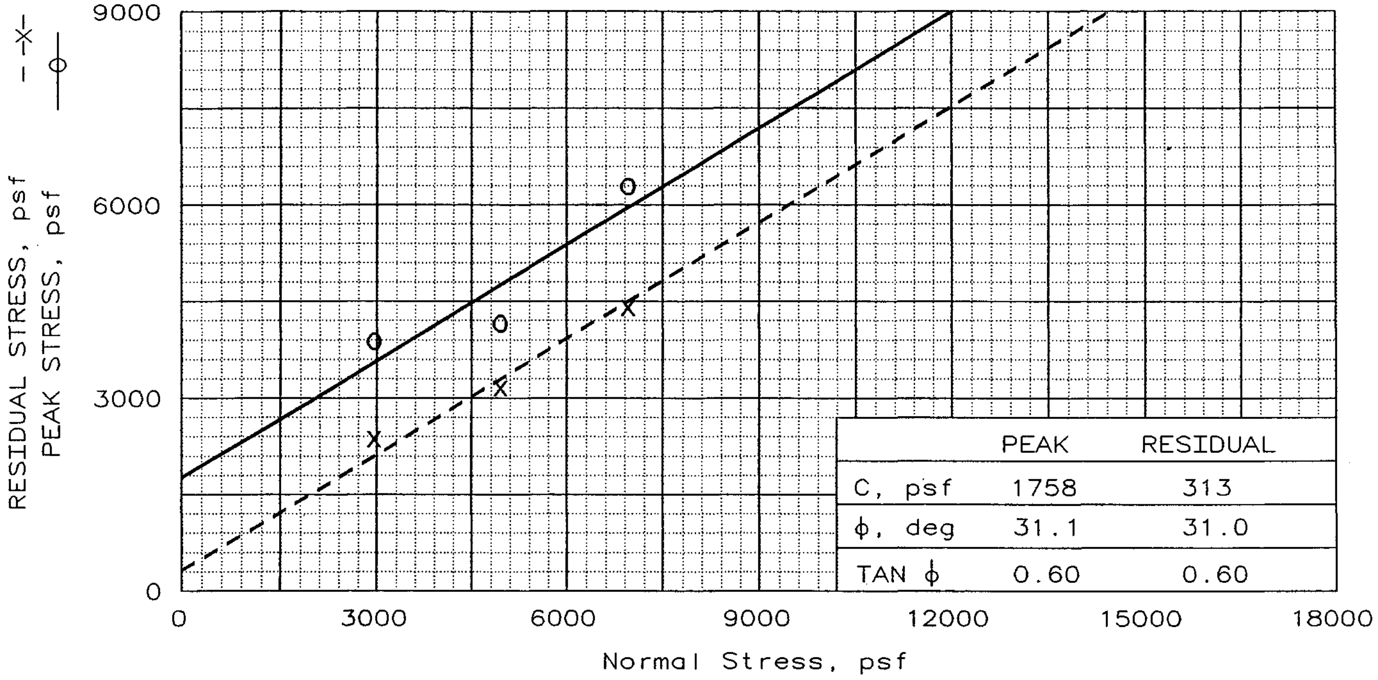
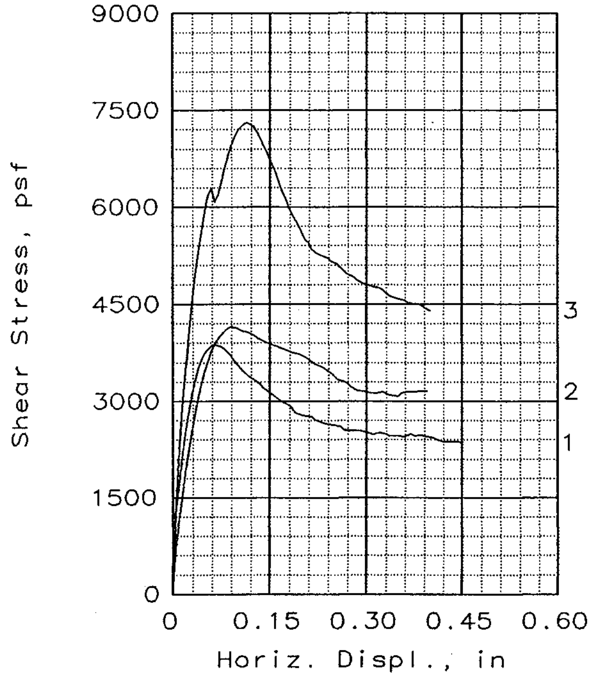


	PEAK	RESIDUAL
C, psf	1758	313
ϕ, deg	31.1	31.0
TAN ϕ	0.60	0.60



	SAMPLE No:	1	2	3
INITIAL	WATER CONTENT, %	9.3	10.2	8.4
	DRY DENSITY, pcf	127.8	123.4	131.6
	SATURATION, %	83.4	79.7	87.0
	VOID RATIO	0.295	0.340	0.257
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	10.6	7.4	8.4
	DRY DENSITY, pcf	129.0	138.2	135.0
	SATURATION, %	99.5	99.4	99.0
	VOID RATIO	0.283	0.197	0.226
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.89	0.98
	NORMAL STRESS, psf	3000	5000	7000
	PEAK STRESS, psf	3876	4152	6287
	DISPLACEMENT, in	0.07	0.09	0.06
	RESIDUAL STRESS, psf	2364	3156	4404
	DISPLACEMENT, in	0.45	0.40	0.40
	Strain rate, in/min	0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty SANDSTONE
(SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Bedrock (TQs)
Cross-bedding
% Fines=36

Fig. No.: B5.8

CLIENT: Newhall Land

PROJECT: Tentative Tract 53425
River Park
SAMPLE LOCATION: BA-6 @ 77 ft.

PROJ. NO.: 03-1571-4 DATE: 4/4/03

DIRECT SHEAR TEST REPORT
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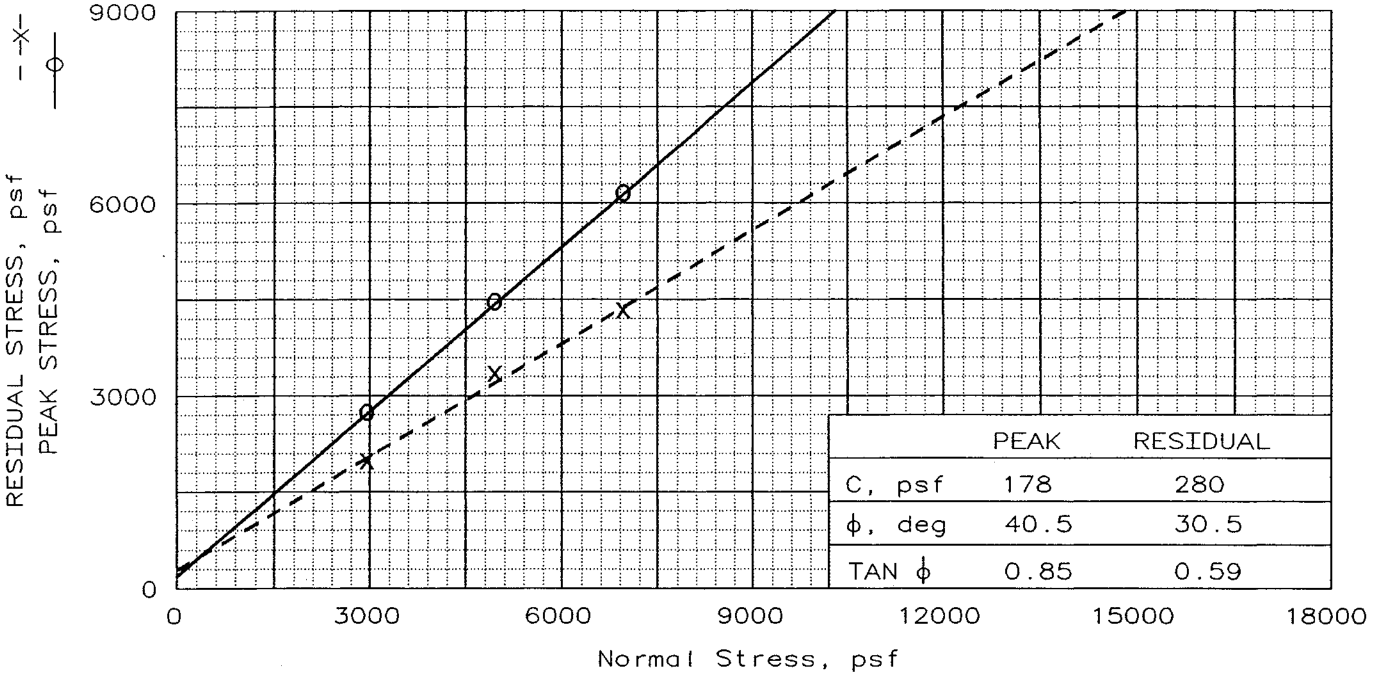
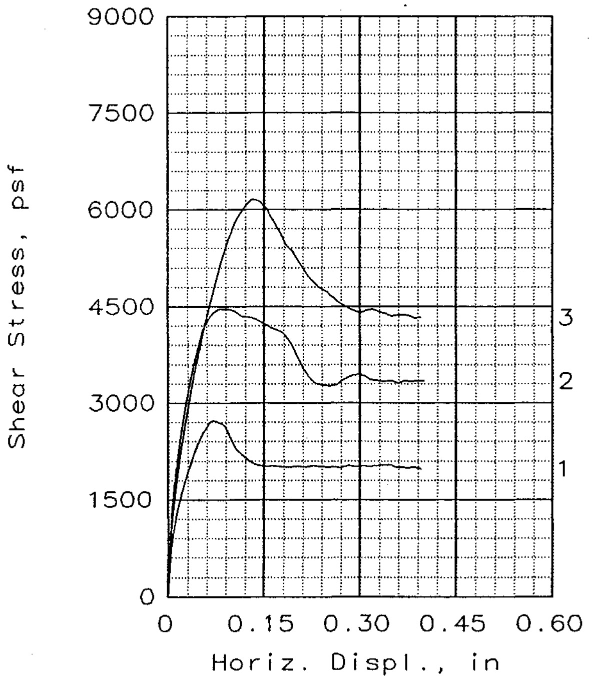


	PEAK	RESIDUAL
C, psf	178	280
ϕ, deg	40.5	30.5
TAN ϕ	0.85	0.59



	SAMPLE No:	1	2	3
INITIAL	WATER CONTENT, %	8.6	8.7	8.5
	DRY DENSITY, pcf	116.1	116.7	113.1
	SATURATION, %	53.3	55.2	48.7
	VOID RATIO	0.425	0.418	0.462
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	14.7	14.6	14.7
	DRY DENSITY, pcf	117.3	119.1	116.7
	SATURATION, %	94.9	99.4	93.2
	VOID RATIO	0.411	0.389	0.417
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.98	0.97
	NORMAL STRESS, psf	3000	5000	7000
	PEAK STRESS, psf	2736	4464	6155
	DISPLACEMENT, in	0.07	0.08	0.13
	RESIDUAL STRESS, psf	1980	3348	4332
	DISPLACEMENT, in	0.40	0.40	0.40
	Strain rate, in/min	0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty SANDSTONE
(SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Bedrock (TQs)
Cross-bedding

Fig. No.: B5.9

CLIENT: Newhall Land

PROJECT: Tentative Tract 53425
River Park
SAMPLE LOCATION: BA-7 @ 40 ft.

PROJ. NO.: 03-1571-4 DATE: 4/4/03

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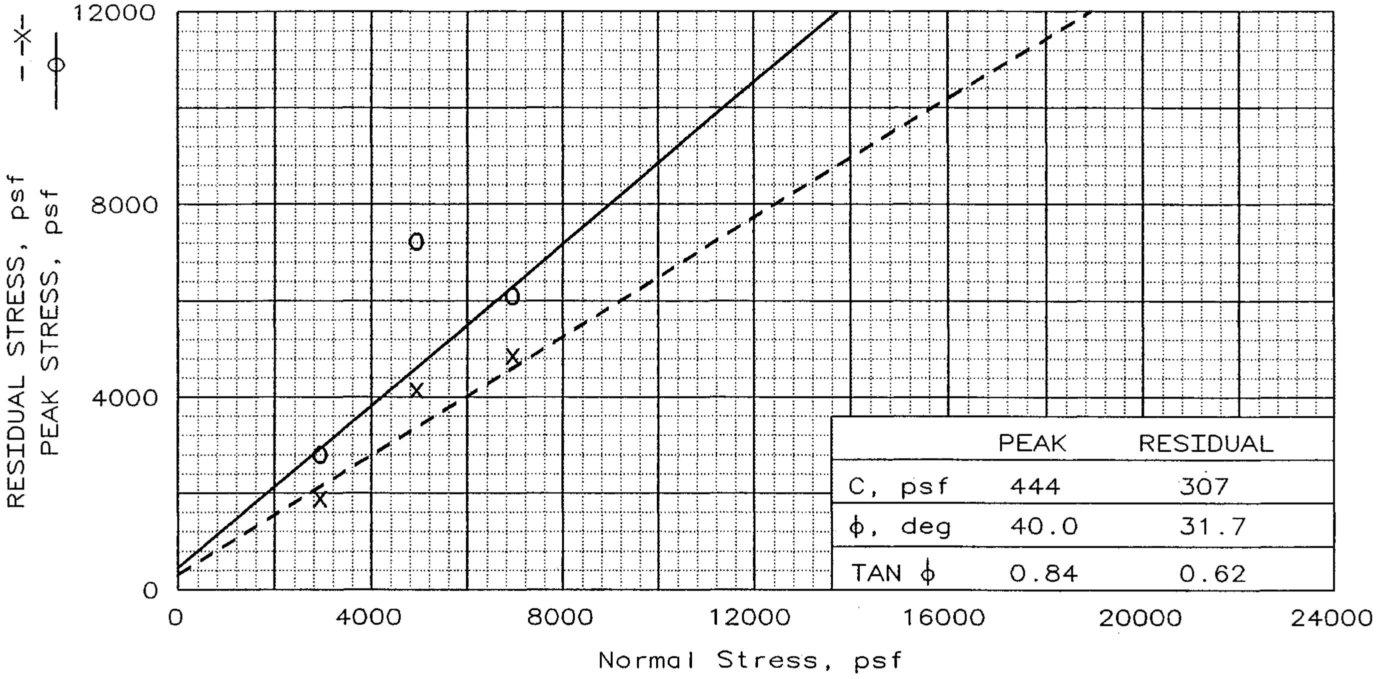
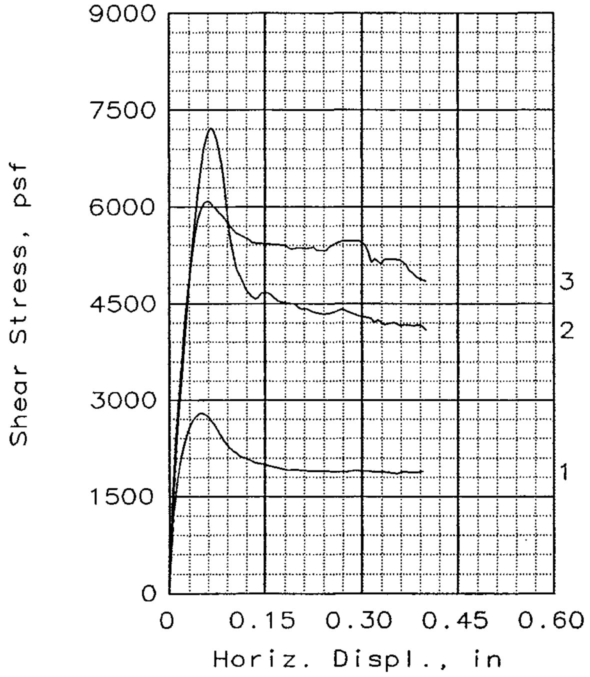


	PEAK	RESIDUAL
C, psf	444	307
ϕ, deg	40.0	31.7
TAN ϕ	0.84	0.62



	SAMPLE No:	1	2	3
INITIAL	WATER CONTENT, %	9.5	7.0	7.6
	DRY DENSITY, pcf	122.0	130.2	127.1
	SATURATION, %	70.6	68.5	66.6
	VOID RATIO	0.356	0.270	0.302
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	12.9	9.3	10.6
	DRY DENSITY, pcf	123.1	132.0	129.2
	SATURATION, %	99.8	97.5	100.0
	VOID RATIO	0.344	0.254	0.280
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.98
	NORMAL STRESS, psf	3000	5000	7000
	PEAK STRESS, psf	2796	7223	6095
	DISPLACEMENT, in	0.05	0.07	0.06
	RESIDUAL STRESS, psf	1884	4140	4848
	DISPLACEMENT, in	0.40	0.40	0.40
	Strain rate, in/min	0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: SANDSTONE

SPECIFIC GRAVITY= 2.65
REMARKS: Bedrock (TQs)
Cross-bedding
% Fines=28

Fig. No.: B5.10

CLIENT: Newhall Land

PROJECT: Tentative Tract 53425
River Park
SAMPLE LOCATION: BA-8 @ 30 ft.

PROJ. NO.: 03-1571-4 DATE: 4/4/03

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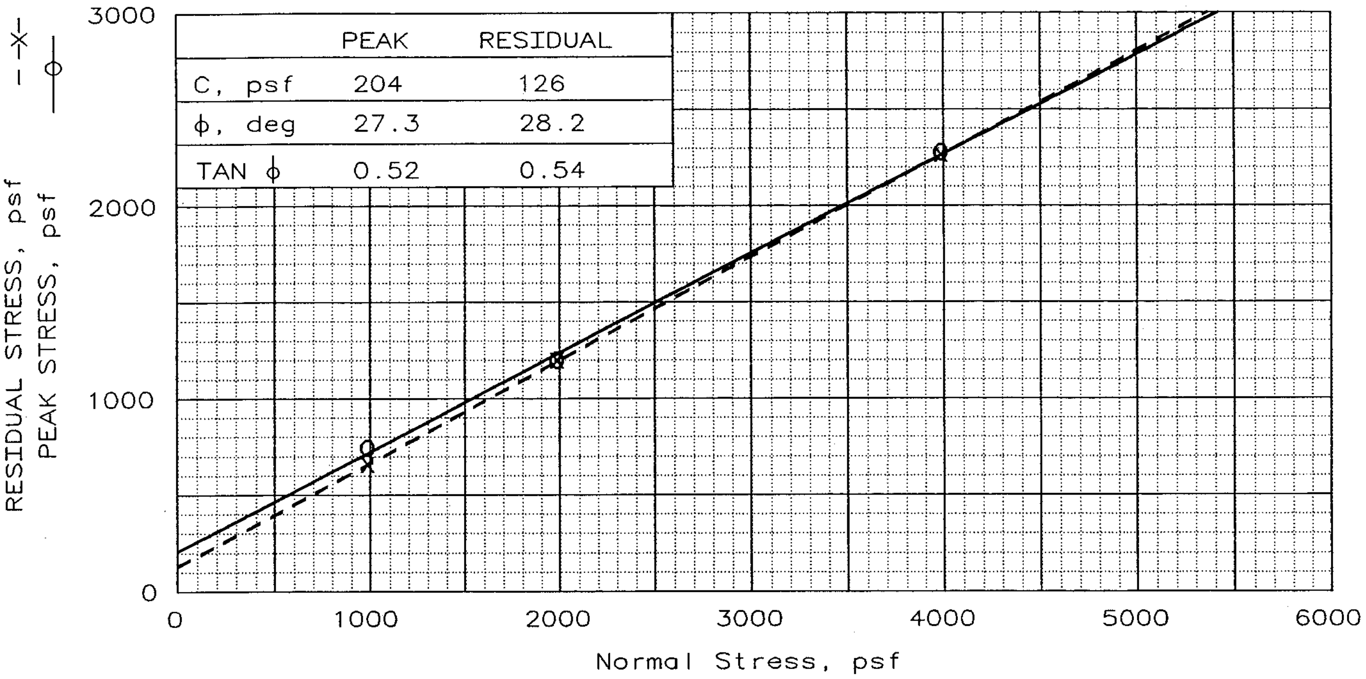
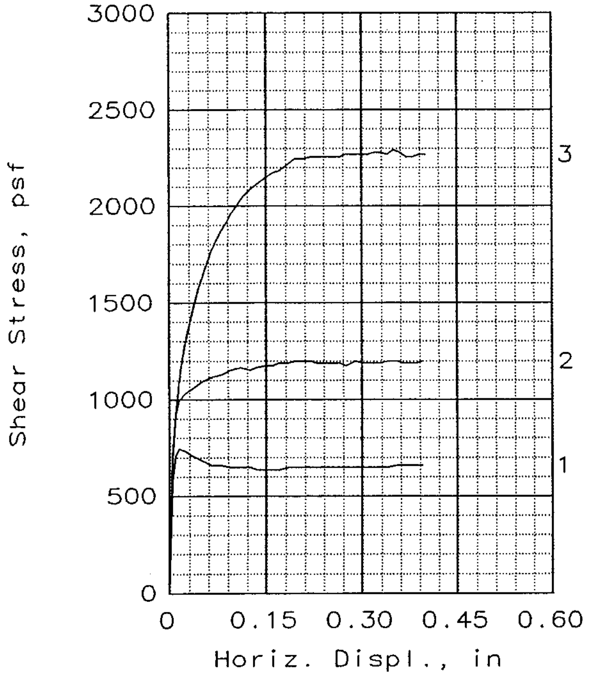


	PEAK	RESIDUAL
C, psf	204	126
ϕ, deg	27.3	28.2
TAN ϕ	0.52	0.54



SAMPLE No:		1	2	3
INITIAL	WATER CONTENT, %	10.6	11.2	11.5
	DRY DENSITY, pcf	111.9	111.7	111.5
	SATURATION, %	58.9	61.6	62.9
	VOID RATIO	0.479	0.482	0.484
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	17.3	17.1	16.4
	DRY DENSITY, pcf	112.7	113.5	114.9
	SATURATION, %	97.9	99.0	98.8
	VOID RATIO	0.468	0.457	0.440
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.98	0.97
NORMAL STRESS, psf		1000	2000	4000
PEAK STRESS, psf		744	1200	2280
DISPLACEMENT, in		0.02	0.20	0.36
RESIDUAL STRESS, psf		660	1200	2268
DISPLACEMENT, in		0.40	0.40	0.40
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: 90% Remolded
DESCRIPTION: Silty SAND (SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Compacted Fill
Remold of Qt
% Fines=33

Fig. No.: B5.11

CLIENT: Newhall Land

PROJECT: Tentative Tract 53425
River Park
SAMPLE LOCATION: BA-6 @ 5 ft.

PROJ. NO.: 03-1571-4 DATE: 4/4/03

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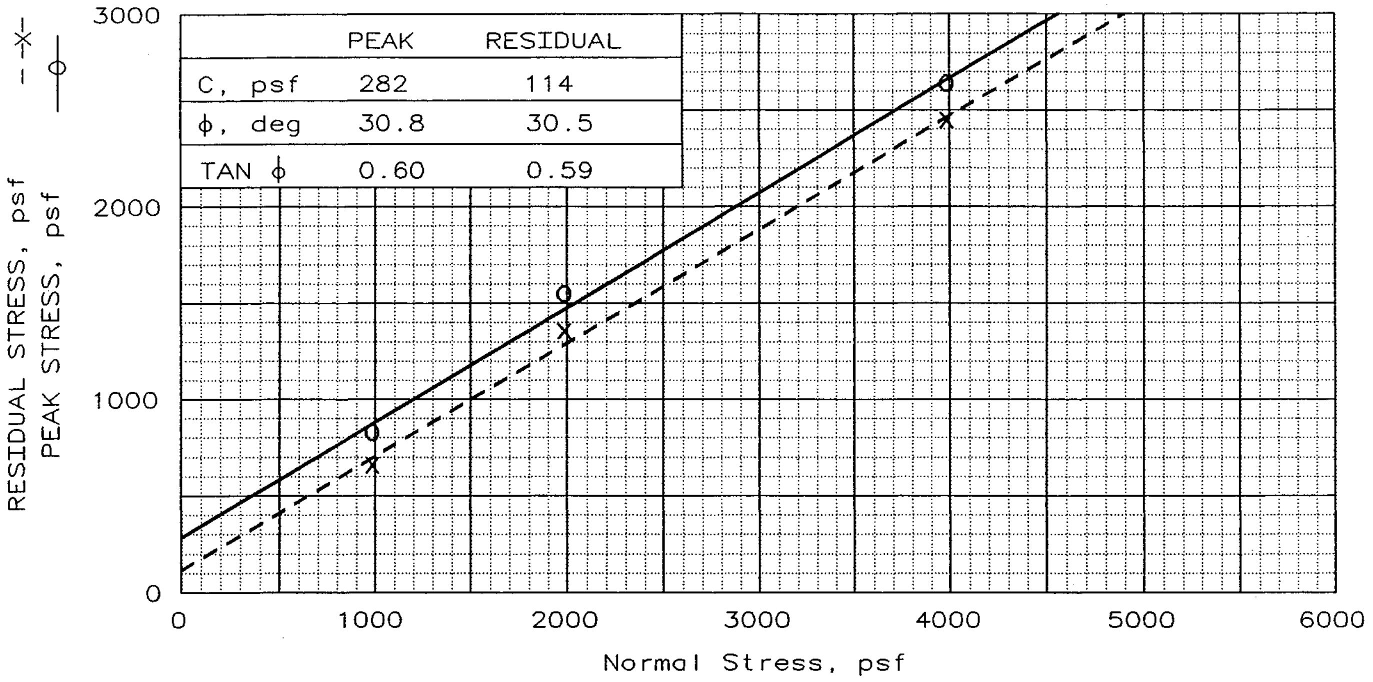
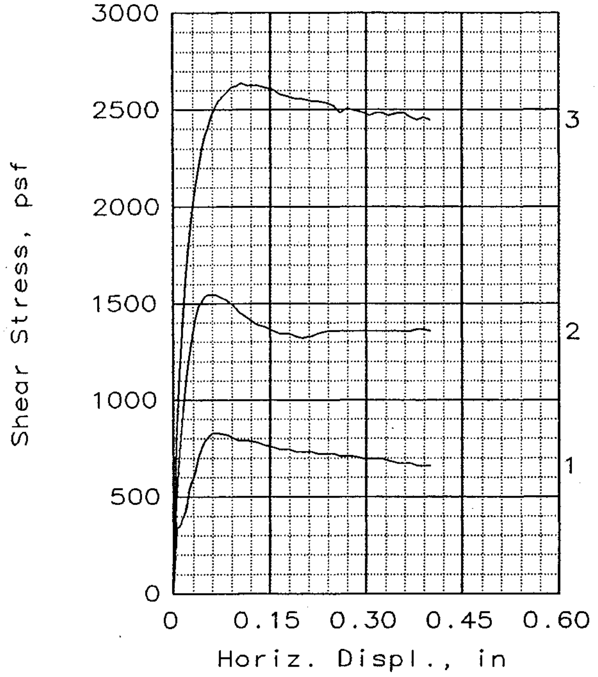


	PEAK	RESIDUAL
C, psf	282	114
ϕ, deg	30.8	30.5
TAN ϕ	0.60	0.59



	SAMPLE No:	1	2	3
INITIAL	WATER CONTENT, %	9.0	8.6	9.5
	DRY DENSITY, pcf	118.3	118.5	117.9
	SATURATION, %	59.7	57.4	62.3
	VOID RATIO	0.399	0.397	0.403
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	18.1	17.0	15.4
	DRY DENSITY, pcf	93.3	97.5	92.2
	SATURATION, %	62.0	64.5	51.4
	VOID RATIO	0.773	0.697	0.794
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.27	1.22	1.28
	NORMAL STRESS, psf	1000	2000	4000
	PEAK STRESS, psf	828	1548	2640
	DISPLACEMENT, in	0.06	0.06	0.11
	RESIDUAL STRESS, psf	660	1356	2448
	DISPLACEMENT, in	0.40	0.40	0.40
	Strain rate, in/min	0.0100	0.0100	0.0100

SAMPLE TYPE: 90% Remolded
DESCRIPTION: Silty SAND (SM)

LL= 29 PL= 23 PI= 6
SPECIFIC GRAVITY= 2.65
REMARKS: Compacted Fill
Remold of TQs
% Fines=34

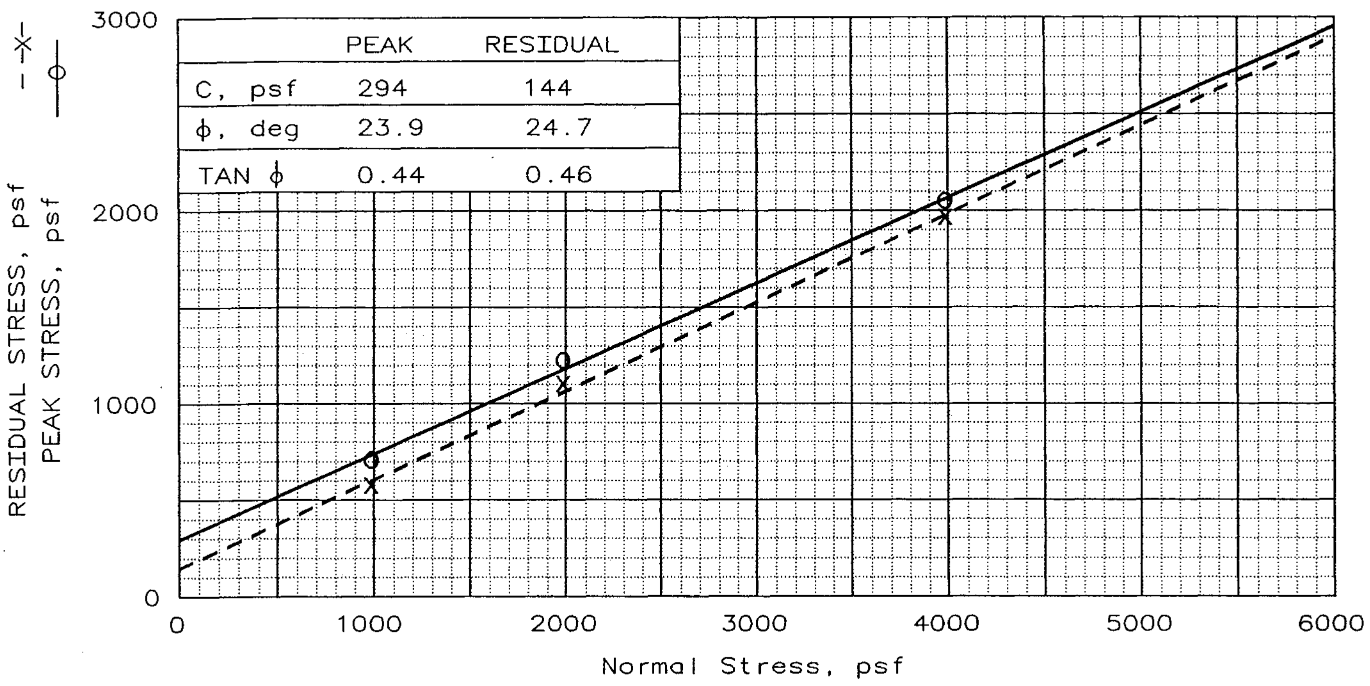
Fig. No.: B5.12

CLIENT: Newhall Land

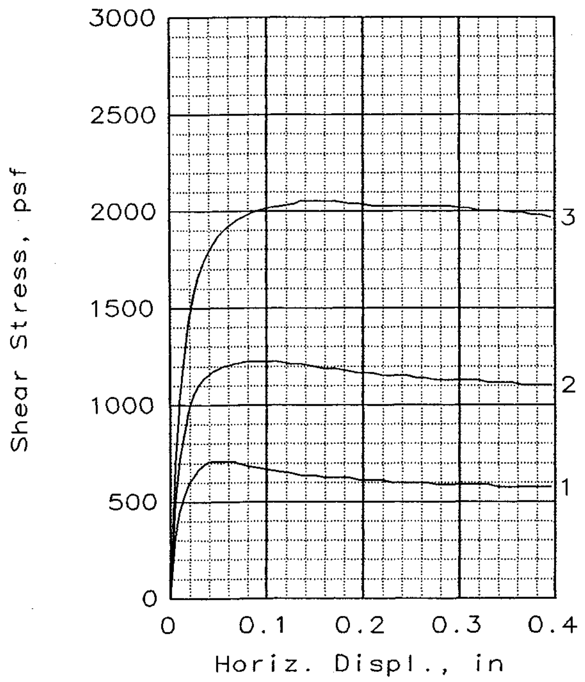
PROJECT: Tentative Tract 53425
River Park
SAMPLE LOCATION: BA-6 @ 23 ft.

PROJ. NO.: 03-1571-4 DATE: 4/4/03

DIRECT SHEAR TEST REPORT
ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.



	PEAK	RESIDUAL
C, psf	294	144
ϕ, deg	23.9	24.7
TAN ϕ	0.44	0.46



SAMPLE No:		1	2	3
INITIAL	WATER CONTENT, %	13.0	24.5	12.7
	DRY DENSITY, pcf	112.8	101.5	110.2
	SATURATION, %	73.7	103.1	67.1
	VOID RATIO	0.466	0.630	0.501
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	22.1	19.9	20.6
	DRY DENSITY, pcf	87.3	80.7	90.9
	SATURATION, %	65.4	50.1	66.5
	VOID RATIO	0.896	1.051	0.820
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.29	1.26	1.21
NORMAL STRESS, psf		1000	2000	4000
PEAK STRESS, psf		708	1224	2052
DISPLACEMENT, in		0.04	0.08	0.14
RESIDUAL STRESS, psf		576	1104	1968
DISPLACEMENT, in		0.40	0.40	0.40
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: 90% Remolded
DESCRIPTION: Sandy lean CLAY
(CL)

SPECIFIC GRAVITY= 2.65
REMARKS: Compacted Fill
Remold of TQs
% Fines=70

Fig. No.: B5.13

CLIENT: Newhall Land

PROJECT: Tentative Tract 53425
River Park
SAMPLE LOCATION: BA-6 @ 40 ft.

PROJ. NO.: 03-1571-4 DATE: 4/4/03

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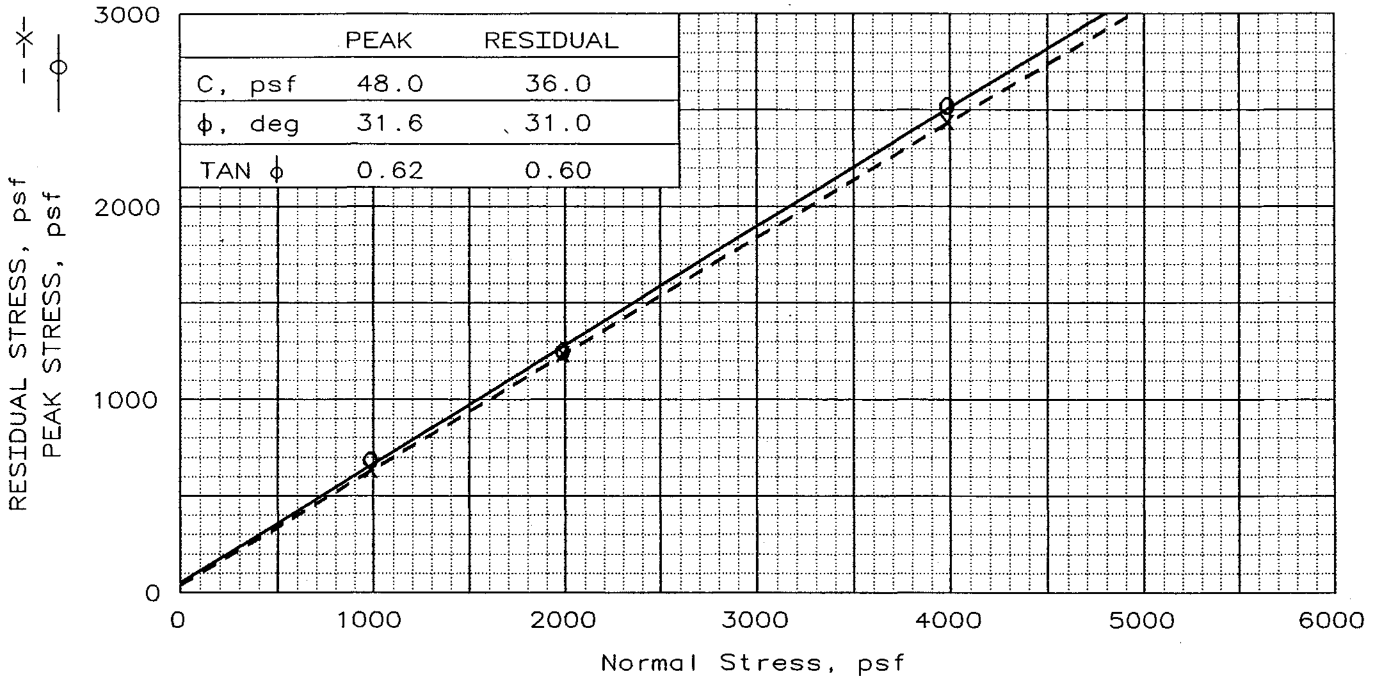
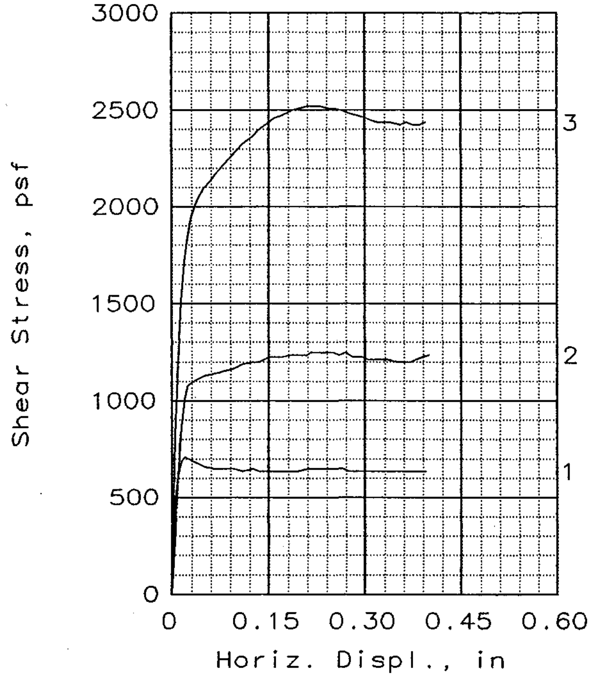


	PEAK	RESIDUAL
C, psf	48.0	36.0
ϕ, deg	31.6	31.0
TAN ϕ	0.62	0.60



SAMPLE No:		1	2	3
INITIAL	WATER CONTENT, %	8.0	8.0	8.0
	DRY DENSITY, pcf	117.0	117.1	117.1
	SATURATION, %	51.6	51.3	51.5
	VOID RATIO	0.413	0.413	0.413
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	15.3	15.0	14.9
	DRY DENSITY, pcf	117.8	118.4	118.5
	SATURATION, %	100.0	99.7	99.5
	VOID RATIO	0.405	0.398	0.396
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.99
NORMAL STRESS, psf		1000	2000	4000
PEAK STRESS, psf		684	1248	2520
DISPLACEMENT, in		0.04	0.22	0.21
RESIDUAL STRESS, psf		636	1236	2436
DISPLACEMENT, in		0.40	0.40	0.40
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: 90% Remolded
DESCRIPTION: Silty SAND (SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Compacted Fill
Remold of TQs
% Fines=26

Fig. No.: B5.14

CLIENT: Newhall Land

PROJECT: Tentative Tract 53425
River Park
SAMPLE LOCATION: BA-8 @ 43 ft.

PROJ. NO.: 03-1571-4 DATE: 4/4/03

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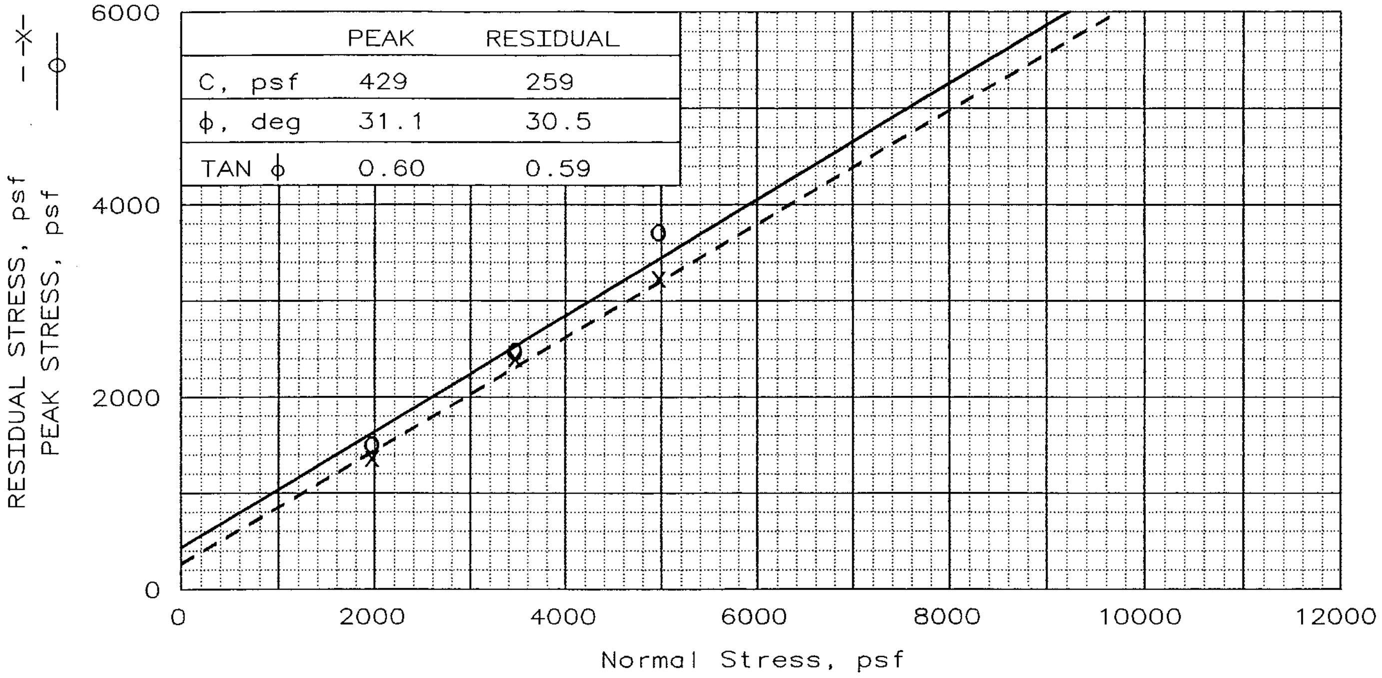
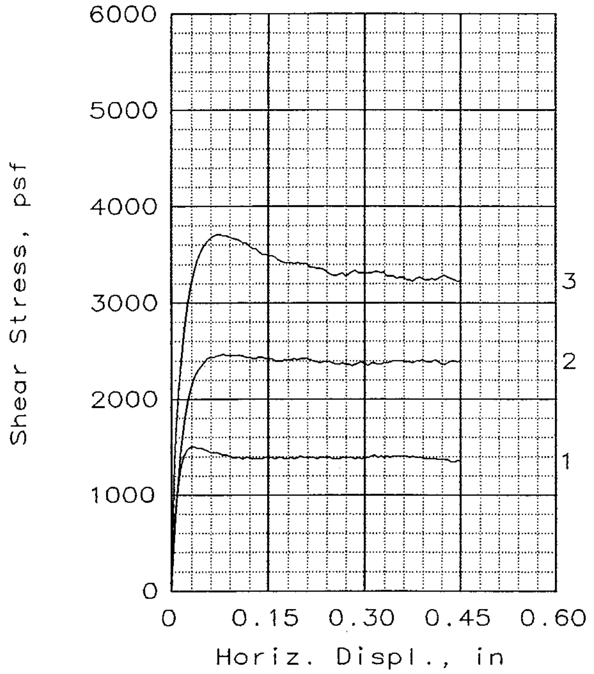


	PEAK	RESIDUAL
C, psf	429	259
ϕ, deg	31.1	30.5
TAN ϕ	0.60	0.59



	SAMPLE No:	1	2	3
INITIAL	WATER CONTENT, %	10.0	10.1	9.9
	DRY DENSITY, pcf	116.1	116.1	116.1
	SATURATION, %	62.1	63.0	61.7
	VOID RATIO	0.425	0.425	0.425
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	15.2	14.9	14.8
	DRY DENSITY, pcf	117.7	118.7	118.7
	SATURATION, %	99.6	100.0	99.9
	VOID RATIO	0.406	0.394	0.394
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.98	0.98
	NORMAL STRESS, psf	2000	3500	5000
	PEAK STRESS, psf	1500	2472	3708
	DISPLACEMENT, in	0.03	0.08	0.07
	RESIDUAL STRESS, psf	1356	2400	3228
	DISPLACEMENT, in	0.45	0.45	0.45
	Strain rate, in/min	0.0100	0.0100	0.0100

SAMPLE TYPE: 90% Remolded
DESCRIPTION: Silty SAND (SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Compacted Fill
Remold of TQs

Fig. No.: B5.15

CLIENT: Castaic Lake Water Agency

PROJECT: CLWA Road Alignment

SAMPLE LOCATION: T-12 & T-28 Mix @ 4 ft.

PROJ. NO.: 99-1571C-1 DATE: June 11, 1999

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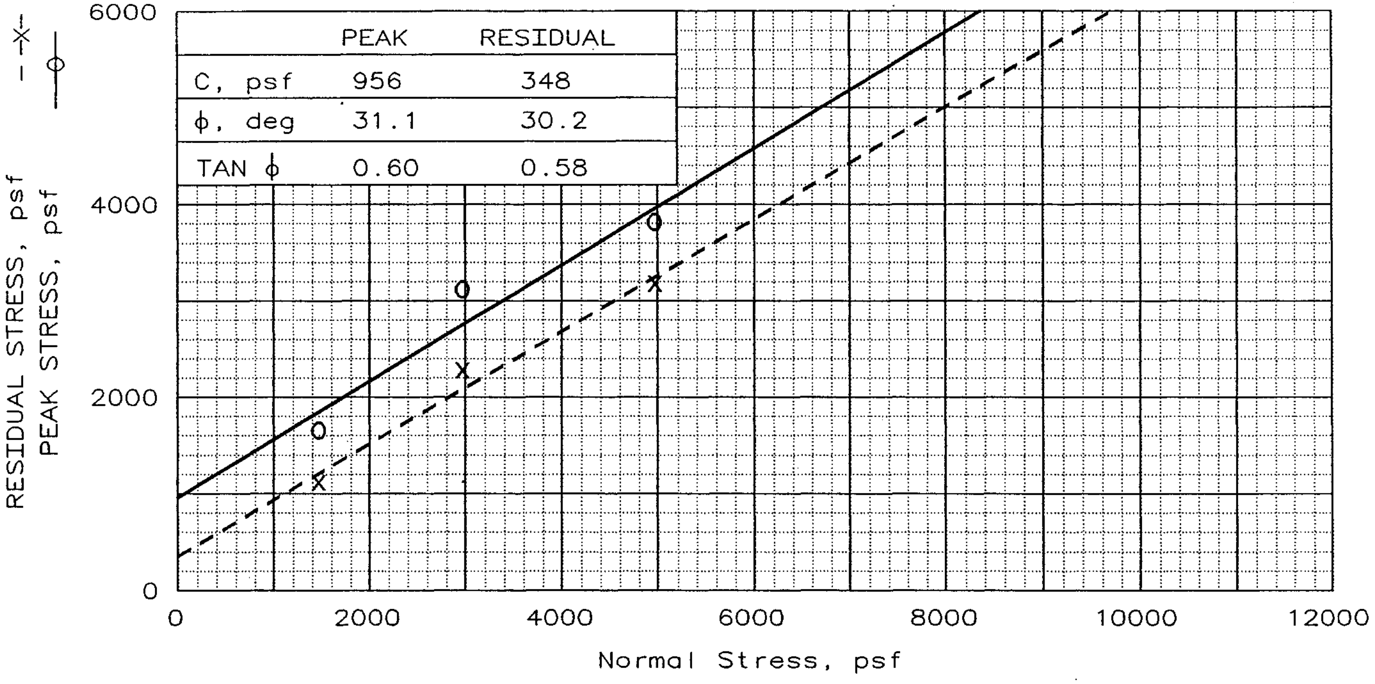
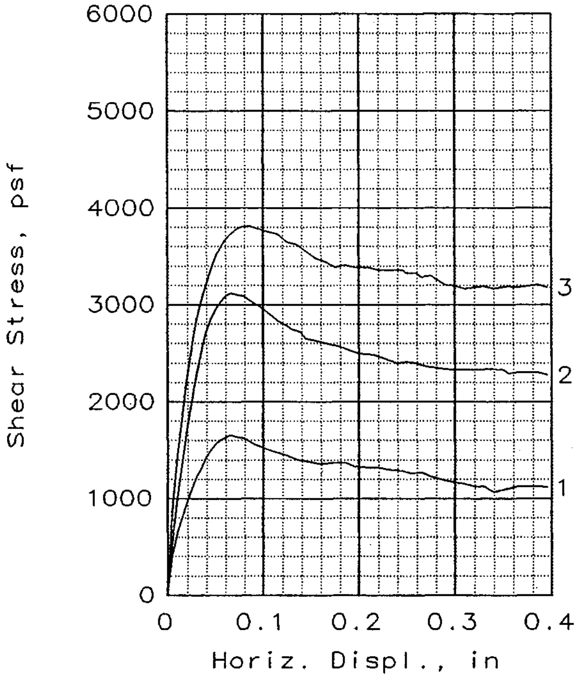
ENGINEERING GEOLOGY, INC.



	PEAK	RESIDUAL
C, psf	956	348
ϕ, deg	31.1	30.2
TAN ϕ	0.60	0.58



	SAMPLE No:	1	2	3
INITIAL	WATER CONTENT, %	4.5	7.1	6.2
	DRY DENSITY, pcf	120.5	122.3	122.7
	SATURATION, %	32.1	53.3	47.4
	VOID RATIO	0.373	0.353	0.348
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	13.7	12.3	11.7
	DRY DENSITY, pcf	121.3	123.9	124.6
	SATURATION, %	100.0	96.9	94.9
	VOID RATIO	0.363	0.335	0.327
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.99	0.98
	NORMAL STRESS, psf	1500	3000	5000
	PEAK STRESS, psf	1656	3120	3816
	DISPLACEMENT, in	0.07	0.07	0.09
	RESIDUAL STRESS, psf	1116	2280	3180
	DISPLACEMENT, in	0.40	0.40	0.40
	Strain rate, in/min	0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty SAND (SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Alluvial (Qal)

% Fines=17

Fig. No.: B5.16

CLIENT: Newhall Land

PROJECT: Tentative Tract 53425
River Park
SAMPLE LOCATION: RW-10 @ 12 ft.

PROJ. NO.: 03-1571-4 DATE: 4/4/03

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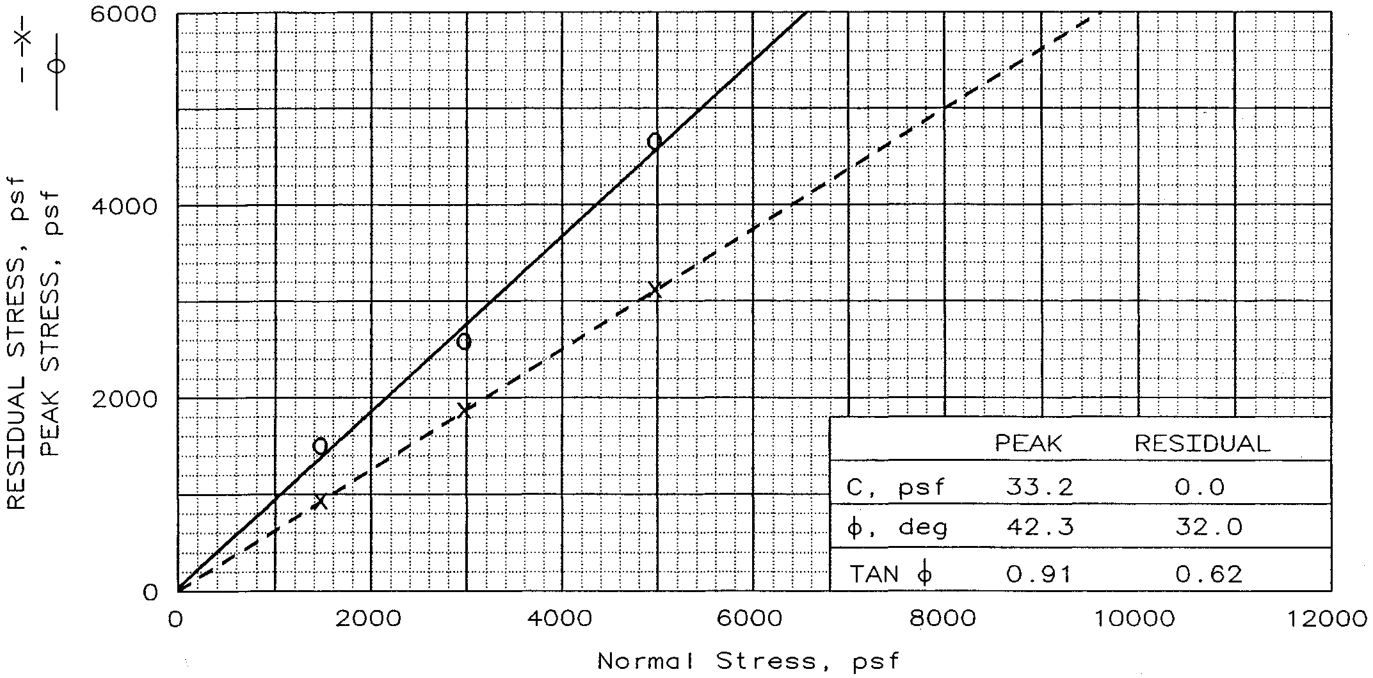
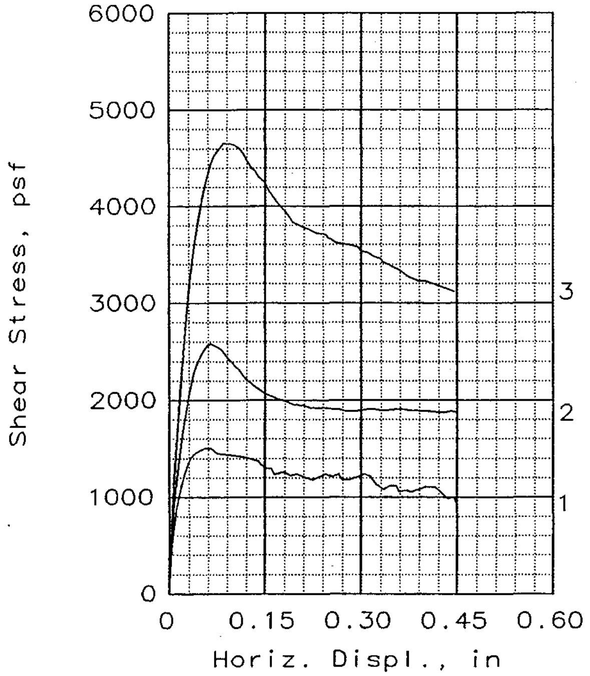


	PEAK	RESIDUAL
C, psf	33.2	0.0
ϕ, deg	42.3	32.0
TAN ϕ	0.91	0.62



	SAMPLE No:	1	2	3
INITIAL	WATER CONTENT, %	8.1	11.7	9.2
	DRY DENSITY, pcf	124.3	115.7	125.4
	SATURATION, %	64.6	71.9	76.0
	VOID RATIO	0.331	0.430	0.319
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	11.9	14.8	10.9
	DRY DENSITY, pcf	125.7	118.6	127.9
	SATURATION, %	100.0	99.6	98.9
	VOID RATIO	0.316	0.395	0.293
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.99	0.98	0.98
	NORMAL STRESS, psf	1500	3000	5000
	PEAK STRESS, psf	1500	2580	4656
	DISPLACEMENT, in	0.06	0.07	0.09
	RESIDUAL STRESS, psf	936	1872	3120
	DISPLACEMENT, in	0.45	0.45	0.45
	Strain rate, in/min	0.0050	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Poorly graded SAND with silt (SP-SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Terrace deposits (Qt)

Fig. No.: B5.17

CLIENT: Newhall Land

PROJECT: Tentative Tract 53425
River Park
SAMPLE LOCATION: BA-6 @ 4 ft.

PROJ. NO.: 03-1571-4 DATE: 4/4/03

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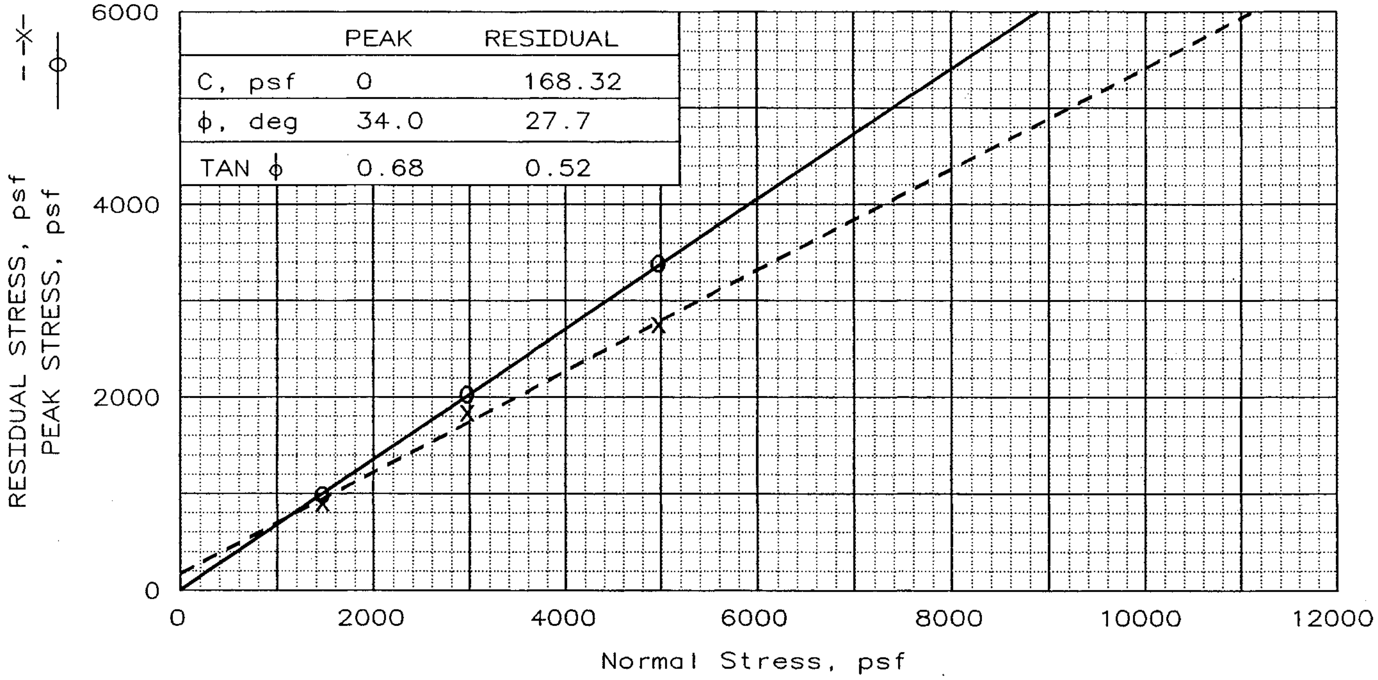
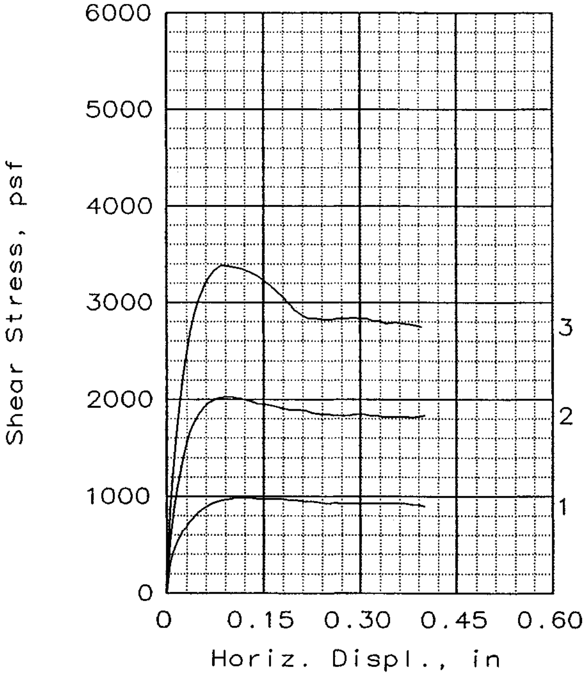
ENGINEERING GEOLOGY, INC.



	PEAK	RESIDUAL
C, psf	0	168.32
ϕ, deg	34.0	27.7
TAN ϕ	0.68	0.52



SAMPLE No:		1	2	3
INITIAL	WATER CONTENT, %	4.5	3.6	3.5
	DRY DENSITY, pcf	98.2	105.2	106.5
	SATURATION, %	17.3	16.5	16.8
	VOID RATIO	0.684	0.573	0.554
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	19.0	19.2	18.8
	DRY DENSITY, pcf	105.1	108.4	110.4
	SATURATION, %	87.7	96.9	100.0
	VOID RATIO	0.574	0.526	0.499
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.93	0.97	0.96
NORMAL STRESS, psf		1500	3000	5000
PEAK STRESS, psf		984	2028	3384
DISPLACEMENT, in		0.11	0.09	0.09
RESIDUAL STRESS, psf		900	1836	2748
DISPLACEMENT, in		0.40	0.40	0.40
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Poorly graded SAND
with silt (SP-SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Terrace deposits (Qt)

% Fines=11

Fig. No.: B5.18

CLIENT: Newhall Land

PROJECT: Tentative Tract 53425
River Park
SAMPLE LOCATION: BA-7 @ 8 ft.

PROJ. NO.: 03-1571-4 DATE: 4/4/03

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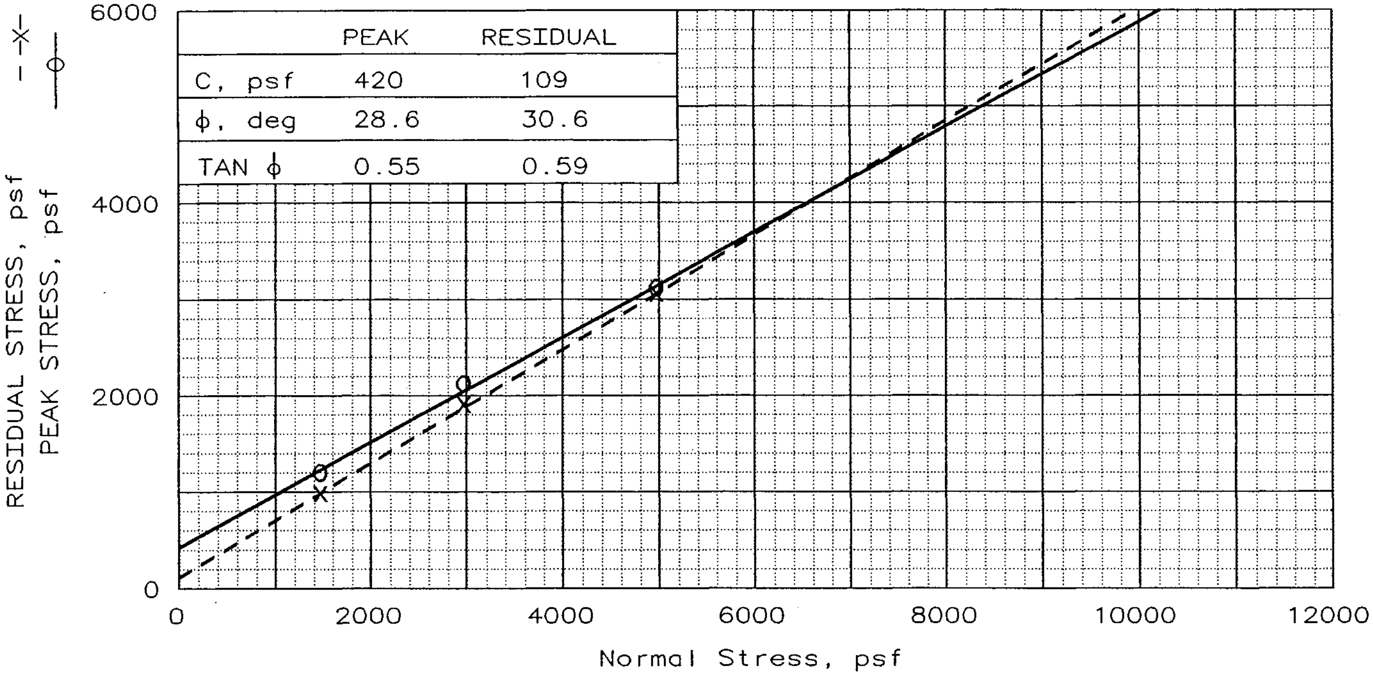
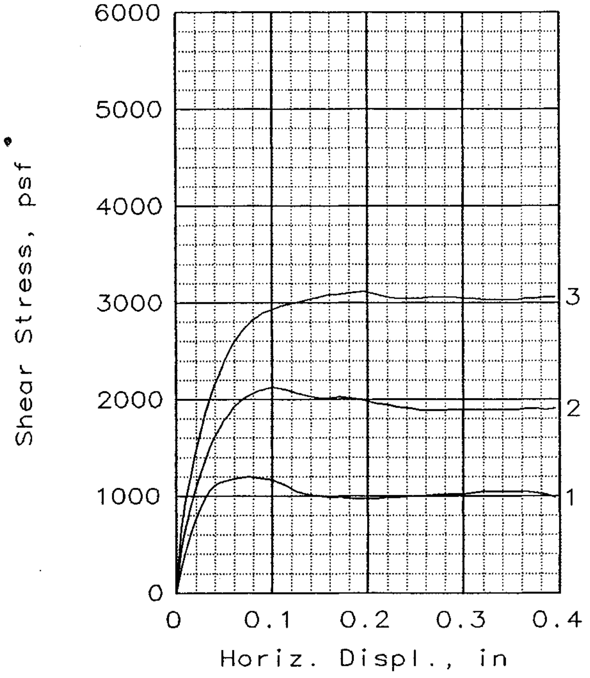
ENGINEERING GEOLOGY, INC.



	PEAK	RESIDUAL
C, psf	420	109
ϕ, deg	28.6	30.6
TAN ϕ	0.55	0.59



SAMPLE No:		1	2	3
INITIAL	WATER CONTENT, %	7.3	7.6	6.9
	DRY DENSITY, pcf	110.3	107.1	109.6
	SATURATION, %	38.6	37.2	36.1
	VOID RATIO	0.500	0.544	0.510
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	1.00	1.00	1.00
AT TEST	WATER CONTENT, %	12.0	18.5	17.4
	DRY DENSITY, pcf	124.1	110.3	113.2
	SATURATION, %	95.2	98.0	99.7
	VOID RATIO	0.333	0.500	0.462
	DIAMETER, in	2.42	2.42	2.42
	HEIGHT, in	0.89	0.97	0.97
NORMAL STRESS, psf		1500	3000	5000
PEAK STRESS, psf		1200	2124	3120
DISPLACEMENT, in		0.08	0.10	0.20
RESIDUAL STRESS, psf		984	1908	3060
DISPLACEMENT, in		0.40	0.40	0.40
Strain rate, in/min		0.0100	0.0100	0.0100

SAMPLE TYPE: Undisturbed
DESCRIPTION: Silty SAND (SM)

SPECIFIC GRAVITY= 2.65
REMARKS: Terrace deposits (Qt)

Fig. No.: B5.19

CLIENT: Newhall Land

PROJECT: Tentative Tract 53425
River Park
SAMPLE LOCATION: BA-8 @ 4 ft.

PROJ. NO.: 03-1571-4 DATE: 4/4/03

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Appendix C

APPENDIX C

LIQUEFACTION POTENTIAL ASSESSMENT AND EVALUATION OF EARTHQUAKE-INDUCED SETTLEMENTS

1.0 INTRODUCTION

We have completed our liquefaction and cyclic settlements evaluations of the subject property. The results of these evaluations affected the removals and recompaction recommended for the project. Thus, the recommended removal depths are based, in part, on upper non-liquefiable soil layers (including proposed fills to be placed above the existing ground surface), and/or cyclic settlements, or blow-count data from CPTs and borings (i,e. weak soils). The need for removals to mitigate static behavior of existing soils is evaluated in the main text of this report.

The combination of the removal, any existing non-liquefiable layer immediately beneath the removal, and the additional fill (as applicable) provided an ultimate cap of non-liquefiable soils at each location analyzed. These caps are sufficient (or much more than adequate at locations of proposed high fills) to mitigate liquefaction at these locations and to attenuate any effects from cyclic settlements remaining at depth.

2.0 DATA AND ASSUMPTIONS

Based on the probabilistic seismic hazard analyses (PSHA) presented in **Appendix D** of this report, a design basis earthquake (DBE) magnitude of 6.50 generating an estimated peak horizontal ground acceleration of 0.71g, and a horizontal acceleration of 0.49g corresponding to an earthquake with a weighted magnitude of 7.5 were used for the liquefaction and earthquake-induced settlement analyses.

Basic information included soil types, existing ground water levels and blow counts obtained from field data. These data are plotted versus depth on **Figures C1** through **C37, graphs (a)** and **(b)**.

For analysis, in the absence of well data, a conservative historic high ground water depth of 5 feet was used, except for a water depth of 12 feet for CPT-6.

Seed et al. (1984) presents design curves based on field performance during earthquakes (cases where evidence of liquefaction has been observed), which provides a higher level of confidence in the analyses results. These curves distinctly separate liquefiable and non-liquefiable soil conditions. Therefore, liquefiable zones in this analysis are based upon the premise that liquefaction potential exists if the cyclic resistance ratio (CRR) against liquefaction is less than the earthquake-induced cyclic stress ratio; this is to say, a stress ratio factor of safety less than unity. The earthquake-induced settlement analysis also considers zones that may settle somewhat even though the factor of safety may be greater than one (i.e. a non-liquefaction condition).

3.0 CORRELATIONS BETWEEN CPTs AND BORINGS

During our investigations, we excavated 10 rotary-wash (RW) borings next to CPT soundings to verify the soil parameters interpreted from the CPTs. Based on the field data, in general, blow counts and percent fines from the CPTs generally correlate well with data from the borings. This is shown in **Table C1**. However, blow count data from CPT-11 are liberal to 15 feet, and are conservative below 15 feet. In CPT-10, the percent fines are somewhat overestimated (liberal) to 30 feet and are estimated conservatively below this depth. In CPT-19 the percent fines are estimated conservatively to 40 feet and liberally below 40 feet (to 50 feet).

The generally good correlation shown in **Table C1** provides an adequate level of confidence in CPT data enhanced with the fact that the CPTs are continuous and sample disturbance is less. Furthermore, soil intervals of conservative data are typically thicker (see **Table C1**) which is expected to more than adequately compensate the effects in the analyses from liberal data. Also, at the locations of CPT-10, CPT-11 and CPT-19, proposed fills (above existing ground surface) and the ultimate non-liquefiable caps are significant (greater than 20-foot fills and thicker than 48-foot caps. See **Table C2**).

4.0 ASSESSMENT OF LIQUEFACTION POTENTIAL

4.1 Method of Analysis

Liquefaction is a phenomenon whereby a saturated granular soil temporarily loses its strength because of the buildup of pore water pressure during seismic excitation. This loss of strength may cause structures founded on these soils to experience subsidence and/or lateral movement due to earthquakes.

Liquefaction potential analyses are performed by a method proposed by Seed, et al. (1984) as mentioned in Section 2 above. Some data provided by the liquefaction analyses are used for the evaluation of earthquake-induced settlements. Per Seed's method, the earthquake-induced stresses at any depth are estimated and compared with empirically based stresses (strength) for sites where liquefaction has occurred.

The calculation of available cyclic resistance ratios versus expected (seismically induced) cyclic shear stress ratios is based on existing soil data from CPTs, such as effective overburden pressure, blow count and percent fines. Corrected SPT blow count data are utilized to determine the strength/overburden pressure ratio for 7 ½ magnitude earthquakes. Correction of blow count for normalized overburden pressure is provided by Liao and Whitman (1986) by the equation C_n =SQRT($1/\sigma'_o$), where σ'_o = effective overburden pressure in TSF. Based on data by Liao and Whitman, we interpret a maximum value of C_n of 2 and a minimum of 0.5. The formula for the corrected SPT "N" is: $N_1=C_nN$.

Correction for fines is provided following procedures of Youd & Idriss (NCEER, 1997). This correction provides equivalent blow count data for clean sand, which is ultimately used to assess strength against liquefaction.

The earthquake-induced horizontal stress is calculated per the following equation by Seed (1984):

Earthquake-induced stress = $\tau_{av} = 0.65\ (a_{max}/g)\ \sigma_o\, r_d$

Where a_{max}/g= ratio of peak ground acceleration and acceleration of gravity.
σ_o =Total overburden pressure
r_d = stress reduction factor to account for soil deformability

Theoretical factors of safety against liquefaction are calculated using corrected blow count data per Youd and Idriss (NCEER, 1997).

4.2 Results of Liquefaction Potential Assessment

Results of computerized calculations for the assessment of liquefaction potential are presented in the attached, **Figures C1 through C37, graphs (a), (b) and (c).**

5.0 ESTIMATION OF EARTHQUAKE-INDUCED SETTLEMENTS

5.1 Method of Analysis

Earthquake-induced settlements were estimated using procedures presented by Tokimatsu and Seed (1987) for dry/moist soils (above the water table) and saturated sands. Settlement analyses were performed for the same location analyzed for liquefaction potential to estimate the possible range of settlements to be expected at the project site.

Volumetric strains for soils above the water table were estimated using blow count data and cyclic shear strain. **The volumetric strain was then doubled to account for multidirectional effects** (the volumetric strain data were originally obtained from one-dimensional laboratory testing). Seismic settlement was obtained by multiplying the thickness of the soil layer by the calculated volumetric strain.

Blow counts used in the settlement calculations above the water table were not corrected for fines content (but were corrected for other factors addressed in the liquefaction potential assessment). Although the referenced procedure applies to both silty and clean sands, the use of the blow counts without corrections for fines content produces more conservative results.

Seismic settlements for saturated sands were estimated using blow count data corrected for fines content (i.e. blow counts for equivalent clean sand were used) and other factors used for liquefaction analyses. The referenced procedure applies only to saturated clean sands.

Volumetric strain for saturated sands was estimated using the calculated earthquake-induced cyclic shear stress and corrected blow count. The seismic settlement was obtained by multiplying the thickness of the liquefied soil layer by the volumetric strain. The volumetric strain obtained from the design chart for saturated sands includes the multidirectional effect.

5.2 Results of Earthquake-Induced Settlement Analysis

The results of computerized cyclic settlement analyses are presented in **Figures C1** through **C37**, **graphs (d)**, and summarized in **Table C2**. Actual seismic settlements are expected to be less due to built-in conservatism in the procedures. A maximum cumulative total settlement of 2.14 inches has been estimated at the location of CPT-10, but approximately 92 percent (24/26) of the analyses in the proposed development show total cyclic settlements less than 1.0 inches. After a removal of 23 feet, the total settlement is reduced to 1.72 inches and the maximum differential settlement is 1.15 inches at CPT-10 location. At this location, a proposed fill height of 36 feet coupled with the removal and recompaction of 23 feet and the existing non-liquefiable soils beneath the removal will result in a **cap of non-liquefiable soils of 61 feet** which will readily attenuate any potential effects from this localized differential settlement (1.15 inches).

Similarly, at the CPT-13 location (**Table C2**), the potential effect from a maximum differential settlement of 1.04 inch (after a removal of 12 feet) will readily be attenuated by the proposed additional 7 feet of fill and a resulting **cap of non-liquefiable soils of 27 feet**. At the remaining CPT's locations the estimated maximum differential settlement is less than 0.60 inch which will be attenuated by a minimum thickness of non-liquefiable soils of 30 feet.

6.0 CONCLUSIONS

The results of the liquefaction assessment indicated that some liquefaction-prone zones exist in the alluvium on site, provided ground water rises to within the upper 5 feet below the existing ground surface. Recommended removals and recompaction will partly eliminate liquefiable zones at some locations.

Certified compacted fill used to replace proposed removals shown in the **Geologic/Geotechnical Map**, existing non-liquefiable soils immediately beneath the removals, and additional proposed fills above existing grade, will result in substantial caps (see **Table C2**) which are anticipated to mitigate any probability of surface manifestation and attenuate/mitigate effects from cyclic settlements due to soil replacement and/or expected bridging effects.

Based upon analytical procedures set forth by Bartlett & Youd (1995), **no lateral spreading** due to liquefaction is expected at this site for the following reasons:

- Alluvial subsurface soils are essentially horizontally layered.
- There is not a free-face toward which liquefied soils could move, and for the "ground surface condition" (Bartlett & Youd), granular soils with $N1_{(60)}$ less than 15 in the

liquefaction-prone zones are few, isolated and thin (cumulative thickness <1m at applicable locations).

- It should be noted that the cyclic settlement calculations include multi-directional effects in the volumetric strains. Proposed removals and recompaction and additional fills will provide caps which will attenuate the effects of strains at depth.

7.0 RECOMMENDATIONS

Owing to the typically low magnitude of estimated conservative earthquake-induced differential settlements, and the proposed recompacted layers and additional fills resulting in significantly thick caps of non-liquefiable soils (see **Table C1**), special measures to further mitigate these settlements are considered to be unnecessary.

The following attachments are located within the Appendix.

References	
Correlations Between Field Data from Adjacent CPTs and Borings	Table C1
Summary of Cyclic Settlement Analyses and Removals (Based on CPT and RW Data)	Table C2
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REFERENCES

Bartlett, S.F., and Youd, T.L., "Empirical prediction of liquefaction – induced lateral spread", Journal of Geotechnical Engineering, Vol. 121, No. 4, April 1995

California Division of Mines and Geology, Special Publication 117, "Guidelines for Evaluating and Mitigating Seismic Hazards in California", adopted by the State on March 13, 1997.

Douglas, B.J., and Olsen, R.S., "Soil classification using Electric Cone Penetrometer", ASCE Special Technical Publication, ST. Louis, Missouri, October, 1981.

Douglas, B.J., Olsen, R.S., and Martin, G.R., "Evaluation of the Cone Penetrometer Test for use in SPT--Liquefaction Potential Assessment," ASCE Preprint Volume No. 81-544, St. Louis, Missouri, October 1981.

Fear and McRoberts, "Reconsideration of initiation of liquefaction in sandy soils", ASCE Geotechnical Journal, March 1995.

Housner, G.W., Chairman of Committee on Earthquake Engineering, Book, "Liquefaction of soils during earthquakes", p. 110-114, National Academy Press, 1985.

Ishihara, K., "Soil Behaviour in Earthquake Geotechnics", Clarendon Press, Oxford, 1996.

Ishihara, K., "Stability of natural deposits during earthquakes", Proceedings of the Eleventh International Conference on Soil Mechanics and Foundation Engineering, A.A. Balkema Publishers, Rotterdame, Netherlands, 1985

Liao, S.S.C., and Whitman, R.V., "Overburden correction factors for SPT in sand", Journal of Geotechnical Engineering, Vol. 112, No. 3, March 1986.

Pradel, D., "Procedure to evaluate earthquake-induced settlements in dry sandy soils," Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Vol. 124, No. 4, April 1998.

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Seed, H.B., "Design problems in soil liquefaction," Report No. UCB/EERC-86/02, February, 1986

Seed, H.B., Tokimatsu, K., Harder, L.F., and Chung, R.M., "The influence of SPT procedures in soil liquefaction resistance evaluations", Earthquake Engineering Research Center Report No. 84/15, University of California, Berkeley, 1984.

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Seed, H.B. and Idriss, I.M., "Ground motions and soil liquefaction during earthquakes", 1982, Monograph, Earthquake Engineering Research Institute.

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Youd, T. Leslie, Hanson, Corbett M. and Bartlett, Steven F. "Revised MLR Equations for Predicting Lateral Spread Displacement", Notes & Handout, ASCE Los Angeles Section Seminar, July, 1999.

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CPT - vs. Boring		CORRELATION	
		CPT Blow Count (N)	CPT % Fines
CPT - 3	RW - 8	Good	Good
CPT - 10	RW - 3	Good	Liberal (to 30')
CPT - 11	RW - 5	Liberal (to 15') Conservative (below 15')	Good
CPT - 13	RW - 6	Good	Good
CPT - 14	RW - 7	Good	Good
CPT - 17	RW - 2	Good	Good
CPT - 19	RW - 4	Good	Liberal (40' – 50')
CPT - 24	RW - 1	Good	Good
CPT - 32b	RW - 9	Good	Good
CPT - 33	RW - 10	Good	Good

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SUMMARY OF CYCLIC SETTLEMENT ANALYSES AND REMOVALS (BASED ON CPT and RW DATA)

ANALYZED LOCATION	GROUND SURFACE ELEVATION (MSL) (FT)	DEPTH TO EXISTING GROUND WATER (FT)	DEPTH TO HISTORIC HIGH GROUND WATER (FT)	ESTIMATED TOTAL CYCLIC SETTLEMENT [a] (PRIOR TO REMOVAL AND RECOMPACTION) (INCH)	PROPOSED FILL HEIGHT (FT)	ESTIMATED REQUIRED REMOVAL DEPTH [b] (FT)	ESTIMATED TOTAL CYCLIC SETTLEMENT (AFTER REMOVAL AND RECOMPACTION) (INCH)	ESTIMATED DIFFERENTIAL CYCLIC SETTLEMENT [c] (AFTER REMOVAL AND RECOMPACTION) (INCH)	ULTIMATE NON-LIQUEFIABLE CAP (REMOVAL AND NEW FILL INCLUDED) (FT)
CPT-1	1212	19.0	5.0	0.48	No Grading	-	-	-	-
CPT-2	1212	19.0	5.0	0.25	No Grading	-	-	-	-
CPT-3	1203	15.5	5.0	1.01	No Grading	-	-	-	-
CPT-4	1196	11.0	5.0	0.01	No Grading	-	-	-	-
CPT-5	1195	11.0	5.0	0.00	5	9	-	-	47
CPT-6	1224	35.0	12.0	0.39	36	17	0.30	0.20	57
CPT-7	1210	25.0	5.0	0.54	40	16	0.29	.019	68
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CPT-13	1177	20.8	5.0	1.56	8	12	1.55	1.04	27
CPT-14	1188	15.2	5.0	0.65	37	10	0.65	0.43	52
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CPT-16	1188	14.4	5.0	0.79	25	5	0.79	0.53	42.5
CPT-17	1192	14.6	5.0	0.27	27	17	0.22	0.15	49
CPT-18	1194	15.4	5.0	0.21	0	9	0.21	0.14	34
CPT-19	1193	16.0	5.0	0.18	23	8	0.18	0.12	48
CPT-20	1195	14.9	5.0	1.18	13	15	0.90	0.60	39
CPT-21	1195	11.5	5.0	0.24	15	7	0.24	0.16	31
CPT-22	1199	13.5	5.0	0.41	16.5	7	0.41	0.28	30

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Analyzed Location	Ground Surface Elevation (MSL) (Ft)	Depth to Existing Ground Water (Ft)	Depth to Historic High Ground Water (Ft)	Estimated Total Cyclic Settlement[a] (Prior to Removal and Recompaction) (Inch)	Proposed Fill Height (Ft)	Estimated Required Removal Depth[b] (Ft)	Estimated Total Cyclic Settlement (After Removal and Recompaction) (Inch)	Estimated Differential Cyclic Settlement[c] (After Removal and Recompaction) (Inch)	Ultimate Non-Liquefiable Cap (Removal and New Fill Included) (Ft)
CPT-23	1206	17.5	5.0	0.27	18	8	0.26	0.17	30
CPT-24	1205	15.4	5.0	0.55	15	3	0.55	0.37	31
CPT-25	1208	12.4	5.0	0.36	18	8	0.30	0.20	55
CPT-26	1176	25.0	5.0	0.28	4	11	0.28	0.19	31
CPT-27	1210	15.0	5.0	0.98	19	14	0.87	0.58	32.5
CPT-28	1209	15.5	5.0	0.89	20	5	0.89	0.60	32
CPT-29	1210	14.4	5.0	0.79	10	-	-	-	No Development
CPT-30	1214	>20.0	5.0	0.00	0-16	-	-	-	No Development
CPT-31A	1261	32	5.0	0.02	19	15	0.00	-	50
CPT-32B	1270	32	5.0	1.29	40	18	0.79	0.53	61
CPT-33	1266	34	5.0	0.37	No Grading	-	-	-	-
CPT-34A	1278	34	5.0	0.63	-	-	-	-	-
CPT-35A	1282	55	5.0	0.12	-	-	-	-	-
CPT-36	1294	36	5.0	0.01	-	-	-	-	-
CPT-37	1304	37	5.0	0.07	-	-	-	-	-

a. Estimated total cyclic settlements based on seismic analysis.

b. Estimated removal depths are based on required (per Ishihara) upper non-liquefiable soil layers (including new fill), and/or cyclic settlements or adjacent borings or CPT blow count.

c. Based on CDMG Special Publication 117 and Los Angeles County-adopted Recommended Procedures for Implementation of CDMG Special Publication 117.

APPENDIX C

LIQUEFACTION POTENTIAL ASSESSMENT AND EVALUATION OF EARTHQUAKE-INDUCED SETTLEMENTS

1.0 INTRODUCTION

We have completed our liquefaction and cyclic settlements evaluations of the subject property. The results of these evaluations affected the removals and recompaction recommended for the project. Thus, the recommended removal depths are based, in part, on upper non-liquefiable soil layers (including proposed fills to be placed above the existing ground surface), and/or cyclic settlements, or blow-count data from CPTs and borings (i.e. weak soils). The need for removals to mitigate static behavior of existing soils is evaluated in the main text of this report.

The combination of the removal, any existing non-liquefiable layer immediately beneath the removal, and the additional fill (as applicable) provided an ultimate cap of non-liquefiable soils at each location analyzed. These caps are sufficient (or much more than adequate at locations of proposed high fills) to mitigate liquefaction at these locations and to attenuate any effects from cyclic settlements remaining at depth.

2.0 DATA AND ASSUMPTIONS

Based on the probabilistic seismic hazard analyses (PSHA) presented in **Appendix D** of this report, a design basis earthquake (DBE) magnitude of 6.50 generating an estimated peak horizontal ground acceleration of 0.71g, and a horizontal acceleration of 0.49g corresponding to an earthquake with a weighted magnitude of 7.5 were used for the liquefaction and earthquake-induced settlement analyses.

Basic information included soil types, existing ground water levels and blow counts obtained from field data. These data are plotted versus depth on **Figures C1** through **C37, graphs (a)** and **(b)**.

For analysis, in the absence of well data, a conservative historic high ground water depth of 5 feet was used, except for a water depth of 12 feet for CPT-6.

Seed et al. (1984) presents design curves based on field performance during earthquakes (cases where evidence of liquefaction has been observed), which provides a higher level of confidence in the analyses results. These curves distinctly separate liquefiable and non-liquefiable soil conditions. Therefore, liquefiable zones in this analysis are based upon the premise that liquefaction potential exists if the cyclic resistance ratio (CRR) against liquefaction is less than the earthquake-induced cyclic stress ratio; this is to say, a stress ratio factor of safety less than unity. The earthquake-induced settlement analysis also considers zones that may settle somewhat even though the factor of safety may be greater than one (i.e. a non-liquefaction condition).

3.0 CORRELATIONS BETWEEN CPTs AND BORINGS

During our investigations, we excavated 10 rotary-wash (RW) borings next to CPT soundings to verify the soil parameters interpreted from the CPTs. Based on the field data, in general, blow counts and percent fines from the CPTs generally correlate well with data from the borings. This is shown in **Table C1**. However, blow count data from CPT-11 are liberal to 15 feet, and are conservative below 15 feet. In CPT-10, the percent fines are somewhat overestimated (liberal) to 30 feet and are estimated conservatively below this depth. In CPT-19 the percent fines are estimated conservatively to 40 feet and liberally below 40 feet (to 50 feet).

The generally good correlation shown in **Table C1** provides an adequate level of confidence in CPT data enhanced with the fact that the CPTs are continuous and sample disturbance is less. Furthermore, soil intervals of conservative data are typically thicker (see **Table C1**) which is expected to more than adequately compensate the effects in the analyses from liberal data. Also, at the locations of CPT-10, CPT-11 and CPT-19, proposed fills (above existing ground surface) and the ultimate non-liquefiable caps are significant (greater than 20-foot fills and thicker than 48-foot caps. See **Table C2**).

4.0 ASSESSMENT OF LIQUEFACTION POTENTIAL

4.1 Method of Analysis

Liquefaction is a phenomenon whereby a saturated granular soil temporarily loses its strength because of the buildup of pore water pressure during seismic excitation. This loss of strength may cause structures founded on these soils to experience subsidence and/or lateral movement due to earthquakes.

Liquefaction potential analyses are performed by a method proposed by Seed, et al. (1984) as mentioned in Section 2 above. Some data provided by the liquefaction analyses are used for the evaluation of earthquake-induced settlements. Per Seed's method, the earthquake-induced stresses at any depth are estimated and compared with empirically based stresses (strength) for sites where liquefaction has occurred.

The calculation of available cyclic resistance ratios versus expected (seismically induced) cyclic shear stress ratios is based on existing soil data from CPTs, such as effective overburden pressure, blow count and percent fines. Corrected SPT blow count data are utilized to determine the strength/overburden pressure ratio for 7 ½ magnitude earthquakes. Correction of blow count for normalized overburden pressure is provided by Liao and Whitman (1986) by the equation C_n =SQRT(1/σ'_o), where σ'_o = effective overburden pressure in TSF. Based on data by Liao and Whitman, we interpret a maximum value of C_n of 2 and a minimum of 0.5. The formula for the corrected SPT "N" is: $N_1=C_nN$.

Correction for fines is provided following procedures of Youd & Idriss (NCEER, 1997). This correction provides equivalent blow count data for clean sand, which is ultimately used to assess strength against liquefaction.

The earthquake-induced horizontal stress is calculated per the following equation by Seed (1984):

Earthquake-induced stress = $\tau_{av} = 0.65\ (a_{max}/g)\ \sigma_o\ r_d$

Where a_{max}/g= ratio of peak ground acceleration and acceleration of gravity.
σ_o =Total overburden pressure
r_d = stress reduction factor to account for soil deformability

Theoretical factors of safety against liquefaction are calculated using corrected blow count data per Youd and Idriss (NCEER, 1997).

4.2 Results of Liquefaction Potential Assessment

Results of computerized calculations for the assessment of liquefaction potential are presented in the attached, **Figures C1 through C37, graphs (a), (b) and (c).**

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5.0 ESTIMATION OF EARTHQUAKE-INDUCED SETTLEMENTS

5.1 Method of Analysis

Earthquake-induced settlements were estimated using procedures presented by Tokimatsu and Seed (1987) for dry/moist soils (above the water table) and saturated sands. Settlement analyses were performed for the same location analyzed for liquefaction potential to estimate the possible range of settlements to be expected at the project site.

Volumetric strains for soils above the water table were estimated using blow count data and cyclic shear strain. **The volumetric strain was then doubled to account for multidirectional effects** (the volumetric strain data were originally obtained from one-dimensional laboratory testing). Seismic settlement was obtained by multiplying the thickness of the soil layer by the calculated volumetric strain.

Blow counts used in the settlement calculations above the water table were not corrected for fines content (but were corrected for other factors addressed in the liquefaction potential assessment). Although the referenced procedure applies to both silty and clean sands, the use of the blow counts without corrections for fines content produces more conservative results.

Seismic settlements for saturated sands were estimated using blow count data corrected for fines content (i.e. blow counts for equivalent clean sand were used) and other factors used for liquefaction analyses. The referenced procedure applies only to saturated clean sands.

Volumetric strain for saturated sands was estimated using the calculated earthquake-induced cyclic shear stress and corrected blow count. The seismic settlement was obtained by multiplying the thickness of the liquefied soil layer by the volumetric strain. The volumetric strain obtained from the design chart for saturated sands includes the multidirectional effect.

5.2 Results of Earthquake-Induced Settlement Analysis

The results of computerized cyclic settlement analyses are presented in **Figures C1** through **C37**, **graphs (d)**, and summarized in **Table C2**. Actual seismic settlements are expected to be less due to built-in conservatism in the procedures. A maximum cumulative total settlement of 2.14 inches has been estimated at the location of CPT-10, but approximately 92 percent (24/26) of the analyses in the proposed development show total cyclic settlements less than 1.0 inches. After a removal of 23 feet, the total settlement is reduced to 1.72 inches and the maximum differential settlement is 1.15 inches at CPT-10 location. At this location, a proposed fill height of 36 feet coupled with the removal and recompaction of 23 feet and the existing non-liquefiable soils beneath the removal will result in a **cap of non-liquefiable soils of 61 feet** which will readily attenuate any potential effects from this localized differential settlement (1.15 inches).

Similarly, at the CPT-13 location (**Table C2**), the potential effect from a maximum differential settlement of 1.04 inch (after a removal of 12 feet) will readily be attenuated by the proposed additional 7 feet of fill and a resulting **cap of non-liquefiable soils of 27 feet**. At the remaining CPT's locations the estimated maximum differential settlement is less than 0.60 inch which will be attenuated by a minimum thickness of non-liquefiable soils of 30 feet.

6.0 CONCLUSIONS

The results of the liquefaction assessment indicated that some liquefaction-prone zones exist in the alluvium on site, provided ground water rises to within the upper 5 feet below the existing ground surface. Recommended removals and recompaction will partly eliminate liquefiable zones at some locations.

Certified compacted fill used to replace proposed removals shown in the **Geologic/Geotechnical Map**, existing non-liquefiable soils immediately beneath the removals, and additional proposed fills above existing grade, will result in substantial caps (see **Table C2**) which are anticipated to mitigate any probability of surface manifestation and attenuate/mitigate effects from cyclic settlements due to soil replacement and/or expected bridging effects.

Based upon analytical procedures set forth by Bartlett & Youd (1995), **no lateral spreading** due to liquefaction is expected at this site for the following reasons:

- Alluvial subsurface soils are essentially horizontally layered.
- There is not a free-face toward which liquefied soils could move, and for the "ground surface condition" (Bartlett & Youd), granular soils with $N1_{(60)}$ less than 15 in the

liquefaction-prone zones are few, isolated and thin (cumulative thickness <1m at applicable locations).

- It should be noted that the cyclic settlement calculations include multi-directional effects in the volumetric strains. Proposed removals and recompaction and additional fills will provide caps which will attenuate the effects of strains at depth.

7.0 RECOMMENDATIONS

Owing to the typically low magnitude of estimated conservative earthquake-induced differential settlements, and the proposed recompacted layers and additional fills resulting in significantly thick caps of non-liquefiable soils (see **Table C1**), special measures to further mitigate these settlements are considered to be unnecessary.

The following attachments are located within the Appendix.

References	
Correlations Between Field Data from Adjacent CPTs and Borings	Table C1
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CPT-22	1199	13.5	5.0	0.41	16.5	7	0.41	0.28	30

APPENDIX C

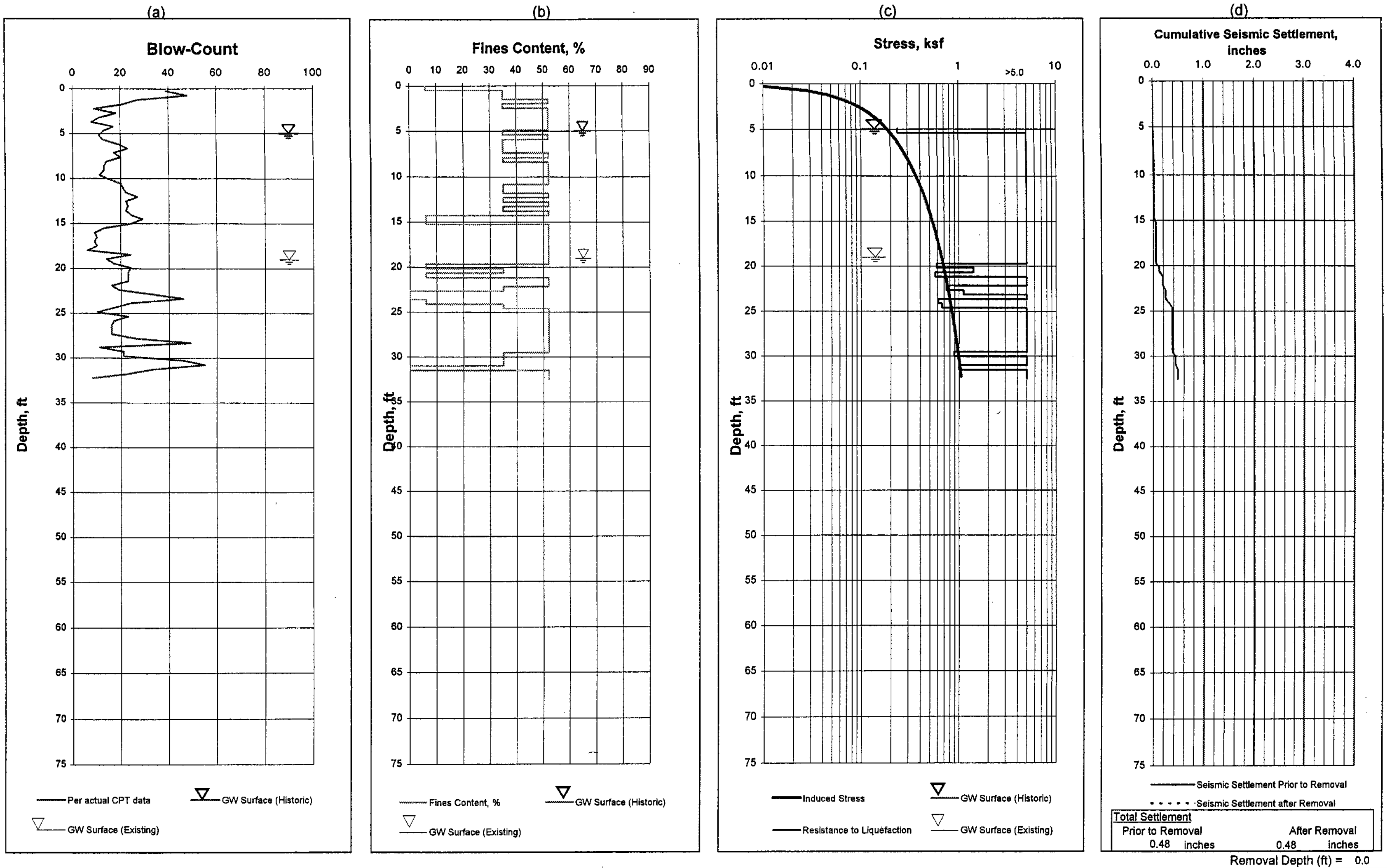
ANALYZED LOCATION	GROUND SURFACE ELEVATION (MSL) (FT)	DEPTH TO EXISTING GROUND WATER (FT)	DEPTH TO HISTORIC HIGH GROUND WATER (FT)	ESTIMATED TOTAL CYCLIC SETTLEMENT [a] (PRIOR TO REMOVAL AND RECOMPACTION) (INCH)	PROPOSED FILL HEIGHT (FT)	ESTIMATED REQUIRED REMOVAL DEPTH [b] (FT)	ESTIMATED TOTAL CYCLIC SETTLEMENT (AFTER REMOVAL AND RECOMPACTION) (INCH)	ESTIMATED DIFFERENTIAL CYCLIC SETTLEMENT [c] (AFTER REMOVAL AND RECOMPACTION) (INCH)	ULTIMATE NON-LIQUEFIABLE CAP (REMOVAL AND NEW FILL INCLUDED) (FT)
CPT-23	1206	17.5	5.0	0.27	18	8	0.26	0.17	30
CPT-24	1205	15.4	5.0	0.55	15	3	0.55	0.37	31
CPT-25	1208	12.4	5.0	0.36	18	8	0.30	0.20	55
CPT-26	1176	25.0	5.0	0.28	4	11	0.28	0.19	31
CPT-27	1210	15.0	5.0	0.98	19	14	0.87	0.58	32.5
CPT-28	1209	15.5	5.0	0.89	20	5	0.89	0.60	32
CPT-29	1210	14.4	5.0	0.79	10	-	-	-	No Development
CPT-30	1214	>20.0	5.0	0.00	0-16	-	-	-	No Development
CPT-31A	1261	32	5.0	0.02	19	15	0.00	-	50
CPT-32B	1270	32	5.0	1.29	40	18	0.79	0.53	61
CPT-33	1266	34	5.0	0.37	No Grading	-	-	-	-
CPT-34A	1278	34	5.0	0.63	-	-	-	-	-
CPT-35A	1282	55	5.0	0.12	-	-	-	-	-
CPT-36	1294	36	5.0	0.01	-	-	-	-	-
CPT-37	1304	37	5.0	0.07	-	-	-	-	-

a. Estimated total cyclic settlements based on seismic analysis.

b. Estimated removal depths are based on required (per Ishihara) upper non-liquefiable soil layers (including new fill), and/or cyclic settlements or adjacent borings or CPT blow count.

c. Based on CDMG Special Publication 117 and Los Angeles County-adopted Recommended Procedures for Implementation of CDMG Special Publication 117.

Location....... **CPT-1**
Elevation (MSL)........ 1212 ft

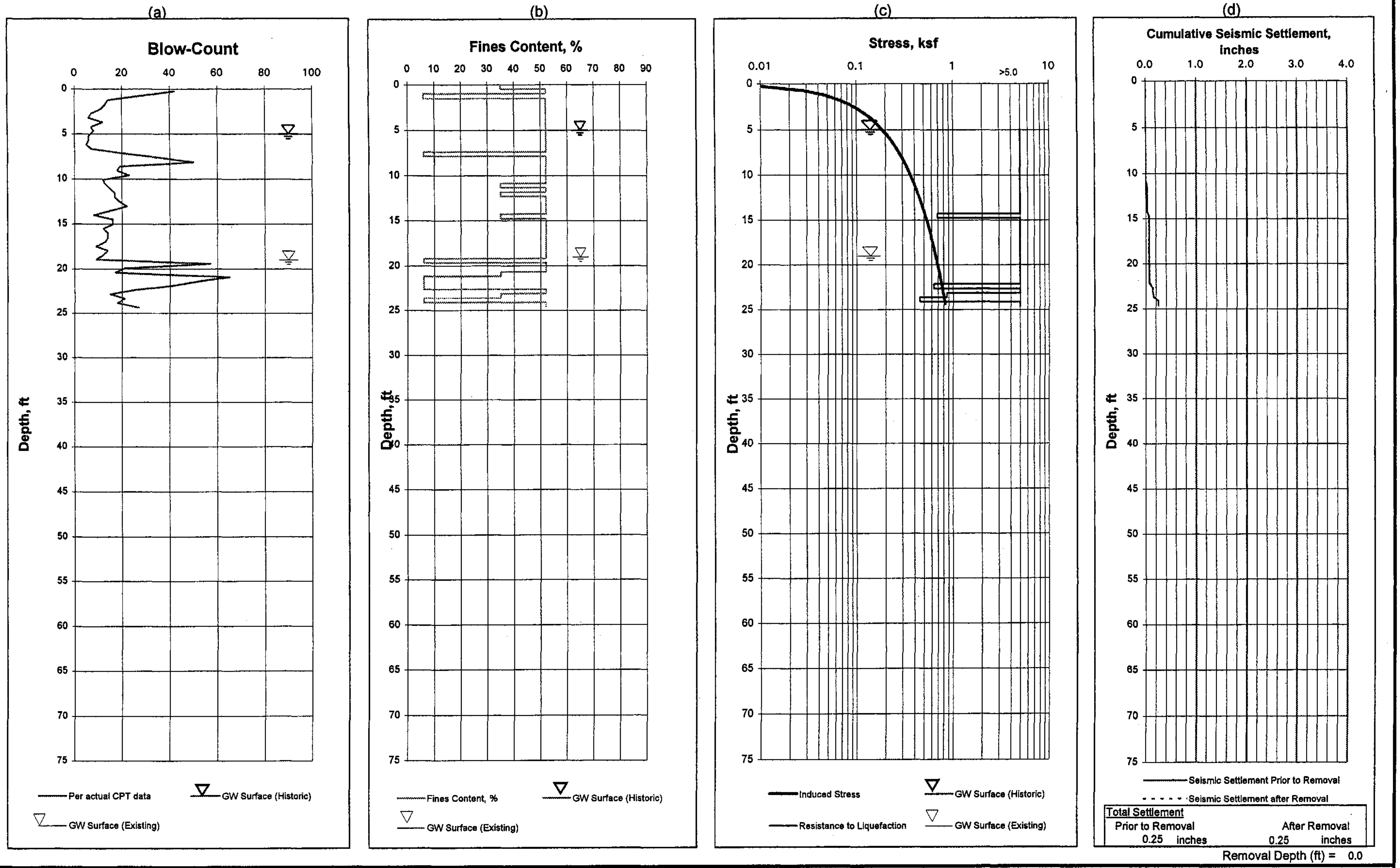


Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-1
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT-2
Elevation (MSL)........ 1212 ft



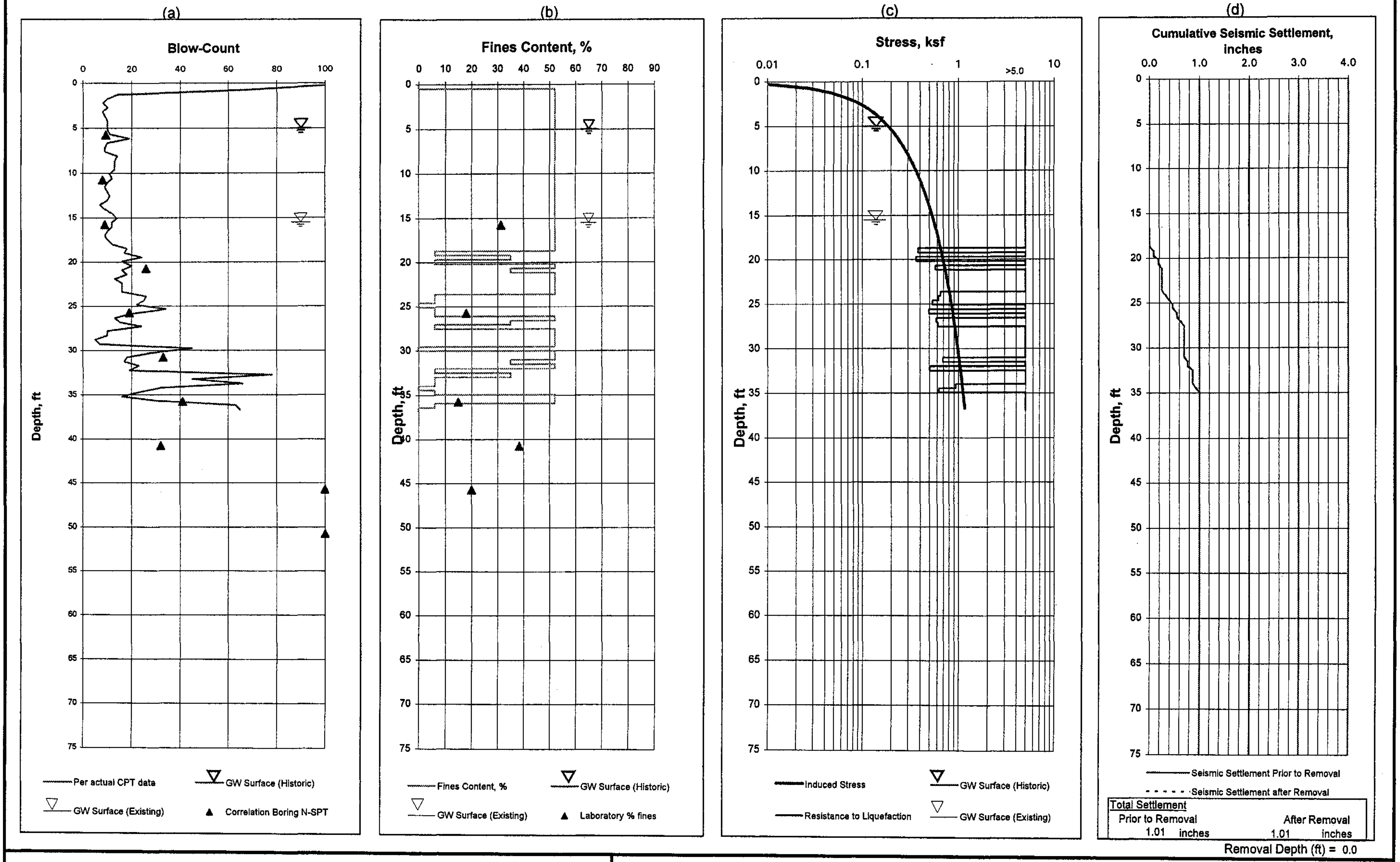
Removal Depth (ft) = 0.0

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-2
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT-3 Near RW-8
Elevation (MSL)........ 1203 ft



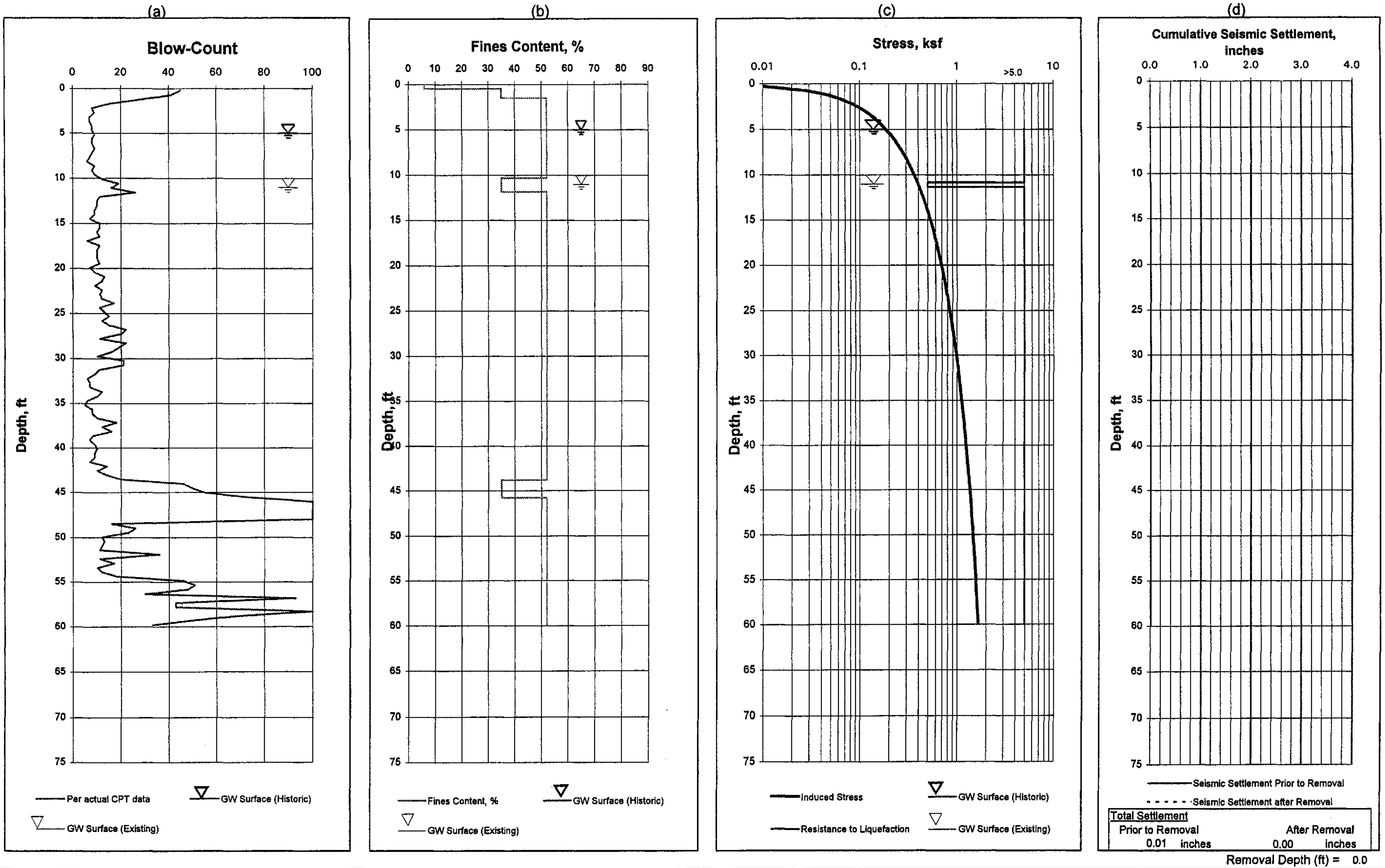
Allan E. Seward Engineering Geology, Inc.

Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5). 0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)... 0.71 g	Figure No.	C-3
For: Newhall Land Company	Magnification Factor.......... 1	Date.	4-4-2003

Location....... **CPT-4**
Elevation (MSL)........ 1196 ft

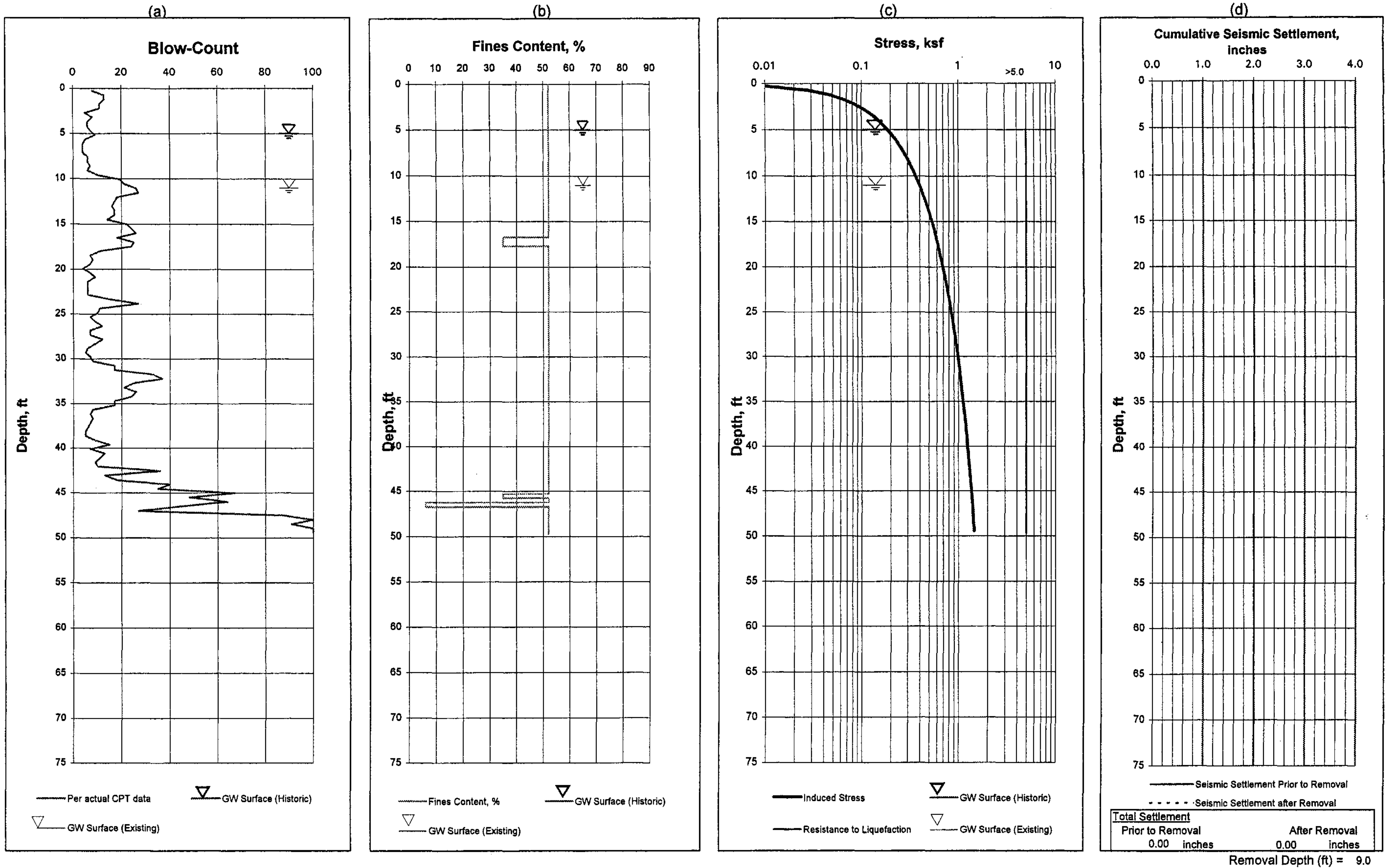


Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-4
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT-5
Elevation (MSL)........ 1195 ft

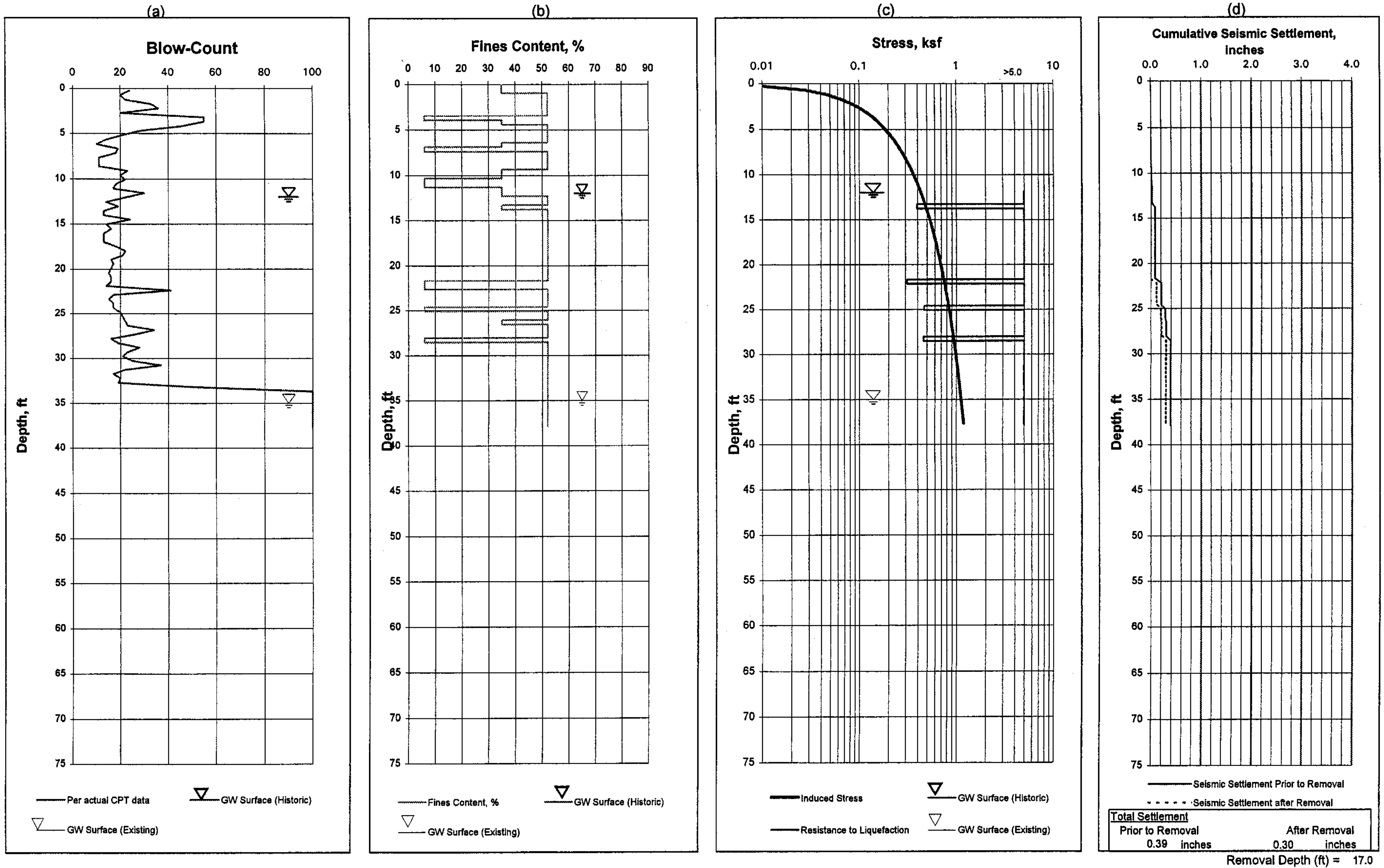


Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-5
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT-6
Elevation (MSL)........ 1224 ft



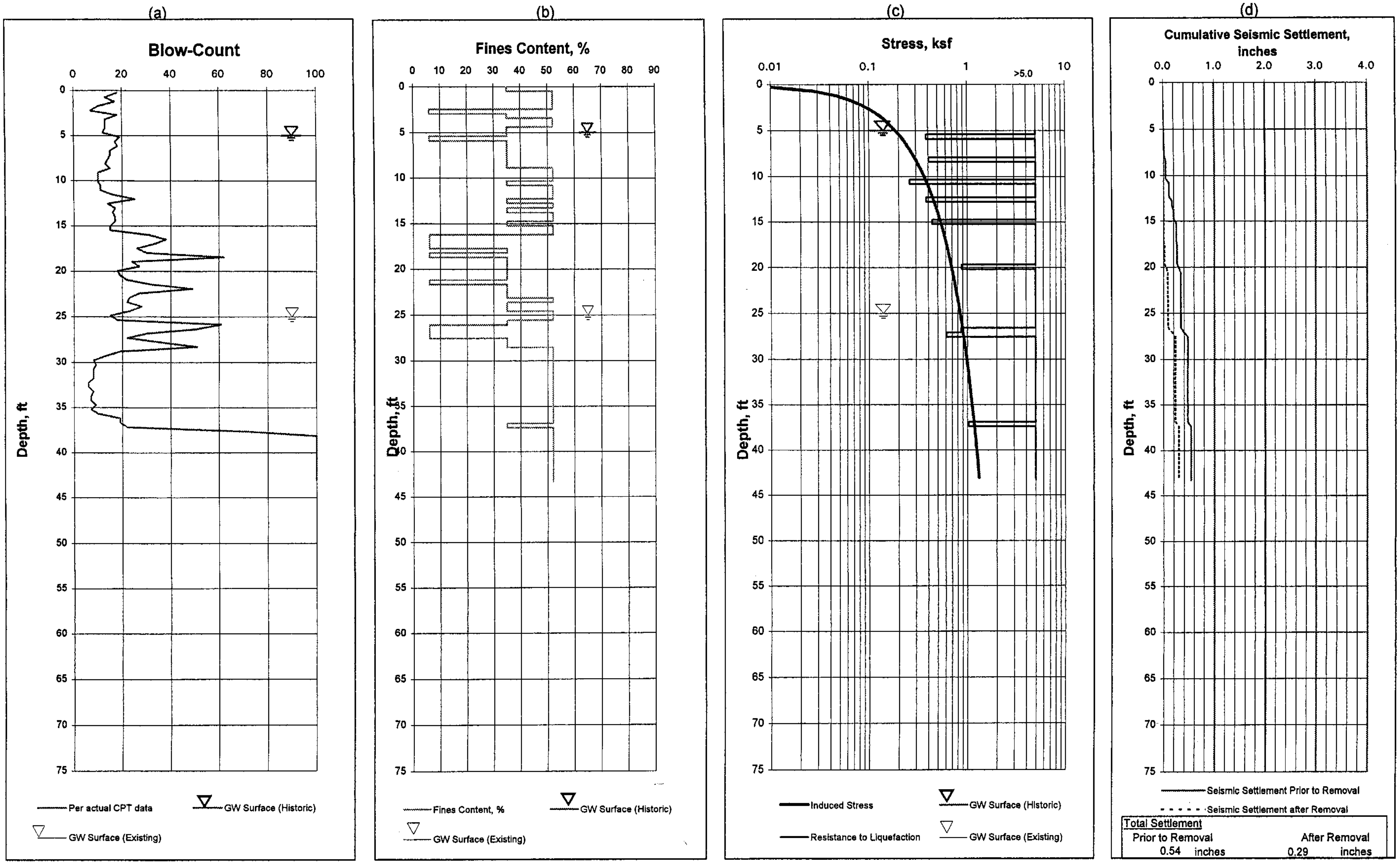
Total Settlement
Prior to Removal 0.39 inches
After Removal 0.30 inches
Removal Depth (ft) = 17.0

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-6
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT-7
Elevation (MSL)........ 1210 ft



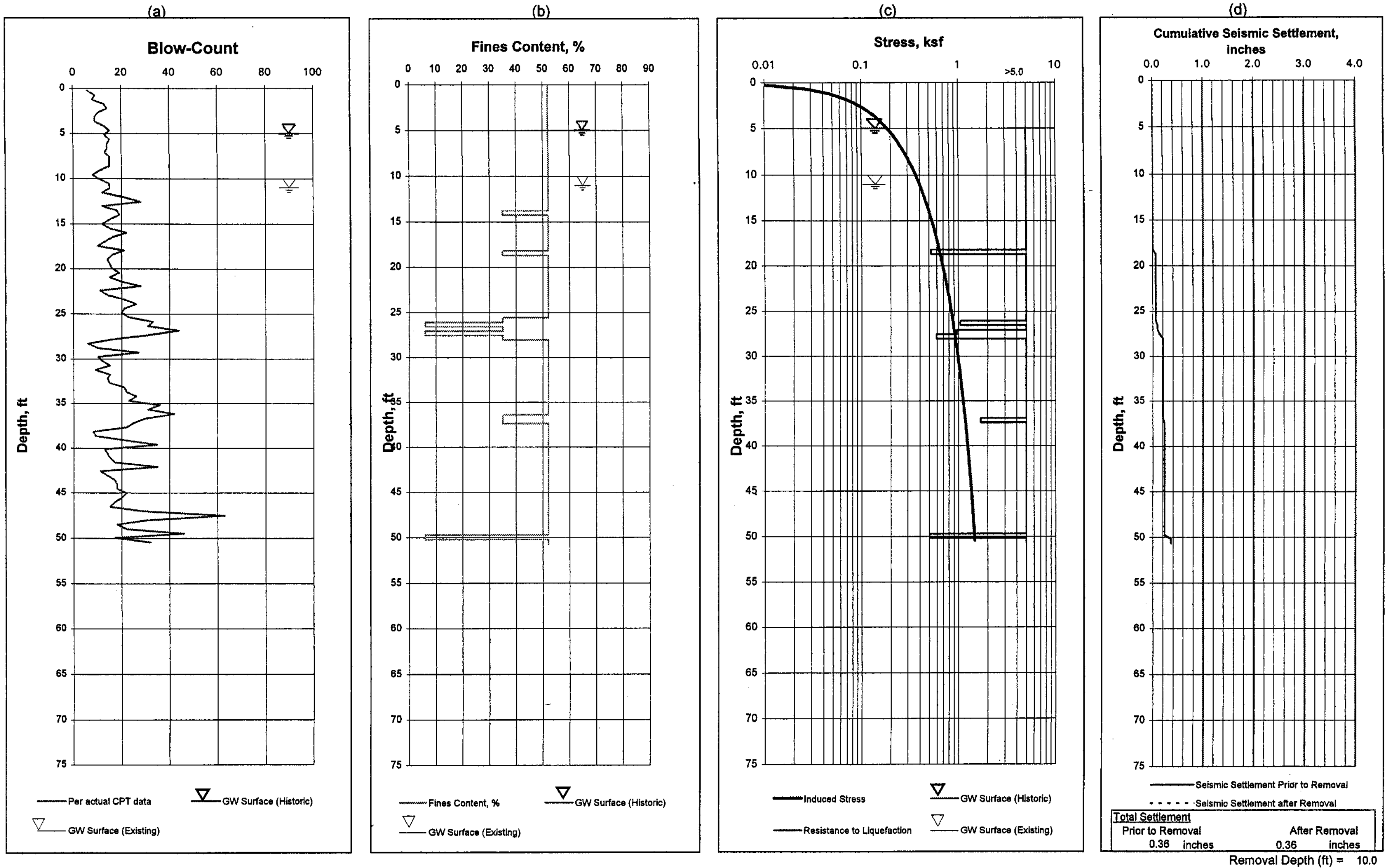
Removal Depth (ft) = 16.0

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-7
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT-8
Elevation (MSL)........ 1198 ft



Total Settlement

Prior to Removal	After Removal
0.36 inches	0.36 inches

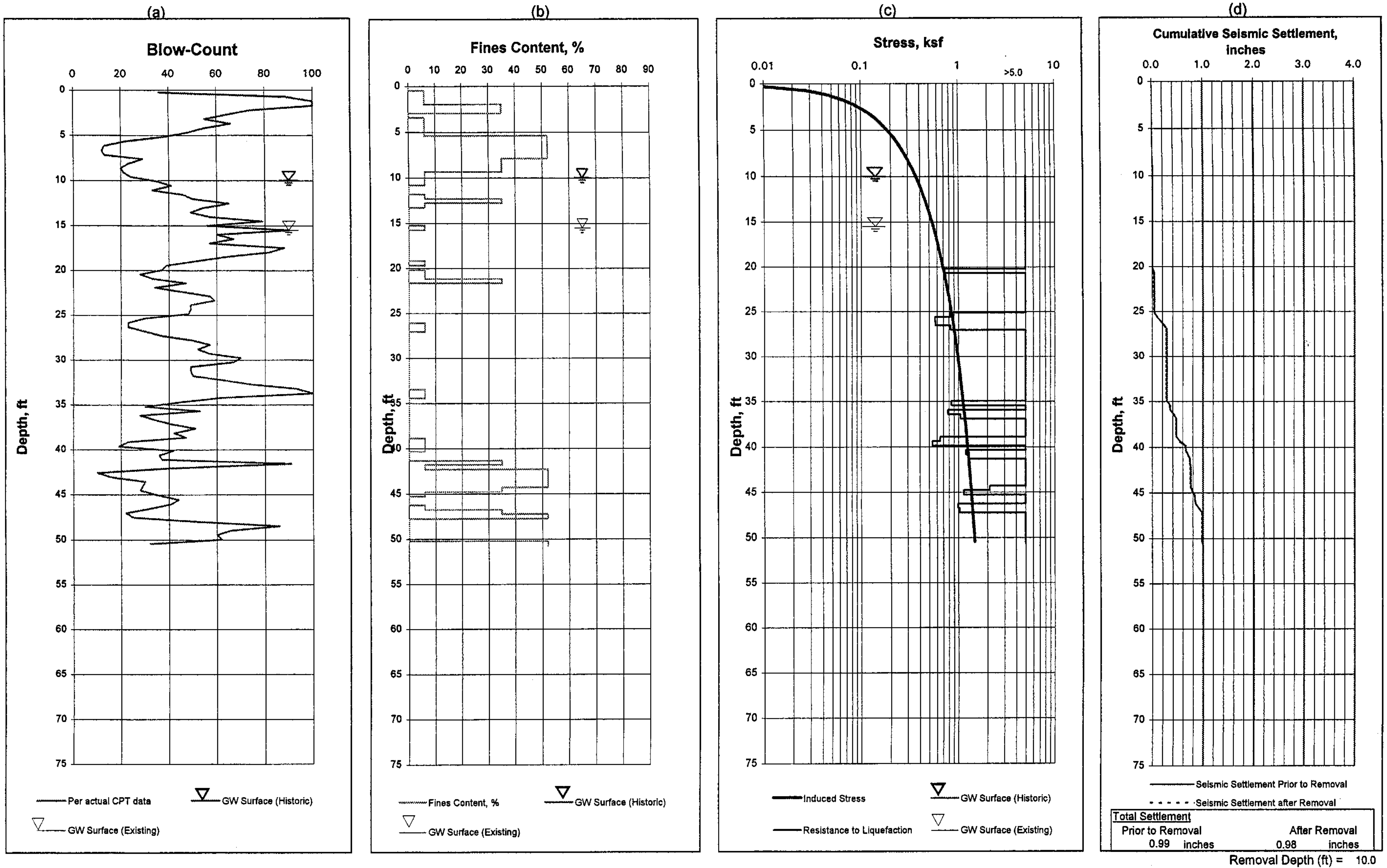
Removal Depth (ft) = 10.0

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-8
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT-9
Elevation (MSL)........ 1196 ft



Total Settlement
Prior to Removal 0.99 inches
After Removal 0.98 inches

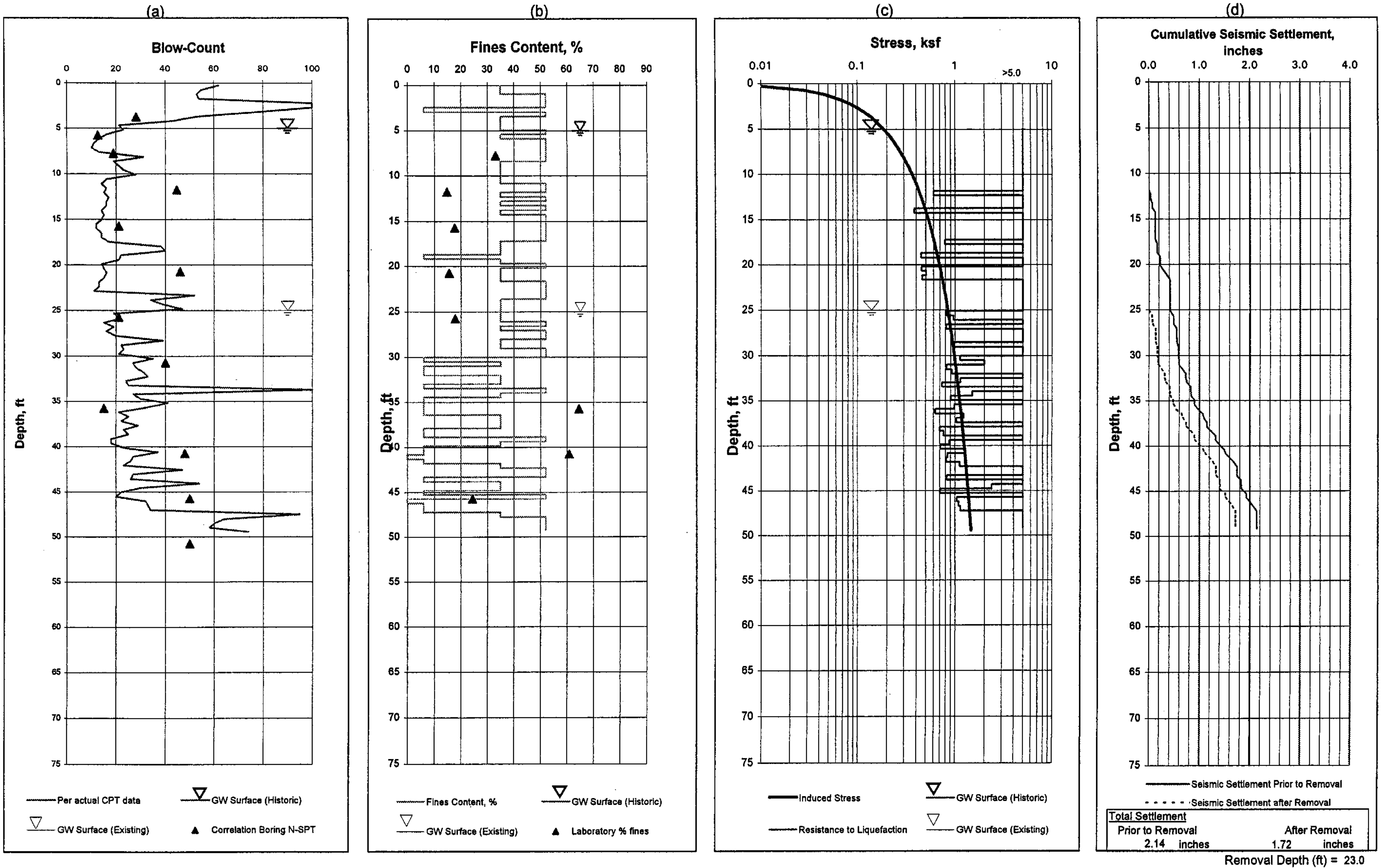
Removal Depth (ft) = 10.0

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5). 0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)... 0.71 g	Figure No.	C-9
For: Newhall Land Company	Magnification Factor.......... 1	Date.	4-4-2003

Location....... CPT- 10 Near RW-3
Elevation (MSL)........ 1194 ft

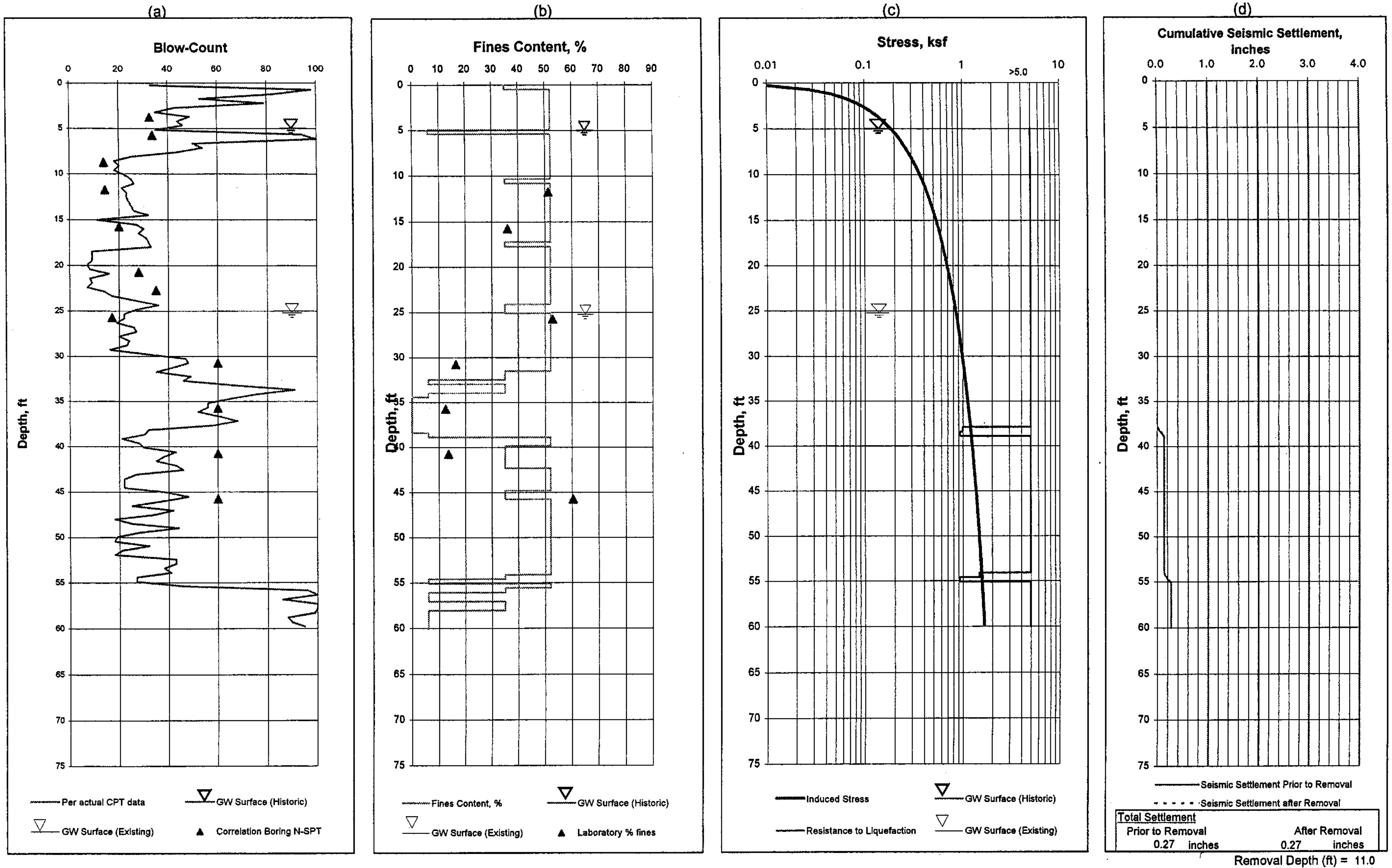


Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-10
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT- 11 Near RW - 5
Elevation (MSL)........ 1186 ft



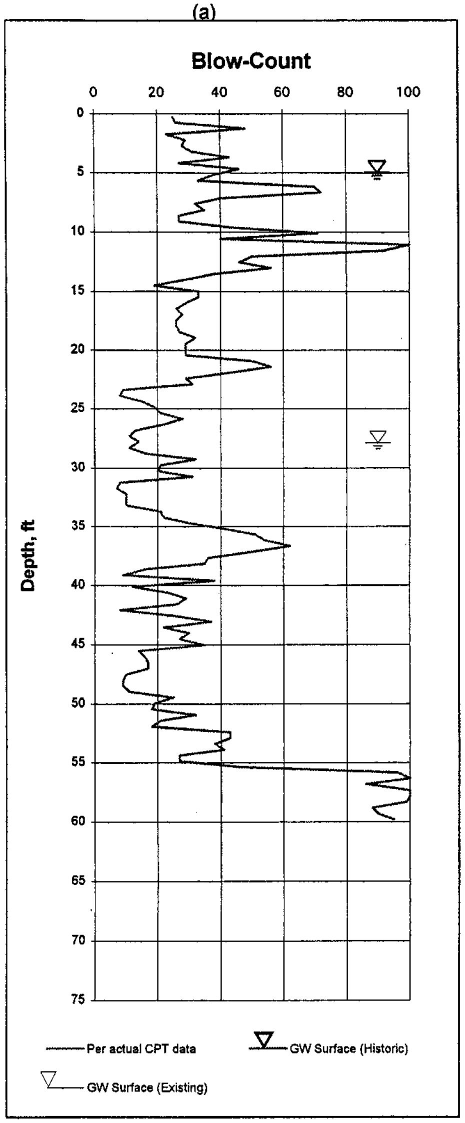
Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

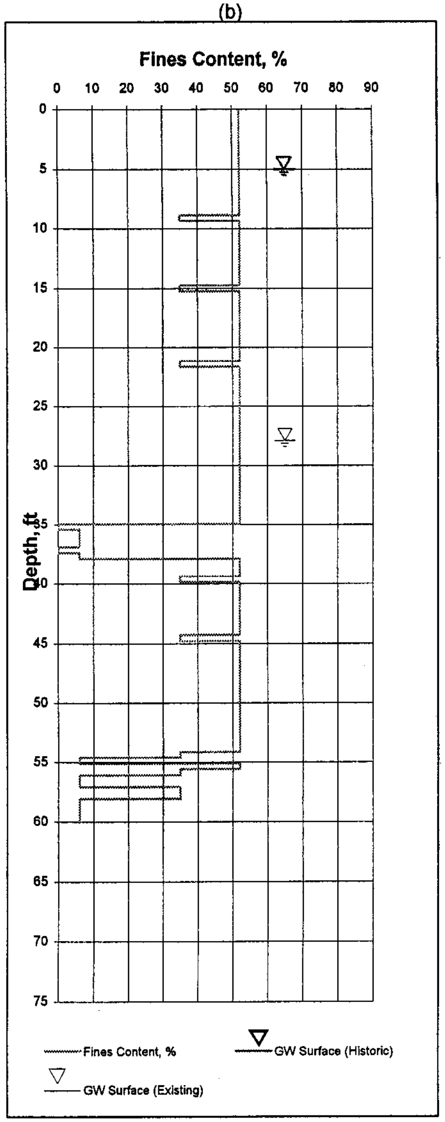
Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-11
For: Newhall Land Company	Magnification Factor.........	1	Date.	4-4-2003

Location....... CPT-12
Elevation (MSL)........ 1194 ft

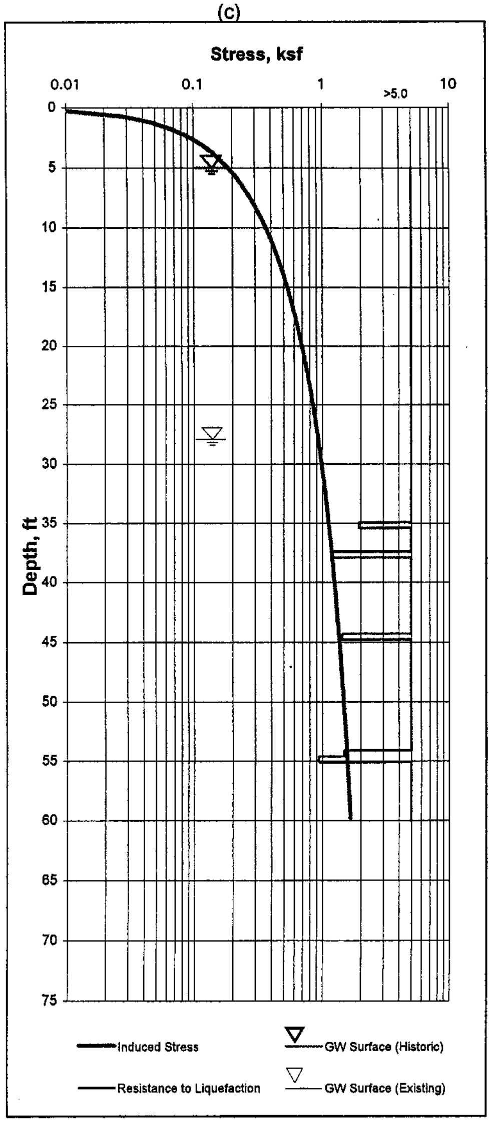
(a)



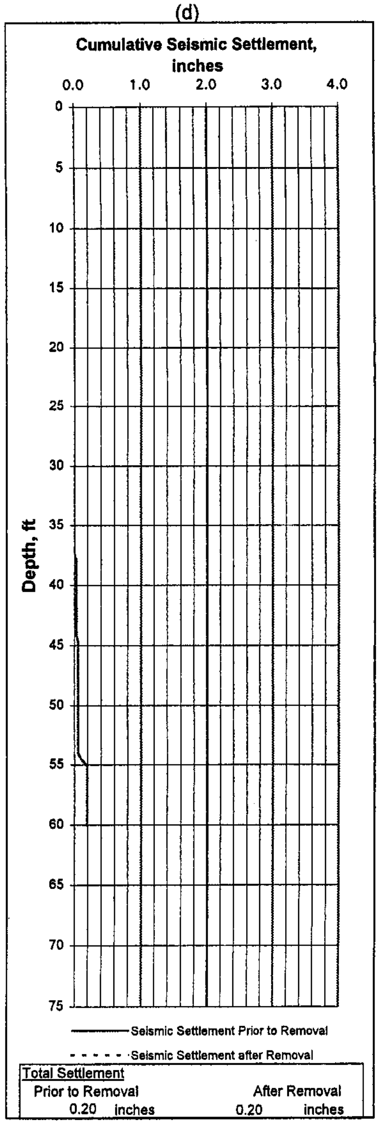
(b)



(c)



(d)



Removal Depth (ft) = 9.0

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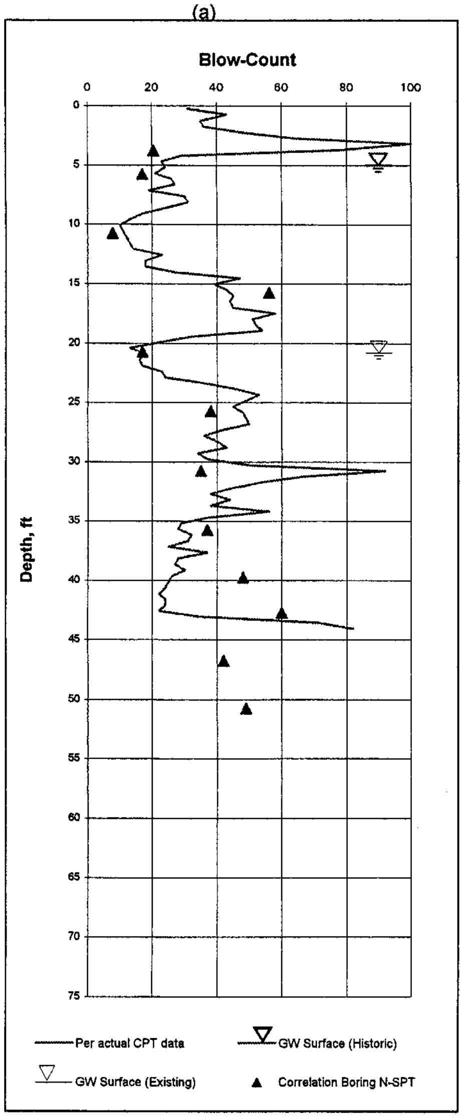
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

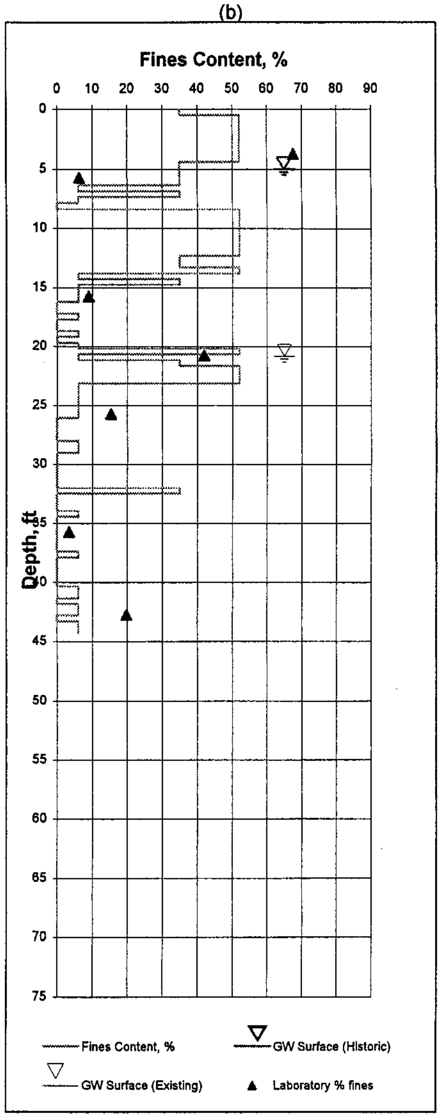
Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-12
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT- 13 Near RW - 6
Elevation (MSL)........ 1177 ft

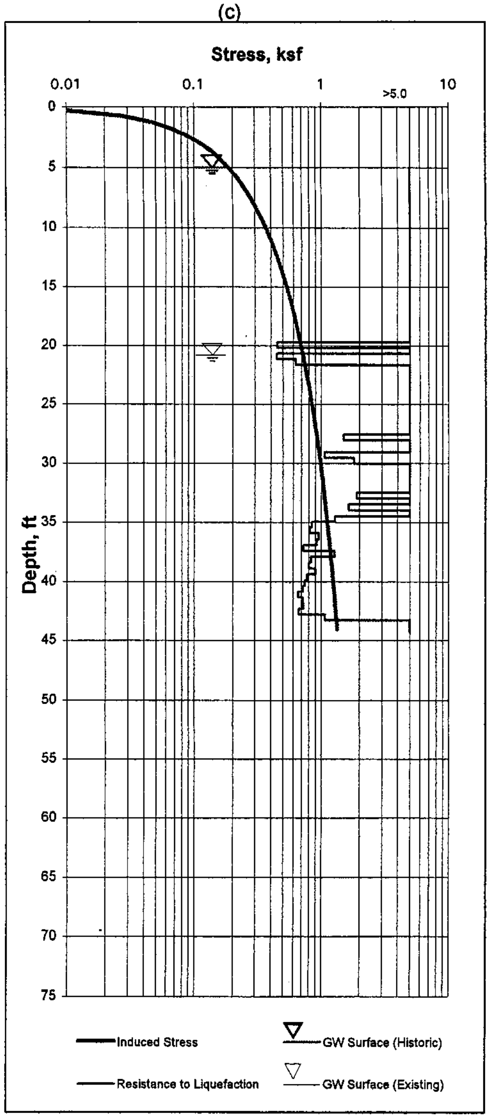
(a)



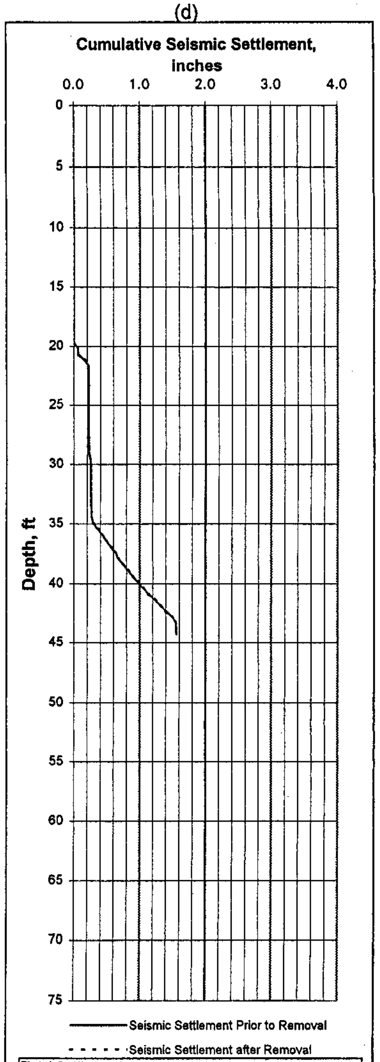
(b)



(c)



(d)



Total Settlement

Prior to Removal	After Removal
1.56 inches	1.55 inches

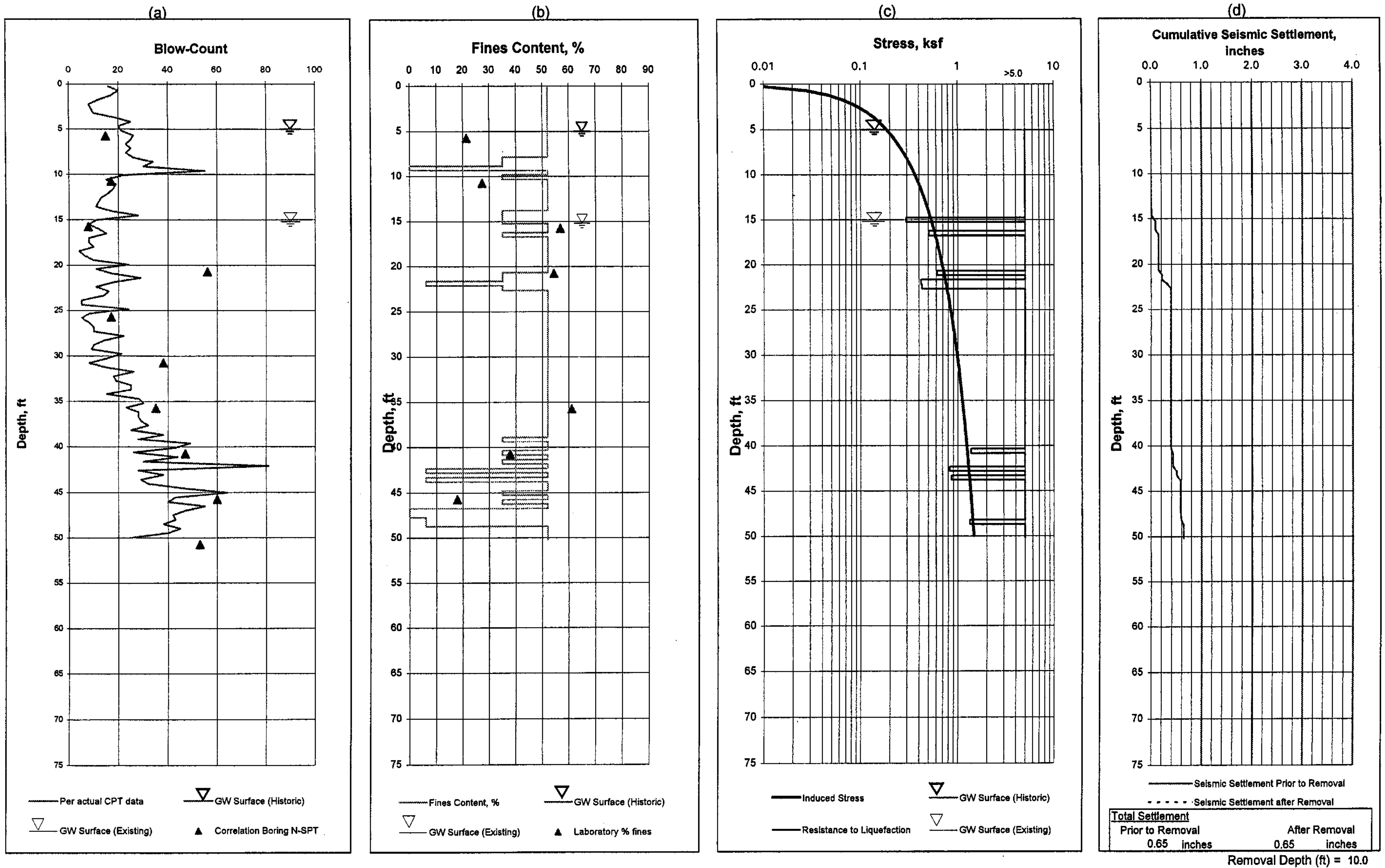
Removal Depth (ft) = 12.0

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-13
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT- 14 Near RW-7
Elevation (MSL)........ 1188 ft

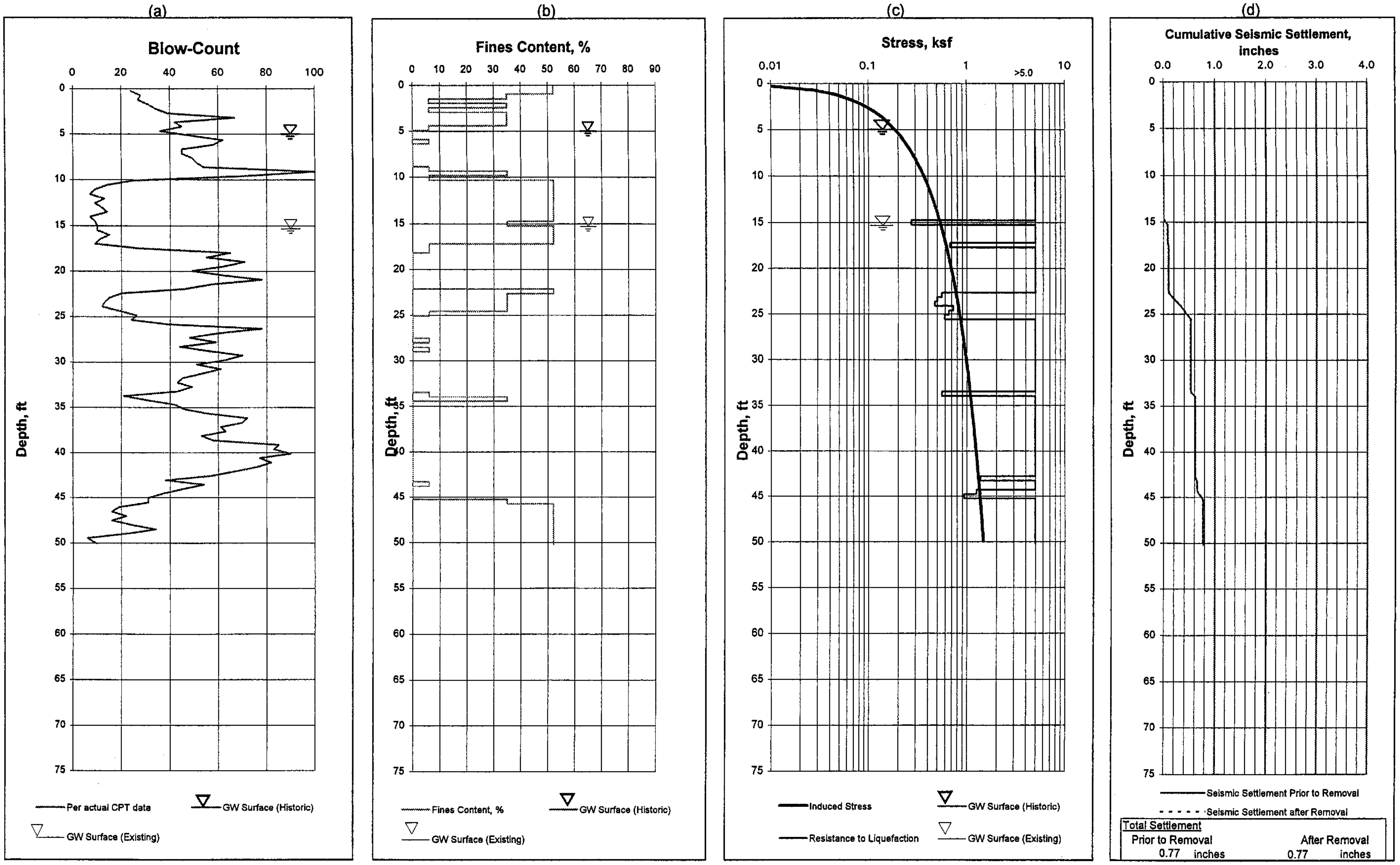


Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-14
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... **CPT-15**
Elevation (MSL)........ 1185 ft



Total Settlement	
Prior to Removal	After Removal
0.77 inches	0.77 inches

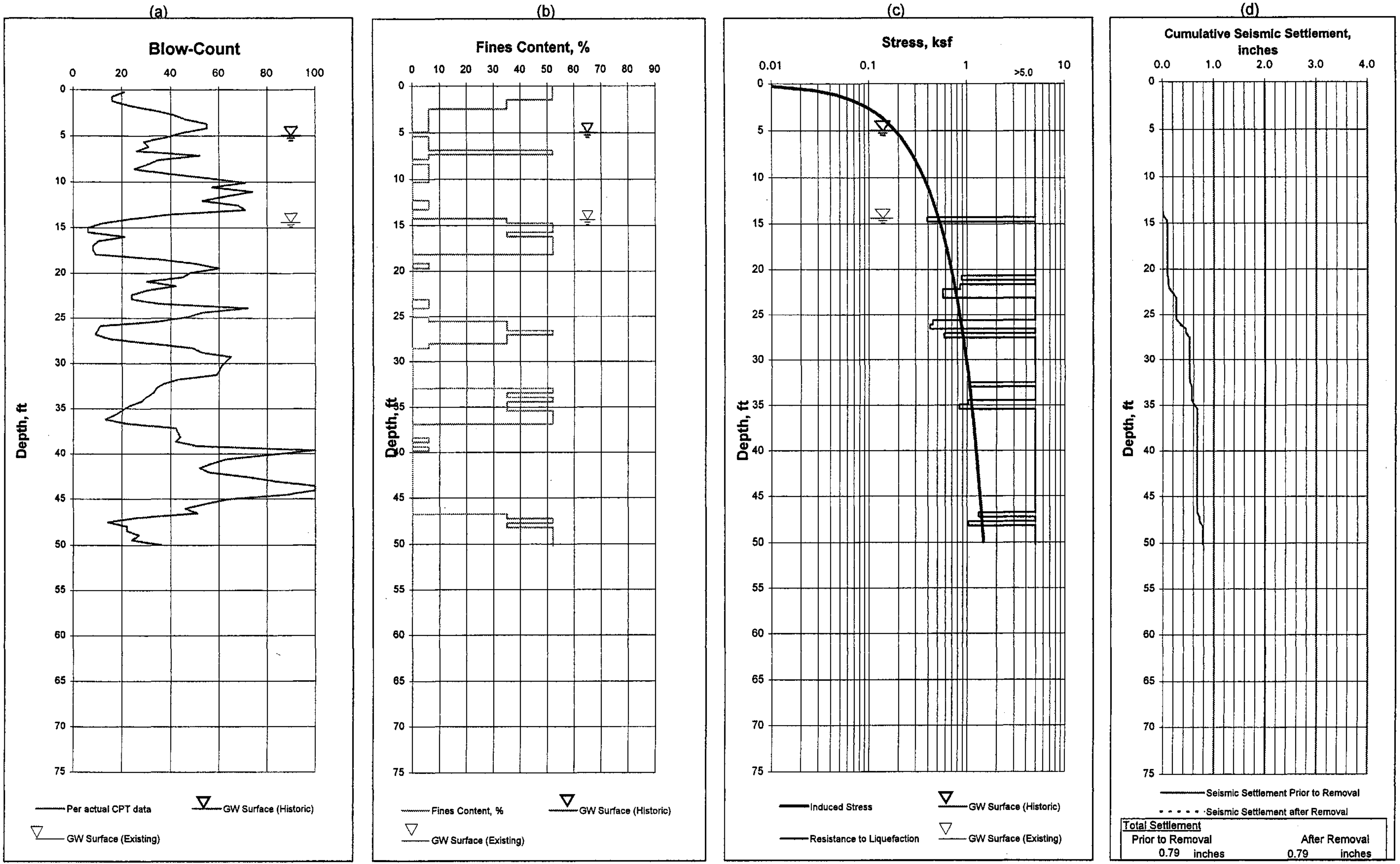
Removal Depth (ft) = 8.0

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5). 0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)... 0.71 g	Figure No.	C-15
For: Newhall Land Company	Magnification Factor.......... 1	Date.	4-4-2003

Location....... **CPT-16**
Elevation (MSL)........ 1188 ft



Total Settlement

Prior to Removal	After Removal
0.79 inches	0.79 inches

Removal Depth (ft) = 9.0

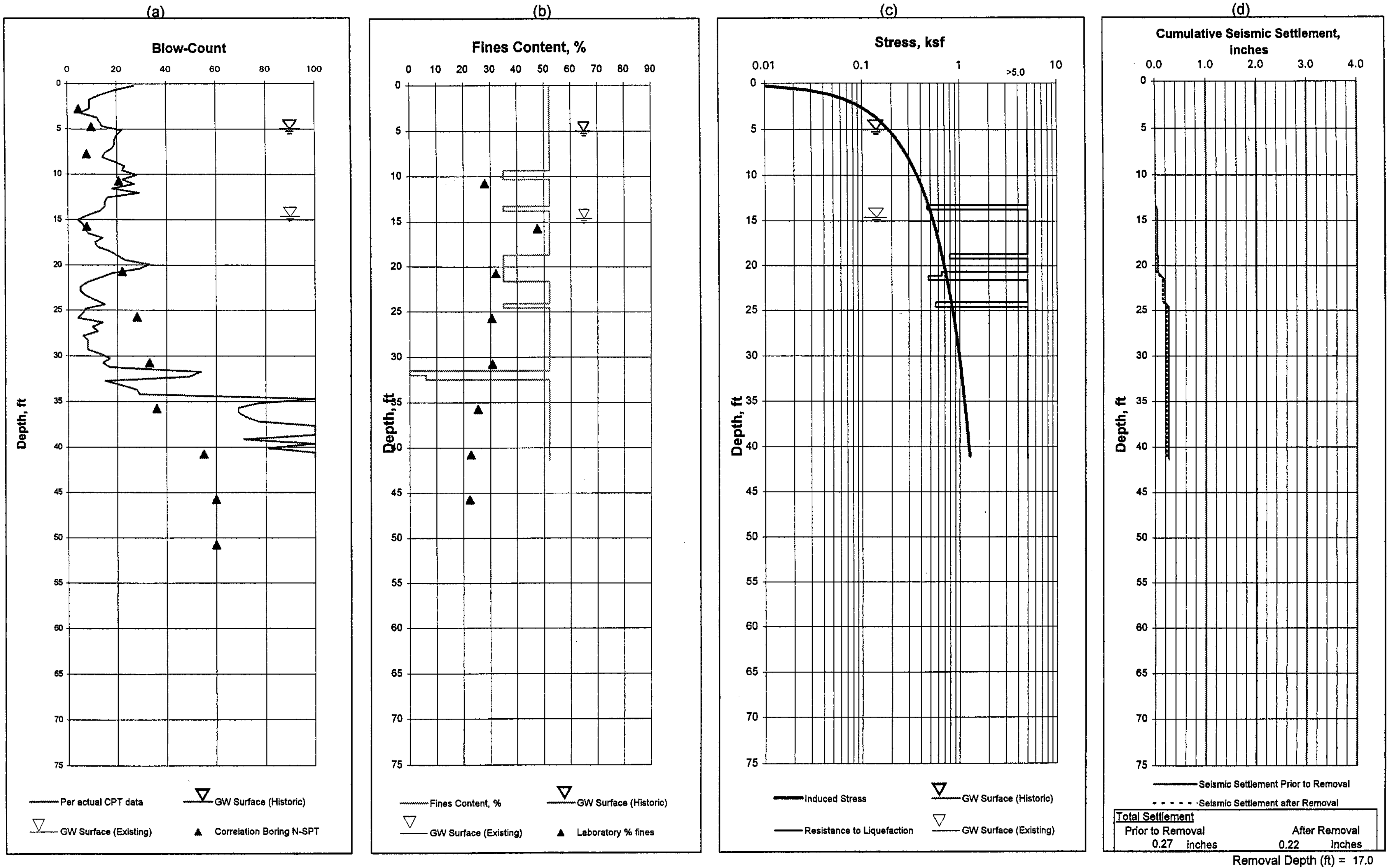
Allan E. Seward Engineering Geology, Inc.

Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5). 0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)... 0.71 g	Figure No.	C-16
For: Newhall Land Company	Magnification Factor.......... 1	Date.	4-4-2003

Location....... CPT-17 Near RW-2
Elevation (MSL)........ 1192 ft

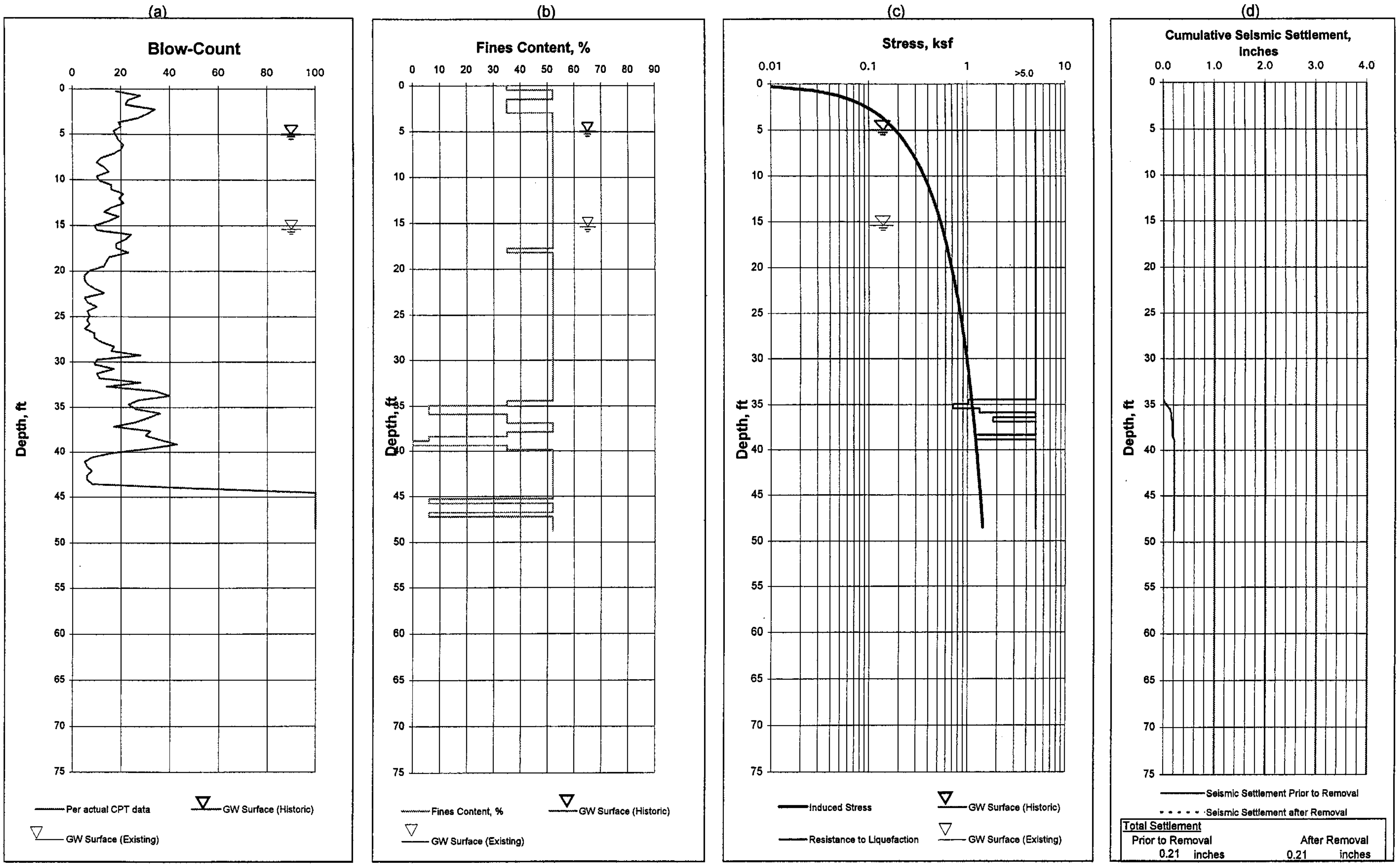


Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5). 0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)... 0.71 g	Figure No.	C-17
For: Newhall Land Company	Magnification Factor.......... 1	Date.	4-4-2003

Location....... **CPT-18**
Elevation (MSL)........ 1194 ft

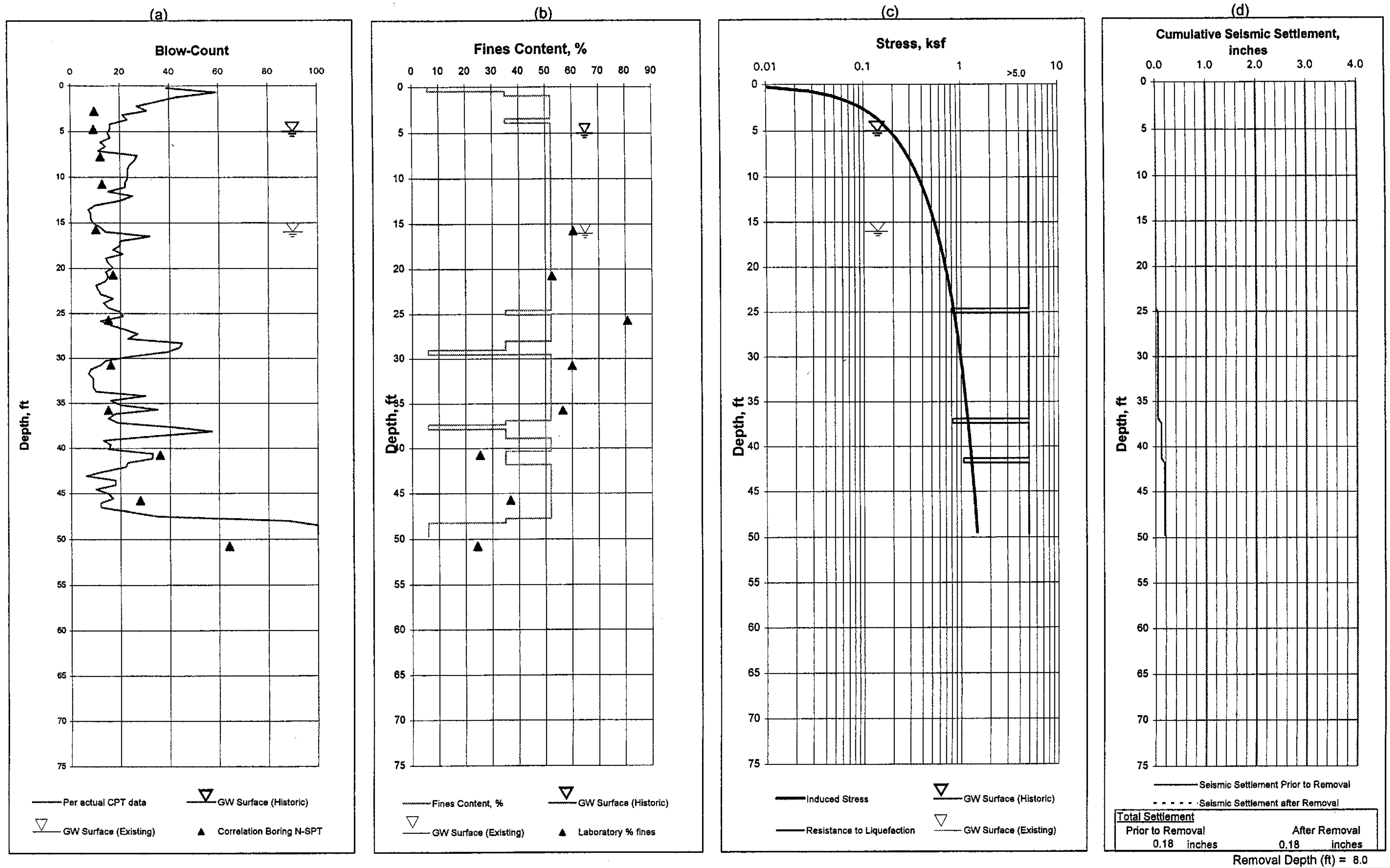


Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-18
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT-19 Near RW-4
Elevation (MSL)........ 1193 ft



Removal Depth (ft) = 8.0

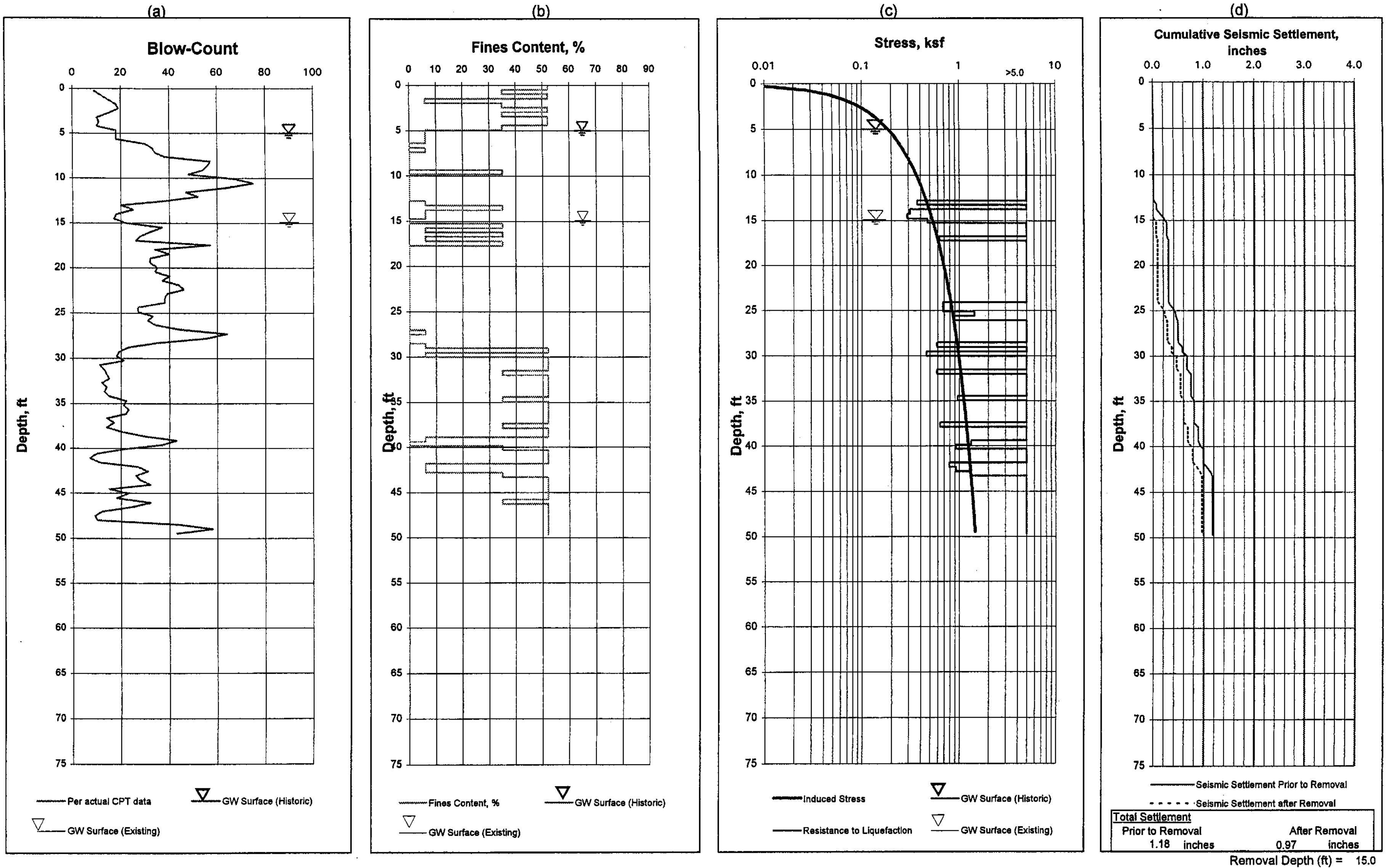
Allan E. Seward Engineering Geology, Inc.

Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-19
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT-20
Elevation (MSL)........ 1195 ft

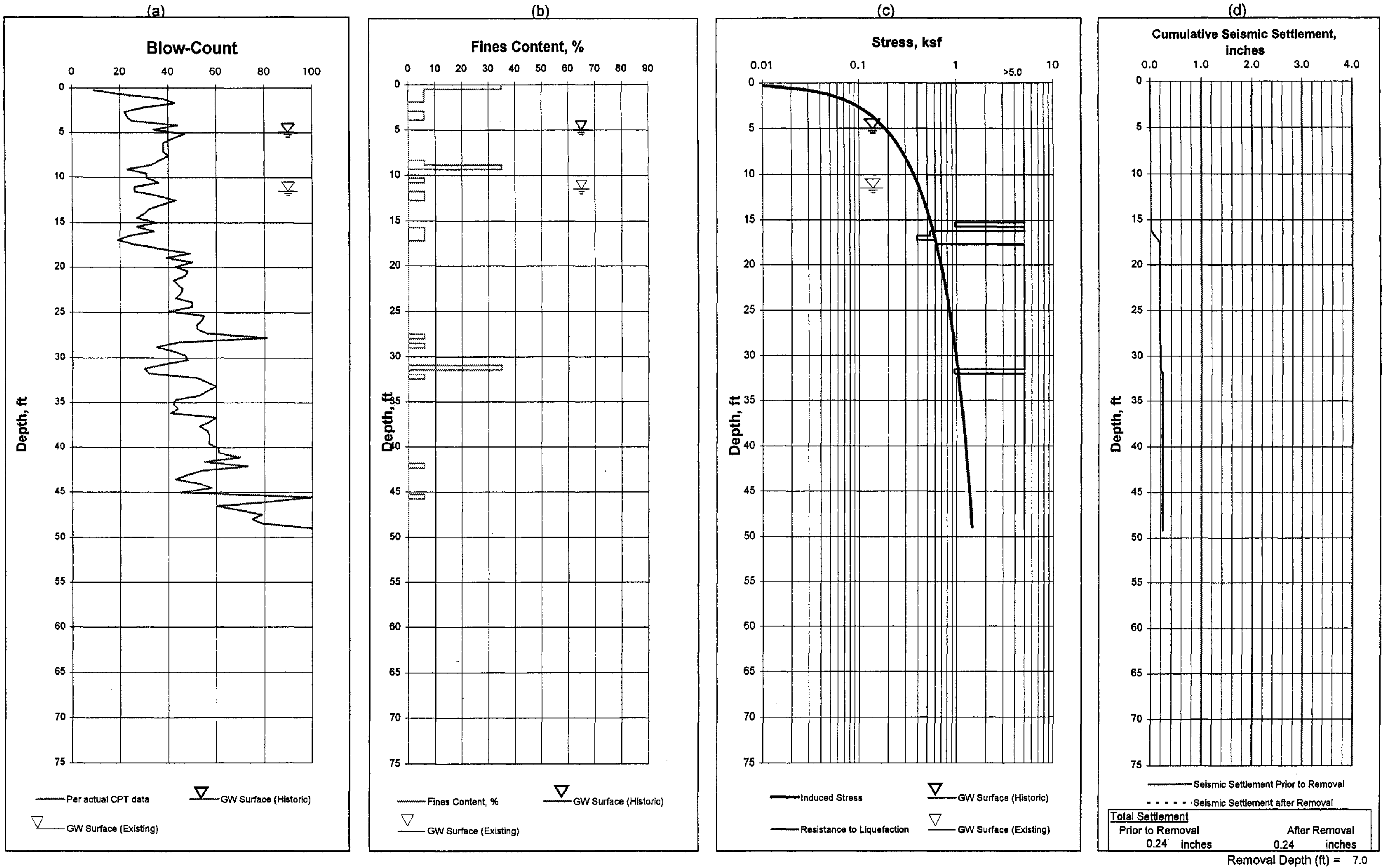


Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5). 0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)... 0.71 g	Figure No.	C-20
For: Newhall Land Company	Magnification Factor.......... 1	Date.	4-4-2003

Location....... CPT-21
Elevation (MSL)........ 1195 ft

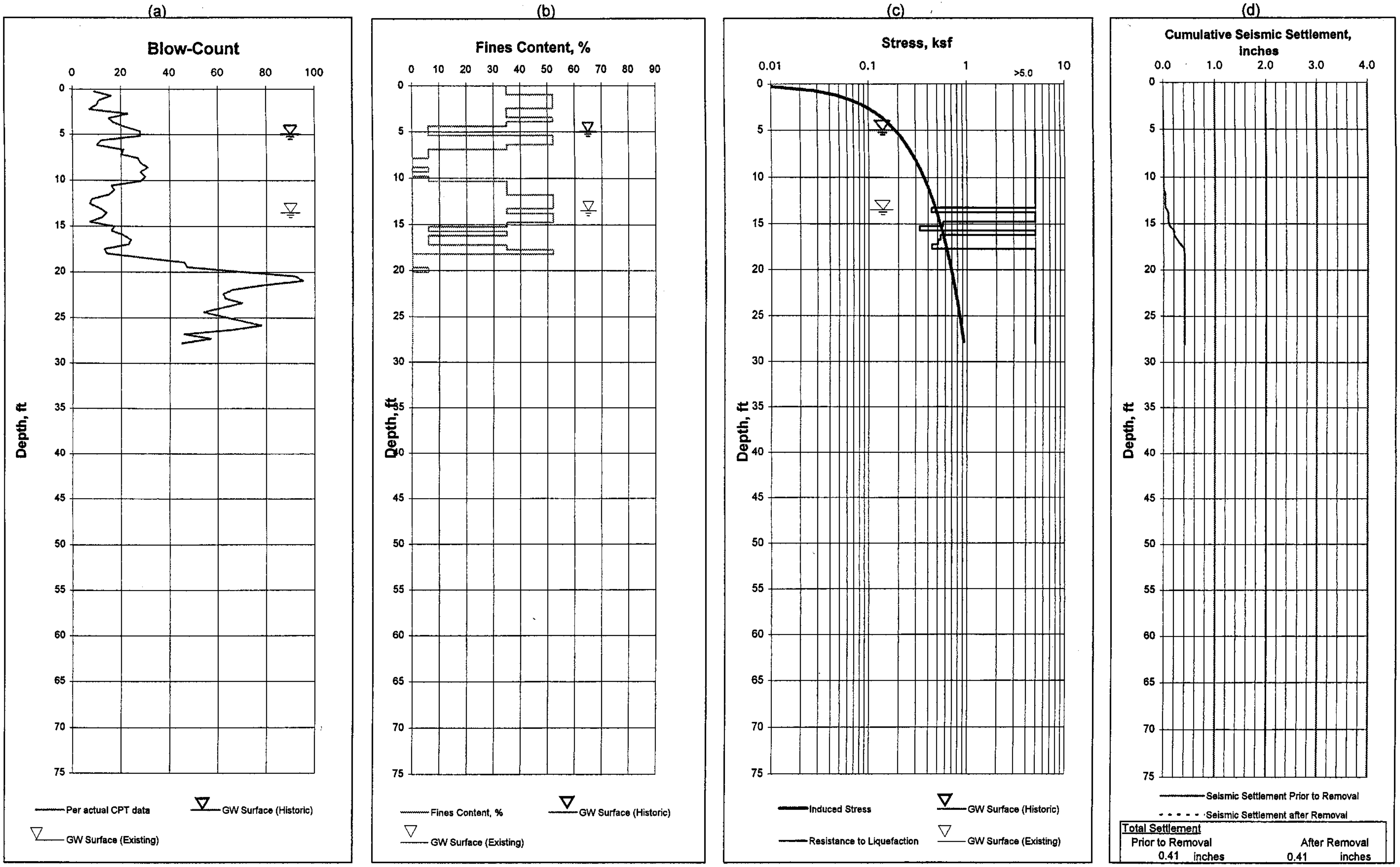


Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5). 0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)... 0.71 g	Figure No.	C-21
For: Newhall Land Company	Magnification Factor.......... 1	Date.	4-4-2003

Location....... **CPT-22**
Elevation (MSL)........ 1199 ft



Total Settlement

Prior to Removal	After Removal
0.41 inches	0.41 inches

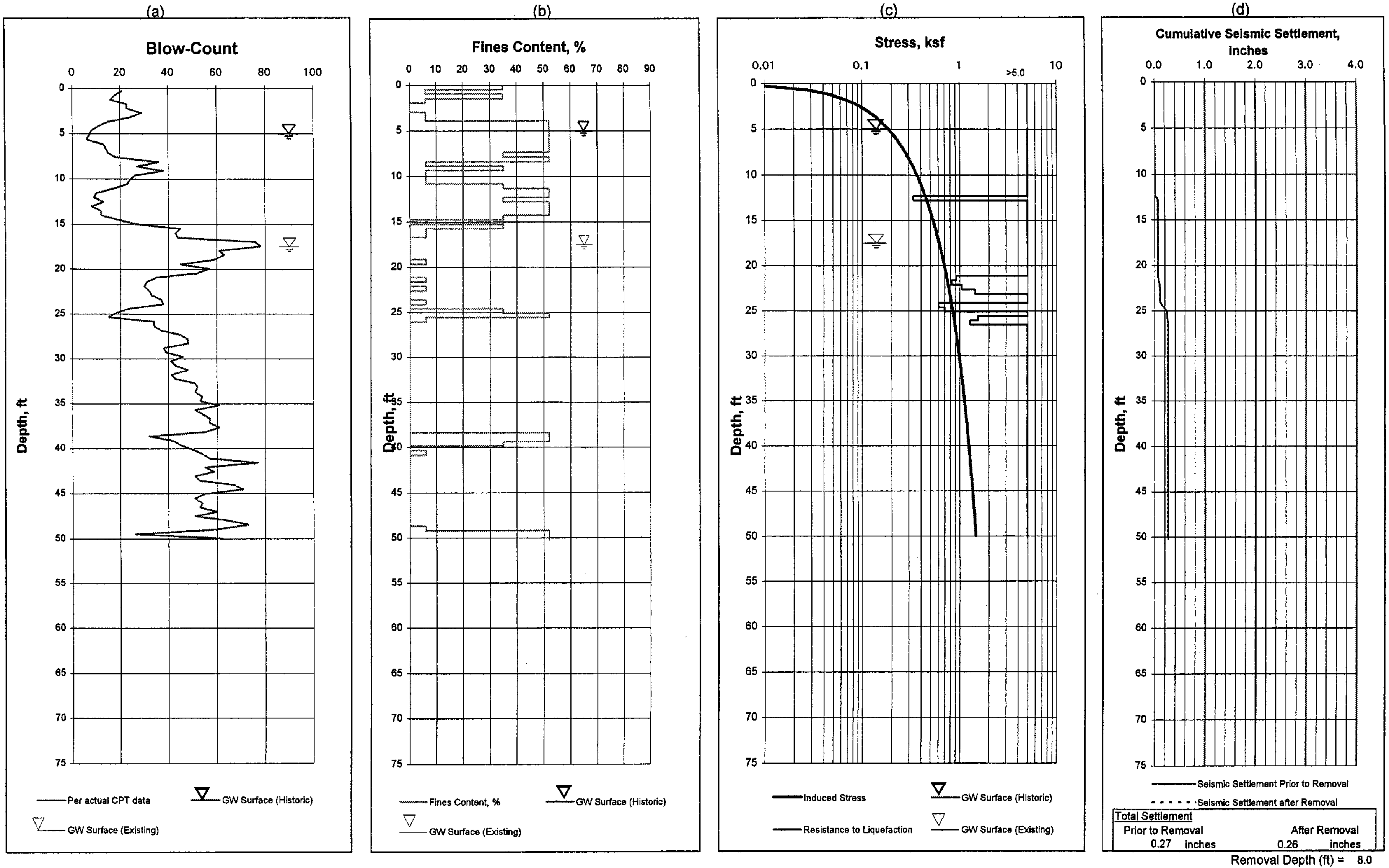
Removal Depth (ft) = 7.0

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5). 0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)... 0.71 g	Figure No.	C-22
For: Newhall Land Company	Magnification Factor.......... 1	Date.	4-4-2003

Location....... CPT-23
Elevation (MSL)........ 1206 ft



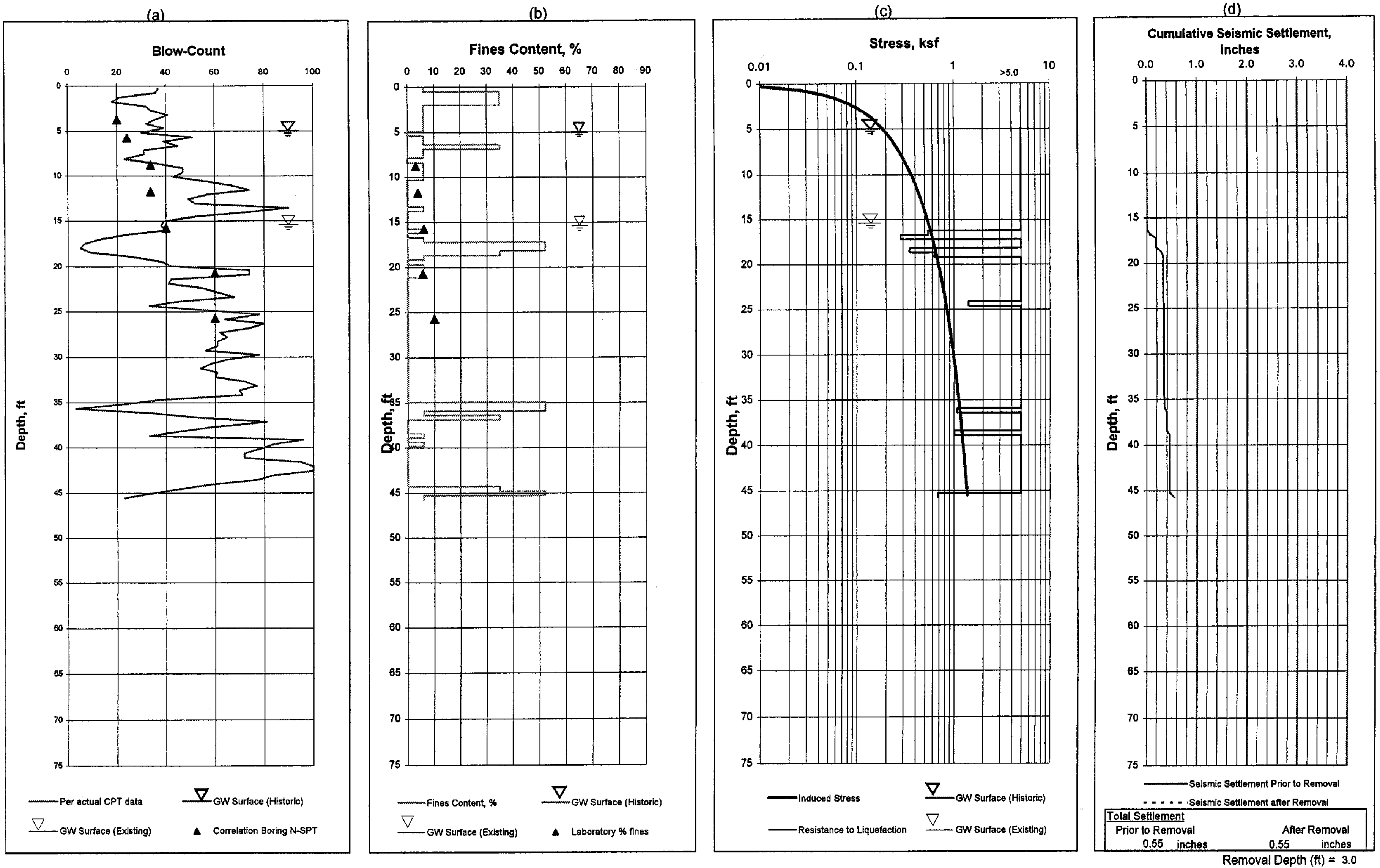
Allan E. Seward Engineering Geology, Inc.

Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-23
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT-24 Near RW-1
Elevation (MSL)........ 1205 ft

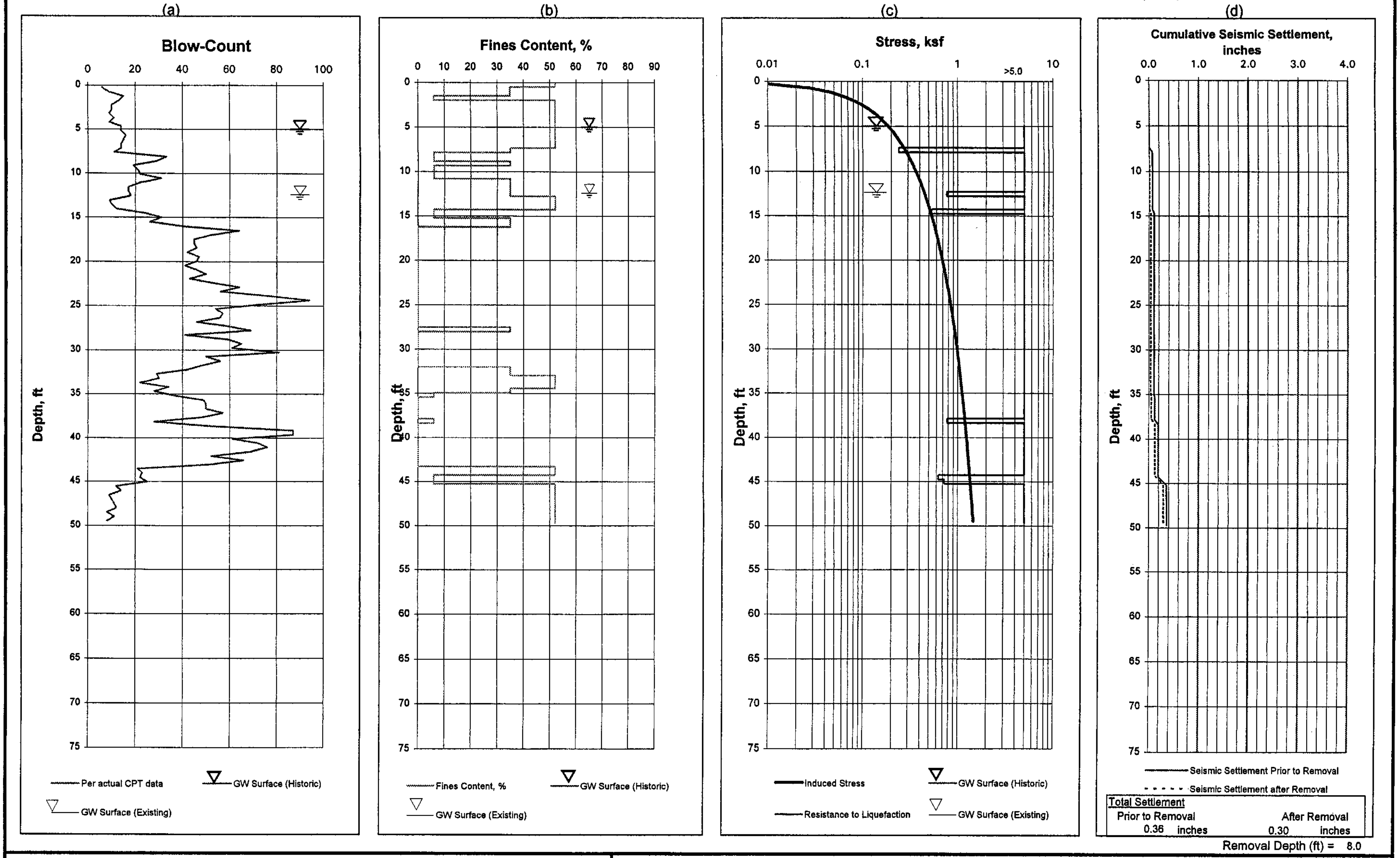


Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-24
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... **CPT-25**
Elevation (MSL)........ 1208 ft

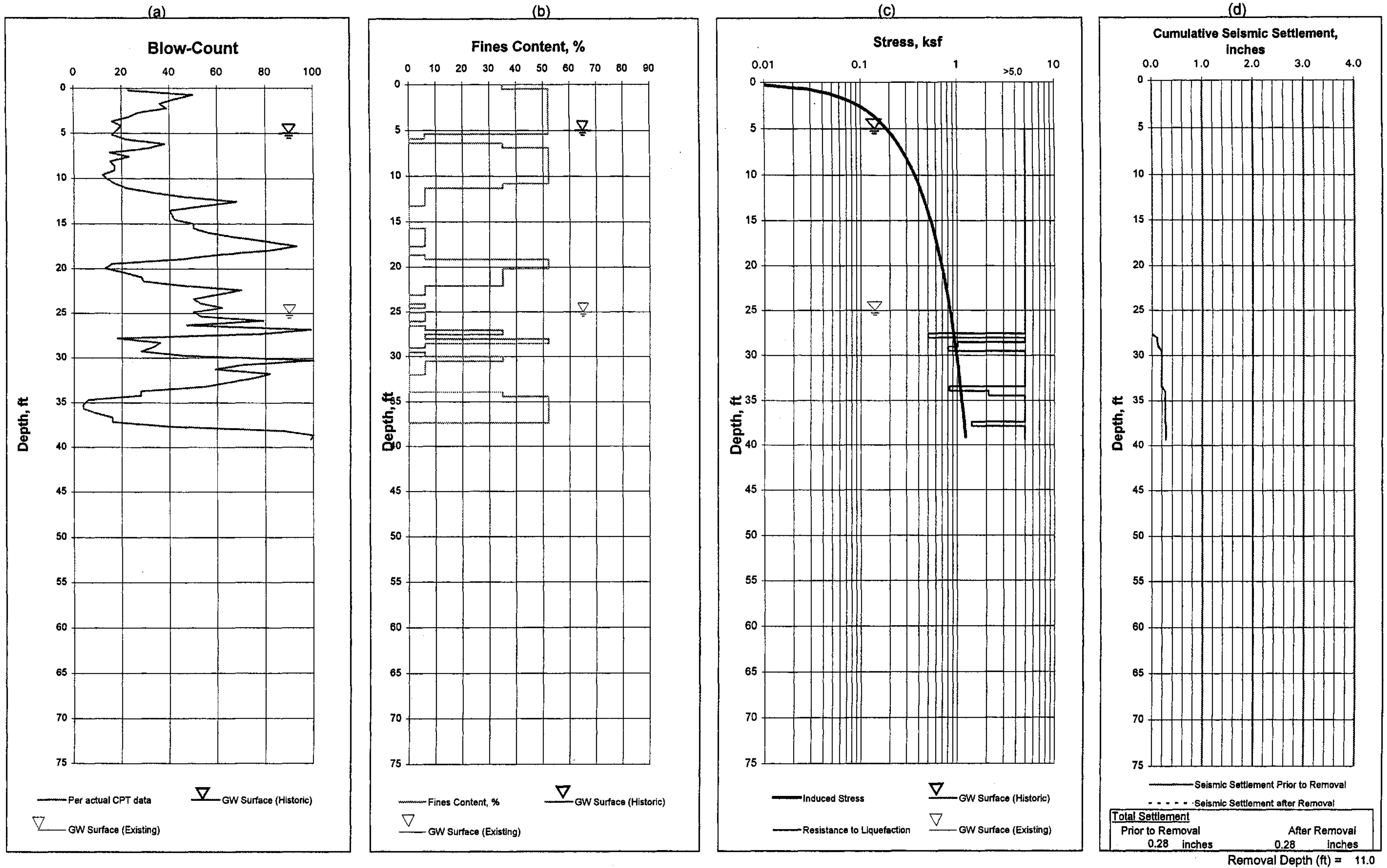


Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-25
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT-26
Elevation (MSL)........ 1176 ft

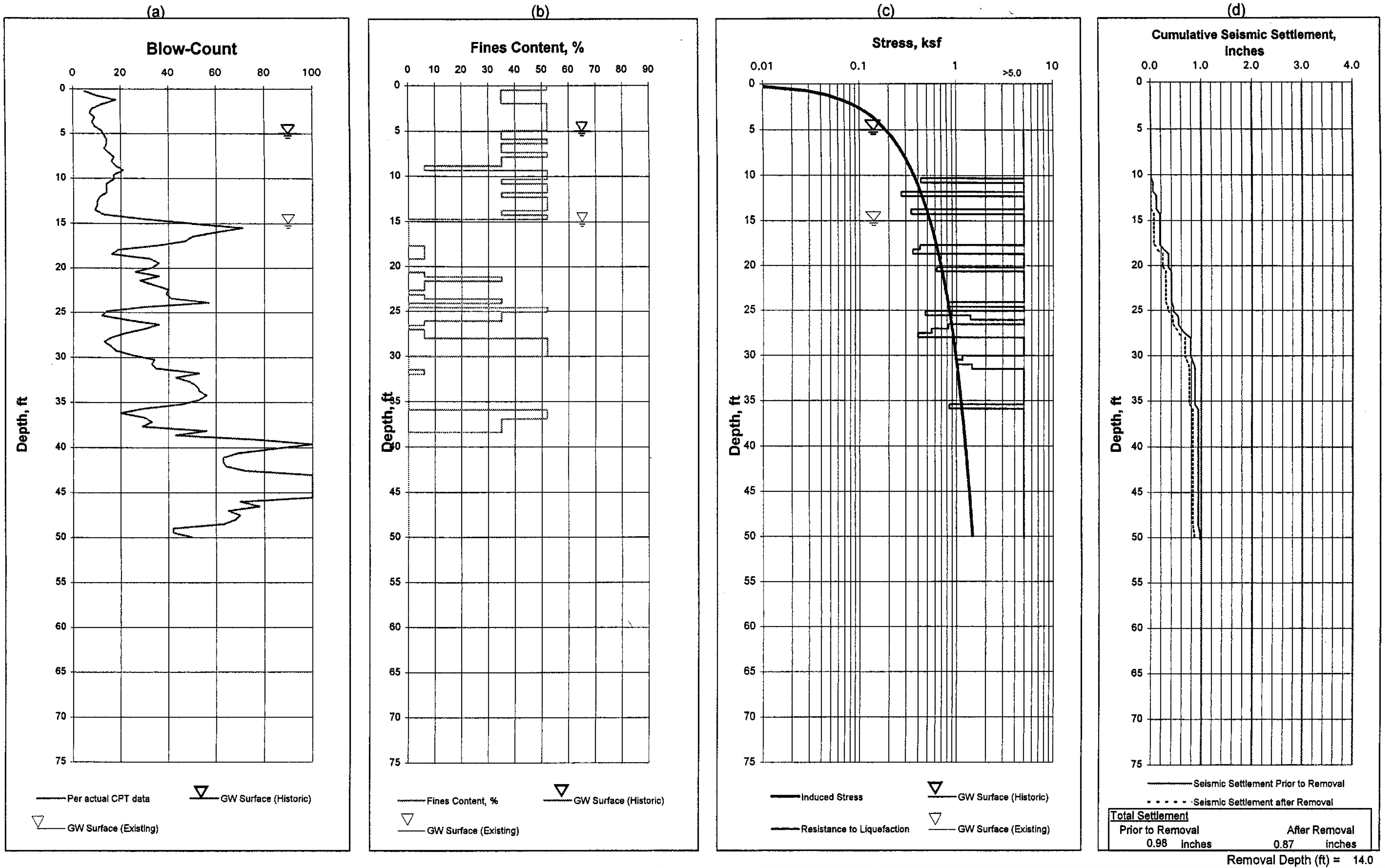


Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-26
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT-27
Elevation (MSL)........ 1210 ft

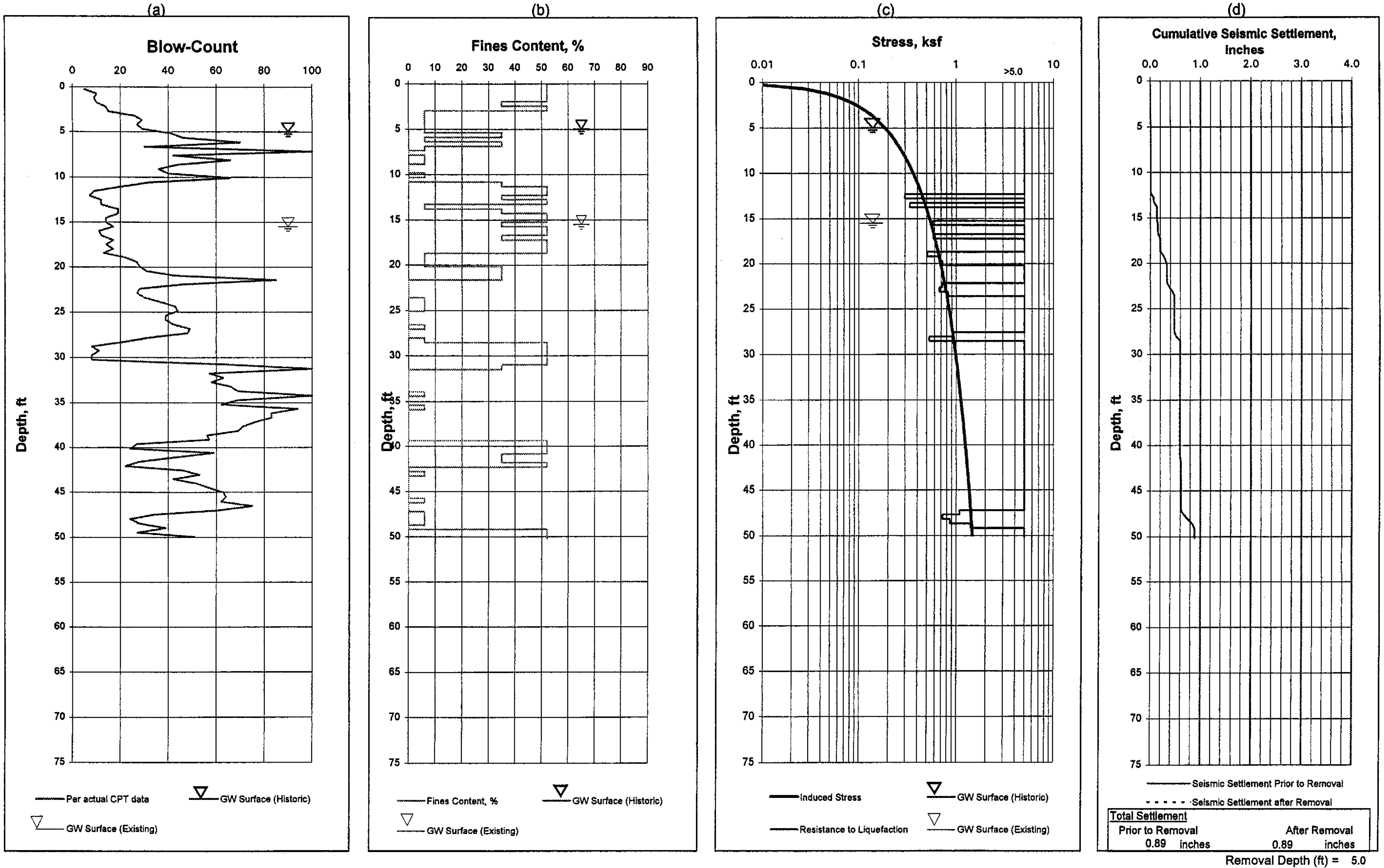


Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-27
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... **CPT-28**
Elevation (MSL)........ 1209 ft

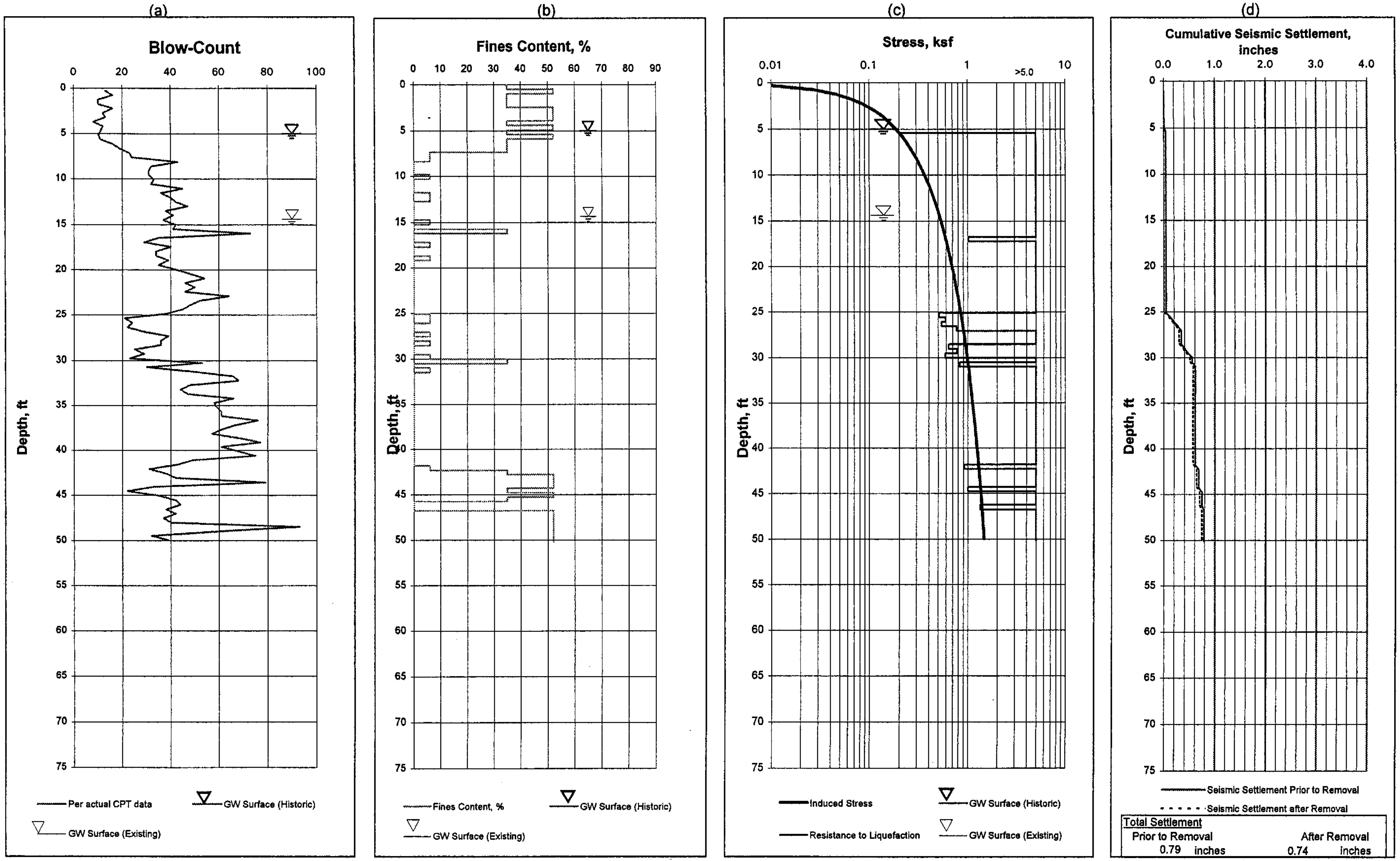


Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-28
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... **CPT-29**
Elevation (MSL)........ 1210 ft



Total Settlement
Prior to Removal 0.79 inches
After Removal 0.74 inches
Removal Depth (ft) = 8.0

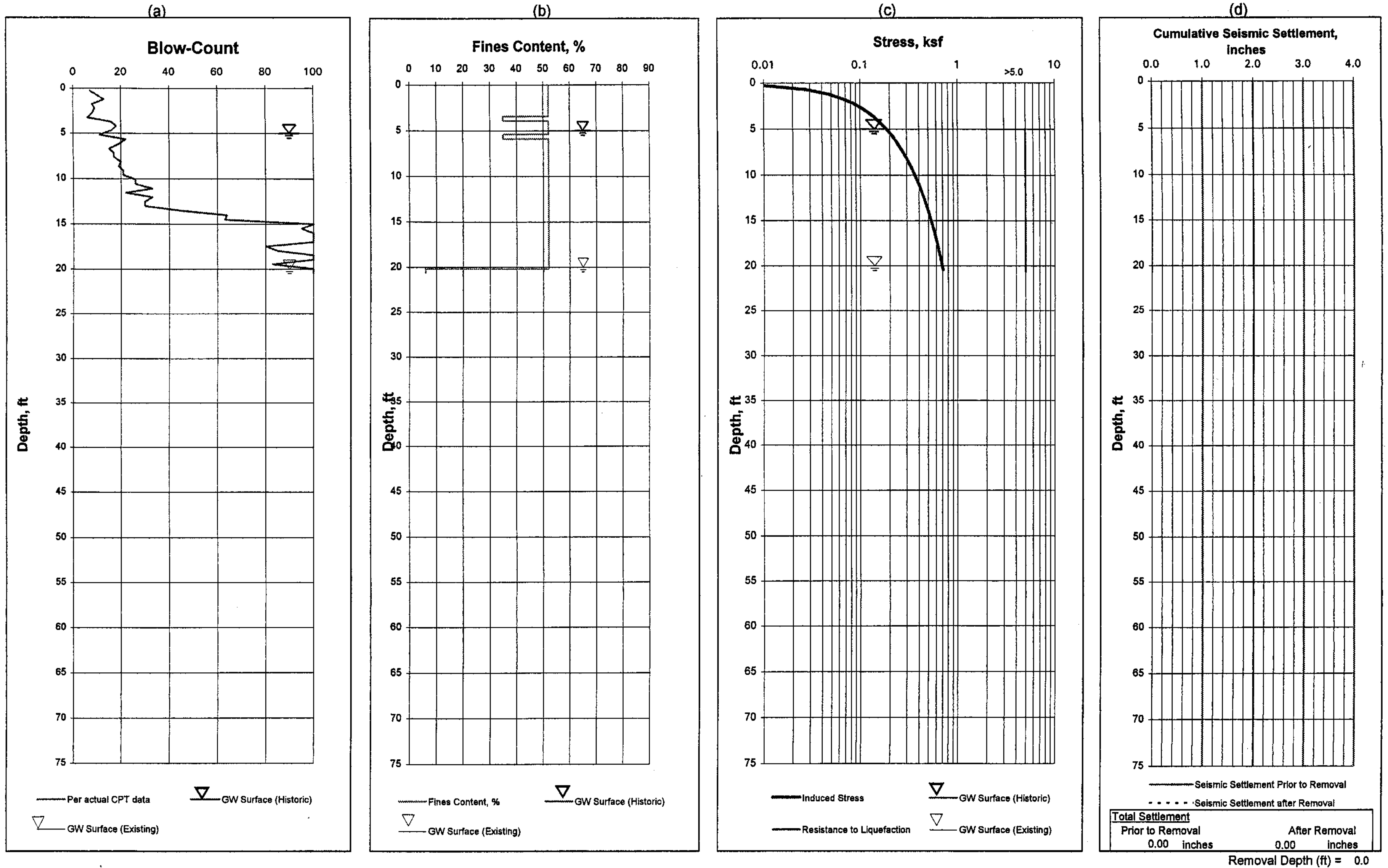
Allan E. Seward Engineering Geology, Inc.

Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-29
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT-30
Elevation (MSL)........ 1214 ft



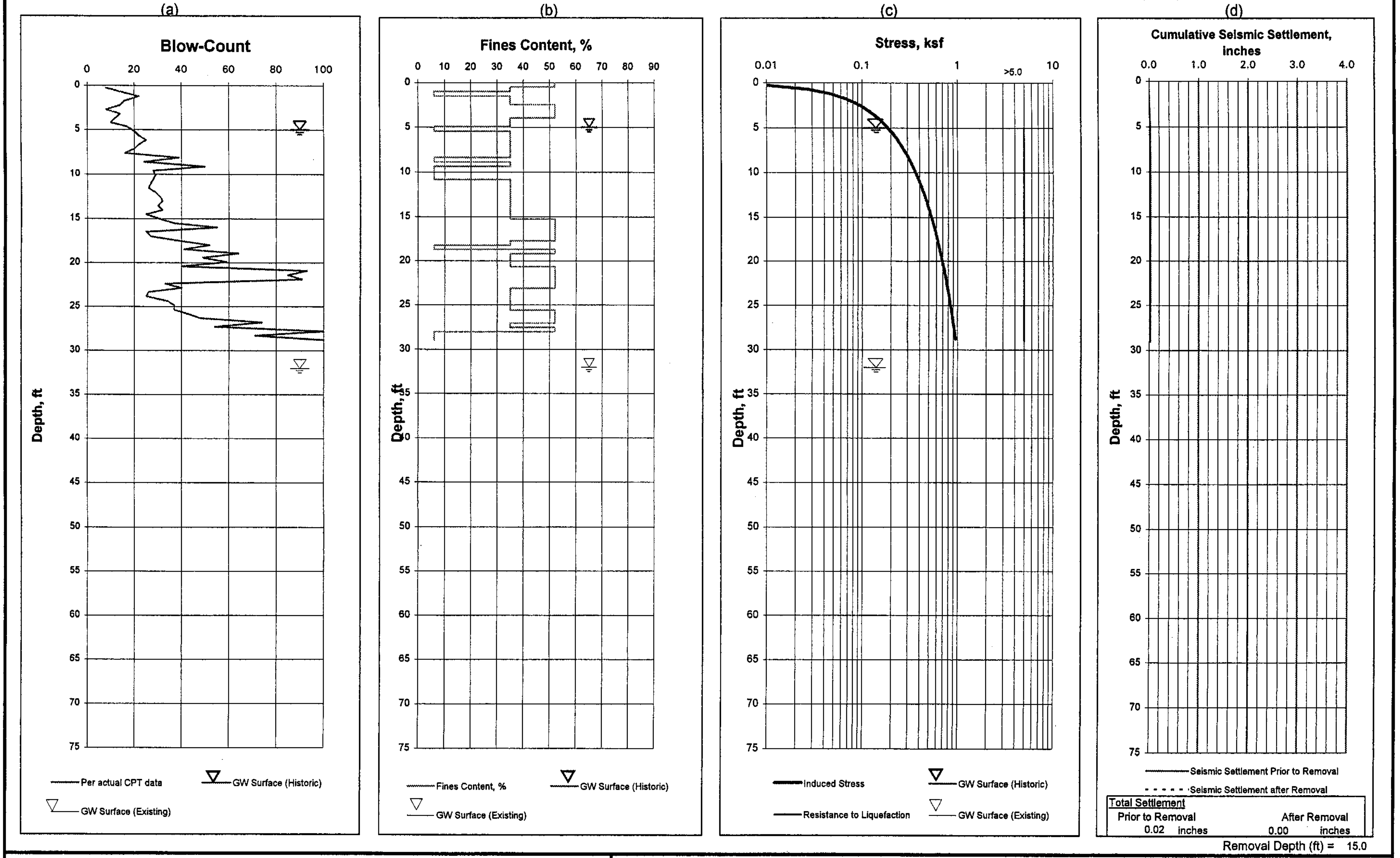
Total Settlement
Prior to Removal 0.00 inches
After Removal 0.00 inches
Removal Depth (ft) = 0.0

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-30
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT-31a
Elevation (MSL)........ 1261 ft

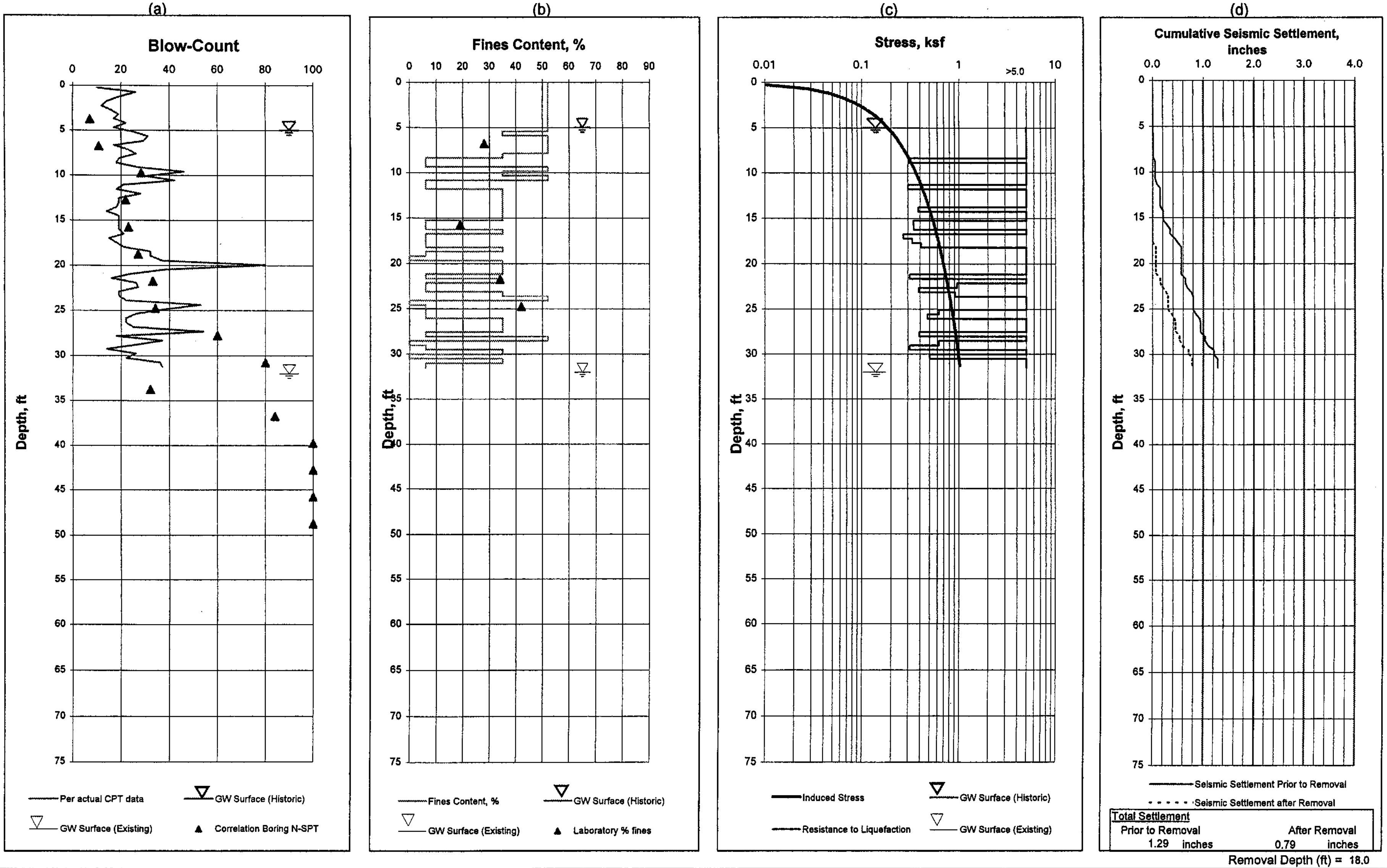


Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.50)...	0.71 g	Figure No.	C-31
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT-32b Near RW-9
Elevation (MSL)........ 1270 ft



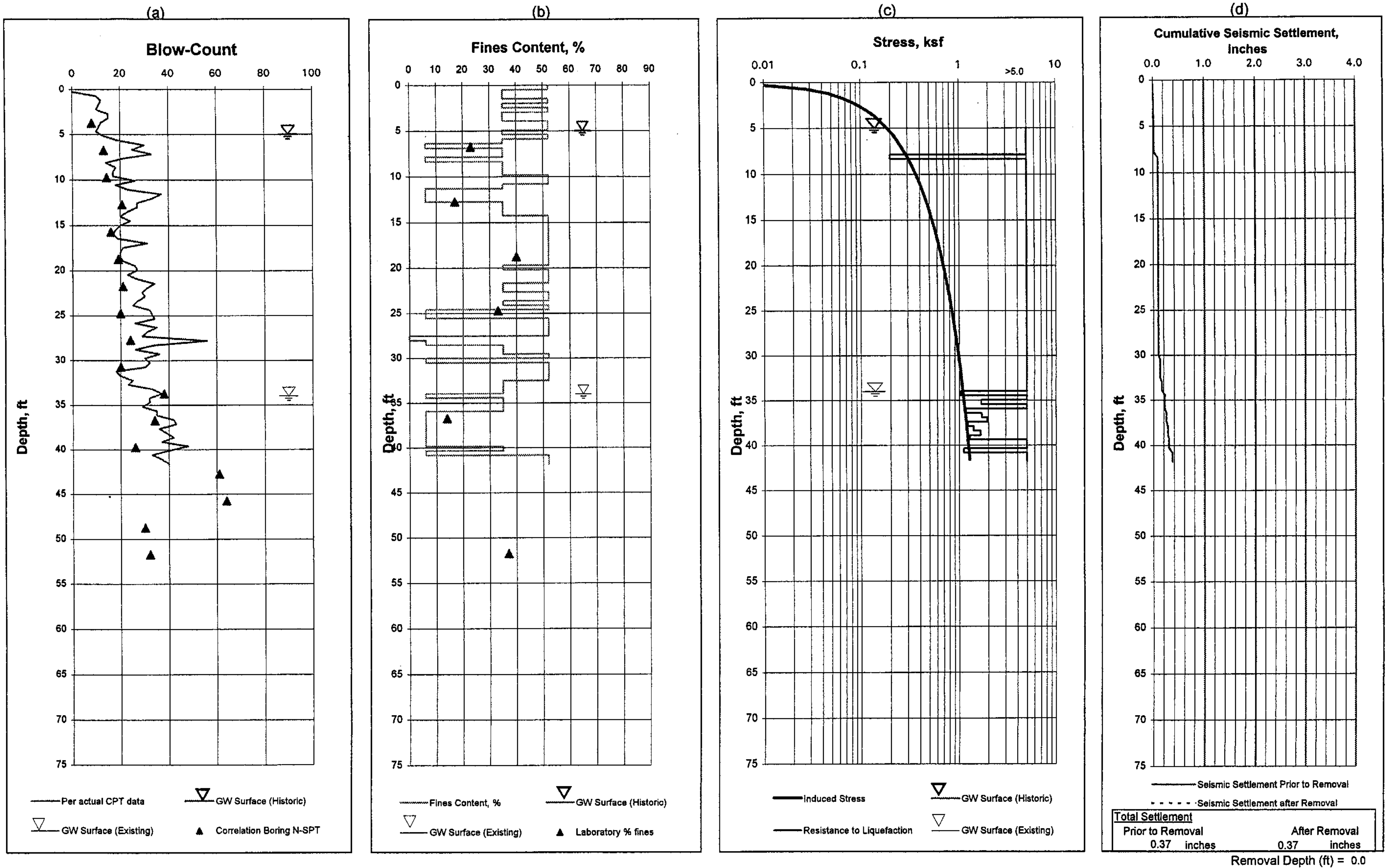
Total Settlement
Prior to Removal 1.29 inches
After Removal 0.79 inches
Removal Depth (ft) = 18.0

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5). 0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)... 0.71 g	Figure No.	C-32
For: Newhall Land Company	Magnification Factor.......... 1	Date.	4-4-2003

Location....... CPT-33 Near RW-10
Elevation (MSL)........ 1266 ft

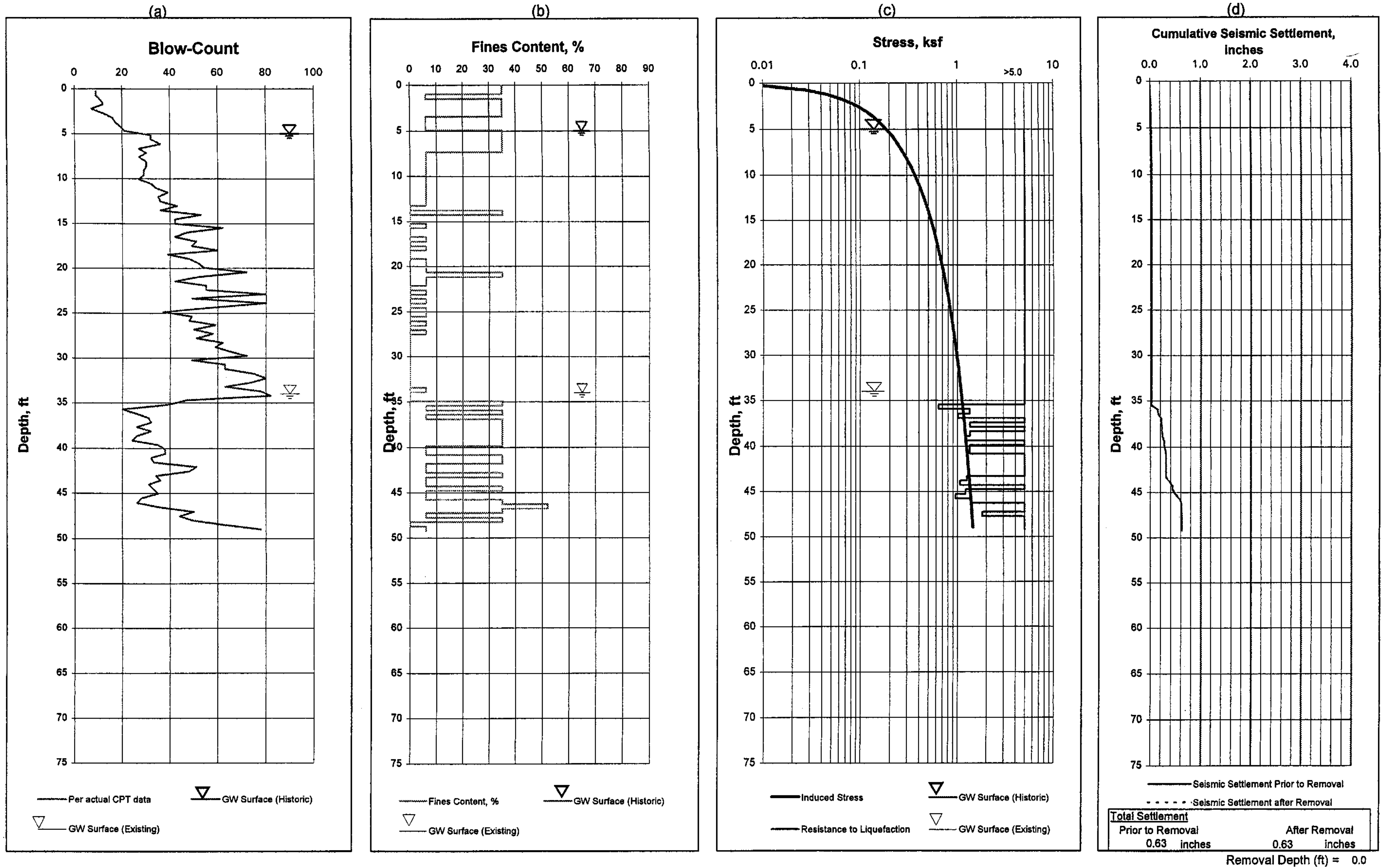


Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.5)...	0.71 g	Figure No.	C-33
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT-34a
Elevation (MSL)........ 1278 ft

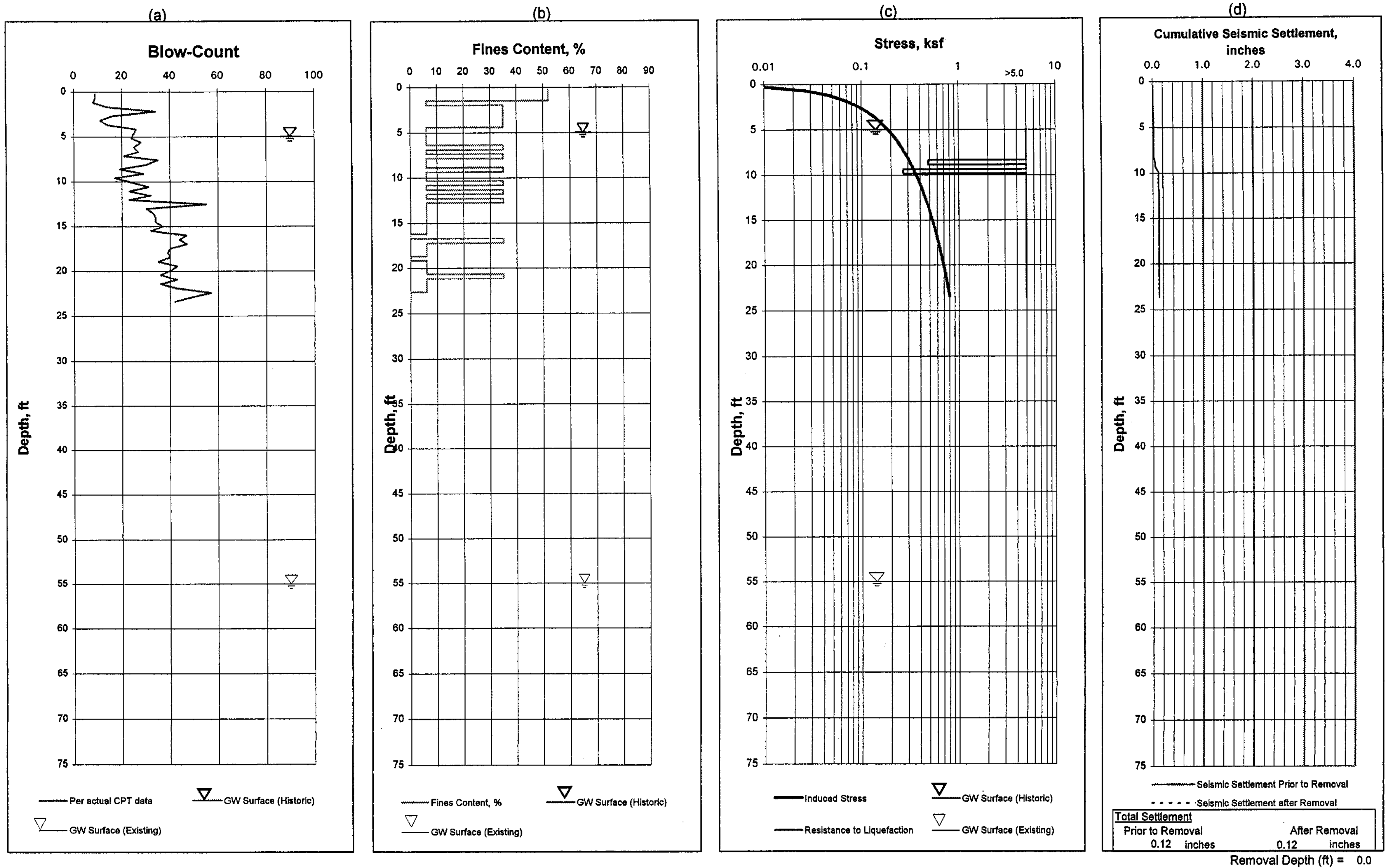


Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.50)...	0.71 g	Figure No.	C-34
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... **CPT-35a**
Elevation (MSL)........ 1282 ft

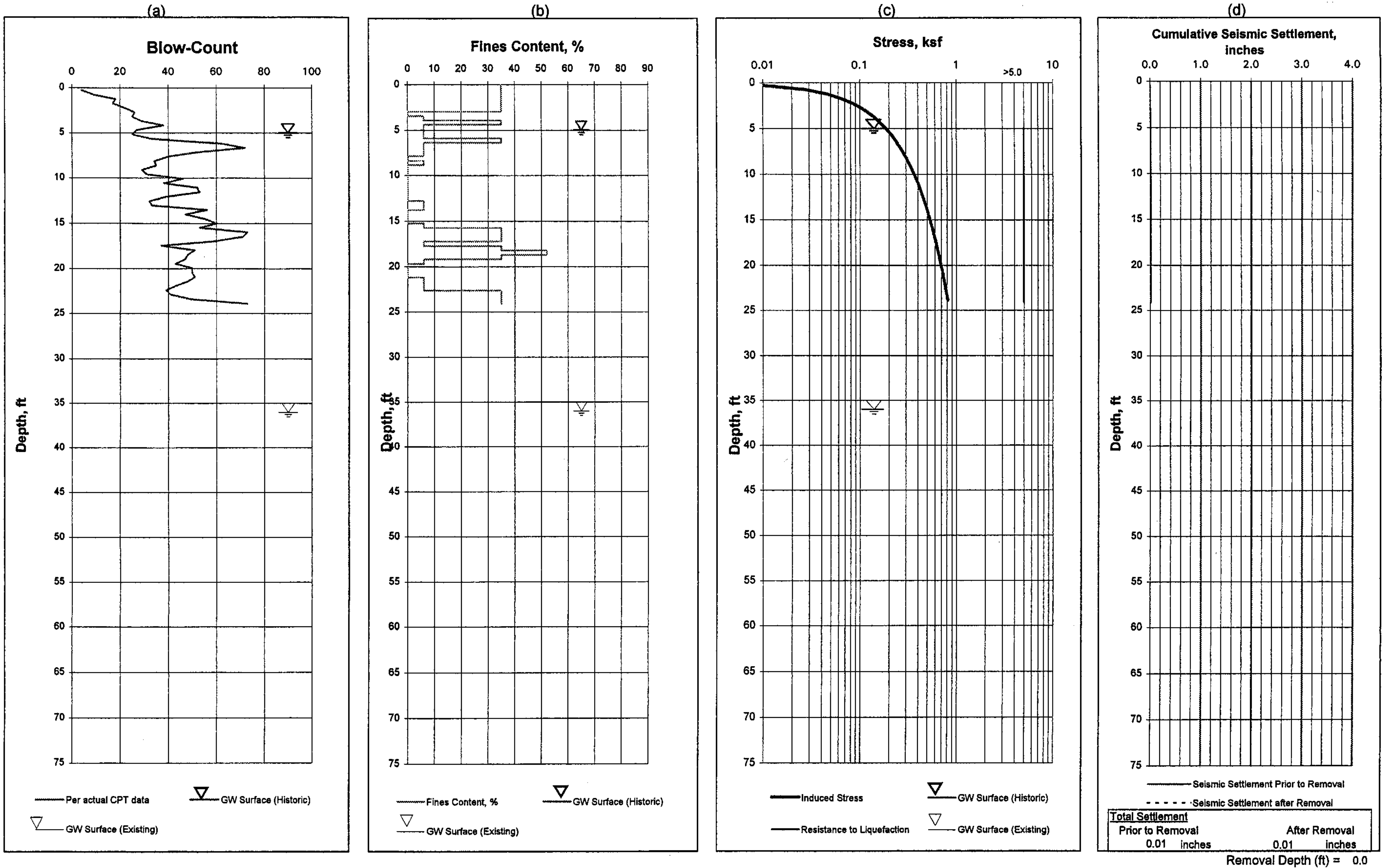


Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.50)...	0.71 g	Figure No.	C-35
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... CPT-36
Elevation (MSL)........ 1294 ft



Total Settlement	
Prior to Removal	After Removal
0.01 inches	0.01 inches

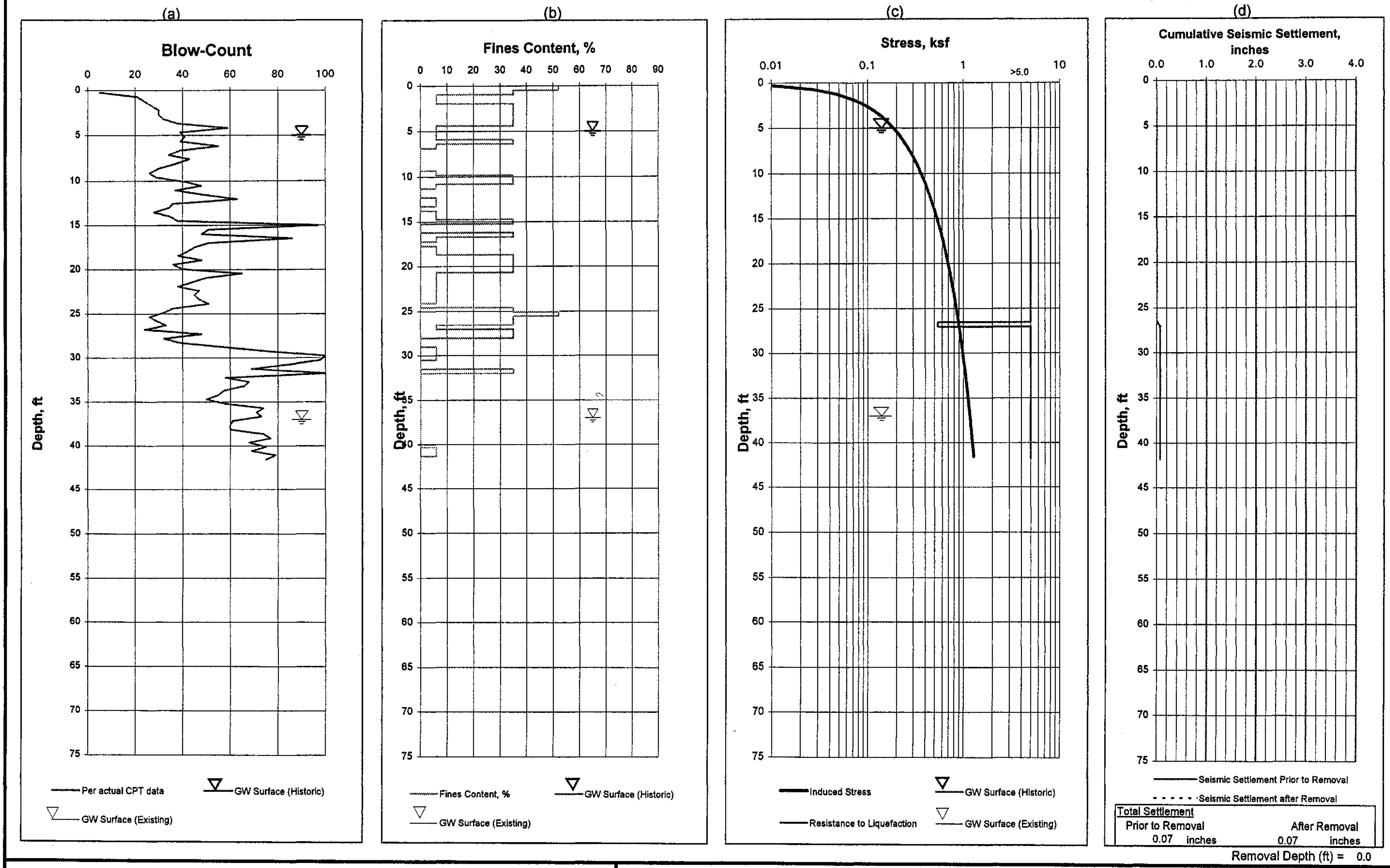
Removal Depth (ft) = 0.0

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5).	0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.50)...	0.71 g	Figure No.	C-36
For: Newhall Land Company	Magnification Factor..........	1	Date.	4-4-2003

Location....... **CPT-37**
Elevation (MSL)........ 1304 ft



Total Settlement
Prior to Removal 0.07 inches
After Removal 0.07 inches
Removal Depth (ft) = 0.0

Allan E. Seward Engineering Geology, Inc.
Geological and Geotechnical Consultants

Analysis of Liquefaction Potential Based on N-Value (Interpreted from CPT Data)

Project: T.T. 53425, River Park	Weighted Gr. Acc. (M=7.5). 0.49 g	Project No.	03-1571-4
City of Santa Clarita, California	Design Gr. Acc.(M= 6.50)... 0.71 g	Figure No.	C-37
For: Newhall Land Company	Magnification Factor.......... 1	Date.	4-4-2003

Appendix D

APPENDIX D

SEISMICITY

1.0 EVALUATION OF POTENTIAL SEISMIC HAZARDS

1.1 Ground Motion

1.1.1 Introduction

Ground motion is generated during an earthquake as two blocks of the earth's crust slip past each other. The intensity of ground motion at a specific site is controlled primarily by the magnitude of the earthquake and the distance from the epicenter and/or ground rupture area. Ground motion generally increases with increasing magnitude and is generally greatest near the epicenter and/or rupture area, and decreases (attenuates) with increasing distance. However, the ground motion measured at a given site is modified by a number of factors including focal depth, proximity to projected or actual fault rupture, fault mechanism, duration of shaking, local geologic structure, source direction of earthquake, underlying earth material characteristics, and topography. All of these factors make it difficult to accurately predict potential ground motions at a given site in the geologically and topographically complex Southern California area.

Current methods used to evaluate future potential ground motions are based on the review of historic earthquakes and statistical distributions of both rupture dimensions and ground motions generated during these earthquakes. Three primary procedures are currently in use to evaluate potential ground motions at a site:

1. Review of ground motions recorded during historic earthquakes
2. Deterministic seismic hazard analysis (DSHA)
3. Probabilistic seismic hazard analysis (PSHA)

Procedure number one involves the use of historically recorded earthquake magnitudes and ground accelerations to estimate accelerations, which have occurred at a given site during known earthquake events. Deterministic analysis (DSHA) utilizes maximum potential magnitude values for each significant fault to estimate maximum potential ground accelerations at a site without reference to a specific time frame. A probabilistic analysis (PSHA) evaluates potential earthquake magnitudes and accelerations based on historic earthquake data and interpreted slip rates for each

APPENDIX D

fault to estimate potential accelerations anticipated within a particular time frame (return period) of interest.

Review of Guidelines for Evaluating and Mitigating Seismic Hazards in California (CDCDMG, 1997) indicates that potential ground motion should be evaluated using simple prescribed parameter values derived from published State maps (Petersen, et al., 1996; SHMA Quadrangle Maps) or by site specific probabilistic or deterministic analyses where sites are in close proximity to seismic sources. In accordance with current State guidelines for geotechnical and geologic reports, we have evaluated potential ground motions at the site with a probabilistic procedure, utilizing the computer program FRISKSP by Thomas Blake and compared our estimate with the Seismic Hazard Map for the Newhall Quadrangle. Historic ground motions at the site have been estimated with the computer program EQSEARCH.

1.1.2 Earthquake Magnitude

Earthquake **magnitude** is a quantitative measure of the strength of an earthquake or the strain energy released by it, as determined by seismographic or geologic observations. It does not vary with distance or the underlying earth material. This differs from **intensity**, which is a qualitative measure of the effects a given earthquake has on people, structures, loose objects, and the ground at a specific location. Intensity generally increases with increasing magnitude and in areas underlain by unconsolidated materials, and decreases with distance from the epicenter. **Figure E-2** gives the 1956 version of the Modified Mercalli intensity scale and the approximate magnitude necessary to generate the effects.

Review of criteria presented in CDCDMG Special Publication 117 indicates that probabilistic ground motions should be estimated based on maximum moment magnitude earthquakes for each fault of interest. In this report we have utilized the default magnitudes contained in the CDMGSCF.DAT file provided with Version 4.00 of the FRISKSP Program by Thomas Blake. These magnitudes were derived primarily from CDMG Open-File Report 96-08 (Peterson et al., 1996) and are based on historic displacements per seismic event or the rupture area-to-magnitude relationships of Wells and Coppersmith (1994). The maximum magnitudes for the significant faults within 50 km of the site are presented in **Table D-II** under the AMMAX descriptor for each fault.

1.1.3 Ground Acceleration

Ground motion is typically reported with respect to the acceleration of gravity in units of g. Maximum, peak amplitudes in two perpendicular horizontal directions and the vertical axis are typically recorded during historic earthquakes on accelerograms.

Review of Sections 1804.5 and 1629A of the 1998 California Building Code (based on the 1997 UBC) and Chapter 4 of the CDCDMG 1997 Guidelines, indicates that an acceleration with a 10% chance of exceedance in 50 years (design basis earthquake ground motion) should be utilized for the evaluation of liquefaction potential for standard structures. This roughly correlates to a 475 year return period.

Site specific evaluation of potential ground motions requires the use of an attenuation relationship based on the observed attenuation of ground motions during historic earthquakes to estimate how ground acceleration will dissipate with increasing distance from the earthquake source. Review of CDCDMG Open-File Report 96-08 and SCEC Implementation Guidelines (Martin and Lew, 1999) indicates that design ground accelerations can be based on the equally weighted average of accelerations from three acceptable attenuation relationships. This procedure has been followed in our probabilistic analysis.

It should be emphasized that the ground acceleration values presented in our report are based on simplified curves of fault rupture area to magnitude, and ground motion attenuation relationships which represent averages of highly variable data measured during historic earthquakes. Predicted accelerations should be considered rough estimates rather than precise facts and, therefore, ground accelerations at the subject site from future seismic events may exceed the predicted accelerations. Due to the dip-slip nature of most of the faults in Southern California, vertical accelerations may equal horizontal accelerations. Ground motions may originate from virtually any direction due to the presence of major faults in all directions from the site.

1.1.4 Seismic Analysis – Tentative Tract 53425

1.1.4.1 Site Conditions

The elevated portions of the site are underlain by Quaternary Terrace Deposits and Saugus Formation Bedrock. Alluvial deposits are present in the low-lying areas within the Santa Clara River drainage and its tributary canyons. The Terrace deposits typically consist of friable fine-to very coarse-grained sand and pebbly sand with cobbles and boulders. The bedrock generally consists of sandstones and pebbly sandstones with interbeds of reddish-brown silty sandstones and mudstones (see **Plate I**). To the depths explored, alluvium is comprised of interbeds of granular soils and fine-grained soils, but granular soils predominate. Generally, these soils are strong, except typically the top 2 feet to 3 feet and at some locations and depths noted in the main text of this report. Weaker upper soils will be removed and recompacted. Therefore, it is reasonable to classify the site as S_C per the Uniform Building Code ("Very Dense Soil and Soft Rock"). For our analysis, we used soil profile type S_c.

1.1.4.2 Maximum Historic Accelerations

In order to provide a rough estimate of maximum ground motions which have occurred at the site from known, historic earthquakes, a site specific analysis using the computer program EQSEARCH (Version 3.00) by Thomas F. Blake was completed. This program utilizes a data base file that contains data on approximately 6000 events greater than magnitude 4 which have occurred in California between 1800 and 2000. This data was extracted primarily from the CDMG computerized earthquake catalog, Townley and Allen (1939) and the U.S. Geological Survey's Earthquake Data Base System. The attenuation relationship of Boore et al. (1997) with a random horizontal component and Site Class C Soil Classification was used to estimate the dissipation of ground motion from the epicenter to the subject site.

Table D-I summarizes the input parameters and a listing of earthquakes of magnitude 5 or greater which have occurred within 50 miles of the site, and the estimated ground motions produced at the site from each event. The locations of historic earthquakes near the subject site are shown on **Figure E-1**. The largest historic acceleration indicated by EQSEARCH for the alluvium at the site is 0.38g from the 1971 San Fernando Earthquake. Review of the contour map of accelerations for bedrock and soil sites prepared by Stewart et al. (1994) indicates a site ground acceleration of approximately 0.45g during the Northridge Earthquake (**Figure D-3**).

1.1.4.3 Probabilistic Seismic Hazard Analysis

In order to provide a site specific, probabilistic seismic hazard analysis for the proposed development, the computer program FRISKSP (Version 4.00) by Thomas F. Blake was utilized. This program evaluates potential ground motions which may statistically occur within a time frame (return period) of interest. For this investigation a return period of 475 years was analyzed. Potential ground motions include a standard deviation to account for variability in observed ground motion attenuation.

The peak ground acceleration with a 10% probability of exceedance in 50 years (design basis ground motion) was calculated to be 0.71g for the alluvial portions of the site. This acceleration was determined by using an unweighted average of the three accelerations indicated by the attenuation relationships of Boore et al. (1997) for a Site Class C, Sadigh et al. (1997) for deep soil, and Campbell and Bozorgnia (1997) for alluvium (see Summary of Calculated Accelerations **Table D-III**). The Seismic Hazard Zone Report for the Newhall Quadrangle (Open-File Report 97-11) indicates a peak ground acceleration with a 10 percent probability of exceedance in 50 years to be 0.68g for the alluvial portion of the site.

The dominant fault controlling maximum potential ground accelerations at the site is the Santa Susana Fault, with secondary impacts from the, San Gabriel, Northridge (East Oak Ridge) and Sierra Madre (San Fernando) Faults per analysis with Boore et al. (1997) (**see Table D-II** for Summaries of Significant Faults). Site-fault distances for faults within 50 km of the site are summarized at the end of **Table D-II**.

The FRISKSP program runs two problems for each attenuation relationship evaluated. The first evaluates potential accelerations, which may be generated within the return period of interest. The second problem normalizes potential accelerations to a 7.5 magnitude based on published empirical relationships because most liquefaction and settlement analyses are based on this standard magnitude. The acceleration is normalized to account for changes in duration for the same acceleration because larger, more distant earthquakes will produce ground motions with a longer duration (i.e. more cycles and more distress) than smaller, closer earthquakes. Where the design earthquake is smaller than a 7.5 magnitude, the normalized acceleration will be smaller than the design acceleration to account for the shorter duration of shaking from the design earthquake compared to the same acceleration from the larger 7.5 magnitude earthquake. The empirical relationship used for magnitude weighting in our analysis is from Youd and Idriss (1997). The average, magnitude-weighted acceleration was found to be 0.49g for the design basis earthquake (see **Table D-III**).

1.1.5 Deaggregation of Fault Hazard

A probabilistic analysis evaluates a range of magnitudes from 5.0 to the maximum magnitude for each fault. However, the dominant magnitude which statistically generates the peak acceleration within a limited time period (e.g. 475 years) is typically less than the maximum magnitude for a given fault. We have, therefore, performed a deaggregation of fault hazard analysis with the PROBOUT Sub-Program of FRISKSP to evaluate what dominate magnitude-distance combination produces the design basis accelerations (DBA). We utilized the unweighted acceleration from Boore et al. (1997) of 0.715g (DBA) for our deaggregation analyses. Review of the magnitude-distance contributions to hazard indicates that the dominant magnitude which generates the DBA acceleration is 6.5 as shown graphically in **Figure D-4**.

1.1.6 Summary

The peak design basis ground acceleration value used in our liquefaction analysis was 0.71g from a 6.5 magnitude earthquake based on our probabilistic evaluation of the site.

Although research on earthquakes during the last forty years has greatly enhanced the level of understanding of earthquake faulting in California, the record is much too short to constrain behavior of all faults in Southern California and the attenuation characteristics of all areas relative to each future potential earthquakes. Predicted accelerations should, therefore, be considered **rough estimates** rather than precise facts and ground motions from future earthquakes may exceed the predicted accelerations. Neither the **Time, Location, nor Magnitude** of an earthquake can be accurately predicted at this time.

The proposed development is located in Southern California, which is in a geologically and seismically active region where large magnitude, potentially destructive earthquakes are common. Therefore, it is reasonable to assume that moderate or large magnitude earthquakes will affect the site during the life of a given structure. The current standards for construction provided in the California Building Code based on the 1997 Uniform Building Code are designed to safeguard against major failures and loss of life, but are not intended to limit damage, maintain functions or provide for easy repair. Per SEAOC, conformance to these recommendations does not constitute any kind of guarantee or assurance that significant structural damage will not occur in the event of a maximum level of earthquake ground motion. However, it is reasonable to expect that a well-planned and constructed structure will not collapse in a major earthquake and that protection of life is reasonably provided, but not with complete assurance.

1.2 Ground Failure

Ground failure is a general term describing seismically induced, secondary permanent ground deformation caused by strong ground motion. This includes liquefaction, lateral spreading, seismic settlement of poorly consolidated materials (dynamic densification), differential materials response, slope failures, sympathetic movement on weak bedding planes or non-causative faults, shattered ridge effects and ground lurching.

Seismic hazards map for the Newhall Quadrangle (dated 2/1/98) indicates that the alluvial portions of Tentative Tract 53425 are in designated zones of required investigation to evaluate the potential for liquefaction and lateral spreading. The potential for liquefaction and seismic settlement has been evaluated in **Appendix C** of this report. Recommended measures to mitigate potential liquefaction and seismic settlements are provided in the earthworks recommendations and foundation and settlement considerations of this report. Historic high ground water levels were assumed at a conservative depth of 5 feet below existing topography based on historical water well records available at the County of Los Angeles.

Differential materials response refers to the different responses various materials display when subjected to seismic waves. Where materials with different densities or strengths are in contact, differential response to the seismic energy may cause distress along the contact. The combination of dynamic compaction and differential settlement along with differential materials response is a source of future potential hazard along cut/fill and bedrock/alluvium contacts. It is, therefore, recommended that **lots** underlain by transitions between different material types (ex. bedrock to fill, bedrock to alluvium, etc.) be **over-excavated 5 feet** to minimize potential adverse impacts.

Earthquake-induced slope failures include activation and reactivation of landslides, rock falls, debris flows and surficial failures. Review of the SHMA map for the Newhall Quadrangle indicates that much of the slope areas on the site are within designated areas requiring investigation to evaluate potential earthquake-induced landslides. Landslides and surficial failures have been mapped by this firm in the vicinity of the proposed development. Existing landslides which could potentially impact the proposed development have been evaluated and appropriate mitigation recommended as presented in this report. The stability of natural and constructed slopes which could potentially affect the proposed development has been evaluated and appropriate mitigation recommended. The potential for earthquake-induced slope failures to adversely impact the proposed development is considered negligible, provided that our Recommendations and those of the Supervising Civil Engineer are incorporated into the proposed design and implemented during construction.

The specific location of future potential sympathetic movement along weak planes such as inclined clay beds cannot be reliably predicted on a site specific basis at this time. Over-excavation of clay-rich bedding planes of the Saugus Formation and subsequent placement of a certified fill cap has been recommended to mitigate potential hazards from expansive material. This certified fill will also reduce potential hazards from potential secondary seismogenic movement along bedding planes.

Development is not proposed on ridgelines, therefore, potential hazards from shattered ridge affects are considered negligible.

APPENDIX D

The following attachments complete this Appendix

APPENDIX D

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                    *************************
                    *                       *
                    *     E Q S E A R C H   *
                    *                       *
                    *      Version 3.00     *
                    *                       *
                    *************************

                         ESTIMATION OF
                     PEAK ACCELERATION FROM
                  CALIFORNIA EARTHQUAKE CATALOGS


JOB NUMBER: 02-1571-4
                                                   DATE: 07-08-2002

JOB NAME: River Park

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT

MAGNITUDE RANGE:
   MINIMUM MAGNITUDE:  5.00
   MAXIMUM MAGNITUDE:  9.00

SITE COORDINATES:
   SITE LATITUDE:  34.4153
   SITE LONGITUDE:  118.5208

SEARCH DATES:
           START DATE:   1800
           END DATE:   2000

SEARCH RADIUS:
           50.0 mi
           80.5 km

ATTENUATION RELATION:   2) Boore et al. (1997) Horiz. - NEHRP C (520)
   UNCERTAINTY (M=Median, S=Sigma): S       Number of Sigmas:  1.0
   ASSUMED SOURCE TYPE:  DS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
   SCOND:   0  Depth Source:  A
   Basement Depth:  5.00 km     Campbell SSR:        Campbell SHR:
   COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km):  0.0
```

APPENDIX D

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                          -------------------------
                          EARTHQUAKE SEARCH RESULTS
                          -------------------------

-------------------------------------------------------------------------------
    |      |       |         |  TIME   |     |     | SITE |SITE|  APPROX.
FILE| LAT. | LONG. |  DATE   |  (UTC)  |DEPTH|QUAKE| ACC. | MM |  DISTANCE
CODE| NORTH| WEST  |         | H M Sec | (km)| MAG.|  g   |INT.|  mi  [km]
----+------+-------+---------+-------+----+-----+----+----------
GSP |34.3780|118.6180|01/19/1994|211144.9| 11.0| 5.10| 0.204 |VIII|  6.1(  9.8)
DMG |34.4110|118.4010|02/09/1971|14 041.8|  8.4| 6.40| 0.378 | IX |  6.8( 11.0)
DMG |34.4110|118.4010|02/09/1971|14 1 8.0|  8.0| 5.80| 0.275 | IX |  6.8( 11.0)
DMG |34.4110|118.4010|02/09/1971|141028.0|  8.0| 5.30| 0.212 |VIII|  6.8( 11.0)
DMG |34.4110|118.4010|02/09/1971|14 244.0|  8.0| 5.80| 0.275 | IX |  6.8( 11.0)
GSB |34.3010|118.5650|01/17/1994|204602.4|  9.0| 5.20| 0.177 |VIII|  8.3( 13.3)
GSP |34.3050|118.5790|01/29/1994|112036.0|  1.0| 5.10| 0.168 |VIII|  8.3( 13.4)
DMG |34.3080|118.4540|02/09/1971|144346.7|  6.2| 5.20| 0.177 |VIII|  8.3( 13.4)
GSP |34.3940|118.6690|06/26/1995|084028.9| 13.0| 5.00| 0.156 |VIII|  8.6( 13.8)
DMG |34.3000|118.6000|04/04/1893|1940 0.0|  0.0| 6.00| 0.253 | IX |  9.1( 14.7)
GSP |34.3690|118.6720|04/26/1997|103730.7| 16.0| 5.10| 0.157 |VIII|  9.2( 14.8)
GSP |34.3770|118.6980|01/18/1994|004308.9| 11.0| 5.20| 0.151 |VIII| 10.4( 16.8)
GSB |34.3790|118.7110|01/19/1994|210928.6| 14.0| 5.50| 0.170 |VIII| 11.1( 17.9)
GSP |34.3260|118.6980|01/17/1994|233330.7|  9.0| 5.60| 0.171 |VIII| 11.8( 19.0)
GSP |34.2310|118.4750|03/20/1994|212012.3| 13.0| 5.30| 0.137 |VIII| 13.0( 20.9)
GSP |34.2130|118.5370|01/17/1994|123055.4| 18.0| 6.70| 0.270 | IX | 14.0( 22.5)
DMG |34.5190|118.1980|08/23/1952|10 9 7.1| 13.1| 5.00| 0.086 | VII| 19.7( 31.7)
MGI |34.0800|118.2600|07/16/1920|18 8 0.0|  0.0| 5.00| 0.066 | VI | 27.5( 44.3)
MGI |34.0000|118.5000|11/19/1918|2018 0.0|  0.0| 5.00| 0.064 | VI | 28.7( 46.2)
DMG |34.0000|118.5000|08/04/1927|1224 0.0|  0.0| 5.00| 0.064 | VI | 28.7( 46.2)
MGI |34.0000|118.3000|09/03/1905| 540 0.0|  0.0| 5.30| 0.070 | VI | 31.3( 50.4)
GSP |34.2620|118.0020|06/28/1991|144354.5| 11.0| 5.40| 0.074 | VII| 31.4( 50.5)
T-A |34.8300|118.7500|11/27/1852| 0 0 0.0|  0.0| 7.00| 0.172 |VIII| 31.5( 50.6)
MGI |34.1000|118.1000|07/11/1855| 415 0.0|  0.0| 6.30| 0.116 | VII| 32.4( 52.2)
T-A |34.0000|118.2500|01/10/1856| 0 0 0.0|  0.0| 5.00| 0.058 | VI | 32.6( 52.4)
T-A |34.0000|118.2500|03/26/1860| 0 0 0.0|  0.0| 5.00| 0.058 | VI | 32.6( 52.4)
T-A |34.0000|118.2500|09/23/1827| 0 0 0.0|  0.0| 5.00| 0.058 | VI | 32.6( 52.4)
DMG |33.9500|118.6320|08/31/1930| 04036.0|  0.0| 5.20| 0.065 | VI | 32.7( 52.7)
DMG |34.7000|119.0000|10/23/1916| 254 0.0|  0.0| 5.50| 0.074 | VII| 33.6( 54.1)
PAS |34.0730|118.0980|10/04/1987|105938.2|  8.2| 5.30| 0.066 | VI | 33.8( 54.3)
PAS |33.9440|118.6810|01/01/1979|231438.9| 11.3| 5.00| 0.057 | VI | 33.8( 54.4)
PAS |33.9190|118.6270|01/19/1989| 65328.8| 11.9| 5.00| 0.055 | VI | 34.8( 56.0)
PAS |34.0610|118.0790|10/01/1987|144220.0|  9.5| 5.90| 0.088 | VII| 35.1( 56.5)
DMG |34.0650|119.0350|02/21/1973|144557.3|  8.0| 5.90| 0.083 | VII| 38.0( 61.2)
DMG |34.2000|117.9000|08/28/1889| 215 0.0|  0.0| 5.50| 0.067 | VI | 38.4( 61.8)
PAS |34.9430|118.7430|06/10/1988|23 643.0|  6.8| 5.40| 0.063 | VI | 38.6( 62.0)
DMG |34.8670|118.9330|09/21/1941|1953 7.2|  0.0| 5.20| 0.056 | VI | 39.0( 62.8)
MGI |34.0000|119.0000|12/14/1912| 0 0 0.0|  0.0| 5.70| 0.072 | VII| 39.6( 63.8)
DMG |34.0000|119.0000|09/24/1827| 4 0 0.0|  0.0| 7.00| 0.144 |VIII| 39.6( 63.8)
DMG |34.9000|118.9000|10/23/1916| 244 0.0|  0.0| 6.00| 0.085 | VII| 39.8( 64.0)
MGI |34.0000|118.0000|12/25/1903|1745 0.0|  0.0| 5.00| 0.049 | VI | 41.3( 66.5)
DMG |34.9000|118.9500|08/01/1952|13 430.0|  0.0| 5.10| 0.051 | VI | 41.4( 66.6)
                          -------------------------
```

APPENDIX D

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                          EARTHQUAKE SEARCH RESULTS
                          -------------------------

-------------------------------------------------------------------------------
    |       |        |         |  TIME   |    |     | SITE  |SITE|  APPROX.
FILE|  LAT. | LONG.  |  DATE   |  (UTC)  |DEPTH|QUAKE|  ACC. | MM |  DISTANCE
CODE| NORTH | WEST   |         | H M Sec| (km)| MAG.|   g   |INT.|  mi  [km]
----+-------+--------+---------+--------+----+-----+---+----------
T-A |34.9200|118.9200|01/20/1857| 0 0 0.0|  0.0| 5.00| 0.048 | VI | 41.6( 66.9)
T-A |34.9200|118.9200|05/23/1857| 0 0 0.0|  0.0| 5.00| 0.048 | VI | 41.6( 66.9)
DMG |33.8500|118.2670|03/11/1933|1425 0.0|  0.0| 5.00| 0.048 | VI | 41.6( 67.0)
DMG |34.9500|118.8670|07/21/1952|121936.0|  0.0| 5.30| 0.056 | VI | 41.8( 67.3)
DMG |34.8000|119.1000|09/05/1883|1230 0.0|  0.0| 6.00| 0.081 | VII| 42.3( 68.1)
DMG |34.9320|118.9760|03/01/1963| 02557.9| 13.9| 5.00| 0.046 | VI | 44.1( 70.9)
DMG |35.0000|118.8330|07/23/1952| 75319.0|  0.0| 5.40| 0.057 | VI | 44.1( 70.9)
DMG |35.0000|118.8330|07/23/1952|181351.0|  0.0| 5.20| 0.051 | VI | 44.1( 70.9)
DMG |34.9410|118.9870|11/15/1961| 53855.5| 10.7| 5.00| 0.045 | VI | 44.9( 72.3)
DMG |33.7830|118.2500|11/14/1941| 84136.3|  0.0| 5.40| 0.055 | VI | 46.3( 74.5)
DMG |34.9830|118.9830|05/23/1954|235243.0|  0.0| 5.10| 0.046 | VI | 47.2( 75.9)
DMG |35.0000|119.0000|02/16/1919|1557 0.0|  0.0| 5.00| 0.043 | VI | 48.7( 78.3)
DMG |35.0000|119.0000|07/21/1952|12 531.0|  0.0| 6.40| 0.089 | VII| 48.7( 78.3)
DMG |33.7830|118.1330|10/02/1933| 91017.6|  0.0| 5.40| 0.053 | VI | 49.0( 78.8)
DMG |35.0000|119.0170|07/21/1952|115214.0|  0.0| 7.70| 0.176 |VIII| 49.2( 79.2)
DMG |35.0000|119.0170|01/12/1954|233349.0|  0.0| 5.90| 0.068 | VI | 49.2( 79.2)
DMG |34.3700|117.6500|12/08/1812|15 0 0.0|  0.0| 7.00| 0.121 | VII| 49.7( 80.0)
DMG |35.0000|119.0330|07/21/1952|12 2 0.0|  0.0| 5.60| 0.058 | VI | 49.7( 80.1)

*******************************************************************************
-END OF SEARCH-   60 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH:   1800  TO  2000

LENGTH OF SEARCH TIME:   201  years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 6.1 MILES (9.8 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 7.7

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.378 g

COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
  a-value=  1.150
  b-value=  0.382
  beta-value=  0.879
```

```
-----------------------------------
TABLE OF MAGNITUDES AND EXCEEDANCES:
-----------------------------------

 Earthquake | Number of Times | Cumulative
  Magnitude |    Exceeded     | No. / Year
 -----------+-----------------+-----------
    4.0     |       60        |  0.29851
    4.5     |       60        |  0.29851
    5.0     |       60        |  0.29851
    5.5     |       22        |  0.10945
    6.0     |       11        |  0.05473
    6.5     |        5        |  0.02488
    7.0     |        4        |  0.01990
    7.5     |        1        |  0.00498
```

APPENDIX D

```
                       SUMMARY TABLE OF FRISKSP PARAMETERS AND OUTPUT

                        *****************************************
                        *                                       *
                        *        FRISKSP - IBM-PC VERSION       *
                        *                                       *
                        *  Modified from *FRISK* (McGuire 1978) *
                        *   To Perform Probabilistic Earthquake *
                        *  Hazard Analyses Using Multiple Forms *
                        * of Ground-Motion-Attenuation Relations *
                        *                                       *
                        *   Modifications by:  Thomas F. Blake  *
                        *             - 1988-2000 -             *
                        *                                       *
                        *             VERSION 4.00              *
                        *            (Visual Fortran)           *
                        *****************************************

ANALYSIS PERFORMED FOR NEWHALL LAND
JOB NO:  02-1571-4
DATE:  July 8, 2002
DESCRIPTION:  Summary of FRISKP.Out files for Boore et al. (1997), Sadigh et al. (1997) and Campbell & Bozorgnia (1997)
 IPR_FILE
  1

Note:  Binary file will be generated only for first attenuation problem and first site.

 IPLOT
  0

 SITE CONDITION
  0.00

 BASEMENT     DEPTH (km)
  5.00

 RHGA FACTOR     RHGA DIST (km)
     1.000           0.000

 NFLT  NSITE   NPROB   NATT     LCD
 20      1       2       6        1
Boore et al. 1997
```

APPENDIX D

```
ATT      C1        C2        C3        C4        C5        C6        C7        C8        C9       C10       C11       C12       C13       C14
  1  -0.3130    0.5270    0.0000   -0.7780   -0.3710 1396.0000    5.5700  520.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
ATT     C15       C16       C17       C18       C19       C20       C21       C22       C23       PER     DSMIN      SIGA    IRELAF      ICHK
  1   0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.5200        35         0

ATT      C1        C2        C3        C4        C5        C6        C7        C8        C9       C10       C11       C12       C13       C14
  2  -0.1170    0.5270    0.0000   -0.7780   -0.3710 1396.0000    5.5700  520.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
ATT     C15       C16       C17       C18       C19       C20       C21       C22       C23       PER     DSMIN      SIGA    IRELAF      ICHK
  2   0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.5200        35         0

ATT      C1        C2        C3        C4        C5        C6        C7        C8        C9       C10       C11       C12       C13       C14
  3  -0.3130    0.5270    0.0000   -0.7780   -0.3710 1396.0000    5.5700  520.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
ATT     C15       C16       C17       C18       C19       C20       C21       C22       C23       PER     DSMIN      SIGA    IRELAF      ICHK
  3   0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.5200        35         0

ATT      C1        C2        C3        C4        C5        C6        C7        C8        C9       C10       C11       C12       C13       C14
  4  -0.1170    0.5270    0.0000   -0.7780   -0.3710 1396.0000    5.5700  520.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
ATT     C15       C16       C17       C18       C19       C20       C21       C22       C23       PER     DSMIN      SIGA    IRELAF      ICHK
  4   0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.5200        35         0

ATT      C1        C2        C3        C4        C5        C6        C7        C8        C9       C10       C11       C12       C13       C14
  5  -0.1170    0.5270    0.0000   -0.7780   -0.3710 1396.0000    5.5700  520.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
ATT     C15       C16       C17       C18       C19       C20       C21       C22       C23       PER     DSMIN      SIGA    IRELAF      ICHK
  5   0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.5200        35         0

ATT      C1        C2        C3        C4        C5        C6        C7        C8        C9       C10       C11       C12       C13       C14
  6  -0.1170    0.5270    0.0000   -0.7780   -0.3710 1396.0000    5.5700  520.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
ATT     C15       C16       C17       C18       C19       C20       C21       C22       C23       PER     DSMIN      SIGA    IRELAF      ICHK
  6   0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.5200        35         0

 PROBLEM DATA:

 BOORE ET AL(1997) NEHRP C (520)1 AMPLITUDES:
     15         0.100     0.200     0.300     0.400     0.500     0.600     0.700     0.800     0.900     1.000
                1.100     1.200     1.300     1.400     1.500

     MAGNITUDE WEIGHTING FACTORS:     MWF:   0    MWF MAGNITUDE:     0.00

 BOORE ET AL(1997) NEHRP C (520)2 AMPLITUDES:
     15         0.100     0.200     0.300     0.400     0.500     0.600     0.700     0.800     0.900     1.000
                1.100     1.200     1.300     1.400     1.500
```

APPENDIX D

```
     MAGNITUDE WEIGHTING FACTORS:     MWF:   2    MWF MAGNITUDE:     7.50

SADIGH ET AL. (1997)

ATT      C1        C2        C3        C4        C5        C6        C7        C8        C9        C10       C11       C12       C13       C14
  1   -2.1700    1.0000    1.7000    0.0000    0.0000    0.0000    0.0000    1.5200    0.1600    0.0000    0.0000    0.0000    0.0000    0.0000
ATT     C15       C16       C17       C18       C19       C20       C21       C22       C23       PER      DSMIN      SIGA     IRELAF      ICHK
  1    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    1.0000      25          0

ATT      C1        C2        C3        C4        C5        C6        C7        C8        C9        C10       C11       C12       C13       C14
  2   -1.9200    1.0000    1.7000    0.0000    0.0000    0.0000    0.0000    1.5200    0.1600    0.0000    0.0000    0.0000    0.0000    0.0000
ATT     C15       C16       C17       C18       C19       C20       C21       C22       C23       PER      DSMIN      SIGA     IRELAF      ICHK
  2    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    1.0000      25          0

ATT      C1        C2        C3        C4        C5        C6        C7        C8        C9        C10       C11       C12       C13       C14
  3   -2.1700    1.0000    1.7000    0.0000    0.0000    0.0000    0.0000    1.5200    0.1600    0.0000    0.0000    0.0000    0.0000    0.0000
ATT     C15       C16       C17       C18       C19       C20       C21       C22       C23       PER      DSMIN      SIGA     IRELAF      ICHK
  3    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    1.0000      25          0

ATT      C1        C2        C3        C4        C5        C6        C7        C8        C9        C10       C11       C12       C13       C14
  4   -1.9200    1.0000    1.7000    0.0000    0.0000    0.0000    0.0000    1.5200    0.1600    0.0000    0.0000    0.0000    0.0000    0.0000
ATT     C15       C16       C17       C18       C19       C20       C21       C22       C23       PER      DSMIN      SIGA     IRELAF      ICHK
  4    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    1.0000      25          0

ATT      C1        C2        C3        C4        C5        C6        C7        C8        C9        C10       C11       C12       C13       C14
  5   -1.9200    1.0000    1.7000    0.0000    0.0000    0.0000    0.0000    1.5200    0.1600    0.0000    0.0000    0.0000    0.0000    0.0000
ATT     C15       C16       C17       C18       C19       C20       C21       C22       C23       PER      DSMIN      SIGA     IRELAF      ICHK
  5    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    1.0000      25          0

ATT      C1        C2        C3        C4        C5        C6        C7        C8        C9        C10       C11       C12       C13       C14
  6   -1.9200    1.0000    1.7000    0.0000    0.0000    0.0000    0.0000    1.5200    0.1600    0.0000    0.0000    0.0000    0.0000    0.0000
ATT     C15       C16       C17       C18       C19       C20       C21       C22       C23       PER      DSMIN      SIGA     IRELAF      ICHK
  6    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    1.0000      25          0

 PROBLEM DATA:

 SADIGH ET AL. (1997) DEEP SOIL 1 AMPLITUDES:
     15        0.100    0.200    0.300    0.400    0.500    0.600    0.700    0.800    0.900    1.000
               1.100    1.200    1.300    1.400    1.500

     MAGNITUDE WEIGHTING FACTORS:     MWF:   0    MWF MAGNITUDE:     0.00
```

APPENDIX D

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SADIGH ET AL. (1997) DEEP SOIL 2 AMPLITUDES:
    15        0.100    0.200    0.300    0.400    0.500    0.600    0.700    0.800    0.900    1.000
              1.100    1.200    1.300    1.400    1.500

     MAGNITUDE WEIGHTING FACTORS:     MWF:   2    MWF MAGNITUDE:     7.50

CAMPBELL AND BOZORGNIA (1997)

ATT       C1        C2        C3        C4        C5        C6        C7        C8        C9       C10       C11       C12       C13       C14
  1  -3.5120    0.9040   -1.3280    0.1490    0.6470    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
ATT      C15       C16       C17       C18       C19       C20       C21       C22       C23       PER     DSMIN      SIGA    IRELAF      ICHK
  1   0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    3.0000    1.0000        37         0

ATT       C1        C2        C3        C4        C5        C6        C7        C8        C9       C10       C11       C12       C13       C14
  2  -3.5120    0.9040   -1.3280    0.1490    0.6470    1.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
ATT      C15       C16       C17       C18       C19       C20       C21       C22       C23       PER     DSMIN      SIGA    IRELAF      ICHK
  2   0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    3.0000    1.0000        37         0

ATT       C1        C2        C3        C4        C5        C6        C7        C8        C9       C10       C11       C12       C13       C14
  3  -3.5120    0.9040   -1.3280    0.1490    0.6470    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
ATT      C15       C16       C17       C18       C19       C20       C21       C22       C23       PER     DSMIN      SIGA    IRELAF      ICHK
  3   0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    3.0000    1.0000        37         0

ATT       C1        C2        C3        C4        C5        C6        C7        C8        C9       C10       C11       C12       C13       C14
  4  -3.5120    0.9040   -1.3280    0.1490    0.6470    1.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
ATT      C15       C16       C17       C18       C19       C20       C21       C22       C23       PER     DSMIN      SIGA    IRELAF      ICHK
  4   0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    3.0000    1.0000        37         0

ATT       C1        C2        C3        C4        C5        C6        C7        C8        C9       C10       C11       C12       C13       C14
  5  -3.5120    0.9040   -1.3280    0.1490    0.6470    1.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
ATT      C15       C16       C17       C18       C19       C20       C21       C22       C23       PER     DSMIN      SIGA    IRELAF      ICHK
  5   0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    3.0000    1.0000        37         0
```

APPENDIX D

```
ATT      C1        C2        C3        C4        C5        C6        C7        C8        C9       C10       C11       C12       C13       C14
  6   -3.5120    0.9040   -1.3280    0.1490    0.6470    1.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
ATT     C15       C16       C17       C18       C19       C20       C21       C22       C23       PER     DSMIN      SIGA    IRELAF      ICHK
  6    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    3.0000    1.0000      37         0

 PROBLEM DATA:

 CAMP. & BOZ. (1997 Rev.) AL 1    AMPLITUDES:
     15         0.100    0.200    0.300    0.400    0.500    0.600    0.700    0.800    0.900    1.000
                1.100    1.200    1.300    1.400    1.500

      MAGNITUDE WEIGHTING FACTORS:     MWF:   0    MWF MAGNITUDE:     0.00

 CAMP. & BOZ. (1997 Rev.) AL 2    AMPLITUDES:
     15         0.100    0.200    0.300    0.400    0.500    0.600    0.700    0.800    0.900    1.000
                1.100    1.200    1.300    1.400    1.500

      MAGNITUDE WEIGHTING FACTORS:     MWF:   2    MWF MAGNITUDE:     7.50

RISKS SPECIFIED:
  5      0.013900  0.010000  0.005000  0.002105  0.001000

 SITE COORDINATES:
  1    -118.5208   34.4153

 FAULT INFORMATION:

 -----------------------------------------------------------------------------

 FAULT  1

 FAULT NAME:  SAN GABRIEL


 NFP    NRL   ATTENUATION CODES:
 10     10       1  3

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  1.0000  2.072  3.600  2.000  1.000

 NMAX AMMAX  PMAX
  1    7.00  1.00
```

APPENDIX D

```
  dmchar ampchar dmpchar
    0.50    6.50    1.00

 Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.936E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  7.0000  1.0000   0.00616   0.00445   0.00171


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA     B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -118.2802   34.3179
  2    -118.3118   34.3394
  3    -118.3904   34.3598
  4    -118.4577   34.3853
  5    -118.5587   34.4363
  6    -118.5975   34.4649
  7    -118.6873   34.5536
  8    -118.7026   34.5700
  9    -118.7312   34.5792
 10    -118.8761   34.7139

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1        0.0000    0.0000
  2        0.0000   13.0000

 Computed Total Fault Area = 0.93E+03

 -----------------------------------------------------------------------------
```

APPENDIX D

```
 FAULT   2

 FAULT NAME: HOLSER


 NFP    NRL   ATTENUATION CODES:
  5     10      2  4

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  0.4000  2.072  1.000  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.50  1.00


   dmchar ampchar dmpchar
     0.50    6.00    1.00

 Slip Rate (  0.4000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.280E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.5000  1.0000   0.00212   0.00097   0.00115


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1     -118.7533   34.4386
  2     -118.7345   34.4386
  3     -118.6741   34.4499
  4     -118.6427   34.4487
  5     -118.5483   34.4172

 NDP
   2
```

APPENDIX D

```
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       5.9000   12.7000

 Computed Total Fault Area = 0.26E+03

 ---------------------------------------------------------------------------

 FAULT  3

 FAULT NAME:  NORTHRIDGE (E. Oak Ridge)


 NFP    NRL   ATTENUATION CODES:
  2     10      5  6

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  1.5000  2.072  1.500  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.90  1.00


   dmchar ampchar dmpchar
     0.50    6.40    1.00

 Slip Rate (  1.5000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.360E+12
 Input Fault Area    - cm**2
0.682E+13
 LOG10[Mo(m)]         = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.9000  1.0000   0.00891   0.00602   0.00288
IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -118.7027   34.4057
  2    -118.4078   34.2781
```

APPENDIX D

```
 NDP
   3
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    4.9900
  2       0.0000    5.0000
  3      16.3000   19.7000

 Computed Total Fault Area = 0.67E+03

 -----------------------------------------------------------------------------

 FAULT  4

 FAULT NAME:  SANTA SUSANA


 NFP    NRL   ATTENUATION CODES:
  8     10      2  4

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  5.0000  2.072  1.300  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.60  1.00


   dmchar ampchar dmpchar
     0.50    6.10    1.00

 Slip Rate (  5.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.432E+13
 LOG10[Mo(m)]         = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.6000  1.0000   0.03249   0.01677   0.01573


 IND_RL
      2
```

APPENDIX D

```
RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.4950   34.3242
 2    -118.4955   34.3242
 3    -118.5340   34.3030
 4    -118.5811   34.3204
 5    -118.6163   34.3229
 6    -118.6339   34.3330
 7    -118.7081   34.3506
 8    -118.7672   34.3594

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       9.2000   13.1000

Computed Total Fault Area = 0.41E+03

-----------------------------------------------------------------------------

FAULT  5

FAULT NAME:  SIERRA MADRE (San Fernando)


NFP    NRL   ATTENUATION CODES:
 8     10      2  4
AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  2.0000  2.072  0.900  2.000  1.000

NMAX AMMAX  PMAX
 1    6.70  1.00


  dmchar ampchar dmpchar
    0.50    6.20    1.00

Slip Rate (  2.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
```

APPENDIX D

```
0.330E+12
 Input Fault Area     - cm**2
0.324E+13
 LOG10[Mo(m)]         = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.7000  1.0000   0.00781   0.00447   0.00334


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -118.2940   34.2782
  2    -118.2951   34.2782
  3    -118.3196   34.2745
  4    -118.3956   34.2905
  5    -118.4189   34.3039
  6    -118.4520   34.2940
  7    -118.4778   34.3027
  8    -118.4790   34.3027

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2      12.7000   12.7000
Computed Total Fault Area = 0.33E+03

 ----------------------------------------------------------------------------

 FAULT  6

 FAULT NAME:  OAK RIDGE (Onshore)


 NFP    NRL   ATTENUATION CODES:
  9     10      2  4

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  4.0000  2.072  2.500  2.000  1.000
```

APPENDIX D

```
 NMAX AMMAX  PMAX
  1    6.90  1.00


   dmchar ampchar dmpchar
     0.50    6.40    1.00

 Slip Rate (  4.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.700E+13
 LOG10[Mo(m)]         = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.9000  1.0000   0.02235   0.01511   0.00723


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -119.2050   34.2481
  2    -119.1582   34.2630
  3    -119.0974   34.3165
  4    -119.0402   34.3522
  5    -118.9589   34.3631
  6    -118.8805   34.3813
  7    -118.8104   34.3850
  8    -118.7742   34.4013
  9    -118.7227   34.3978

 NDP
   3
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    1.0000
  2       0.0000    1.1000
  3       5.9000   13.7000

 Computed Total Fault Area = 0.67E+03
```

APPENDIX D

```
 ----------------------------------------------------------------------------

 FAULT  7

 FAULT NAME:  VERDUGO


 NFP    NRL   ATTENUATION CODES:
  7     10       2  4

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  0.5000  2.072  1.400  2.000  1.000

 NMAX AMMAX  PMAX
  1    6.70  1.00


   dmchar ampchar dmpchar
     0.50    6.20    1.00

 Slip Rate (  0.5000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.522E+13
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.7000  1.0000   0.00315   0.00180   0.00135


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -118.1536   34.1313
  2    -118.1865   34.1496
  3    -118.2285   34.1551
  4    -118.2907   34.1971
  5    -118.3657   34.2227
```

```
 6    -118.4077   34.2538
 7    -118.4206   34.2612

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2      12.7000   12.7000

Computed Total Fault Area = 0.52E+03

-----------------------------------------------------------------------------

FAULT  8

FAULT NAME:  SAN CAYETANO


NFP    NRL   ATTENUATION CODES:
 9     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  6.0000  2.072  2.200  2.000  1.000

NMAX AMMAX  PMAX
 1    6.80  1.00


  dmchar ampchar dmpchar
    0.50    6.30    1.00

Slip Rate (  6.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.660E+13
LOG10[Mo(m)]        = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.8000  1.0000   0.03867   0.02422   0.01445


IND_RL
```

APPENDIX D

```
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.7621   34.4361
 2    -118.8313   34.4047
 3    -118.9130   34.4172
 4    -118.9281   34.4587
 5    -118.9382   34.4612
 6    -118.9835   34.4348
 7    -119.0690   34.4361
 8    -119.1067   34.4386
 9    -119.1708   34.4625

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       7.5000   13.0000
Computed Total Fault Area = 0.60E+03

------------------------------------------------------------------------------

FAULT  9

FAULT NAME:  SIERRA MADRE


NFP    NRL   ATTENUATION CODES:
12     10       2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  3.0000  2.072  2.800  2.000  1.000

NMAX AMMAX  PMAX
 1    7.00  1.00


  dmchar ampchar dmpchar
    0.50    6.50    1.00
```

APPENDIX D

```
 Slip Rate (  3.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.103E+14
 LOG10[Mo(m)]         = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  7.0000  1.0000   0.02034   0.01469   0.00565


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -117.7397   34.1231
  2    -117.7691   34.1317
  3    -117.8176   34.1323
  4    -117.8807   34.1470
  5    -117.9402   34.1501
  6    -118.0027   34.1752
  7    -118.0683   34.1758
  8    -118.1118   34.2010
  9    -118.1492   34.2028
 10    -118.2461   34.2279
 11    -118.2896   34.2751
 12    -118.2960   34.2751

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2      12.7000   12.7000

 Computed Total Fault Area = 0.11E+04

 ------------------------------------------------------------------------------

 FAULT 10

 FAULT NAME:  SIMI-SANTA ROSA
```

APPENDIX D

```
NFP    NRL   ATTENUATION CODES:
 5     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  1.0000  2.072  1.500  2.000  1.000

NMAX AMMAX  PMAX
 1    6.70  1.00


  dmchar ampchar dmpchar
    0.50    6.20    1.00

Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.450E+13
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.7000  1.0000   0.00543   0.00311   0.00232


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.7982   34.2901
 2    -118.9084   34.2578
 3    -118.9364   34.2615
 4    -118.9680   34.2615
 5    -119.1147   34.2261

NDP
  3
ORIGINAL FAULT CROSS SECTION
 1        0.0000    1.0000
 2        0.0000    1.1000
```

APPENDIX D

```
 3       7.5000   14.0000

Computed Total Fault Area = 0.45E+03

------------------------------------------------------------------------------

FAULT 11

FAULT NAME:  SAN ANDREAS - 1857 Rupture


NFP    NRL   ATTENUATION CODES:
12     10      1  3

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1 34.0000  2.072 17.200  2.000  0.500

NMAX AMMAX  PMAX
 1    7.80  1.00


  dmchar ampchar dmpchar
    0.50    7.30    1.00

Slip Rate ( 34.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.300E+12
Input Fault Area    - cm**2
0.414E+14
LOG10[Mo(m)]          = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  7.8000  1.0000   0.22372   0.20895   0.01477


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA     SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -120.5605   36.0019
 2    -120.2928   35.7488
```

APPENDIX D

```
  3     -119.8632   35.3106
  4     -119.8598   35.3072
  5     -119.6673   35.1336
  6     -119.4061   34.9395
  7     -119.2103   34.8639
  8     -118.9010   34.8175
  9     -118.5075   34.7006
 10     -118.5024   34.6989
 11     -118.0075   34.5116
 12     -117.5298   34.3106

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       0.0000   12.0000

 Computed Total Fault Area = 0.41E+04

 ----------------------------------------------------------------------------

 FAULT 12

 FAULT NAME:  SAN ANDREAS - Mojave


 NFP    NRL   ATTENUATION CODES:
  3     10       1  3

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1 30.0000  2.072  4.900  2.000  0.500

 NMAX AMMAX  PMAX
  1    7.10  1.00


   dmchar ampchar dmpchar
     0.50    6.60    1.00

 Slip Rate ( 30.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.300E+12
```

APPENDIX D

```
 Input Fault Area     - cm**2
0.119E+14
 LOG10[Mo(m)]          = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX      ARATE = EX-RATE + CH-RATE
      1  7.1000  1.0000   0.17754   0.13551   0.04202


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490      0.910      0.240

 FAULT SEGMENT COORDINATES
  1    -118.5024   34.6989
  2    -118.0075   34.5116
  3    -117.5298   34.3106

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1        0.0000    0.0000
  2        0.0000   12.0000

 Computed Total Fault Area = 0.12E+04

 --------------------------------------------------------------------------

 FAULT 13

 FAULT NAME:  SAN ANDREAS - Carrizo


 NFP    NRL   ATTENUATION CODES:
  6     10      1  3

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1 34.0000  2.072  7.200  2.000  0.500

 NMAX AMMAX  PMAX
  1    7.20  1.00
```

APPENDIX D

```
  dmchar ampchar dmpchar
    0.50    6.70    1.00

 Slip Rate ( 34.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.300E+12
 Input Fault Area    - cm**2
0.174E+14
 LOG10[Mo(m)]        = (1.50)m + (16.05)
   IMAX   AMMAX     PMAX      ARATE = EX-RATE + CH-RATE
      1  7.2000  1.0000   0.24626   0.19696   0.04930


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -119.8598   35.3072
  2    -119.6673   35.1336
  3    -119.4061   34.9395
  4    -119.2103   34.8639
  5    -118.9010   34.8175
  6    -118.5075   34.7006

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1        0.0000    0.0000
  2        0.0000   12.0000

 Computed Total Fault Area = 0.17E+04

 -----------------------------------------------------------------------------

 FAULT 14

 FAULT NAME:  HOLLYWOOD


 NFP    NRL   ATTENUATION CODES:
```

APPENDIX D

```
 4     10       2  4

AMMIN    AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
5.000    0.1000      1  1.0000   2.072   0.800   2.000   1.000

NMAX AMMAX   PMAX
 1    6.40   1.00


  dmchar ampchar dmpchar
    0.50    5.90    1.00

Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area     - cm**2
0.238E+13
LOG10[Mo(m)]          = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.4000  1.0000   0.00575   0.00229   0.00346


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA     B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.2302   34.1192
 2    -118.3170   34.1104
 3    -118.3723   34.0991
 4    -118.4063   34.0827

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1        0.0000    0.0000
 2        4.8000   13.2000

Computed Total Fault Area = 0.25E+03

-----------------------------------------------------------------------------
```

APPENDIX D

```
FAULT 15

FAULT NAME:  SANTA MONICA
NFP    NRL   ATTENUATION CODES:
 3     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  1.0000  2.072  1.400  2.000  1.000

NMAX AMMAX  PMAX
 1    6.60  1.00


  dmchar ampchar dmpchar
    0.50    6.10    1.00

Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.360E+12
Input Fault Area    - cm**2
0.364E+13
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.6000  1.0000    0.00597    0.00308    0.00289


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.4085    34.0814
 2    -118.5244    34.0263
 3    -118.6855    33.9896

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1        0.0000    0.0000
 2        3.4000   12.6000
```

APPENDIX D

```
Computed Total Fault Area = 0.35E+03
-----------------------------------------------------------------------------

FAULT 16

FAULT NAME:  SANTA YNEZ (East)


NFP    NRL   ATTENUATION CODES:
 6     10      1  3

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  2.0000  2.072  3.400  2.000  1.000

NMAX AMMAX  PMAX
 1    7.00  1.00


  dmchar ampchar dmpchar
    0.50    6.50    1.00

Slip Rate (  2.0000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.884E+13
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX      ARATE = EX-RATE + CH-RATE
     1  7.0000  1.0000    0.01164    0.00840    0.00323


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -119.6298   34.4939
 2    -119.5091   34.4864
 3    -119.3783   34.5065
 4    -119.1972   34.5367
```

APPENDIX D

```
 5    -119.1167   34.5317
 6    -118.9055   34.5870

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       2.3000   12.8000

Computed Total Fault Area = 0.89E+03

-----------------------------------------------------------------------------

FAULT 17

FAULT NAME:  MALIBU COAST


NFP    NRL   ATTENUATION CODES:
 4     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  0.3000  2.072  1.800  2.000  1.000

NMAX AMMAX  PMAX
 1    6.70  1.00


  dmchar ampchar dmpchar
    0.50    6.20    1.00

Slip Rate (  0.3000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.481E+13
LOG10[Mo(m)]         = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.7000  1.0000   0.00174   0.00100   0.00074

IND_RL
     2
```

APPENDIX D

```
RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.5333   34.0299
 2    -118.6339   34.0412
 3    -118.6666   34.0387
 4    -118.9332   34.0513

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       3.4000   12.6000

Computed Total Fault Area = 0.48E+03

-----------------------------------------------------------------------------

FAULT 18

FAULT NAME:  RAYMOND


NFP    NRL   ATTENUATION CODES:
 4     10      2  4

AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
5.000   0.1000      1  0.5000  2.072  1.000  2.000  1.000

NMAX AMMAX  PMAX
 1    6.50  1.00


  dmchar ampchar dmpchar
    0.50    6.00    1.00

Slip Rate (  0.5000 mm/yr) Converted to Activity Rate:
Input Shear Modulus - dyne/cm**2
0.330E+12
Input Fault Area    - cm**2
0.273E+13
```

APPENDIX D

```
LOG10[Mo(m)]          = (1.50)m + (16.05)
  IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
     1  6.5000  1.0000   0.00259   0.00118   0.00140


IND_RL
     2

RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

FAULT SEGMENT COORDINATES
 1    -118.0051   34.1670
 2    -118.0579   34.1444
 3    -118.1258   34.1293
 4    -118.2227   34.1217

NDP
  2
ORIGINAL FAULT CROSS SECTION
 1       0.0000    0.0000
 2       3.4000   12.6000

Computed Total Fault Area = 0.26E+03

------------------------------------------------------------------------------

FAULT 19

FAULT NAME:  NEWPORT-INGLEWOOD (L.A.Basin)


NFP    NRL   ATTENUATION CODES:
 5     10       1  3

AMMIN    AMSTEP  IRATE     RATE    BETA    ECTR    ECDP    COEF
5.000    0.1000      1   1.0000   2.072   3.200   2.000   1.000
NMAX AMMAX   PMAX
 1    6.90   1.00


  dmchar ampchar dmpchar
    0.50    6.40    1.00
```

APPENDIX D

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 Slip Rate (  1.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.832E+13
 LOG10[Mo(m)]         = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  6.9000  1.0000   0.00664   0.00449   0.00215


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -118.3723   34.0337
  2    -118.1862   33.8073
  3    -118.1510   33.7822
  4    -118.1208   33.7746
  5    -117.9246   33.6061

 NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1        0.0000    0.0000
  2        0.0000   13.0000

 Computed Total Fault Area = 0.83E+03

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```

APPENDIX D

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FAULT 20

 FAULT NAME:  PALOS VERDES


 NFP    NRL   ATTENUATION CODES:
  4     10      1  3

 AMMIN   AMSTEP  IRATE    RATE   BETA   ECTR   ECDP   COEF
 5.000   0.1000      1  3.0000  2.030  4.800  2.000  1.000

 NMAX AMMAX  PMAX
  1    7.10  1.00


   dmchar ampchar dmpchar
     0.50    6.60    1.00

 Slip Rate (  3.0000 mm/yr) Converted to Activity Rate:
 Input Shear Modulus - dyne/cm**2
0.330E+12
 Input Fault Area    - cm**2
0.125E+14
 LOG10[Mo(m)]         = (1.50)m + (16.05)
   IMAX   AMMAX    PMAX     ARATE = EX-RATE + CH-RATE
      1  7.1000  1.0000   0.02038   0.01553   0.00485


 IND_RL
      2

 RUPTURE AREA VS. MAGNITUDE  A_RA      B_RA    SIG_RA  -3.490     0.910     0.240

 FAULT SEGMENT COORDINATES
  1    -117.9388   33.2825
  2    -118.1977   33.6571
  3    -118.2758   33.7560
  4    -118.5568   33.9720
```

APPENDIX D

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NDP
   2
 ORIGINAL FAULT CROSS SECTION
  1       0.0000    0.0000
  2       0.0000   13.0000

 Computed Total Fault Area = 0.13E+04

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 SITE 1 COORDINATES: -118.5208  34.4153

 BOORE ET AL(1997) NEHRP C (520)1 - Problem #1
      AMPLITUDES (g):      0.1000E+000.2000E+000.3000E+000.4000E+000.5000E+000.6000E+000.7000E+000.8000E+000.9000E+000.1000E+01
      LN (AMPLITUDE):        -2.30      -1.61      -1.20      -0.92      -0.69      -0.51      -0.36      -0.22      -0.11       0.00
   FAULT    1 E(NO/YR)     0.3754E-020.2167E-020.1351E-020.8559E-030.5437E-030.3466E-030.2223E-030.1439E-030.9404E-040.6214E-04
   FAULT    2 E(NO/YR)     0.1811E-020.1123E-020.6394E-030.3566E-030.1996E-030.1134E-030.6560E-040.3871E-040.2330E-040.1429E-04
   FAULT    3 E(NO/YR)     0.6032E-020.2922E-020.1471E-020.7532E-030.3930E-030.2097E-030.1147E-030.6427E-040.3687E-040.2163E-04
   FAULT    4 E(NO/YR)     0.2802E-010.1846E-010.1149E-010.7003E-020.4250E-020.2592E-020.1597E-020.9968E-030.6308E-030.4048E-03
   FAULT    5 E(NO/YR)     0.6241E-020.3652E-020.2078E-020.1175E-020.6681E-030.3847E-030.2253E-030.1344E-030.8160E-040.5045E-04
   FAULT    6 E(NO/YR)     0.7384E-020.1925E-020.5706E-030.1883E-030.6815E-040.2668E-040.1116E-040.4945E-050.2302E-050.1118E-05
   FAULT    7 E(NO/YR)     0.1423E-020.3920E-030.1145E-030.3677E-040.1294E-040.4935E-050.2016E-050.8736E-060.3985E-060.1901E-06
   FAULT    8 E(NO/YR)     0.1282E-010.2850E-020.7189E-030.2066E-030.6647E-040.2352E-040.9007E-050.3690E-050.1601E-050.7301E-06
   FAULT    9 E(NO/YR)     0.5300E-020.1219E-020.3351E-030.1050E-030.3659E-040.1390E-040.5677E-050.2465E-050.1128E-050.5399E-06
   FAULT   10 E(NO/YR)     0.1588E-020.2751E-030.5590E-040.1345E-040.3731E-050.1162E-050.3982E-060.1477E-060.5863E-070.2465E-07
   FAULT   11 E(NO/YR)     0.9065E-020.2492E-020.8232E-030.2915E-030.1104E-030.4457E-040.1906E-040.8576E-050.4037E-050.1979E-05
   FAULT   12 E(NO/YR)     0.1539E-010.2679E-020.5702E-030.1429E-030.4093E-040.1309E-040.4587E-050.1735E-050.7000E-060.2987E-06
   FAULT   13 E(NO/YR)     0.1059E-010.1504E-020.2886E-030.6781E-040.1859E-040.5752E-050.1964E-050.7273E-060.2884E-060.1212E-06
   FAULT   14 E(NO/YR)     0.1750E-020.2371E-030.3883E-040.7852E-050.1885E-050.5191E-060.1598E-060.5393E-070.1966E-070.7652E-08
   FAULT   15 E(NO/YR)     0.1584E-020.2176E-030.3671E-040.7619E-050.1871E-050.5252E-060.1644E-060.5633E-070.2082E-070.8204E-08
   FAULT   16 E(NO/YR)     0.1110E-020.1153E-030.1685E-040.3180E-050.7278E-060.1934E-060.5789E-070.1909E-070.6827E-080.2614E-08
   FAULT   17 E(NO/YR)     0.4137E-030.5521E-040.9197E-050.1892E-050.4612E-060.1287E-060.4008E-070.1366E-070.5027E-080.1973E-08
   FAULT   18 E(NO/YR)     0.5498E-030.5858E-040.8249E-050.1494E-050.3290E-060.8438E-070.2445E-070.7829E-080.2724E-080.1017E-08
   FAULT   19 E(NO/YR)     0.4756E-030.3637E-040.4307E-050.6953E-060.1406E-060.3373E-070.9252E-080.2828E-080.9450E-090.3405E-09
   FAULT   20 E(NO/YR)     0.1128E-020.9040E-040.1112E-040.1849E-050.3826E-060.9353E-070.2607E-070.8078E-080.2733E-080.9957E-09
   TOTAL      E(NO/YR)     0.1164E+000.4247E-010.2063E-010.1122E-010.6418E-020.3782E-020.2279E-020.1401E-020.8772E-030.5583E-03
   TOTAL RISK              0.1099E+000.4158E-010.2042E-010.1116E-010.6397E-020.3775E-020.2277E-020.1400E-020.8768E-030.5582E-03

      AMPLITUDES (g):      0.1100E+010.1200E+010.1300E+010.1400E+010.1500E+01
      LN (AMPLITUDE):         0.10       0.18       0.26       0.34       0.41
   FAULT    1 E(NO/YR)     0.4152E-040.2804E-040.1914E-040.1320E-040.9198E-05
   FAULT    2 E(NO/YR)     0.8920E-050.5663E-050.3652E-050.2390E-050.1585E-05
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FAULT    3 E(NO/YR)      0.1295E-040.7909E-050.4916E-050.3107E-050.1995E-05
FAULT    4 E(NO/YR)      0.2634E-030.1737E-030.1160E-030.7841E-040.5362E-04
FAULT    5 E(NO/YR)      0.3173E-040.2028E-040.1315E-040.8656E-050.5772E-05
FAULT    6 E(NO/YR)      0.5645E-060.2946E-060.1585E-060.8760E-070.4962E-07
FAULT    7 E(NO/YR)      0.9429E-070.4844E-070.2567E-070.1399E-070.7823E-08
FAULT    8 E(NO/YR)      0.3477E-060.1721E-060.8811E-070.4651E-070.2524E-07
FAULT    9 E(NO/YR)      0.2690E-060.1388E-060.7388E-070.4045E-070.2272E-07
FAULT   10 E(NO/YR)      0.1090E-070.5037E-080.2420E-080.1204E-080.6176E-09
FAULT   11 E(NO/YR)      0.1005E-050.5272E-060.2846E-060.1577E-060.8952E-07
FAULT   12 E(NO/YR)      0.1338E-060.6254E-070.3036E-070.1525E-070.7892E-08
FAULT   13 E(NO/YR)      0.5360E-070.2477E-070.1190E-070.5924E-080.3041E-08
FAULT   14 E(NO/YR)      0.3153E-080.1365E-080.6169E-090.2899E-090.1410E-09
FAULT   15 E(NO/YR)      0.3418E-080.1495E-080.6827E-090.3238E-090.1589E-09
FAULT   16 E(NO/YR)      0.1062E-080.4538E-090.2028E-090.9419E-100.4520E-10
FAULT   17 E(NO/YR)      0.8191E-090.3571E-090.1625E-090.7683E-100.3759E-10
FAULT   18 E(NO/YR)      0.4035E-090.1687E-090.7388E-100.3370E-100.1591E-10
FAULT   19 E(NO/YR)      0.1308E-090.5300E-100.2246E-100.9834E-110.4375E-11
FAULT   20 E(NO/YR)      0.3863E-090.1581E-090.6775E-100.3008E-100.1367E-10
TOTAL      E(NO/YR)      0.3610E-030.2368E-030.1575E-030.1061E-030.7237E-04
TOTAL RISK               0.3609E-030.2368E-030.1575E-030.1061E-030.7237E-04

  SPECIFIED RISKS:          0.013900  0.010000  0.005000  0.002105  0.001000
  ESTIMATED LN AMP.  :       -1.021    -0.872    -0.608    -0.335    -0.138
   ESTIMATED AMP. (g):      0.36026   0.41797   0.54445   0.71526   0.87072

BOORE ET AL(1997) NEHRP C (520)2 - Problem 2
     AMPLITUDES (g):     0.1000E+000.2000E+000.3000E+000.4000E+000.5000E+000.6000E+000.7000E+000.8000E+000.9000E+000.1000E+01
     LN (AMPLITUDE):       -2.30      -1.61      -1.20      -0.92      -0.69      -0.51      -0.36      -0.22      -0.11       0.00
FAULT    1 E(NO/YR)      0.2244E-020.1304E-020.7829E-030.4575E-030.2650E-030.1543E-030.9095E-040.5443E-040.3312E-040.2049E-04
FAULT    2 E(NO/YR)      0.1174E-020.5199E-030.2187E-030.9364E-040.4172E-040.1943E-040.9439E-050.4768E-050.2494E-050.1347E-05
FAULT    3 E(NO/YR)      0.3324E-020.1527E-020.6724E-030.2964E-030.1345E-030.6344E-040.3109E-040.1579E-040.8298E-050.4494E-05
FAULT    4 E(NO/YR)      0.1859E-010.9788E-020.4887E-020.2407E-020.1204E-020.6181E-030.3265E-030.1775E-030.9912E-040.5677E-04
FAULT    5 E(NO/YR)      0.3839E-020.1885E-020.8795E-030.4086E-030.1945E-030.9575E-040.4879E-040.2569E-040.1395E-040.7792E-05
FAULT    6 E(NO/YR)      0.3693E-020.7716E-030.1833E-030.5027E-040.1560E-040.5358E-050.2002E-050.8028E-060.3419E-060.1533E-06
FAULT    7 E(NO/YR)      0.6606E-030.1209E-030.2543E-040.6310E-050.1800E-050.5756E-060.2020E-060.7666E-070.3107E-070.1333E-07
FAULT    8 E(NO/YR)      0.5857E-020.9103E-030.1713E-030.3915E-040.1046E-040.3170E-050.1063E-050.3875E-060.1516E-060.6299E-07
FAULT    9 E(NO/YR)      0.2667E-020.5238E-030.1207E-030.3254E-040.9994E-050.3411E-050.1269E-050.5078E-060.2159E-060.9678E-07
FAULT   10 E(NO/YR)      0.6196E-030.6413E-040.8989E-050.1635E-050.3629E-060.9394E-070.2749E-070.8890E-080.3124E-080.1178E-08
FAULT   11 E(NO/YR)      0.6159E-020.2332E-020.8541E-030.3224E-030.1283E-030.5403E-040.2397E-040.1114E-040.5405E-050.2722E-05
FAULT   12 E(NO/YR)      0.7981E-020.1174E-020.2093E-030.4547E-040.1161E-040.3372E-050.1088E-050.3831E-060.1451E-060.5850E-07
FAULT   13 E(NO/YR)      0.5852E-020.7421E-030.1251E-030.2647E-040.6657E-050.1917E-050.6155E-060.2160E-060.8165E-070.3289E-07
FAULT   14 E(NO/YR)      0.4424E-030.2525E-040.2368E-050.3185E-060.5548E-070.1173E-070.2885E-080.8008E-090.2456E-090.8160E-10
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APPENDIX D

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FAULT  15 E(NO/YR)     0.5044E-030.3592E-040.3891E-050.5822E-060.1104E-060.2504E-070.6540E-080.1914E-080.6150E-090.2139E-09
FAULT  16 E(NO/YR)     0.4962E-030.3719E-040.4276E-050.6745E-060.1339E-060.3165E-070.8571E-080.2591E-080.8577E-090.3064E-09
FAULT  17 E(NO/YR)     0.1433E-030.1085E-040.1221E-050.1877E-060.3634E-070.8387E-080.2222E-080.6584E-090.2139E-090.7511E-10
FAULT  18 E(NO/YR)     0.1374E-030.6674E-050.5666E-060.7092E-070.1168E-070.2359E-080.5580E-090.1498E-090.4451E-100.1430E-10
FAULT  19 E(NO/YR)     0.1744E-030.8668E-050.7668E-060.9984E-070.1704E-070.3552E-080.8646E-090.2380E-090.7241E-100.2386E-10
FAULT  20 E(NO/YR)     0.5309E-030.3245E-040.3279E-050.4707E-060.8675E-070.1927E-070.4952E-080.1430E-080.4542E-090.1562E-09
TOTAL     E(NO/YR)     0.6509E-010.2182E-010.9155E-020.4190E-020.2025E-020.1023E-020.5370E-030.2917E-030.1634E-030.9403E-04
TOTAL RISK             0.6301E-010.2158E-010.9113E-020.4181E-020.2023E-020.1023E-020.5369E-030.2917E-030.1634E-030.9403E-04

   AMPLITUDES (g):     0.1100E+010.1200E+010.1300E+010.1400E+010.1500E+01
   LN (AMPLITUDE):        0.10      0.18      0.26      0.34      0.41
FAULT   1 E(NO/YR)     0.1288E-040.8224E-050.5328E-050.3500E-050.2329E-05
FAULT   2 E(NO/YR)     0.7488E-060.4271E-060.2494E-060.1488E-060.9050E-07
FAULT   3 E(NO/YR)     0.2502E-050.1429E-050.8349E-060.4981E-060.3030E-06
FAULT   4 E(NO/YR)     0.3328E-040.1993E-040.1217E-040.7569E-050.4786E-05
FAULT   5 E(NO/YR)     0.4465E-050.2619E-050.1569E-050.9591E-060.5968E-06
FAULT   6 E(NO/YR)     0.7195E-070.3512E-070.1776E-070.9269E-080.4976E-08
FAULT   7 E(NO/YR)     0.6001E-080.2821E-080.1378E-080.6960E-090.3624E-09
FAULT   8 E(NO/YR)     0.2757E-070.1262E-070.6017E-080.2972E-080.1515E-08
FAULT   9 E(NO/YR)     0.4540E-070.2217E-070.1122E-070.5857E-080.3147E-08
FAULT  10 E(NO/YR)     0.4715E-090.1989E-090.8774E-100.4026E-100.1904E-10
FAULT  11 E(NO/YR)     0.1418E-050.7611E-060.4199E-060.2375E-060.1374E-06
FAULT  12 E(NO/YR)     0.2489E-070.1110E-070.5161E-080.2490E-080.1241E-08
FAULT  13 E(NO/YR)     0.1399E-070.6239E-080.2901E-080.1400E-080.6978E-09
FAULT  14 E(NO/YR)     0.2887E-100.1073E-100.4021E-110.1296E-110.0000E+00
FAULT  15 E(NO/YR)     0.7940E-100.3102E-100.1256E-100.5210E-110.2123E-11
FAULT  16 E(NO/YR)     0.1167E-090.4685E-100.1969E-100.8494E-110.3718E-11
FAULT  17 E(NO/YR)     0.2817E-100.1110E-100.4586E-110.1953E-110.8200E-12
FAULT  18 E(NO/YR)     0.4848E-110.1659E-110.4899E-120.7213E-130.0000E+00
FAULT  19 E(NO/YR)     0.8338E-110.3010E-110.1057E-110.3550E-120.7740E-13
FAULT  20 E(NO/YR)     0.5726E-100.2200E-100.8662E-110.3571E-110.1315E-11
TOTAL     E(NO/YR)     0.5548E-040.3348E-040.2062E-040.1294E-040.8256E-05
TOTAL RISK             0.5548E-040.3348E-040.2062E-040.1294E-040.8256E-05

  SPECIFIED RISKS:        0.013900  0.010000  0.005000  0.002105  0.001000
  ESTIMATED LN AMP.  :     -1.403    -1.248    -0.982    -0.705    -0.506
   ESTIMATED AMP. (g):     0.24598   0.28718   0.37444   0.49394   0.60320
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 SITE 1 COORDINATES: -118.5208  34.4153
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APPENDIX D

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SADIGH ET AL. (1997) DEEP SOIL Problem #1
     AMPLITUDES (g):     0.1000E+000.2000E+000.3000E+000.4000E+000.5000E+000.6000E+000.7000E+000.8000E+000.9000E+000.1000E+01
     LN (AMPLITUDE):       -2.30     -1.61     -1.20     -0.92     -0.69     -0.51     -0.36     -0.22     -0.11      0.00
   FAULT   1 E(NO/YR)    0.3753E-020.2544E-020.1884E-020.1403E-020.1016E-020.7144E-030.4912E-030.3331E-030.2243E-030.1507E-03
   FAULT   2 E(NO/YR)    0.1822E-020.1359E-020.9642E-030.6598E-030.4430E-030.2954E-030.1970E-030.1320E-030.8906E-040.6060E-04
   FAULT   3 E(NO/YR)    0.5763E-020.3510E-020.2095E-020.1176E-020.6363E-030.3397E-030.1817E-030.9809E-040.5374E-040.2995E-04
   FAULT   4 E(NO/YR)    0.2683E-010.1805E-010.1106E-010.6409E-020.3638E-020.2062E-020.1179E-020.6834E-030.4026E-030.2412E-03
   FAULT   5 E(NO/YR)    0.6092E-020.3939E-020.2350E-020.1322E-020.7254E-030.3963E-030.2183E-030.1219E-030.6924E-040.4004E-04
   FAULT   6 E(NO/YR)    0.7749E-020.2753E-020.9332E-030.3190E-030.1134E-030.4234E-040.1665E-040.6881E-050.2982E-050.1350E-05
   FAULT   7 E(NO/YR)    0.1518E-020.5638E-030.1938E-030.6779E-040.2492E-040.9683E-050.3974E-050.1716E-050.7767E-060.3668E-06
   FAULT   8 E(NO/YR)    0.1349E-010.3877E-020.1076E-020.3149E-030.9922E-040.3367E-040.1224E-040.4739E-050.1941E-050.8372E-06
   FAULT   9 E(NO/YR)    0.5327E-020.1526E-020.4171E-030.1165E-030.3447E-040.1094E-040.3724E-050.1358E-050.5280E-060.2182E-06
   FAULT  10 E(NO/YR)    0.1602E-020.3209E-030.6547E-040.1504E-040.3911E-050.1136E-050.3636E-060.1266E-060.4746E-070.1899E-07
   FAULT  11 E(NO/YR)    0.8870E-020.2990E-020.8311E-030.2146E-030.5627E-040.1548E-040.4516E-050.1397E-050.4579E-060.1584E-06
   FAULT  12 E(NO/YR)    0.1614E-010.2880E-020.4568E-030.7867E-040.1547E-040.3497E-050.9041E-060.2654E-060.8767E-070.3225E-07
   FAULT  13 E(NO/YR)    0.9234E-020.1185E-020.1532E-030.2269E-040.3953E-050.8081E-060.1925E-060.5303E-070.1674E-070.5978E-08
   FAULT  14 E(NO/YR)    0.1573E-020.2267E-030.3866E-040.8076E-050.2000E-050.5688E-060.1812E-060.6349E-070.2411E-070.9807E-08
   FAULT  15 E(NO/YR)    0.1433E-020.1912E-030.2903E-040.5373E-050.1185E-050.3027E-060.8740E-070.2800E-070.9813E-080.3718E-08
   FAULT  16 E(NO/YR)    0.8021E-030.5007E-040.3946E-050.4209E-060.5886E-070.1042E-070.2268E-080.5919E-090.1805E-090.6261E-10
   FAULT  17 E(NO/YR)    0.3651E-030.4316E-040.5784E-050.9569E-060.1914E-060.4492E-070.1207E-070.3642E-080.1215E-080.4430E-09
   FAULT  18 E(NO/YR)    0.4335E-030.4149E-040.5214E-050.8558E-060.1737E-060.4177E-070.1152E-070.3559E-080.1211E-080.4475E-09
   FAULT  19 E(NO/YR)    0.2735E-030.1150E-040.7434E-060.7075E-070.9213E-080.1554E-080.3260E-090.8227E-100.2414E-100.7884E-11
   FAULT  20 E(NO/YR)    0.5830E-030.1904E-040.9287E-060.6912E-070.7457E-080.1117E-080.2224E-090.5551E-100.1617E-100.4727E-11
   TOTAL       E(NO/YR)    0.1137E+000.4608E-010.2256E-010.1214E-010.6814E-020.3926E-020.2310E-020.1385E-020.8458E-030.5255E-03
   TOTAL RISK            0.1074E+000.4504E-010.2231E-010.1206E-010.6791E-020.3919E-020.2307E-020.1384E-020.8454E-030.5254E-03

     AMPLITUDES (g):     0.1100E+010.1200E+010.1300E+010.1400E+010.1500E+01
     LN (AMPLITUDE):        0.10      0.18      0.26      0.34      0.41
   FAULT   1 E(NO/YR)    0.1014E-030.6850E-040.4655E-040.3185E-040.2196E-04
   FAULT   2 E(NO/YR)    0.4161E-040.2884E-040.2017E-040.1424E-040.1014E-04
   FAULT   3 E(NO/YR)    0.1699E-040.9811E-050.5771E-050.3455E-050.2104E-05
   FAULT   4 E(NO/YR)    0.1470E-030.9115E-040.5742E-040.3674E-040.2386E-04
   FAULT   5 E(NO/YR)    0.2359E-040.1415E-040.8633E-050.5358E-050.3380E-05
   FAULT   6 E(NO/YR)    0.6373E-060.3125E-060.1588E-060.8343E-070.4524E-07
   FAULT   7 E(NO/YR)    0.1801E-060.9164E-070.4818E-070.2611E-070.1455E-07
   FAULT   8 E(NO/YR)    0.3783E-060.1783E-060.8743E-070.4444E-070.2336E-07
   FAULT   9 E(NO/YR)    0.9543E-070.4402E-070.2134E-070.1083E-070.5739E-08
   FAULT  10 E(NO/YR)    0.8059E-080.3604E-080.1691E-080.8285E-090.4223E-09
   FAULT  11 E(NO/YR)    0.5768E-070.2205E-070.8828E-080.3695E-080.1611E-08
   FAULT  12 E(NO/YR)    0.1306E-070.5750E-080.2718E-080.1365E-080.7201E-09
   FAULT  13 E(NO/YR)    0.2378E-080.1037E-080.4866E-090.2421E-090.1260E-09
   FAULT  14 E(NO/YR)    0.4238E-080.1931E-080.9225E-090.4597E-090.2379E-09
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APPENDIX D

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 FAULT  15 E(NO/YR)     0.1509E-080.6513E-090.2970E-090.1423E-090.7128E-10
 FAULT  16 E(NO/YR)     0.2381E-100.9645E-110.3931E-110.1604E-110.5373E-12
 FAULT  17 E(NO/YR)     0.1746E-090.7376E-100.3316E-100.1575E-100.7761E-11
 FAULT  18 E(NO/YR)     0.1778E-090.7529E-100.3374E-100.1590E-100.7577E-11
 FAULT  19 E(NO/YR)     0.2725E-110.8703E-120.2555E-120.0000E+000.0000E+00
 FAULT  20 E(NO/YR)     0.1227E-110.0000E+000.0000E+000.0000E+000.0000E+00
 TOTAL     E(NO/YR)     0.3320E-030.2131E-030.1389E-030.9182E-040.6154E-04
 TOTAL RISK             0.3319E-030.2131E-030.1389E-030.9182E-040.6154E-04

   SPECIFIED RISKS:        0.013900  0.010000  0.005000  0.002105  0.001000
   ESTIMATED LN AMP.  :     -0.983    -0.843    -0.592    -0.333    -0.145
    ESTIMATED AMP. (g):    0.37432   0.43021   0.55343   0.71699   0.86460

SADIGH ET AL. (1997) DEEP SOIL Problem #2
    AMPLITUDES (g):     0.1000E+000.2000E+000.3000E+000.4000E+000.5000E+000.6000E+000.7000E+000.8000E+000.9000E+000.1000E+01
    LN (AMPLITUDE):       -2.30     -1.61     -1.20     -0.92     -0.69     -0.51     -0.36     -0.22     -0.11      0.00
 FAULT   1 E(NO/YR)     0.2530E-020.1721E-020.1232E-020.8297E-030.5258E-030.3201E-030.1906E-030.1125E-030.6628E-040.3921E-04
 FAULT   2 E(NO/YR)     0.1356E-020.8104E-030.4502E-030.2429E-030.1310E-030.7157E-040.3983E-040.2262E-040.1311E-040.7748E-05
 FAULT   3 E(NO/YR)     0.3705E-020.2075E-020.1013E-020.4529E-030.1973E-030.8630E-040.3845E-040.1755E-040.8231E-050.3965E-05
 FAULT   4 E(NO/YR)     0.1856E-010.9309E-020.4150E-020.1791E-020.7816E-030.3506E-030.1625E-030.7791E-040.3858E-040.1969E-04
 FAULT   5 E(NO/YR)     0.4085E-020.2087E-020.9317E-030.3954E-030.1680E-030.7306E-040.3276E-040.1518E-040.7264E-050.3585E-05
 FAULT   6 E(NO/YR)     0.4643E-020.1207E-020.2952E-030.7559E-040.2085E-040.6215E-050.1992E-050.6820E-060.2478E-060.9497E-07
 FAULT   7 E(NO/YR)     0.8524E-030.1983E-030.4521E-040.1126E-040.3106E-050.9401E-060.3091E-060.1092E-060.4109E-070.1634E-07
 FAULT   8 E(NO/YR)     0.7304E-020.1328E-020.2486E-030.5247E-040.1252E-040.3330E-050.9736E-060.3090E-060.1053E-060.3820E-07
 FAULT   9 E(NO/YR)     0.3126E-020.6553E-030.1289E-030.2688E-040.6144E-050.1542E-050.4223E-060.1251E-060.3978E-070.1347E-07
 FAULT  10 E(NO/YR)     0.7126E-030.7438E-040.9284E-050.1449E-050.2733E-060.6016E-070.1504E-070.4183E-080.1273E-080.4180E-09
 FAULT  11 E(NO/YR)     0.6675E-020.2811E-020.8815E-030.2509E-030.7153E-040.2116E-040.6567E-050.2144E-050.7354E-060.2642E-06
 FAULT  12 E(NO/YR)     0.9329E-020.1089E-020.1180E-030.1468E-040.2151E-050.3665E-060.7123E-070.1553E-070.3735E-080.9783E-09
 FAULT  13 E(NO/YR)     0.5475E-020.5053E-030.4886E-040.5651E-050.7828E-060.1271E-060.2364E-070.4941E-080.1140E-080.2860E-09
 FAULT  14 E(NO/YR)     0.4215E-030.2401E-040.2195E-050.2863E-060.4839E-070.9950E-080.2386E-080.6477E-090.1943E-090.6321E-10
 FAULT  15 E(NO/YR)     0.4729E-030.2759E-040.2357E-050.2807E-060.4309E-070.8051E-080.1759E-080.4361E-090.1199E-090.3590E-10
 FAULT  16 E(NO/YR)     0.3377E-030.1112E-040.5415E-060.3862E-070.3731E-080.4580E-090.6794E-100.1157E-100.1985E-110.1073E-12
 FAULT  17 E(NO/YR)     0.1279E-030.6799E-050.5184E-060.5536E-070.7687E-080.1311E-080.2632E-090.6029E-100.1539E-100.4266E-11
 FAULT  18 E(NO/YR)     0.1053E-030.4002E-050.2720E-060.2802E-070.3890E-080.6752E-090.1392E-090.3290E-100.8592E-110.2221E-11
 FAULT  19 E(NO/YR)     0.8770E-040.1760E-050.6676E-070.4103E-080.3595E-090.4109E-100.5643E-110.7626E-120.0000E+000.0000E+00
 FAULT  20 E(NO/YR)     0.2435E-030.4382E-050.1361E-060.6758E-080.4802E-090.4463E-100.4913E-110.2318E-120.0000E+000.0000E+00
 TOTAL     E(NO/YR)     0.7015E-010.2395E-010.9558E-020.4152E-020.1921E-020.9354E-030.4746E-030.2491E-030.1346E-030.7463E-04
 TOTAL RISK             0.6774E-010.2367E-010.9513E-020.4143E-020.1919E-020.9349E-030.4745E-030.2491E-030.1346E-030.7463E-04

    AMPLITUDES (g):     0.1100E+010.1200E+010.1300E+010.1400E+010.1500E+01
    LN (AMPLITUDE):        0.10      0.18      0.26      0.34      0.41
 FAULT   1 E(NO/YR)     0.2337E-040.1405E-040.8537E-050.5243E-050.3257E-05
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APPENDIX D

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  FAULT    2 E(NO/YR)      0.4668E-050.2862E-050.1785E-050.1130E-050.7264E-06
  FAULT    3 E(NO/YR)      0.1961E-050.9945E-060.5166E-060.2744E-060.1489E-06
  FAULT    4 E(NO/YR)      0.1034E-040.5571E-050.3076E-050.1736E-050.1001E-05
  FAULT    5 E(NO/YR)      0.1822E-050.9507E-060.5087E-060.2786E-060.1559E-06
  FAULT    6 E(NO/YR)      0.3819E-070.1604E-070.7004E-080.3170E-080.1483E-08
  FAULT    7 E(NO/YR)      0.6827E-080.2980E-080.1353E-080.6361E-090.3089E-09
  FAULT    8 E(NO/YR)      0.1464E-070.5895E-080.2479E-080.1084E-080.4897E-09
  FAULT    9 E(NO/YR)      0.4828E-080.1820E-080.7187E-090.2956E-090.1260E-09
  FAULT   10 E(NO/YR)      0.1466E-090.5430E-100.2104E-100.8383E-110.3393E-11
  FAULT   11 E(NO/YR)      0.9907E-070.3866E-070.1565E-070.6551E-080.2830E-08
  FAULT   12 E(NO/YR)      0.2749E-090.8153E-100.2474E-100.2815E-110.0000E+00
  FAULT   13 E(NO/YR)      0.7655E-100.2119E-100.5359E-110.1248E-110.0000E+00
  FAULT   14 E(NO/YR)      0.2199E-100.7901E-110.1910E-110.0000E+000.0000E+00
  FAULT   15 E(NO/YR)      0.1129E-100.3279E-110.5399E-120.0000E+000.0000E+00
  FAULT   16 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
  FAULT   17 E(NO/YR)      0.1187E-110.1107E-120.0000E+000.0000E+000.0000E+00
  FAULT   18 E(NO/YR)      0.3431E-120.0000E+000.0000E+000.0000E+000.0000E+00
  FAULT   19 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
  FAULT   20 E(NO/YR)      0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00
  TOTAL      E(NO/YR)      0.4232E-040.2449E-040.1445E-040.8675E-050.5294E-05
  TOTAL RISK               0.4232E-040.2449E-040.1445E-040.8675E-050.5294E-05

    SPECIFIED RISKS:          0.013900  0.010000  0.005000  0.002105  0.001000
    ESTIMATED LN AMP.  :       -1.373    -1.226    -0.981    -0.720    -0.528
     ESTIMATED AMP. (g):      0.25342   0.29341   0.37480   0.48679   0.58985

SITE 1 COORDINATES: -118.5208  34.4153

 CAMP. & BOZ. (1997 Rev.) AL Problem #1
      AMPLITUDES (g):      0.1000E+000.2000E+000.3000E+000.4000E+000.5000E+000.6000E+000.7000E+000.8000E+000.9000E+000.1000E+01
      LN (AMPLITUDE):        -2.30      -1.61      -1.20      -0.92      -0.69      -0.51      -0.36      -0.22      -0.11       0.00
  FAULT    1 E(NO/YR)      0.3971E-020.2812E-020.2006E-020.1339E-020.8301E-030.4875E-030.2769E-030.1544E-030.8542E-040.4721E-04
  FAULT    2 E(NO/YR)      0.1959E-020.1597E-020.1232E-020.8881E-030.6010E-030.3876E-030.2422E-030.1483E-030.8990E-040.5423E-04
  FAULT    3 E(NO/YR)      0.6099E-020.3763E-020.2350E-020.1368E-020.7447E-030.3891E-030.1991E-030.1012E-030.5155E-040.2644E-04
  FAULT    4 E(NO/YR)      0.2951E-010.2202E-010.1430E-010.8323E-020.4495E-020.2327E-020.1181E-020.5962E-030.3018E-030.1540E-03
  FAULT    5 E(NO/YR)      0.6643E-020.4565E-020.2838E-020.1590E-020.8252E-030.4108E-030.2009E-030.9787E-040.4794E-040.2372E-04
  FAULT    6 E(NO/YR)      0.6855E-020.2327E-020.7001E-030.2001E-030.5778E-040.1731E-040.5433E-050.1790E-050.6183E-060.2234E-06
  FAULT    7 E(NO/YR)      0.1423E-020.4780E-030.1330E-030.3522E-040.9507E-050.2686E-050.8009E-060.2521E-060.8365E-070.2914E-07
  FAULT    8 E(NO/YR)      0.1121E-010.2723E-020.6012E-030.1362E-030.3309E-040.8701E-050.2471E-050.7540E-060.2456E-060.8487E-07
  FAULT    9 E(NO/YR)      0.4419E-020.1210E-020.2996E-030.7313E-040.1858E-040.5012E-050.1441E-050.4411E-060.1431E-060.4905E-07
  FAULT   10 E(NO/YR)      0.1243E-020.2048E-030.3553E-040.7079E-050.1617E-050.4165E-060.1189E-060.3710E-070.1249E-070.4492E-08
  FAULT   11 E(NO/YR)      0.8682E-020.4143E-020.1625E-020.5516E-030.1797E-030.5894E-040.1986E-040.6933E-050.2513E-050.9455E-06
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APPENDIX D

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FAULT  12 E(NO/YR)      0.1592E-010.3800E-020.8035E-030.1762E-030.4199E-040.1093E-040.3097E-050.9466E-060.3097E-060.1077E-06
FAULT  13 E(NO/YR)      0.9954E-020.1949E-020.3810E-030.8077E-040.1897E-040.4921E-050.1397E-050.4296E-060.1419E-060.4989E-07
FAULT  14 E(NO/YR)      0.1144E-020.1262E-030.1810E-040.3320E-050.7380E-060.1908E-060.5569E-070.1795E-070.6287E-080.2362E-08
FAULT  15 E(NO/YR)      0.9955E-030.1129E-030.1642E-040.3029E-050.6742E-060.1741E-060.5070E-070.1629E-070.5682E-080.2126E-08
FAULT  16 E(NO/YR)      0.9048E-030.1099E-030.1662E-040.3113E-050.6949E-060.1787E-060.5160E-070.1640E-070.5652E-080.2088E-08
FAULT  17 E(NO/YR)      0.2455E-030.2695E-040.3871E-050.7101E-060.1578E-060.4077E-070.1188E-070.3826E-080.1338E-080.5020E-09
FAULT  18 E(NO/YR)      0.2791E-030.2389E-040.3061E-050.5295E-060.1141E-060.2899E-070.8395E-080.2699E-080.9465E-090.3570E-09
FAULT  19 E(NO/YR)      0.3342E-030.3046E-040.4071E-050.7210E-060.1571E-060.4014E-070.1162E-070.3729E-080.1302E-080.4881E-09
FAULT  20 E(NO/YR)      0.8162E-030.7928E-040.1091E-040.1959E-050.4299E-060.1102E-060.3196E-070.1025E-070.3576E-080.1339E-08
TOTAL     E(NO/YR)      0.1126E+000.5210E-010.2738E-010.1478E-010.7861E-020.4112E-020.2135E-020.1110E-020.5807E-030.3071E-03
TOTAL RISK              0.1065E+000.5077E-010.2701E-010.1467E-010.7830E-020.4104E-020.2133E-020.1109E-020.5805E-030.3071E-03

   AMPLITUDES (g):      0.1100E+010.1200E+010.1300E+010.1400E+010.1500E+01
   LN (AMPLITUDE):         0.10       0.18       0.26       0.34       0.41
FAULT   1 E(NO/YR)      0.2618E-040.1461E-040.8217E-050.4665E-050.2675E-05
FAULT   2 E(NO/YR)      0.3270E-040.1977E-040.1200E-040.7330E-050.4506E-05
FAULT   3 E(NO/YR)      0.1370E-040.7188E-050.3820E-050.2058E-050.1124E-05
FAULT   4 E(NO/YR)      0.7947E-040.4154E-040.2201E-040.1183E-040.6449E-05
FAULT   5 E(NO/YR)      0.1190E-040.6053E-050.3128E-050.1641E-050.8747E-06
FAULT   6 E(NO/YR)      0.8415E-070.3296E-070.1338E-070.5616E-080.2431E-08
FAULT   7 E(NO/YR)      0.1063E-070.4042E-080.1598E-080.6549E-090.2775E-09
FAULT   8 E(NO/YR)      0.3095E-070.1185E-070.4742E-080.1976E-080.8544E-09
FAULT   9 E(NO/YR)      0.1767E-070.6666E-080.2624E-080.1074E-080.4554E-09
FAULT  10 E(NO/YR)      0.1712E-080.6874E-090.2889E-090.1265E-090.5744E-10
FAULT  11 E(NO/YR)      0.3688E-060.1489E-060.6207E-070.2666E-070.1178E-07
FAULT  12 E(NO/YR)      0.3957E-070.1527E-070.6158E-080.2586E-080.1126E-08
FAULT  13 E(NO/YR)      0.1856E-070.7259E-080.2971E-080.1266E-080.5600E-09
FAULT  14 E(NO/YR)      0.9427E-090.3966E-090.1747E-090.8014E-100.3810E-10
FAULT  15 E(NO/YR)      0.8450E-090.3540E-090.1553E-090.7094E-100.3360E-10
FAULT  16 E(NO/YR)      0.8187E-090.3383E-090.1464E-090.6594E-100.3075E-10
FAULT  17 E(NO/YR)      0.2001E-090.8405E-100.3698E-100.1694E-100.8044E-11
FAULT  18 E(NO/YR)      0.1433E-090.6066E-100.2688E-100.1235E-100.5789E-11
FAULT  19 E(NO/YR)      0.1946E-090.8175E-100.3592E-100.1639E-100.7706E-11
FAULT  20 E(NO/YR)      0.5328E-090.2235E-090.9808E-100.4475E-100.2106E-10
TOTAL     E(NO/YR)      0.1645E-030.8939E-040.4928E-040.2757E-040.1565E-04
TOTAL RISK              0.1645E-030.8939E-040.4928E-040.2757E-040.1565E-04

  SPECIFIED RISKS:         0.013900   0.010000   0.005000   0.002105   0.001000
  ESTIMATED LN AMP.  :      -0.897     -0.780     -0.567     -0.354     -0.204
   ESTIMATED AMP. (g):      0.40775    0.45837    0.56747    0.70189    0.81521

CAMP. & BOZ. (1997 Rev.) AL Problem #2
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   AMPLITUDES (g):     0.1000E+000.2000E+000.3000E+000.4000E+000.5000E+000.6000E+000.7000E+000.8000E+000.9000E+000.1000E+01
   LN (AMPLITUDE):       -2.30      -1.61      -1.20      -0.92      -0.69      -0.51      -0.36      -0.22      -0.11       0.00
FAULT    1 E(NO/YR)    0.2739E-020.1770E-020.1117E-020.6236E-030.3183E-030.1550E-030.7397E-040.3518E-040.1683E-040.8146E-05
FAULT    2 E(NO/YR)    0.1526E-020.1029E-020.6032E-030.3112E-030.1497E-030.6991E-040.3239E-040.1508E-040.7107E-050.3401E-05
FAULT    3 E(NO/YR)    0.3812E-020.2333E-020.1232E-020.5647E-030.2422E-030.1016E-030.4266E-040.1816E-040.7877E-050.3492E-05
FAULT    4 E(NO/YR)    0.2098E-010.1192E-010.5455E-020.2162E-020.8135E-030.3044E-030.1157E-030.4505E-040.1806E-040.7457E-05
FAULT    5 E(NO/YR)    0.4428E-020.2535E-020.1158E-020.4552E-030.1695E-030.6277E-040.2360E-040.9103E-050.3614E-050.1479E-05
FAULT    6 E(NO/YR)    0.4169E-020.9964E-030.2020E-030.4129E-040.9017E-050.2133E-050.5460E-060.1504E-060.4431E-070.1386E-07
FAULT    7 E(NO/YR)    0.7920E-030.1479E-030.2357E-040.3939E-050.7265E-060.1486E-060.3351E-070.8250E-080.2197E-080.6274E-09
FAULT    8 E(NO/YR)    0.5942E-020.8305E-030.1129E-030.1725E-040.3027E-050.6037E-060.1350E-060.3334E-070.8993E-080.2620E-08
FAULT    9 E(NO/YR)    0.2673E-020.5255E-030.9145E-040.1657E-040.3280E-050.7149E-060.1708E-060.4435E-070.1242E-070.3723E-08
FAULT   10 E(NO/YR)    0.5252E-030.4366E-040.4579E-050.6203E-060.1038E-060.2060E-070.4700E-080.1204E-080.3399E-090.1043E-09
FAULT   11 E(NO/YR)    0.7091E-020.3976E-020.1709E-020.6339E-030.2244E-030.7946E-040.2871E-040.1068E-040.4103E-050.1629E-05
FAULT   12 E(NO/YR)    0.1040E-010.1782E-020.2805E-030.4865E-040.9558E-050.2112E-050.5186E-060.1396E-060.4070E-070.1274E-07
FAULT   13 E(NO/YR)    0.6750E-020.1035E-020.1627E-030.2892E-040.5873E-050.1346E-050.3430E-060.9582E-070.2902E-070.9430E-08
FAULT   14 E(NO/YR)    0.2674E-030.1184E-040.9363E-060.1105E-060.1731E-070.3347E-080.7614E-090.1973E-090.5684E-100.1751E-10
FAULT   15 E(NO/YR)    0.3105E-030.1681E-040.1494E-050.1908E-060.3169E-070.6413E-080.1514E-080.4049E-090.1199E-090.3858E-10
FAULT   16 E(NO/YR)    0.4733E-030.3810E-040.4304E-050.6464E-060.1208E-060.2676E-070.6794E-080.1928E-080.6008E-090.2025E-09
FAULT   17 E(NO/YR)    0.8513E-040.4880E-050.4538E-060.6024E-070.1034E-070.2154E-080.5222E-090.1430E-090.4326E-100.1422E-10
FAULT   18 E(NO/YR)    0.6560E-040.2642E-050.2101E-060.2564E-070.4195E-080.8496E-090.2026E-090.5493E-100.1644E-100.5284E-11
FAULT   19 E(NO/YR)    0.1428E-030.8307E-050.8205E-060.1158E-060.2105E-070.4621E-080.1175E-080.3363E-090.1060E-090.3615E-10
FAULT   20 E(NO/YR)    0.4473E-030.3169E-040.3508E-050.5346E-060.1029E-060.2361E-070.6226E-080.1837E-080.5945E-090.2079E-09
TOTAL      E(NO/YR)    0.7362E-010.2904E-010.1216E-010.4909E-020.1950E-020.7802E-030.3188E-030.1337E-030.5773E-040.2565E-04
TOTAL RISK             0.7098E-010.2862E-010.1209E-010.4897E-020.1948E-020.7799E-030.3187E-030.1337E-030.5773E-040.2565E-04

   AMPLITUDES (g):     0.1100E+010.1200E+010.1300E+010.1400E+010.1500E+01
   LN (AMPLITUDE):        0.10       0.18       0.26       0.34       0.41
FAULT    1 E(NO/YR)    0.3998E-050.1993E-050.1010E-050.5202E-060.2724E-06
FAULT    2 E(NO/YR)    0.1656E-050.8208E-060.4143E-060.2128E-060.1112E-06
FAULT    3 E(NO/YR)    0.1584E-050.7351E-060.3488E-060.1691E-060.8369E-07
FAULT    4 E(NO/YR)    0.3170E-050.1387E-050.6232E-060.2873E-060.1356E-06
FAULT    5 E(NO/YR)    0.6234E-060.2705E-060.1206E-060.5518E-070.2587E-07
FAULT    6 E(NO/YR)    0.4581E-080.1590E-080.5771E-090.2175E-090.8431E-10
FAULT    7 E(NO/YR)    0.1907E-090.6132E-100.2060E-100.7085E-110.2416E-11
FAULT    8 E(NO/YR)    0.8176E-090.2709E-090.9321E-100.3195E-100.1005E-10
FAULT    9 E(NO/YR)    0.1186E-080.3994E-090.1412E-090.5188E-100.1928E-10
FAULT   10 E(NO/YR)    0.3432E-100.1185E-100.4001E-110.1172E-110.1600E-12
FAULT   11 E(NO/YR)    0.6675E-060.2821E-060.1227E-060.5486E-070.2516E-07
FAULT   12 E(NO/YR)    0.4248E-080.1497E-080.5540E-090.2139E-090.8333E-10
FAULT   13 E(NO/YR)    0.3262E-080.1193E-080.4578E-090.1833E-090.7535E-10
FAULT   14 E(NO/YR)    0.5506E-110.1100E-110.0000E+000.0000E+000.0000E+00
FAULT   15 E(NO/YR)    0.1317E-100.4468E-110.1052E-110.0000E+000.0000E+00
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 FAULT  16 E(NO/YR)       0.7292E-100.2779E-100.1107E-100.4344E-110.1520E-11
 FAULT  17 E(NO/YR)       0.4994E-110.1816E-110.5749E-120.1307E-120.0000E+00
 FAULT  18 E(NO/YR)       0.1752E-110.5545E-120.0000E+000.0000E+000.0000E+00
 FAULT  19 E(NO/YR)       0.1316E-100.4993E-110.1952E-110.7101E-120.1296E-12
 FAULT  20 E(NO/YR)       0.7761E-100.3056E-100.1253E-100.5222E-110.1990E-11
 TOTAL     E(NO/YR)       0.1171E-040.5493E-050.2641E-050.1300E-050.6543E-06
 TOTAL RISK               0.1171E-040.5493E-050.2641E-050.1300E-050.6543E-06

   SPECIFIED RISKS:         0.013900  0.010000  0.005000  0.002105  0.001000
   ESTIMATED LN AMP.  :      -1.270    -1.144    -0.923    -0.712    -0.560
    ESTIMATED AMP. (g):     0.28095   0.31869   0.39737   0.49069   0.57101
-------------------------------------------------
 CLOSEST DISTANCES BETWEEN SITE AND FAULT RUPTURES
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 NO.        FAULT NAME                 CD_1DRP  CD_2DRP   CDIST   CLODIS   CD_EPI  CD_HYPO
 ---------------------------------------------------------------------------------------
   1 SAN GABRIEL                           0.2      0.2     3.0      0.2      0.2      1.3 km
   2 HOLSER                                2.5      2.5     4.4      2.5      3.7      3.8 km
   3 NORTHRIDGE (E. Oak Ridge)             8.7      8.7    10.0     10.0      9.5     11.1 km
   4 SANTA SUSANA                         10.4      1.0     8.4      8.4      1.6      8.5 km
   5 SIERRA MADRE (San Fernando)          13.1      4.0     9.7      9.7      5.1     10.2 km
   6 OAK RIDGE (Onshore)                  18.6     18.6    19.0     18.6     19.8     19.9 km
   7 VERDUGO                              19.5     17.3    18.4     18.4     18.4     19.5 km
   8 SAN CAYETANO                         22.3     22.3    23.5     22.3     23.5     23.5 km
   9 SIERRA MADRE                         25.8     20.8    23.4     23.4     22.0     24.3 km
  10 SIMI-SANTA ROSA                      29.0     28.6    29.0     29.0     29.7     30.1 km
  11 SAN ANDREAS - 1857 Rupture           29.4     29.4    29.5     29.4     29.4     29.4 km
  12 SAN ANDREAS - Mojave                 29.4     29.4    29.5     29.4     29.4     29.4 km
  13 SAN ANDREAS - Carrizo                31.8     31.8    31.9     31.8     32.1     32.1 km
  14 HOLLYWOOD                            37.7     32.9    35.4     35.4     33.2     35.4 km
  15 SANTA MONICA                         38.5     35.2    37.3     37.3     35.8     37.6 km
  16 SANTA YNEZ (East)                    40.1     38.5    39.8     39.8     39.4     40.6 km
  17 MALIBU COAST                         42.6     39.2    41.1     41.1     39.5     41.1 km
  18 RAYMOND                              42.6     39.8    41.6     41.6     40.7     42.2 km
  19 NEWPORT-INGLEWOOD (L.A.Basin)        44.6     44.6    44.7     44.6     45.6     45.6 km
  20 PALOS VERDES                         49.4     49.4    49.5     49.4     50.1     50.1 km
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 EXPLANATION
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CD_1DRP = Closest distance to projection of rupture area along fault trace.
CD_2DRP = Closest distance to surface projection of the rupture area.
CDIST = Closest distance to seismogenic rupture.
CLODIS = Closest distance to subsurface rupture.
CD_EPI = Closest epicentral distance.
CD_HYPO = Closest hypocentral distance.

APPENDIX D

SUMMARY OF CALCULATED ACCELERATIONS

Unweighted Accelerations (g)

Attenuation Relationship	Return Period Evaluated				
	72	100	200	475	1000
Boore et al. (1997)	0.36026	0.41797	0.54445	**0.71526**	0.87072
Sadigh et al. (1997)	0.37432	0.43021	0.55343	**0.71699**	0.86460
Campbell & Bozorgnia (1997)	0.40775	0.45837	0.56747	**0.70189**	0.81521
Average	0.38	0.44	0.56	**0.71**	0.85

Accelerations (g) Weighted for a 7.5 Magnitude

Attenuation Relationship	Return Period Evaluated				
	72	100	200	475	1000
Boore et al. (1997)	0.24598	0.28718	0.37444	**0.49394**	0.60320
Sadigh et al. (1997)	0.25342	0.29341	0.37480	**0.48679**	0.58985
Campbell & Bozorgnia (1997)	0.28095	0.31869	0.39737	**049069**	0.57101
Average	0.26	0.30	0.38	**0.49**	0.59

Appendix E

APPENDIX E

RECOMMENDED EARTHWORK SPECIFICATIONS

The following specifications are recommended to provide a basis for quality control during the placement of compacted fill or backfill as applicable.

1. Areas that are to receive compacted fill shall be observed by Allan E. Seward Engineering Geology, Inc. (AES) prior to the placement of fill.

2. All drainage devices shall be properly installed and observed by AES and/or owner's representative(s) prior to placement of backfill.

3. Fill soils shall consist of imported soils or on-site soils free of organics, cobbles, and deleterious material provided each material is approved by AESEGI. AESEGI shall evaluate and/or test the import material for its conformance with the report recommendations prior to its delivery to the site. The contractor shall notify AESEGI 72 hours prior to importing material to the site.

4. Fill shall be placed in controlled layers (lifts), the thickness of which is compatible with the type of compaction equipment used. The fill materials shall be brought to optimum moisture content or above, thoroughly mixed during spreading to obtain a near uniform moisture condition and uniform blend of materials, and then placed in layers with a thickness (loose) not exceeding 8 inches. Each layer shall be compacted to a minimum compaction of 90% relative to the maximum dry density determined per the latest ASTM D1557 test. Density testing shall be performed by AESEGI to verify relative compaction. The contractor shall provide proper access and level areas for testing.

5. Rocks or rock fragments less than eight (8) inches in the largest dimension may be utilized in the fill, provided they are not placed in concentrated pockets, except rocks larger than four (4) inches shall not be placed within three (3) feet of finish grade.

   Rocks greater than eight (8) inches in largest dimension shall be taken offsite, or placed in accordance with the recommendation of the Soils Engineer in areas designated as suitable for rock disposal.

6. Where space limitations do not allow for conventional fill compaction operations, special backfill materials and procedures may be required. Pea gravel or other select

fill can be used in areas of limited space. A sand and portland cement slurry (2 sacks per cubic-yard mix) shall be used in limited space areas for shallow backfill near final pad grade, and pea gravel shall be placed in deeper backfill near drainage systems.

7. AES shall observe the placement of fill and conduct in-place field density tests on the compacted fill to check for adequate moisture content and the required relative compaction. Where less than specified relative compaction is indicated, additional compacting effort shall be applied and the soil moisture conditioned as necessary until adequate relative compaction is attained.

8. The Contractor shall comply with the minimum relative compaction out to the finish slope face of fill slopes, buttresses, and stabilization fills as set forth in the specifications for compacted fill. This may be achieved by overbuilding the slope and cutting back as necessary.

9. Any abandoned underground structures such as cesspools, cisterns, mining shafts, tunnels, septic tanks, wells, pipelines or others not discovered prior to grading are to be removed or treated to the satisfaction of the Soils Engineer and/or the controlling agency for the project.

10. The Contractor shall have suitable and sufficient equipment during a particular operation to handle the volume of fill being placed. When necessary, fill placement equipment shall be shut down temporarily in order to permit proper compaction of fills, correction of deficient areas, or to facilitate required field testing.

11. The Contractor shall be responsible for the satisfactory completion of all earthwork in accordance with the project plans and specifications.

12. Final reports shall be submitted after completion of earthwork and after the Soils Engineer and Engineering Geologist have finished their observations of the work. No additional excavation or filling shall be performed without prior notification to the Soils Engineer and/or Engineering Geologist.

13. Whenever the words "supervision", "inspection" or "control" are used, they shall mean <u>observation</u> of the work and/or testing of the compacted fill by AESEGI to assess whether substantial compliance with plans, specifications and design concepts has been achieved, and does not include direction of the actual work of the contractor or the contractor's workmen.

APPENDIX E

RECOMMENDED SPECIFICATIONS FOR PLACEMENT OF TRENCH BACKFILL

1. Trench excavations to receive backfill shall be free of trash, debris or other unsatisfactory materials prior to backfill placement, and shall be observed by Allan E. Seward Engineering Geology, Inc. (AESEGI) representative.

2. Except as stipulated herein, soils obtained from the excavation may be used as backfill if they are essentially free of organics and deleterious materials.

   Rocks generated from the trench excavation not exceeding three (3) inches in largest dimension may be used as backfill material. However, such material may not be placed within 12 inches of the top of the pipeline. No more than 30 percent of the backfill volume shall contain particles larger than 1 ½ inches in diameter, and rocks shall be well mixed with finer soil.

3. Soils (other than aggregates) with a Sand Equivalent (SE) greater than or equal to 30, as determined by ASTM D 2419 Standard Test Method or at the discretion of the engineer or representative in the field, may be used for bedding and shading material in the pipe zone areas. These soils are considered satisfactory for compaction by jetting procedures.

4. No jetting will be permitted in utility trenches within the top 2 feet of the subgrade of concrete slabs-on-grade.

5. Trench backfill other than bedding and shading shall be compacted by mechanical methods as tamping sheepsfoot, vibrating or pneumatic rollers or other mechanical tampers to achieve the density specified herein. The backfill materials shall be brought to optimum moisture content or above, thoroughly mixed during spreading to obtain a near uniform moisture condition and uniform blend of materials, and then placed in horizontal layers with a thickness (loose) not exceeding 8 inches. Trench backfills shall be compacted to a minimum compaction of 90 percent relative to the maximum dry density determined per the latest ASTM D1557 test.

6. The contractor shall select the equipment and process to be used to achieve the specified density without damage to the pipeline, the adjacent ground, existing improvements or completed work.

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7. Observations and field tests shall be carried on during construction by AES to confirm that the required degree of compaction has been obtained. Where compaction is less than that specified, additional compaction effort shall be made with adjustment of the moisture content as necessary until the specified compaction is obtained. Field density tests may be omitted at the discretion of the engineer or his representative in the field.

8. Whenever, in the opinion of AES or the Owner's Representative(s), an unstable condition is being created, either by cutting or filling, the work shall not proceed until an investigation has been made and the excavation plan revised, if deemed necessary.

9. Fill material shall not be placed, spread, or rolled during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations shall not be resumed until field tests by AES indicate the moisture content and density of the fill are as specified.

10. Whenever the words "supervision", "inspection", or "control" are used, they shall mean <u>observation</u> of the work and/or testing of the compacted fill by AESEGI to assess whether substantial compliance with plans, specifications and design concepts has been achieved.

APPENDIX E

DRAINAGE AND EROSION CONTROL RECOMMENDATIONS

Slopes and pads on this project were designed to direct surficial runoff away from structures and reduce water-induced surficial erosion/sloughing. Permanent erosion control measures should be initiated immediately following completion of grading. All constructed slopes will undergo some erosion when subjected to sustained water influx. To maintain appropriate long-term drainage and erosion control, the following points should be considered in slope protection, landscaping, irrigation and modifications to slopes, pads and structures:

1. All interceptor ditches, drainage terraces, down-drains and any other drainage devices should be maintained and kept clear of debris. A qualified Engineer should review any proposed additions or revisions to these systems, to evaluate their impact on slope erosion.

2. Retaining walls should have adequate freeboard to provide a catchment area for minor slope erosion. Periodic inspection, and if necessary, cleanout of deposited soil and debris should be performed; particularly during and after periods of rainfall.

3. The future developers should be made aware of the **potential problems**, which may develop **when drainage is altered** through landscaping and/or construction of retaining walls, and paved walkways. Ponded water, water directed over slope faces, leaking irrigation systems, **overwatering** or other conditions which could lead to excessive soil moisture, **must be avoided.**

4. Slope surficial soils may be subject to water-induced mass erosion. Therefore, a suitable proportion of slope planting should have root systems, which will develop well below three feet. We suggest consideration of drought-resistant shrubs and low trees for this purpose. Intervening areas can then be planted with lightweight surface plants with shallower root systems. All plants should be lightweight and require low moisture. Any loose slough generated during the process of planting should be properly removed from the slope face(s).

5. Construction delays, climate/weather conditions, and plant growth rates may be such that additional short-term, nonplant erosion control measures may be needed; examples would be matting, netting, plastic sheets, deep (5-feet) staking, etc.

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6. Major erosion can be initiated by seemingly insignificant events; rodent burrowing, human trespass (footprints, etc.), small concentrations of uncontrolled surface/subsurface water; or poor compaction of utility trench backfill on slopes.

7. High and/or fluctuating water content in slope materials is a major factor in slope erosion and/or slope failures. Therefore, all possible precautions should be taken to maintain a moderate and uniform soil moisture. Slope irrigation systems should be properly operated and maintained and system controls should be placed under strict control.

EROSION CONTROL REFERENCES

1. "Slope Protection for Residential Developments", National Academy of Sciences, Washington D.C. (1969).

2. "Guide for Erosion and Debris Control in Hillside Areas", Department of Building and Safety, City of Los Angeles. (1970).

3. "Slope Stability Report", Orange County Department of Building and Safety (1973).

4. "Guides for Erosion and Sediment Control", Soil Conservation Service, Davis, California, U.S. Department of Agriculture (1977).

5. "Rain-Care and Protection of Hillside Homes", brochure undated, published by Building and Safety Division, Los Angeles County Engineer.

6. "Guidelines for Erosion and Sediment Control Planning and Implementation: Office of Research and Monitoring", U.S. Environmental Protection Agency (1972).

7. "Resource Conservation Glossary", Soil Conservation Society of America (1970).

8. "Standards and Specifications for Soil Erosion and Sediment Control Developing Areas", Soil Conservation Service, U.S. Department of Agriculture (1975).

9. "Homeowners Guide for Debris and Erosion Control", Los Angeles County Flood Control District (undated).

APPENDIX E

10. "Grading Guidelines (8 pages, stapled sheets)", Building and Safety Division, Department of County Engineer, County of Los Angeles (undated, but probably about 1977).

11. "Biotechnical Slope Protection and Erosion Control", Donald H. Gray and Andrew T. Leiser, Robert E. Krieger Publishing Company, Malabuv, Florida, 1989.

APPENDIX E

CONSTRUCTION DIAGRAMS

MINIMUM FOUNDATION AND SLAB RECOMMENDATIONS FOR EXPANSIVE SOILS
(ONE-, TWO-, AND THREE-STORY BUILDINGS)

Minimum Residential Footing Recommendations

EXPANSION CLASSIFICATION (UBC)	EXPANSION INDEX (UBC)	FOOTING DEPTHS (INCHES)				CONTINUOUS FOOTING REINFORCEMENT
		One and Two Stories		Three Stories		
		PERIMETER	INTERIOR	PERIMETER	INTERIOR	
Very Low	0 to 20	18	12	24	18	Per structural requirements
Low	21 to 50	18	12	24	18	One # 4 Rebar Top and Bottom
Medium	51 to 90	24	18	30	24	One # 4 Rebar Top and Bottom
High	91 to 130	30	18	36	30	Two # 4 Rebars Top and Bottom

- Minimum footing widths: 12 inches (one-story); 15 inches (two-story); 18 inches (three-story); 24 inches for individual columns.
- All footing depths are measured below lowest adjacent final grade.
- The base of the garage door grade beam should be at the same elevation as that of the adjoining footings.
- Garage slabs should be isolated from stem wall footings with a minimum 3/8" felt expansion joint.
- Isolated exterior structural column footings should be tied back to the main foundation system in at least two (2) orthogonal directions (conventional foundations only).

Minimum Residential Slab Recommendations

EXPANSION CLASSIFICATION (UBC)	EXPANSION INDEX (UBC)	*SLAB SUBGRADE* PRESOAKING	*SLAB REINFORCEMENT*		*MINIMUM* Slab Thickness (REF: PCA)
			OPTION 1	OPTION 2	
Very Low	0 to 20	None	#3 Rebar at 24" each way	6-#6 gauge, 10"x10" welded wire mesh or equivalent	4 inches
Low	21 to 50	120 percent of optimum moisture content[1] to 18 inches depth	#3 Rebar at 18" each way		
Medium	51 to 90	130 percent of optimum moisture content to 18 inches depth	#4 Rebar at 18" each way	#6-#6 gauge, 6"x6" welded wire mesh or equivalent	5 inches
High	91 to 130	140 percent of optimum moisture content to 24 inches depth	#4 Rebar at 14" each way		6 inches

- Concrete for floor slabs should conform to the requirements contained in Chapter 19 of the 1997 edition of the Uniform Building Code.

Minimum Residential Slab Recommendations continued on back of this page

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[1] Optimum moisture content as determined by ASTM D1557 Test Method on subgrade soils.

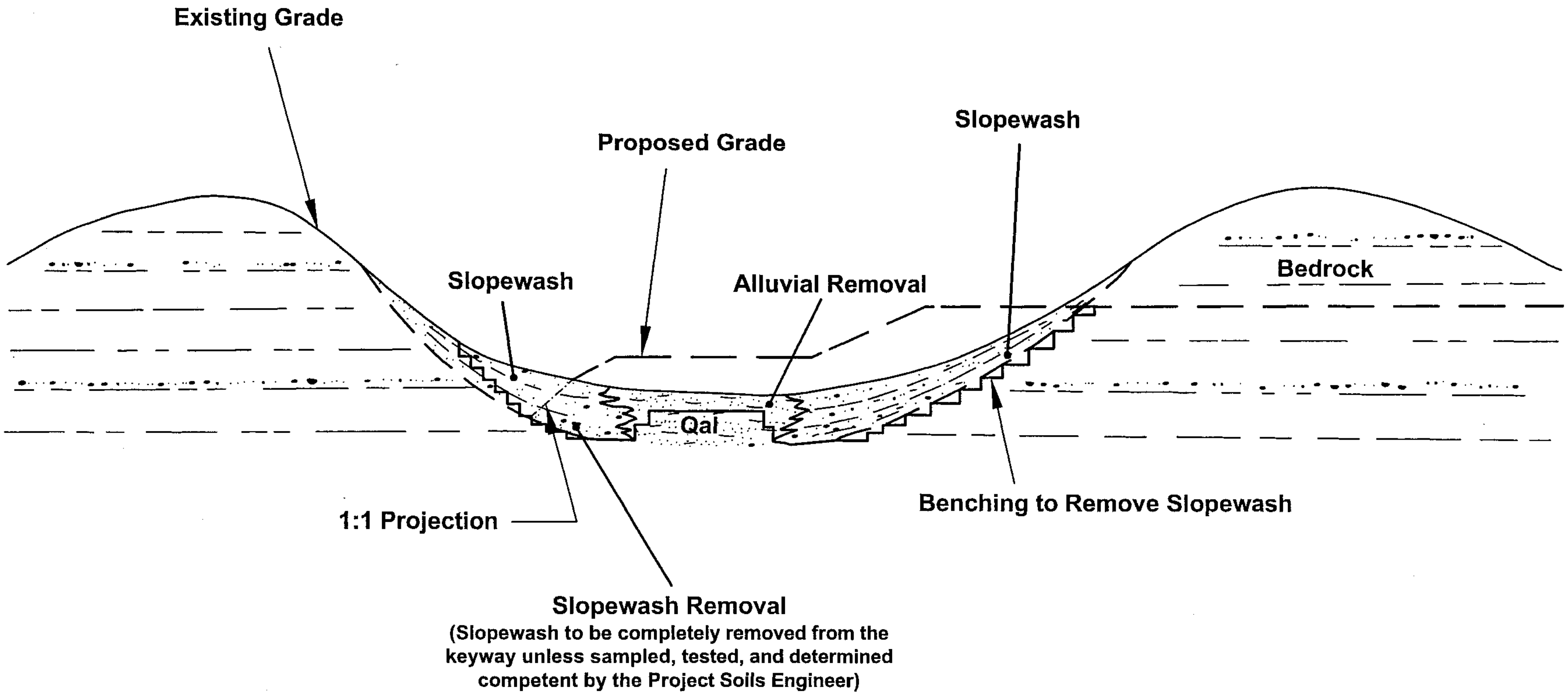
MINIMUM FOUNDATION AND SLAB RECOMMENDATIONS FOR EXPANSIVE SOILS
(ONE-, TWO-, AND THREE-STORY BUILDINGS)

Minimum Residential Slab Recommendations (continued from front side of this page)

- Sand base should have a Sand Equivalent of 30 or greater (e.g., washed concrete sand).
- Interior area slabs, except garages may be tied to the footings as directed by the Structural Engineer. For Medium and High Expansion Potential subgrades, dowels of No. 3 bars should be placed at 36 inches on centers in the footings and bent 3 feet into the slab.
- It has been observed that welded wire-fabric reinforcement seldom stays at the design height within concrete slabs. We recommend the use of No. 3 reinforcing bars instead of 6x6-10/10 WWF and No. 4 reinforcing bars instead of 6x6-6/6 WWF at the center spacings indicated above.
- Vapor barrier for slabs-on-grade: A sheet of 10-mil visqueen sandwiched between two, 2-inch layers of compacted sand. The vapor barrier must be properly lapped and/or sealed, and sealed around all plumbing structures and other openings. Care should be taken to avoid punctures in the vapor barrier resulting from sharp objects in the subgrade and/or structures. Equivalents are acceptable.
- To reduce moisture intrusion beneath slabs on grade, utility trenches should be backfilled with lean concrete or concrete slurry at foundation perimeters. The plug shall be under the full width of the footing and be extended along a minimum of 24-inch of trench length below the slab.
- Materials from foundation and/or utility trench excavations should not be spread on slab-on-grade areas unless it is compacted and tested.
- Foundation excavations should be observed by a representative of this firm prior to placement of forms, reinforcement, or concrete, to verify that the excavations are embedded to the recommended depth into the recommended material. The excavations should be moisture-conditioned and free of all loose or sloughed material prior to placement of concrete.
- Foundations and floor slabs supported on subsoils with an expansion index greater than 130 should be individually engineered based on actual details of the foundation system.

Post-Tensioned Slabs

As an alternative to conventional foundations, buildings may be supported on post-tensioned slabs, to be designed by a structural engineer in consultation with the geotechnical engineer. In addition, a post-tensioned slab is also recommended for VERY HIGH expansion potential soils (Expansion Index greater than 130), if encountered. Post-tensioned slabs should have footings embedded a minimum of 12 inches below the lowest adjacent grade. The slabs should be designed so that they can be deformed approximately 1 inch vertically over a width of 30 feet without distress in the event of shrinkage or swelling of the supporting soils. The slab should be underlain by a vapor barrier sandwiched between two, 2-inch layers of compacted sand.



Note: Not to Scale

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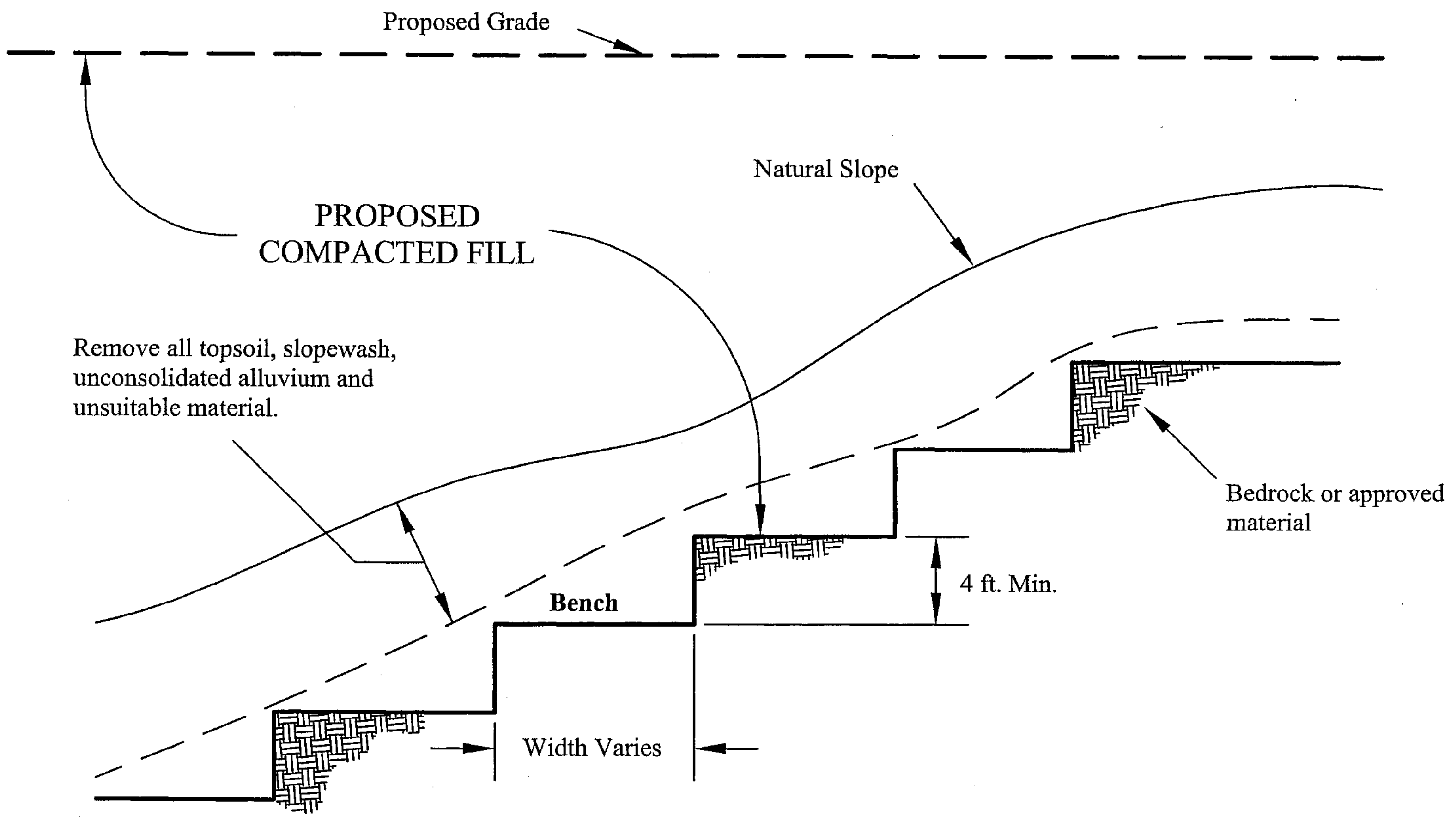
SCHEMATIC ALLUVIAL/ SLOPEWASH DETAIL

Job No.: 03-1571-4
Date: 4/4/03 *Figure:* E1



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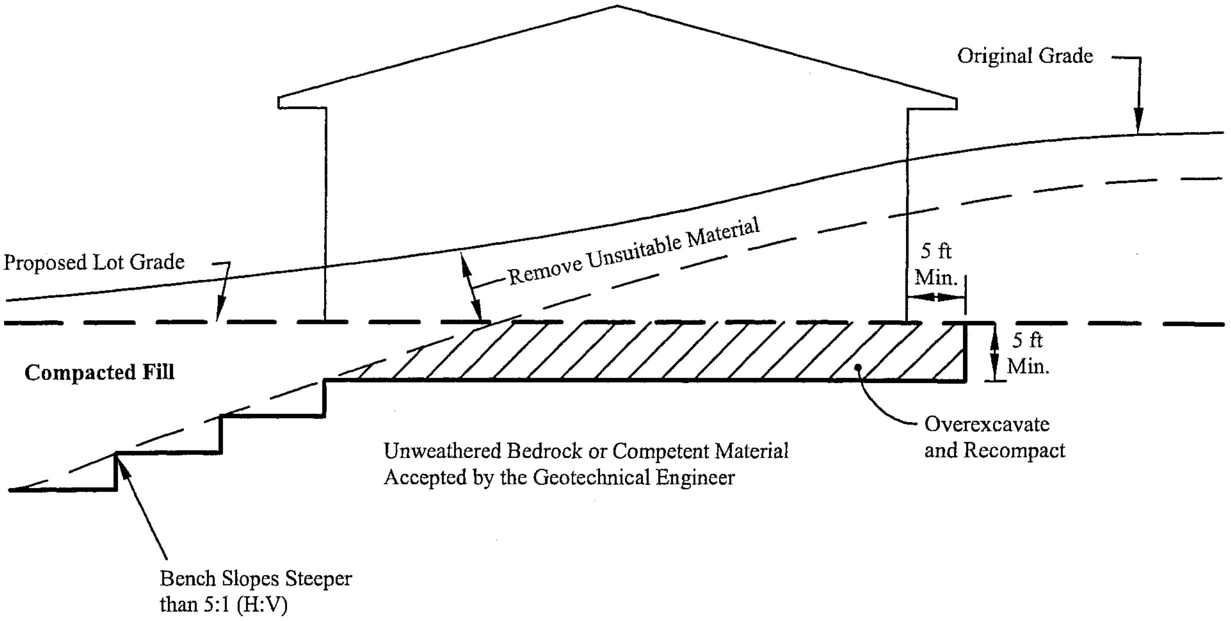
FILL OVER NATURAL SLOPE 5:1 OR STEEPER

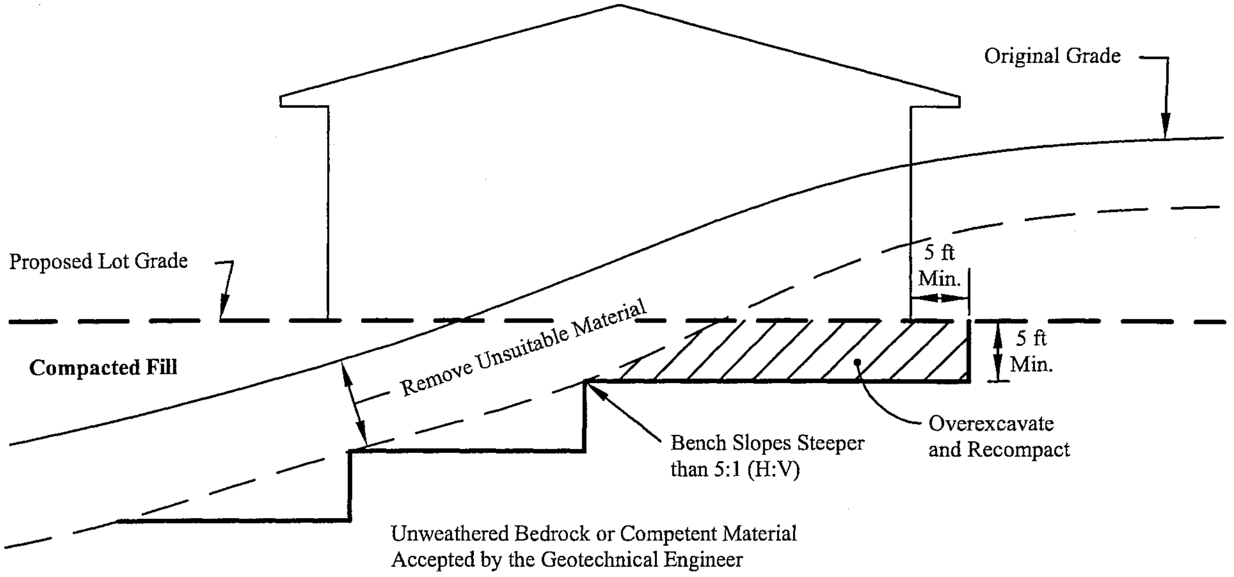
Job No.: 03-1571-4

Date: 4/4/03 *Figure:* E2

Cut Lot



Cut Fill Lot



NOTE: Deeper Overexcavation and/or Additional Foundation Reinforcement may be Required by the Soils Engineer in Steep Cut/Fill Transition Areas (See Text)

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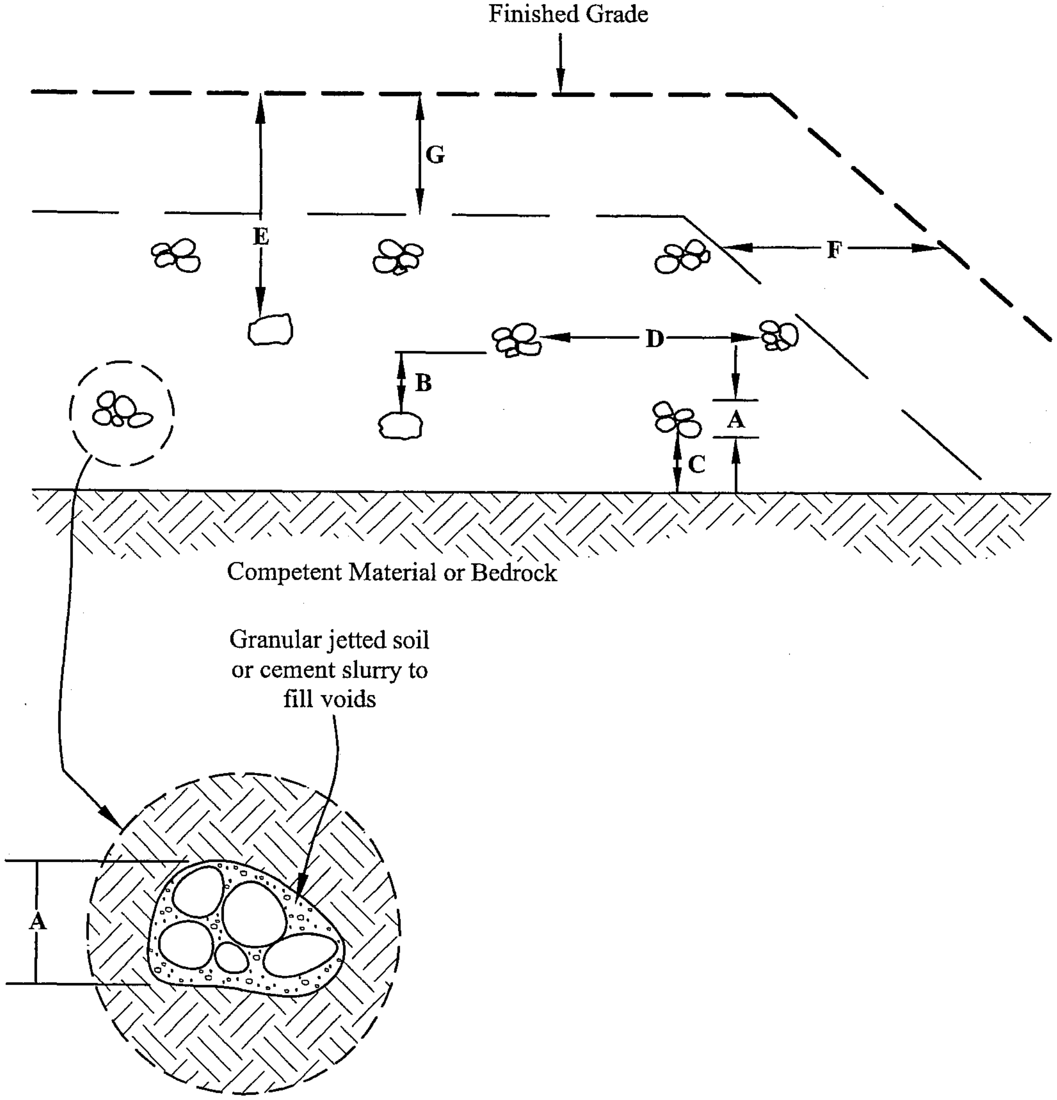
CUT LOT AND CUT FILL LOT(TRANSITIONAL)

Job No.: 03-1571-4

Date: 4/4/03 *Figure:* E3



EXPLANATION

A) ±4 ft, Height and Width may vary depending on rock size

B) Minimum of 4 ft from stagger windrow

C) Minimum of 5 ft from first set of windrow to competent material or bedrock

D) Minimum of 15 ft between windrows

E) Minimum of 23 ft from oversized rocks (> 4 ft in its largest dimension) to finished subgrade;all oversized rocks must be individually placed

F) Minimum of 25 ft from projected windrow area to finished subgrade

G) Minimum of 15 ft to clear for foundations and pools or 5 ft below the deepest adjacent utility trench, whichever is deepest

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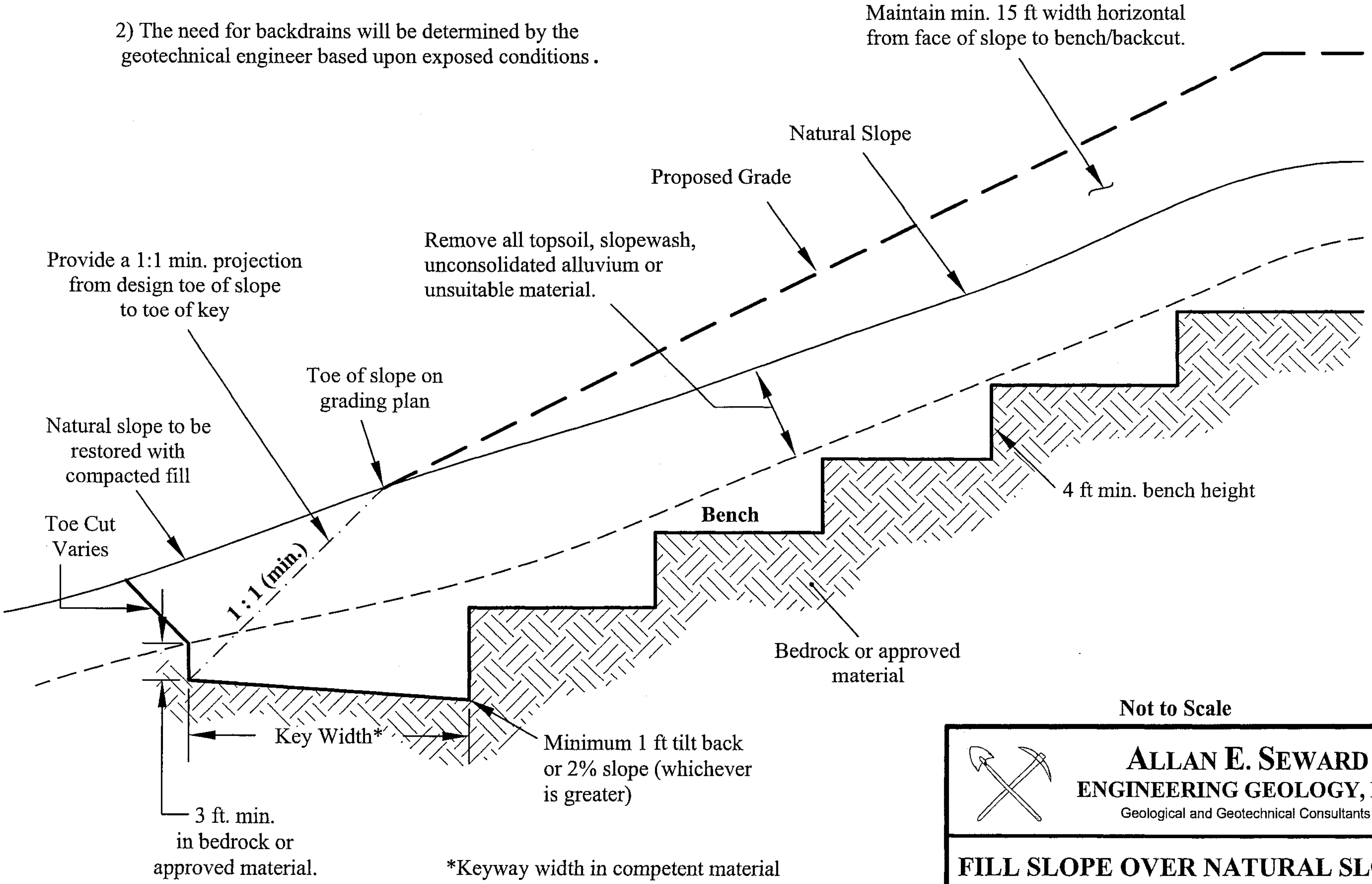
ROCK DISPOSAL (WINDROWS)

Job No.: 03-1571-4

Date: 4/4/03 *Figure:* E4

NOTE: 1) Where the natural slope approches or exceeds the design slope ratio, special recommendations will be provided by the geotechnical engineer.

2) The need for backdrains will be determined by the geotechnical engineer based upon exposed conditions.



*Keyway width in competent material minimum of 15 ft or as recommended by the Geotechnical Engineer.

Not to Scale

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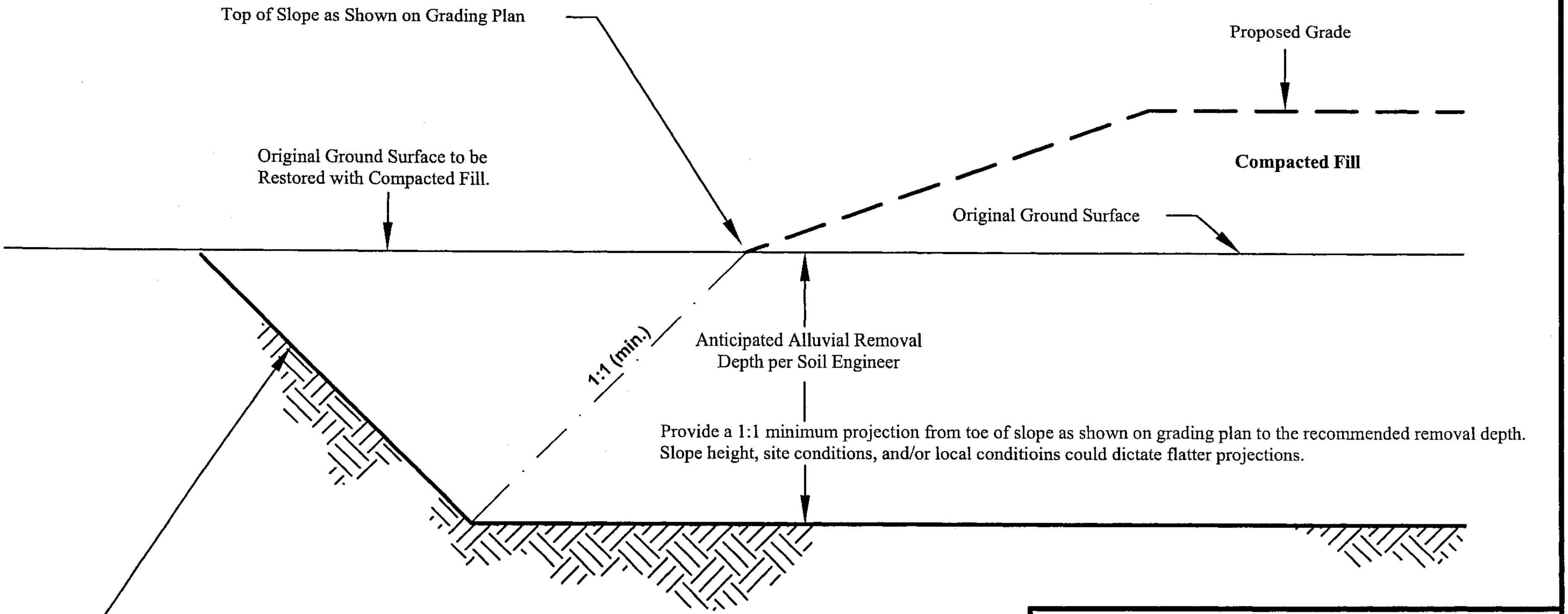
FILL SLOPE OVER NATURAL SLOPE 5:1 OR STEEPER

Job No.: 03-1571-4

Date: 4/4/03

Figure: E5



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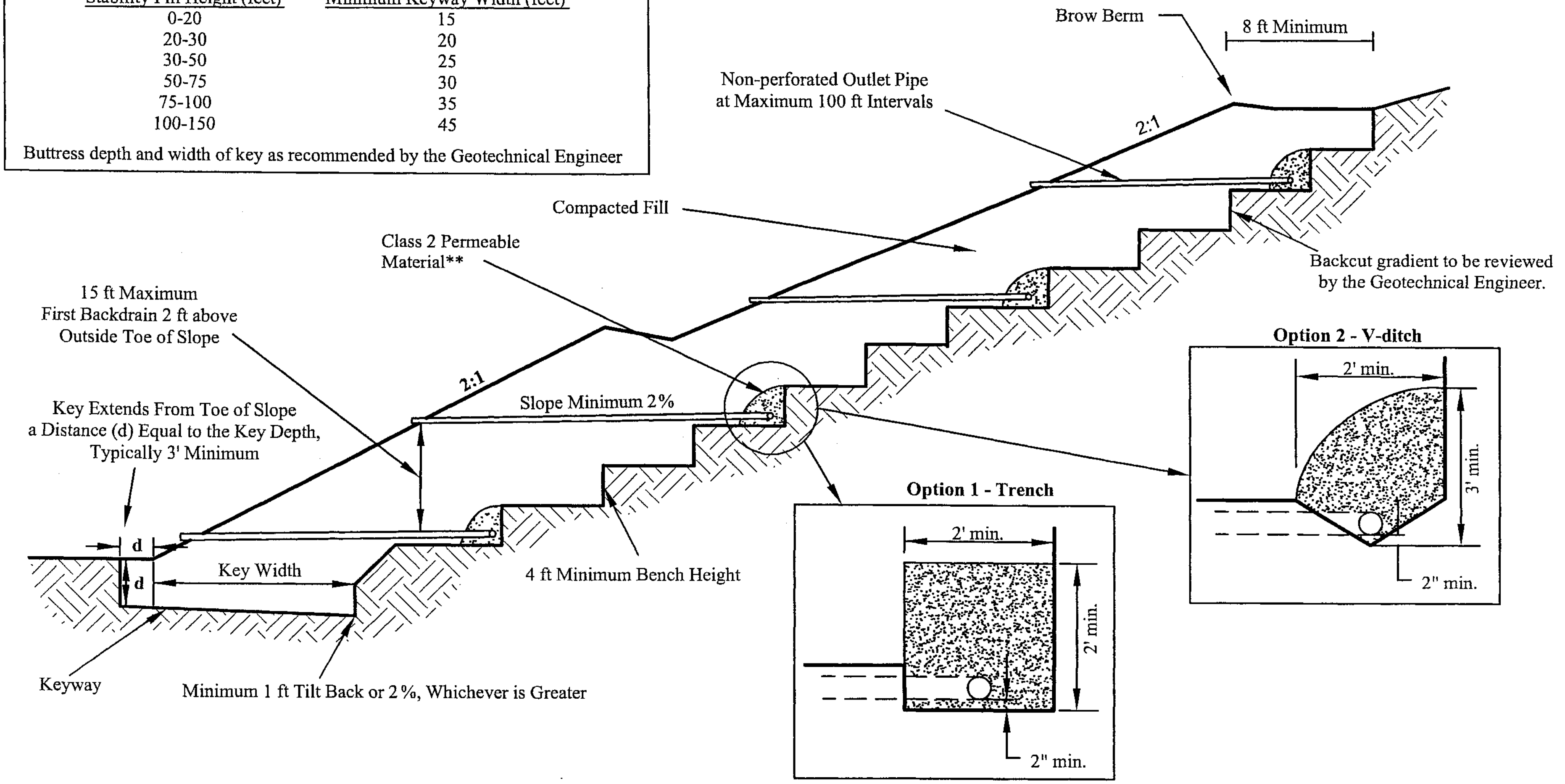
FILL SLOPE TOEING OUT ON FLAT ALLUVIATED CANYON

Job No.: 03-1571-4
Date: 4/4/03
Figure: E6

Standard Keyway Width vs. Slope Height for Stability Fill

Stability Fill Height (feet)	Minimum Keyway Width (feet)
0-20	15
20-30	20
30-50	25
50-75	30
75-100	35
100-150	45

Buttress depth and width of key as recommended by the Geotechnical Engineer



All backdrains and outlet pipes to be 4" diameter PVC pipe (SDR 35 or Schedule 40); Backdrain Perforations positioned down; Upper ends of backdrains to be sealed with an approved cap.

**Specifications for CalTrans Class 2 Permeable Material

U.S. Standard Sieve Size	% Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

Sand Equivalent >75

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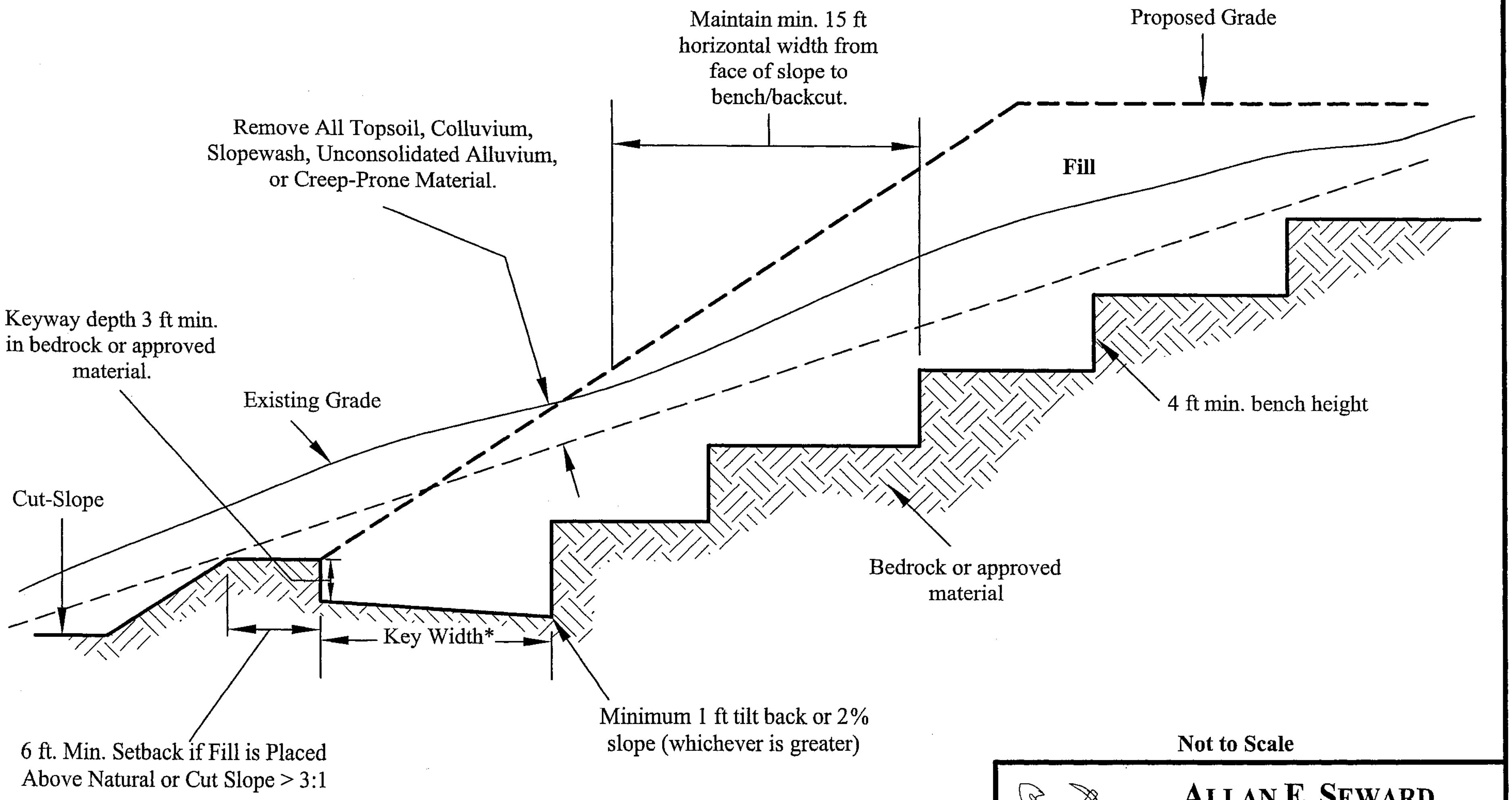
STABILITY/BUTTRESS FILL AND BACKDRAINS

Job No.: 03-1571-4

Date: 4/4/03 *Figure:* E7



*Keyway width in competent material minimum of 15 ft. or as recommended by Geotechnical Engineer.

Not to Scale

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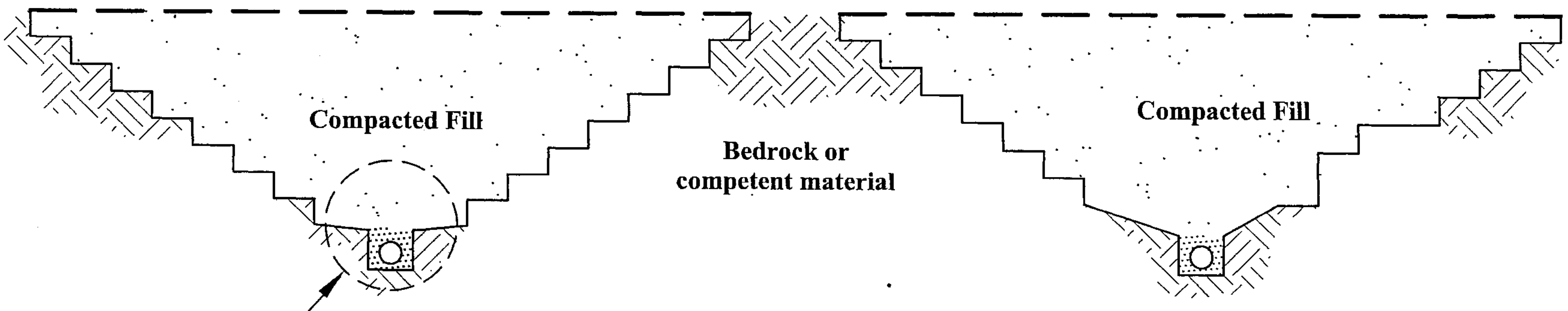
TYPICAL FILL ABOVE CUT-SLOPE

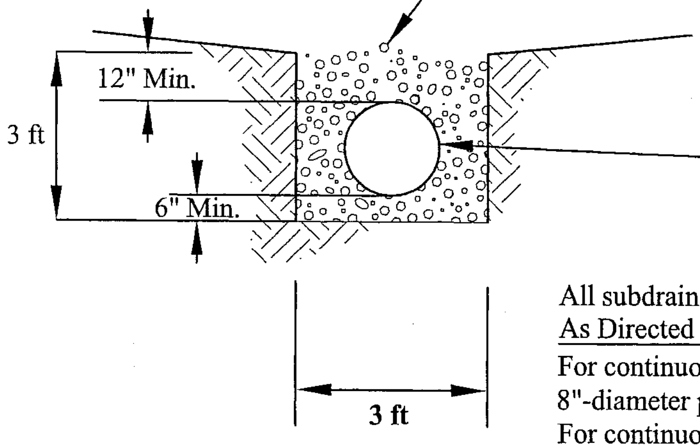
Job No.: 03-1571-4

Date: 4/4/03 *Figure:* E8



See enlargement
below (typ.)

9 cubic feet per linear foot of perforated
pipe of Class 2 Permeable material as
specified in Sec. 68-1.025 of the State
of California, Dept. of Transportation
Standard Spec.



All subdrains to be PVC pipe (SDR 35 or Schedule 40)
<u>As Directed by the Soils Engineer:</u>
For continuous run in excess of 500 ft, use 8"-diameter pipe
For continuous run in excess of 1500 ft, use 10"-diameter pipe

Notes:
Downstream 20 feet minimum of pipe at outlet shall be non-perforated.
Drain pipe perforations shall be 1/4" diameter open holes in two rows along the bottom quarter of pipe.
Center to center spacing between perforations in each row shall not exceed 12 inches.
Subdrain perforations positioned down.
Remove all unsuitable material before placing any fill.
Upslope end of pipe should be capped with an approved cap*.
Minimum 2% gradient.

* Endpoints and long runs should be surveyed

Not to scale

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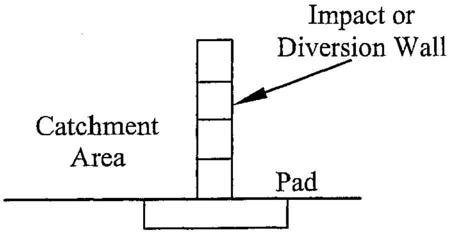
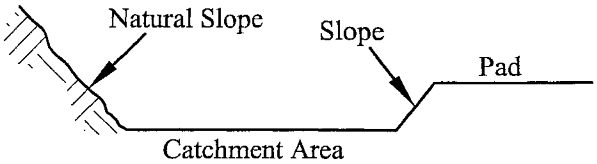
CANYON SUBDRAIN DETAIL

Job No.: 03-1571-4
Date: 4/4/03
Figure: E9

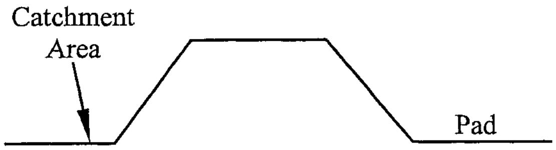




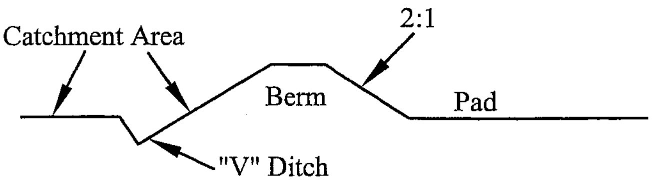
NOTE: Not to scale

ALTERNATIVE DEBRIS CONTROL DEVICES

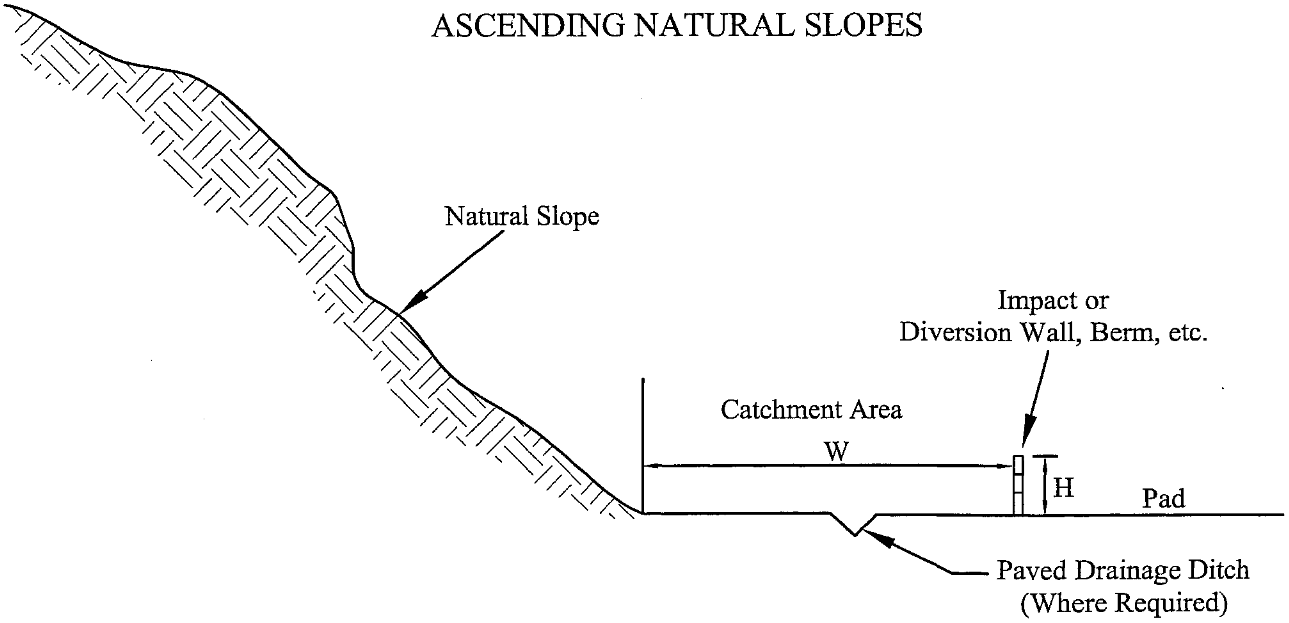
Earth Berm



Earth Berm and Trench
(For Rockfall)



ASCENDING NATURAL SLOPES



NOTE: W and H will vary according to natural slope
height, gradient, and material

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DEBRIS FLOW HAZARD CONTROL DEVICES

Job No.: 03-1571-4	
Date: 4/4/03	*Figure:* E10

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GEOLOGIC AND GEOTECHNICAL REPORT

Review of Tentative Tract Map (Dated February 25, 2003)
Tentative Tract 53425
River Park
City of Santa Clarita, California

VOLUME II OF II

Prepared for:

Newhall Land
23823 West Valencia Boulevard
Valencia, California 91355

Job No: 03-1571-4
Dated April 4, 2003

Appendix F

APPENDIX F

SLOPE STABILITY ANALYSES

Introduction

Analyses were performed to evaluate the stability of proposed cut and fill slopes, critical natural slopes proposed to remain adjacent to the development and landslide areas which may impact the proposed development. The stability analyses utilized cross sections constructed to illustrate critical structural geometries and maximum slope heights for each analyzed slope. Our evaluation included gross and surficial stability and static and pseudostatic (i.e. with an imposed pseudostatic simulated load) conditions were considered for gross stability. Based on our analyses, the need for stabilization measures was explored and dimensional design of these measures was performed, as needed, in a step-by-step fashion utilizing computer-based numerical slope stability analyses. The results of our stability analyses are summarized in Table F1 along with slope parameters and recommended mitigations. Slope stability diagrams graphically illustrating the results of our analyses for each cross section are attached for review.

Summary of Slope Conditions Analyzed

Natural slopes evaluated for this investigation include ridgelines and riverbank areas proposed to remain above the Santa Clara River. Cross Sections 3-3’, 5-5’, 6-6’ and 7-7’, illustrate the anticipated conditions at critical ridgeline areas. Cross Sections 13-13’, 16-16’ through 18-18’, and 23-23’ illustrate the anticipated critical conditions where development is proposed along the Santa Clara riverbank. Cross Section 21-21’ illustrates the anticipated conditions where the development is proposed above a natural slope area within the proposed park site.

Calculated factors of safety and recommended mitigation measures are presented in **Table F1** for review. For general description of the geologic/geotechnical conditions, see Section 9.2.11 within the text portion of the report. A 20-foot Building Setback, based on geologic and geotechnical judgment is recommended for Lots 388 through 393, adjacent to the steep natural riverbank slope located below proposed cut-slope CS-10.

The three dimensional geometry of critical cut-slopes are illustrated on Cross Sections 1-1’, 2-2’, 4-4’, 8-8’, 9-9’, 11-11’ through 15-15’, 17-17’, 18-18’, 22-22’, 23-23’, 28-28’, through 31-31’. The results of our stability analyses of these cross sections are presented in **Table F1**. Mitigation measures including buttresses and stability fills have been recommended as

APPENDIX F

needed to provide factors of safety which meet City of Santa Clarita standards as summarized in
Table F1.

The highest proposed fill slope is 80 feet in height as illustrated on Cross Section 20-20'. This fill slope calculates as grossly stable per City of Santa Clarita standards.

Fourteen (14) landslides have been mapped on the subject site. The three-dimensional geometry of the anticipated conditions are illustrated on Cross Sections 4-4', 8-8', 9-9', 10-10', 23-23', 24-24', 27-27'and 28-28'. Stability analyses have been performed on Landslides Qls-5b and Qls-6 (Cross Sections 9-9' and 10-10') only. The results of our stability analyses of these cross sections are presented in **Table F1**. Mitigation measures including complete removal, buttress fills, partial removal and placement into a Restricted Use Area are discussed in the Landslide Summary (**Table 1**) located after the References.

Surficial stability analysis of fill slopes utilizing the "infinite slope" method for this site was performed and is included at the end of Table F1. All permanent cut-slopes exposing terrace deposits or alluvium should be constructed as Stability Fills.

Geometry and Groundwater

As shown on the respective cross sections, the analyzed geometries of cut-slopes and natural slopes included removal of vegetation, topsoil, artificial fill, alluvium, landslide debris and bedrock materials and adding certified compacted fill to achieve the proposed grades, or remedial grades as needed on portions of the slopes. Analyses included cross-bedding and potential adverse bedding with dips ranging from neutral to **17 degrees** depending on geologic data obtained near each cross section listed in **Table F1.**

Review of ground water data in the vicinity and trench and boring log data indicates that the proposed cut-slopes in bedrock are above historic high ground water levels. Perched ground water was observed within the terrace deposits and Saugus formation bedrock within our Bucket Auger Borings BA-1 through BA-6, BA-8, BA-12 and BA-13 at the elevated portions of the site. Where appropriate, ground water was modeled in the slope stability analyses. Where rapid drawdown conditions were expectable adjacent to planned debris basins, those conditions were included in the analyses. Backdrains are proposed for all Stability Fill/Buttress slopes.

APPENDIX F

Shear Strength Parameters

A total of 19 direct shear strength tests were performed for this project. Individual Direct Shear test results are presented in **Appendix B**. Data used in our analyses are summarized in the below table:

Table F2 - Summary of Design Shear Strength Values

MATERIAL	PEAK		RESIDUAL		UNIT WT. (PCF)
	COHESION (psf)	PHI ϕ	COHESION (psf)	PHI ϕ	
Landslide Debris (Qls)	100	26°	100	26°	125
Landslide Plane (Qls)	300	8.5°	300	8.5°	130
Bedrock (TQs), Along Siltstone Bedding	500	21°	450	19°	130
Bedrock (TQs), Along Claystone Bedding[1]	450	16°	250	14.5°	130
Bedrock (TQs), Cross-Bedding	500	43°	400	38°	130
Compacted Fill (Cef)	250	29°	250	29°	130
Alluvium (Qal)	50	28°	50	28°	120
Terrace Deposits (Qt)	50	34°	50	34°	120

During our subsurface investigation for the project we encountered an in-place claystone bedding plane within Bucket-Auger Boring BA-7 located within the CLWA property just north of Landslide Qls-5a. This in-place claystone bedding unit is the basal landslide plane for Landslides Qls-5a, Qls-5b, Qls-6 and possibly Qls-9. This claystone bedding plane was hand sampled using industry standard brass rings oriented perpendicular to the bedding plane and sheared down-dip in our laboratory to obtain shear strength values. Projection of this claystone bedding plane unit and review of the Tentative Tract Map design elevations indicates that this unit does not encounter or project into the vicinity of proposed cut-slopes for this project. North of Landslide Qls-9 this claystone unit is interpreted to be above the proposed grade indicated on the Tentative Map. Based on our subsurface borings and test pits, the site is predominantly coarse-grained. However, the conservative residual shear strength along Saugus Formation siltstone bedding is used in our slope stability evaluation of the site.

In our analyses, residual shear strengths of bedrock and recent alluvium were used for static gross stability while peak strengths were used for pseudostatic gross stability. The weighted

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[1] This bedding plane strength was not used in the analyses, as discussed (see text).

APPENDIX F

average of peak shear strengths of new compacted fill materials was used for slope stability analyses.

The following attachments are located within this Appendix.

Slope Stability Analyses Results	Table F1
Slope Stability Diagrams and Data Sheets for Runs 1 through 46	

APPENDIX F

SLOPE STABILITY ANALYSES RESULTS

Run No.	File Name	Cross Section	Slope Condition Analyzed	Factor of Safety [1]		Comments
				Static	Pseudostatic (Coeff=0.15)	
1	T1S1A	1	CS-1, 86' 2:1 Cut on 120' Bedrock Ridge w RUA	1.76	1.30	Grossly stable as designed
2	T2S1A	2	CS-1 on TQs Ridge with RUA, Cut to Elev 1333 and Fill to El 1210	1.57	~	Grossly stable as designed
3	T3S1A	3	TQs Ridge Cut to Elev 1310 with RUA and Fill to El 1237	1.60	1.32	Grossly stable as designed
4	T4S1A	4	CS-2 on TQs Ridge with RUA, Cut to Elev 1310 and Complete Removal and Replacement of Qls-1 at toe	1.86	~	Grossly stable as designed
5	T5S1A	5	TQs Ridge with RUA, Cut to Elev 1310 and Fill to El 1232	1.67	1.33	Grossly stable as designed
6	T6S1A	6	TQs Ridge with RUA, Cut to Elev 1304 and Removal and Replacement of Qls at toe	1.69	1.36	Grossly stable as designed
7	T7S1A	7	TQs Ridge with RUA, Cut to Elev 1291 and Removal and Replacement of Qls at toe	1.86	1.52	Grossly stable as designed
8	T8S1B	8	CS-6; 20 ft Stability Fill on 28 ft cut	1.84	~	Grossly stable with remedial grading
9	T8S2B	8	CS-7; 20 ft Stability Fill on 21 ft cut	1.87	~	Grossly stable with remedial grading
10	T9S1A	9	Proposed Pad Cut to Elev 1268 in Park Along Canyon Sidewall, at toe of landslide Qls-5b	1.26	0.71	Proposed slope is Grossly Unstable.
11	T9S1C	9	150 ft W x 45 ft D Buttress Below Elev 1268 Cut in Park Site Along Canyon Sidewall, at toe of landslide Qls-5b	2.18	1.11	Grossly stable with remedial grading.

APPENDIX F

SLOPE STABILITY ANALYSES RESULTS

Run No.	File Name	Cross Section	Slope Condition Analyzed	Factor of Safety [1]		Comments
				Static	Pseudostatic (Coeff=0.15)	
12	T10S1A	10	Existing Newhall Ranch Rd Fill on Bedrock Cut Above Unstable Park Site	1.97	1.10	Grossly stable as designed
13	T10S2A	10	Existing Qls-6 Slope across Park Site and into Canyon with Cut for Park Trail	1.58	0.77	Proposed slope is Grossly Unstable Under Pseudo-Static Condition.
14	T11S1A	11	CS-15; As Designed	1.48	~	Proposed slope is Grossly Unstable
15	T11S1B	11	CS-15; 40 ft Buttress on 51 ft cut	1.63	1.31	Grossly stable with remedial grading
16	T11S2B	11	CS-13; 20 ft Stability Fill on 24 ft cut	2.67	~	Grossly stable with remedial grading
17	T11S3B	11	CS-12, 20 ft Stability Fill on TQs cut	1.99	~	Grossly stable with remedial grading
18	T11S4A	11	CS-11 As Designed	1.44	~	Grossly unstable without remedial grading
19	T11S4B	11	CS-11; 80 ft Buttress on 70 ft cut	1.63	1.18	Grossly stable with remedial grading
20	T12S1A	12	CS-15 As Designed	1.60	1.18	Grossly stable as designed
21	T12S1B	12	CS-15; 30 Stability Fill on 54 ft cut	1.81	~	Grossly stable with remedial grading
22	T13S1A	13	CS-15; As Designed	1.08	~	Proposed slope is Grossly Unstable
23	T13S1B	13	CS-15; 95 ft Buttress on 87 ft cut	1.54	1.18	Grossly stable with remedial grading
24	T13S2A	13	Elev 1356 Daylight Cut on Existing Slope with 15 ft Paseo Walkway at toe	1.54	1.17	Grossly stable as designed
25	T14S1B	14	CS-15; 80 ft Buttress on 85 ft cut	1.64	1.20	Grossly stable with remedial grading
26	T14S2A	14	CS-13 As Designed	1.81	~	Grossly stable as designed
27	T14S2B	14	CS-13; 30 ft Stability Fill on 51 ft cut	1.98	~	Grossly stable with remedial grading
28	T15S1A	15	CS-16 As Designed	1.83	~	Grossly stable as designed

APPENDIX F

SLOPE STABILITY ANALYSES RESULTS

Run No.	File Name	Cross Section	Slope Condition Analyzed	Factor of Safety [1]		Comments
				Static	Pseudostatic (Coeff=0.15)	
29	T15S1A	15	CS-16; 25 ft Stability Fill on 33 ft cut with Rapid Drawdown of Adjacent Basin	1.76	1.38	Grossly stable with remedial grading
30	T15S2A	15	CS-17 As Designed	1.39	~	Grossly unstable without remedial grading
31	T15S2B	15	CS-17; 30 ft Buttress on 69 ft Fill over Cut	1.73	1.32	Grossly stable with remedial grading
32	T16SA	16	49 ft River Bank after pad cut to Elev 1268 and Bike Trail cut with Stability Fill on CS-10	1.60	1.39	Grossly stable with structural setback
33	T17S1A	17	44 ft River Bank after pad cut to Elev 1270 and Bike Trail cut with Stability Fill on CS-10	2.08	~	Grossly stable with structural setback
34	T18S1A	18	46 ft River Bank after pad cut to Elev 1265 and Bike Trail cut	1.96	~	Grossly stable with structural setback
35	T20S1A	20	80 ft 2:1 fill slope (highest proposed on site); circular arc search through toe	1.63	1.14	Grossly stable as designed
36	T20S2A	20	25 ft Stability Fill on CS-16	1.65	1.15	Grossly stable with remedial grading
37	T21S1A	21	Elev 1300 Daylight Cut of Qt/TQs above Canyon Sidewall	1.52	1.39	Grossly stable as designed
38	T22S1B	22	CS-7; 25 ft Stability Fill on 33 ft cut	1.80	1.33	Grossly stable with remedial grading
39	T23S1A	23	CS-13 and CS-14 As Designed	1.42	0.94	Grossly Unstable without remedial grading
40	T23S1A	23	CS-13 and CS-14 with 150 ft W x 24 ft D Buttress on 103 ft cut on TQs	1.65	1.13	Grossly stable with remedial grading
41	T28S1A	28	CS-2 and Complete Qls Removal on TQs Ridge with RUA and Elev 1310 Cut	1.80	1.36	Grossly stable as designed

APPENDIX F

SLOPE STABILITY ANALYSES RESULTS

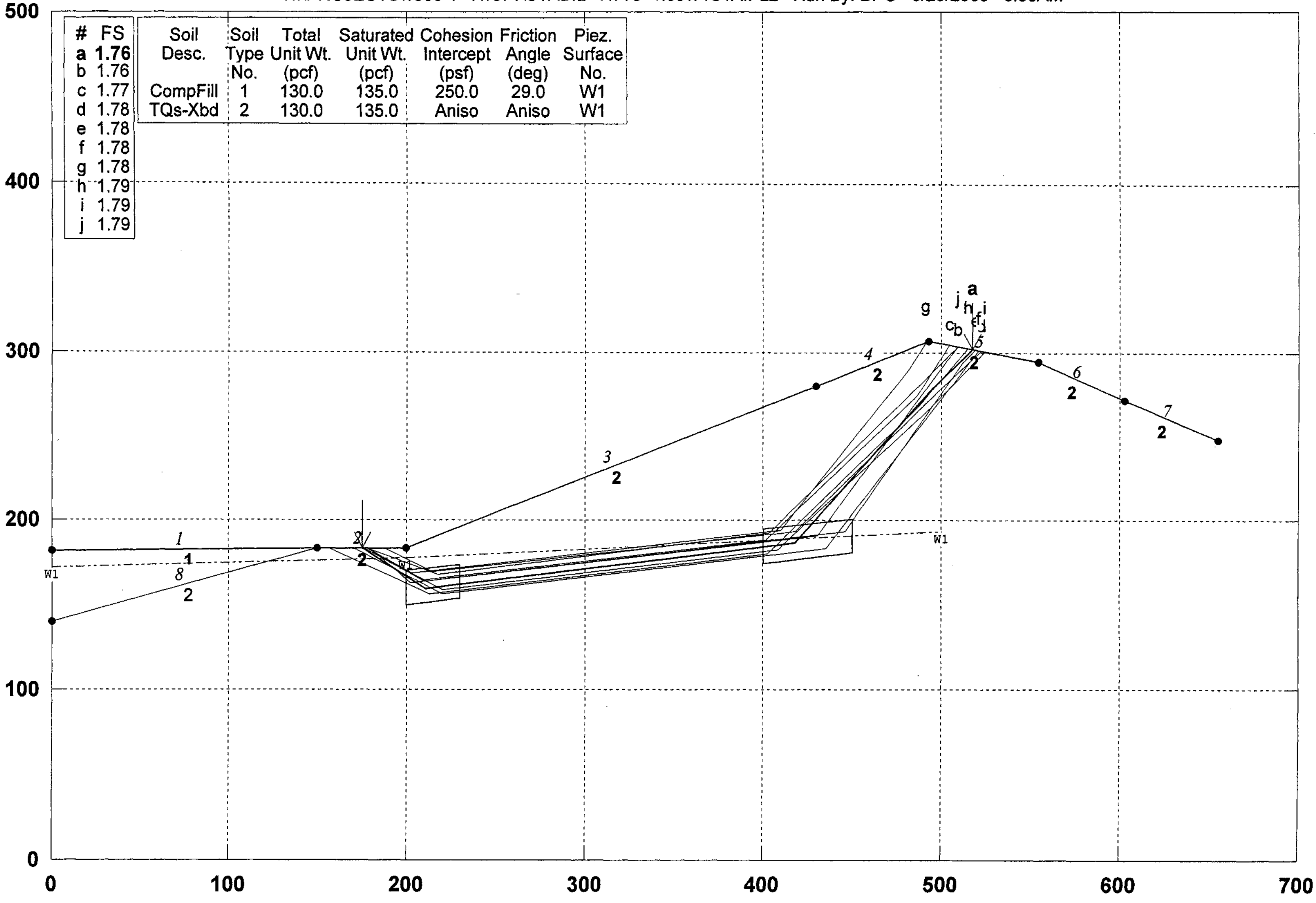
Run No.	File Name	Cross Section	Slope Condition Analyzed	Factor of Safety [1]		Comments
				Static	Pseudostatic (Coeff=0.15)	
42	T29S1A	29	CS-3 on TQs Ridge with RUA and Elev 1333 Cut	1.65	1.32	Grossly stable as designed
43	T30S1A	30	CS-8 As Designed on Qt/TQs Cut	1.89	~	Grossly stable as designed
44	T30S1B	30	CS-8 with 25′ Stability Fill on Qt/TQs	1.74	1.28	Grossly stable with remedial grading
45	T31S1A	31	CS-16 on Qt/TQs with Stability Fill on toe of 155′ TQs Ridge	1.67	1.20	Grossly stable with remedial grading
46	FILL SLOPE	~	Surficial Stability of Infinite Fill Slope with Surficial Saturation	1.65	~	Surficially stable as designed

The above results for static conditions are based upon site-specific shear strength characteristics tabulated in Table F2. These shear strengths were developed based on the direct shear test results presented on Table B2 of "Summary of Shear Strength Test Data"in Appendix B. Residual shear strength values were used for all existing natural materials under static load. Peak shear strength values were used for bedrock, terrace deposits, landslide debris and recent alluvium for pseudostatic loads and for planned compacted fill under both static and pseudostatic loads.

Appendix G

TT53425; 1-1', CS-1; 120' TQs Ridge wit h Elev 1183 Fill+Cut Pad; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T1S1A.PL2 Run By: BPG 3/25/2003 8:53AM



#	FS
a	**1.76**
b	1.76
c	1.77
d	1.78
e	1.78
f	1.78
g	1.78
h	1.79
i	1.79
j	1.79

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.76

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #1

```
                        ** PCSTABL5M **
                              by
                        Purdue University
                   --Slope Stability Analysis--
              Simplified Janbu, Simplified Bishop
                 or Spencer`s Method of Slices
 Run Date:                 3/25/2003
 Time of Run:              8:53AM
 Run By:                   BPG
 Input Data Filename:      N:t1s1a.in
 Output Filename:          N:t1s1a.OUT
 Unit:                     ENGLISH
 Plotted Output Filename:  N:t1s1a.PLT
 PROBLEM DESCRIPTION    TT53425; 1-1', CS-1; 120' TQs Ridge wit
                        h Elev 1183 Fill+Cut Pad; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

     7 Top   Boundaries
     8 Total Boundaries
 Boundary      X-Left     Y-Left     X-Right     Y-Right     Soil Type
    No.         (ft)       (ft)        (ft)        (ft)      Below Bnd
     1           .00      182.00      150.00      183.00         1
     2        150.00      183.00      200.00      183.00         2
     3        200.00      183.00      430.00      280.00         2
     4        430.00      280.00      493.00      307.00         2
     5        493.00      307.00      554.00      295.00         2
     6        554.00      295.00      603.00      272.00         2
     7        603.00      272.00      655.00      248.00         2
     8           .00      140.00      150.00      183.00         2
ISOTROPIC SOIL PARAMETERS
  2 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   130.0    135.0     250.0     29.0     .00        .0       1
   2   130.0    135.0     400.0     38.0     .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  2 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit     Intercept      Angle
    No.             (deg)            (psf)        (deg)
     1               6.5             400.0         38.0
     2               7.5             450.0         19.0
     3              90.0             400.0         38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  3 Coordinate Points
   Point      X-Water     Y-Water
    No.         (ft)        (ft)
     1           .00      172.00
     2        200.00      178.00
     3        500.00      193.00
 Janbus Empirical Coef is being used for the case of  c & phi both > 0
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 500 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 120.0
 Box        X-Left     Y-Left     X-Right     Y-Right       Height
 No.         (ft)       (ft)        (ft)        (ft)         (ft)
  1         200.00     160.00      230.00      163.68       20.00
```

RUN #1

```
 2        400.00     184.56     450.00     190.70      20.00
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       183.96      183.00
    2       214.90      165.88
    3       439.94      193.04
    4       442.93      285.54
Factor Of Safety For The Preceding Specified Surface =  3.728
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       196.42      183.00
    2       224.92      157.70
    3       405.86      185.38
    4       408.89      271.10
Factor Of Safety For The Preceding Specified Surface =  5.909
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       161.36      183.00
    2       217.37      162.95
    3       407.54      188.41
    4       409.92      271.53
Factor Of Safety For The Preceding Specified Surface =  6.368
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       198.95      183.00
    2       228.63      163.31
    3       432.26      187.64
    4       435.07      282.17
Factor Of Safety For The Preceding Specified Surface =  4.090
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       192.43      183.00
    2       229.81      160.08
    3       443.31      199.10
    4       444.95      286.41
Factor Of Safety For The Preceding Specified Surface =  5.692
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       173.85      183.00
    2       213.66      157.35
    3       431.14      192.29
    4       434.20      281.80
Factor Of Safety For The Preceding Specified Surface =  5.442
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        70.99      182.47
```

RUN #1

```
      2         106.35      174.79
      3         224.91      156.23
      4         449.89      192.09
      5         450.97      288.99
  Factor Of Safety For The Preceding Specified Surface =  6.935
  Factor Of Safety Calculation Has Gone Through Ten Iterations
  The Trial Failure Surface In Question Is Defined
  By The Following  4 Coordinate Points
    Point       X-Surf      Y-Surf
     No.         (ft)        (ft)
      1         198.46      183.00
      2         221.14      160.33
      3         431.70      179.97
      4         434.97      282.13
  Factor Of Safety For The Preceding Specified Surface =  7.003
  Factor Of Safety Calculation Has Gone Through Ten Iterations
  The Trial Failure Surface In Question Is Defined
  By The Following  4 Coordinate Points
    Point       X-Surf      Y-Surf
     No.         (ft)        (ft)
      1         208.63      186.64
      2         225.98      170.94
      3         421.40      178.25
      4         422.01      276.63
  Factor Of Safety For The Preceding Specified Surface = 16.298
  Factor Of Safety Calculation Has Gone Through Ten Iterations
  The Trial Failure Surface In Question Is Defined
  By The Following  4 Coordinate Points
    Point       X-Surf      Y-Surf
     No.         (ft)        (ft)
      1         200.66      183.28
      2         228.75      166.84
      3         427.77      186.23
      4         432.29      280.98
  Factor Of Safety For The Preceding Specified Surface =  6.089
  Following Are Displayed The Ten Most Critical Of The Trial
        Failure Surfaces Examined.  They Are Ordered - Most Critical
        First.
        * * Safety Factors Are Calculated By The Modified Janbu Method * *
        Failure Surface Specified By  5 Coordinate Points
          Point       X-Surf      Y-Surf
           No.         (ft)        (ft)
            1         175.46      183.00
            2         210.08      159.68
            3         418.15      186.90
            4         495.18      278.91
            5         517.08      302.26
              ***     1.763     ***
           Individual data on the     9  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     8.2   2910.4       .0       .0        .0      .0       .0      .0      .0
  2    16.4  23918.1       .0   7099.8        .0      .0       .0      .0      .0
  3    10.1  29665.7       .0  11496.5        .0      .0       .0      .0      .0
  4   208.1 ********       .0  *******        .0      .0       .0      .0      .0
  5     1.8  19898.8       .0    170.1        .0      .0       .0      .0      .0
  6    10.1 108783.9       .0       .0        .0      .0       .0      .0      .0
  7    63.0 448959.6       .0       .0        .0      .0       .0      .0      .0
  8     2.2   8283.9       .0       .0        .0      .0       .0      .0      .0
  9    21.9  39371.0       .0       .0        .0      .0       .0      .0      .0
```

RUN #1

TT53425; 1-1', CS-1; 120' TQs Ridge wit h Elev 1183 Fill+Cut Pad; Pseudo-Static

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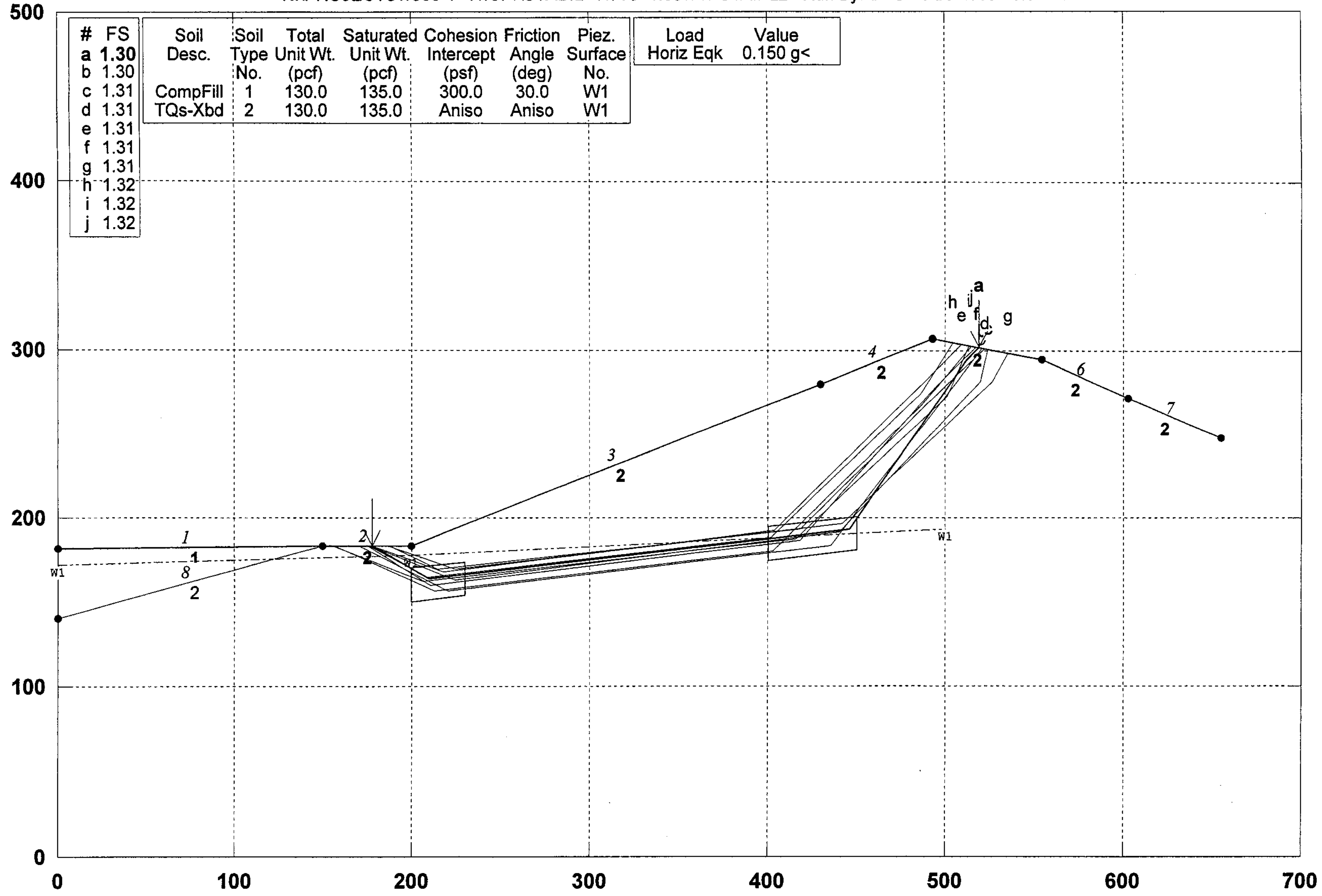


PCSTABL5M/si FSmin=1.30

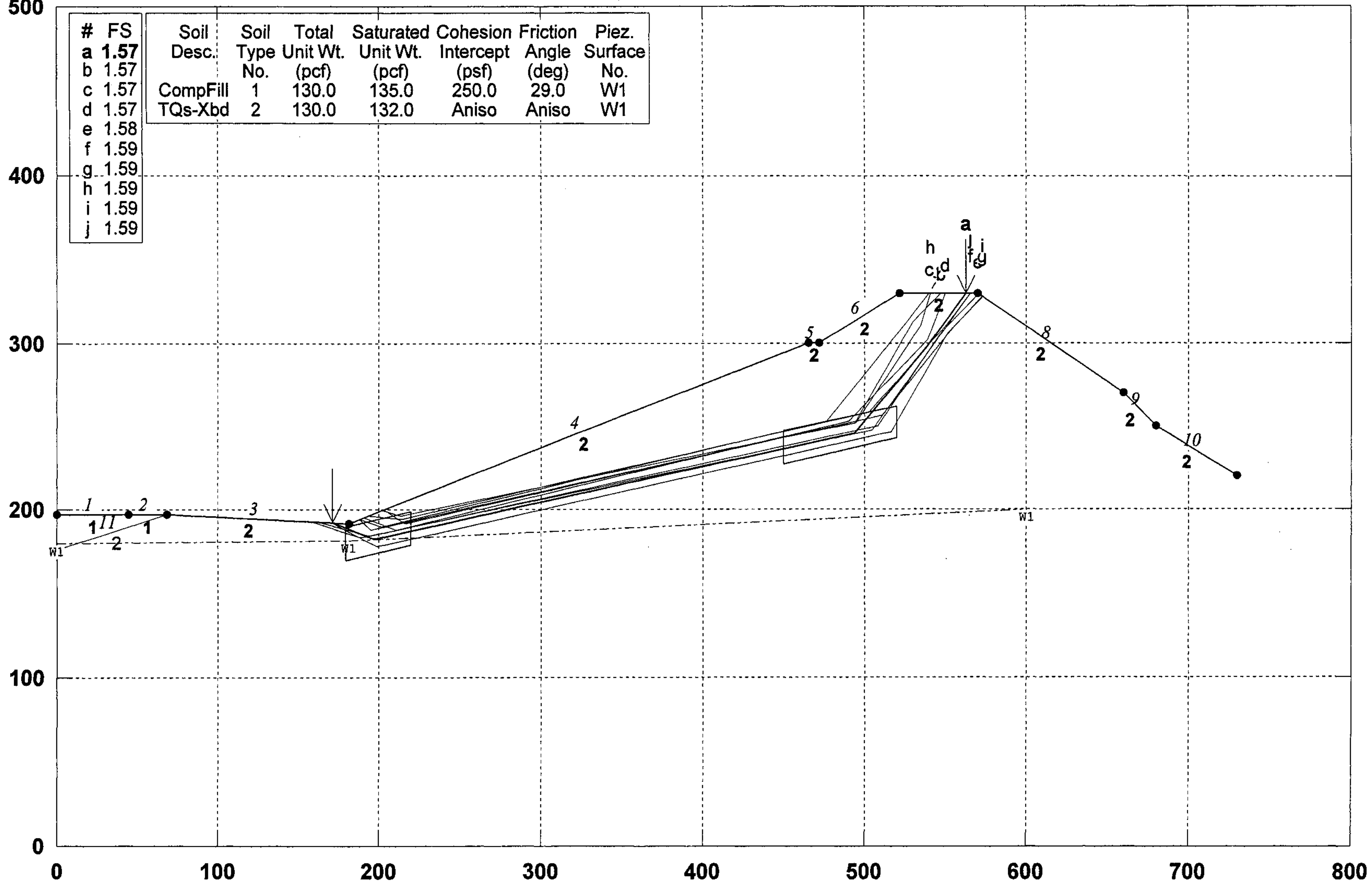
Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #1

TT 53425; 2-2', CS-1, w Ridge Cut to El 1330 Above w RUA; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T2S1A.PL2 Run By: BPG 3/24/2003 6:24PM



#	FS
a	**1.57**
b	1.57
c	1.57
d	1.57
e	1.58
f	1.59
g	1.59
h	1.59
i	1.59
j	1.59

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
TQs-Xbd	2	130.0	132.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.57
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #2

```
                           ** PCSTABL5M **
                                 by
                          Purdue University
                    --Slope Stability Analysis--
                 Simplified Janbu, Simplified Bishop
                    or Spencer`s Method of Slices
 Run Date:                  3/24/2003
 Time of Run:               6:24PM
 Run By:                    BPG
 Input Data Filename:       N:t2s1a.in
 Output Filename:           N:t2s1a.OUT
 Unit:                      ENGLISH
 Plotted Output Filename:   N:t2s1a.PLT
 PROBLEM DESCRIPTION    TT 53425; 2-2', CS-1, w Ridge Cut to
                         El 1330 Above w RUA; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

    10 Top   Boundaries
    11 Total Boundaries
 Boundary      X-Left     Y-Left     X-Right    Y-Right    Soil Type
    No.         (ft)       (ft)       (ft)       (ft)      Below Bnd
     1           .00      197.00      45.00     197.00        1
     2         45.00      197.00      68.00     197.00        1
     3         68.00      197.00     182.00     192.00        2
     4        182.00      192.00     465.00     300.00        2
     5        465.00      300.00     472.00     300.00        2
     6        472.00      300.00     522.00     330.00        2
     7        522.00      330.00     570.00     330.00        2
     8        570.00      330.00     660.00     270.00        2
     9        660.00      270.00     680.00     250.00        2
    10        680.00      250.00     730.00     220.00        2
    11           .00      176.00      68.00     197.00        2
ISOTROPIC SOIL PARAMETERS
  2 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   130.0    135.0     250.0     29.0     .00        .0      1
   2   130.0    132.0     400.0     38.0     .00        .0      1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  2 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction     Counterclockwise     Cohesion     Friction
   Range        Direction Limit     Intercept      Angle
    No.              (deg)            (psf)        (deg)
     1               11.0             400.0         38.0
     2               13.0             450.0         19.0
     3               90.0             400.0         38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  3 Coordinate Points
   Point      X-Water     Y-Water
    No.         (ft)        (ft)
     1           .00      180.00
     2        182.00      182.00
     3        600.00      200.00
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 300 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  70.0
 Box        X-Left      Y-Left     X-Right     Y-Right       Height
```

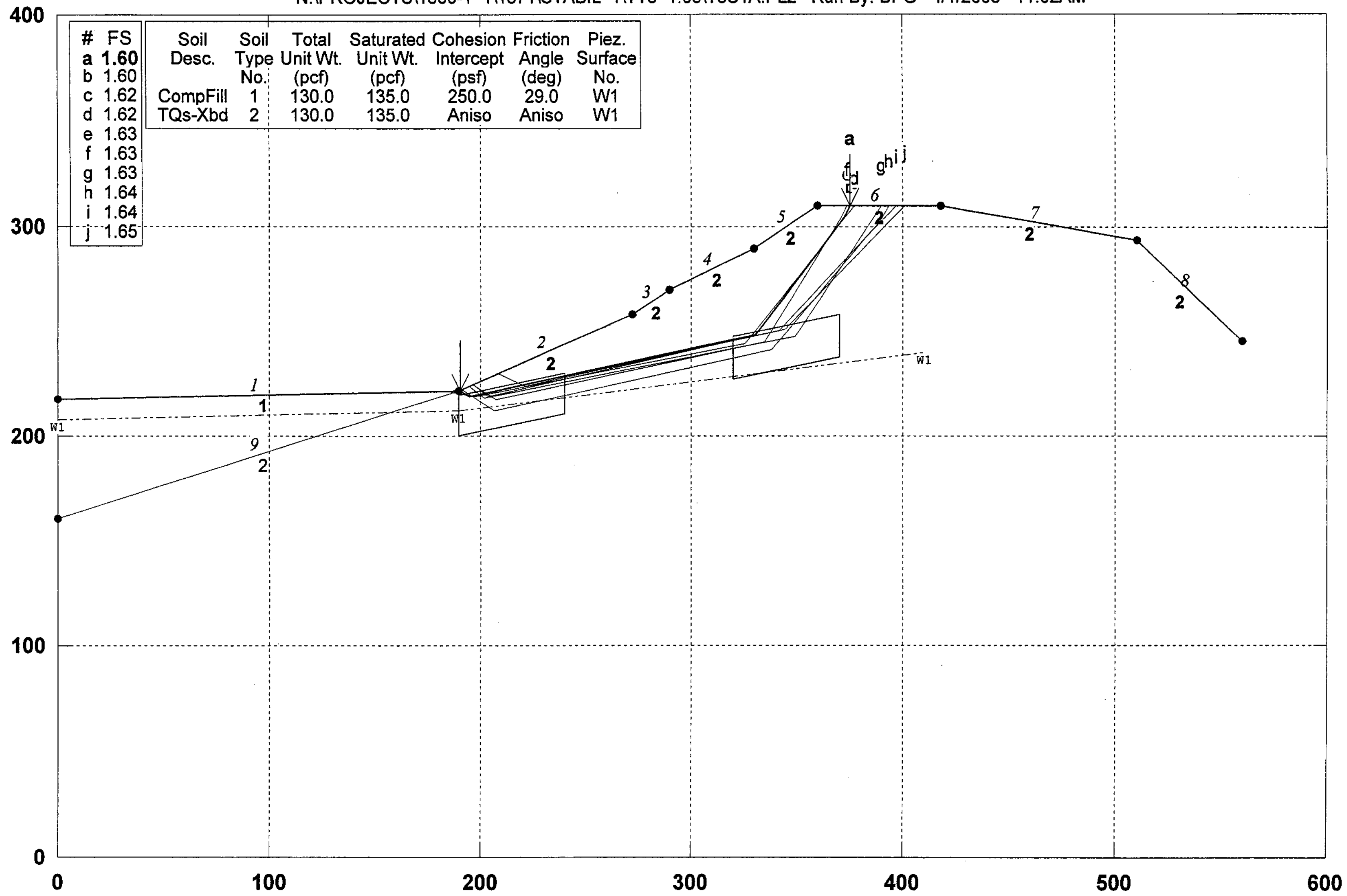
RUN #2

```
    No.        (ft)       (ft)       (ft)       (ft)        (ft)
     1        180.00     180.00     220.00     188.50       20.00
     2        450.00     237.39     520.00     252.27       20.00
    Following Are Displayed The Ten Most Critical Of The Trial
          Failure Surfaces Examined.  They Are Ordered - Most Critical
          First.
          * * Safety Factors Are Calculated By The Modified Janbu Method * *
          Failure Surface Specified By  5 Coordinate Points
            Point      X-Surf      Y-Surf
             No.        (ft)        (ft)
              1        171.88      192.44
              2        196.90      182.32
              3        493.76      245.30
              4        538.96      298.75
              5        562.90      330.00
                ***     1.566    ***
                Individual data on the    10  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      10.1   2402.2      .0      .0       .0       .0       .0       .0       .0
   2      14.2  17014.7      .0      .0       .0       .0       .0       .0       .0
   3        .7   1405.7      .0     7.7       .0       .0       .0       .0       .0
   4       1.9   3830.7      .0    19.4       .0       .0       .0       .0       .0
   5     266.2 ********      .0      .0       .0       .0       .0       .0       .0
   6       7.0  54658.3      .0      .0       .0       .0       .0       .0       .0
   7      21.8 179771.3      .0      .0       .0       .0       .0       .0       .0
   8      28.2 218544.0      .0      .0       .0       .0       .0       .0       .0
   9      17.0  91002.9      .0      .0       .0       .0       .0       .0       .0
  10      23.9  48636.7      .0      .0       .0       .0       .0       .0       .0
```

RUN #2

TT 53425; 3-3' w TQs Ridge Cut to El 1310 + El 1222 Fill Pad + RUA; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T3S1A.PL2 Run By: BPG 4/1/2003 11:02AM



#	FS
a	**1.60**
b	1.60
c	1.62
d	1.62
e	1.63
f	1.63
g	1.63
h	1.64
i	1.64
j	1.65

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.60

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #3

```
                          ** PCSTABL5M **
                                by
                          Purdue University
                      --Slope Stability Analysis--
                  Simplified Janbu, Simplified Bishop
                    or Spencer`s Method of Slices
 Run Date:                  4/1/2003
 Time of Run:               11:02AM
 Run By:                    BPG
 Input Data Filename:       N:t3s1a.in
 Output Filename:           N:t3s1a.OUT
 Unit:                      ENGLISH
 Plotted Output Filename:   N:t3s1a.PLT
 PROBLEM DESCRIPTION    TT 53425; 3-3' w TQs Ridge Cut to El 131
                        0 + El 1222 Fill Pad + RUA; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

     8 Top   Boundaries
     9 Total Boundaries
 Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
    No.        (ft)        (ft)        (ft)        (ft)      Below Bnd
     1           .00      218.00      190.00      222.00         1
     2        190.00      222.00      272.00      258.00         2
     3        272.00      258.00      290.00      270.00         2
     4        290.00      270.00      330.00      290.00         2
     5        330.00      290.00      360.00      310.00         2
     6        360.00      310.00      418.00      310.00         2
     7        418.00      310.00      510.00      294.00         2
     8        510.00      294.00      560.00      246.00         2
     9           .00      160.00      190.00      222.00         2
ISOTROPIC SOIL PARAMETERS
  2 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   130.0    135.0     250.0     29.0     .00        .0       1
   2   130.0    135.0     400.0     38.0     .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  2 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit     Intercept      Angle
    No.            (deg)             (psf)        (deg)
     1              11.0             400.0         38.0
     2              13.0             450.0         19.0
     3              90.0             400.0         38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  3 Coordinate Points
   Point      X-Water      Y-Water
    No.        (ft)         (ft)
     1           .00       208.00
     2        190.00       212.00
     3        410.00       240.00
 Janbus Empirical Coef is being used for the case of  c & phi both > 0
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 800 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  70.0
 Box        X-Left      Y-Left     X-Right     Y-Right       Height
 No.         (ft)        (ft)        (ft)        (ft)         (ft)
```

RUN #3

```
 1          190.00     210.00     240.00     220.63     20.00
 2          320.00     237.63     370.00     248.26     20.00
Factor Of Safety Calculation Has Gone Through Ten Iterations
```

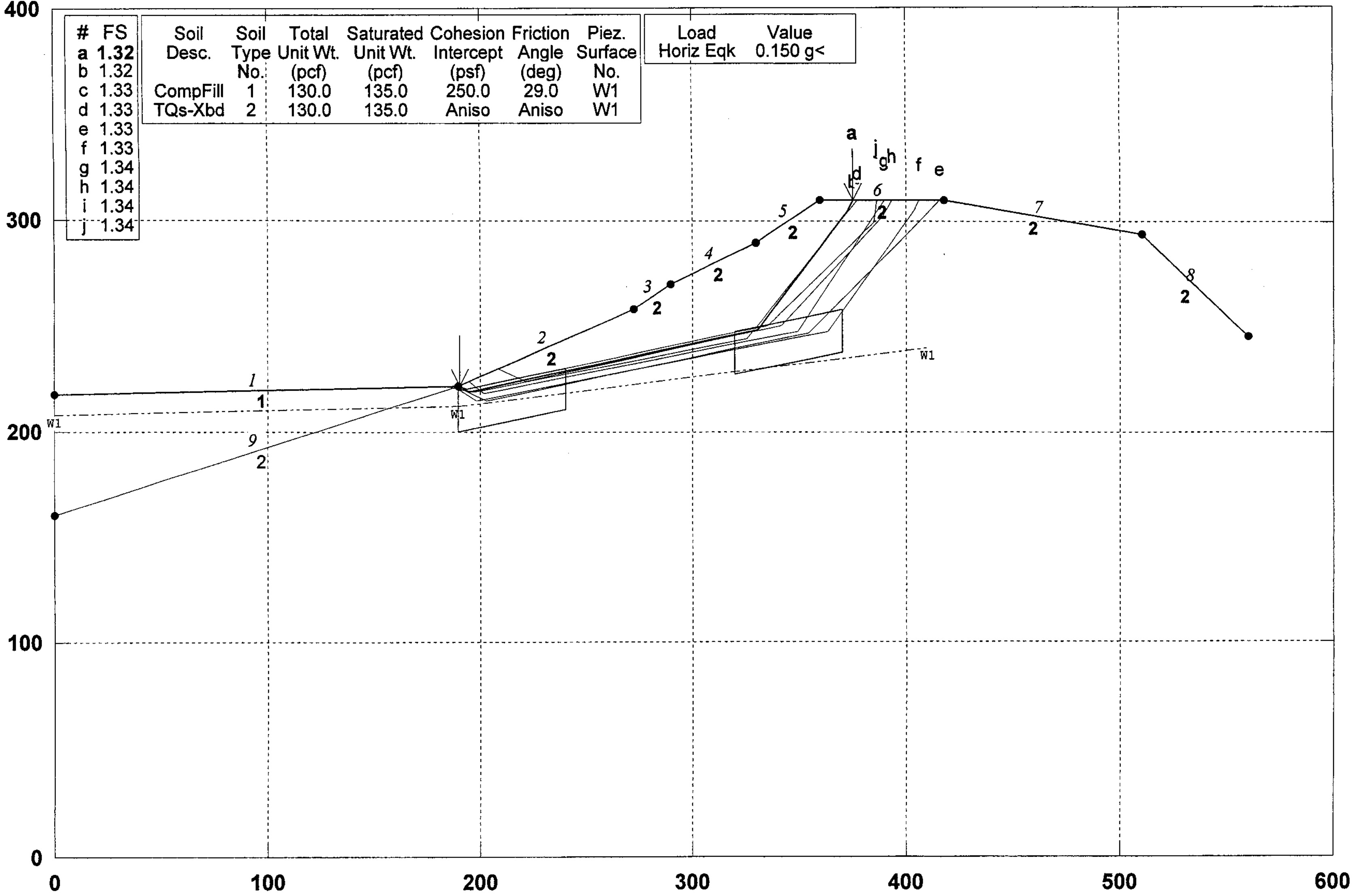
RUN #3

```
                   ** PCSTABL5M **
 Factor Of Safety Calculation Has Gone Through Ten Iterations
 The Trial Failure Surface In Question Is Defined
 By The Following  4 Coordinate Points
   Point      X-Surf      Y-Surf
    No.        (ft)        (ft)
     1        216.84      233.79
     2        237.71      219.94
     3        352.26      243.61
     4        354.12      306.08
 Factor Of Safety For The Preceding Specified Surface =  3.421
 Following Are Displayed The Ten Most Critical Of The Trial
       Failure Surfaces Examined.  They Are Ordered - Most Critical
       First.
       * * Safety Factors Are Calculated By The Modified Janbu Method * *
       Failure Surface Specified By  5 Coordinate Points
         Point      X-Surf      Y-Surf
          No.        (ft)        (ft)
           1        190.27      222.12
           2        194.93      219.45
           3        330.08      248.40
           4        372.16      304.34
           5        375.38      310.00
             ***     1.603   ***
            Individual data on the     8  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     4.7   1428.9    .0      .0      .0      .0      .0      .0      .0
  2    77.1 134033.1    .0      .0      .0      .0      .0      .0      .0
  3    18.0  61105.3    .0      .0      .0      .0      .0      .0      .0
  4    40.0 186687.7    .0      .0      .0      .0      .0      .0      .0
  5      .1    432.8    .0      .0      .0      .0      .0      .0      .0
  6    29.9 123440.6    .0      .0      .0      .0      .0      .0      .0
  7    12.2  21707.7    .0      .0      .0      .0      .0      .0      .0
  8     3.2   1185.5    .0      .0      .0      .0      .0      .0      .0
```

RUN #3

TT 53425; 3-3' w El 1310 TQs Ridge Cut +El 1222 Fill Pad + RUA; Pseudo-Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T3PS1A.PL2 Run By: BPG 3/25/2003 8:19AM



#	FS
a	**1.32**
b	1.32
c	1.33
d	1.33
e	1.33
f	1.33
g	1.34
h	1.34
i	1.34
j	1.34

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=1.32

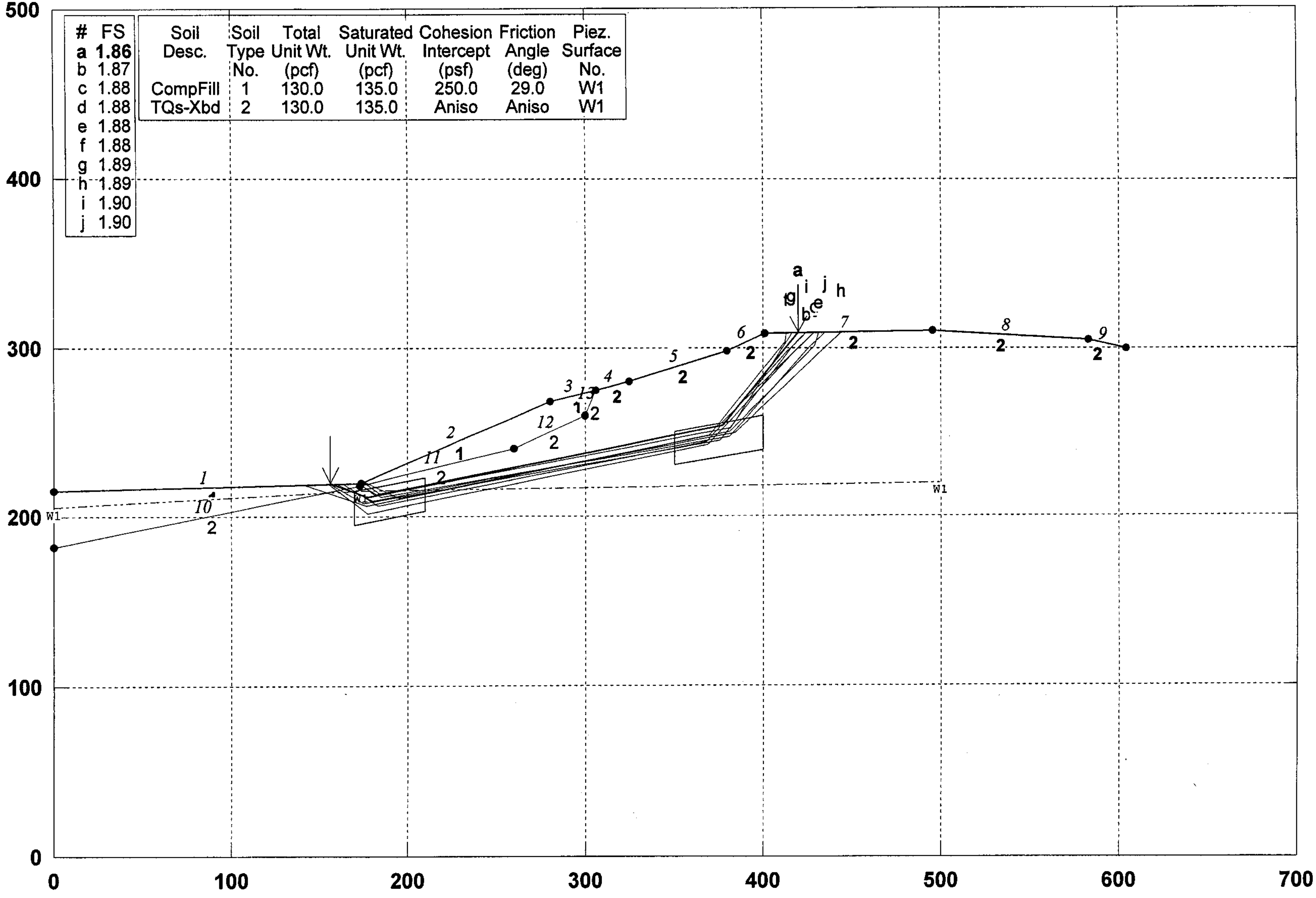
Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #3

TT 53425; 4-4', CS-2 w El 1310 TQs Ridge Cut + Qls-1 OX/Replace + RUA; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T4S1A.PL2 Run By: BPG 4/1/2003 11:21AM



#	FS
a	**1.86**
b	1.87
c	1.88
d	1.88
e	1.88
f	1.88
g	1.89
h	1.89
i	1.90
j	1.90

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.86

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #4

```
                    ** PCSTABL5M **
                          by
                   Purdue University
             --Slope Stability Analysis--
          Simplified Janbu, Simplified Bishop
             or Spencer`s Method of Slices
 Run Date:                4/1/2003
 Time of Run:             11:21AM
 Run By:                  BPG
 Input Data Filename:     N:t4s1a.in
 Output Filename:         N:t4s1a.OUT
 Unit:                    ENGLISH
 Plotted Output Filename: N:t4s1a.PLT
 PROBLEM DESCRIPTION   TT 53425;  4-4', CS-2 w El 1310 TQs Ridg
                       e Cut + Qls-1 OX/Replace + RUA; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

     9 Top   Boundaries
    13 Total Boundaries
 Boundary     X-Left     Y-Left     X-Right     Y-Right     Soil Type
    No.        (ft)       (ft)       (ft)        (ft)       Below Bnd
     1          .00      215.00     174.00      220.00          1
     2       174.00      220.00     280.00      268.00          1
     3       280.00      268.00     306.00      275.00          1
     4       306.00      275.00     325.00      280.00          2
     5       325.00      280.00     380.00      298.00          2
     6       380.00      298.00     401.00      309.00          2
     7       401.00      309.00     495.00      310.00          2
     8       495.00      310.00     583.00      305.00          2
     9       583.00      305.00     604.00      300.00          2
    10          .00      182.00     173.00      218.00          2
    11       173.00      218.00     260.00      240.00          2
    12       260.00      240.00     300.00      260.00          2
    13       300.00      260.00     306.00      275.00          2
ISOTROPIC SOIL PARAMETERS
  2 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   130.0    135.0     250.0     29.0     .00        .0       1
   2   130.0    135.0     400.0     38.0     .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
      1 soil type(s)
 Soil Type  2 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction     Counterclockwise     Cohesion     Friction
   Range        Direction Limit    Intercept      Angle
    No.             (deg)            (psf)        (deg)
     1              10.0             400.0         38.0
     2              12.0             450.0         19.0
     3              90.0             400.0         38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  3 Coordinate Points
   Point       X-Water      Y-Water
    No.         (ft)         (ft)
     1           .00        205.00
     2         174.00       215.00
     3         500.00       220.00
 Janbus Empirical Coef is being used for the case of  c & phi both > 0
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 400 Trial Surfaces Have Been Generated.
 2 Boxes Specified For Generation Of Central Block Base
```

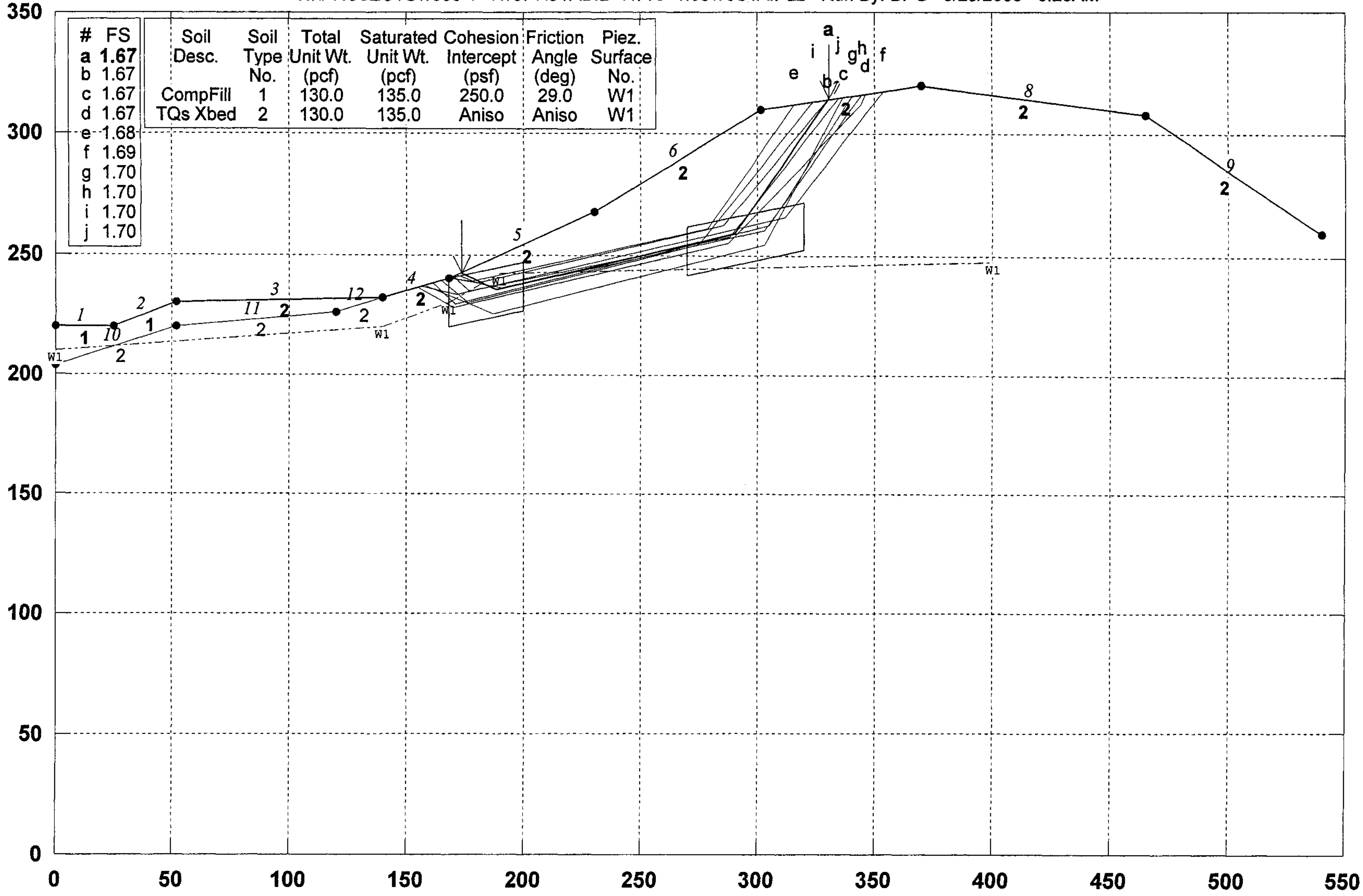
RUN #4

```
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is  70.0
Box         X-Left      Y-Left     X-Right     Y-Right       Height
No.          (ft)        (ft)        (ft)        (ft)         (ft)
 1          170.00      205.00      210.00      212.78       20.00
 2          350.00      239.99      400.00      249.71       20.00
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Examined.  They Are Ordered - Most Critical
      First.
      * * Safety Factors Are Calculated By The Modified Janbu Method * *
      Failure Surface Specified By  4 Coordinate Points
        Point       X-Surf       Y-Surf
         No.         (ft)         (ft)
          1         156.31       219.49
          2         177.24       211.58
          3         377.68       253.34
          4         419.55       309.20
             ***     1.860    ***
           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      8.5    1897.8      .0       .0       .0       .0       .0       .0       .0
  2      4.2    2333.1      .0       .0       .0       .0       .0       .0       .0
  3      4.0    3153.6      .0    236.9       .0       .0       .0       .0       .0
  4      1.0     918.9      .0    131.7       .0       .0       .0       .0       .0
  5      3.2    3648.3      .0    613.0       .0       .0       .0       .0       .0
  6     18.0   28414.8      .0   1989.1       .0       .0       .0       .0       .0
  7     64.8  186968.0      .0       .0       .0       .0       .0       .0       .0
  8     20.0   84670.5      .0       .0       .0       .0       .0       .0       .0
  9     20.0   92608.9      .0       .0       .0       .0       .0       .0       .0
 10      6.0   28399.8      .0       .0       .0       .0       .0       .0       .0
 11     19.0   91669.2      .0       .0       .0       .0       .0       .0       .0
 12     52.7  279192.3      .0       .0       .0       .0       .0       .0       .0
 13      2.3   12873.8      .0       .0       .0       .0       .0       .0       .0
 14     21.0   90242.9      .0       .0       .0       .0       .0       .0       .0
 15     18.5   29594.9      .0       .0       .0       .0       .0       .0       .0
```

RUN #4

TT 53425; 5-5' Ridge Cut El 1320, El 1220 Fill Pad + RUA; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T5S1A.PL2 Run By: BPG 3/25/2003 8:25AM



#	FS
a	**1.67**
b	1.67
c	1.67
d	1.67
e	1.68
f	1.69
g	1.70
h	1.70
i	1.70
j	1.70

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
TQs Xbed	2	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.67

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #5

```
                     ** PCSTABL5M **
                           by
                   Purdue University
                --Slope Stability Analysis--
           Simplified Janbu, Simplified Bishop
              or Spencer`s Method of Slices
Run Date:                3/25/2003
Time of Run:             8:25AM
Run By:                  BPG
Input Data Filename:     N:t5s1a.in
Output Filename:         N:t5s1a.OUT
Unit:                    ENGLISH
Plotted Output Filename: N:t5s1a.PLT
PROBLEM DESCRIPTION    TT 53425; 5-5' Ridge Cut El 1320, El 122
                       0 Fill Pad + RUA; Static
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 0.00 to X-values and 0.00 to Y-values listed.

    9 Top   Boundaries
   12 Total Boundaries
Boundary     X-Left     Y-Left     X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)      Below Bnd
    1          .00      220.00      25.00     220.00         1
    2        25.00      220.00      52.00     230.00         1
    3        52.00      230.00     140.00     232.00         2
    4       140.00      232.00     168.00     240.00         2
    5       168.00      240.00     230.00     268.00         2
    6       230.00      268.00     302.00     310.00         2
    7       302.00      310.00     370.00     320.00         2
    8       370.00      320.00     465.00     308.00         2
    9       465.00      308.00     540.00     260.00         2
   10          .00      204.00      52.00     220.00         2
   11        52.00      220.00     120.00     226.00         2
   12       120.00      226.00     140.00     232.00         2
ISOTROPIC SOIL PARAMETERS
  2 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   130.0    135.0     250.0     29.0     .00        .0        1
   2   130.0    135.0     400.0     38.0     .00        .0        1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  2 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit     Intercept      Angle
    No.            (deg)             (psf)        (deg)
     1             11.0              400.0         38.0
     2             14.0              450.0         19.0
     3             90.0              400.0         38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  5 Coordinate Points
   Point      X-Water     Y-Water
    No.        (ft)        (ft)
     1          .00       210.00
     2        140.00      220.00
     3        168.00      230.00
     4        190.00      242.00
     5        400.00      248.00
 Janbus Empirical Coef is being used for the case of  c & phi both > 0
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 400 Trial Surfaces Have Been Generated.
```

RUN #5

```
   2 Boxes Specified For Generation Of Central Block Base
   Length Of Line Segments For Active And Passive Portions Of
   Sliding Block Is  80.0
   Box        X-Left     Y-Left    X-Right    Y-Right      Height
   No.         (ft)       (ft)      (ft)       (ft)         (ft)
    1         168.00     230.00     200.00     236.80      20.00
    2         270.00     251.68     320.00     262.31      20.00
   Factor Of Safety Calculation Has Gone Through Ten Iterations
   The Trial Failure Surface In Question Is Defined
   By The Following  4 Coordinate Points
     Point      X-Surf      Y-Surf
      No.        (ft)        (ft)
       1        182.91      246.73
       2        195.77      235.41
       3        289.15      256.38
       4        289.86      302.92
   Factor Of Safety For The Preceding Specified Surface =  3.872
   Factor Of Safety Calculation Has Gone Through Ten Iterations
   The Trial Failure Surface In Question Is Defined
   By The Following  4 Coordinate Points
     Point      X-Surf      Y-Surf
      No.        (ft)        (ft)
       1        166.36      239.53
       2        175.78      230.13
       3        313.87      257.84
       4        314.76      311.88
   Factor Of Safety For The Preceding Specified Surface =  3.223
   Factor Of Safety Calculation Has Gone Through Ten Iterations
   The Trial Failure Surface In Question Is Defined
   By The Following  4 Coordinate Points
     Point      X-Surf      Y-Surf
      No.        (ft)        (ft)
       1        165.80      239.37
       2        178.42      227.46
       3        281.47      250.29
       4        282.08      298.38
   Factor Of Safety For The Preceding Specified Surface =  3.733
   Factor Of Safety Calculation Has Gone Through Ten Iterations
   The Trial Failure Surface In Question Is Defined
   By The Following  4 Coordinate Points
     Point      X-Surf      Y-Surf
      No.        (ft)        (ft)
       1        168.27      240.12
       2        190.37      237.21
       3        308.44      262.65
       4        308.66      310.98
   Factor Of Safety For The Preceding Specified Surface =  3.379
   Following Are Displayed The Ten Most Critical Of The Trial
         Failure Surfaces Examined.  They Are Ordered - Most Critical
         First.
         * * Safety Factors Are Calculated By The Modified Janbu Method * *
         Failure Surface Specified By  4 Coordinate Points
           Point      X-Surf      Y-Surf
            No.        (ft)        (ft)
             1        173.72      242.58
             2        188.44      235.25
             3        290.00      259.45
             4        330.99      314.26
               ***     1.667    ***
              Individual data on the     8  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      9.1   5077.8      .0      .0       .0      .0      .0      .0      .0
  2      5.7   8378.6      .0  1029.5       .0      .0      .0      .0      .0
  3      1.6   2905.2      .0   542.7       .0      .0      .0      .0      .0
```

RUN #5

```
     4      30.4  69919.4      .0  6220.0      .0      .0      .0      .0      .0
     5       9.6  27185.7      .0      .0      .0      .0      .0      .0      .0
     6      60.0 258991.5      .0      .0      .0      .0      .0      .0      .0
     7      12.0  60869.7      .0      .0      .0      .0      .0      .0      .0
     8      29.0  65040.5      .0      .0      .0      .0      .0      .0      .0
```

RUN #5

TT 53425; 5-5' Ridge Cut El 1320, El 1220 Fill Pad + RUA; PseudoStatic

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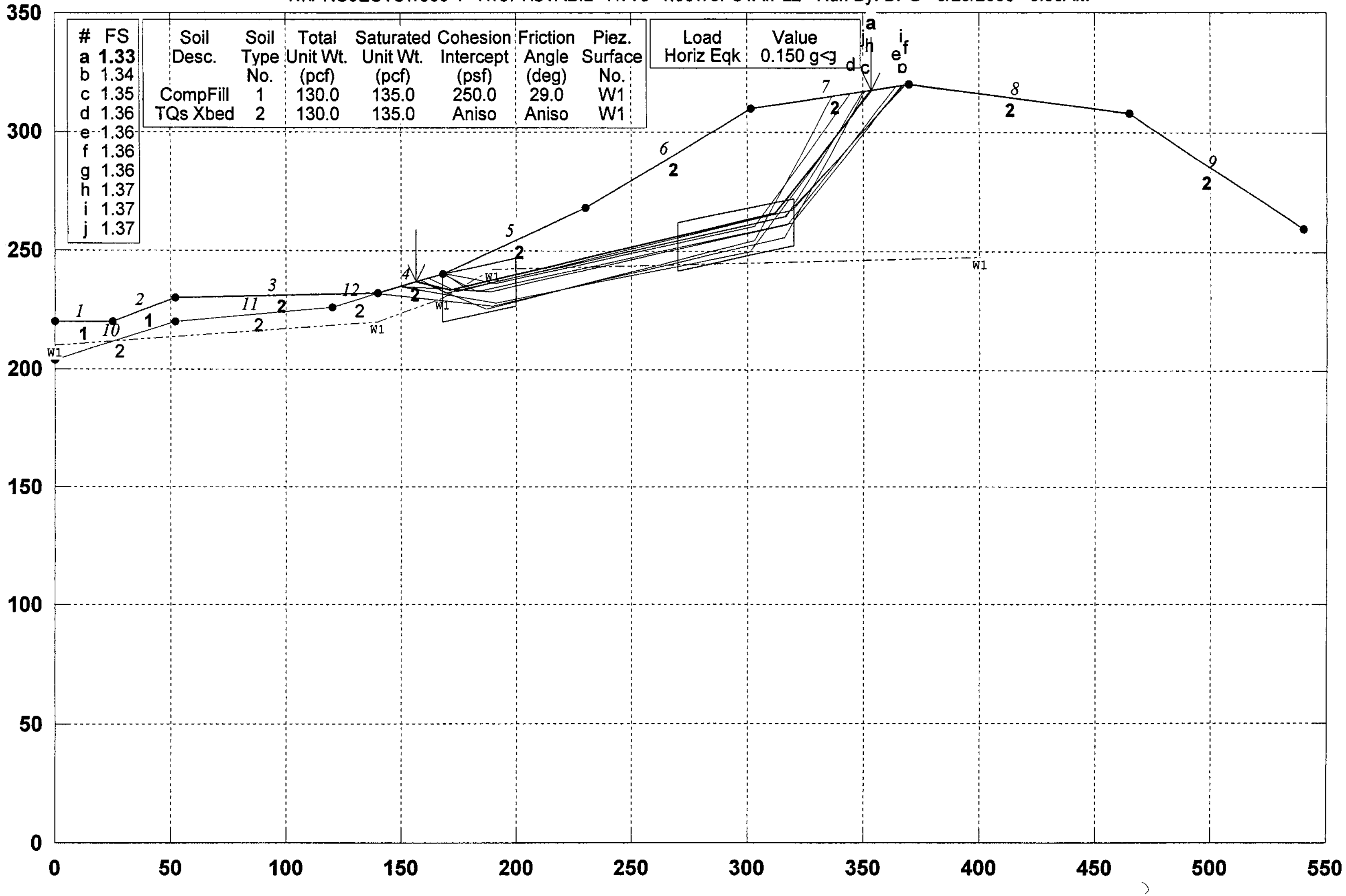


#	FS
a	**1.33**
b	1.34
c	1.35
d	1.36
e	1.36
f	1.36
g	1.36
h	1.37
i	1.37
j	1.37

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
TQs Xbed	2	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<g

PCSTABL5M/si FSmin=1.33

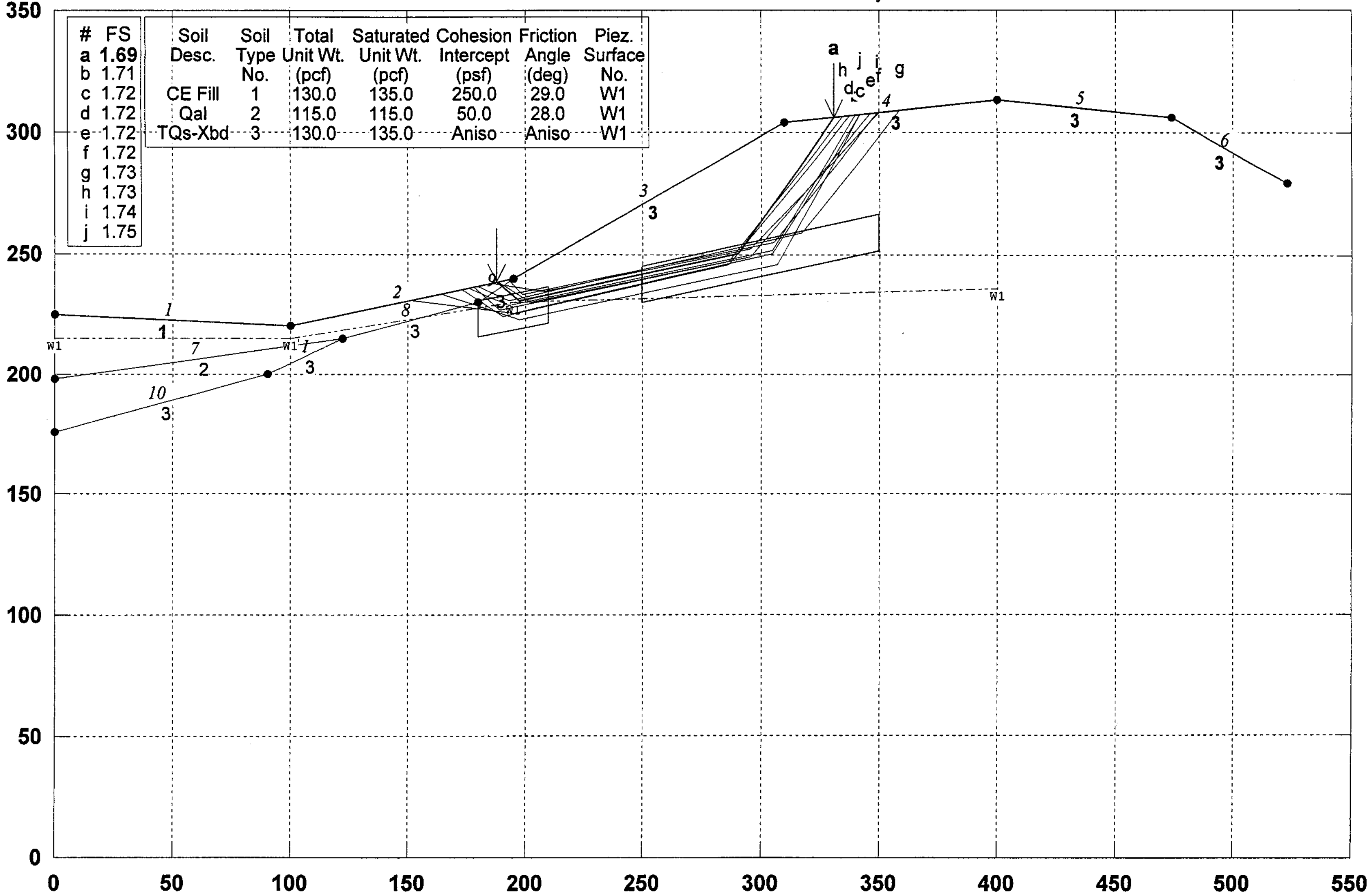
Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN # 5

TT 53425; 6-6'; El 1220 Fill Pad + El 1312 Ridge Cut + RUA; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T6S1A.PL2   Run By: BPG   3/25/2003   8:40AM



#	FS
a	**1.69**
b	1.71
c	1.72
d	1.72
e	1.72
f	1.72
g	1.73
h	1.73
i	1.74
j	1.75

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CE Fill	1	130.0	135.0	250.0	29.0	W1
Qal	2	115.0	115.0	50.0	28.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.69

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #6

```
                        ** PCSTABL5M **
                              by
                       Purdue University
                  --Slope Stability Analysis--
              Simplified Janbu, Simplified Bishop
                 or Spencer`s Method of Slices
 Run Date:                  3/25/2003
 Time of Run:               8:40AM
 Run By:                    BPG
 Input Data Filename:       N:t6s1a.in
 Output Filename:           N:t6s1a.OUT
 Unit:                      ENGLISH
 Plotted Output Filename:   N:t6s1a.PLT
 PROBLEM DESCRIPTION    TT 53425; 6-6'; El 1220 Fill Pad + El 13
                        12 Ridge Cut + RUA; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

     6 Top   Boundaries
    11 Total Boundaries
 Boundary     X-Left      Y-Left     X-Right     Y-Right    Soil Type
    No.        (ft)        (ft)        (ft)        (ft)     Below Bnd
     1          .00      225.00      100.00      220.00         1
     2       100.00      220.00      195.00      240.00         1
     3       195.00      240.00      310.00      304.00         3
     4       310.00      304.00      400.00      313.00         3
     5       400.00      313.00      474.00      306.00         3
     6       474.00      306.00      523.00      280.00         3
     7          .00      198.00      122.00      215.00         2
     8       122.00      215.00      180.00      230.00         3
     9       180.00      230.00      195.00      240.00         3
    10          .00      176.00       90.00      200.00         3
    11        90.00      200.00      122.00      215.00         3
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   130.0    135.0     250.0    29.0     .00        .0       1
   2   115.0    115.0      50.0    28.0     .00        .0       1
   3   130.0    135.0     400.0    38.0     .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type   3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction     Counterclockwise     Cohesion     Friction
   Range        Direction Limit     Intercept      Angle
    No.             (deg)             (psf)        (deg)
     1              11.0              400.0        38.0
     2              13.0              450.0        19.0
     3              90.0              400.0        38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  4 Coordinate Points
   Point       X-Water     Y-Water
    No.         (ft)        (ft)
     1           .00       215.00
     2        100.00       215.00
     3        195.00       230.00
     4        400.00       236.00
 Janbus Empirical Coef is being used for the case of  c & phi both > 0
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 400 Trial Surfaces Have Been Generated.
 2 Boxes Specified For Generation Of Central Block Base
```

RUN #6

```
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is  80.0
Box       X-Left     Y-Left     X-Right    Y-Right      Height
No.        (ft)       (ft)       (ft)       (ft)         (ft)
 1        180.00     223.00     210.00     229.38       15.00
 2        250.00     237.88     350.00     259.13       15.00
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        162.73      233.21
    2        201.08      231.97
    3        317.89      253.76
    4        319.06      304.91
Factor Of Safety For The Preceding Specified Surface =  5.522
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        184.20      237.73
    2        200.02      221.91
    3        286.81      238.94
    4        289.59      292.64
Factor Of Safety For The Preceding Specified Surface =  3.590
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        177.35      236.28
    2        196.07      226.93
    3        251.97      233.56
    4        252.80      272.17
Factor Of Safety For The Preceding Specified Surface = 10.582
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        174.75      235.74
    2        192.36      222.28
    3        299.16      244.32
    4        300.64      298.79
Factor Of Safety For The Preceding Specified Surface =  3.475
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        166.05      233.91
    2        200.97      229.30
    3        326.87      256.32
    4        327.11      305.71
Factor Of Safety For The Preceding Specified Surface =  3.235
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        173.10      235.39
    2        197.25      224.65
    3        274.07      245.83
    4        274.47      284.22
Factor Of Safety For The Preceding Specified Surface =  5.821
Factor Of Safety Calculation Has Gone Through Ten Iterations
```

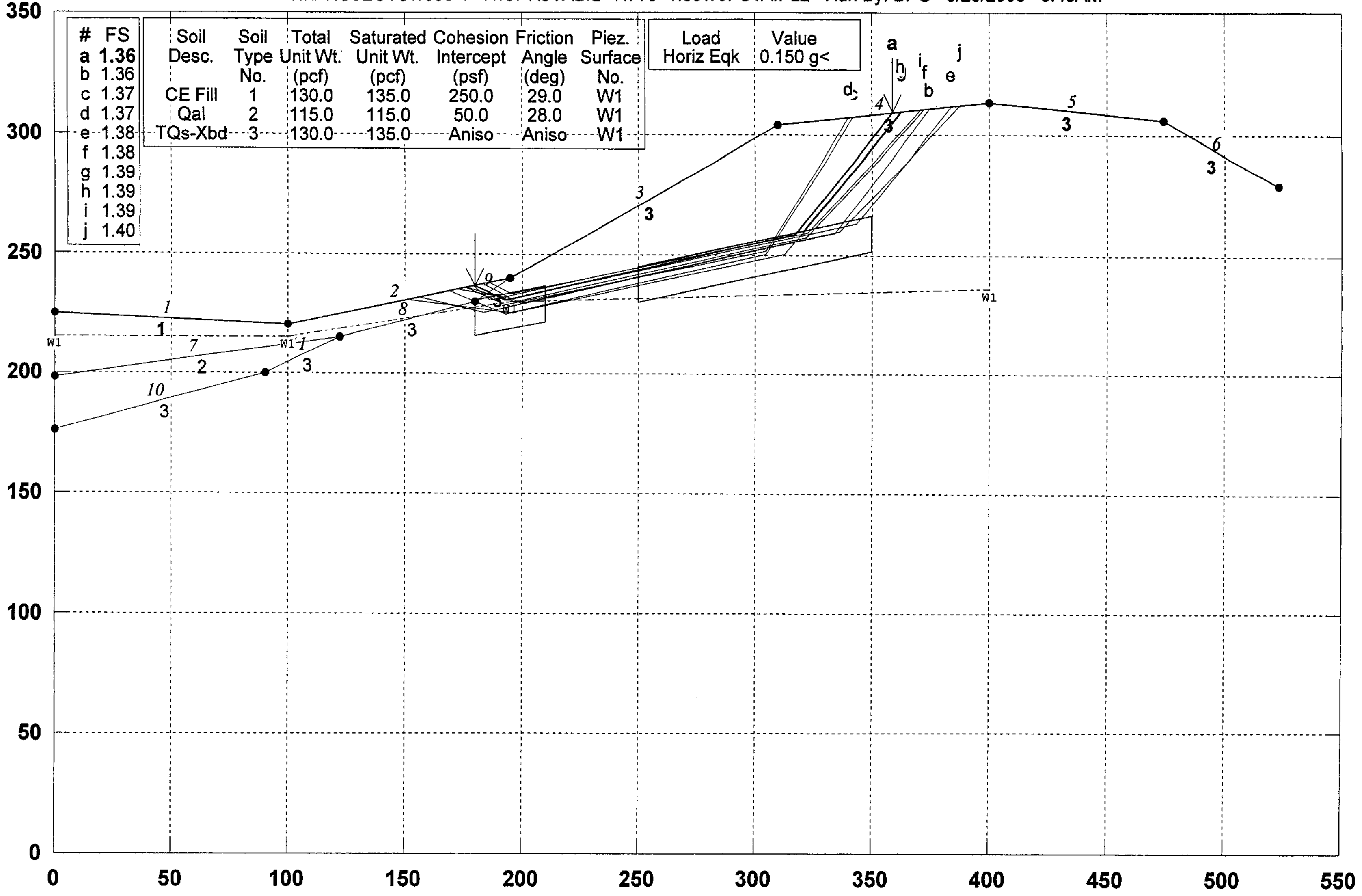
RUN #6

```
   The Trial Failure Surface In Question Is Defined
   By The Following  4 Coordinate Points
     Point      X-Surf      Y-Surf
      No.        (ft)        (ft)
       1        106.82      221.43
       2        186.06      216.86
       3        320.14      250.65
       4        321.14      305.11
   Factor Of Safety For The Preceding Specified Surface =  4.606
   Factor Of Safety Calculation Has Gone Through Ten Iterations
   The Trial Failure Surface In Question Is Defined
   By The Following  4 Coordinate Points
     Point      X-Surf      Y-Surf
      No.        (ft)        (ft)
       1        169.88      234.71
       2        184.76      231.48
       3        307.03      255.93
       4        307.55      302.63
   Factor Of Safety For The Preceding Specified Surface =  3.548
   Following Are Displayed The Ten Most Critical Of The Trial
         Failure Surfaces Examined.  They Are Ordered - Most Critical
         First.
         * * Safety Factors Are Calculated By The Modified Janbu Method * *
         Failure Surface Specified By  4 Coordinate Points
           Point      X-Surf      Y-Surf
            No.        (ft)        (ft)
             1        187.53      238.43
             2        197.69      230.88
             3        290.37      250.63
             4        330.51      306.05
              ***     1.687   ***
                Individual data on the     6  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      2.4     362.5      .0      .0       .0      .0      .0     .0     .0
  2      5.1    3095.7      .0      .0       .0      .0      .0     .0     .0
  3      2.7    3105.2      .0      .0       .0      .0      .0     .0     .0
  4     92.7  319681.2      .0      .0       .0      .0      .0     .0     .0
  5     19.6   87660.6      .0      .0       .0      .0      .0     .0     .0
  6     20.5   35023.0      .0      .0       .0      .0      .0     .0     .0
```

RUN #6

TT 53425, 6-6'; El 1220 Fill Pad + El 1312 TQs Ridge Cut + RUA ; Pseudo-Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T6PS1A.PL2 Run By: BPG 3/25/2003 8:43AM



#	FS
a	**1.36**
b	1.36
c	1.37
d	1.37
e	1.38
f	1.38
g	1.39
h	1.39
i	1.39
j	1.40

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CE Fill	1	130.0	135.0	250.0	29.0	W1
Qal	2	115.0	115.0	50.0	28.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=1.36

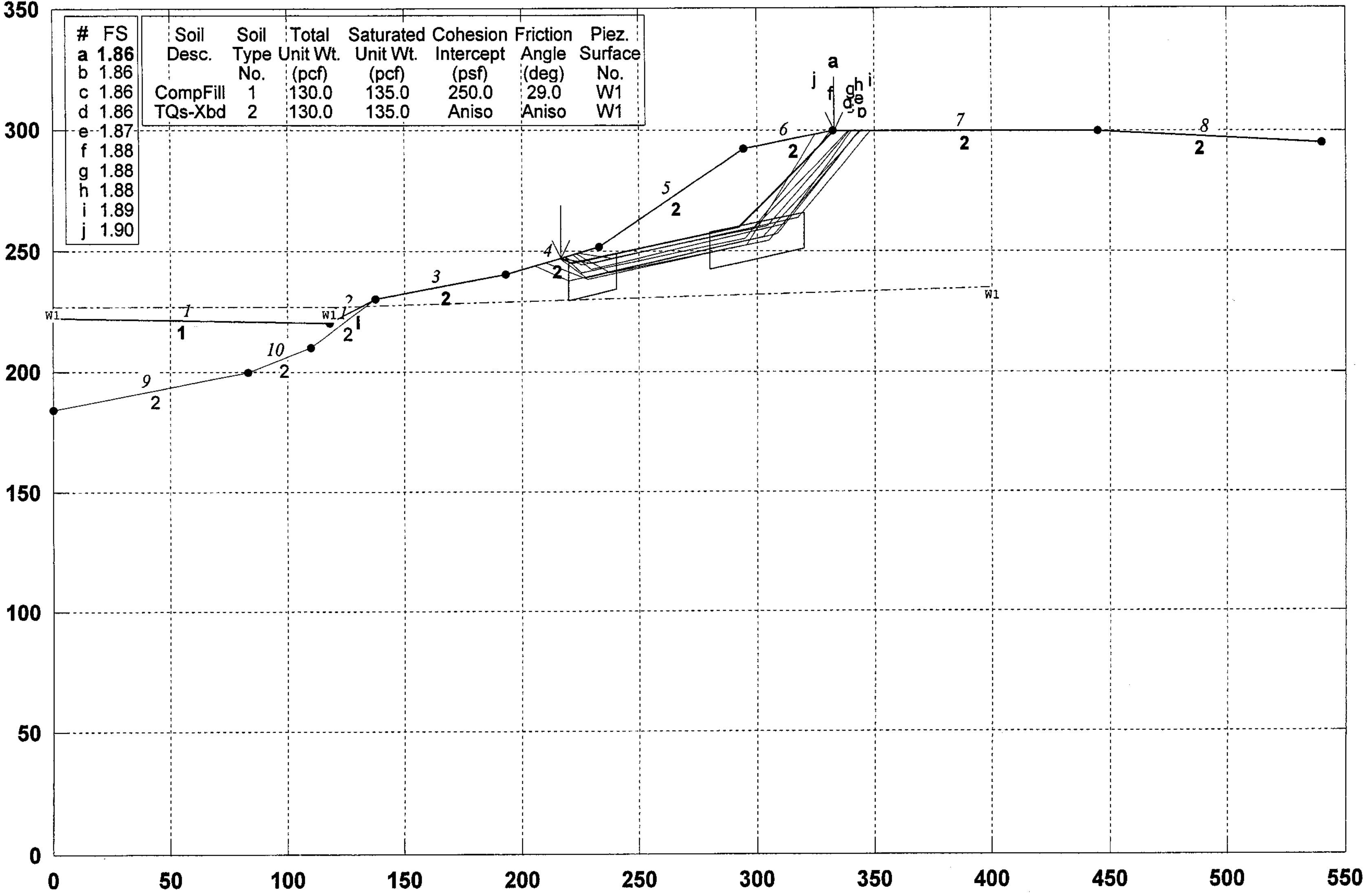
Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #6

TT 53425, 7-7'; El 1220 Basin BLo El 1300 TQs Ridge Cut + RUA; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T7S1A.PL2   Run By: BPG   3/25/2003   8:59AM



#	FS
a	**1.86**
b	1.86
c	1.86
d	1.86
e	1.87
f	1.88
g	1.88
h	1.88
i	1.89
j	1.90

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.86

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #7

```
                     ** PCSTABL5M **
                           by
                    Purdue University
              --Slope Stability Analysis--
           Simplified Janbu, Simplified Bishop
              or Spencer`s Method of Slices
 Run Date:                 3/25/2003
 Time of Run:              8:59AM
 Run By:                   BPG
 Input Data Filename:      N:t7s1a.in
 Output Filename:          N:t7s1a.OUT
 Unit:                     ENGLISH
 Plotted Output Filename:  N:t7s1a.PLT
 PROBLEM DESCRIPTION   TT 53425, 7-7'; El 1220 Basin BLo El 130
                       0 TQs Ridge Cut + RUA; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

     8 Top   Boundaries
    11 Total Boundaries
 Boundary     X-Left     Y-Left     X-Right    Y-Right    Soil Type
    No.        (ft)       (ft)       (ft)       (ft)      Below Bnd
     1          .00      222.00     118.00     220.00        1
     2        118.00     220.00     138.00     230.00        1
     3        138.00     230.00     193.00     240.00        2
     4        193.00     240.00     233.00     252.00        2
     5        233.00     252.00     294.00     292.00        2
     6        294.00     292.00     332.00     300.00        2
     7        332.00     300.00     445.00     300.00        2
     8        445.00     300.00     540.00     295.00        2
     9          .00      184.00      83.00     200.00        2
    10         83.00     200.00     110.00     210.00        2
    11        110.00     210.00     138.00     230.00        2
ISOTROPIC SOIL PARAMETERS
  2 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   130.0     135.0     250.0    29.0     .00        .0      1
   2   130.0     135.0     400.0    38.0     .00        .0      1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  2 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit     Intercept      Angle
    No.             (deg)            (psf)        (deg)
     1              11.0             400.0         38.0
     2              13.0             450.0         19.0
     3              90.0             400.0         38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  3 Coordinate Points
   Point      X-Water     Y-Water
    No.        (ft)        (ft)
     1          .00       227.00
     2        118.00      227.00
     3        400.00      235.00
 Janbus Empirical Coef is being used for the case of  c & phi both > 0
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 400 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  60.0
```

RUN #7

```
Box         X-Left     Y-Left    X-Right     Y-Right       Height
No.          (ft)       (ft)       (ft)        (ft)          (ft)
 1          220.00     237.27     240.00      241.52        15.00
 2          280.00     250.13     320.00      258.63        15.00
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         218.23       247.57
    2         227.53       240.69
    3         287.23       254.44
    4         289.16       288.82
Factor Of Safety For The Preceding Specified Surface =  3.443
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         231.10       251.43
    2         235.00       247.68
    3         308.81       249.00
    4         311.05       295.59
Factor Of Safety For The Preceding Specified Surface =  8.358
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         224.61       249.48
    2         236.69       239.43
    3         281.09       249.79
    4         282.95       284.76
Factor Of Safety For The Preceding Specified Surface =  5.608
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         214.48       246.44
    2         226.51       235.09
    3         289.18       249.21
    4         289.68       289.17
Factor Of Safety For The Preceding Specified Surface =  5.396
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         210.34       245.20
    2         233.98       242.09
    3         310.75       258.77
    4         310.92       295.56
Factor Of Safety For The Preceding Specified Surface =  4.124
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
    1         219.51       247.95
    2         226.47       241.26
    3         290.97       257.42
    4         291.09       290.09
Factor Of Safety For The Preceding Specified Surface =  7.550
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
```

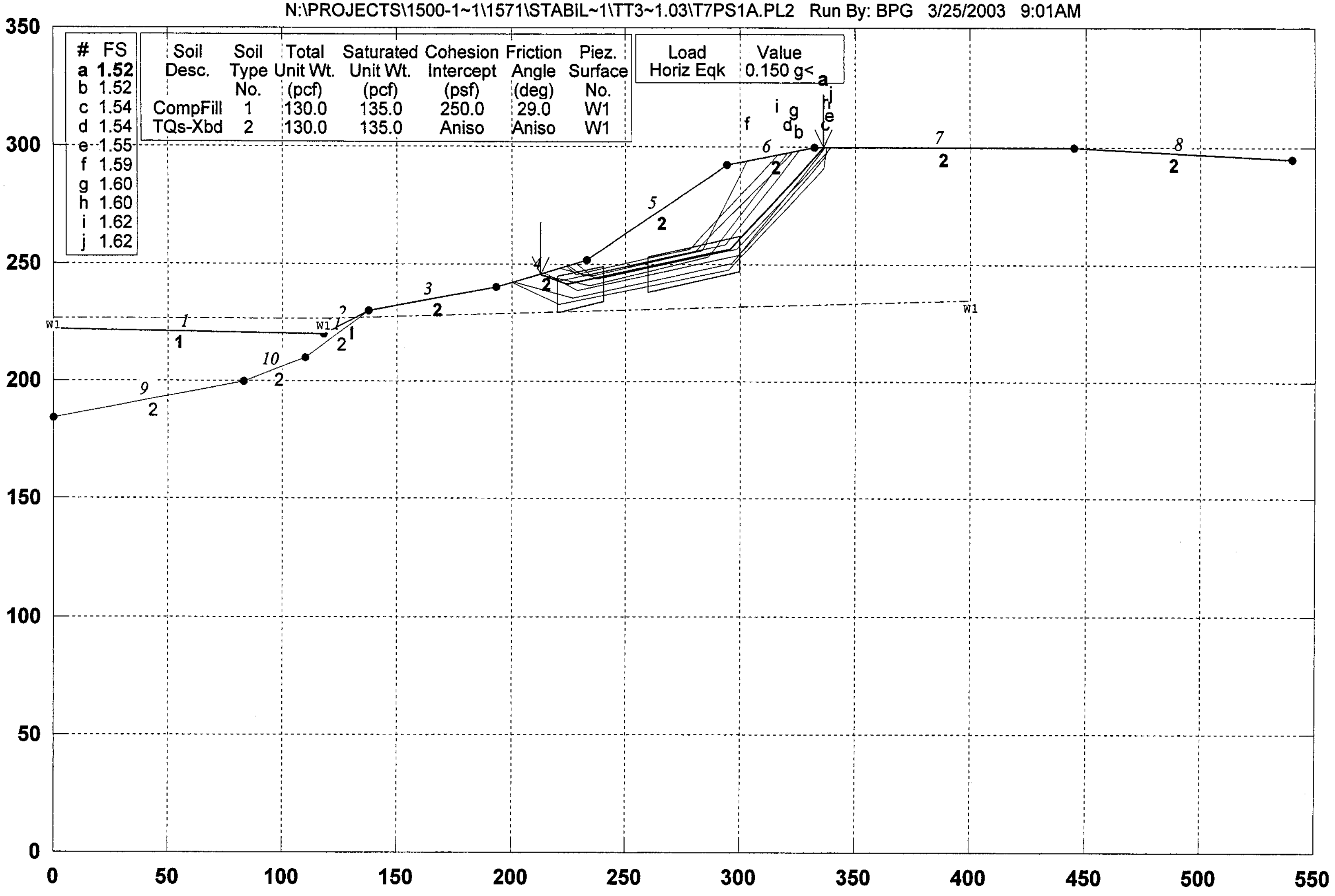
RUN #7

```
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        201.03      242.41
            2        223.13      236.58
            3        304.61      254.12
            4        304.69      294.25
        Factor Of Safety For The Preceding Specified Surface =  4.574
        Following Are Displayed The Ten Most Critical Of The Trial
              Failure Surfaces Examined.  They Are Ordered - Most Critical
              First.
              * * Safety Factors Are Calculated By The Modified Janbu Method * *
              Failure Surface Specified By  4 Coordinate Points
                Point      X-Surf      Y-Surf
                 No.        (ft)        (ft)
                  1        216.86      247.16
                  2        221.44      244.83
                  3        292.32      259.82
                  4        332.50      300.00
                    ***     1.859    ***
                   Individual data on the     6  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      4.6    1103.0      .0     .0       .0      .0      .0      .0      .0
     2     11.6    6330.8      .0     .0       .0      .0      .0      .0      .0
     3     59.3  138065.7      .0     .0       .0      .0      .0      .0      .0
     4      1.7    6717.8      .0     .0       .0      .0      .0      .0      .0
     5     38.0   76583.1      .0     .0       .0      .0      .0      .0      .0
     6       .5      16.4      .0     .0       .0      .0      .0      .0      .0
```

RUN #7

TT 53425, 7-7'; El 1220 Basin BLo El 1300 TQs Ridge Cut + RUA; Pseudo-Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T7PS1A.PL2 Run By: BPG 3/25/2003 9:01AM



#	FS
a	**1.52**
b	1.52
c	1.54
d	1.54
e	1.55
f	1.59
g	1.60
h	1.60
i	1.62
j	1.62

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=1.52

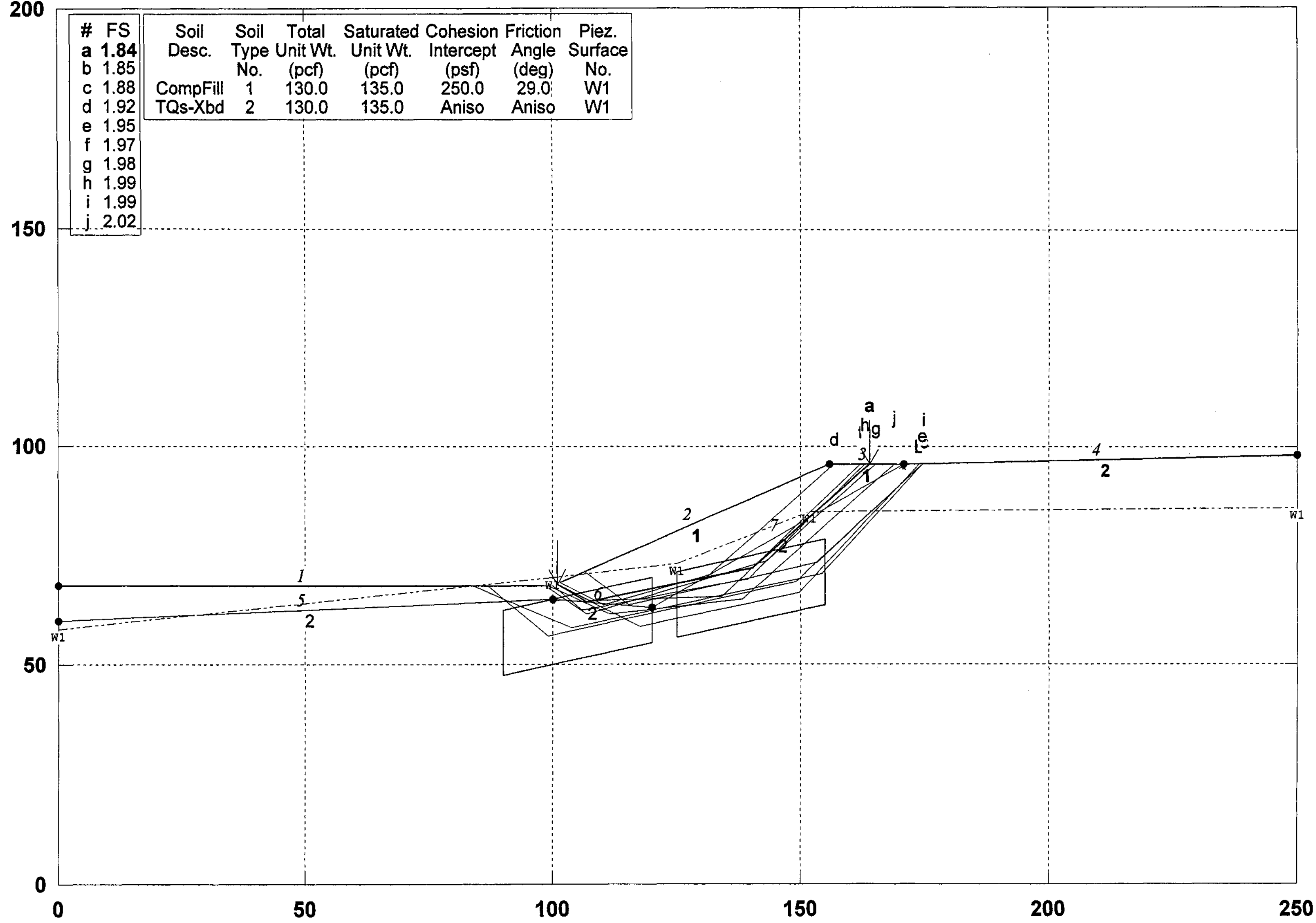
Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #7

TT 53425; 8-8', CS-6 w 20' StabFill BLo Newhall Ranch Rd; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T8S1B.PL2 Run By: BPG 3/26/2003 6:47PM



#	FS
a	**1.84**
b	1.85
c	1.88
d	1.92
e	1.95
f	1.97
g	1.98
h	1.99
i	1.99
j	2.02

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.84

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN # 8

```
                     ** PCSTABL5M **
                          by
                   Purdue University
             --Slope Stability Analysis--
          Simplified Janbu, Simplified Bishop
             or Spencer`s Method of Slices
 Run Date:                3/26/2003
 Time of Run:             6:47PM
 Run By:                  BPG
 Input Data Filename:     N:t8s1b.in
 Output Filename:         N:t8s1b.OUT
 Unit:                    ENGLISH
 Plotted Output Filename: N:t8s1b.PLT
 PROBLEM DESCRIPTION   TT 53425; 8-8', CS-6 w 20' StabFill BLo
                        Newhall Ranch Rd; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

     4 Top   Boundaries
     7 Total Boundaries
 Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
    No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
     1          .00      68.00     100.00      68.00         1
     2       100.00      68.00     156.00      96.00         1
     3       156.00      96.00     171.00      96.00         1
     4       171.00      96.00     250.00      98.00         2
     5          .00      60.00     100.00      65.00         2
     6       100.00      65.00     120.00      63.00         2
     7       120.00      63.00     171.00      96.00         2
ISOTROPIC SOIL PARAMETERS
  2 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   130.0    135.0     250.0     29.0     .00        .0       1
   2   130.0    135.0     350.0     32.0     .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  2 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit     Intercept      Angle
    No.            (deg)             (psf)        (deg)
     1             13.5              350.0         32.0
     2             14.5              450.0         19.0
     3             90.0              350.0         32.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  5 Coordinate Points
   Point      X-Water     Y-Water
    No.        (ft)        (ft)
     1          .00        58.00
     2       100.00        70.00
     3       125.00        73.00
     4       152.00        85.00
     5       250.00        86.00
 Janbus Empirical Coef is being used for the case of  c & phi both > 0
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 400 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  60.0
 Box        X-Left     Y-Left     X-Right    Y-Right       Height
 No.         (ft)       (ft)       (ft)       (ft)          (ft)
```

RUN #8

```
 1          90.00      55.00      120.00      62.48      15.00
 2         125.00      63.73      155.00      71.21      15.00
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        105.52       70.76
    2        113.56       62.93
    3        125.93       64.93
    4        126.24       81.12
Factor Of Safety For The Preceding Specified Surface = 20.584
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        105.24       70.62
    2        116.04       61.12
    3        136.49       67.07
    4        136.79       86.39
Factor Of Safety For The Preceding Specified Surface = 10.459
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         92.17       68.00
    2        106.19       62.19
    3        152.90       65.30
    4        154.07       95.04
Factor Of Safety For The Preceding Specified Surface =  5.301
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         79.44       68.00
    2        104.84       52.92
    3        150.31       65.55
    4        150.96       93.48
Factor Of Safety For The Preceding Specified Surface =  4.515
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         89.61       68.00
    2        100.00       59.20
    3        126.49       59.94
    4        127.56       81.78
Factor Of Safety For The Preceding Specified Surface =  8.820
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        110.96       73.48
    2        118.57       68.15
    3        145.70       76.05
    4        146.01       91.01
Factor Of Safety For The Preceding Specified Surface =  6.028
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
```

RUN # 8

```
       1          67.82        68.00
       2          92.22        56.63
       3         132.89        64.95
       4         133.01        84.50
  Factor Of Safety For The Preceding Specified Surface = 13.313
  Factor Of Safety Calculation Has Gone Through Ten Iterations
  The Trial Failure Surface In Question Is Defined
  By The Following  4 Coordinate Points
    Point      X-Surf      Y-Surf
     No.        (ft)        (ft)
      1          83.16       68.00
      2         107.25       57.28
      3         132.22       68.37
      4         132.38       84.19
  Factor Of Safety For The Preceding Specified Surface =  6.058
  Factor Of Safety Calculation Has Gone Through Ten Iterations
  The Trial Failure Surface In Question Is Defined
  By The Following  4 Coordinate Points
    Point      X-Surf      Y-Surf
     No.        (ft)        (ft)
      1          91.43       68.00
      2          99.71       60.04
      3         133.23       70.74
      4         133.28       84.64
  Factor Of Safety For The Preceding Specified Surface =  7.233
  Factor Of Safety Calculation Has Gone Through Ten Iterations
  The Trial Failure Surface In Question Is Defined
  By The Following  4 Coordinate Points
    Point      X-Surf      Y-Surf
     No.        (ft)        (ft)
      1          44.67       68.00
      2          94.70       54.82
      3         143.46       67.09
      4         143.50       89.75
  Factor Of Safety For The Preceding Specified Surface =  7.759
  Factor Of Safety Calculation Has Gone Through Ten Iterations
  The Trial Failure Surface In Question Is Defined
  By The Following  4 Coordinate Points
    Point      X-Surf      Y-Surf
     No.        (ft)        (ft)
      1          92.57       68.00
      2         101.01       60.47
      3         137.16       63.65
      4         137.41       86.71
  Factor Of Safety For The Preceding Specified Surface = 12.669
  Following Are Displayed The Ten Most Critical Of The Trial
        Failure Surfaces Examined.  They Are Ordered - Most Critical
        First.
        * * Safety Factors Are Calculated By The Modified Janbu Method * *
        Failure Surface Specified By  4 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1         100.86       68.43
            2         106.90       64.29
            3         140.31       72.32
            4         163.96       96.00
              ***      1.837    ***
             Individual data on the    11  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      6.0    2882.8    211.0   1844.7      .0      .0      .0      .0      .0
  2       .0      39.8       .0     20.3      .0      .0      .0      .0      .0
  3       .1      68.9       .0     29.7      .0      .0      .0      .0      .0
  4     18.0   22805.5       .0   6258.8      .0      .0      .0      .0      .0
  5      5.9    9831.8       .0   1727.0      .0      .0      .0      .0      .0
```

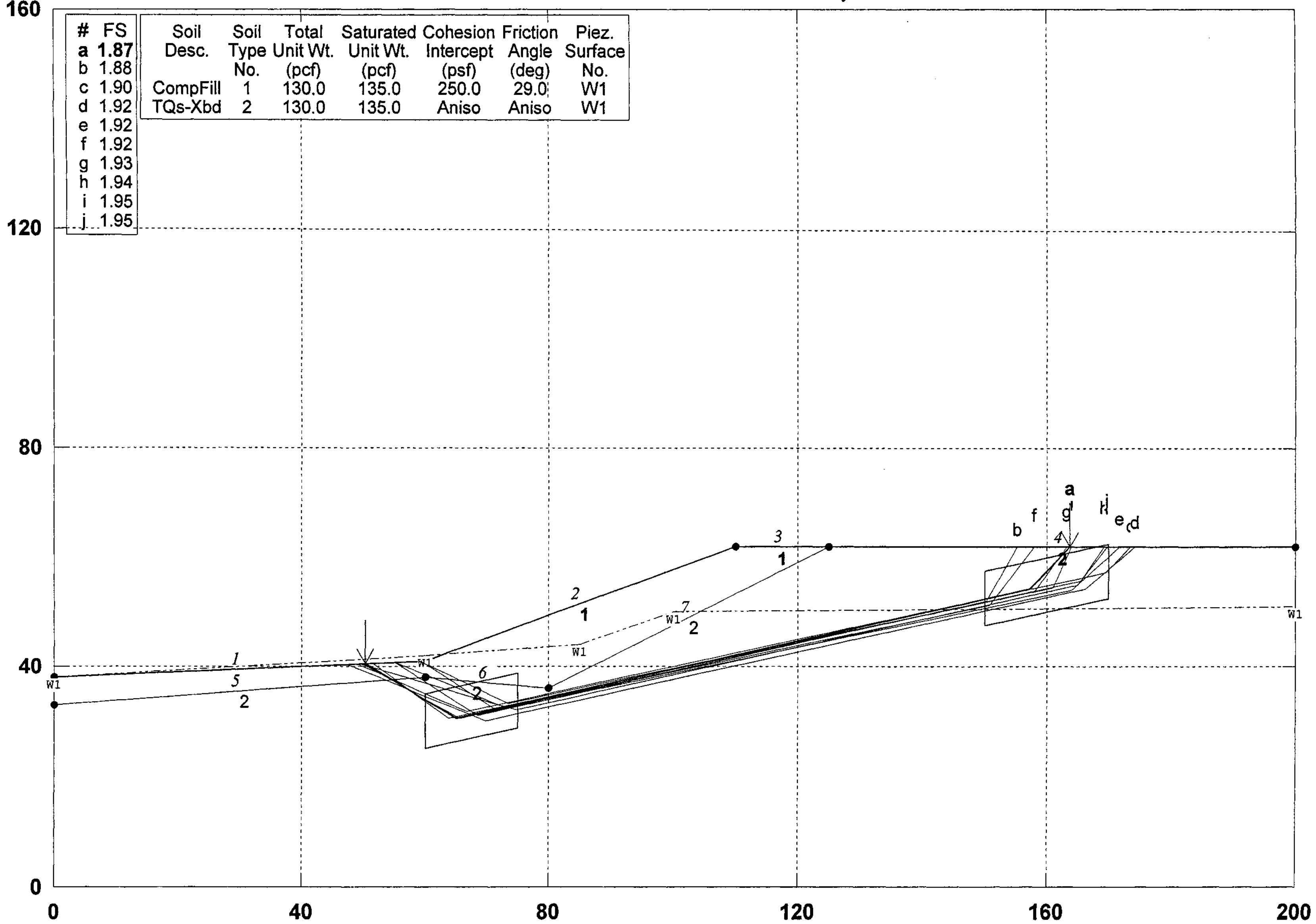
RUN # 8

```
   6      9.4  18141.2      .0  3612.5       .0      .0      .0      .0      .0
   7     10.8  18641.2      .0  3917.7       .0      .0      .0      .0      .0
   8       .9   1204.2      .0    89.8       .0      .0      .0      .0      .0
   9      1.0   1244.9      .0    42.2       .0      .0      .0      .0      .0
  10      3.0   3422.5      .0      .0       .0      .0      .0      .0      .0
  11      8.0   4122.2      .0      .0       .0      .0      .0      .0      .0
```

RUN # 8

TT 53425; 8-8'; CS-7 w 20' StabFill at Toe of Qls-5b in TQs; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T8S2B.PL2 Run By: BPG 3/26/2003 6:46PM



#	FS
a	**1.87**
b	1.88
c	1.90
d	1.92
e	1.92
f	1.92
g	1.93
h	1.94
i	1.95
j	1.95

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.87
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #9

```
                  ** PCSTABL5M **
                        by
                 Purdue University
             --Slope Stability Analysis--
          Simplified Janbu, Simplified Bishop
             or Spencer`s Method of Slices
Run Date:                  3/26/2003
Time of Run:               6:46PM
Run By:                    BPG
Input Data Filename:       N:T8S2B.IN
Output Filename:           N:T8S2B.OUT
Unit:                      ENGLISH
Plotted Output Filename:   N:T8S2B.PLT
PROBLEM DESCRIPTION    TT 53425; 8-8'; CS-7 w 20' StabFill at T
                       oe of Qls-5b in TQs; Static
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 0.00 to X-values and 0.00 to Y-values listed.

    4 Top   Boundaries
    7 Total Boundaries
Boundary     X-Left     Y-Left     X-Right     Y-Right     Soil Type
   No.        (ft)       (ft)       (ft)        (ft)       Below Bnd
   1           .00       38.00       60.00       41.00         1
   2         60.00       41.00      110.00       62.00         1
   3        110.00       62.00      125.00       62.00         1
   4        125.00       62.00      200.00       62.00         2
   5           .00       33.00       60.00       38.00         2
   6         60.00       38.00       80.00       36.00         2
   7         80.00       36.00      125.00       62.00         2
ISOTROPIC SOIL PARAMETERS
  2 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   130.0    135.0     250.0     29.0     .00        .0      1
   2   130.0    135.0     400.0     38.0     .00        .0      1
ANISOTROPIC STRENGTH PARAMETERS
    1 soil type(s)
 Soil Type  2 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit    Intercept       Angle
    No.            (deg)            (psf)         (deg)
     1              13.5            400.0          38.0
     2              14.5            300.0           8.5
     3              90.0            400.0          38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  5 Coordinate Points
   Point      X-Water     Y-Water
    No.        (ft)        (ft)
     1          .00        38.00
     2        60.00        42.00
     3        85.00        44.00
     4       100.00        50.00
     5       200.00        51.00
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 400 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  30.0
 Box         X-Left     Y-Left     X-Right     Y-Right       Height
 No.          (ft)       (ft)       (ft)        (ft)          (ft)
  1          60.00      30.00      75.00       33.74         10.00
```

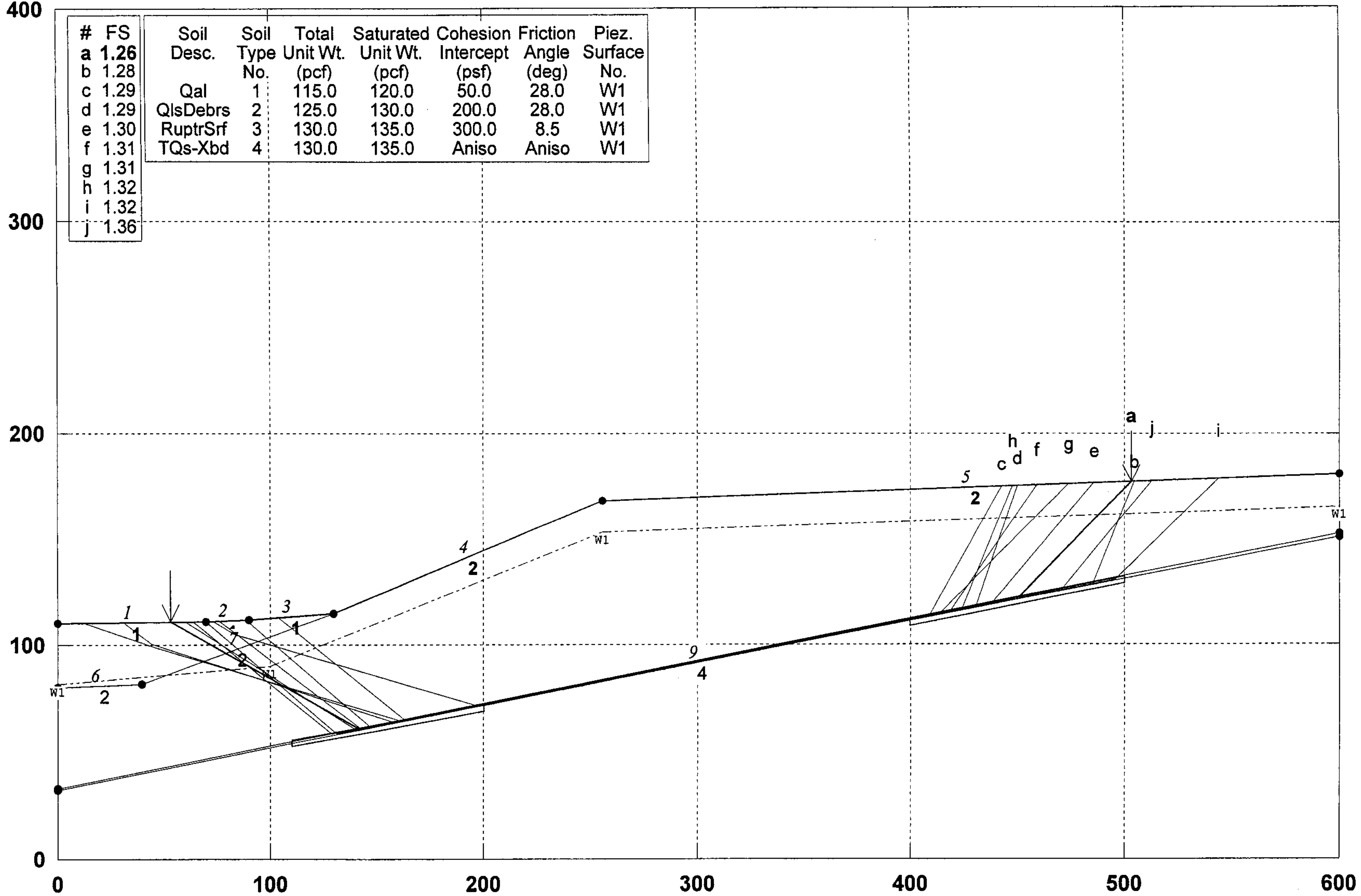
RUN #9

```
    2        150.00       52.44      170.00       57.43       10.00
   Following Are Displayed The Ten Most Critical Of The Trial
         Failure Surfaces Examined.  They Are Ordered - Most Critical
         First.
         * * Safety Factors Are Calculated By The Modified Janbu Method * *
         Failure Surface Specified By  4 Coordinate Points
           Point       X-Surf       Y-Surf
            No.         (ft)         (ft)
             1          50.15        40.51
             2          65.04        30.48
             3         157.26        54.31
             4         163.70        62.00
               ***      1.871      ***
              Individual data on the     12  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       4.4     944.4    238.2    813.2       .0       .0       .0       .0       .0
  2       5.4    3790.7    320.4   2498.3       .0       .0       .0       .0       .0
  3       5.0    6725.3     37.9   3790.0       .0       .0       .0       .0       .0
  4      15.0   27714.0       .0  10175.8       .0       .0       .0       .0       .0
  5       5.0   10267.7       .0   2829.6       .0       .0       .0       .0       .0
  6      15.0   33953.7       .0   8482.9       .0       .0       .0       .0       .0
  7       4.3   10643.7       .0   2761.3       .0       .0       .0       .0       .0
  8       5.7   14641.6       .0   3196.6       .0       .0       .0       .0       .0
  9      15.0   35491.5       .0   5935.2       .0       .0       .0       .0       .0
 10      17.2   31075.9       .0   2372.6       .0       .0       .0       .0       .0
 11      15.0   18840.5       .0       .0       .0       .0       .0       .0       .0
 12       6.4    3218.9       .0       .0       .0       .0       .0       .0       .0
```

RUN #9

TT 53425; 9-9'; El 1268 Top Cut of Qls-5b w Bike Trail @ El 1211; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T9S1A.PL2 Run By: BPG 3/26/2003 1:50PM



#	FS
a	**1.26**
b	1.28
c	1.29
d	1.29
e	1.30
f	1.31
g	1.31
h	1.32
i	1.32
j	1.36

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	115.0	120.0	50.0	28.0	W1
QlsDebrs	2	125.0	130.0	200.0	28.0	W1
RuptrSrf	3	130.0	135.0	300.0	8.5	W1
TQs-Xbd	4	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.26

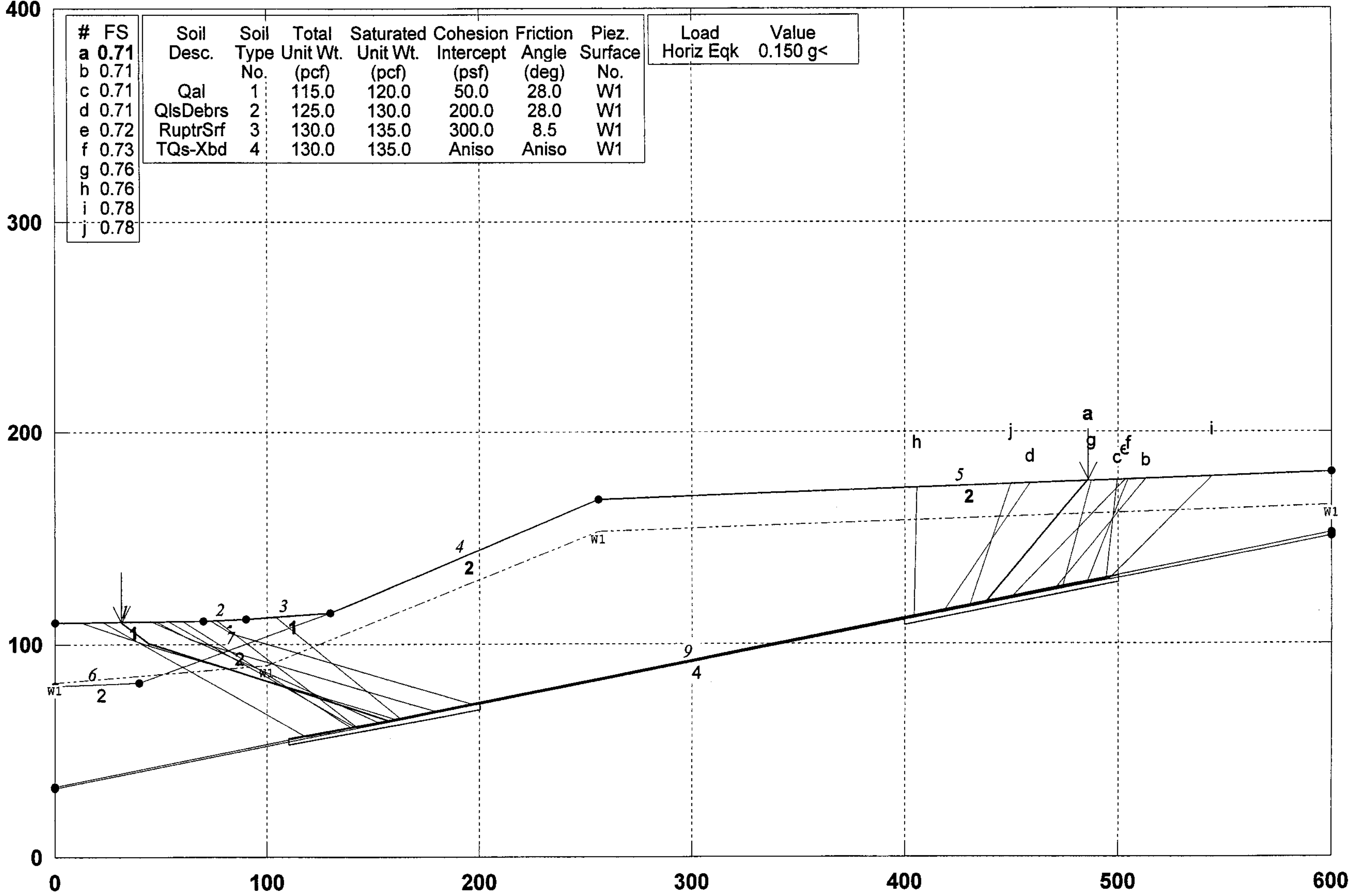
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #10

TT 53425; 9-9'; El 1268 Top Cut of Qls- 5b w Bike Trail @ El 1211; Pseudo-Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T9PS1A.PL2 Run By: BPG 3/26/2003 1:52PM



#	FS
a	**0.71**
b	0.71
c	0.71
d	0.71
e	0.72
f	0.73
g	0.76
h	0.76
i	0.78
j	0.78

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	115.0	120.0	50.0	28.0	W1
QlsDebrs	2	125.0	130.0	200.0	28.0	W1
RuptrSrf	3	130.0	135.0	300.0	8.5	W1
TQs-Xbd	4	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=0.71

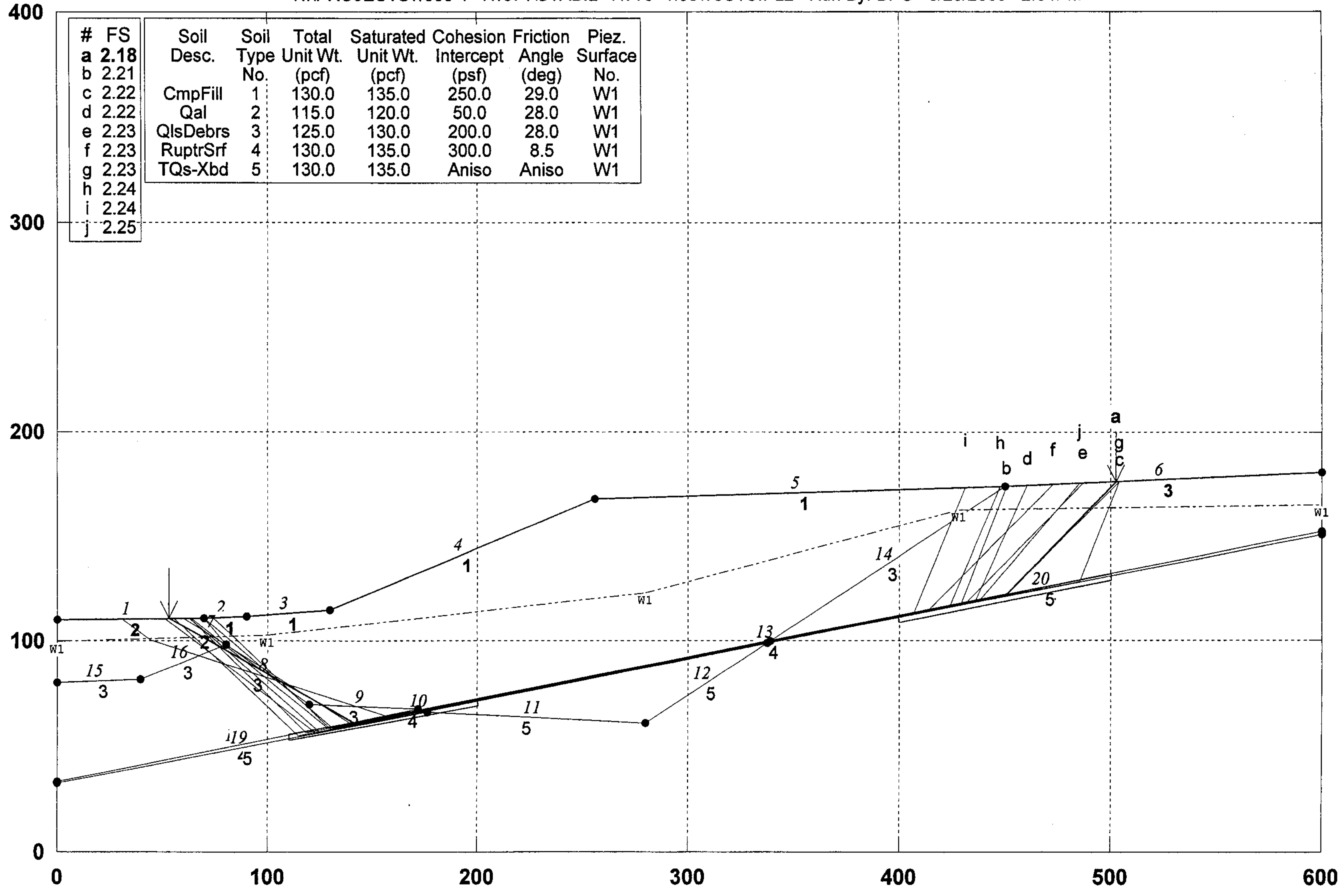
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #10

TT 53425; 9-9'; 150'W x 45'D Buttress + El 1268 Top Cut of Qls-5b; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T9S1C.PL2 Run By: BPG 3/26/2003 2:04PM



#	FS
a	**2.18**
b	2.21
c	2.22
d	2.22
e	2.23
f	2.23
g	2.23
h	2.24
i	2.24
j	2.25

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CmpFill	1	130.0	135.0	250.0	29.0	W1
Qal	2	115.0	120.0	50.0	28.0	W1
QlsDebrs	3	125.0	130.0	200.0	28.0	W1
RuptrSrf	4	130.0	135.0	300.0	8.5	W1
TQs-Xbd	5	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=2.18

Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #11

```
                       ** PCSTABL5M **
                             by
                      Purdue University
                 --Slope Stability Analysis--
           Simplified Janbu, Simplified Bishop
              or Spencer`s Method of Slices
 Run Date:                    3/26/2003
 Time of Run:                 2:04PM
 Run By:                      BPG
 Input Data Filename:         N:t9s1c.in
 Output Filename:             N:t9s1c.OUT
 Unit:                        ENGLISH
 Plotted Output Filename:     N:t9s1c.PLT
 PROBLEM DESCRIPTION   TT 53425; 9-9'; 150'W x 45'D Buttress +
                       El 1268 Top Cut of Qls-5b; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

     6 Top   Boundaries
    20 Total Boundaries
 Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
    No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
     1          .00     110.00      70.00     111.00        2
     2        70.00     111.00      90.00     112.00        1
     3        90.00     112.00     130.00     115.00        1
     4       130.00     115.00     256.00     168.00        1
     5       256.00     168.00     449.70     174.00        1
     6       449.70     174.00     600.00     181.00        3
     7        70.00     111.00      80.00      98.00        2
     8        80.00      98.00     120.00      70.00        3
     9       120.00      70.00     172.00      67.26        3
    10       172.00      67.26     176.00      66.26        4
    11       176.00      66.26     280.00      60.81        5
    12       280.00      60.81     337.20      98.98        5
    13       337.20      98.98     338.70     100.00        4
    14       338.70     100.00     449.70     174.00        3
    15          .00      80.00      40.00      82.00        3
    16        40.00      82.00      80.00      98.00        3
    17          .00      33.20     172.00      67.26        4
    18       338.70     100.00     600.00     152.00        4
    19          .00      32.20     176.00      66.26        5
    20       337.20      98.98     600.00     151.00        5
ISOTROPIC SOIL PARAMETERS
  5 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   130.0    135.0     250.0      29.0      .00        .0       1
   2   115.0    120.0      50.0      28.0      .00        .0       1
   3   125.0    130.0     200.0      28.0      .00        .0       1
   4   130.0    135.0     300.0       8.5      .00        .0       1
   5   130.0    135.0     350.0      32.0      .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  5 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit    Intercept      Angle
    No.             (deg)           (psf)        (deg)
     1               9.5            400.0         38.0
     2              10.5            450.0         19.0
     3              90.0            400.0         38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  5 Coordinate Points
   Point      X-Water     Y-Water
```

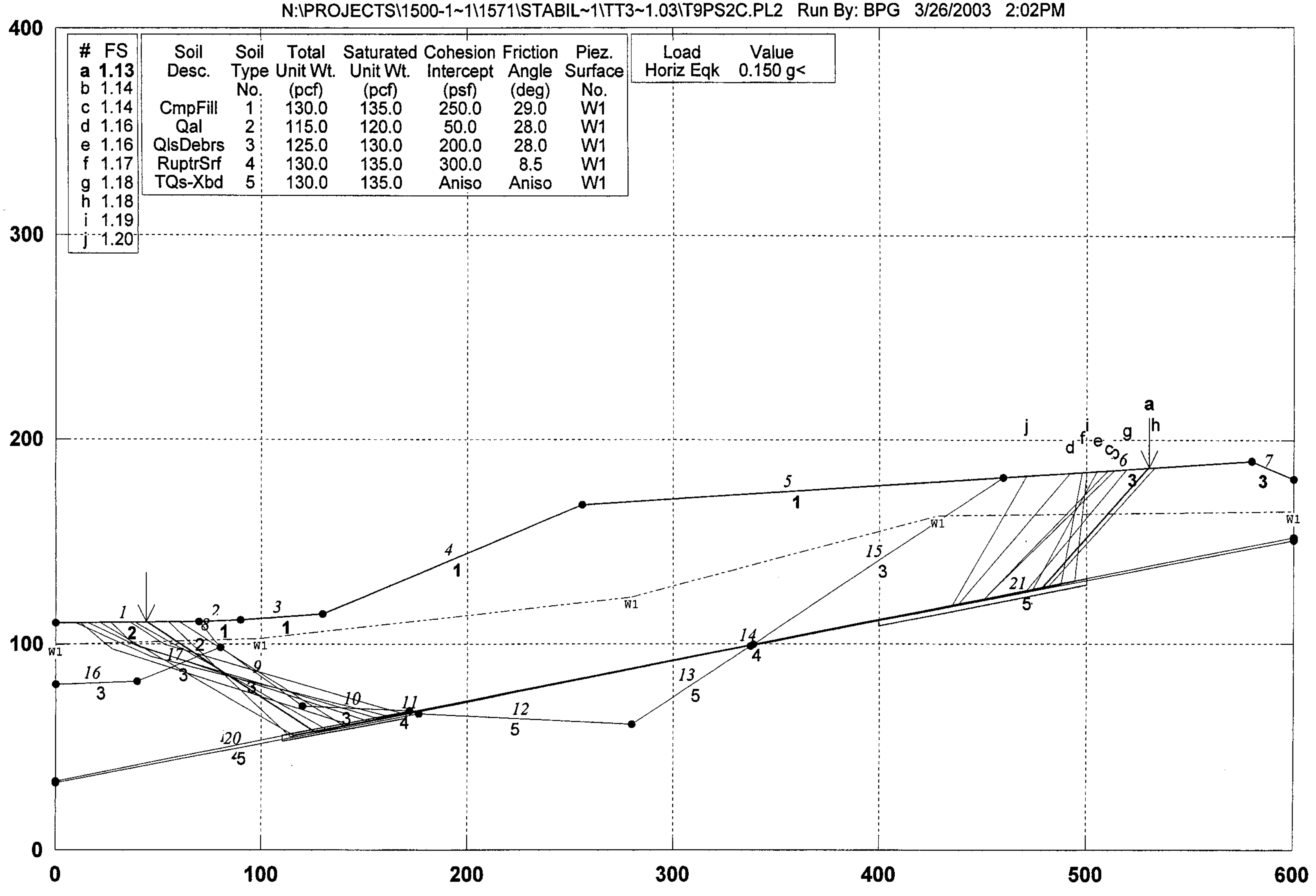
RUN #11

```
       No.          (ft)         (ft)
        1            .00       100.00
        2         100.00       103.00
        3         280.00       123.00
        4         428.00       163.00
        5         600.00       165.00
    A Critical Failure Surface Searching Method, Using A Random
    Technique For Generating Sliding Block Surfaces, Has Been
    Specified.
    400 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 120.0
    Box         X-Left     Y-Left     X-Right     Y-Right       Height
    No.          (ft)       (ft)        (ft)        (ft)          (ft)
     1          110.00      54.00     200.00       70.68          3.00
     2          400.00     110.42     500.00      130.22          3.00
    Following Are Displayed The Ten Most Critical Of The Trial
          Failure Surfaces Examined.  They Are Ordered - Most Critical
          First.
          * * Safety Factors Are Calculated By The Modified Janbu Method * *
          Failure Surface Specified By  4 Coordinate Points
            Point      X-Surf      Y-Surf
             No.        (ft)        (ft)
              1         53.04      110.76
              2        142.12       60.46
              3        451.07      121.93
              4        502.70      176.47
                ***     2.182    ***
                 Individual data on the    25  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     15.4    7910.5      .0      .0       .0       .0       .0       .0       .0
   2      1.5    1672.8      .0    51.1       .0       .0       .0       .0       .0
   3      6.7    9691.0      .0  1395.0       .0       .0       .0       .0       .0
   4       .8    1349.3      .0   275.4       .0       .0       .0       .0       .0
   5      2.6    5026.6      .0  1118.8       .0       .0       .0       .0       .0
   6     10.0   25154.8      .0  7048.4       .0       .0       .0       .0       .0
   7      8.2   27066.7      .0  8991.3       .0       .0       .0       .0       .0
   8      1.8    6604.7      .0  2316.4       .0       .0       .0       .0       .0
   9     25.8  126562.8      .0 50380.5       .0       .0       .0       .0       .0
  10      4.2   26329.4      .0 11361.3       .0       .0       .0       .0       .0
  11     11.0   77702.5      .0 33356.5       .0       .0       .0       .0       .0
  12      1.2    9128.2      .0  3866.9       .0       .0       .0       .0       .0
  13     29.9  250796.3      .0 86747.3       .0       .0       .0       .0       .0
  14      1.9   16903.8      .0  5368.5       .0       .0       .0       .0       .0
  15     82.1  825433.6      .0 *******       .0       .0       .0       .0       .0
  16     24.0  262861.3      .0 54882.5       .0       .0       .0       .0       .0
  17     57.8  581480.3      .0 *******       .0       .0       .0       .0       .0
  18       .9    8427.3      .0  2156.8       .0       .0       .0       .0       .0
  19     89.3  746067.6      .0 *******       .0       .0       .0       .0       .0
  20      5.3   38273.3      .0 15207.4       .0       .0       .0       .0       .0
  21     16.4  114187.2      .0 45025.7       .0       .0       .0       .0       .0
  22      1.4    9220.6      .0  3609.4       .0       .0       .0       .0       .0
  23       .5    3397.2      .0  1892.7       .0       .0       .0       .0       .0
  24     39.1  159766.9      .0 72349.8       .0       .0       .0       .0       .0
  25     12.1    9180.2      .0      .0       .0       .0       .0       .0       .0
```

RUN #11

TT 53425; 9-9'; 150'W x 45'D Buttress + El 1268 Top Cut of Qls-5b; PseudoStatic

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T9PS2C.PL2 Run By: BPG 3/26/2003 2:02PM



#	FS
a	**1.13**
b	1.14
c	1.14
d	1.16
e	1.16
f	1.17
g	1.18
h	1.18
i	1.19
j	1.20

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CmpFill	1	130.0	135.0	250.0	29.0	W1
Qal	2	115.0	120.0	50.0	28.0	W1
QlsDebrs	3	125.0	130.0	200.0	28.0	W1
RuptrSrf	4	130.0	135.0	300.0	8.5	W1
TQs-Xbd	5	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=1.13

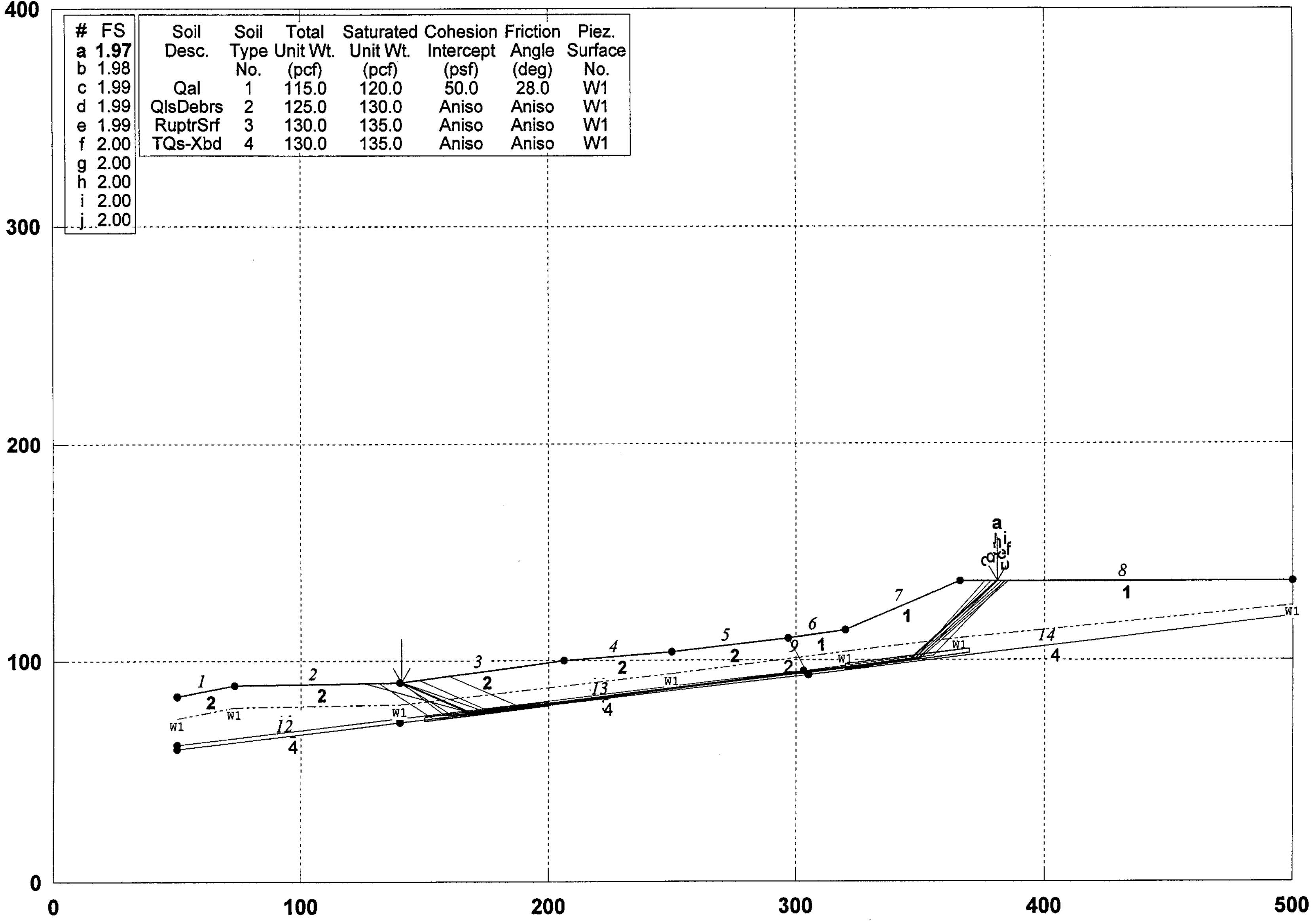
Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #11

TT 53425; 10-10'; Qls-6 Slope from Newhall Ranch Rd into Park Site; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T10S1A.PL2 Run By: BPG 3/26/2003 2:13PM



#	FS
a	**1.97**
b	1.98
c	1.99
d	1.99
e	1.99
f	2.00
g	2.00
h	2.00
i	2.00
j	2.00

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	115.0	120.0	50.0	28.0	W1
QlsDebrs	2	125.0	130.0	Aniso	Aniso	W1
RuptrSrf	3	130.0	135.0	Aniso	Aniso	W1
TQs-Xbd	4	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.97

Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #12

```
                    ** PCSTABL5M **
                          by
                   Purdue University
               --Slope Stability Analysis--
            Simplified Janbu, Simplified Bishop
               or Spencer`s Method of Slices
Run Date:                 3/26/2003
Time of Run:              2:13PM
Run By:                   BPG
Input Data Filename:      N:t10s1a.in
Output Filename:          N:t10s1a.OUT
Unit:                     ENGLISH
Plotted Output Filename:  N:t10s1a.PLT
PROBLEM DESCRIPTION    TT 53425; 10-10'; Qls-6 Slope from Newha
                       ll Ranch Rd into Park Site; Static
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 0.00 to X-values and 0.00 to Y-values listed.

    8 Top   Boundaries
   14 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1         50.00      84.00      73.00      89.00        2
    2         73.00      89.00     140.00      90.00        2
    3        140.00      90.00     206.00     100.00        2
    4        206.00     100.00     250.00     104.00        2
    5        250.00     104.00     297.00     110.00        2
    6        297.00     110.00     320.00     114.00        1
    7        320.00     114.00     366.00     136.00        1
    8        366.00     136.00     500.00     136.00        1
    9        297.00     110.00     305.00      93.00        2
   10         50.00      62.00     140.00      73.60        3
   11        140.00      73.60     303.00      95.00        3
   12         50.00      60.00     140.00      71.60        4
   13        140.00      71.60     305.00      93.00        4
   14        305.00      93.00     500.00     120.10        4
ISOTROPIC SOIL PARAMETERS
  4 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    120.0      50.0     28.0     .00        .0      1
   2   125.0    130.0     100.0     26.0     .00        .0      1
   3   130.0    135.0     300.0      8.5     .00        .0      1
   4   130.0    135.0     400.0     38.0     .00        .0      1
ANISOTROPIC STRENGTH PARAMETERS
     3 soil type(s)
 Soil Type  2 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit    Intercept      Angle
    No.             (deg)           (psf)        (deg)
    1                9.0            100.0         26.0
    2               11.0            450.0         19.0
    3               90.0            100.0         26.0
 Soil Type  3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit    Intercept      Angle
    No.             (deg)           (psf)        (deg)
    1                7.5            200.0         24.0
    2                8.5            300.0          8.5
    3               90.0            200.0         24.0
 Soil Type  4 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
```

RUN #12

```
  Range       Direction Limit    Intercept       Angle
   No.            (deg)            (psf)         (deg)
    1              9.5             400.0          38.0
    2             10.5             450.0          19.0
    3             90.0             400.0          38.0
1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
Unit Weight of Water =  62.40
Piezometric Surface No.  1 Specified by  7 Coordinate Points
  Point      X-Water     Y-Water
   No.         (ft)        (ft)
    1         50.00       74.00
    2         73.00       79.00
    3        140.00       80.00
    4        250.00       94.00
    5        320.00      104.00
    6        366.00      110.00
    7        500.00      125.00
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
800 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  80.0
Box        X-Left      Y-Left     X-Right     Y-Right      Height
No.         (ft)        (ft)        (ft)        (ft)         (ft)
 1         150.00      73.29      200.00      80.24         2.00
 2         320.00      96.92      370.00     103.87         2.00
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        153.07       91.98
    2        174.53       77.58
    3        366.68      102.89
    4        366.84      136.00
Factor Of Safety For The Preceding Specified Surface =  3.903
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Examined.  They Are Ordered - Most Critical
      First.
      * * Safety Factors Are Calculated By The Modified Janbu Method * *
      Failure Surface Specified By  4 Coordinate Points
        Point      X-Surf      Y-Surf
         No.        (ft)        (ft)
          1        140.42       90.06
          2        168.36       76.35
          3        346.24      100.02
          4        381.45      136.00
            ***     1.970    ***
             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    16.2  10530.9     .0      .0       .0       .0      .0      .0      .0
  2    10.2  17559.7     .0  2208.9       .0       .0      .0      .0      .0
  3     1.6   3460.6     .0   729.4       .0       .0      .0      .0      .0
  4    37.6  87583.6     .0 16804.1       .0       .0      .0      .0      .0
  5    44.0  99113.9     .0 18991.8       .0       .0      .0      .0      .0
  6    47.0  99678.2     .0 20545.9       .0       .0      .0      .0      .0
  7     4.1   8472.8     .0  1853.7       .0       .0      .0      .0      .0
  8     1.9   3841.1     .0   866.2       .0       .0      .0      .0      .0
  9     1.3   2619.1     .0   601.6       .0       .0      .0      .0      .0
 10    15.7  31496.8     .0  7224.1       .0       .0      .0      .0      .0
 11    26.2  67357.2     .0 12179.9       .0       .0      .0      .0      .0
 12     8.3  23325.4     .0  2717.9       .0       .0      .0      .0      .0
```

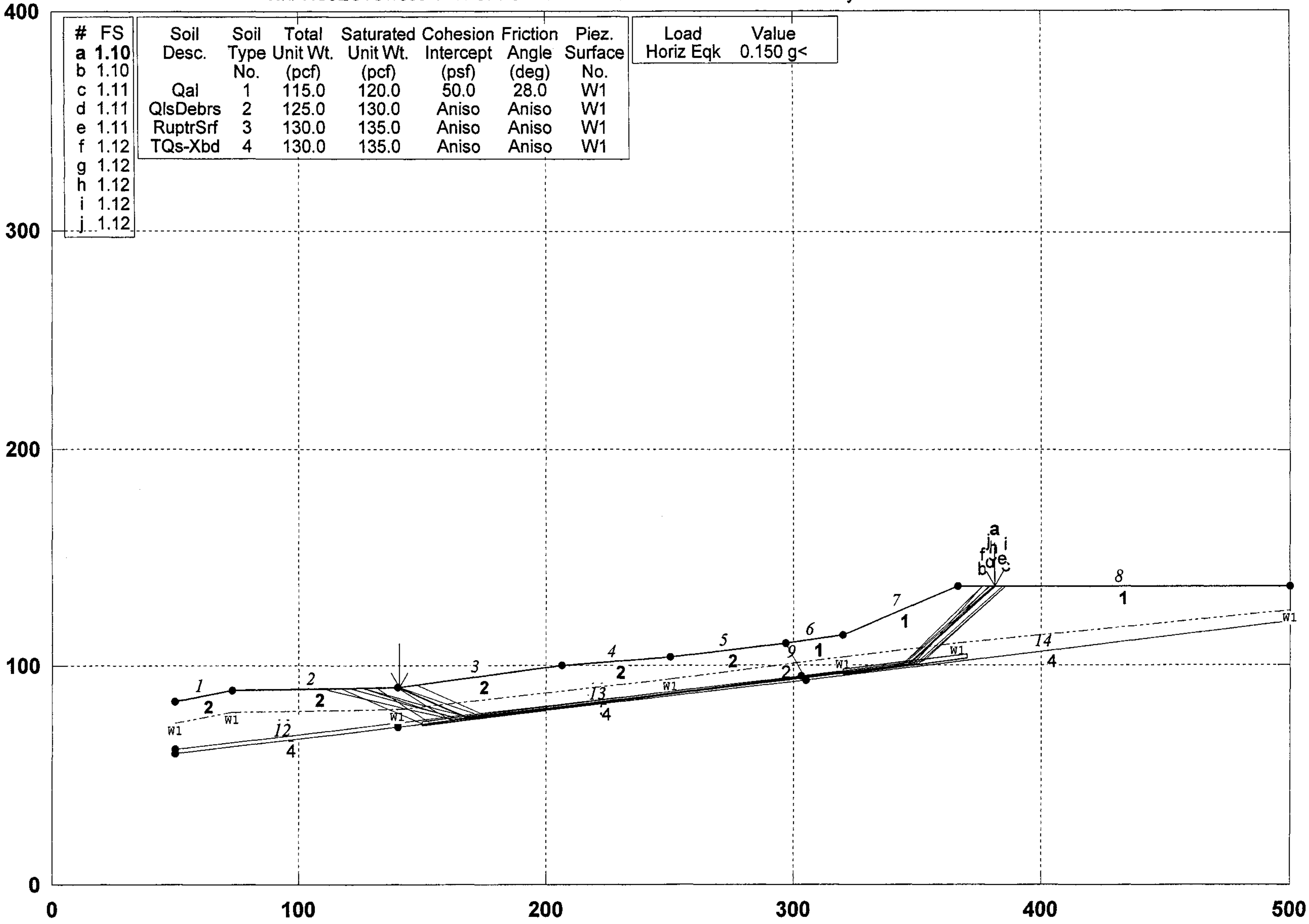
RUN #12

```
  13      11.5  24901.5      .0      .0       .0      .0      .0      .0      .0
  14      15.4  14025.2      .0      .0       .0      .0      .0      .0      .0
```

RUN# 12

TT 53425; 10-10'; Qls-6 Slope from Newhall Ranch Rd into Park Site; PseudoStatic

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T10PS1A.PL2 Run By: BPG 3/26/2003 2:11PM



#	FS
a	1.10
b	1.10
c	1.11
d	1.11
e	1.11
f	1.12
g	1.12
h	1.12
i	1.12
j	1.12

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	115.0	120.0	50.0	28.0	W1
QlsDebrs	2	125.0	130.0	Aniso	Aniso	W1
RuptrSrf	3	130.0	135.0	Aniso	Aniso	W1
TQs-Xbd	4	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=1.10

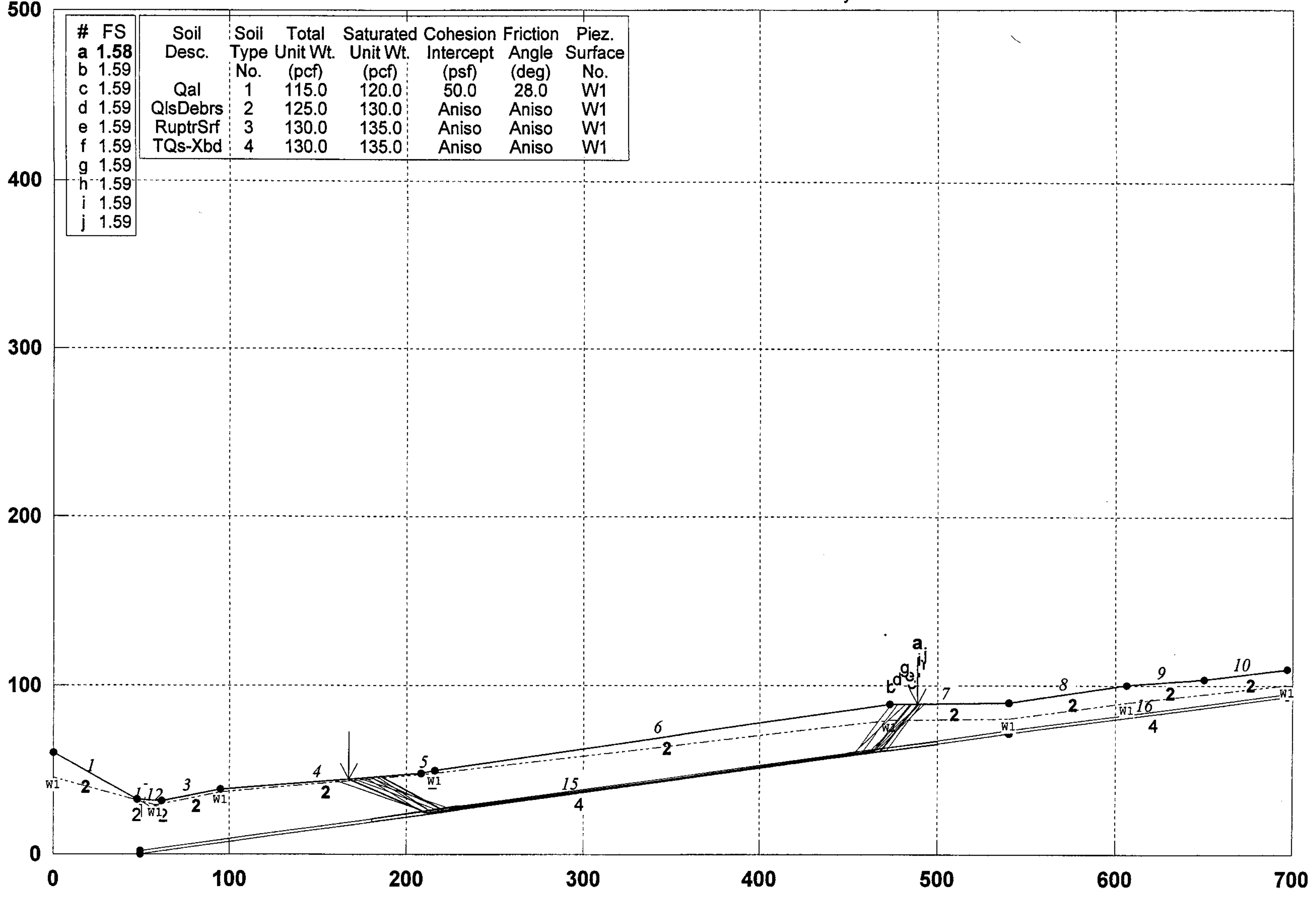
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #12

TT 53425; 10-10'; Qls-6 Slope thru Park into Canyon w Trail Cuts; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T10S2A.PL2 Run By: BPG 3/26/2003 2:17PM



#	FS
a	**1.58**
b	1.59
c	1.59
d	1.59
e	1.59
f	1.59
g	1.59
h	1.59
i	1.59
j	1.59

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	115.0	120.0	50.0	28.0	W1
QlsDebrs	2	125.0	130.0	Aniso	Aniso	W1
RuptrSrf	3	130.0	135.0	Aniso	Aniso	W1
TQs-Xbd	4	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.58

Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN # 13

```
                     ** PCSTABL5M **
                           by
                    Purdue University
                --Slope Stability Analysis--
            Simplified Janbu, Simplified Bishop
               or Spencer`s Method of Slices
Run Date:                 3/26/2003
Time of Run:              2:17PM
Run By:                   BPG
Input Data Filename:      N:t10s2a.in
Output Filename:          N:t10s2a.OUT
Unit:                     ENGLISH
Plotted Output Filename:  N:t10s2a.PLT
PROBLEM DESCRIPTION    TT 53425; 10-10'; Qls-6 Slope thru Park
                       into Canyon w Trail Cuts; Static
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 0.00 to X-values and 0.00 to Y-values listed.

   10 Top   Boundaries
   16 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1           .00      60.00      48.00      32.00        2
    2         48.00      32.00      62.00      31.00        1
    3         62.00      31.00      95.00      38.00        2
    4         95.00      38.00     208.00      48.00        2
    5        208.00      48.00     216.00      50.00        2
    6        216.00      50.00     473.00      89.00        2
    7        473.00      89.00     540.00      90.00        2
    8        540.00      90.00     606.00     100.00        2
    9        606.00     100.00     650.00     104.00        2
   10        650.00     104.00     697.00     110.00        2
   11         48.00      32.00      58.00      26.00        2
   12         58.00      26.00      62.00      31.00        2
   13         50.00       2.00     540.00      73.60        3
   14        540.00      73.60     697.00      95.00        3
   15         50.00        .00     540.00      71.60        4
   16        540.00      71.60     697.00      93.00        4
ISOTROPIC SOIL PARAMETERS
  4 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    120.0      50.0     28.0     .00        .0       1
   2   125.0    130.0     100.0     26.0     .00        .0       1
   3   130.0    135.0     300.0      8.5     .00        .0       1
   4   130.0    135.0     334.0     49.0     .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     3 soil type(s)
 Soil Type  2 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction     Counterclockwise     Cohesion      Friction
   Range        Direction Limit     Intercept       Angle
    No.              (deg)            (psf)         (deg)
     1                9.0             100.0          26.0
     2               11.0             450.0          19.0
     3               90.0             100.0          26.0
 Soil Type  3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction     Counterclockwise     Cohesion      Friction
   Range        Direction Limit     Intercept       Angle
    No.              (deg)            (psf)         (deg)
     1                7.5             200.0          28.0
     2                8.5             300.0           8.5
     3               90.0             200.0          28.0
 Soil Type  4 Is Anisotropic
```

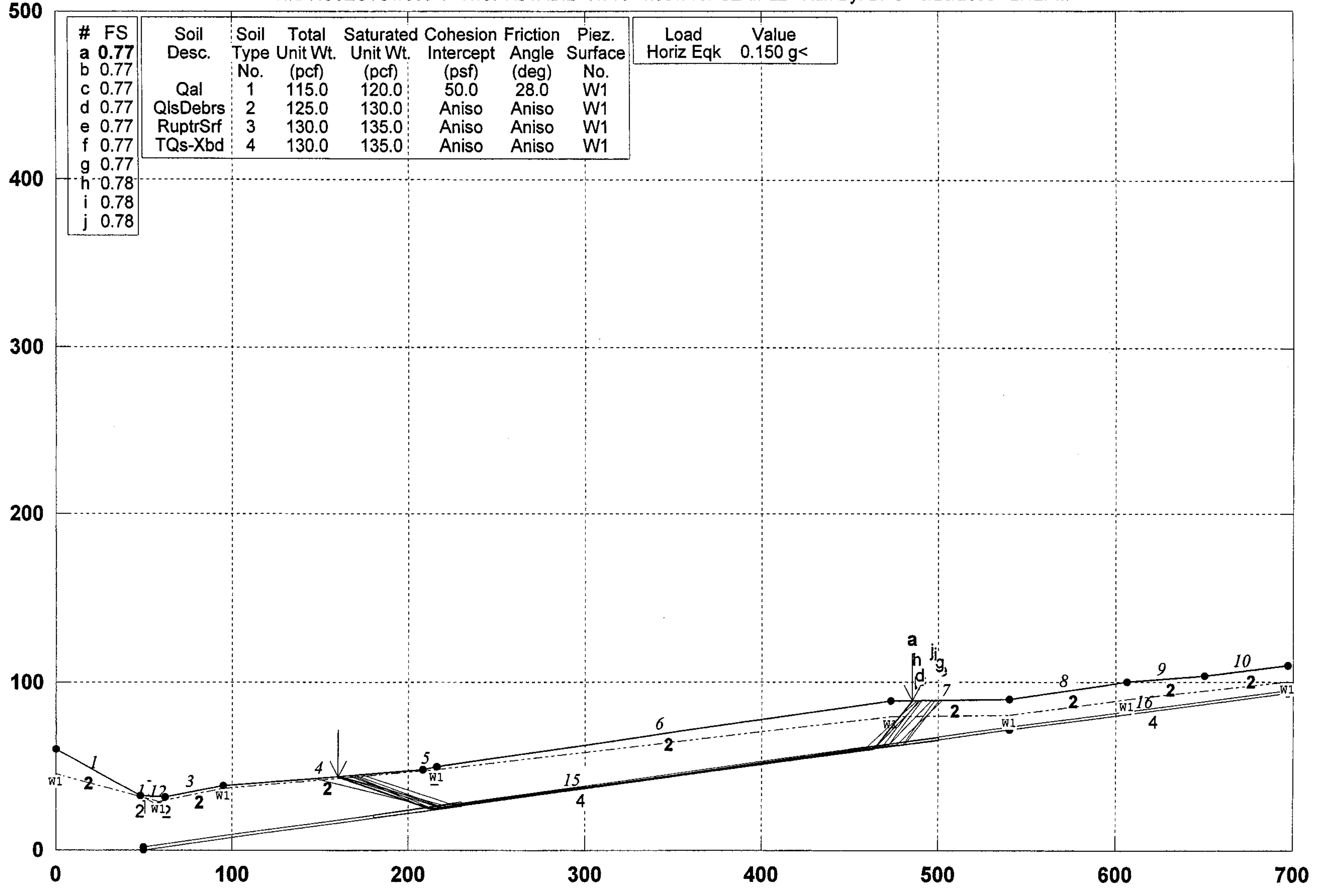
RUN #13

```
   Number Of Direction Ranges Specified =  3
   Direction     Counterclockwise     Cohesion     Friction
     Range        Direction Limit    Intercept      Angle
      No.            (deg)             (psf)        (deg)
       1              9.5              334.0        49.0
       2             10.5             1982.0        24.3
       3             90.0              334.0        49.0
   1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
   Unit Weight of Water =  62.40
   Piezometric Surface No.  1 Specified by  8 Coordinate Points
     Point      X-Water     Y-Water
      No.        (ft)        (ft)
       1           .00       45.00
       2         58.00       29.00
       3         95.00       37.00
       4        216.00       48.00
       5        473.00       79.00
       6        540.00       80.00
       7        606.00       90.00
       8        697.00      100.00
   A Critical Failure Surface Searching Method, Using A Random
   Technique For Generating Sliding Block Surfaces, Has Been
   Specified.
   800 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  80.0
   Box         X-Left      Y-Left     X-Right     Y-Right       Height
   No.          (ft)        (ft)        (ft)        (ft)         (ft)
    1          180.00      20.17      230.00      27.36         2.00
    2          450.00      59.39      500.00      66.34         2.00
   Following Are Displayed The Ten Most Critical Of The Trial
         Failure Surfaces Examined.  They Are Ordered - Most Critical
         First.
         * * Safety Factors Are Calculated By The Modified Janbu Method * *
         Failure Surface Specified By  4 Coordinate Points
           Point       X-Surf      Y-Surf
            No.         (ft)        (ft)
             1         167.36      44.40
             2         212.04      24.04
             3         467.76      61.17
             4         488.92      89.24
               ***      1.583    ***
             Individual data on the    10  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      1.5     77.6      .0      .0      .0       .0      .0      .0      .0
  2     39.1  58177.9      .0 28576.7      .0       .0      .0      .0      .0
  3      1.3   3885.1      .0  1968.8      .0       .0      .0      .0      .0
  4      2.7   8467.7      .0  4237.4      .0       .0      .0      .0      .0
  5      4.0  12955.2      .0  5840.4      .0       .0      .0      .0      .0
  6    251.8 852377.8      .0 *******      .0       .0      .0      .0      .0
  7      1.6   5324.4      .0  2658.1      .0       .0      .0      .0      .0
  8      3.7  10746.9      .0  4916.2      .0       .0      .0      .0      .0
  9      8.3  16235.9      .0  4677.3      .0       .0      .0      .0      .0
 10      7.6   4765.4      .0      .0      .0       .0      .0      .0      .0
```

RUN #13

TT 53425; 10-10'; Qls-6 Slope into Canyon w Park Trail; Pseudo-Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T10PS2A.PL2   Run By: BPG   3/26/2003   2:12PM



#	FS
a	**0.77**
b	0.77
c	0.77
d	0.77
e	0.77
f	0.77
g	0.77
h	0.78
i	0.78
j	0.78

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	115.0	120.0	50.0	28.0	W1
QlsDebrs	2	125.0	130.0	Aniso	Aniso	W1
RuptrSrf	3	130.0	135.0	Aniso	Aniso	W1
TQs-Xbd	4	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=0.77

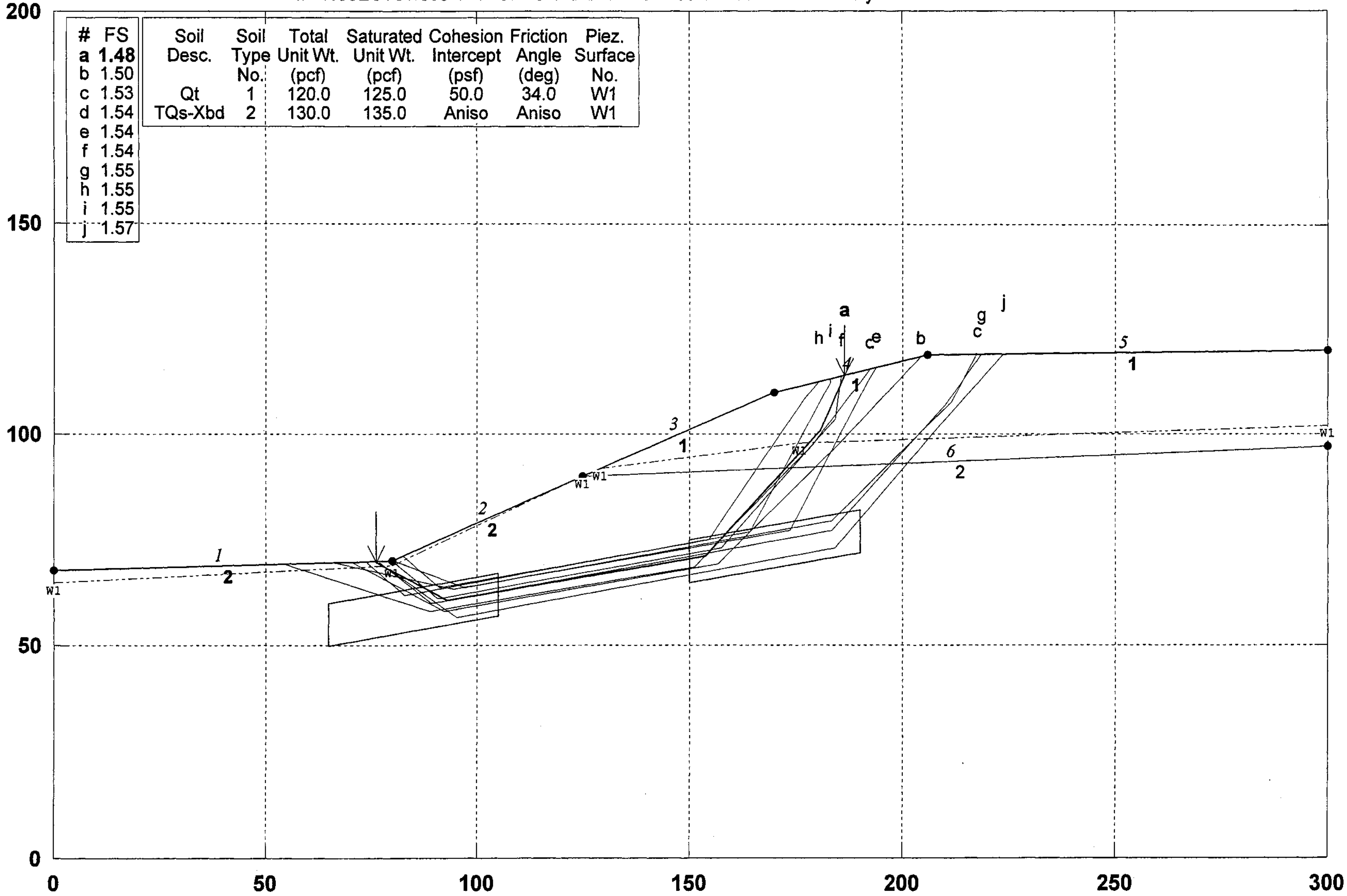
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #13

TT 53425; 11-11', CS-15; Qt/TQs Cut As Designed; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T11S1A.PL2 Run By: BPG 3/26/2003 3:15PM



#	FS
a	**1.48**
b	1.50
c	1.53
d	1.54
e	1.54
f	1.54
g	1.55
h	1.55
i	1.55
j	1.57

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qt	1	120.0	125.0	50.0	34.0	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.48

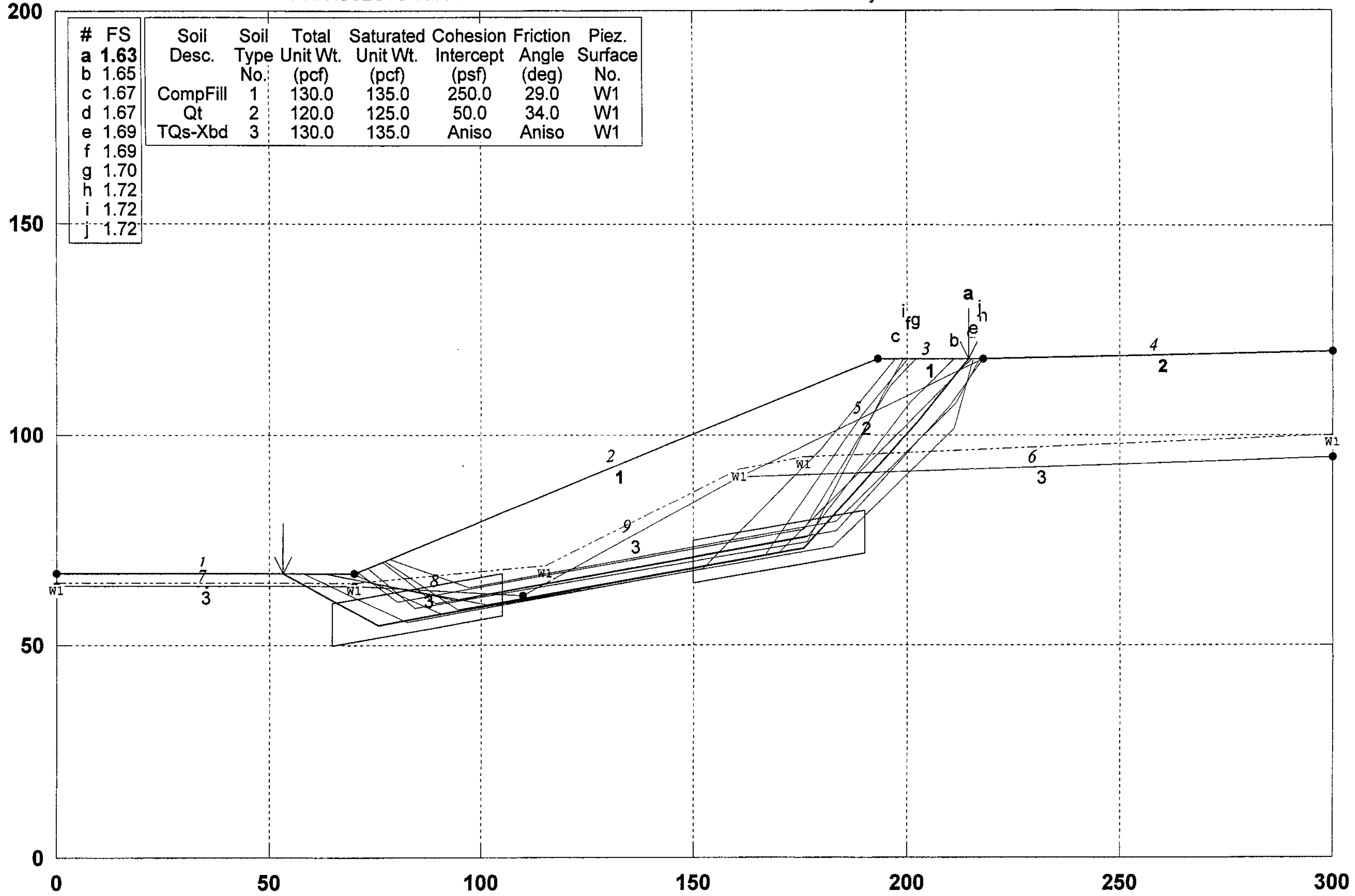
Safety Factors Are Calculated By The Modified Janbu Method for the case of 1 soil type(s)

STED

RUN # 14

TT 53425; 11-11', CS-15; Qt/TQs Cut w 40' Buttress; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T11S1B.PL2 Run By: BPG 3/25/2003 5:52PM



#	FS
a	**1.63**
b	1.65
c	1.67
d	1.67
e	1.69
f	1.69
g	1.70
h	1.72
i	1.72
j	1.72

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qt	2	120.0	125.0	50.0	34.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.63

Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #15

```
                     ** PCSTABL5M **
                           by
                    Purdue University
               --Slope Stability Analysis--
            Simplified Janbu, Simplified Bishop
               or Spencer`s Method of Slices
Run Date:                 3/25/2003
Time of Run:              5:52PM
Run By:                   BPG
Input Data Filename:      N:t11s1b.in
Output Filename:          N:t11s1b.OUT
Unit:                     ENGLISH
Plotted Output Filename:  N:t11s1b.PLT
PROBLEM DESCRIPTION   TT 53425; 11-11', CS-15; Qt/TQs Cut w 40
                      ' Buttress; Static
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 0.00 to X-values and 0.00 to Y-values listed.

    4 Top   Boundaries
    9 Total Boundaries
Boundary     X-Left     Y-Left    X-Right     Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)        (ft)     Below Bnd
    1          .00       67.00      70.00       67.00        1
    2        70.00       67.00     193.00      118.00        1
    3       193.00      118.00     218.00      118.00        1
    4       218.00      118.00     300.00      120.00        2
    5       161.00       90.00     218.00      118.00        2
    6       161.00       90.00     300.00       95.00        3
    7          .00       64.00      70.00       64.00        3
    8        70.00       64.00     110.00       62.00        3
    9       110.00       62.00     161.00       90.00        3
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   130.0    135.0     250.0     29.0     .00        .0       1
   2   120.0    125.0      50.0     34.0     .00        .0       1
   3   130.0    135.0     400.0     38.0     .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction     Counterclockwise     Cohesion     Friction
   Range        Direction Limit    Intercept       Angle
    No.              (deg)           (psf)         (deg)
    1                 9.5            400.0         38.0
    2                10.5            450.0         19.0
    3                90.0            400.0         38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  6 Coordinate Points
   Point      X-Water     Y-Water
    No.        (ft)        (ft)
    1           .00        65.00
    2         70.00        65.00
    3        115.00        69.00
    4        161.00        92.00
    5        176.00        95.00
    6        300.00       100.00
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 400 Trial Surfaces Have Been Generated.
 2 Boxes Specified For Generation Of Central Block Base
 Length Of Line Segments For Active And Passive Portions Of
```

RUN #15

```
Sliding Block Is  40.0
Box         X-Left      Y-Left     X-Right     Y-Right       Height
No.          (ft)        (ft)        (ft)        (ft)         (ft)
 1          65.00       55.00      105.00       62.05        10.00
 2         150.00       69.98      190.00       77.03        10.00
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point       X-Surf      Y-Surf
   No.         (ft)        (ft)
    1          67.19       67.00
    2          88.16       59.49
    3         156.03       72.51
    4         156.91      103.03
Factor Of Safety For The Preceding Specified Surface =  4.774
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point       X-Surf      Y-Surf
   No.         (ft)        (ft)
    1          89.31       75.01
    2         104.82       66.11
    3         182.85       75.17
    4         183.94      114.24
Factor Of Safety For The Preceding Specified Surface =  5.436
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point       X-Surf      Y-Surf
   No.         (ft)        (ft)
    1          83.58       72.63
    2          94.69       61.53
    3         185.99       72.35
    4         186.47      112.34
    5         186.69      115.38
Factor Of Safety For The Preceding Specified Surface =  6.142
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point       X-Surf      Y-Surf
   No.         (ft)        (ft)
    1          44.87       67.00
    2          67.97       56.24
    3         160.52       71.33
    4         160.72      104.62
Factor Of Safety For The Preceding Specified Surface =  6.250
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point       X-Surf      Y-Surf
   No.         (ft)        (ft)
    1          48.51       67.00
    2          48.65       66.86
    3          87.47       57.20
    4         176.98       72.48
    5         177.12      111.41
Factor Of Safety For The Preceding Specified Surface =  3.355
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point       X-Surf      Y-Surf
   No.         (ft)        (ft)
    1          74.73       68.96
    2          88.08       63.60
    3         157.83       68.04
    4         158.53      103.71
Factor Of Safety For The Preceding Specified Surface =  7.359
```

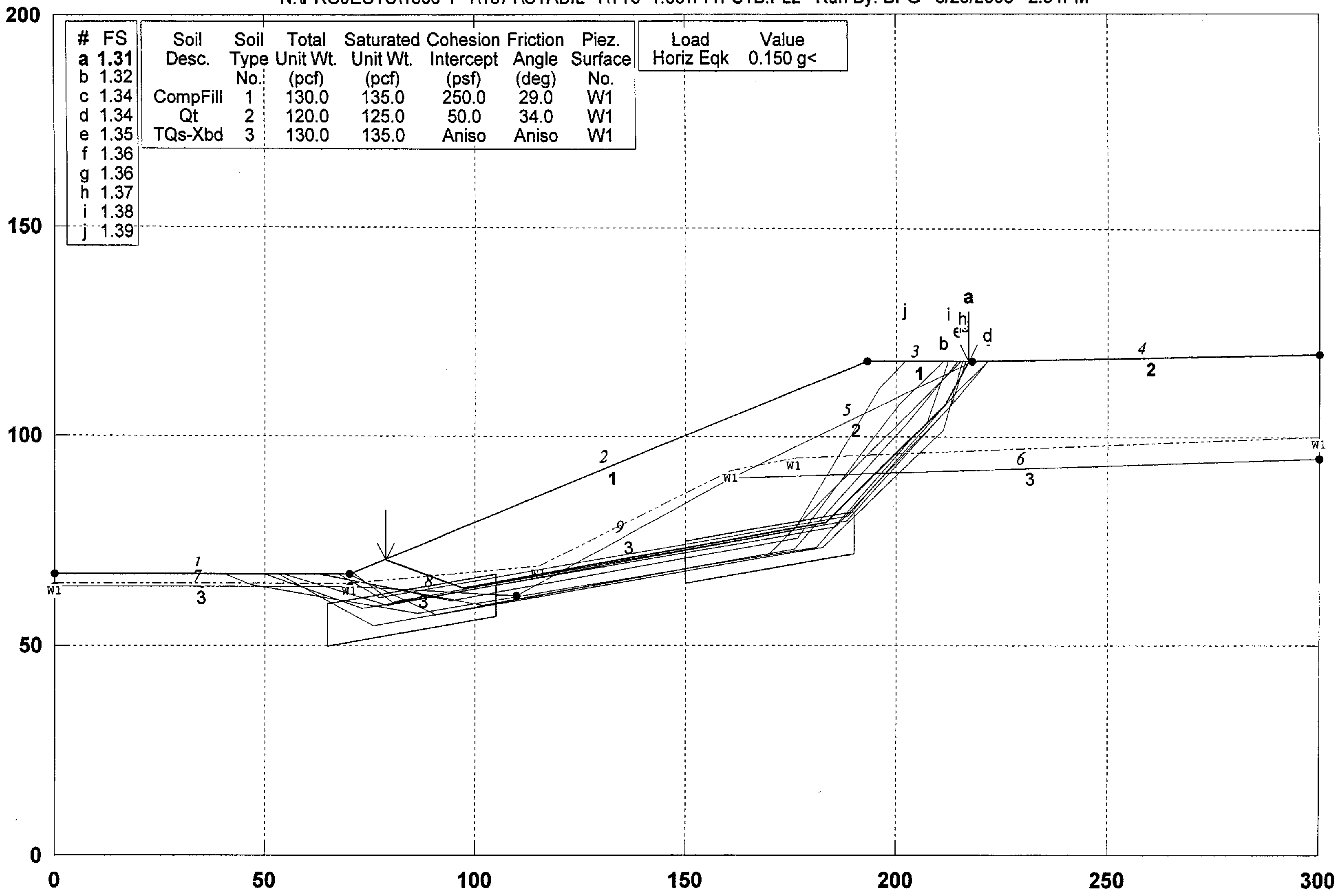
RUN # 15

```
   Following Are Displayed The Ten Most Critical Of The Trial
         Failure Surfaces Examined.  They Are Ordered - Most Critical
         First.
         * * Safety Factors Are Calculated By The Modified Janbu Method * *
         Failure Surface Specified By  5 Coordinate Points
           Point      X-Surf      Y-Surf
            No.        (ft)        (ft)
             1         53.11       67.00
             2         75.77       54.77
             3        176.06       73.24
             4        202.47      103.28
             5        214.49      118.00
               ***     1.635   ***
              Individual data on the   16  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      3.7    481.7      .0      .0      .0      .0      .0      .0      .0
  2      1.9    606.7      .0    65.7      .0      .0      .0      .0      .0
  3     11.3   9156.0      .0  3261.6      .0      .0      .0      .0      .0
  4      5.8   9159.1      .0  3639.2      .0      .0      .0      .0      .0
  5     34.2  84181.6      .0 19716.2      .0      .0      .0      .0      .0
  6      5.0  15188.0      .0  2289.3      .0      .0      .0      .0      .0
  7     46.0 176166.5      .0 37485.1      .0      .0      .0      .0      .0
  8      6.9  31917.7      .0  9226.0      .0      .0      .0      .0      .0
  9      8.1  39351.8      .0 10985.6      .0      .0      .0      .0      .0
 10       .1    306.7      .0    85.6      .0      .0      .0      .0      .0
 11     15.7  64852.4      .0 19498.2      .0      .0      .0      .0      .0
 12      1.2   4009.8      .0   448.3      .0      .0      .0      .0      .0
 13      2.9   8643.7      .0   434.4      .0      .0      .0      .0      .0
 14      6.6  15172.0      .0      .0      .0      .0      .0      .0      .0
 15      9.7  10719.3      .0      .0      .0      .0      .0      .0      .0
 16      2.3    439.4      .0      .0      .0      .0      .0      .0      .0
```

RUN#15

TT 53425; 11-11', CS-15; Qt/TQs Cut w 40' Buttress; PseudoStatic

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T11PS1B.PL2 Run By: BPG 3/25/2003 2:34PM



#	FS
a	**1.31**
b	1.32
c	1.34
d	1.34
e	1.35
f	1.36
g	1.36
h	1.37
i	1.38
j	1.39

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qt	2	120.0	125.0	50.0	34.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=1.31

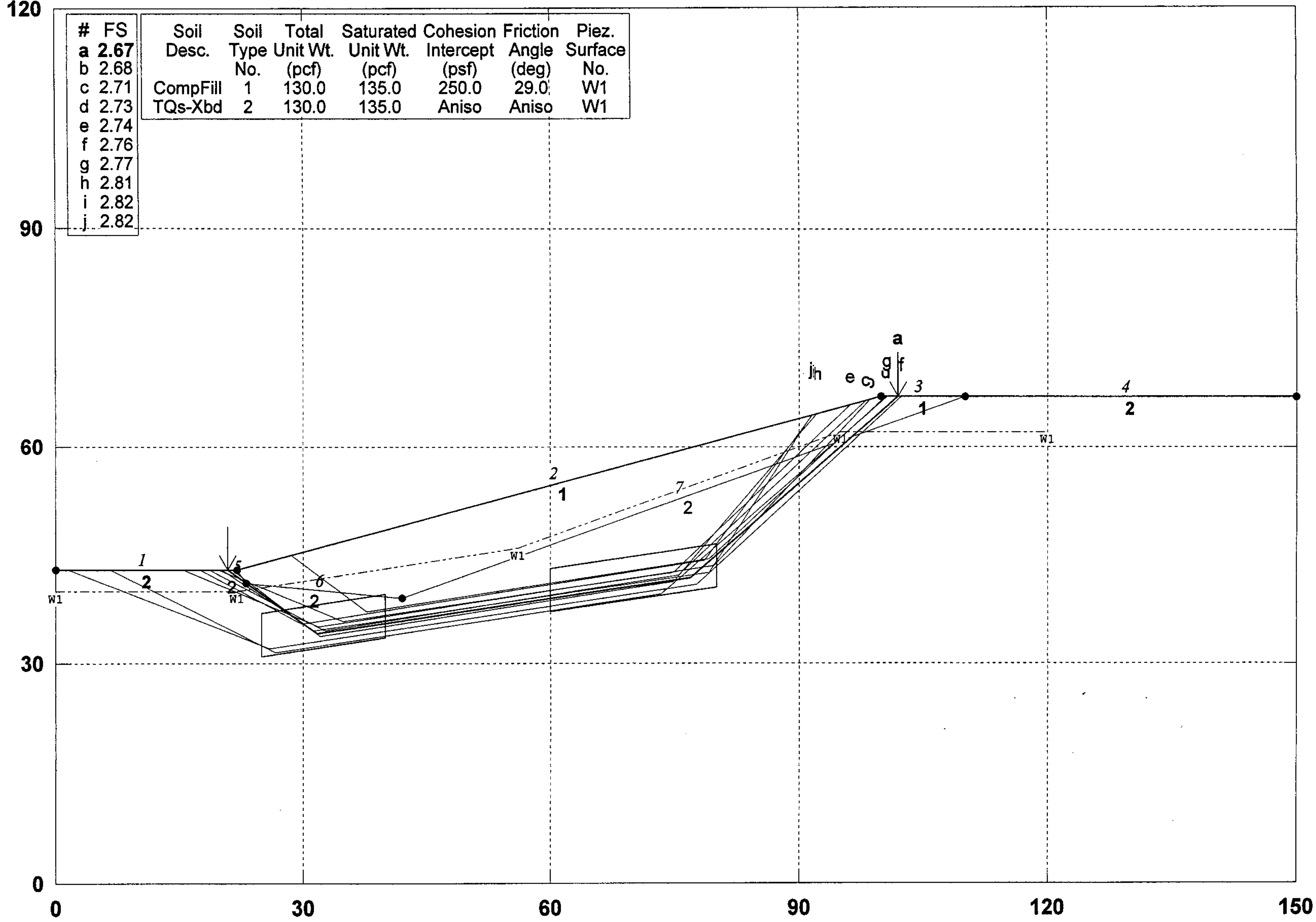
Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #15

TT 53425; 11-11', CS-13 w 20' StabFill for TQs Cut BLo El 1367; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T11S2B.PL2 Run By: BPG 3/26/2003 3:46PM



#	FS
a	**2.67**
b	2.68
c	2.71
d	2.73
e	2.74
f	2.76
g	2.77
h	2.81
i	2.82
j	2.82

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=2.67
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #16

```
                    ** PCSTABL5M **
                          by
                   Purdue University
              --Slope Stability Analysis--
           Simplified Janbu, Simplified Bishop
              or Spencer`s Method of Slices
 Run Date:                 3/26/2003
 Time of Run:              3:46PM
 Run By:                   BPG
 Input Data Filename:      N:t11s2b.in
 Output Filename:          N:t11s2b.OUT
 Unit:                     ENGLISH
 Plotted Output Filename:  N:t11s2b.PLT
 PROBLEM DESCRIPTION    TT 53425; 11-11', CS-13 w 20' StabFill f
                        or TQs Cut BLo El 1367; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

     4 Top   Boundaries
     7 Total Boundaries
 Boundary     X-Left     Y-Left     X-Right    Y-Right     Soil Type
    No.        (ft)       (ft)       (ft)       (ft)       Below Bnd
     1          .00       43.00      22.00      43.00          2
     2        22.00       43.00     100.00      67.00          1
     3       100.00       67.00     110.00      67.00          1
     4       110.00       67.00     150.00      67.00          2
     5        22.00       43.00      23.00      41.00          2
     6        23.00       41.00      42.00      39.00          2
     7        42.00       39.00     110.00      67.00          2
ISOTROPIC SOIL PARAMETERS
  2 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   130.0    135.0     250.0    29.0     .00        .0       1
   2   130.0    135.0     400.0    38.0     .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  2 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise    Cohesion     Friction
   Range       Direction Limit    Intercept      Angle
    No.            (deg)            (psf)        (deg)
     1               9.5            400.0         38.0
     2              10.5            450.0         19.0
     3              90.0            400.0         38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  5 Coordinate Points
   Point      X-Water     Y-Water
    No.        (ft)        (ft)
     1          .00        40.00
     2        22.00        40.00
     3        56.00        46.00
     4        95.00        62.00
     5       120.00        62.00
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 400 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  40.0
 Box        X-Left     Y-Left     X-Right    Y-Right      Height
 No.         (ft)       (ft)       (ft)        (ft)        (ft)
  1         25.00      33.88      40.00      36.53        6.00
```

RUN #16

```
 2          60.00      40.05      80.00      43.58       6.00
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        26.03       44.24
    2        36.16       34.16
    3        77.10       43.55
    4        77.45       60.06
Factor Of Safety For The Preceding Specified Surface =  8.592
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        20.54       43.00
    2        32.45       36.41
    3        75.98       43.94
    4        76.49       59.77
Factor Of Safety For The Preceding Specified Surface =  6.120
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        28.00       44.85
    2        38.02       36.03
    3        67.66       41.59
    4        67.90       57.12
Factor Of Safety For The Preceding Specified Surface = 16.054
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        13.18       43.00
    2        33.69       35.66
    3        63.02       41.46
    4        63.42       55.75
Factor Of Safety For The Preceding Specified Surface = 10.748
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        23.81       43.56
    2        32.36       37.82
    3        78.67       41.81
    4        78.77       60.47
Factor Of Safety For The Preceding Specified Surface = 19.011
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        19.69       43.00
    2        28.65       34.07
    3        77.55       42.20
    4        77.84       60.18
Factor Of Safety For The Preceding Specified Surface =  9.280
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         7.86       43.00
```

RUN #16

```
     2          26.29        31.70
     3          79.87        42.48
     4          80.22        60.91
Factor Of Safety For The Preceding Specified Surface =  7.727
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
     1          16.24        43.00
     2          33.83        35.32
     3          78.52        40.55
     4          79.23        60.61
Factor Of Safety For The Preceding Specified Surface =  8.326
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
     1           7.88        43.00
     2          26.11        34.51
     3          65.26        40.68
     4          65.35        56.34
Factor Of Safety For The Preceding Specified Surface = 19.515
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
     1          14.73        43.00
     2          33.63        34.60
     3          64.81        42.03
     4          64.96        56.22
Factor Of Safety For The Preceding Specified Surface = 13.073
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
     1           1.09        43.00
     2          27.38        37.29
     3          71.41        44.44
     4          71.56        58.25
Factor Of Safety For The Preceding Specified Surface = 12.536
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
     1          22.45        43.14
     2          30.50        35.94
     3          68.11        40.24
     4          68.29        57.24
Factor Of Safety For The Preceding Specified Surface = 18.382
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point       X-Surf       Y-Surf
   No.         (ft)         (ft)
     1          26.78        44.47
     2          39.26        35.28
     3          74.70        42.64
     4          74.89        59.27
Factor Of Safety For The Preceding Specified Surface = 12.316
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Examined.  They Are Ordered - Most Critical
      First.
```

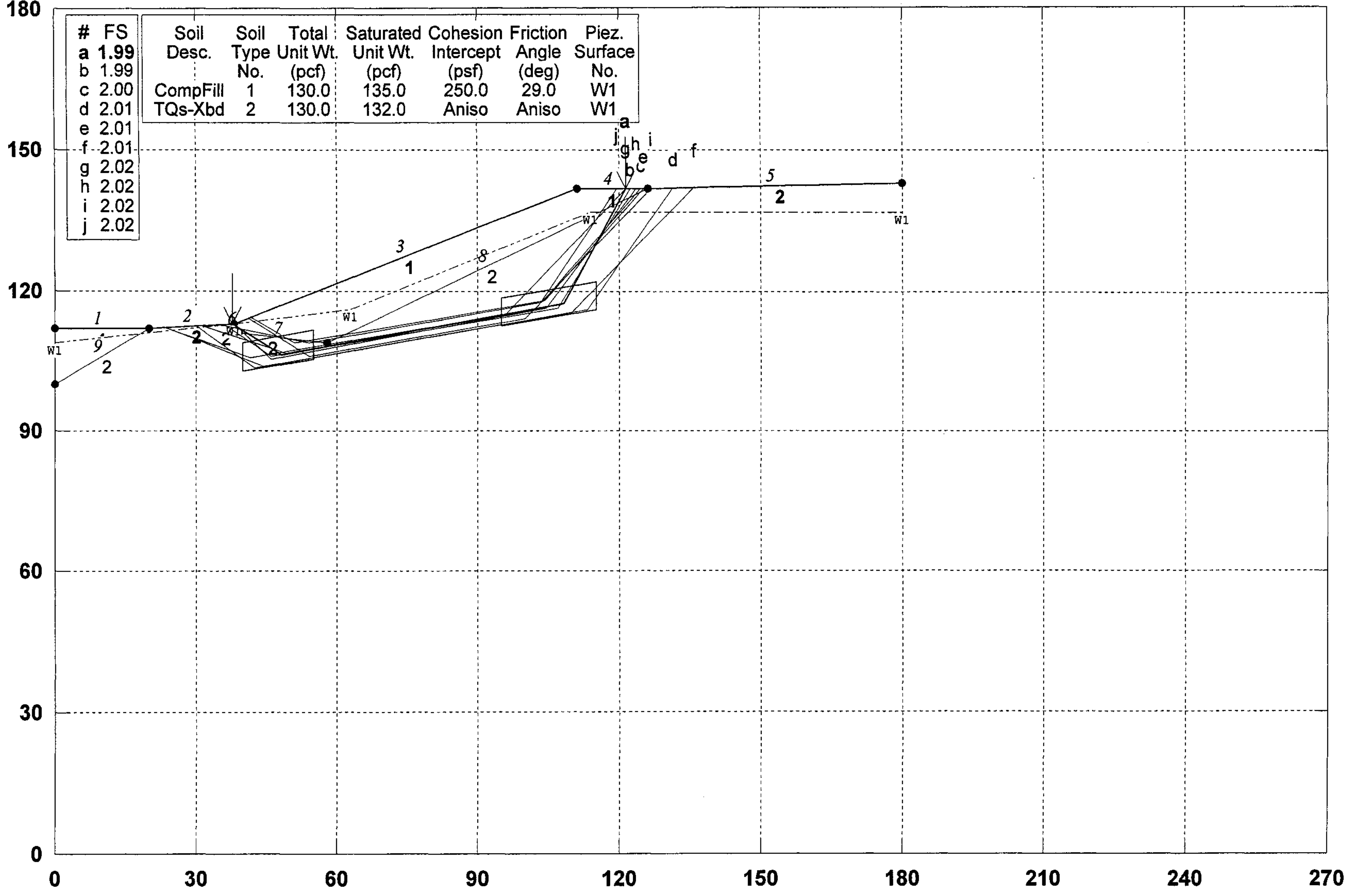
RUN #16

```
              * * Safety Factors Are Calculated By The Modified Janbu Method * *
              Failure Surface Specified By  4 Coordinate Points
                Point      X-Surf      Y-Surf
                 No.        (ft)        (ft)
                  1         20.86       43.00
                  2         31.68       34.13
                  3         76.95       41.86
                  4        102.09       67.00
                    ***     2.666    ***
                   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      1.1     69.8        .0      .0       .0       .0       .0       .0       .0
   2       .8    143.3        .0      .0       .0       .0       .0       .0       .0
   3       .5    151.4        .0      .0       .0       .0       .0       .0       .0
   4       .7    271.7        .0      .0       .0       .0       .0       .0       .0
   5      1.9   1048.4        .0   135.9       .0       .0       .0       .0       .0
   6      5.8   6578.1        .0  2157.7       .0       .0       .0       .0       .0
   7     10.3  17232.9        .0  4896.8       .0       .0       .0       .0       .0
   8     14.0  26417.4        .0  6704.6       .0       .0       .0       .0       .0
   9     20.9  46241.2        .0 12586.4       .0       .0       .0       .0       .0
  10     18.1  28313.5        .0 10958.7       .0       .0       .0       .0       .0
  11      1.5   1020.3        .0   179.6       .0       .0       .0       .0       .0
  12       .5    300.9        .0    12.8       .0       .0       .0       .0       .0
  13      2.9   1171.9        .0      .0       .0       .0       .0       .0       .0
  14      2.1    283.3        .0      .0       .0       .0       .0       .0       .0
```

RUN #16

TT 53425; 11-11', CS-12; TQs Cut w 20' StabFill BLo El 1342; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T11S3B.PL2 Run By: BPG 3/26/2003 4:15PM



#	FS
a	**1.99**
b	1.99
c	2.00
d	2.01
e	2.01
f	2.01
g	2.02
h	2.02
i	2.02
j	2.02

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
TQs-Xbd	2	130.0	132.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.99

Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #17

```
                   ** PCSTABL5M **
                         by
                  Purdue University
             --Slope Stability Analysis--
          Simplified Janbu, Simplified Bishop
             or Spencer`s Method of Slices
 Run Date:                3/26/2003
 Time of Run:             4:15PM
 Run By:                  BPG
 Input Data Filename:     N:t11s3b.in
 Output Filename:         N:t11s3b.OUT
 Unit:                    ENGLISH
 Plotted Output Filename: N:t11s3b.PLT
 PROBLEM DESCRIPTION    TT 53425; 11-11', CS-12; TQs Cut w 20' S
                        tabFill BLo El 1342; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

     5 Top   Boundaries
     9 Total Boundaries
 Boundary     X-Left      Y-Left    X-Right     Y-Right     Soil Type
    No.        (ft)        (ft)       (ft)        (ft)      Below Bnd
     1           .00      112.00      20.00      112.00         1
     2         20.00      112.00      38.00      113.00         2
     3         38.00      113.00     111.00      142.00         1
     4        111.00      142.00     126.00      142.00         1
     5        126.00      142.00     180.00      143.00         2
     6         38.00      113.00      39.00      111.00         2
     7         39.00      111.00      58.00      109.00         2
     8         58.00      109.00     126.00      142.00         2
     9           .00      100.00      20.00      112.00         2
ISOTROPIC SOIL PARAMETERS
  2 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   130.0    135.0     250.0    29.0      .00        .0       1
   2   130.0    132.0     400.0    38.0      .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  2 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise    Cohesion     Friction
   Range       Direction Limit    Intercept      Angle
    No.             (deg)           (psf)        (deg)
     1                9.5           400.0         38.0
     2               10.5           450.0         19.0
     3               90.0           400.0         38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  5 Coordinate Points
   Point      X-Water     Y-Water
    No.         (ft)        (ft)
     1           .00      109.00
     2         38.00      113.00
     3         63.00      116.00
     4        114.00      137.00
     5        180.00      137.00
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 400 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  40.0
 Box        X-Left     Y-Left     X-Right     Y-Right      Height
```

RUN #17

```
No.          (ft)        (ft)        (ft)        (ft)         (ft)
 1          40.00      105.88       55.00      108.53         6.00
 2          95.00      115.58      115.00      119.11         6.00
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         36.77      112.93
    2         43.65      106.07
    3        112.55      117.73
    4        112.95      142.00
Factor Of Safety For The Preceding Specified Surface =  3.511
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         39.90      113.75
    2         45.56      109.01
    3        101.31      115.19
    4        101.99      138.42
Factor Of Safety For The Preceding Specified Surface =  6.103
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         46.40      116.34
    2         54.28      110.81
    3        108.80      120.88
    4        109.22      141.29
Factor Of Safety For The Preceding Specified Surface =  3.967
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         33.28      112.74
    2         44.60      107.32
    3         95.74      114.68
    4         96.29      136.16
Factor Of Safety For The Preceding Specified Surface =  6.185
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         39.01      113.40
    2         44.86      107.78
    3        100.49      118.53
    4        100.56      137.85
Factor Of Safety For The Preceding Specified Surface =  6.628
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         18.64      112.00
    2         42.35      105.75
    3        107.30      117.25
    4        107.35      140.55
Factor Of Safety For The Preceding Specified Surface =  4.296
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
```

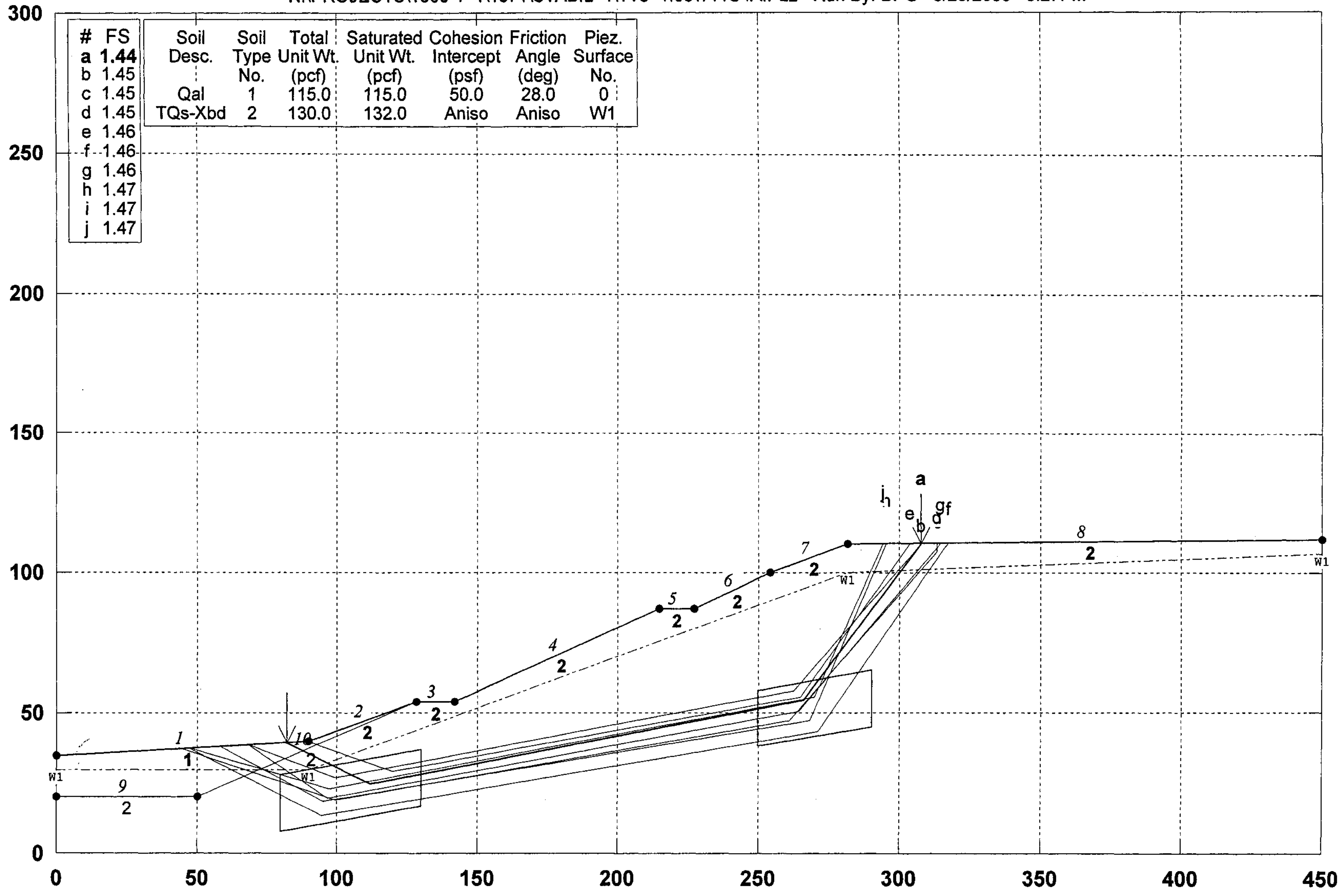
RUN #17

```
      No.         (ft)        (ft)
       1          42.40       114.75
       2          52.40       105.41
       3          99.14       116.60
       4          99.50       137.43
   Factor Of Safety For The Preceding Specified Surface =  5.775
   Following Are Displayed The Ten Most Critical Of The Trial
         Failure Surfaces Examined.  They Are Ordered - Most Critical
         First.
         * * Safety Factors Are Calculated By The Modified Janbu Method * *
         Failure Surface Specified By  4 Coordinate Points
           Point       X-Surf       Y-Surf
            No.         (ft)         (ft)
             1          37.79       112.99
             2          48.03       106.18
             3         108.23       117.19
             4         121.46       142.00
               ***      1.989     ***
              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      .0       .0      .0      .0      .0      .0       .0      .0      .0
   2      .2      2.1      .0     1.1      .0      .0       .0      .0      .0
   3      .1      3.3      .0     1.7      .0      .0       .0      .0      .0
   4     3.0    748.4      .0   316.5      .0      .0       .0      .0      .0
   5     6.9   6552.2      .0  2731.6      .0      .0       .0      .0      .0
   6    10.0  15701.7      .0  4843.0      .0      .0       .0      .0      .0
   7     5.0   8913.3      .0  2279.5      .0      .0       .0      .0      .0
   8    45.2 112200.2      .0 32617.8      .0      .0       .0      .0      .0
   9     2.8   7876.0      .0  5247.3      .0      .0       .0      .0      .0
  10     3.0   6615.6      .0  4127.2      .0      .0       .0      .0      .0
  11     1.7   2761.8      .0  1664.6      .0      .0       .0      .0      .0
  12     3.1   3197.1      .0  1191.2      .0      .0       .0      .0      .0
  13     1.1    559.9      .0      .0      .0      .0       .0      .0      .0
  14     1.6    306.5      .0      .0      .0      .0       .0      .0      .0
```

RUN #17

TT 53425; 11-11', CS-11; Design TQs Cut BLo Elev 1310; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T11S4A.PL2 Run By: BPG 3/25/2003 5:27PM



#	FS
a	**1.44**
b	1.45
c	1.45
d	1.45
e	1.46
f	1.46
g	1.46
h	1.47
i	1.47
j	1.47

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	115.0	115.0	50.0	28.0	0
TQs-Xbd	2	130.0	132.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.44

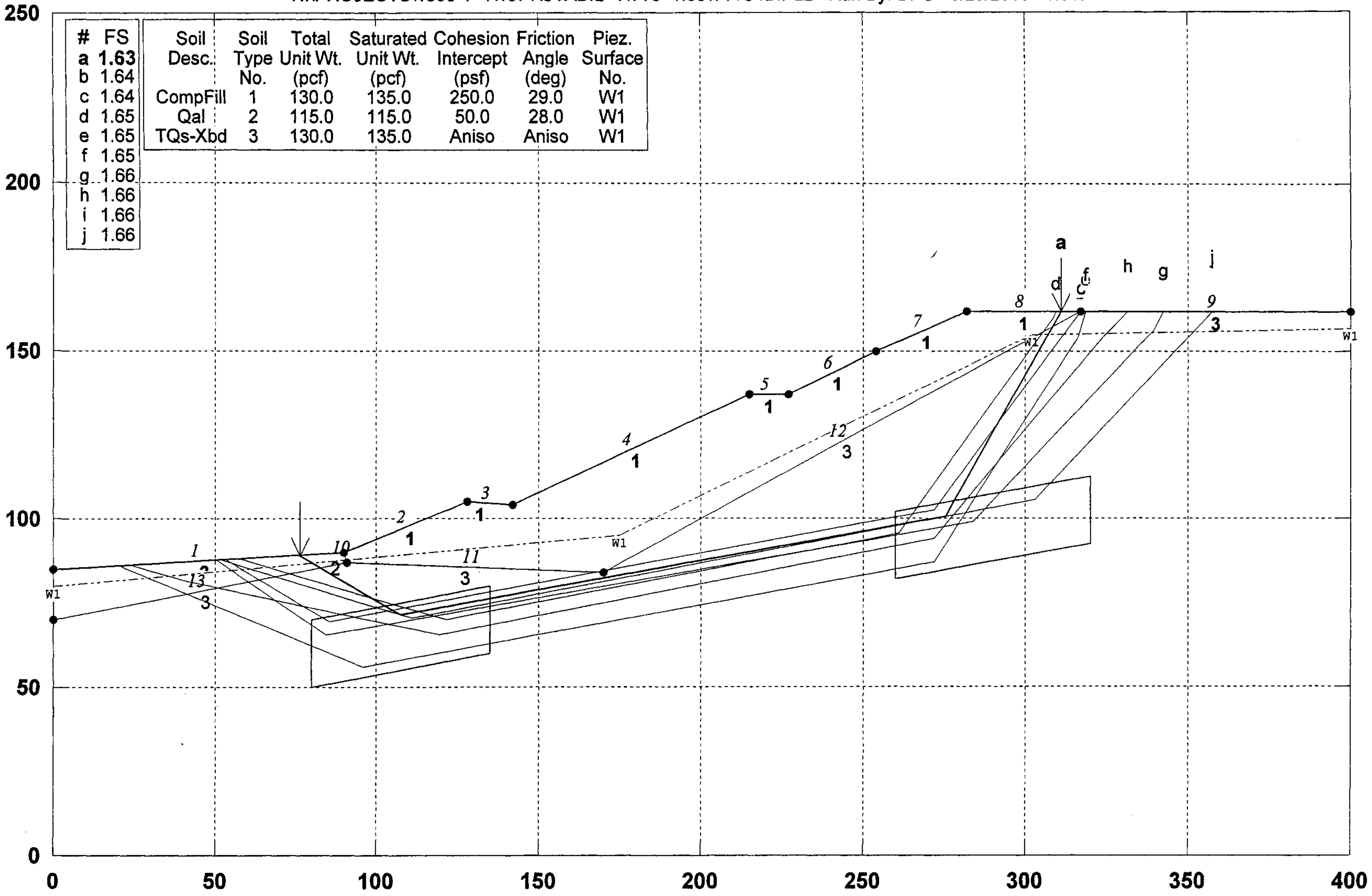
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #18

TT 53425, 11-11', CS-11 w 80' Buttress for TQs Cut BLo Elev 1310; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T11S4B.PL2 Run By: BPG 3/25/2003 5:30PM



#	FS
a	**1.63**
b	1.64
c	1.64
d	1.65
e	1.65
f	1.65
g	1.66
h	1.66
i	1.66
j	1.66

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qal	2	115.0	115.0	50.0	28.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.63

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN#19

```
                    ** PCSTABL5M **
                          by
                   Purdue University
             --Slope Stability Analysis--
          Simplified Janbu, Simplified Bishop
             or Spencer`s Method of Slices
Run Date:                 3/25/2003
Time of Run:              5:30PM
Run By:                   BPG
Input Data Filename:      N:t11s4b.in
Output Filename:          N:t11s4b.OUT
Unit:                     ENGLISH
Plotted Output Filename:  N:t11s4b.PLT
PROBLEM DESCRIPTION   TT 53425,  11-11', CS-11 w 80' Buttress
                      for TQs Cut BLo Elev 1310; Static
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 0.00 to X-values and 0.00 to Y-values listed.

    9 Top   Boundaries
   13 Total Boundaries
Boundary     X-Left     Y-Left     X-Right     Y-Right     Soil Type
   No.        (ft)       (ft)        (ft)        (ft)      Below Bnd
    1          .00       85.00       90.00       90.00         2
    2        90.00       90.00      128.00      105.00         1
    3       128.00      105.00      142.00      104.00         1
    4       142.00      104.00      215.00      137.00         1
    5       215.00      137.00      227.00      137.00         1
    6       227.00      137.00      254.00      150.00         1
    7       254.00      150.00      282.00      162.00         1
    8       282.00      162.00      317.00      162.00         1
    9       317.00      162.00      400.00      162.00         3
   10        90.00       90.00       91.00       87.00         2
   11        91.00       87.00      170.00       84.00         3
   12       170.00       84.00      317.00      162.00         3
   13          .00       70.00       91.00       87.00         3
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   130.0    135.0     250.0     29.0     .00        .0       1
  2   115.0    115.0      50.0     28.0     .00        .0       1
  3   130.0    135.0     400.0     38.0     .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type   3 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit    Intercept       Angle
   No.             (deg)           (psf)         (deg)
    1               9.5            400.0         38.0
    2              10.5            450.0         19.0
    3              90.0            400.0         38.0
1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
Unit Weight of Water =  62.40
Piezometric Surface No.  1 Specified by  4 Coordinate Points
  Point      X-Water     Y-Water
   No.        (ft)        (ft)
    1          .00       80.00
    2       175.00       95.00
    3       302.00      155.00
    4       400.00      157.00
Janbus Empirical Coef is being used for the case of  c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
```

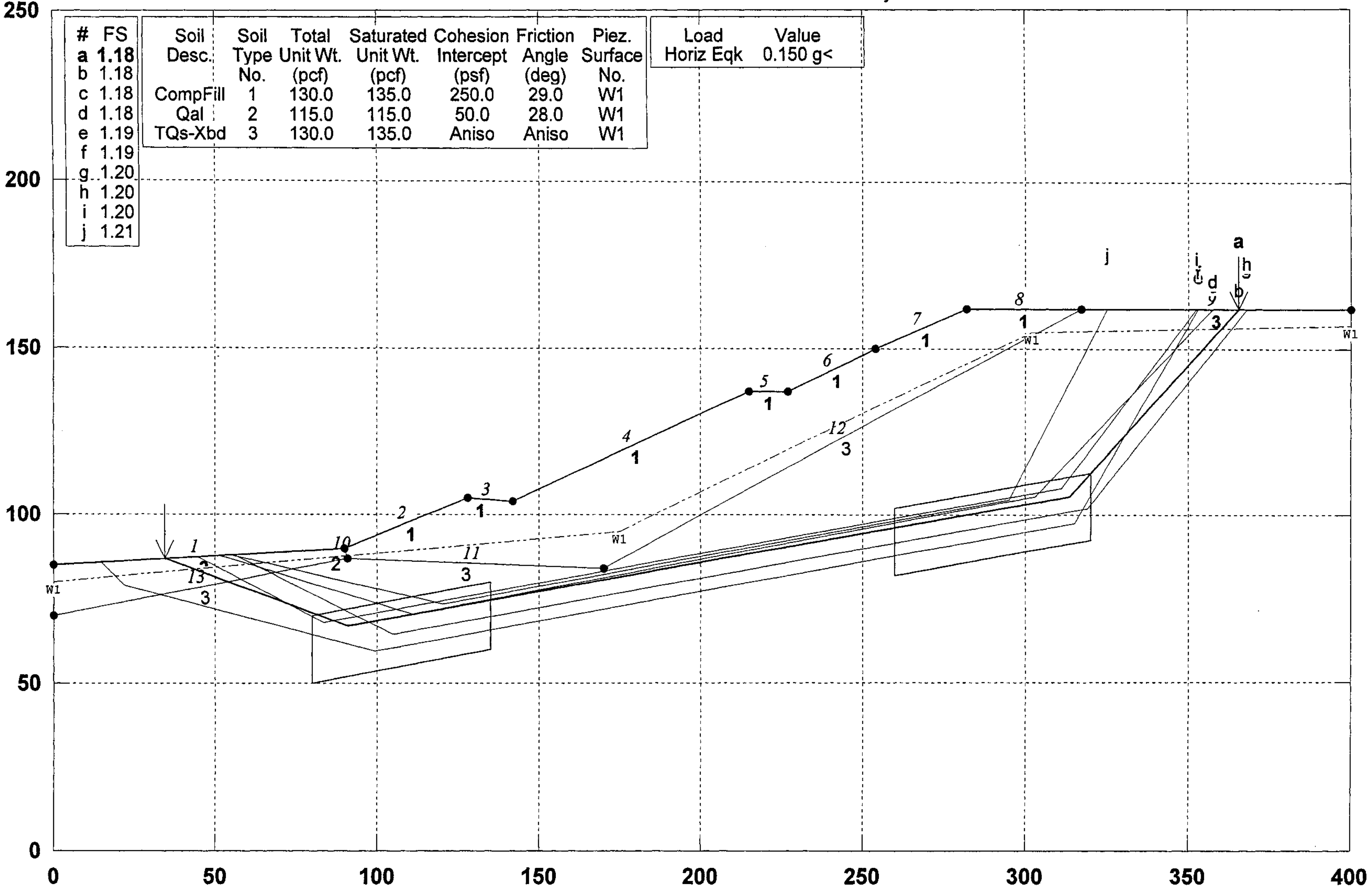
RUN #19

```
     800 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  80.0
     Box        X-Left      Y-Left     X-Right     Y-Right       Height
     No.         (ft)        (ft)        (ft)        (ft)         (ft)
      1          80.00       60.13      135.00       69.82        20.00
      2         260.00       91.86      320.00      102.44        20.00
     Factor Of Safety Calculation Has Gone Through Ten Iterations
     The Trial Failure Surface In Question Is Defined
     By The Following  5 Coordinate Points
       Point       X-Surf      Y-Surf
        No.         (ft)        (ft)
         1          14.03       85.78
         2          22.81       77.10
         3         100.84       59.45
         4         275.32       86.53
         5         275.72      159.31
     Factor Of Safety For The Preceding Specified Surface =  4.770
     Following Are Displayed The Ten Most Critical Of The Trial
           Failure Surfaces Examined.  They Are Ordered - Most Critical
           First.
           * * Safety Factors Are Calculated By The Modified Janbu Method * *
           Failure Surface Specified By  4 Coordinate Points
             Point       X-Surf      Y-Surf
              No.         (ft)        (ft)
               1          76.30       89.24
               2         107.70       71.69
               3         275.66      100.39
               4         310.81      162.00
                 ***      1.628    ***
                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      4.2    619.3     .0      .0       .0       .0       .0      .0      .0
    2      2.5    959.5     .0    143.3      .0       .0       .0      .0      .0
    3      7.0   5420.1     .0   1934.6      .0       .0       .0      .0      .0
    4       .7    842.8     .0    336.2      .0       .0       .0      .0      .0
    5       .3    318.2     .0    123.6      .0       .0       .0      .0      .0
    6     16.7  38641.8     .0 14462.8       .0       .0       .0      .0      .0
    7     20.3  74450.9     .0 21356.8       .0       .0       .0      .0      .0
    8     14.0  52287.0     .0 13437.5       .0       .0       .0      .0      .0
    9     28.0 112478.3     .0 23715.9       .0       .0       .0      .0      .0
   10      5.0  23065.9     .0  3791.8       .0       .0       .0      .0      .0
   11     40.0 218270.0     .0 41055.6       .0       .0       .0      .0      .0
   12     12.0  73081.2     .0 17729.2       .0       .0       .0      .0      .0
   13     27.0 176272.5     .0 49024.4       .0       .0       .0      .0      .0
   14     21.7 161761.2     .0 48459.6       .0       .0       .0      .0      .0
   15      6.3  46205.7     .0 27661.0       .0       .0       .0      .0      .0
   16     20.0  87634.7     .0 48605.6       .0       .0       .0      .0      .0
   17      1.9   3434.1     .0  1611.4       .0       .0       .0      .0      .0
   18      3.0   3740.4     .0   975.1       .0       .0       .0      .0      .0
   19      1.2    942.5     .0      .0       .0       .0       .0      .0      .0
   20      2.7    823.6     .0      .0       .0       .0       .0      .0      .0
```

RUN #19

TT 53425, 11-11', CS-11 w 80' Buttress for TQs Cut BLo Elev 1310; PseudoStatic

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T11PS4B.PL2 Run By: BPG 3/25/2003 5:33PM



PCSTABL5M/si FSmin=1.18

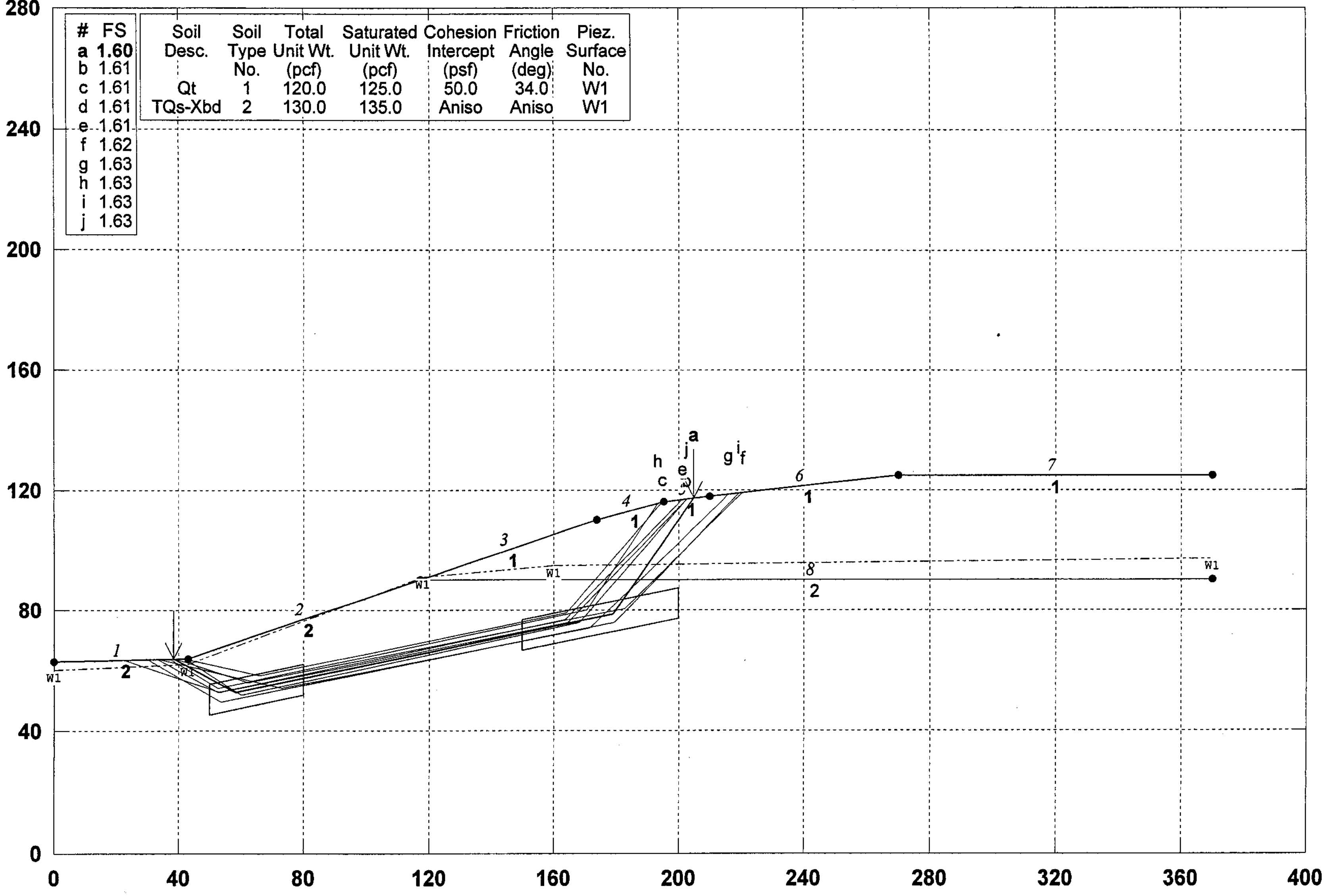
Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN#19

River Park, TT 53425; 12-12', CS-15; Qt/TQs Cut As Designed; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T12S1A.PL2 Run By: BPG 3/26/2003 2:44PM



#	FS
a	**1.60**
b	1.61
c	1.61
d	1.61
e	1.61
f	1.62
g	1.63
h	1.63
i	1.63
j	1.63

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qt	1	120.0	125.0	50.0	34.0	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	W1

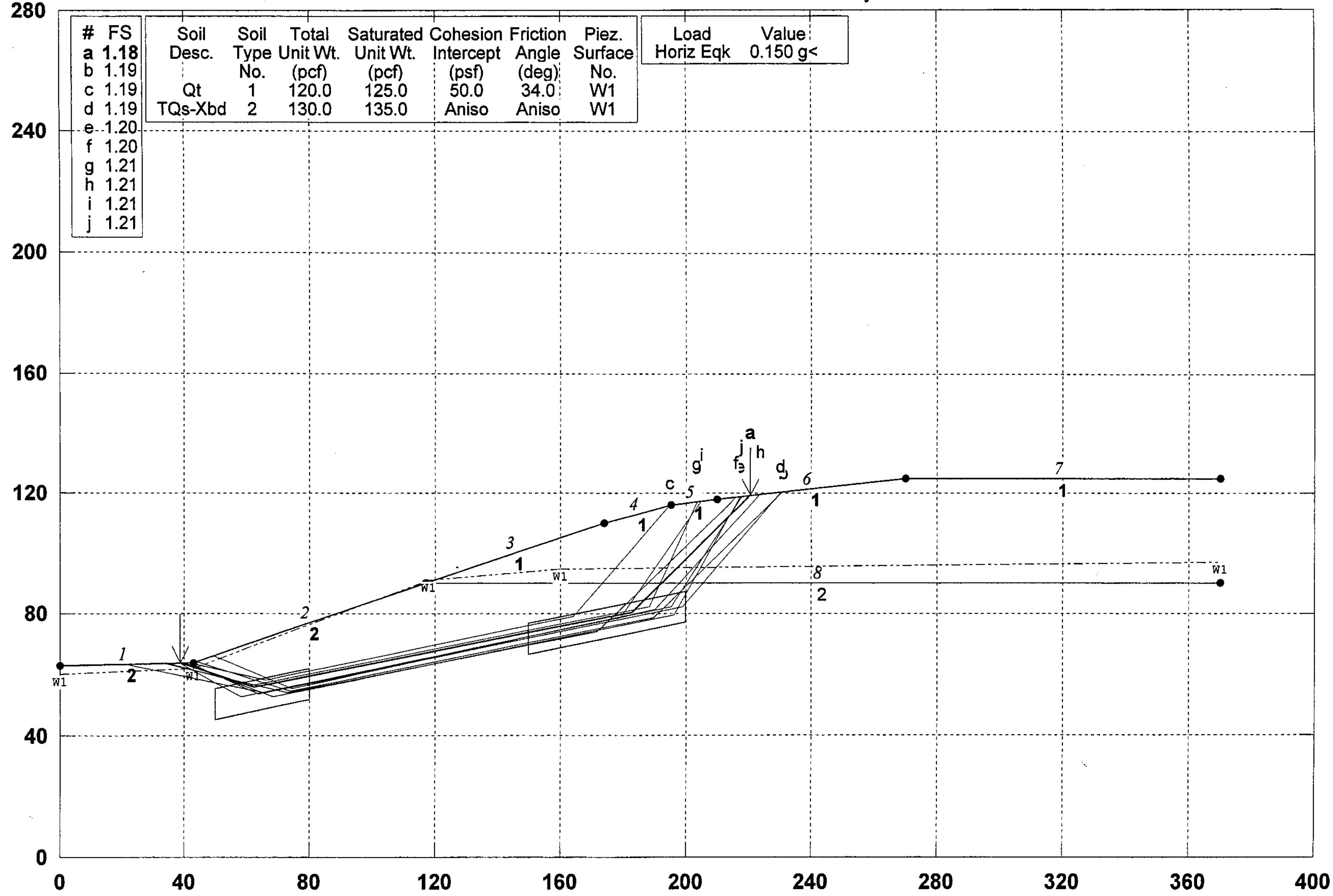
PCSTABL5M/si FSmin=1.60
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #20

River Park, TT 53425; 12-12', CS-15; Qt/TQs Cut As Designed; PseudoStatic

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T12PS1A.PL2   Run By: BPG   3/27/2003   5:30PM



#	FS
a	**1.18**
b	1.19
c	1.19
d	1.19
e	1.20
f	1.20
g	1.21
h	1.21
i	1.21
j	1.21

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qt	1	120.0	125.0	50.0	34.0	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=1.18

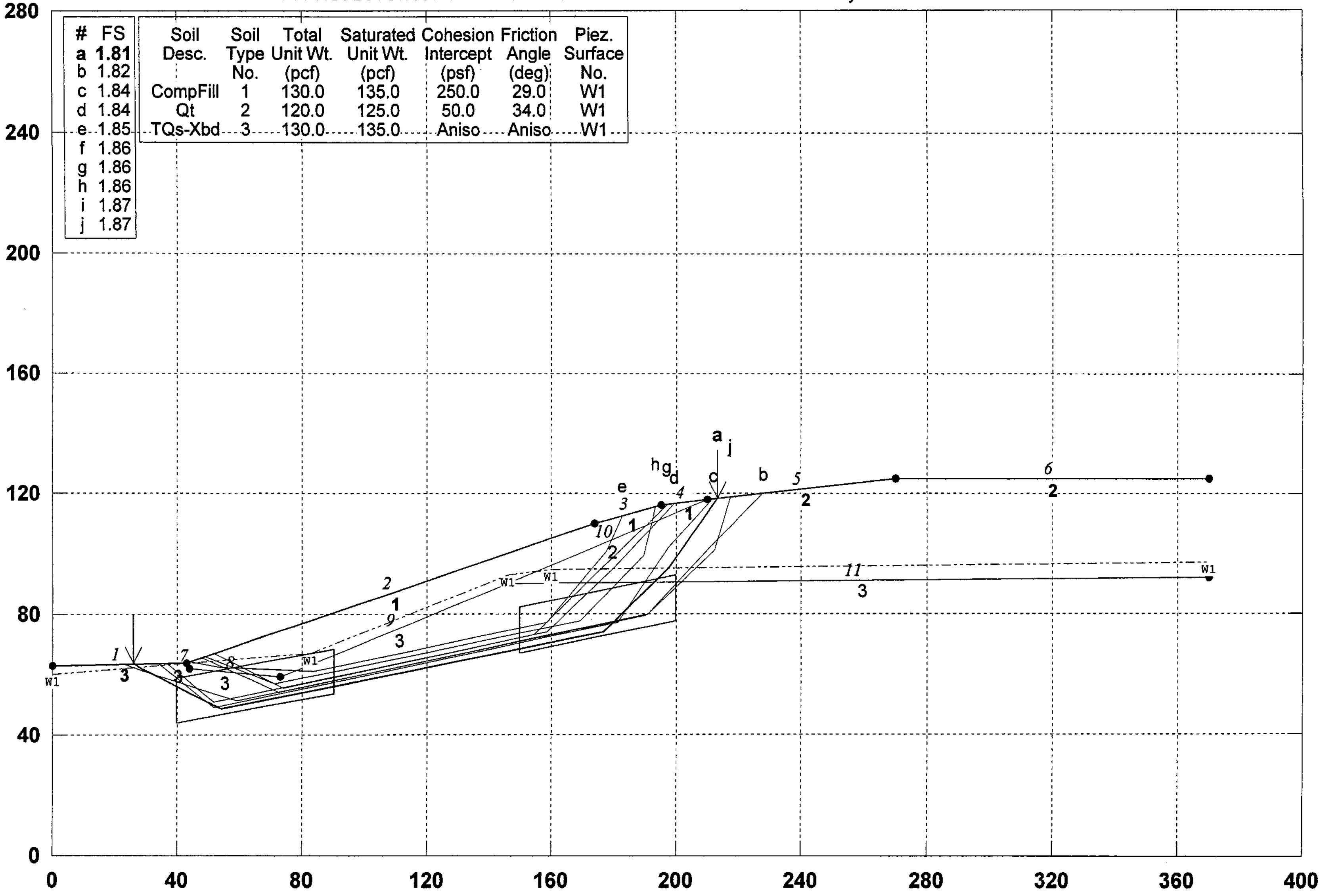
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #20

River Park, TT 53425, 12-12', CS-15; Qt/TQs Cut w 30' Stab Fill; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T12S1B.PL2 Run By: BPG 3/26/2003 2:48PM



#	FS
a	**1.81**
b	1.82
c	1.84
d	1.84
e	1.85
f	1.86
g	1.86
h	1.86
i	1.87
j	1.87

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qt	2	120.0	125.0	50.0	34.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.81

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #21

```
                    ** PCSTABL5M **
                          by
                  Purdue University
             --Slope Stability Analysis--
          Simplified Janbu, Simplified Bishop
             or Spencer`s Method of Slices
Run Date:                  3/26/2003
Time of Run:               2:48PM
Run By:                    BPG
Input Data Filename:       N:t12s1b.in
Output Filename:           N:t12s1b.OUT
Unit:                      ENGLISH
Plotted Output Filename:   N:t12s1b.PLT
PROBLEM DESCRIPTION    River Park, TT 53425, 12~12', CS-15; Qt/
                       TQs Cut w 30' Stab Fill; Static
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 0.00 to X-values and 0.00 to Y-values listed.

    6 Top   Boundaries
   11 Total Boundaries
Boundary      X-Left     Y-Left     X-Right     Y-Right     Soil Type
   No.         (ft)       (ft)       (ft)        (ft)       Below Bnd
    1           .00       63.00       43.00       64.00         3
    2         43.00       64.00      174.00      110.00         1
    3        174.00      110.00      195.00      116.00         1
    4        195.00      116.00      210.00      118.00         1
    5        210.00      118.00      270.00      125.00         2
    6        270.00      125.00      370.00      125.00         2
    7         43.00       64.00       44.00       62.00         3
    8         44.00       62.00       73.00       59.00         3
    9         73.00       59.00      146.20       90.00         3
   10        146.20       90.00      210.00      118.00         2
   11        146.20       90.00      370.00       92.00         3
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   130.0    135.0     250.0     29.0     .00        .0       1
  2   120.0    125.0      50.0     34.0     .00        .0       1
  3   130.0    135.0     400.0     38.0     .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type   3 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction     Counterclockwise     Cohesion     Friction
  Range        Direction Limit     Intercept      Angle
   No.              (deg)            (psf)        (deg)
    1                11.5            400.0         38.0
    2                12.5            450.0         19.0
    3                90.0            400.0         38.0
1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
Unit Weight of Water =  62.40
Piezometric Surface No.  1 Specified by  5 Coordinate Points
  Point       X-Water      Y-Water
   No.          (ft)         (ft)
    1            .00         60.00
    2          83.00         67.00
    3         146.20         93.00
    4         160.00         95.00
    5         370.00         97.00
Janbus Empirical Coef is being used for the case of  c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
800 Trial Surfaces Have Been Generated.
```

RUN #21

```
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is  30.0
Box        X-Left     Y-Left    X-Right    Y-Right      Height
No.         (ft)       (ft)       (ft)       (ft)        (ft)
 1          40.00      51.40      90.00      61.00       15.00
 2         150.00      74.78     200.00      85.41       15.00
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         67.23       72.51
    2         85.36       57.21
    3        180.20       74.25
    4        180.33      104.25
    5        187.56      113.87
Factor Of Safety For The Preceding Specified Surface =  5.543
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         65.63       71.95
    2         77.11       60.48
    3        194.99       78.38
    4        195.35      108.38
    5        195.90      116.12
Factor Of Safety For The Preceding Specified Surface =  5.515
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         56.45       68.72
    2         68.85       63.74
    3        159.79       71.88
    4        160.37      101.87
    5        163.40      106.28
Factor Of Safety For The Preceding Specified Surface =  6.018
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         73.25       74.62
    2         83.30       65.53
    3        171.40       72.63
    4        171.58      102.63
    5        180.88      111.96
Factor Of Safety For The Preceding Specified Surface =  7.831
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         35.01       63.81
    2         45.77       59.87
    3        171.96       78.45
    4        172.08      108.45
    5        172.84      109.59
Factor Of Safety For The Preceding Specified Surface =  5.441
Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Examined.  They Are Ordered - Most Critical
      First.
      * * Safety Factors Are Calculated By The Modified Janbu Method * *
      Failure Surface Specified By  6 Coordinate Points
```

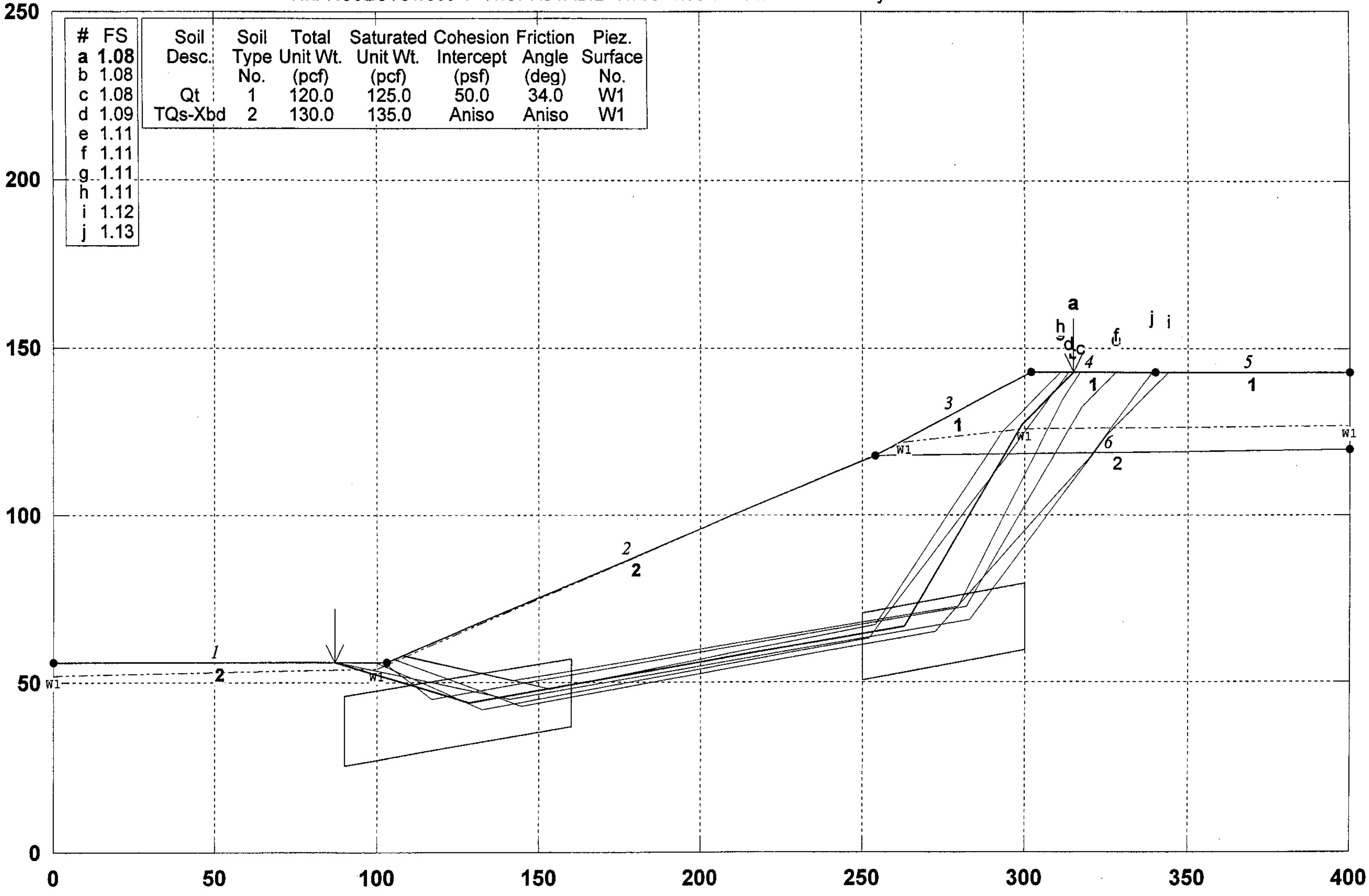
RUN #21

```
                Point       X-Surf       Y-Surf
                 No.         (ft)         (ft)
                  1          25.68        63.60
                  2          27.54        62.33
                  3          54.27        48.70
                  4         176.55        73.89
                  5         197.71        95.16
                  6         213.19       118.37
                    ***      1.808    ***
                  Individual data on the    19  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      1.9    158.8      .0      .0       .0       .0       .0       .0       .0
  2       .0      1.4      .0      .0       .0       .0       .0       .0       .0
  3     15.4  11272.8      .0  4951.4       .0       .0       .0       .0       .0
  4       .2    232.7      .0   115.5       .0       .0       .0       .0       .0
  5       .8   1112.9      .0   546.2       .0       .0       .0       .0       .0
  6     10.3  20461.7      .0  9193.8       .0       .0       .0       .0       .0
  7     18.7  51589.4      .0 17530.5       .0       .0       .0       .0       .0
  8     10.0  30162.4      .0  8248.2       .0       .0       .0       .0       .0
  9     63.2 235704.6      .0 70493.1       .0       .0       .0       .0       .0
 10     10.2  45278.0      .0 16121.3       .0       .0       .0       .0       .0
 11      3.6  16298.0      .0  5581.5       .0       .0       .0       .0       .0
 12     14.0  65194.9      .0 20642.2       .0       .0       .0       .0       .0
 13      2.5  12120.6      .0  3491.9       .0       .0       .0       .0       .0
 14     16.4  64450.2      .0 19031.0       .0       .0       .0       .0       .0
 15      2.0   5990.4      .0   692.6       .0       .0       .0       .0       .0
 16      2.7   7400.9      .0   370.6       .0       .0       .0       .0       .0
 17       .1    347.7      .0     1.5       .0       .0       .0       .0       .0
 18     12.2  18779.9      .0      .0       .0       .0       .0       .0       .0
 19      3.2    845.6      .0      .0       .0       .0       .0       .0       .0
```

RUN #21

River Park, TT 53425, 13-13', CS-15, As Designed on Qt/TQs Cut; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T13S1A.PL2 Run By: BPG 3/31/2003 3:46PM



#	FS
a	**1.08**
b	1.08
c	1.08
d	1.09
e	1.11
f	1.11
g	1.11
h	1.11
i	1.12
j	1.13

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qt	1	120.0	125.0	50.0	34.0	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.08

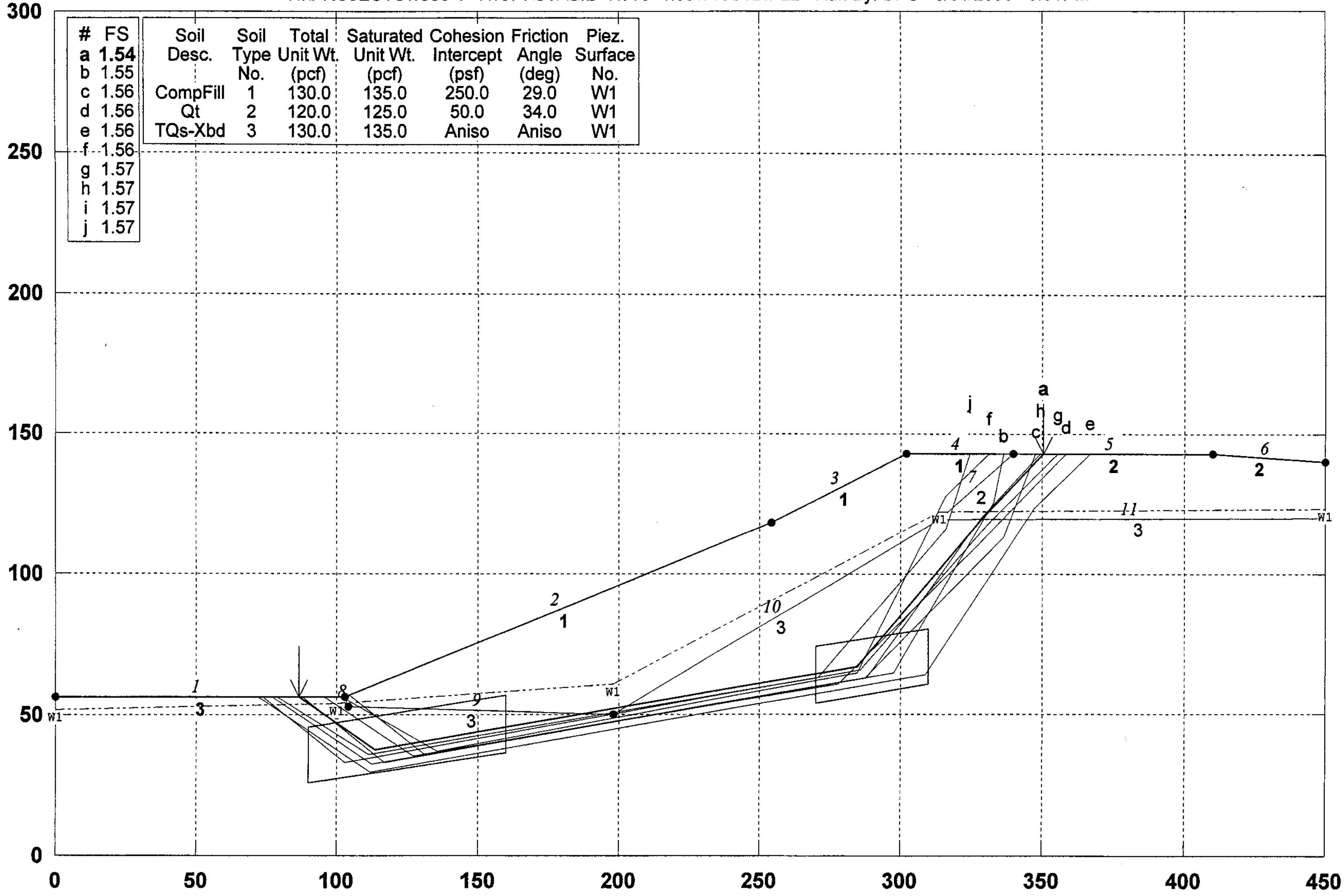
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #22

River Park, TT 53425, 13-13', CS-15, w 95' Buttress on Qt/TQs Cut; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T13S1B.PL2 Run By: BPG 3/31/2003 3:31PM



#	FS
a	**1.54**
b	1.55
c	1.56
d	1.56
e	1.56
f	1.56
g	1.57
h	1.57
i	1.57
j	1.57

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qt	2	120.0	125.0	50.0	34.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.54

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #23

```
                    ** PCSTABL5M **
                          by
                   Purdue University
              --Slope Stability Analysis--
         Simplified Janbu, Simplified Bishop
            or Spencer`s Method of Slices
Run Date:                3/31/2003
Time of Run:             3:31PM
Run By:                  BPG
Input Data Filename:     N:t13s1b.in
Output Filename:         N:t13s1b.OUT
Unit:                    ENGLISH
Plotted Output Filename: N:t13s1b.PLT
PROBLEM DESCRIPTION   River Park, TT 53425, 13-13', CS-15, w 9
                      5' Buttress on Qt/TQs Cut; Static
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 0.00 to X-values and 0.00 to Y-values listed.

    6 Top   Boundaries
   11 Total Boundaries
Boundary     X-Left     Y-Left     X-Right     Y-Right     Soil Type
   No.        (ft)       (ft)       (ft)        (ft)       Below Bnd
    1          .00       56.00     103.00       56.00          3
    2       103.00       56.00     254.00      118.00          1
    3       254.00      118.00     302.00      143.00          1
    4       302.00      143.00     340.00      143.00          1
    5       340.00      143.00     410.00      143.00          2
    6       410.00      143.00     450.00      140.00          2
    7       314.00      119.00     340.00      143.00          2
    8       103.00       56.00     104.00       53.00          3
    9       104.00       53.00     198.00       50.00          3
   10       198.00       50.00     314.00      119.00          3
   11       314.00      119.00     450.00      120.00          3
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   130.0    135.0     250.0     29.0     .00        .0       1
   2   120.0    125.0      50.0     34.0     .00        .0       1
   3   130.0    135.0     400.0     38.0     .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction     Counterclockwise     Cohesion     Friction
   Range        Direction Limit     Intercept      Angle
    No.             (deg)             (psf)        (deg)
     1                9.5             400.0        38.0
     2               10.5             450.0        19.0
     3               90.0             400.0        38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  5 Coordinate Points
   Point      X-Water     Y-Water
    No.        (ft)        (ft)
     1          .00        52.00
     2       100.00        54.00
     3       198.00        61.00
     4       314.00       122.00
     5       450.00       123.00
 Janbus Empirical Coef is being used for the case of  c & phi both > 0
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 800 Trial Surfaces Have Been Generated.
```

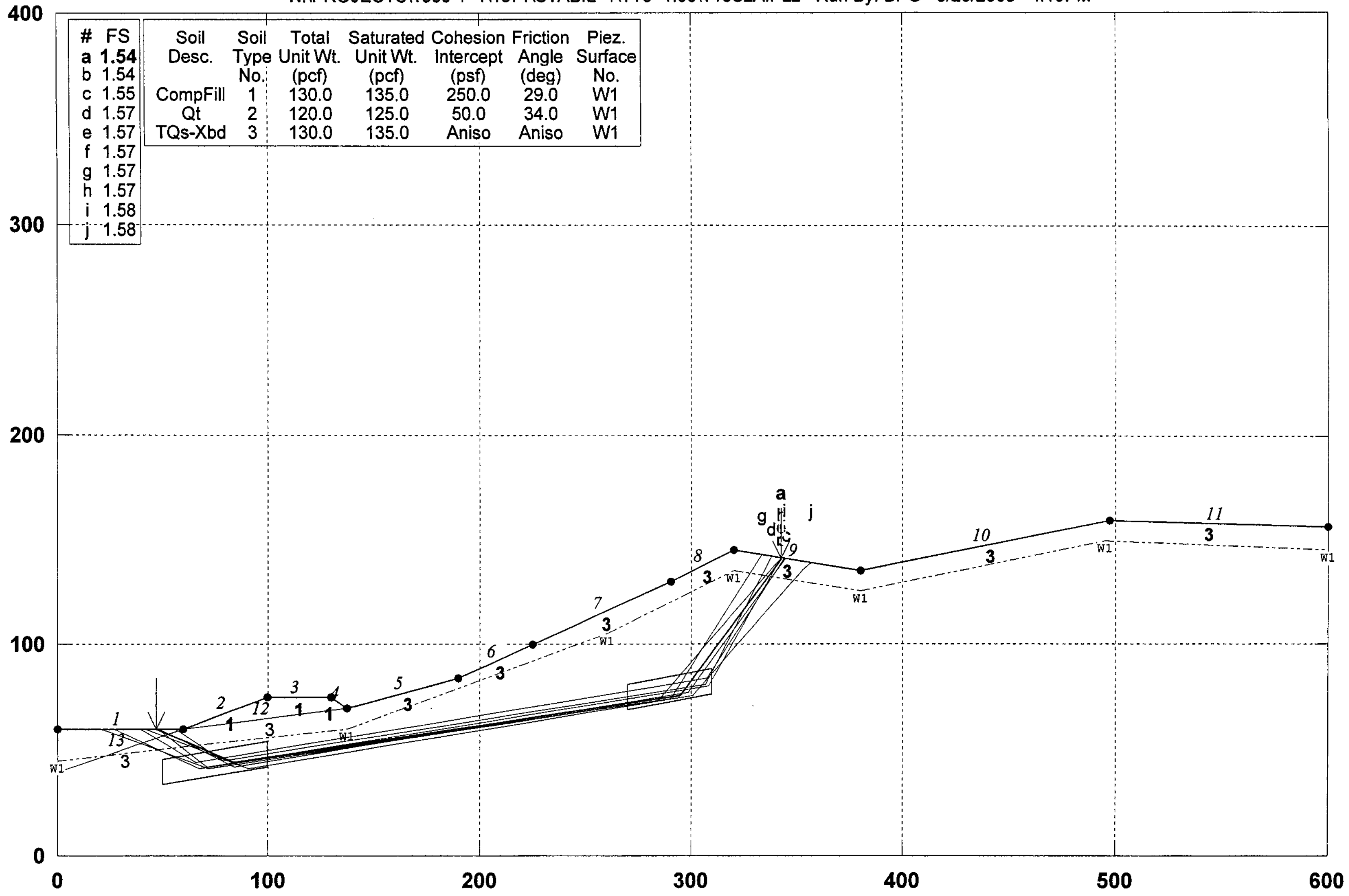
RUN #23

```
2 Boxes Specified For Generation Of Central Block Base
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is  70.0
Box         X-Left     Y-Left     X-Right    Y-Right      Height
No.          (ft)       (ft)       (ft)       (ft)         (ft)
 1           90.00      35.75     160.00      46.84        20.00
 2          270.00      64.26     310.00      70.59        20.00
Factor Of Safety Calculation Has Gone Through Ten Iterations
```

RUN #23

River Park, TT 53425; 13-13'; 99' TQs River Bank w 15' Paseo Toe Berm; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T13S2A.PL2 Run By: BPG 3/25/2003 4:19PM



#	FS
a	**1.54**
b	1.54
c	1.55
d	1.57
e	1.57
f	1.57
g	1.57
h	1.57
i	1.58
j	1.58

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qt	2	120.0	125.0	50.0	34.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.54

Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN # 24

```
                       ** PCSTABL5M **
                             by
                      Purdue University
                  --Slope Stability Analysis--
               Simplified Janbu, Simplified Bishop
                  or Spencer`s Method of Slices
 Run Date:                   3/25/2003
 Time of Run:                4:19PM
 Run By:                     BPG
 Input Data Filename:        N:t13s2a.in
 Output Filename:            N:t13s2a.OUT
 Unit:                       ENGLISH
 Plotted Output Filename:  N:t13s2a.PLT
 PROBLEM DESCRIPTION   River Park, TT 53425; 13-13'; 99' TQs Ri
                       ver Bank w 15' Paseo Toe Berm; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

    11 Top   Boundaries
    13 Total Boundaries
 Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
    No.        (ft)        (ft)        (ft)        (ft)      Below Bnd
     1           .00       60.00       60.00       60.00         2
     2         60.00       60.00      100.00       75.00         1
     3        100.00       75.00      130.00       75.00         1
     4        130.00       75.00      137.00       70.00         1
     5        137.00       70.00      190.00       84.00         3
     6        190.00       84.00      225.00      100.00         3
     7        225.00      100.00      290.00      130.00         3
     8        290.00      130.00      320.00      145.00         3
     9        320.00      145.00      380.00      135.00         3
    10        380.00      135.00      497.00      159.00         3
    11        497.00      159.00      600.00      156.00         3
    12         60.00       60.00      137.00       70.00         3
    13           .00       40.00       60.00       60.00         3
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   130.0    135.0     250.0    29.0     .00        .0       1
   2   120.0    125.0      50.0    34.0     .00        .0       1
   3   130.0    135.0     400.0    38.0     .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction     Counterclockwise     Cohesion     Friction
   Range        Direction Limit     Intercept      Angle
    No.              (deg)            (psf)        (deg)
     1                8.5             400.0         38.0
     2                9.5             450.0         19.0
     3               90.0             400.0         38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  7 Coordinate Points
   Point       X-Water      Y-Water
    No.         (ft)         (ft)
     1            .00        45.00
     2         137.00        60.00
     3         260.00       105.00
     4         320.00       135.00
     5         380.00       125.00
     6         495.00       149.00
     7         600.00       145.00
 A Critical Failure Surface Searching Method, Using A Random
```

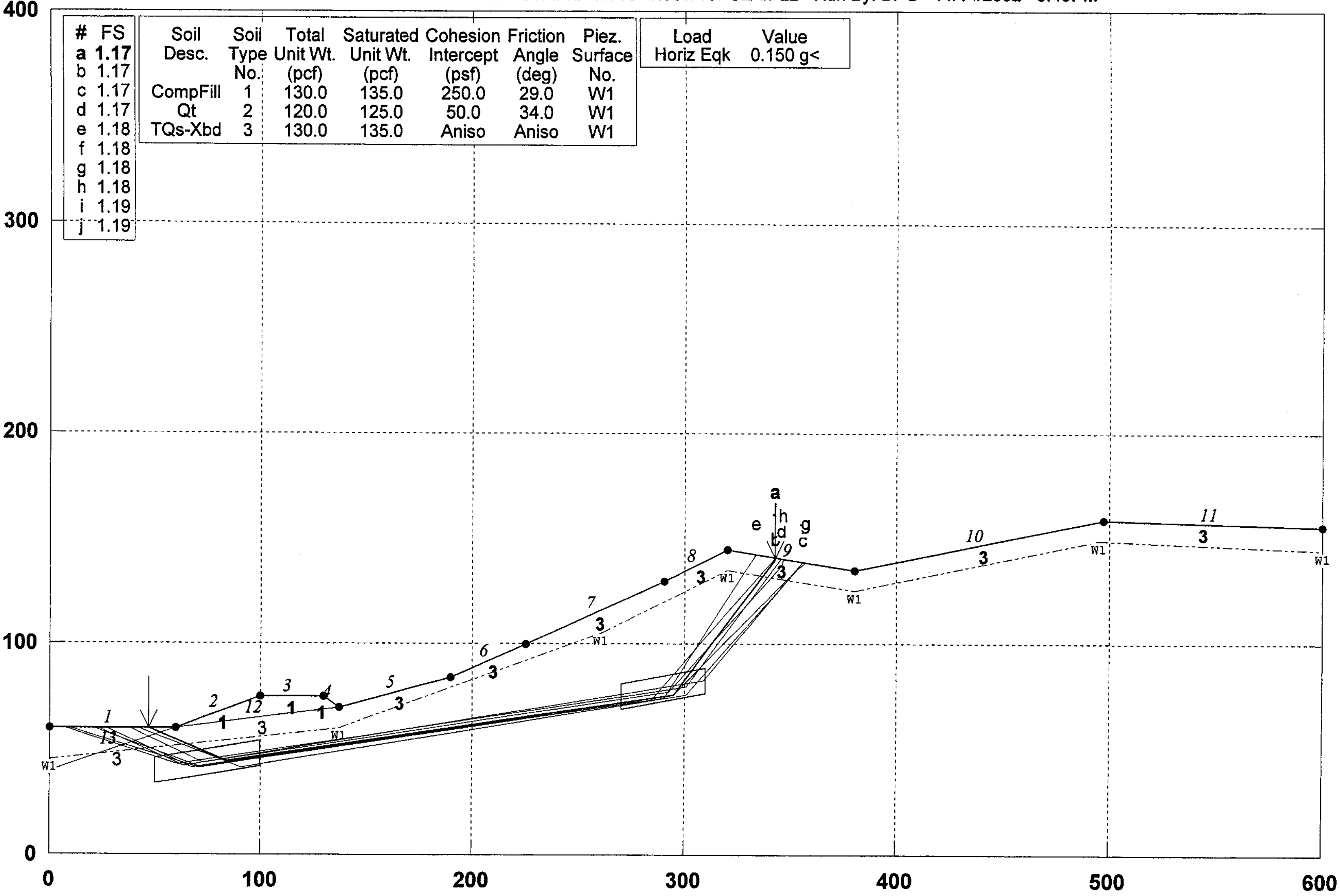
RUN #24

```
   Technique For Generating Sliding Block Surfaces, Has Been
   Specified.
   800 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  80.0
   Box        X-Left     Y-Left     X-Right     Y-Right       Height
   No.         (ft)       (ft)       (ft)        (ft)          (ft)
    1          50.00      40.00     100.00       47.92         12.00
    2         270.00      74.85     310.00       82.76         12.00
   Following Are Displayed The Ten Most Critical Of The Trial
         Failure Surfaces Examined.  They Are Ordered - Most Critical
         First.
         * * Safety Factors Are Calculated By The Modified Janbu Method * *
         Failure Surface Specified By  5 Coordinate Points
           Point       X-Surf      Y-Surf
            No.         (ft)        (ft)
             1          47.53       60.00
             2          83.91       43.89
             3         294.84       75.93
             4         342.44      140.23
             5         342.50      141.25
               ***      1.540    ***
              Individual data on the    16  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     5.4    762.0       .0       .0      .0      .0      .0      .0      .0
  2     7.1   3566.0       .0       .0      .0      .0      .0      .0      .0
  3     5.3   5254.7       .0       .0      .0      .0      .0      .0      .0
  4    18.6  42770.5       .0   6510.7      .0      .0      .0      .0      .0
  5    16.1  57006.3       .0  10050.9      .0      .0      .0      .0      .0
  6    30.0 104244.7       .0  16897.8      .0      .0      .0      .0      .0
  7     7.0  19464.2       .0   3598.2      .0      .0      .0      .0      .0
  8    53.0 148239.3       .0  43167.3      .0      .0      .0      .0      .0
  9    35.0 137282.8       .0  48074.8      .0      .0      .0      .0      .0
 10    35.0 187475.0       .0  63640.3      .0      .0      .0      .0      .0
 11    30.0 200961.2       .0  67451.8      .0      .0      .0      .0      .0
 12     4.8  36016.0       .0  12552.8      .0      .0      .0      .0      .0
 13    25.2 153801.3       .0  84977.5      .0      .0      .0      .0      .0
 14    16.5  49466.2       .0  21449.5      .0      .0      .0      .0      .0
 15     5.9   4238.1       .0       .0      .0      .0      .0      .0      .0
 16      .1      3.8       .0       .0      .0      .0      .0      .0      .0
```

RVN#24

River Park, Tr 53425 - X-Section 13; 99'TQs River Bank w 15' Toe Berm; Pseudost

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T13PS2A.PL2 Run By: BPG 11/14/2002 5:45PM



#	FS
a	**1.17**
b	1.17
c	1.17
d	1.17
e	1.18
f	1.18
g	1.18
h	1.18
i	1.19
j	1.19

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qt	2	120.0	125.0	50.0	34.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

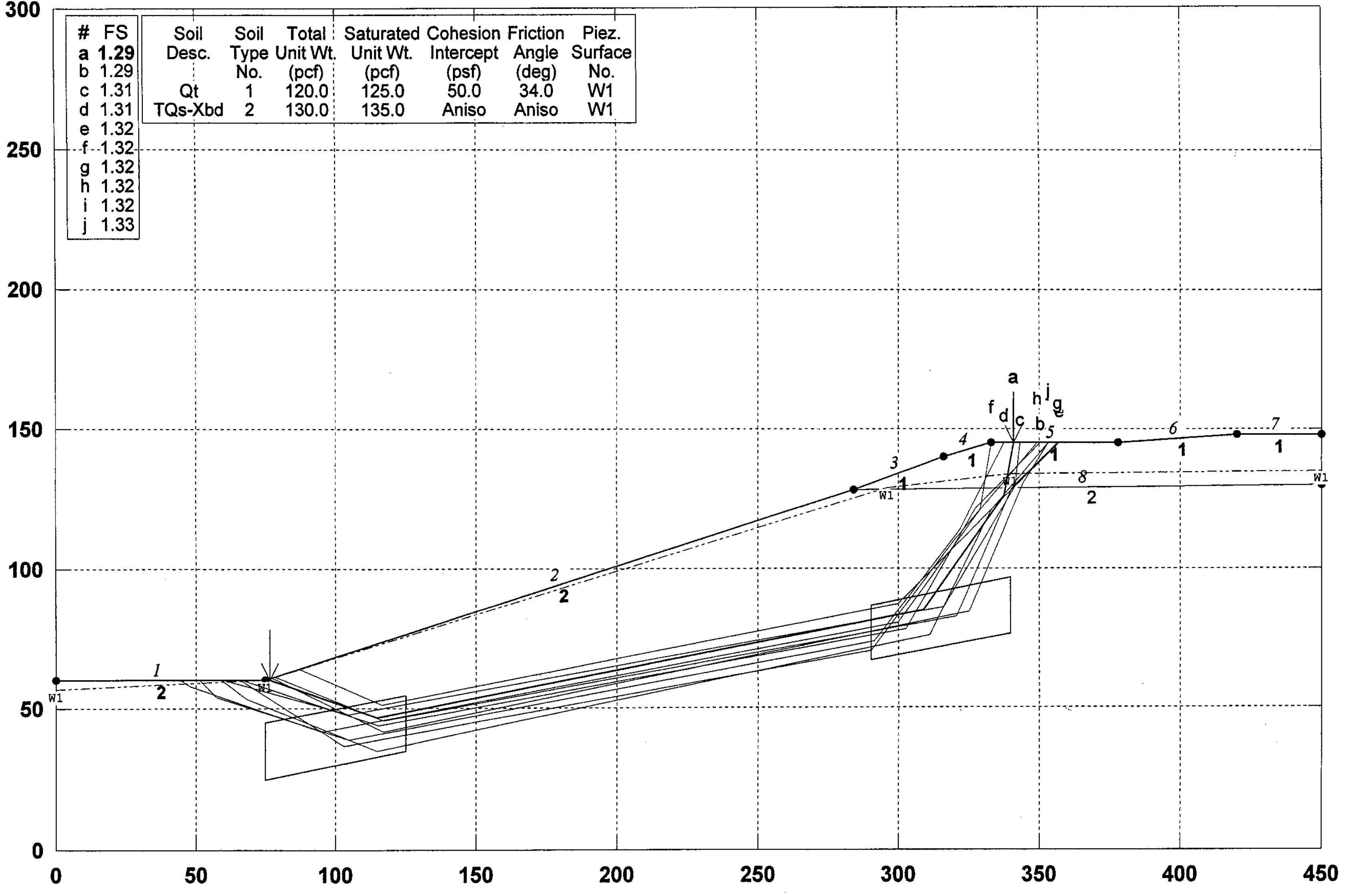
PCSTABL5M/si FSmin=1.17
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #24

TT 53425, 14-14', CS-15 w Qt/QTs Cut As Designed, Abve Newhall Rnch Rd; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T14S1A.PL2 Run By: BPG 3/31/2003 4:19PM



#	FS
a	**1.29**
b	1.29
c	1.31
d	1.31
e	1.32
f	1.32
g	1.32
h	1.32
i	1.32
j	1.33

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qt	1	120.0	125.0	50.0	34.0	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	W1

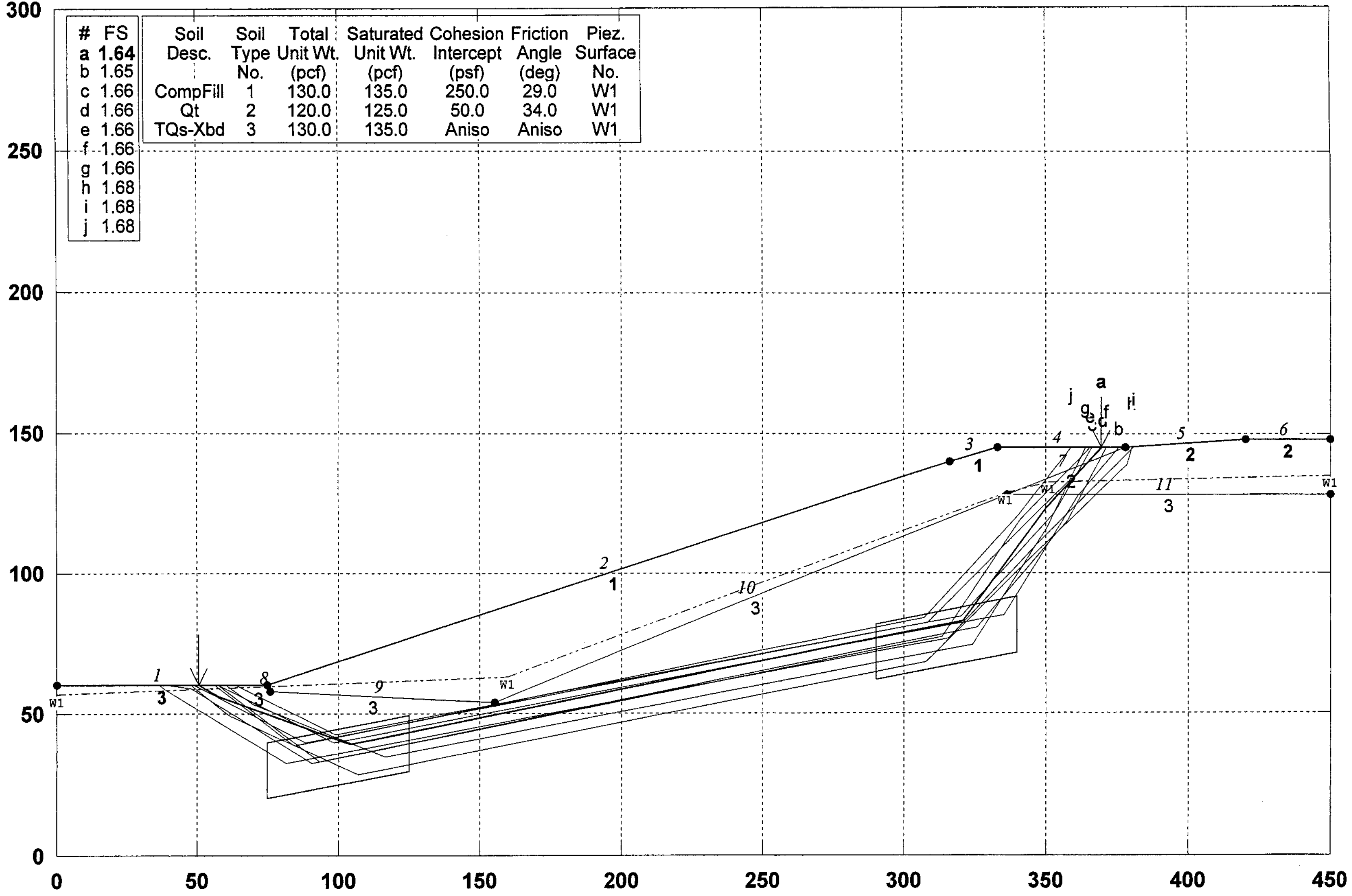
PCSTABL5M/si FSmin=1.29
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #25

TT 53425, 14-14', CS-15 w Qt/QTs Cut + 80' Buttress Abve Newhall Rnch Rd; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T14S1B.PL2 Run By: BPG 3/25/2003 10:34AM



#	FS
a	**1.64**
b	1.65
c	1.66
d	1.66
e	1.66
f	1.66
g	1.66
h	1.68
i	1.68
j	1.68

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qt	2	120.0	125.0	50.0	34.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.64

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #26

```
                    ** PCSTABL5M **
                          by
                   Purdue University
              --Slope Stability Analysis--
           Simplified Janbu, Simplified Bishop
              or Spencer`s Method of Slices
Run Date:                3/25/2003
Time of Run:             10:33AM
Run By:                  BPG
Input Data Filename:     N:t14s1b.in
Output Filename:         N:t14s1b.OUT
Unit:                    ENGLISH
Plotted Output Filename: N:t14s1b.PLT
PROBLEM DESCRIPTION   Tr 53425, 14-14', CS-15 w Qt/QTs Cut + 8
                      0' Buttress Abve Newhall Rnch Rd; Static
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 0.00 to X-values and 0.00 to Y-values listed.

    6 Top   Boundaries
   11 Total Boundaries
Boundary     X-Left     Y-Left     X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)        (ft)       (ft)     Below Bnd
    1          .00       60.00       75.00      60.00        3
    2        75.00       60.00      316.00     140.00        1
    3       316.00      140.00      333.00     145.00        1
    4       333.00      145.00      378.00     145.00        1
    5       378.00      145.00      420.00     148.00        2
    6       420.00      148.00      450.00     148.00        2
    7       336.34      128.00      378.00     145.00        2
    8        75.00       60.00       76.00      58.00        3
    9        76.00       58.00      155.00      54.00        3
   10       155.00       54.00      336.34     128.00        3
   11       336.34      128.00      450.00     128.00        3
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   130.0    135.0      250.0     29.0     .00         .0       1
   2   120.0    125.0       50.0     34.0     .00         .0       1
   3   130.0    135.0      400.0     38.0     .00         .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction     Counterclockwise     Cohesion     Friction
   Range        Direction Limit     Intercept      Angle
    No.             (deg)             (psf)        (deg)
     1              10.5              400.0         38.0
     2              11.5              450.0         19.0
     3              90.0              400.0         38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  5 Coordinate Points
   Point      X-Water     Y-Water
    No.        (ft)        (ft)
     1          .00        57.00
     2       160.00        63.00
     3       336.00       129.00
     4       351.00       133.00
     5       450.00       135.00
 Janbus Empirical Coef is being used for the case of  c & phi both > 0
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 400 Trial Surfaces Have Been Generated.
```

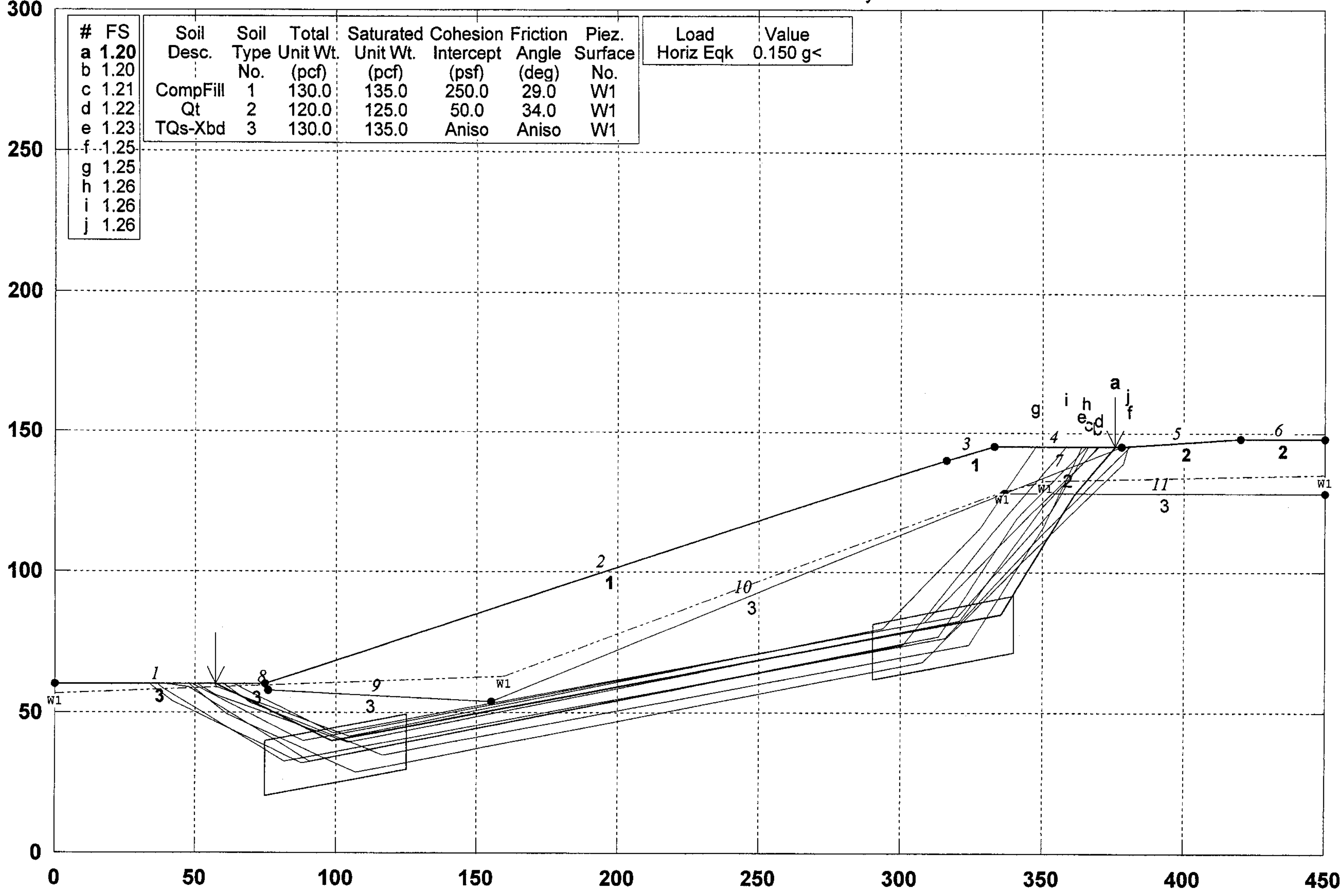
RUN #26

```
  2 Boxes Specified For Generation Of Central Block Base
  Length Of Line Segments For Active And Passive Portions Of
  Sliding Block Is  50.0
  Box        X-Left     Y-Left     X-Right     Y-Right       Height
  No.         (ft)       (ft)       (ft)        (ft)          (ft)
   1          75.00      30.00     125.00       39.72         20.00
   2         290.00      71.79     340.00       81.51         20.00
  Following Are Displayed The Ten Most Critical Of The Trial
        Failure Surfaces Examined.  They Are Ordered - Most Critical
        First.
        * * Safety Factors Are Calculated By The Modified Janbu Method * *
        Failure Surface Specified By  6 Coordinate Points
          Point      X-Surf       Y-Surf
           No.        (ft)         (ft)
            1         50.71        60.00
            2         57.32        56.25
            3        104.31        39.14
            4        320.65        82.86
            5        349.91       123.41
            6        369.40       145.00
             ***      1.640    ***
             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     1.8    121.6     .0      .0       .0       .0       .0       .0      .0
  2     4.8   1526.0     .0   499.1       .0       .0       .0       .0      .0
  3    17.7  16588.5     .0  7568.1       .0       .0       .0       .0      .0
  4      .1    126.9     .0    61.2       .0       .0       .0       .0      .0
  5      .9   1293.8     .0   615.8       .0       .0       .0       .0      .0
  6    28.3  78573.7     .0 30214.2       .0       .0       .0       .0      .0
  7    50.7 227710.8     .0 56748.3       .0       .0       .0       .0      .0
  8     5.0  24695.4     .0  4139.3       .0       .0       .0       .0      .0
  9   156.0 991447.4     .0 *******       .0       .0       .0       .0      .0
 10     4.6  36098.8     .0 11101.9       .0       .0       .0       .0      .0
 11    12.4  85088.3     .0 42191.1       .0       .0       .0       .0      .0
 12     3.0  17117.8     .0  7918.5       .0       .0       .0       .0      .0
 13      .3   1836.2     .0   864.8       .0       .0       .0       .0      .0
 14     7.7  35771.3     .0 16035.6       .0       .0       .0       .0      .0
 15     5.9  19611.8     .0  7585.9       .0       .0       .0       .0      .0
 16     1.1   2968.9     .0   870.6       .0       .0       .0       .0      .0
 17     3.0   7309.0     .0  1907.4       .0       .0       .0       .0      .0
 18     4.7   8525.6     .0  1096.7       .0       .0       .0       .0      .0
 19     5.7   6307.6     .0      .0       .0       .0       .0       .0      .0
 20     5.0   1812.8     .0      .0       .0       .0       .0       .0      .0
```

RUN #26

TT 53425; 14-14', CS-7 w Qt/TQs Cut+ 80'Buttress Abv Newhall Rnch Rd; PseudoSt

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T14PS1B.PL2 Run By: BPG 3/25/2003 10:36AM



#	FS
a	**1.20**
b	1.20
c	1.21
d	1.22
e	1.23
f	1.25
g	1.25
h	1.26
i	1.26
j	1.26

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qt	2	120.0	125.0	50.0	34.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=1.20

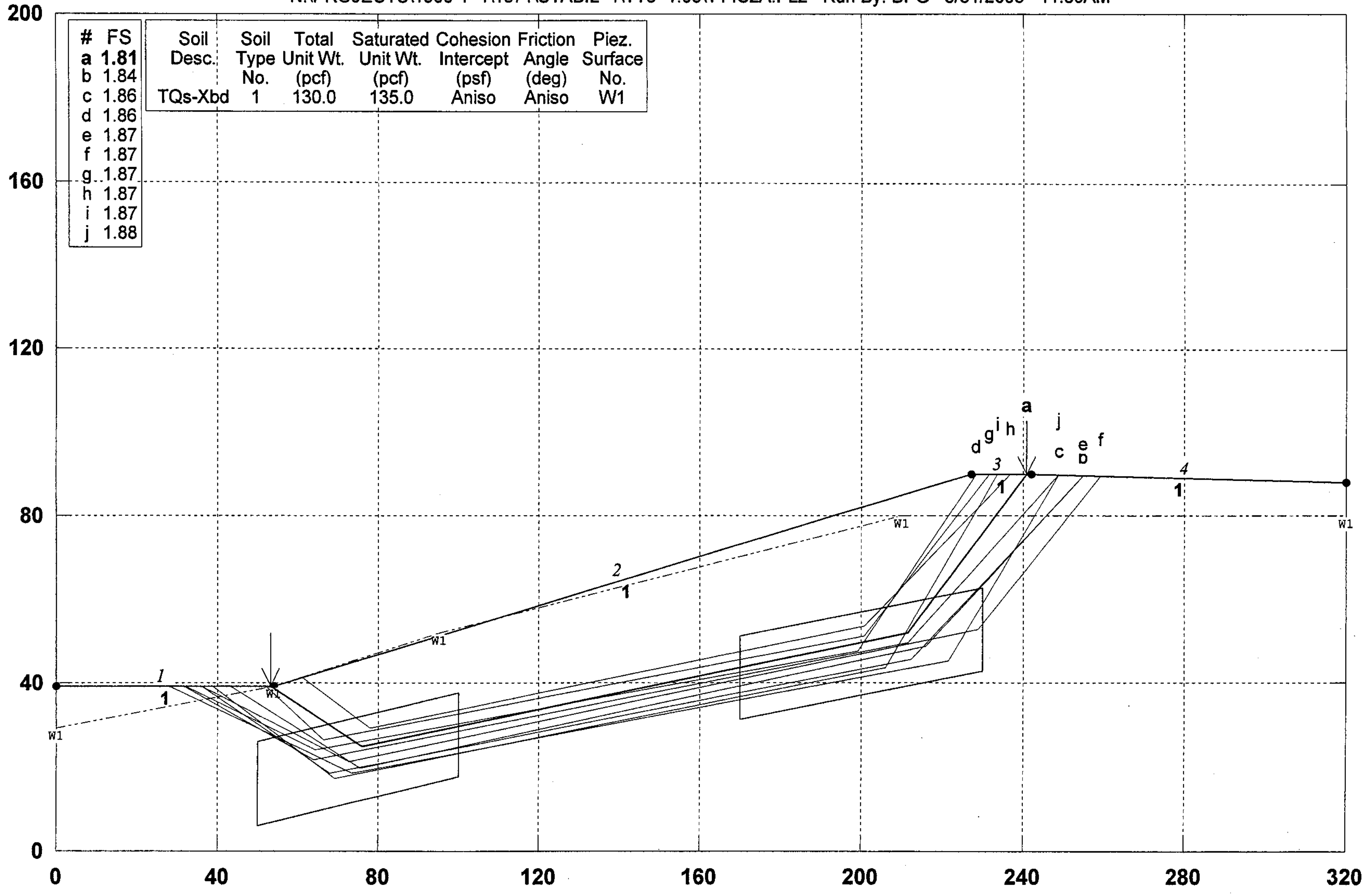
Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #26

TT 53425; 14-14', CS-13; TQs Cut As Designed; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T14S2A.PL2 Run By: BPG 3/31/2003 11:39AM



#	FS
a	**1.81**
b	1.84
c	1.86
d	1.86
e	1.87
f	1.87
g	1.87
h	1.87
i	1.87
j	1.88

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
TQs-Xbd	1	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.81

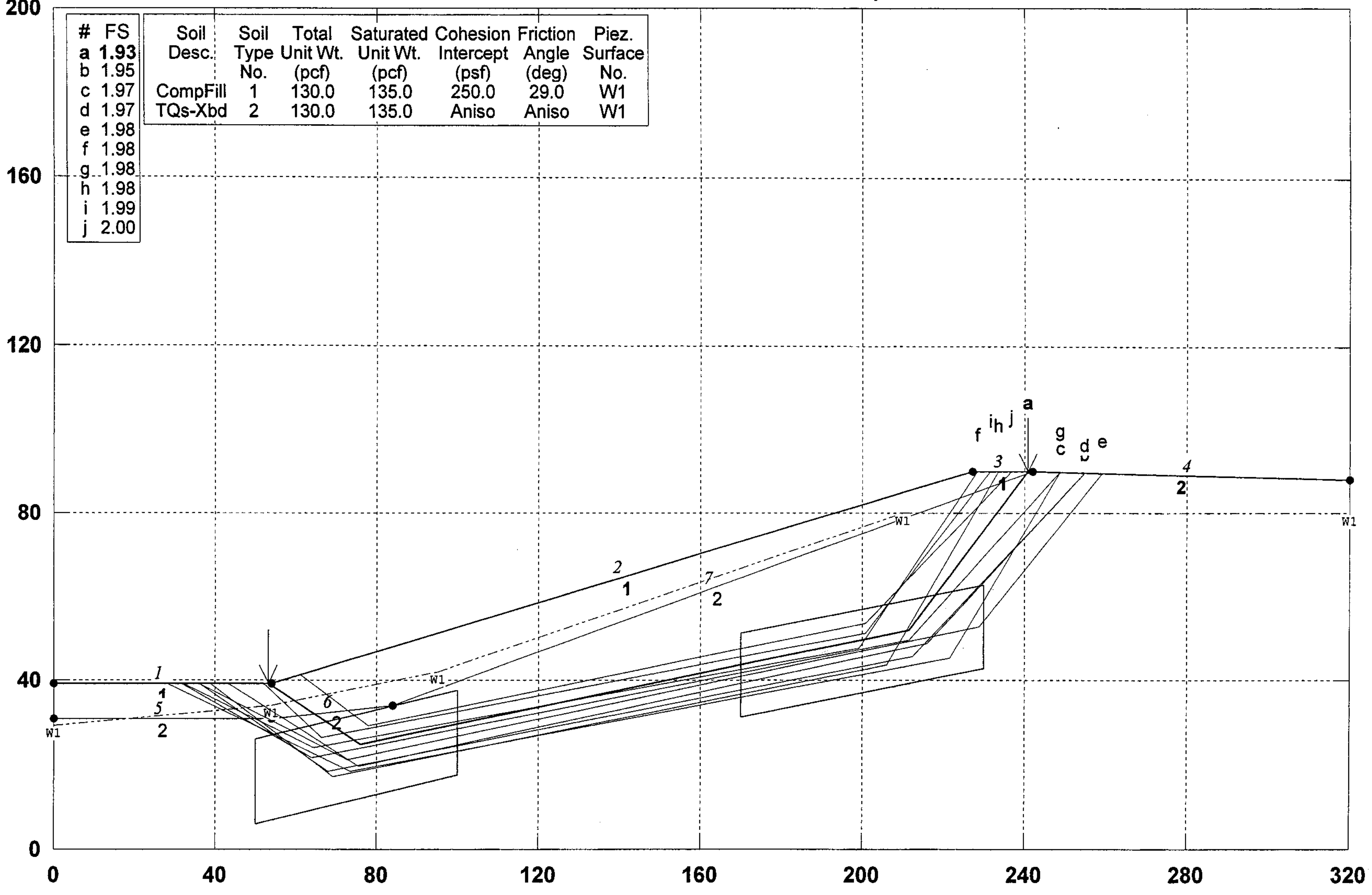
Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #27

TT 53425; 14-14', CS-13, TQs Cut w 30' Stability Fill; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T14S2B.PL2 Run By: BPG 3/31/2003 11:32AM



#	FS
a	**1.93**
b	1.95
c	1.97
d	1.97
e	1.98
f	1.98
g	1.98
h	1.98
i	1.99
j	2.00

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.93

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #28

```
                   ** PCSTABL5M **
                         by
                  Purdue University
            --Slope Stability Analysis--
         Simplified Janbu, Simplified Bishop
            or Spencer`s Method of Slices
Run Date:                3/31/2003
Time of Run:             11:32AM
Run By:                  BPG
Input Data Filename:     N:t14s2b.in
Output Filename:         N:t14s2b.OUT
Unit:                    ENGLISH
Plotted Output Filename: N:t14s2b.PLT
PROBLEM DESCRIPTION    TT 53425; 14-14', CS-13, TQs Cut w 30' S
                       tability Fill; Static
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 0.00 to X-values and 0.00 to Y-values listed.

    4 Top   Boundaries
    7 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1           .00      39.00      54.00      39.00        1
    2         54.00      39.00     227.00      90.00        1
    3        227.00      90.00     242.00      90.00        1
    4        242.00      90.00     320.00      88.00        2
    5           .00      31.00      54.00      31.00        2
    6         54.00      31.00      84.00      34.00        2
    7         84.00      34.00     242.00      90.00        2
ISOTROPIC SOIL PARAMETERS
 2 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   130.0    135.0     250.0     29.0     .00        .0       1
  2   130.0    135.0     400.0     38.0     .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  2 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range        Direction Limit    Intercept      Angle
    No.            (deg)             (psf)        (deg)
     1              10.0             400.0         38.0
     2              12.0             450.0         19.0
     3              90.0             400.0         38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  5 Coordinate Points
   Point      X-Water     Y-Water
    No.         (ft)        (ft)
     1           .00       29.00
     2         54.00       34.00
     3         95.00       42.00
     4        210.00       80.00
     5        320.00       80.00
 Janbus Empirical Coef is being used for the case of  c & phi both > 0
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 400 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  80.0
 Box        X-Left     Y-Left    X-Right    Y-Right      Height
 No.         (ft)       (ft)       (ft)       (ft)        (ft)
```

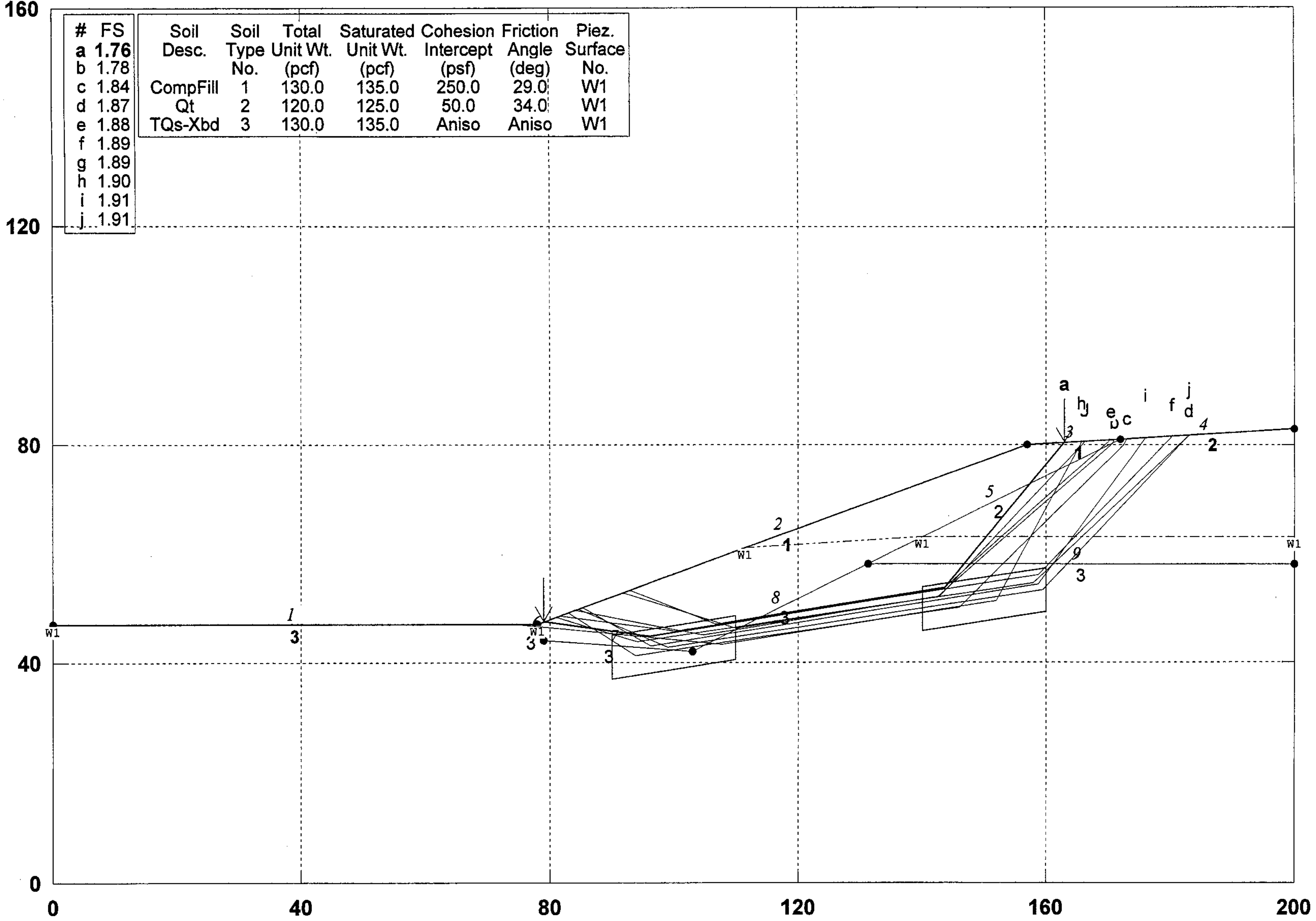
RIIN #28

```
    1          50.00      16.00     100.00      27.66      20.00
    2         170.00      41.27     230.00      52.93      20.00
   Factor Of Safety Calculation Has Gone Through Ten Iterations
   The Trial Failure Surface In Question Is Defined
   By The Following  4 Coordinate Points
     Point      X-Surf      Y-Surf
      No.        (ft)        (ft)
       1         59.47       40.61
       2         74.53       30.50
       3        226.01       47.02
       4        226.23       89.77
   Factor Of Safety For The Preceding Specified Surface =  5.851
   Following Are Displayed The Ten Most Critical Of The Trial
         Failure Surfaces Examined.  They Are Ordered - Most Critical
         First.
         * * Safety Factors Are Calculated By The Modified Janbu Method * *
         Failure Surface Specified By  4 Coordinate Points
           Point      X-Surf      Y-Surf
            No.        (ft)        (ft)
             1         53.21       39.00
             2         76.14       24.88
             3        211.54       52.12
             4        240.92       90.00
                ***    1.933   ***
              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       .8     24.7      .0      .0       .0       .0      .0      .0      .0
  2      5.6   2186.6      .0      .0       .0       .0      .0      .0      .0
  3      4.9   5050.5      .0   709.5       .0       .0      .0      .0      .0
  4     11.6  23721.3      .0  7300.5       .0       .0      .0      .0      .0
  5      7.9  21975.4      .0  6583.8       .0       .0      .0      .0      .0
  6     11.0  32031.0      .0  9180.1       .0       .0      .0      .0      .0
  7    115.0 426871.9      .0 *******       .0       .0      .0      .0      .0
  8      1.5   6869.5      .0  2746.8       .0       .0      .0      .0      .0
  9      2.2   9702.0      .0  6045.7       .0       .0      .0      .0      .0
 10     13.2  43205.4      .0 22152.9       .0       .0      .0      .0      .0
 11      6.2  11318.0      .0  2493.2       .0       .0      .0      .0      .0
 12      7.3   5027.3      .0      .0       .0       .0      .0      .0      .0
 13       .4     14.1      .0      .0       .0       .0      .0      .0      .0
```

RUN #28

TT 53425, 15-15', CS-16, 25' Stab Fill on Qt/TQs Cut; Static + Rapid Drawdown

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T15S1A.PL2 Run By: BPG 3/25/2003 11:09AM



#	FS
a	**1.76**
b	1.78
c	1.84
d	1.87
e	1.88
f	1.89
g	1.89
h	1.90
i	1.91
j	1.91

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qt	2	120.0	125.0	50.0	34.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.76

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #29

```
                      ** PCSTABL5M **
                            by
                     Purdue University
                --Slope Stability Analysis--
           Simplified Janbu, Simplified Bishop
              or Spencer`s Method of Slices
 Run Date:                 3/25/2003
 Time of Run:              11:09AM
 Run By:                   BPG
 Input Data Filename:      N:t15s1a.in
 Output Filename:          N:t15s1a.OUT
 Unit:                     ENGLISH
 Plotted Output Filename:  N:t15s1a.PLT
 PROBLEM DESCRIPTION    TT 53425, 15-15', CS-16, 25' Stab Fill
                        on Qt/TQs Cut; Static + Rapid Drawdown
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

     4 Top   Boundaries
     9 Total Boundaries
 Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
    No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
     1          .00      47.00      78.00      47.00         3
     2        78.00      47.00     157.00      80.00         1
     3       157.00      80.00     172.00      81.00         1
     4       172.00      81.00     200.00      83.00         2
     5       131.31      58.00     172.00      81.00         2
     6        78.00      47.00      79.00      44.00         3
     7        79.00      44.00     103.00      42.00         3
     8       103.00      42.00     131.31      58.00         3
     9       131.31      58.00     200.00      58.00         3
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   130.0    135.0     250.0    29.0     .00        .0       1
   2   120.0    125.0      50.0    34.0     .00        .0       1
   3   130.0    135.0     400.0    38.0     .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise    Cohesion     Friction
   Range       Direction Limit    Intercept      Angle
    No.            (deg)            (psf)        (deg)
     1              9.5             400.0         38.0
     2             10.5             450.0         19.0
     3             90.0             400.0         38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  5 Coordinate Points
   Point      X-Water     Y-Water
    No.        (ft)        (ft)
     1          .00       47.00
     2        78.00       47.00
     3       111.50       61.00
     4       140.00       63.00
     5       200.00       63.00
 Janbus Empirical Coef is being used for the case of  c & phi both > 0
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 400 Trial Surfaces Have Been Generated.
 2 Boxes Specified For Generation Of Central Block Base
 Length Of Line Segments For Active And Passive Portions Of
```

RUN #29

```
Sliding Block Is  40.0
Box         X-Left     Y-Left    X-Right    Y-Right       Height
No.          (ft)       (ft)       (ft)       (ft)         (ft)
 1           90.00      41.00     110.00      44.53         8.00
 2          140.00      49.82     160.00      53.34         8.00
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         95.49       54.31
    2        107.36       43.87
    3        147.66       51.42
    4        148.04       76.26
Factor Of Safety For The Preceding Specified Surface =  8.000
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         88.75       51.49
    2         98.20       43.96
    3        150.73       53.75
    4        151.16       77.56
Factor Of Safety For The Preceding Specified Surface =  5.525
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         85.82       50.27
    2         94.86       41.25
    3        157.55       51.64
    4        158.02       80.07
Factor Of Safety For The Preceding Specified Surface =  5.854
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         51.44       47.00
    2         59.53       43.58
    3         99.29       39.25
    4        143.19       48.13
    5        143.58       74.39
Factor Of Safety For The Preceding Specified Surface =  5.929
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         45.48       47.00
    2         55.78       41.64
    3         95.63       38.27
    4        154.80       48.76
    5        155.32       79.30
Factor Of Safety For The Preceding Specified Surface =  4.254
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         87.41       50.93
    2         96.67       43.09
    3        140.99       47.78
    4        142.27       73.85
Factor Of Safety For The Preceding Specified Surface =  5.631
```

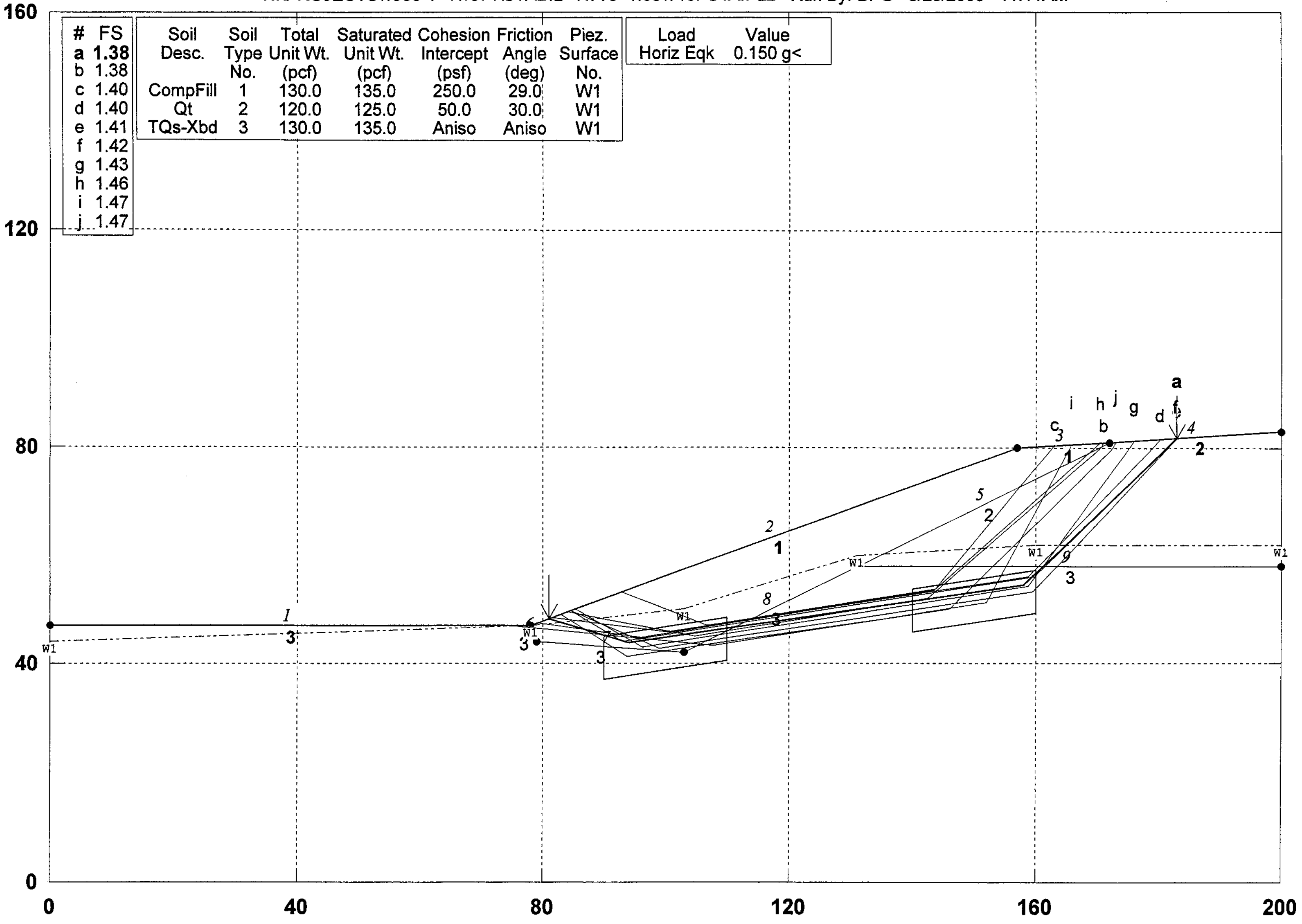
RUN # 29

```
    Factor Of Safety Calculation Has Gone Through Ten Iterations
    The Trial Failure Surface In Question Is Defined
    By The Following  4 Coordinate Points
      Point        X-Surf       Y-Surf
       No.          (ft)         (ft)
        1           85.87        50.29
        2           96.51        40.25
        3          144.59        49.10
        4          144.92        74.95
    Factor Of Safety For The Preceding Specified Surface =  4.957
    Following Are Displayed The Ten Most Critical Of The Trial
          Failure Surfaces Examined.  They Are Ordered - Most Critical
          First.
          * * Safety Factors Are Calculated By The Modified Janbu Method * *
          Failure Surface Specified By  4 Coordinate Points
            Point        X-Surf       Y-Surf
             No.          (ft)         (ft)
              1           78.97        47.41
              2           96.02        44.78
              3          143.43        53.56
              4          163.12        80.41
                 ***      1.763    ***
                Individual data on the    12  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     17.0  11180.4      .0  4855.0      .0       .0       .0       .0       .0
   2     15.5  24056.5      .0 10501.0      .0       .0       .0       .0       .0
   3      2.2   4089.5      .0  1866.0      .0       .0       .0       .0       .0
   4     17.6  37409.7      .0 13445.9      .0       .0       .0       .0       .0
   5      8.7  21663.5      .0  5815.4      .0       .0       .0       .0       .0
   6       .2    404.6      .0    99.3      .0       .0       .0       .0       .0
   7      3.3   8647.2      .0  2024.6      .0       .0       .0       .0       .0
   8      3.3   7996.7      .0  2477.6      .0       .0       .0       .0       .0
   9      3.7   7387.0      .0   967.3      .0       .0       .0       .0       .0
  10      6.6   9368.6      .0      .0      .0       .0       .0       .0       .0
  11       .6    558.7      .0      .0      .0       .0       .0       .0       .0
  12      5.5   2594.3      .0      .0      .0       .0       .0       .0       .0
```

RUN #29

TT 53425, 15-15', CS-13 w 25' Stab Fill on Qt over TQs; Pseudo-Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T15PS1A.PL2 Run By: BPG 3/25/2003 11:11AM



#	FS
a	**1.38**
b	1.38
c	1.40
d	1.40
e	1.41
f	1.42
g	1.43
h	1.46
i	1.47
j	1.47

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qt	2	120.0	125.0	50.0	30.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=1.38

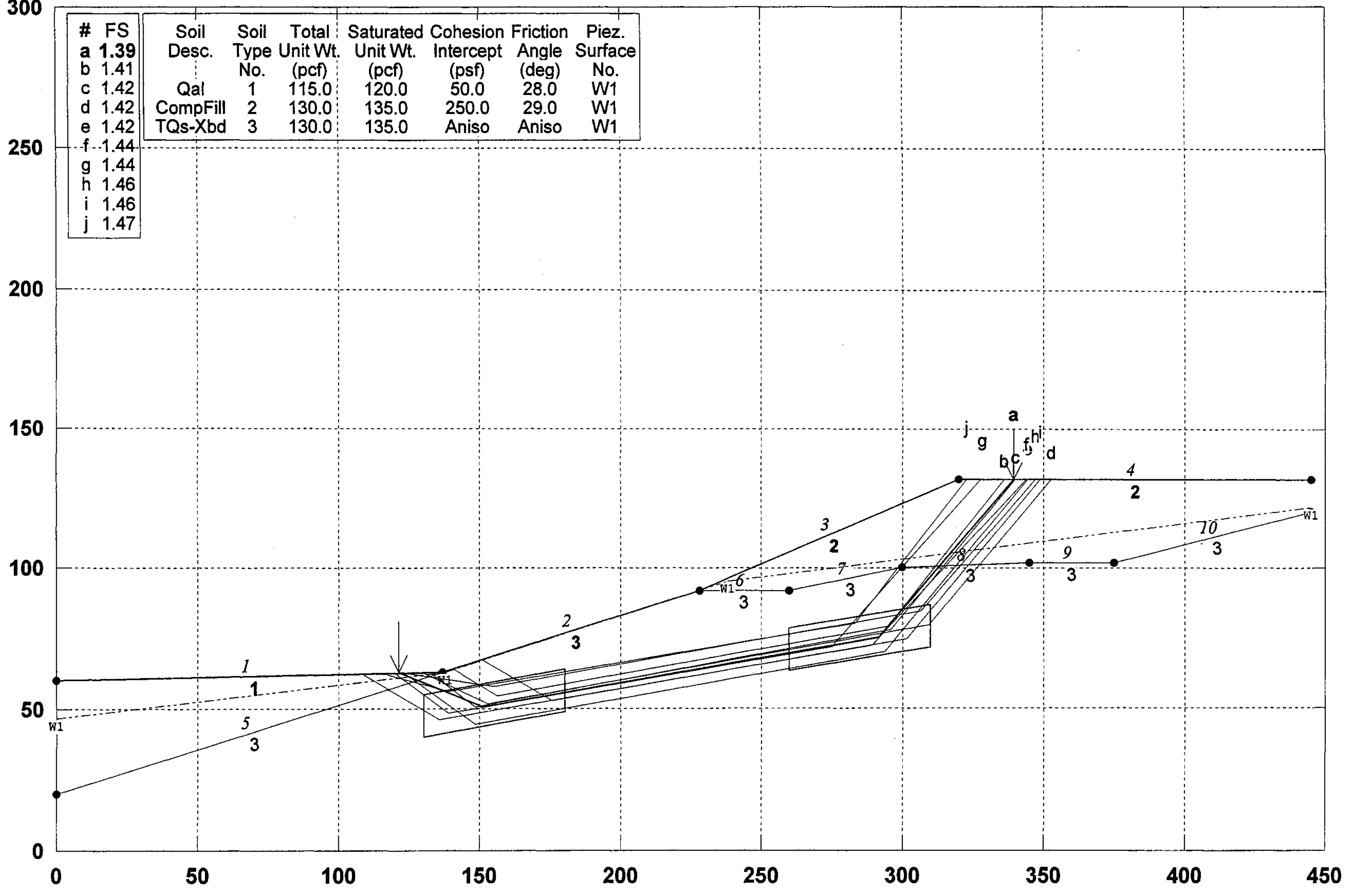
Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #29

TT 53425, 15-15', CS-17 Fill Over TQs Cut As Designed; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T15S2A.PL2 Run By: BPG 3/26/2003 4:59PM



#	FS
a	**1.39**
b	1.41
c	1.42
d	1.42
e	1.42
f	1.44
g	1.44
h	1.46
i	1.46
j	1.47

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	115.0	120.0	50.0	28.0	W1
CompFill	2	130.0	135.0	250.0	29.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.39

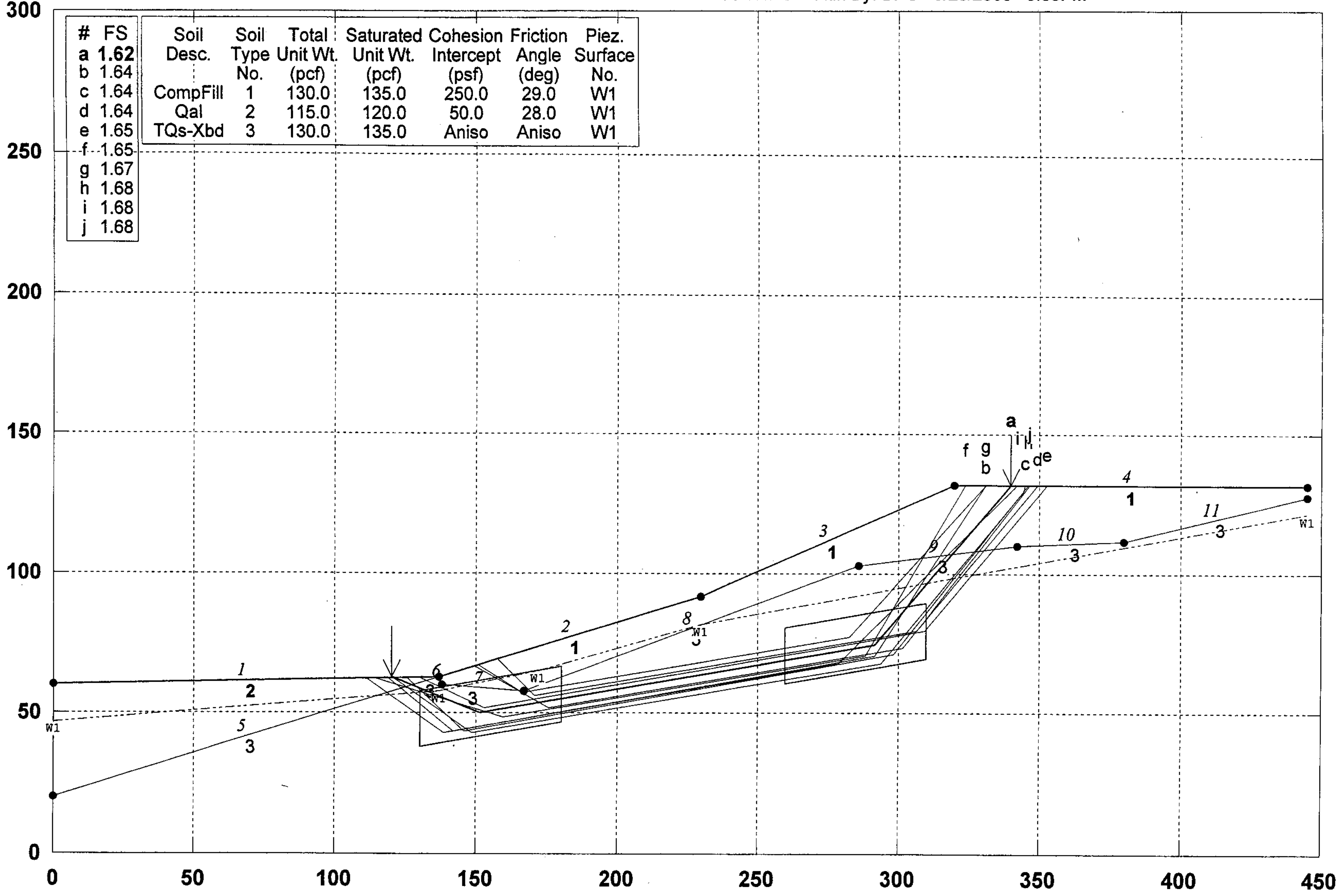
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #30

TT 53425; 15-15', CS-17 with 30' Buttress on Fill over TQs Slope; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T15S2B.PL2 Run By: BPG 3/26/2003 5:33PM



#	FS
a	**1.62**
b	1.64
c	1.64
d	1.64
e	1.65
f	1.65
g	1.67
h	1.68
i	1.68
j	1.68

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qal	2	115.0	120.0	50.0	28.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.62
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #31

```
                     ** PCSTABL5M **
                           by
                    Purdue University
               --Slope Stability Analysis--
            Simplified Janbu, Simplified Bishop
               or Spencer`s Method of Slices
 Run Date:                3/26/2003
 Time of Run:             5:33PM
 Run By:                  BPG
 Input Data Filename:     N:T15S2B.IN
 Output Filename:         N:T15S2B.OUT
 Unit:                    ENGLISH
 Plotted Output Filename: N:T15S2B.PLT
 PROBLEM DESCRIPTION   TT 53425; 15-15', CS-17 with 30' Buttres
                      s on Fill over TQs Slope; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

     4 Top   Boundaries
    11 Total Boundaries
 Boundary     X-Left     Y-Left     X-Right    Y-Right    Soil Type
    No.        (ft)       (ft)        (ft)       (ft)     Below Bnd
     1          .00       60.00      137.00      63.00        2
     2       137.00       63.00      230.00      92.00        1
     3       230.00       92.00      320.00     132.00        1
     4       320.00      132.00      445.00     132.00        1
     5          .00       20.00      137.00      63.00        3
     6       137.00       63.00      138.00      60.00        3
     7       138.00       60.00      167.00      58.00        3
     8       167.00       58.00      286.00     103.00        3
     9       286.00      103.00      342.00     110.00        3
    10       342.00      110.00      380.00     112.00        3
    11       380.00      112.00      445.00     128.00        3
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   130.0    135.0     250.0     29.0     .00        .0       1
   2   115.0    120.0      50.0     28.0     .00        .0       1
   3   130.0    135.0     400.0     38.0     .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
      1 soil type(s)
 Soil Type  3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction     Counterclockwise     Cohesion     Friction
   Range       Direction Limit     Intercept      Angle
    No.             (deg)            (psf)        (deg)
     1               9.5             400.0         38.0
     2              10.5             450.0         19.0
     3              90.0             400.0         38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  5 Coordinate Points
   Point      X-Water      Y-Water
    No.         (ft)         (ft)
     1           .00        46.48
     2        137.00        58.00
     3        172.00        65.00
     4        230.00        82.00
     5        445.00       122.00
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 400 Trial Surfaces Have Been Generated.
 2 Boxes Specified For Generation Of Central Block Base
```

RUN #31

```
Length Of Line Segments For Active And Passive Portions Of
Sliding Block Is  80.0
Box        X-Left     Y-Left    X-Right    Y-Right      Height
No.         (ft)       (ft)       (ft)       (ft)        (ft)
 1         130.00      47.76     180.00      56.58       20.00
 2         260.00      70.68     310.00      79.50       20.00
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        160.83       70.43
    2        167.50       64.01
    3        296.01       67.36
    4        298.66      122.52
Factor Of Safety For The Preceding Specified Surface =  5.830
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        137.07       63.02
    2        156.79       53.17
    3        260.99       64.53
    4        261.88      106.17
Factor Of Safety For The Preceding Specified Surface =  6.246
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        137.74       63.23
    2        152.47       52.12
    3        297.88       72.56
    4        298.22      122.32
Factor Of Safety For The Preceding Specified Surface =  5.951
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        159.76       70.10
    2        169.46       60.98
    3        307.06       79.41
    4        308.83      127.04
Factor Of Safety For The Preceding Specified Surface =  4.836
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         39.06       60.86
    2         64.37       47.68
    3        144.08       40.94
    4        297.01       68.05
    5        297.92      122.19
Factor Of Safety For The Preceding Specified Surface =  3.387
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        128.34       62.81
    2        146.28       45.88
    3        271.47       68.88
    4        272.00      110.67
Factor Of Safety For The Preceding Specified Surface =  3.355
```

RUN #31

```
   Factor Of Safety Calculation Has Gone Through Ten Iterations
   The Trial Failure Surface In Question Is Defined
   By The Following  4 Coordinate Points
     Point      X-Surf      Y-Surf
      No.        (ft)        (ft)
       1        117.91       62.58
       2        164.95       56.38
       3        298.44       80.26
       4        298.64      122.50
   Factor Of Safety For The Preceding Specified Surface =  3.384
   Factor Of Safety Calculation Has Gone Through Ten Iterations
   The Trial Failure Surface In Question Is Defined
   By The Following  4 Coordinate Points
     Point      X-Surf      Y-Surf
      No.        (ft)        (ft)
       1        130.18       62.85
       2        158.76       50.14
       3        272.03       76.59
       4        272.39      110.84
   Factor Of Safety For The Preceding Specified Surface =  4.651
   Following Are Displayed The Ten Most Critical Of The Trial
         Failure Surfaces Examined.  They Are Ordered - Most Critical
         First.
         * * Safety Factors Are Calculated By The Modified Janbu Method * *
         Failure Surface Specified By  4 Coordinate Points
           Point      X-Surf      Y-Surf
            No.        (ft)        (ft)
             1        120.42       62.64
             2        151.13       50.22
             3        291.26       74.80
             4        339.62      132.00
               ***     1.620     ***
              Individual data on the    16  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      6.7   1113.0      .0      .0       .0      .0      .0      .0      .0
  2      5.6   2791.8      .0      .0       .0      .0      .0      .0      .0
  3      4.2   3377.0      .0   293.8       .0      .0      .0      .0      .0
  4      1.0    977.2      .0   156.5       .0      .0      .0      .0      .0
  5      6.7   9012.8      .0  2074.9       .0      .0      .0      .0      .0
  6      6.4  12724.9      .0  3680.8       .0      .0      .0      .0      .0
  7     15.9  38544.0      .0 10655.8       .0      .0      .0      .0      .0
  8      5.0  13073.3      .0  3436.4       .0      .0      .0      .0      .0
  9     58.0 184954.3      .0 51298.4       .0      .0      .0      .0      .0
 10       .9   3433.5      .0  1027.4       .0      .0      .0      .0      .0
 11     55.1 259898.9      .0 62625.0       .0      .0      .0      .0      .0
 12      5.3  30372.8      .0  6084.6       .0      .0      .0      .0      .0
 13     18.7  91930.9      .0 16494.0       .0      .0      .0      .0      .0
 14      8.6  30792.3      .0      .0       .0      .0      .0      .0      .0
 15      1.5   4493.0      .0      .0       .0      .0      .0      .0      .0
 16     19.6  29607.2      .0      .0       .0      .0      .0      .0      .0
```

RUN #31

TT 53425 15-15', CS-17 Fill Over TQs Slope w 30' Buttress; Pseudo-Static

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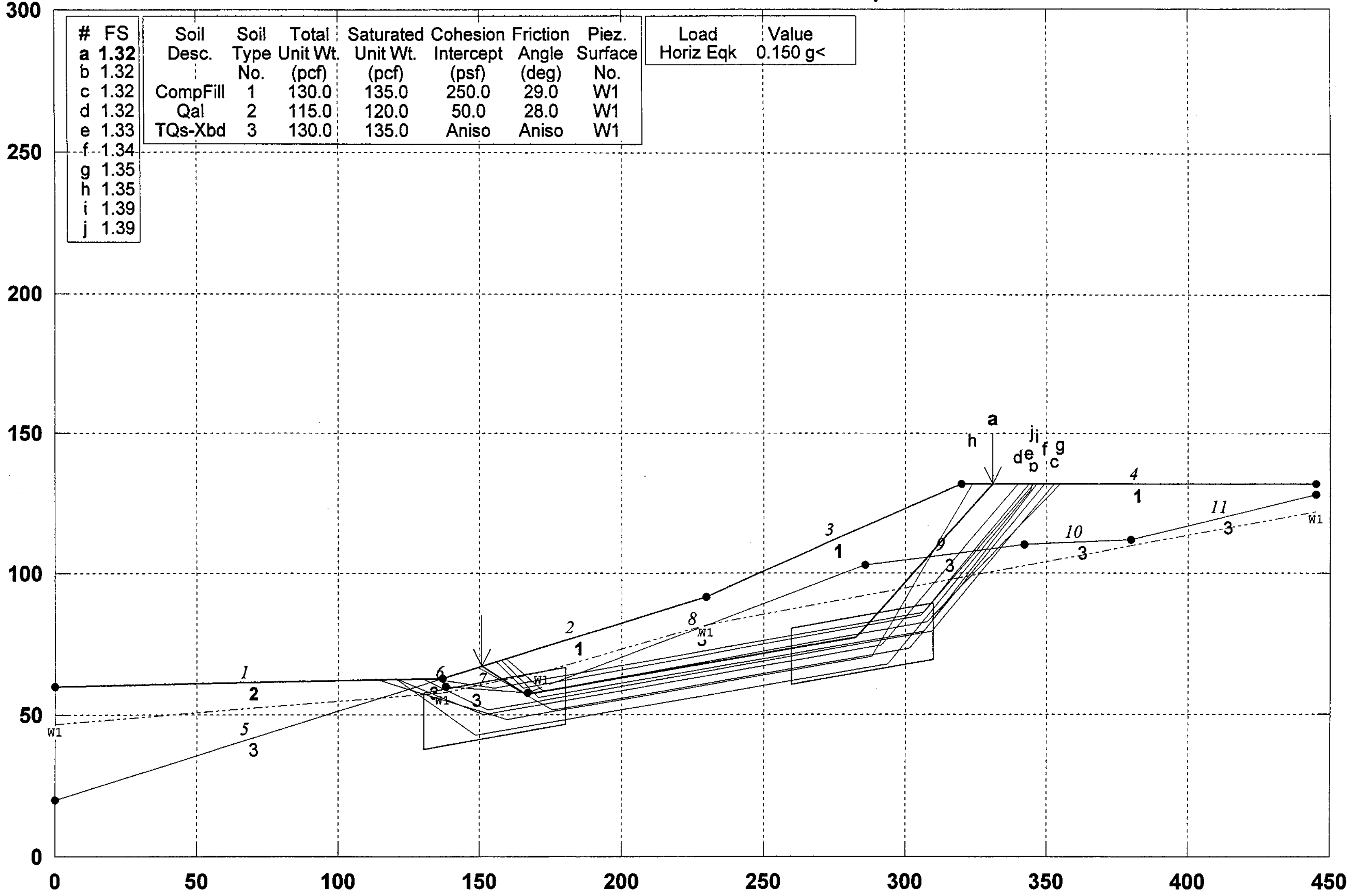


#	FS
a	**1.32**
b	1.32
c	1.32
d	1.32
e	1.33
f	1.34
g	1.35
h	1.35
i	1.39
j	1.39

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qal	2	115.0	120.0	50.0	28.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=1.32

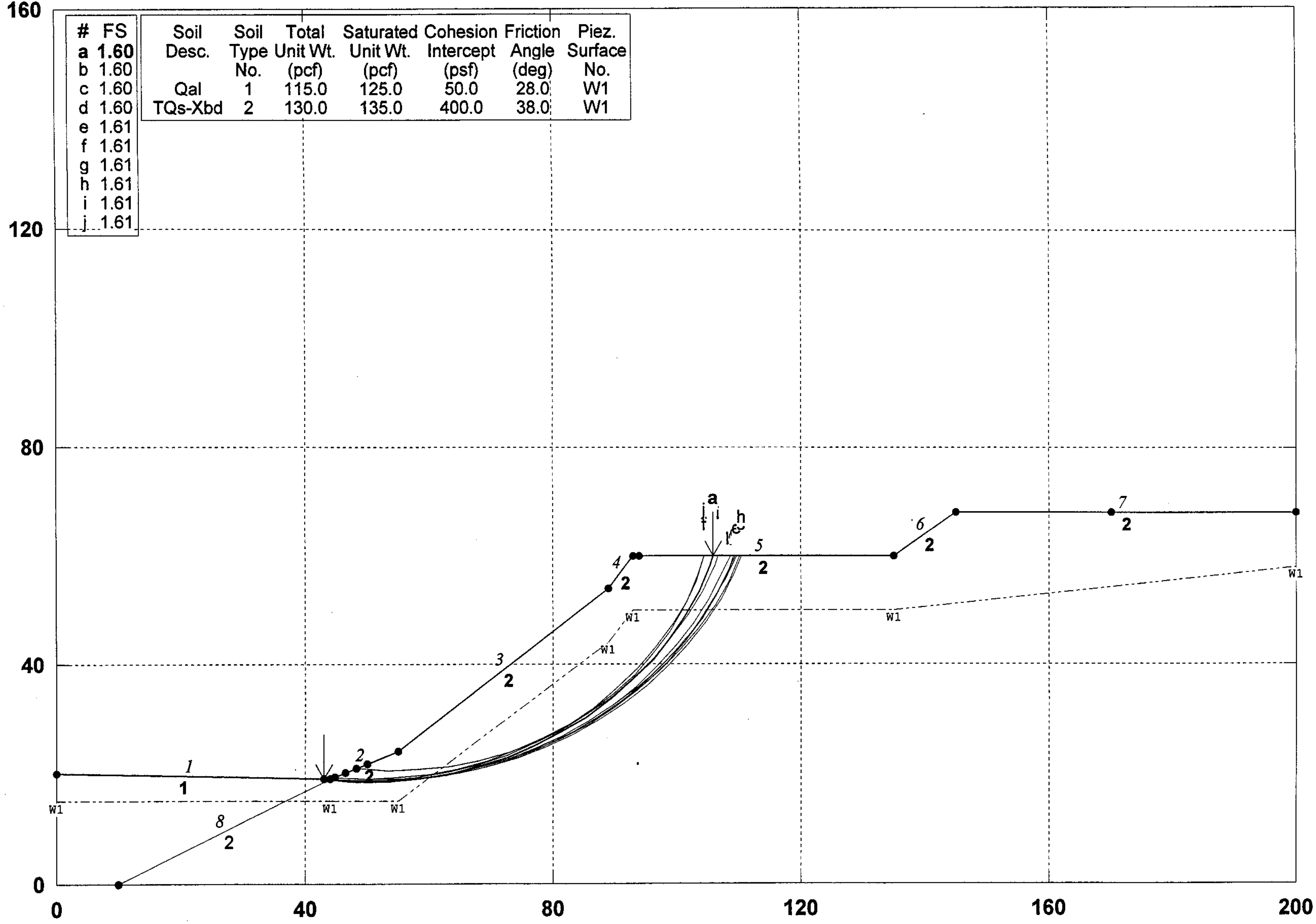
Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #31

TTr 53425, 16-16', 49' TQs River Bank Cut 10' for Bike Path; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T16S1A.PL2 Run By: BPG 3/26/2003 5:43PM



#	FS
a	**1.60**
b	1.60
c	1.60
d	1.60
e	1.61
f	1.61
g	1.61
h	1.61
i	1.61
j	1.61

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	115.0	125.0	50.0	28.0	W1
TQs-Xbd	2	130.0	135.0	400.0	38.0	W1

PCSTABL5M/si FSmin=1.60

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #32

```
                       ** PCSTABL5M **
                              by
                       Purdue University
                  --Slope Stability Analysis--
              Simplified Janbu, Simplified Bishop
                 or Spencer`s Method of Slices
 Run Date:                3/26/2003
 Time of Run:             5:43PM
 Run By:                  BPG
 Input Data Filename:     N:t16s1a.in
 Output Filename:         N:t16s1a.OUT
 Unit:                    ENGLISH
 Plotted Output Filename: N:t16s1a.PLT
 PROBLEM DESCRIPTION    TTr 53425, 16-16', 49' TQs River Bank Cu
                        t 10' for Bike Path; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

     7 Top   Boundaries
     8 Total Boundaries
 Boundary     X-Left      Y-Left     X-Right     Y-Right    Soil Type
    No.        (ft)        (ft)        (ft)        (ft)     Below Bnd
     1          .00       20.00       44.00       19.00         1
     2        44.00       19.00       55.00       24.00         2
     3        55.00       24.00       89.00       54.00         2
     4        89.00       54.00       93.00       60.00         2
     5        93.00       60.00      135.00       60.00         2
     6       135.00       60.00      145.00       68.00         2
     7       145.00       68.00      200.00       68.00         2
     8        10.00         .00       44.00       19.00         2
ISOTROPIC SOIL PARAMETERS
  2 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    125.0      50.0     28.0      .00       .0      1
   2   130.0    135.0     400.0     38.0      .00       .0      1
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  7 Coordinate Points
   Point      X-Water     Y-Water
    No.         (ft)        (ft)
     1          .00       15.00
     2        44.00       15.00
     3        55.00       15.00
     4        89.00       44.00
     5        93.00       50.00
     6       135.00       50.00
     7       200.00       58.00
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Circular Surfaces, Has Been Specified.
 Janbus Empirical Coef. is being used for the case of  c & phi both > 0
 500 Trial Surfaces Have Been Generated.
 100 Surfaces Initiate From Each Of  5 Points Equally Spaced
 Along The Ground Surface Between  X =  43.00 ft.
                              and  X =  50.00 ft.
 Each Surface Terminates Between   X =  94.00 ft.
                              and  X = 170.00 ft.
 Unless Further Limitations Were Imposed, The Minimum Elevation
 At Which A Surface Extends Is  Y = 10.00 ft.
  5.00 ft. Line Segments Define Each Trial Failure Surface.
 Restrictions Have Been Imposed Upon The Angle Of Initiation.
 The Angle Has Been Restricted Between The Angles Of  -5.0
 And  40.0 deg.
 Following Are Displayed The Ten Most Critical Of The Trial
       Failure Surfaces Examined.  They Are Ordered - Most Critical
```

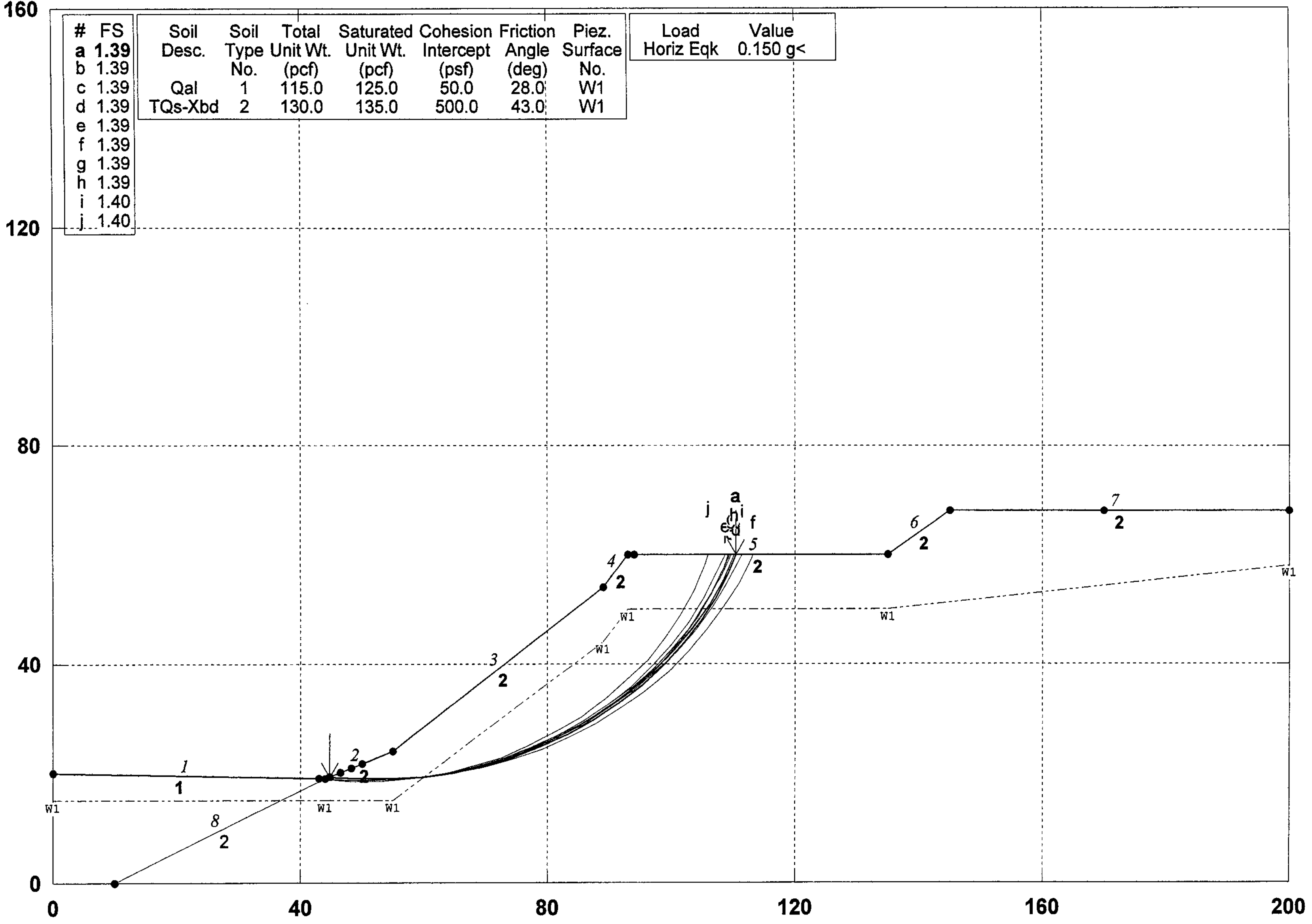
RUN #32

```
          First.
          * * Safety Factors Are Calculated By The Modified Janbu Method * *
          Failure Surface Specified By 18 Coordinate Points
            Point      X-Surf      Y-Surf
             No.        (ft)        (ft)
              1         43.00       19.02
              2         47.98       18.59
              3         52.98       18.59
              4         57.96       19.01
              5         62.89       19.87
              6         67.72       21.14
              7         72.43       22.83
              8         76.98       24.91
              9         81.32       27.38
             10         85.44       30.22
             11         89.30       33.40
             12         92.87       36.89
             13         96.13       40.69
             14         99.05       44.75
             15        101.61       49.04
             16        103.79       53.54
             17        105.57       58.21
             18        106.08       60.00
                 ***     1.602    ***
               Individual data on the    24  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      .9        3.0         .0        .0       .0       .0       .0       .0       .0
   2      .1         .7         .0        .0       .0       .0       .0       .0       .0
   3     4.0      591.4         .0        .0       .0       .0       .0       .0       .0
   4     5.0     2183.3         .0        .0       .0       .0       .0       .0       .0
   5     2.0     1277.6         .0        .0       .0       .0       .0       .0       .0
   6     3.0     2473.9         .0        .0       .0       .0       .0       .0       .0
   7     2.2     2379.8         .0        .0       .0       .0       .0       .0       .0
   8     2.7     3617.5         .0     127.6       .0       .0       .0       .0       .0
   9     4.8     7975.7         .0     809.6       .0       .0       .0       .0       .0
  10     4.7     9482.7         .0    1447.1       .0       .0       .0       .0       .0
  11     4.5    10488.8         .0    1954.3       .0       .0       .0       .0       .0
  12     4.3    10991.7         .0    2327.4       .0       .0       .0       .0       .0
  13     4.1    11009.6         .0    2563.7       .0       .0       .0       .0       .0
  14     3.6     9746.7         .0    2451.7       .0       .0       .0       .0       .0
  15      .3      835.6         .0     175.3       .0       .0       .0       .0       .0
  16     3.6    10350.6         .0    2445.6       .0       .0       .0       .0       .0
  17      .1      378.7         .0     101.5       .0       .0       .0       .0       .0
  18     3.1     8781.3         .0    3341.0       .0       .0       .0       .0       .0
  19     2.9     6664.6         .0    2272.3       .0       .0       .0       .0       .0
  20     2.6     4399.0         .0     968.8       .0       .0       .0       .0       .0
  21      .5      632.8         .0      31.8       .0       .0       .0       .0       .0
  22     1.7     1835.4         .0        .0       .0       .0       .0       .0       .0
  23     1.8      956.0         .0        .0       .0       .0       .0       .0       .0
  24      .5       59.3         .0        .0       .0       .0       .0       .0       .0
```

RUN #32

TTr 53425 - X-Section 16; 49' River Bankw Bike Path, TQs Sideslope; PseudoStatc

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T16PS1A.PL2 Run By: BPG 3/26/2003 5:45PM



#	FS
a	**1.39**
b	1.39
c	1.39
d	1.39
e	1.39
f	1.39
g	1.39
h	1.39
i	1.40
j	1.40

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	115.0	125.0	50.0	28.0	W1
TQs-Xbd	2	130.0	135.0	500.0	43.0	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=1.39

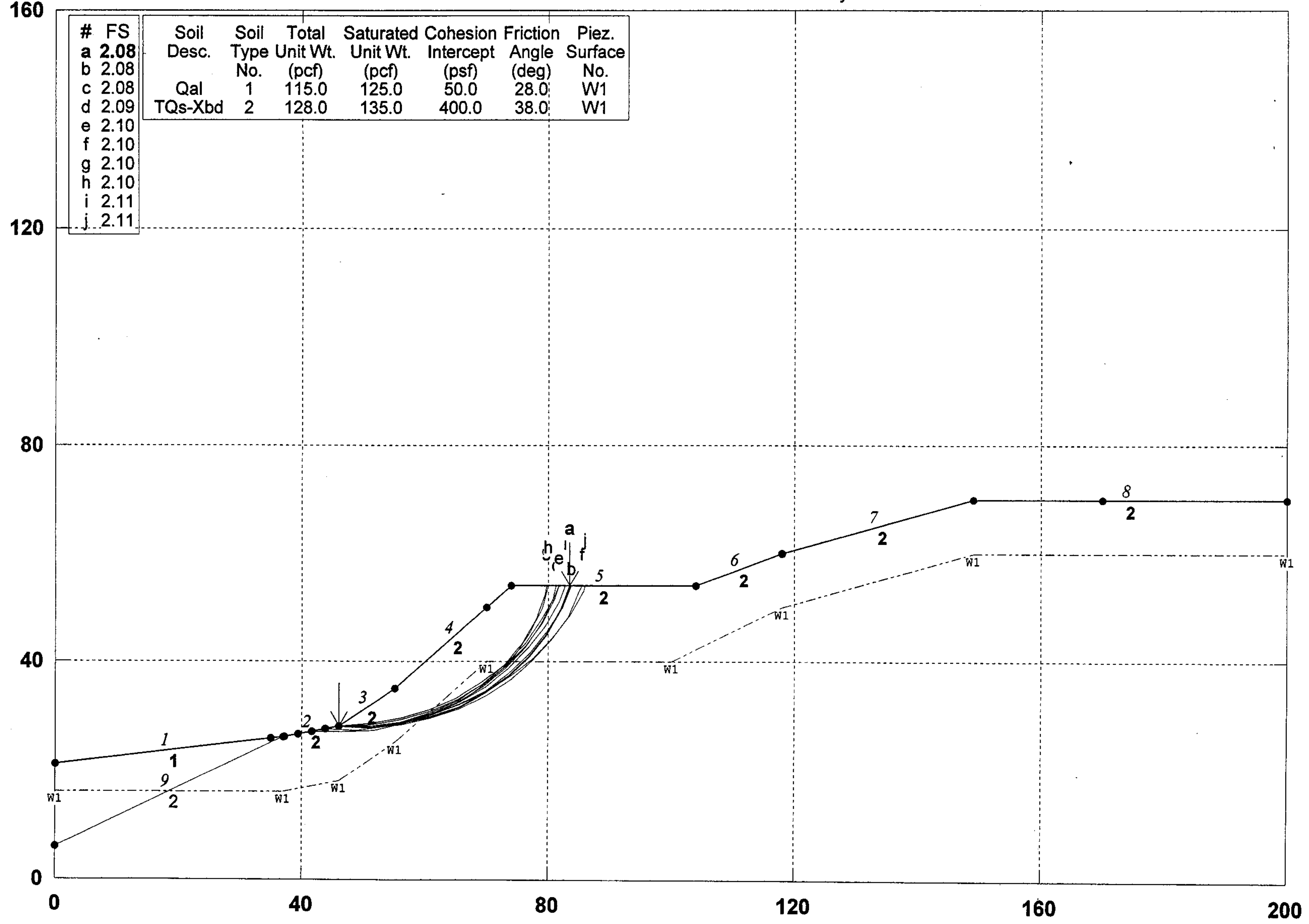
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #32

TT 53425, 17-17', 49' TQs River Bank w 16' Cut for Bike Path; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T17S1A.PL2 Run By: BPG 3/25/2003 11:20AM



#	FS
a	**2.08**
b	2.08
c	2.08
d	2.09
e	2.10
f	2.10
g	2.10
h	2.10
i	2.11
j	2.11

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qal	1	115.0	125.0	50.0	28.0	W1
TQs-Xbd	2	128.0	135.0	400.0	38.0	W1

PCSTABL5M/si FSmin=2.08

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #33

```
                         ** PCSTABL5M **
                               by
                        Purdue University
                   --Slope Stability Analysis--
               Simplified Janbu, Simplified Bishop
                  or Spencer`s Method of Slices
 Run Date:                 3/25/2003
 Time of Run:              11:20AM
 Run By:                   BPG
 Input Data Filename:      N:t17s1a.in
 Output Filename:          N:t17s1a.OUT
 Unit:                     ENGLISH
 Plotted Output Filename:  N:t17s1a.PLT
 PROBLEM DESCRIPTION   TT 53425, 17-17', 49' TQs River Bank w
                       16' Cut for Bike Path; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

     8 Top   Boundaries
     9 Total Boundaries
 Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
    No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
     1           .00      21.00      37.00      26.00        1
     2         37.00      26.00      46.00      28.00        2
     3         46.00      28.00      55.00      35.00        2
     4         55.00      35.00      74.00      54.00        2
     5         74.00      54.00     104.00      54.00        2
     6        104.00      54.00     118.00      60.00        2
     7        118.00      60.00     149.00      70.00        2
     8        149.00      70.00     200.00      70.00        2
     9           .00       6.00      37.00      26.00        2
ISOTROPIC SOIL PARAMETERS
  2 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    125.0      50.0     28.0     .00        .0       1
   2   128.0    135.0     400.0     38.0     .00        .0       1
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  9 Coordinate Points
   Point      X-Water     Y-Water
    No.        (ft)        (ft)
     1           .00       16.00
     2         37.00       16.00
     3         46.00       18.00
     4         55.00       25.00
     5         70.00       40.00
     6        100.00       40.00
     7        118.00       50.00
     8        149.00       60.00
     9        200.00       60.00
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Circular Surfaces, Has Been Specified.
 Janbus Empirical Coef. is being used for the case of  c & phi both > 0
 600 Trial Surfaces Have Been Generated.
 100 Surfaces Initiate From Each Of  6 Points Equally Spaced
 Along The Ground Surface Between  X =  35.00 ft.
                              and  X =  46.00 ft.
 Each Surface Terminates Between   X =  70.00 ft.
                              and  X = 170.00 ft.
 Unless Further Limitations Were Imposed, The Minimum Elevation
 At Which A Surface Extends Is  Y =  1.00 ft.
  5.00 ft. Line Segments Define Each Trial Failure Surface.
 Restrictions Have Been Imposed Upon The Angle Of Initiation.
 The Angle Has Been Restricted Between The Angles Of  -2.0
```

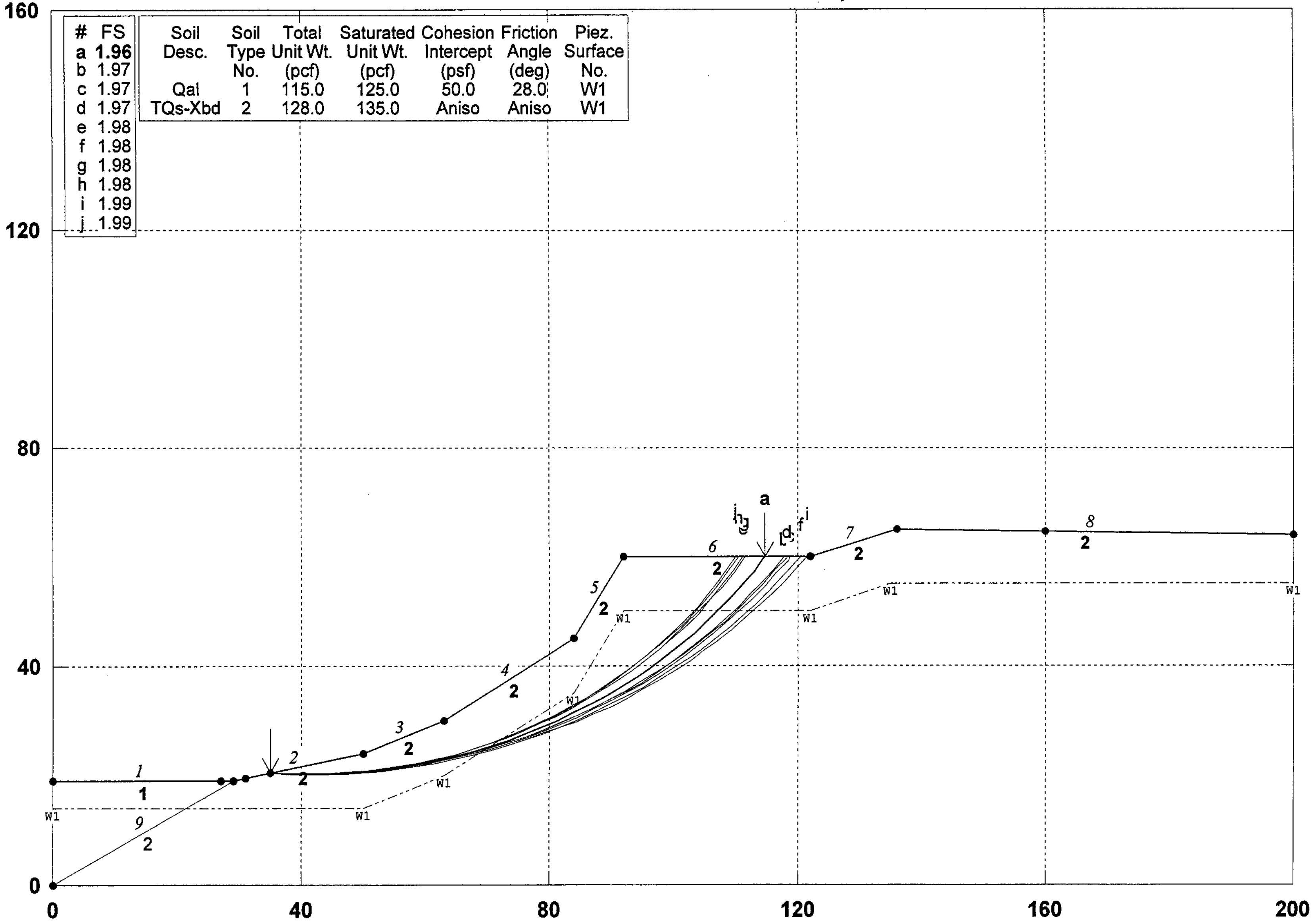
RUN #33

```
      And  15.0 deg.
      Following Are Displayed The Ten Most Critical Of The Trial
            Failure Surfaces Examined.  They Are Ordered - Most Critical
            First.
            * * Safety Factors Are Calculated By The Modified Janbu Method * *
            Failure Surface Specified By 11 Coordinate Points
              Point       X-Surf       Y-Surf
               No.         (ft)         (ft)
                1         46.00        28.00
                2         51.00        27.83
                3         55.97        28.38
                4         60.81        29.63
                5         65.42        31.56
                6         69.71        34.13
                7         73.59        37.28
                8         76.97        40.96
                9         79.80        45.09
               10         82.01        49.57
               11         83.44        54.00
                   ***    2.081    ***
                 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     5.0    1297.5     .0      .0       .0       .0       .0      .0      .0
     2     4.0    2763.4     .0      .0       .0       .0       .0      .0      .0
     3     1.0     887.1     .0      .0       .0       .0       .0      .0      .0
     4     3.2    3655.1     .0      .0       .0       .0       .0      .0      .0
     5     1.6    2166.9     .0    45.6       .0       .0       .0      .0      .0
     6     4.6    7455.3     .0   590.6       .0       .0       .0      .0      .0
     7     4.3    8190.8     .0  1105.7       .0       .0       .0      .0      .0
     8      .3     587.0     .0    98.0       .0       .0       .0      .0      .0
     9     3.6    7441.2     .0  1206.4       .0       .0       .0      .0      .0
    10      .4     865.5     .0    94.6       .0       .0       .0      .0      .0
    11     2.1    4067.2     .0   218.7       .0       .0       .0      .0      .0
    12      .9    1530.1     .0      .0       .0       .0       .0      .0      .0
    13     2.8    3970.7     .0      .0       .0       .0       .0      .0      .0
    14     2.2    1884.8     .0      .0       .0       .0       .0      .0      .0
    15     1.4     407.2     .0      .0       .0       .0       .0      .0      .0
```

D11A1 #33

TTr 53425 - X-Section 18'; 45' TQs RiverBank Slope w Bike Path; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T18S1A.PL2 Run By: BPG 3/25/2003 11:25AM



PCSTABL5M/si FSmin=1.96

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #34

```
                     ** PCSTABL5M **
                           by
                    Purdue University
               --Slope Stability Analysis--
           Simplified Janbu, Simplified Bishop
               or Spencer`s Method of Slices
 Run Date:                 3/25/2003
 Time of Run:              11:25AM
 Run By:                   BPG
 Input Data Filename:      N:t18s1a.in
 Output Filename:          N:t18s1a.OUT
 Unit:                     ENGLISH
 Plotted Output Filename:  N:t18s1a.PLT
 PROBLEM DESCRIPTION    TTr 53425 - X-Section 18'; 45' TQs River
                         Bank Slope w Bike Path; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

     8 Top   Boundaries
     9 Total Boundaries
 Boundary     X-Left     Y-Left     X-Right     Y-Right     Soil Type
    No.        (ft)       (ft)        (ft)        (ft)      Below Bnd
     1           .00      19.00       29.00       19.00         1
     2         29.00      19.00       50.00       24.00         2
     3         50.00      24.00       63.00       30.00         2
     4         63.00      30.00       84.00       45.00         2
     5         84.00      45.00       92.00       60.00         2
     6         92.00      60.00      122.00       60.00         2
     7        122.00      60.00      136.00       65.00         2
     8        136.00      65.00      200.00       64.00         2
     9           .00        .00       29.00       19.00         2
ISOTROPIC SOIL PARAMETERS
  2 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    125.0      50.0     28.0     .00        .0       1
   2   128.0    135.0     400.0     38.0     .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  2 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit     Intercept      Angle
    No.            (deg)             (psf)        (deg)
     1              2.5              400.0         38.0
     2              3.5              450.0         19.0
     3             90.0              400.0         38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  8 Coordinate Points
   Point      X-Water     Y-Water
    No.        (ft)        (ft)
     1           .00       14.00
     2         50.00       14.00
     3         63.00       20.00
     4         84.00       35.00
     5         92.00       50.00
     6        122.00       50.00
     7        135.00       55.00
     8        200.00       55.00
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Circular Surfaces, Has Been Specified.
 Janbus Empirical Coef. is being used for the case of  c & phi both > 0
 900 Trial Surfaces Have Been Generated.
 300 Surfaces Initiate From Each Of  3 Points Equally Spaced
```

RUN #34

```
   Along The Ground Surface Between  X =  27.00 ft.
                                and  X =  35.00 ft.
   Each Surface Terminates Between   X =  92.00 ft.
                                and  X = 160.00 ft.
   Unless Further Limitations Were Imposed, The Minimum Elevation
   At Which A Surface Extends Is  Y =  1.00 ft.
    3.00 ft. Line Segments Define Each Trial Failure Surface.
   Restrictions Have Been Imposed Upon The Angle Of Initiation.
   The Angle Has Been Restricted Between The Angles Of  -3.0
   And  20.0 deg.
   Following Are Displayed The Ten Most Critical Of The Trial
         Failure Surfaces Examined.  They Are Ordered - Most Critical
         First.
         * * Safety Factors Are Calculated By The Modified Janbu Method * *
         Failure Surface Specified By 33 Coordinate Points
           Point      X-Surf      Y-Surf
            No.        (ft)        (ft)
             1        35.00       20.43
             2        38.00       20.27
             3        41.00       20.22
             4        44.00       20.27
             5        46.99       20.42
             6        49.98       20.67
             7        52.96       21.03
             8        55.93       21.48
             9        58.87       22.04
            10        61.80       22.69
            11        64.70       23.45
            12        67.58       24.30
            13        70.43       25.25
            14        73.24       26.30
            15        76.01       27.44
            16        78.75       28.68
            17        81.44       30.00
            18        84.08       31.42
            19        86.67       32.93
            20        89.22       34.52
            21        91.70       36.20
            22        94.13       37.97
            23        96.49       39.81
            24        98.80       41.73
            25       101.03       43.74
            26       103.20       45.81
            27       105.29       47.96
            28       107.31       50.18
            29       109.25       52.46
            30       111.12       54.82
            31       112.90       57.23
            32       114.60       59.70
            33       114.79       60.00
               ***     1.961    ***
            Individual data on the    38  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      3.0    166.5          .0      .0        .0       .0      .0       .0      .0
  2      3.0    480.6          .0      .0        .0       .0      .0       .0      .0
  3      3.0    755.6          .0      .0        .0       .0      .0       .0      .0
  4      3.0    990.1          .0      .0        .0       .0      .0       .0      .0
  5      3.0   1183.2          .0      .0        .0       .0      .0       .0      .0
  6       .0      8.0          .0      .0        .0       .0      .0       .0      .0
  7      3.0   1451.6          .0      .0        .0       .0      .0       .0      .0
  8      3.0   1819.9          .0      .0        .0       .0      .0       .0      .0
  9      2.9   2133.6          .0      .0        .0       .0      .0       .0      .0
 10      2.9   2399.8          .0      .0        .0       .0      .0       .0      .0
 11      1.2   1054.8          .0      .0        .0       .0      .0       .0      .0
```

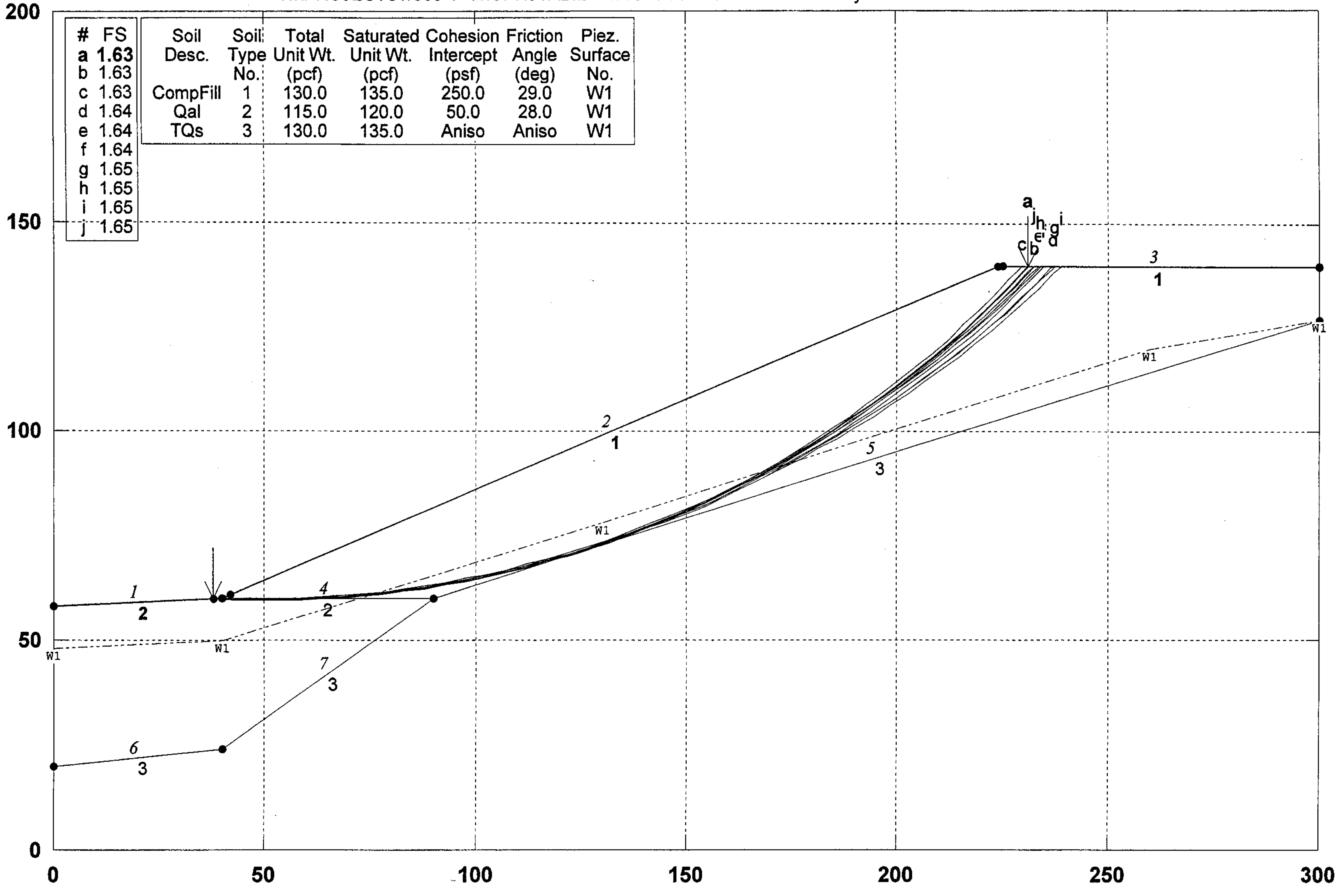
RUN #3A

```
 12     1.7  1610.3     .0      .0      .0     .0     .0     .0     .0
 13     2.9  3080.9     .0      .0      .0     .0     .0     .0     .0
 14     2.7  3290.2     .0      .0      .0     .0     .0     .0     .0
 15      .1   173.7     .0      .2      .0     .0     .0     .0     .0
 16     2.8  3799.1     .0    82.8      .0     .0     .0     .0     .0
 17     2.8  4083.3     .0   223.0      .0     .0     .0     .0     .0
 18     2.7  4308.8     .0   344.2      .0     .0     .0     .0     .0
 19     2.7  4476.4     .0   446.3      .0     .0     .0     .0     .0
 20     2.6  4445.6     .0   512.0      .0     .0     .0     .0     .0
 21      .1   141.5     .0    12.7      .0     .0     .0     .0     .0
 22     2.6  5175.6     .0   618.2      .0     .0     .0     .0     .0
 23     2.5  6167.5     .0   991.3      .0     .0     .0     .0     .0
 24     2.5  7043.6     .0  1342.9      .0     .0     .0     .0     .0
 25      .3   913.1     .0   188.9      .0     .0     .0     .0     .0
 26     2.1  6403.2     .0  2102.1      .0     .0     .0     .0     .0
 27     2.4  6576.9     .0  2080.1      .0     .0     .0     .0     .0
 28     2.3  5813.3     .0  1727.3      .0     .0     .0     .0     .0
 29     2.2  5052.5     .0  1359.9      .0     .0     .0     .0     .0
 30     2.2  4299.8     .0   978.3      .0     .0     .0     .0     .0
 31     2.1  3560.1     .0   582.9      .0     .0     .0     .0     .0
 32     1.9  2631.9     .0   175.5      .0     .0     .0     .0     .0
 33      .2   206.8     .0      .0      .0     .0     .0     .0     .0
 34     1.9  2158.2     .0      .0      .0     .0     .0     .0     .0
 35     1.9  1517.5     .0      .0      .0     .0     .0     .0     .0
 36     1.8   908.0     .0      .0      .0     .0     .0     .0     .0
 37     1.7   334.3     .0      .0      .0     .0     .0     .0     .0
 38      .2     3.7     .0      .0      .0     .0     .0     .0     .0
```

RUN #34

TT 53425; 20-20'; 80' 2:1 Fill Slope, Highest Planned; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T20S1A.PL2 Run By: BPG 3/25/2003 11:35AM



#	FS
a	**1.63**
b	1.63
c	1.63
d	1.64
e	1.64
f	1.64
g	1.65
h	1.65
i	1.65
j	1.65

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qal	2	115.0	120.0	50.0	28.0	W1
TQs	3	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.63

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #35

```
                     ** PCSTABL5M **
                          by
                    Purdue University
              --Slope Stability Analysis--
           Simplified Janbu, Simplified Bishop
              or Spencer`s Method of Slices
 Run Date:                  3/25/2003
 Time of Run:               11:35AM
 Run By:                    BPG
 Input Data Filename:       N:t20s1a.in
 Output Filename:           N:t20s1a.OUT
 Unit:                      ENGLISH
 Plotted Output Filename:   N:t20s1a.PLT
 PROBLEM DESCRIPTION    TT 53425; 20-20'; 80' 2:1 Fill Slope, Hi
                        ghest Planned; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

     3 Top   Boundaries
     7 Total Boundaries
 Boundary     X-Left     Y-Left     X-Right    Y-Right    Soil Type
   No.         (ft)       (ft)       (ft)       (ft)      Below Bnd
    1           .00      58.00       40.00      60.00         2
    2         40.00      60.00      224.00     140.00         1
    3        224.00     140.00      300.00     140.00         1
    4         40.00      60.00       90.00      60.00         2
    5         90.00      60.00      300.00     127.00         3
    6           .00      20.00       40.00      24.00         3
    7         40.00      24.00       90.00      60.00         3
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   130.0    135.0     250.0     29.0     .00        .0       1
   2   115.0    120.0      50.0     28.0     .00        .0       1
   3   130.0    135.0     400.0     38.0     .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction     Counterclockwise     Cohesion     Friction
   Range        Direction Limit    Intercept      Angle
    No.             (deg)            (psf)        (deg)
     1               8.5             400.0         38.0
     2               9.5             450.0         19.0
     3              90.0             400.0         38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  5 Coordinate Points
   Point       X-Water      Y-Water
    No.         (ft)         (ft)
     1           .00        48.00
     2         40.00        50.00
     3        130.00        78.00
     4        260.00       120.00
     5        300.00       127.00
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Circular Surfaces, Has Been Specified.
 Janbus Empirical Coef. is being used for the case of  c & phi both > 0
1200 Trial Surfaces Have Been Generated.
 400 Surfaces Initiate From Each Of  3 Points Equally Spaced
 Along The Ground Surface Between  X =  38.00 ft.
                              and  X =  42.00 ft.
 Each Surface Terminates Between   X = 225.00 ft.
                             and   X = 300.00 ft.
```

RUN #35

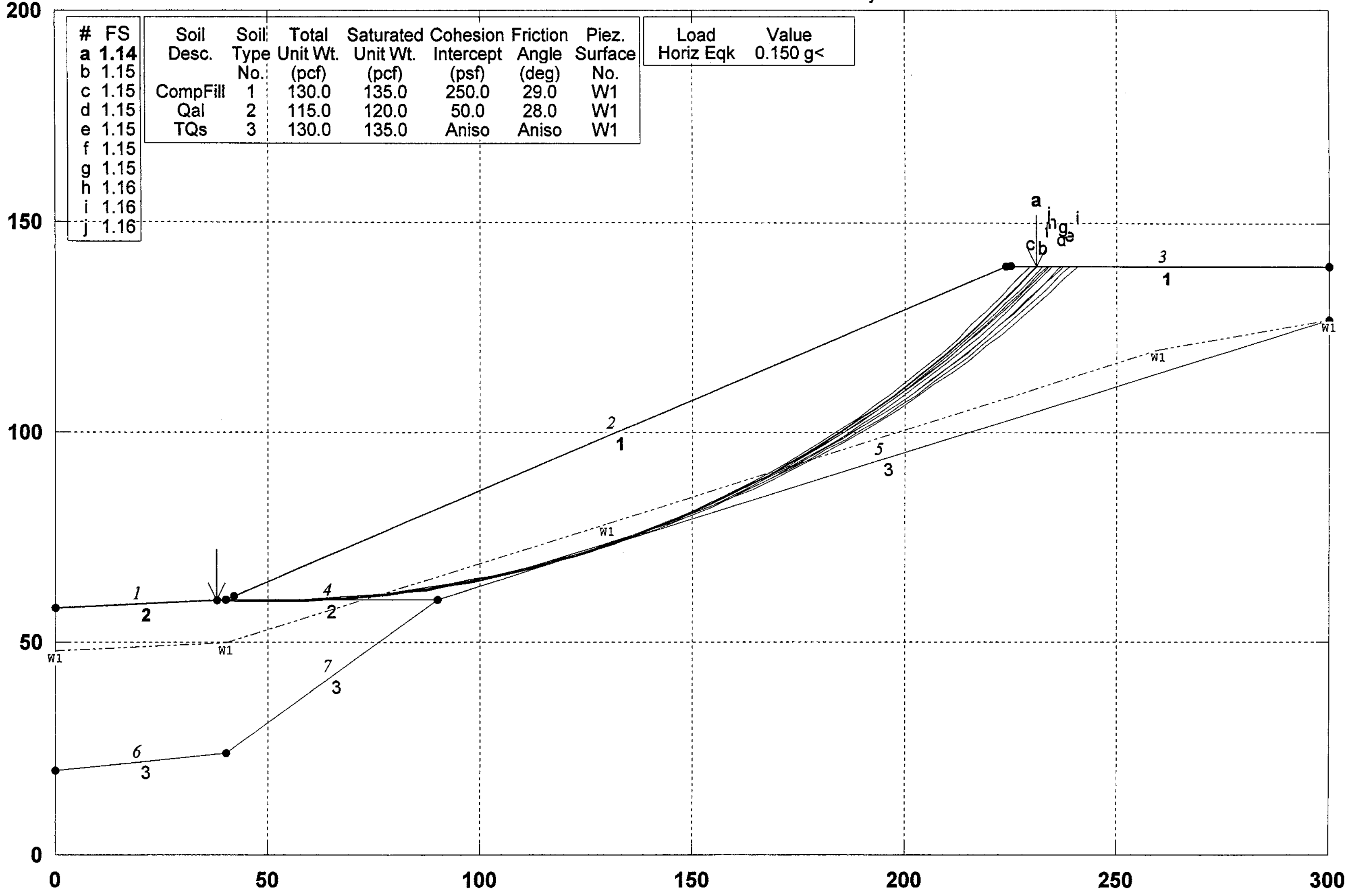
```
  Unless Further Limitations Were Imposed, The Minimum Elevation
  At Which A Surface Extends Is  Y = 50.00 ft.
   5.00 ft. Line Segments Define Each Trial Failure Surface.
  Restrictions Have Been Imposed Upon The Angle Of Initiation.
  The Angle Has Been Restricted Between The Angles Of  -5.0
  And  24.0 deg.
  Following Are Displayed The Ten Most Critical Of The Trial
        Failure Surfaces Examined.  They Are Ordered - Most Critical
        First.
        * * Safety Factors Are Calculated By The Modified Janbu Method * *
        Failure Surface Specified By 45 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1         38.00       59.90
            2         43.00       59.69
            3         47.99       59.58
            4         52.99       59.57
            5         57.99       59.67
            6         62.99       59.87
            7         67.98       60.17
            8         72.96       60.58
            9         77.94       61.09
           10         82.90       61.70
           11         87.85       62.42
           12         92.78       63.23
           13         97.70       64.15
           14        102.59       65.17
           15        107.46       66.29
           16        112.31       67.51
           17        117.14       68.83
           18        121.93       70.25
           19        126.69       71.77
           20        131.43       73.39
           21        136.12       75.10
           22        140.78       76.91
           23        145.41       78.82
           24        149.99       80.82
           25        154.53       82.92
           26        159.02       85.10
           27        163.47       87.39
           28        167.87       89.76
           29        172.22       92.22
           30        176.52       94.77
           31        180.77       97.42
           32        184.96      100.14
           33        189.09      102.96
           34        193.17      105.86
           35        197.18      108.84
           36        201.13      111.90
           37        205.02      115.05
           38        208.84      118.27
           39        212.59      121.58
           40        216.28      124.96
           41        219.89      128.41
           42        223.43      131.94
           43        226.90      135.54
           44        230.29      139.21
           45        230.99      140.00
              ***     1.631    ***
               Individual data on the    50  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      2.0     21.3      .0     .0      .0      .0      .0      .0      .0
  2      3.0    339.4      .0     .0      .0      .0      .0      .0      .0
  3      5.0   1763.7      .0     .0      .0      .0      .0      .0      .0
```

RUN #35

```
   4      5.0    3210.2     .0      .0      .0      .0      .0      .0      .0
   5      5.0    4596.0     .0      .0      .0      .0      .0      .0      .0
   6      5.0    5918.9     .0      .0      .0      .0      .0      .0      .0
   7      2.1    2925.7     .0      .0      .0      .0      .0      .0      .0
   8      2.9    4247.2     .0      .0      .0      .0      .0      .0      .0
   9      5.0    8339.2     .0      .0      .0      .0      .0      .0      .0
  10      1.6    2832.3     .0      .0      .0      .0      .0      .0      .0
  11      3.4    6600.4     .0    73.1      .0      .0      .0      .0      .0
  12      5.0   10464.7     .0   351.7      .0      .0      .0      .0      .0
  13      4.9   11416.0     .0   613.8      .0      .0      .0      .0      .0
  14      4.9   12284.5     .0   843.9      .0      .0      .0      .0      .0
  15      4.9   13069.3     .0  1042.1      .0      .0      .0      .0      .0
  16      4.9   13769.7     .0  1208.3      .0      .0      .0      .0      .0
  17      4.9   14385.4     .0  1342.4      .0      .0      .0      .0      .0
  18      4.8   14916.3     .0  1444.3      .0      .0      .0      .0      .0
  19      4.8   15362.4     .0  1514.0      .0      .0      .0      .0      .0
  20      4.8   15724.0     .0  1551.5      .0      .0      .0      .0      .0
  21      4.8   16001.8     .0  1556.7      .0      .0      .0      .0      .0
  22      3.3   11288.9     .0  1073.4      .0      .0      .0      .0      .0
  23      1.4    4907.5     .0   455.6      .0      .0      .0      .0      .0
  24      4.7   16309.6     .0  1479.1      .0      .0      .0      .0      .0
  25      4.7   16342.3     .0  1404.5      .0      .0      .0      .0      .0
  26      4.6   16295.7     .0  1297.8      .0      .0      .0      .0      .0
  27      4.6   16171.1     .0  1158.9      .0      .0      .0      .0      .0
  28      4.5   15970.5     .0   987.9      .0      .0      .0      .0      .0
  29      4.5   15696.0     .0   784.9      .0      .0      .0      .0      .0
  30      4.4   15349.9     .0   550.0      .0      .0      .0      .0      .0
  31      4.4   14934.5     .0   283.2      .0      .0      .0      .0      .0
  32      2.0    6565.9     .0    32.0      .0      .0      .0      .0      .0
  33      2.4    7890.1     .0      .0      .0      .0      .0      .0      .0
  34      4.3   13931.1     .0      .0      .0      .0      .0      .0      .0
  35      4.2   13349.4     .0      .0      .0      .0      .0      .0      .0
  36      4.2   12711.8     .0      .0      .0      .0      .0      .0      .0
  37      4.1   12021.6     .0      .0      .0      .0      .0      .0      .0
  38      4.1   11282.2     .0      .0      .0      .0      .0      .0      .0
  39      4.0   10497.2     .0      .0      .0      .0      .0      .0      .0
  40      4.0    9670.3     .0      .0      .0      .0      .0      .0      .0
  41      3.9    8805.4     .0      .0      .0      .0      .0      .0      .0
  42      3.8    7906.5     .0      .0      .0      .0      .0      .0      .0
  43      3.8    6977.8     .0      .0      .0      .0      .0      .0      .0
  44      3.7    6023.5     .0      .0      .0      .0      .0      .0      .0
  45      3.6    5047.8     .0      .0      .0      .0      .0      .0      .0
  46      3.5    4055.3     .0      .0      .0      .0      .0      .0      .0
  47       .6     564.5     .0      .0      .0      .0      .0      .0      .0
  48      2.9    2248.4     .0      .0      .0      .0      .0      .0      .0
  49      3.4    1156.6     .0      .0      .0      .0      .0      .0      .0
  50       .7      35.6     .0      .0      .0      .0      .0      .0      .0
```

TT 53425; 20-20'; 80' 2:1 Fill Slope, Highest Planned; Pseudo-Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T20PS1A.PL2 Run By: BPG 3/25/2003 11:37AM



#	FS
a	**1.14**
b	1.15
c	1.15
d	1.15
e	1.15
f	1.15
g	1.15
h	1.16
i	1.16
j	1.16

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qal	2	115.0	120.0	50.0	28.0	W1
TQs	3	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=1.14

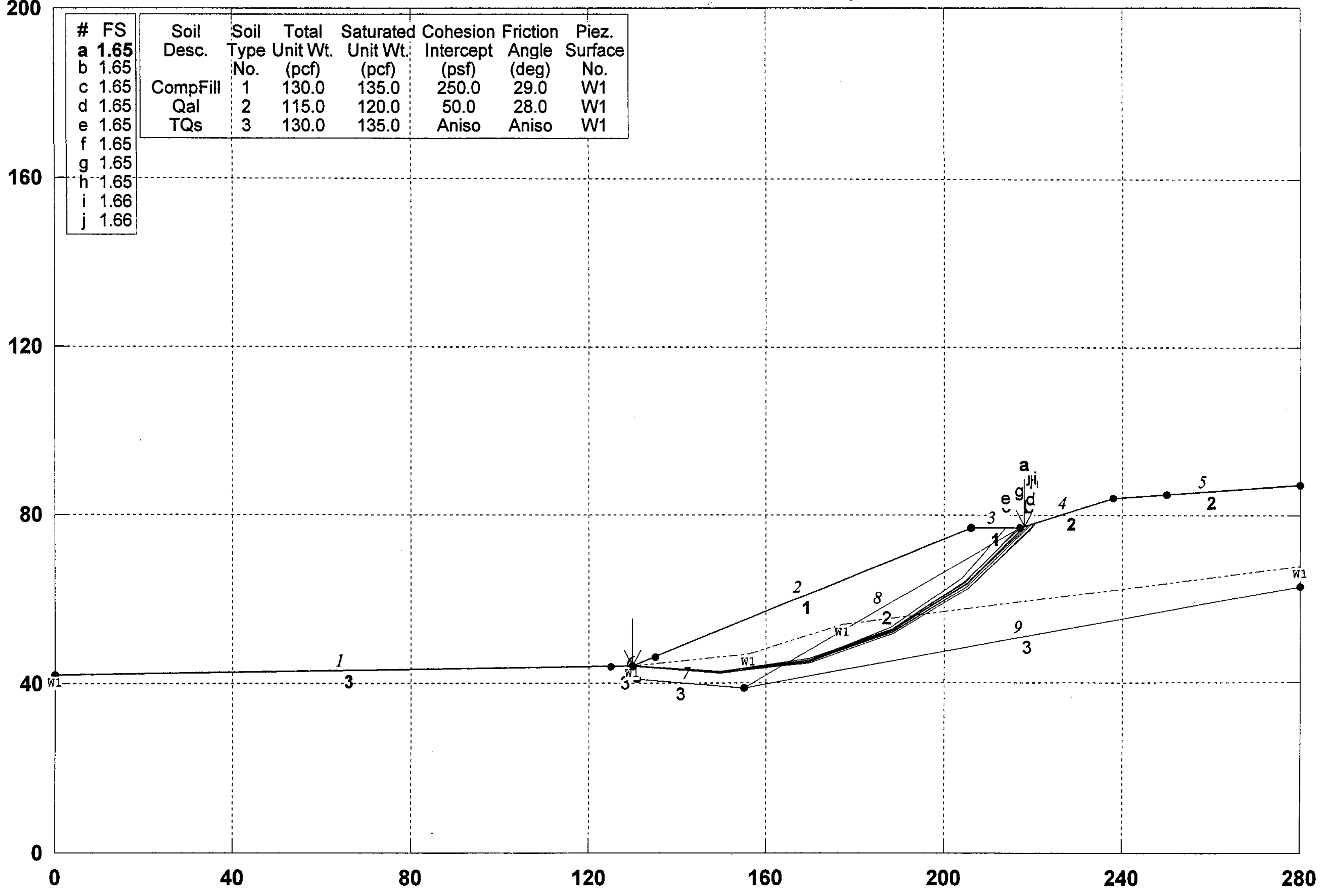
Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #35

TT 53425, 20-20', CS-16, 25' Stab Fill on Qt over TQs Cut; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T20S2B.PL2 Run By: BPG 3/26/2003 5:58PM



#	FS
a	**1.65**
b	1.65
c	1.65
d	1.65
e	1.65
f	1.65
g	1.65
h	1.65
i	1.66
j	1.66

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qal	2	115.0	120.0	50.0	28.0	W1
TQs	3	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.65

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN#36

```
                     ** PCSTABL5M **
                           by
                    Purdue University
              --Slope Stability Analysis--
           Simplified Janbu, Simplified Bishop
              or Spencer`s Method of Slices
 Run Date:                 3/26/2003
 Time of Run:              5:58PM
 Run By:                   BPG
 Input Data Filename:      N:t20s2b.in
 Output Filename:          N:t20s2b.OUT
 Unit:                     ENGLISH
 Plotted Output Filename:  N:t20s2b.PLT
 PROBLEM DESCRIPTION   TT 53425, 20-20', CS-16, 25' Stab Fill o
                       n Qt over TQs Cut; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

     5 Top   Boundaries
     9 Total Boundaries
 Boundary     X-Left     Y-Left     X-Right     Y-Right     Soil Type
    No.        (ft)       (ft)       (ft)        (ft)       Below Bnd
     1          .00       42.00      130.00       44.00          3
     2       130.00       44.00      206.00       77.00          1
     3       206.00       77.00      217.00       77.00          1
     4       217.00       77.00      238.00       84.00          2
     5       238.00       84.00      280.00       87.00          2
     6       130.00       44.00      131.00       41.00          3
     7       131.00       41.00      155.00       39.00          3
     8       155.00       39.00      217.00       77.00          2
     9       155.00       39.00      280.00       63.00          3
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   130.0    135.0      250.0    29.0     .00         .0      1
   2   115.0    120.0       50.0    28.0     .00         .0      1
   3   130.0    135.0      400.0    38.0     .00         .0      1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit    Intercept      Angle
    No.           (deg)           (psf)         (deg)
     1             8.5           400.0          38.0
     2             9.5           450.0          19.0
     3            90.0           400.0          38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  5 Coordinate Points
   Point      X-Water     Y-Water
    No.         (ft)       (ft)
     1          .00        42.00
     2       130.00        44.00
     3       156.00        47.00
     4       177.00        54.00
     5       280.00        68.00
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Circular Surfaces, Has Been Specified.
 Janbus Empirical Coef. is being used for the case of  c & phi both > 0
1200 Trial Surfaces Have Been Generated.
 400 Surfaces Initiate From Each Of  3 Points Equally Spaced
 Along The Ground Surface Between  X = 125.00 ft.
                              and  X = 135.00 ft.
```

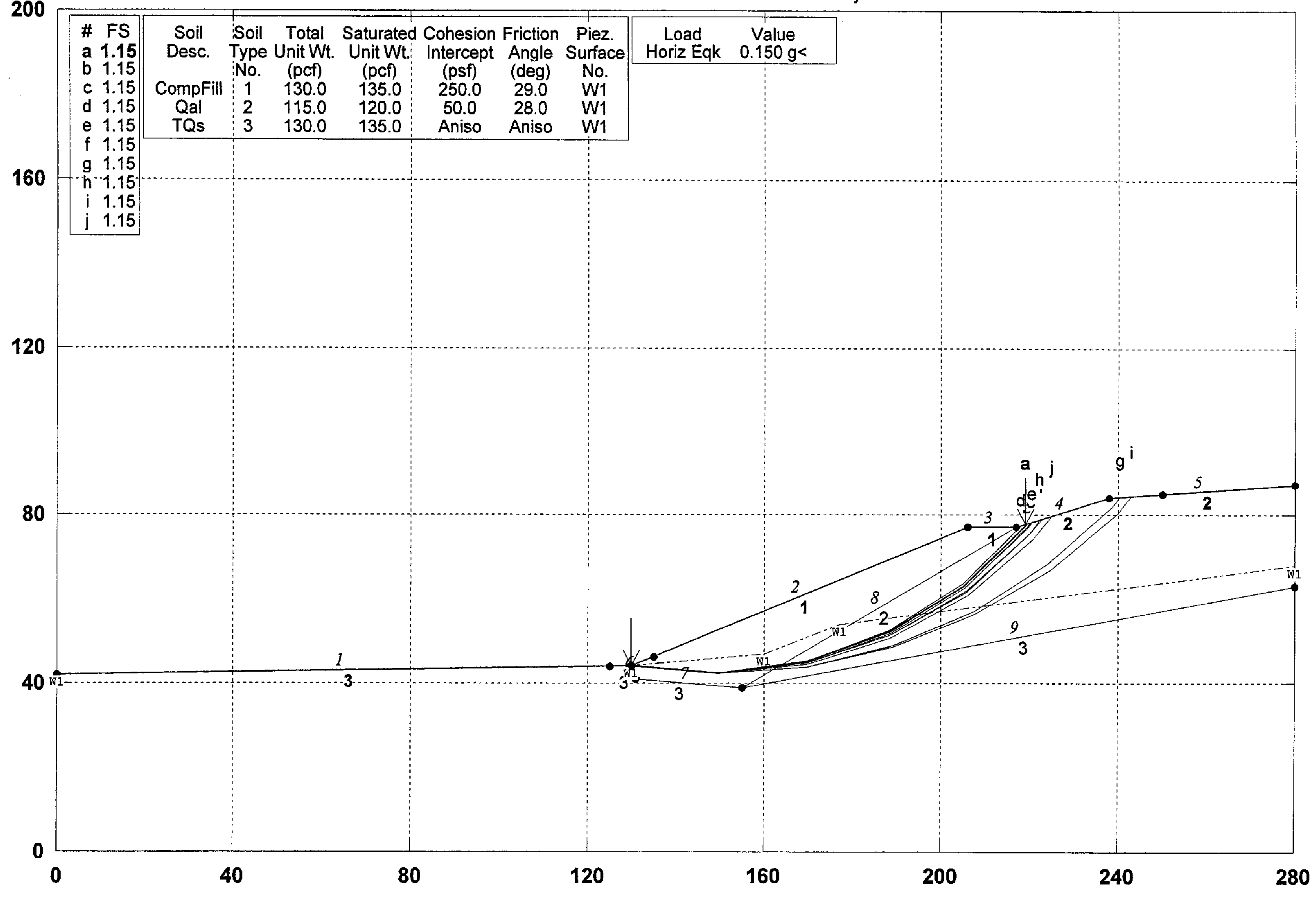
RUN #36

```
   Each Surface Terminates Between    X = 206.00 ft.
                                 and   X = 250.00 ft.
   Unless Further Limitations Were Imposed, The Minimum Elevation
   At Which A Surface Extends Is  Y = 35.00 ft.
   20.00 ft. Line Segments Define Each Trial Failure Surface.
   Restrictions Have Been Imposed Upon The Angle Of Initiation.
   The Angle Has Been Restricted Between The Angles Of  -5.0
   And  24.0 deg.
   Following Are Displayed The Ten Most Critical Of The Trial
         Failure Surfaces Examined.  They Are Ordered - Most Critical
         First.
         * * Safety Factors Are Calculated By The Modified Janbu Method * *
         Failure Surface Specified By  6 Coordinate Points
           Point      X-Surf      Y-Surf
            No.        (ft)        (ft)
             1        130.00       44.00
             2        149.93       42.38
             3        169.73       45.23
             4        188.40       52.39
             5        205.02       63.53
             6        218.08       77.36
               ***     1.646   ***
              Individual data on the    12  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     19.9  13506.4           .0  2428.8      .0      .0       .0      .0      .0
  2      6.1   8910.6           .0  1455.6      .0      .0       .0      .0      .0
  3      7.8  13444.0           .0  2083.0      .0      .0       .0      .0      .0
  4      6.0  11804.8           .0  2068.4      .0      .0       .0      .0      .0
  5      7.3  15131.2           .0  2845.9      .0      .0       .0      .0      .0
  6      3.2   6663.6           .0  1176.6      .0      .0       .0      .0      .0
  7      8.2  17330.4           .0  2274.3      .0      .0       .0      .0      .0
  8      5.9  11930.6           .0   693.9      .0      .0       .0      .0      .0
  9     10.7  18884.4           .0      .0      .0      .0       .0      .0      .0
 10      1.0   1537.8           .0      .0      .0      .0       .0      .0      .0
 11     11.0   8919.3           .0      .0      .0      .0       .0      .0      .0
 12      1.1     49.1           .0      .0      .0      .0       .0      .0      .0
```

RUN # 36

TT 53425, 20-20', CS-16, 25' Stab Fill on Qt over TQs Cut; Pseudo-Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T20PS2A.PL2 Run By: BPG 3/26/2003 6:16PM



#	FS
a	**1.15**
b	1.15
c	1.15
d	1.15
e	1.15
f	1.15
g	1.15
h	1.15
i	1.15
j	1.15

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qal	2	115.0	120.0	50.0	28.0	W1
TQs	3	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=1.15

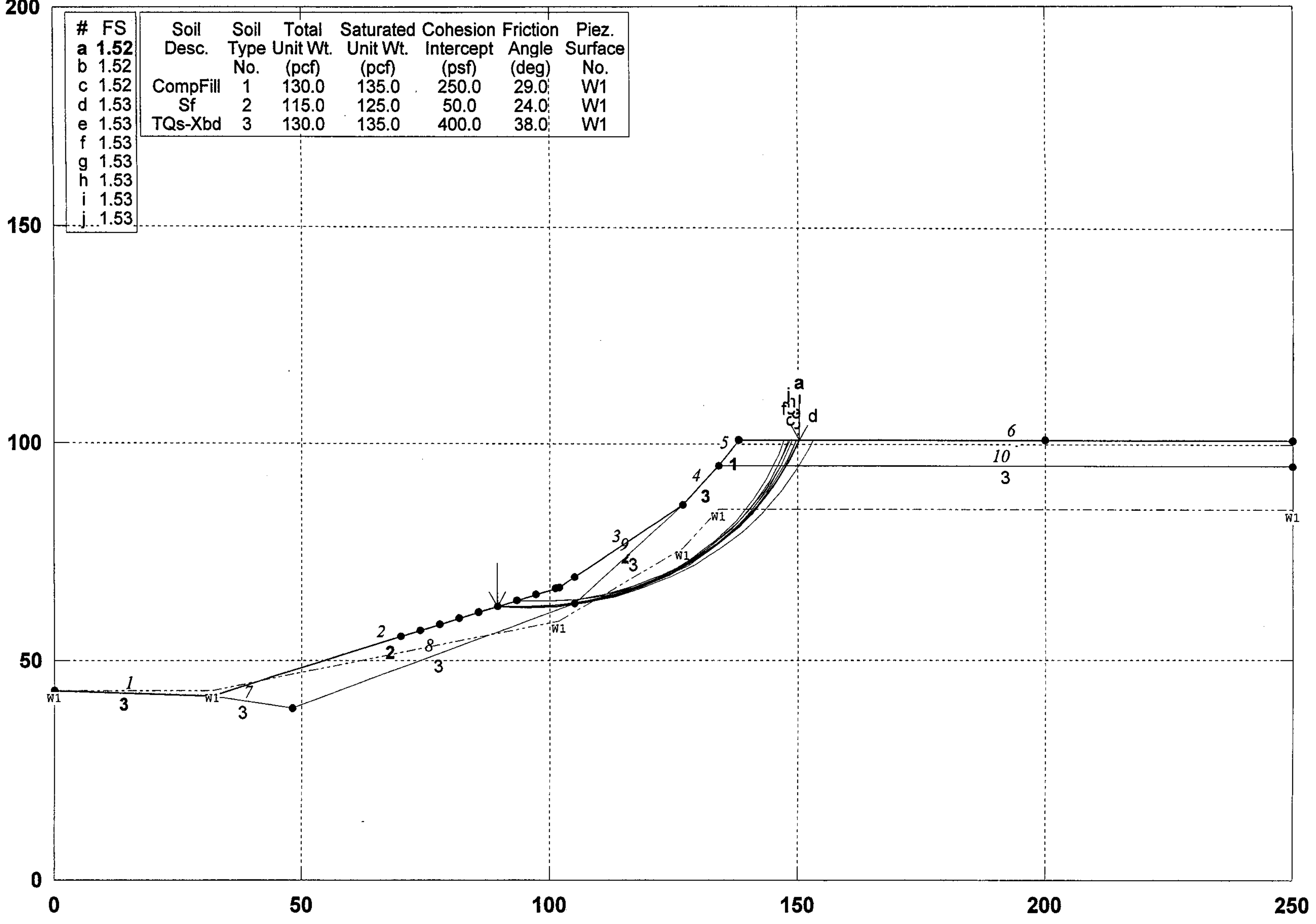
Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #36

TT 53425; 21-21'; 59' Existing Canyon TQs Side Slope; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T21S1F.PL2 Run By: BPG 3/27/2003 11:54AM



#	FS
a	**1.52**
b	1.52
c	1.52
d	1.53
e	1.53
f	1.53
g	1.53
h	1.53
i	1.53
j	1.53

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Sf	2	115.0	125.0	50.0	24.0	W1
TQs-Xbd	3	130.0	135.0	400.0	38.0	W1

PCSTABL5M/si FSmin=1.52

Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #37

```
                          ** PCSTABL5M **
                                by
                         Purdue University
                     --Slope Stability Analysis--
                 Simplified Janbu, Simplified Bishop
                    or Spencer`s Method of Slices
 Run Date:                 3/27/2003
 Time of Run:              11:54AM
 Run By:                   BPG
 Input Data Filename:      N:T21S1F.IN
 Output Filename:          N:T21S1F.OUT
 Unit:                     ENGLISH
 Plotted Output Filename:  N:T21S1F.PLT
 PROBLEM DESCRIPTION    TT 53425; 21-21'; 59' Existing Canyon TQ
                        s Side Slope; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

     6 Top   Boundaries
    10 Total Boundaries
 Boundary      X-Left      Y-Left     X-Right     Y-Right     Soil Type
    No.         (ft)        (ft)        (ft)        (ft)      Below Bnd
     1           .00       43.00       32.00       42.00          3
     2         32.00       42.00      102.00       67.00          2
     3        102.00       67.00      127.00       86.00          2
     4        127.00       86.00      134.00       95.00          3
     5        134.00       95.00      138.00      101.00          1
     6        138.00      101.00      250.00      101.00          1
     7         32.00       42.00       48.00       39.00          3
     8         48.00       39.00      105.00       63.00          3
     9        105.00       63.00      127.00       86.00          3
    10        134.00       95.00      250.00       95.00          3
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   130.0    135.0     250.0     29.0     .00        .0       1
   2   115.0    125.0      50.0     24.0     .00        .0       1
   3   130.0    135.0     400.0     38.0     .00        .0       1
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  6 Coordinate Points
   Point      X-Water     Y-Water
    No.        (ft)        (ft)
     1          .00       43.00
     2        32.00       43.00
     3       102.00       59.00
     4       127.00       76.00
     5       134.00       85.00
     6       250.00       85.00
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Circular Surfaces, Has Been Specified.
3000 Trial Surfaces Have Been Generated.
 300 Surfaces Initiate From Each Of 10 Points Equally Spaced
 Along The Ground Surface Between  X =  70.00 ft.
                             and  X = 105.00 ft.
 Each Surface Terminates Between   X = 138.00 ft.
                             and  X = 200.00 ft.
 Unless Further Limitations Were Imposed, The Minimum Elevation
 At Which A Surface Extends Is  Y =  1.00 ft.
  6.00 ft. Line Segments Define Each Trial Failure Surface.
 Restrictions Have Been Imposed Upon The Angle Of Initiation.
 The Angle Has Been Restricted Between The Angles Of  -3.0
 And  16.0 deg.
 Following Are Displayed The Ten Most Critical Of The Trial
```

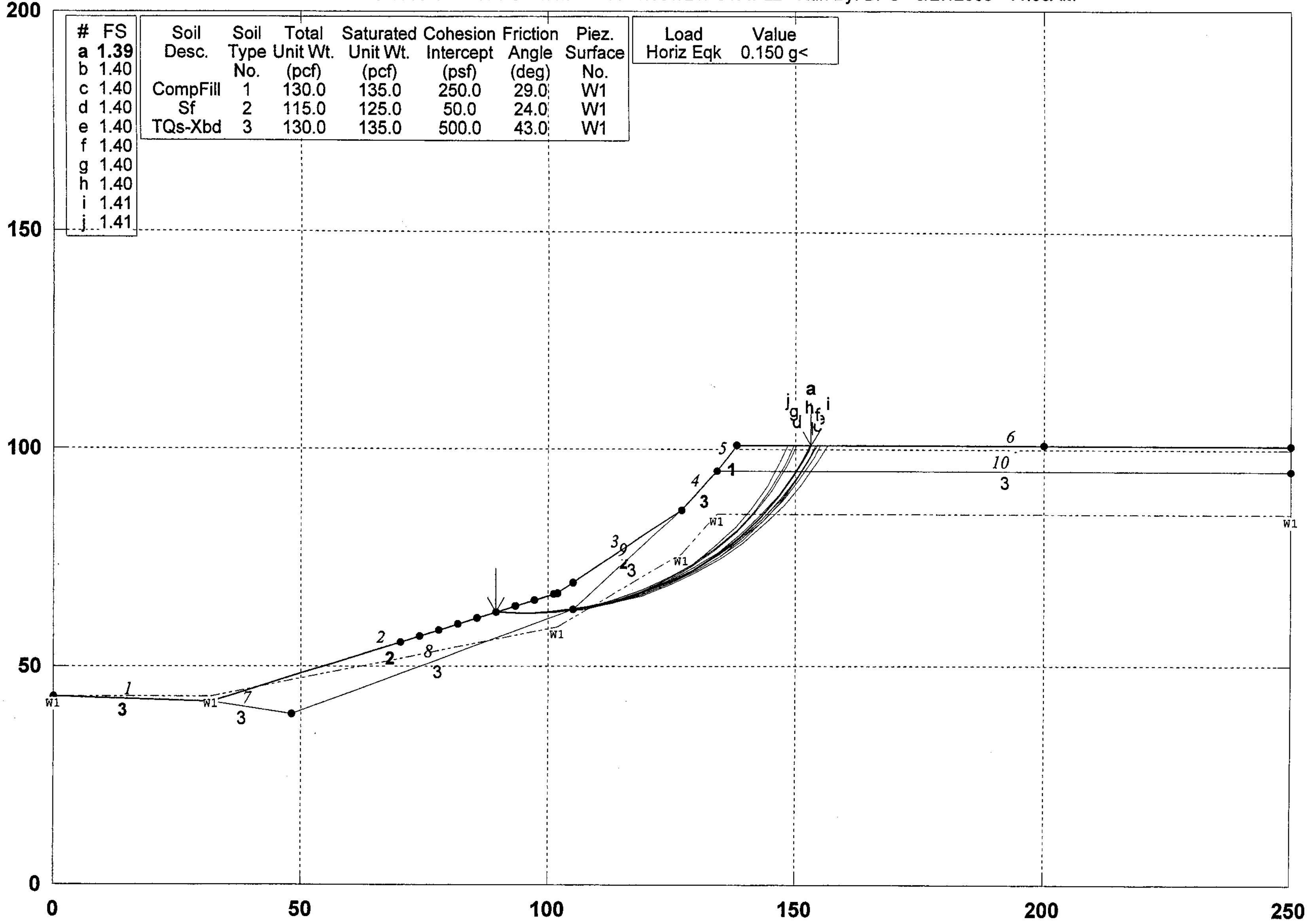
RUN #37

```
         Failure Surfaces Examined.  They Are Ordered - Most Critical
         First.
         * * Safety Factors Are Calculated By The Modified Janbu Method * *
         Failure Surface Specified By 14 Coordinate Points
           Point      X-Surf      Y-Surf
            No.        (ft)        (ft)
             1         89.44       62.52
             2         95.44       62.22
             3        101.43       62.55
             4        107.36       63.48
             5        113.16       65.02
             6        118.77       67.14
             7        124.13       69.83
             8        129.19       73.06
             9        133.89       76.79
            10        138.19       80.98
            11        142.03       85.58
            12        145.38       90.56
            13        148.20       95.86
            14        150.29      101.00
               ***     1.519  ***
              Individual data on the    21  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      6.0    838.7      .0      .0      .0      .0      .0      .0      .0
  2      6.0   2302.9      .0      .0      .0      .0      .0      .0      .0
  3       .6    282.8      .0      .0      .0      .0      .0      .0      .0
  4      3.1   1905.0      .0      .0      .0      .0      .0      .0      .0
  5      2.2   1809.6      .0      .0      .0      .0      .0      .0      .0
  6      2.0   1965.6      .0      .0      .0      .0      .0      .0      .0
  7      3.8   4434.6      .0   160.8      .0      .0      .0      .0      .0
  8      5.6   8201.0      .0   760.2      .0      .0      .0      .0      .0
  9      5.4   9224.4      .0  1177.5      .0      .0      .0      .0      .0
 10      2.9   5318.0      .0   764.6      .0      .0      .0      .0      .0
 11      2.2   4319.7      .0   562.8      .0      .0      .0      .0      .0
 12      4.7  10450.8      .0  1782.3      .0      .0      .0      .0      .0
 13       .1    259.7      .0    53.0      .0      .0      .0      .0      .0
 14      4.0  10084.3      .0  2146.7      .0      .0      .0      .0      .0
 15       .2    489.2      .0    66.6      .0      .0      .0      .0      .0
 16      3.4   7890.1      .0   657.8      .0      .0      .0      .0      .0
 17       .5    994.9      .0      .0      .0      .0      .0      .0      .0
 18      3.3   5628.7      .0      .0      .0      .0      .0      .0      .0
 19      2.4   2526.1      .0      .0      .0      .0      .0      .0      .0
 20       .5    331.0      .0      .0      .0      .0      .0      .0      .0
 21      2.1    700.0      .0      .0      .0      .0      .0      .0      .0
```

RUN #37

TT 53425; 21-21'; 59' Existing Canyon TQs Side Slope; PseudoStatic

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T21PS1F.PL2 Run By: BPG 3/27/2003 11:58AM



#	FS
a	**1.39**
b	1.40
c	1.40
d	1.40
e	1.40
f	1.40
g	1.40
h	1.40
i	1.41
j	1.41

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Sf	2	115.0	125.0	50.0	24.0	W1
TQs-Xbd	3	130.0	135.0	500.0	43.0	W1

Load	Value
Horiz Eqk	0.150 g<

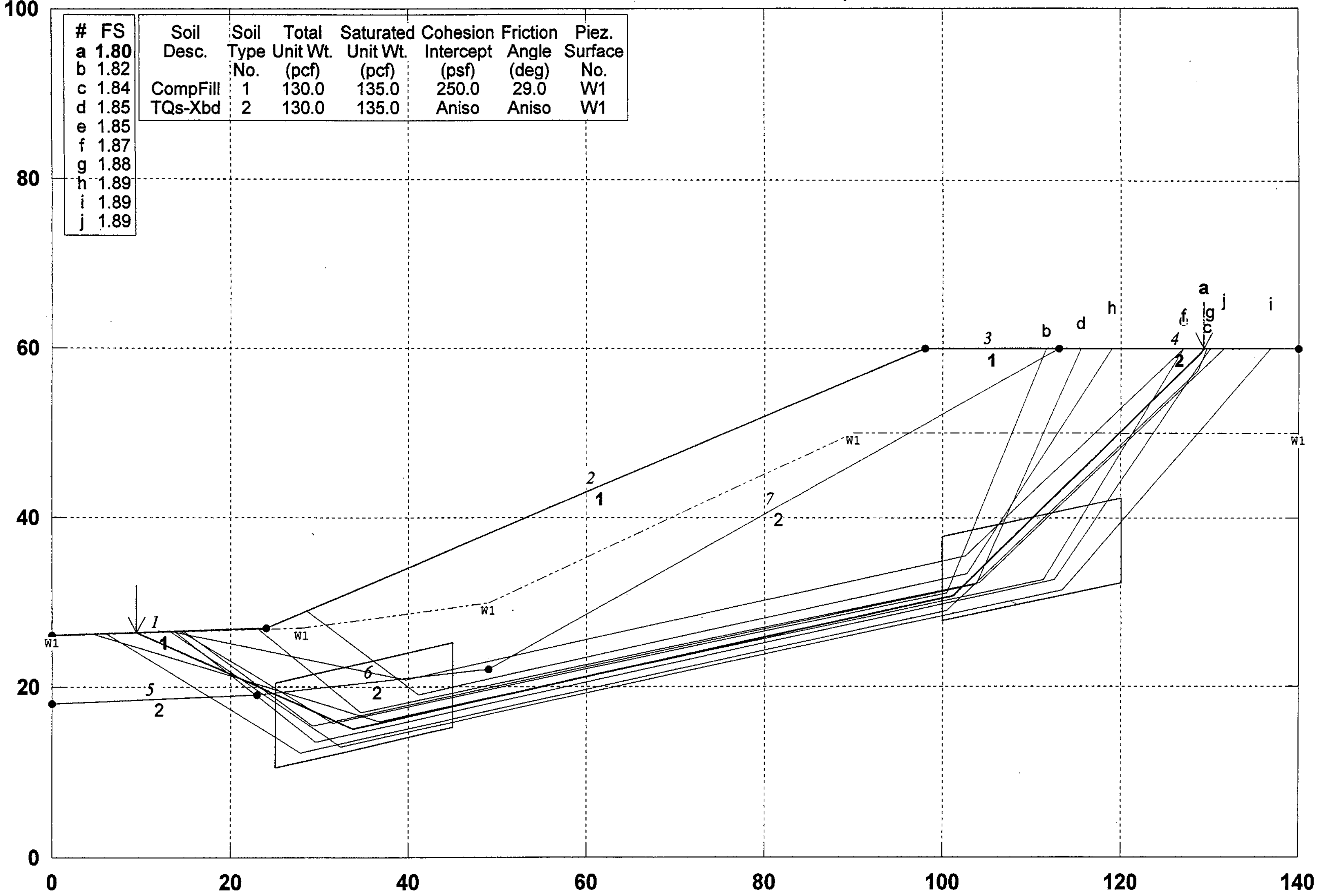
PCSTABL5M/si FSmin=1.39
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #37

TT 53425; 22-22', CS-7, 2:1 TQs Cut w 25' Stability Fill; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T22S1B.PL2 Run By: BPG 3/31/2003 10:28AM



#	FS
a	**1.80**
b	1.82
c	1.84
d	1.85
e	1.85
f	1.87
g	1.88
h	1.89
i	1.89
j	1.89

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.80

Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #39

```
                   ** PCSTABL5M **
                         by
                  Purdue University
               --Slope Stability Analysis--
          Simplified Janbu, Simplified Bishop
             or Spencer`s Method of Slices
Run Date:                3/31/2003
Time of Run:             10:28AM
Run By:                  BPG
Input Data Filename:     N:t22s1b.in
Output Filename:         N:t22s1b.OUT
Unit:                    ENGLISH
Plotted Output Filename: N:t22s1b.PLT
PROBLEM DESCRIPTION    TT 53425; 22-22', CS-7, 2:1 TQs Cut w 25
                       ' Stability Fill; Static
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 0.00 to X-values and 0.00 to Y-values listed.

    4 Top   Boundaries
    7 Total Boundaries
Boundary     X-Left     Y-Left     X-Right     Y-Right     Soil Type
   No.        (ft)       (ft)       (ft)        (ft)       Below Bnd
    1          .00       26.00      24.00       27.00          1
    2        24.00       27.00      98.00       60.00          1
    3        98.00       60.00     113.00       60.00          1
    4       113.00       60.00     140.00       60.00          2
    5          .00       18.00      23.00       19.00          2
    6        23.00       19.00      49.00       22.00          2
    7        49.00       22.00     113.00       60.00          2
ISOTROPIC SOIL PARAMETERS
  2 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   130.0    135.0     250.0     29.0     .00        .0       1
  2   130.0    135.0     400.0     38.0     .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  2 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range       Direction Limit     Intercept      Angle
   No.             (deg)            (psf)        (deg)
    1              12.5             400.0         38.0
    2              13.5             450.0         19.0
    3              90.0             400.0         38.0
1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
Unit Weight of Water =  62.40
Piezometric Surface No.  1 Specified by  5 Coordinate Points
  Point      X-Water     Y-Water
   No.        (ft)        (ft)
    1          .00        26.00
    2        28.00        27.00
    3        49.00        30.00
    4        90.00        50.00
    5       140.00        50.00
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
400 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  40.0
Box         X-Left     Y-Left     X-Right     Y-Right       Height
No.          (ft)       (ft)       (ft)        (ft)          (ft)
 1          25.00      15.47      45.00       20.28         10.00
```

RUN #38

```
   2         100.00       32.78      120.00       37.40       10.00
  Factor Of Safety Calculation Has Gone Through Ten Iterations
  The Trial Failure Surface In Question Is Defined
  By The Following  4 Coordinate Points
    Point       X-Surf      Y-Surf
     No.         (ft)        (ft)
      1          21.94       26.91
      2          33.99       17.83
      3         115.15       33.88
      4         115.33       60.00
  Factor Of Safety For The Preceding Specified Surface =  4.838
  Factor Of Safety Calculation Has Gone Through Ten Iterations
  The Trial Failure Surface In Question Is Defined
  By The Following  4 Coordinate Points
    Point       X-Surf      Y-Surf
     No.         (ft)        (ft)
      1          26.90       28.29
      2          40.67       14.73
      3         101.52       28.99
      4         101.83       60.00
  Factor Of Safety For The Preceding Specified Surface =  3.402
  Factor Of Safety Calculation Has Gone Through Ten Iterations
  The Trial Failure Surface In Question Is Defined
  By The Following  4 Coordinate Points
    Point       X-Surf      Y-Surf
     No.         (ft)        (ft)
      1          30.35       29.83
      2          39.84       20.34
      3         118.00       32.96
      4         118.32       60.00
  Factor Of Safety For The Preceding Specified Surface =  5.888
  Factor Of Safety Calculation Has Gone Through Ten Iterations
  The Trial Failure Surface In Question Is Defined
  By The Following  4 Coordinate Points
    Point       X-Surf      Y-Surf
     No.         (ft)        (ft)
      1          20.71       26.86
      2          32.58       15.12
      3         105.11       29.94
      4         105.27       60.00
  Factor Of Safety For The Preceding Specified Surface =  4.906
  Following Are Displayed The Ten Most Critical Of The Trial
        Failure Surfaces Examined.  They Are Ordered - Most Critical
        First.
        * * Safety Factors Are Calculated By The Modified Janbu Method * *
        Failure Surface Specified By  5 Coordinate Points
          Point       X-Surf      Y-Surf
           No.         (ft)        (ft)
            1          9.39       26.39
            2         33.84       15.01
            3        101.13       30.85
            4        128.96       59.58
            5        129.29       60.00
              ***      1.804    ***
             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        .4      .0      .0       .0       .0       .0       .0       .0
  2      14.5    7299.2      .0  3623.2       .0       .0       .0       .0       .0
  3        .8     860.1      .0   421.3       .0       .0       .0       .0       .0
  4       3.2    4105.4      .0  1853.4       .0       .0       .0       .0       .0
  5       5.8   10724.2      .0  4392.5       .0       .0       .0       .0       .0
  6      15.2   36332.5      .0 11662.3       .0       .0       .0       .0       .0
  7      41.0  130389.0      .0 39425.7       .0       .0       .0       .0       .0
  8       6.2   23746.5      .0  8308.8       .0       .0       .0       .0       .0
```

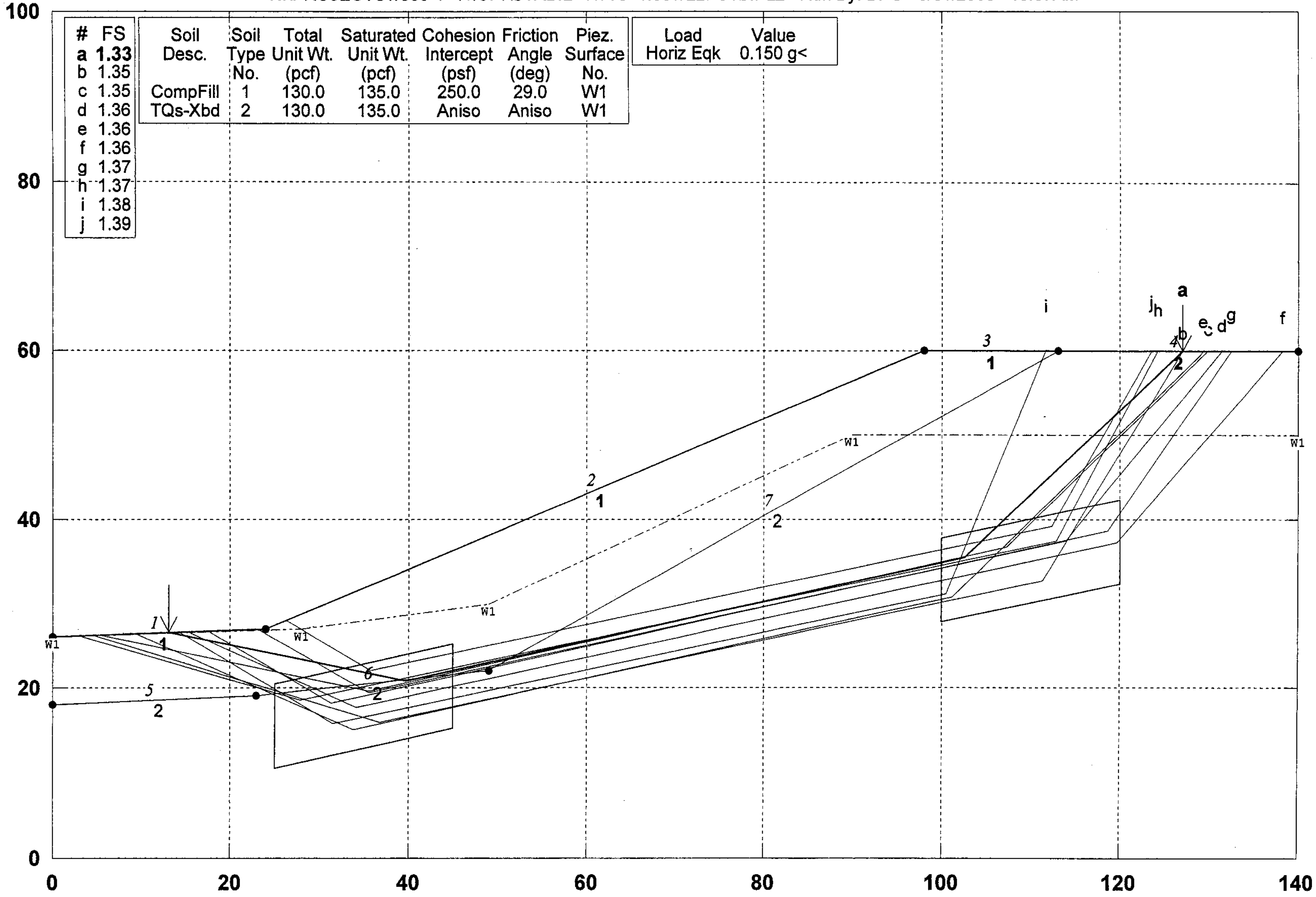
RUN #38

```
   9       1.8   7296.8       .0  2374.4        .0        .0        .0        .0        .0
  10       3.1  12324.5       .0  3919.1        .0        .0        .0        .0        .0
  11      11.9  36298.7       .0 13867.4        .0        .0        .0        .0        .0
  12       6.7  11790.2       .0  2065.7        .0        .0        .0        .0        .0
  13       9.3   6282.8       .0      .0        .0        .0        .0        .0        .0
  14        .3      9.1       .0      .0        .0        .0        .0        .0        .0
```

RUN #38

TT 53425; 22-22', CS-7, 2:1 TQs Cut w 25' Stability Fill; PseudoStatic

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T22PS1B.PL2 Run By: BPG 3/31/2003 10:37AM



#	FS
a	**1.33**
b	1.35
c	1.35
d	1.36
e	1.36
f	1.36
g	1.37
h	1.37
i	1.38
j	1.39

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=1.33

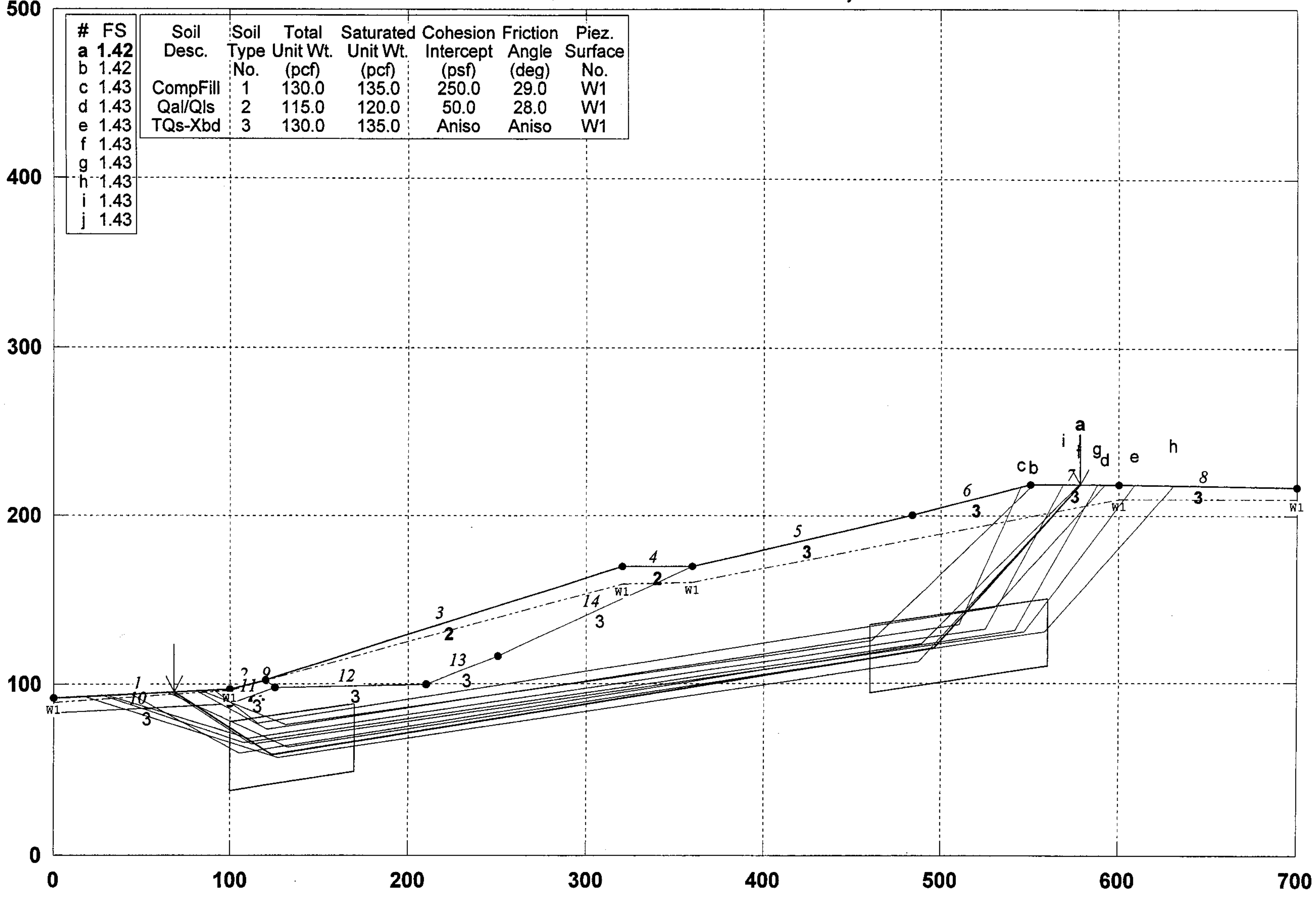
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #38

TT 53425; 23-23', CS-13 + CS-14, Qls R&R/TQs Cut; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T23S1A.PL2   Run By: BPG   3/24/2003   4:42PM



#	FS
a	**1.42**
b	1.42
c	1.43
d	1.43
e	1.43
f	1.43
g	1.43
h	1.43
i	1.43
j	1.43

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qal/Qls	2	115.0	120.0	50.0	28.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

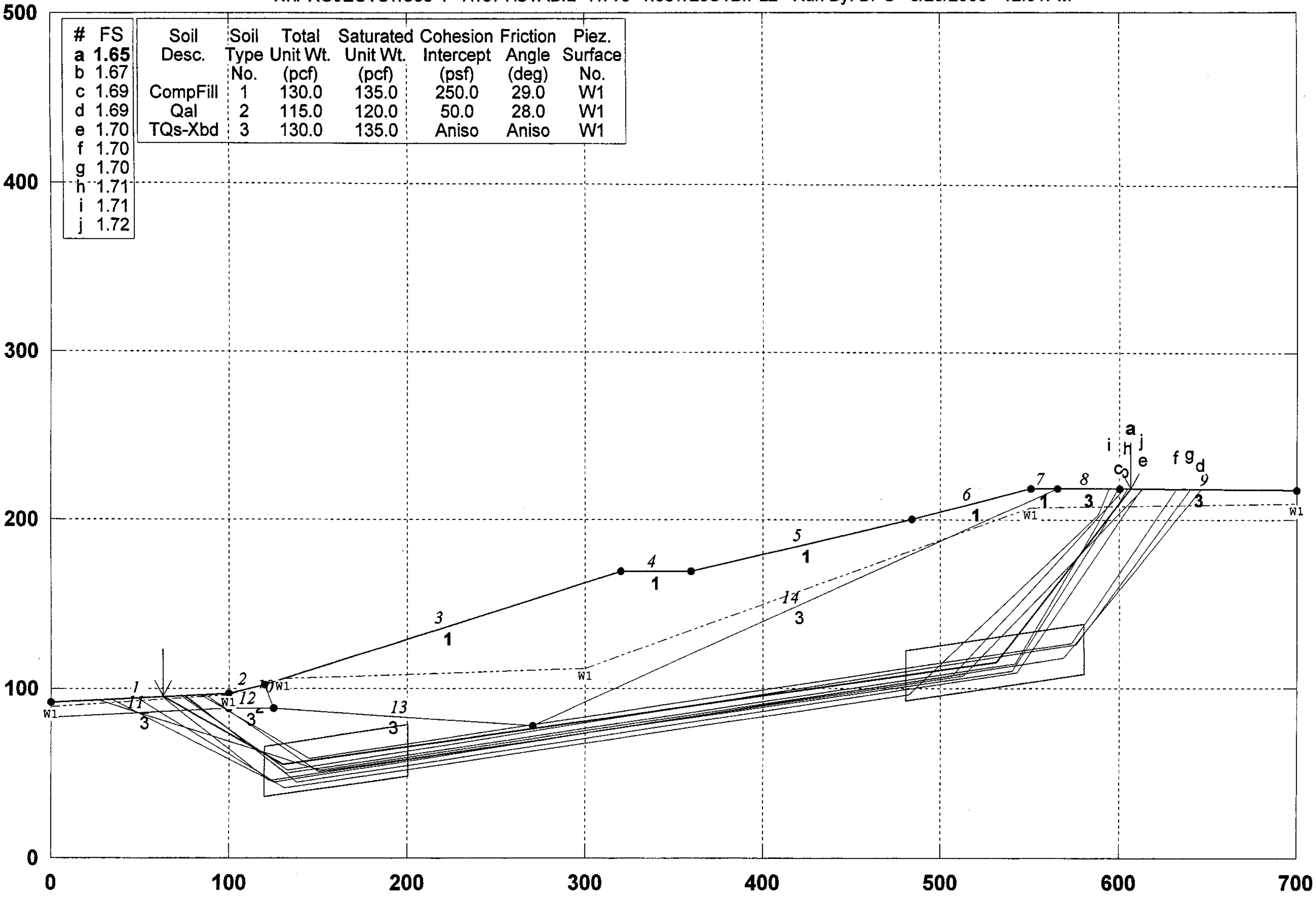
PCSTABL5M/si FSmin=1.42
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #39

TT 53425; 23-23', CS-13 + CS-14, Qls R&R/TQs Cut w 150' x 24' Buttress; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T23S1B.PL2 Run By: BPG 3/25/2003 12:31PM



#	FS
a	**1.65**
b	1.67
c	1.69
d	1.69
e	1.70
f	1.70
g	1.70
h	1.71
i	1.71
j	1.72

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qal	2	115.0	120.0	50.0	28.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.65

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #40

```
                    ** PCSTABL5M **
                          by
                   Purdue University
                --Slope Stability Analysis--
            Simplified Janbu, Simplified Bishop
               or Spencer`s Method of Slices
 Run Date:                3/25/2003
 Time of Run:             12:31PM
 Run By:                  BPG
 Input Data Filename:     N:t23s1b.in
 Output Filename:         N:t23s1b.OUT
 Unit:                    ENGLISH
 Plotted Output Filename: N:t23s1b.PLT
 PROBLEM DESCRIPTION   TT 53425; 23-23', CS-13 + CS-14, Qls R&R
                       /TQs Cut w 150' x 24' Buttress; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

     9 Top   Boundaries
    14 Total Boundaries
 Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
    No.        (ft)        (ft)        (ft)        (ft)      Below Bnd
     1          .00       92.00      100.00       97.00          2
     2       100.00       97.00      120.00      102.00          2
     3       120.00      102.00      320.00      170.00          1
     4       320.00      170.00      360.00      170.00          1
     5       360.00      170.00      484.00      200.00          1
     6       484.00      200.00      550.00      219.00          1
     7       550.00      219.00      565.00      219.00          1
     8       565.00      219.00      600.00      218.50          3
     9       600.00      218.50      700.00      217.50          3
    10       120.00      102.00      125.00       88.00          2
    11          .00       83.00      100.00       88.00          3
    12       100.00       88.00      125.00       88.00          3
    13       125.00       88.00      270.00       78.00          3
    14       270.00       78.00      565.00      219.00          3
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   130.0    135.0     250.0     29.0      .00        .0        1
   2   115.0    120.0      50.0     28.0      .00        .0        1
   3   130.0    135.0     400.0     38.0      .00        .0        1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range        Direction Limit    Intercept      Angle
    No.             (deg)            (psf)        (deg)
     1               8.5             400.0         38.0
     2               9.5             450.0         19.0
     3              90.0             400.0         38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  6 Coordinate Points
   Point       X-Water      Y-Water
    No.          (ft)         (ft)
     1            .00        89.00
     2         100.00        96.00
     3         130.00       106.00
     4         300.00       112.00
     5         550.00       207.00
     6         700.00       210.00
 Janbus Empirical Coef is being used for the case of  c & phi both > 0
```

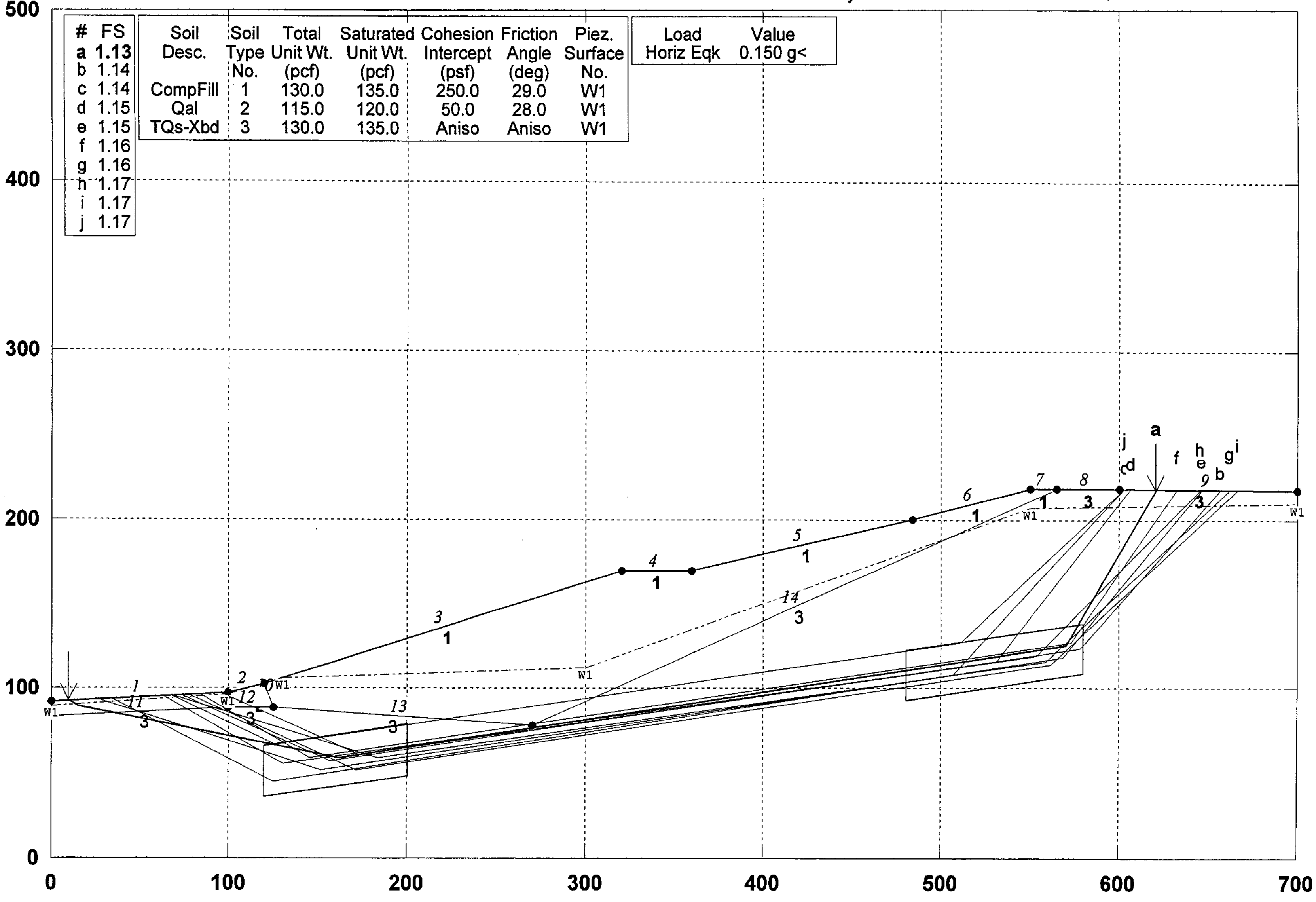
RUN #40

```
   A Critical Failure Surface Searching Method, Using A Random
   Technique For Generating Sliding Block Surfaces, Has Been
   Specified.
   400 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 150.0
   Box          X-Left     Y-Left     X-Right     Y-Right       Height
   No.           (ft)       (ft)        (ft)       (ft)          (ft)
    1           120.00      50.76      200.00      63.43        30.00
    2           480.00     107.77      580.00     123.61        30.00
   Following Are Displayed The Ten Most Critical Of The Trial
         Failure Surfaces Examined.  They Are Ordered - Most Critical
         First.
         * * Safety Factors Are Calculated By The Modified Janbu Method * *
         Failure Surface Specified By  4 Coordinate Points
           Point       X-Surf       Y-Surf
            No.         (ft)         (ft)
             1          63.28        95.16
             2         130.72        54.73
             3         531.24       115.27
             4         606.79       218.43
               ***      1.648    ***
                Individual data on the    19  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      2.6    250.6       .0      .0       .0       .0       .0      .0      .0
  2     11.3   7130.4       .0  3083.2       .0       .0       .0      .0      .0
  3     22.9  47471.1       .0 25221.0       .0       .0       .0      .0      .0
  4     20.0  83718.0       .0 44491.5       .0       .0       .0      .0      .0
  5      5.0  28593.7       .0 15153.5       .0       .0       .0      .0      .0
  6      5.0  32283.4       .0 16765.8       .0       .0       .0      .0      .0
  7       .7   4901.2     21.7  2665.5       .0       .0       .0      .0      .0
  8    139.3 ********       .0 *******       .0       .0       .0      .0      .0
  9     30.0 317215.0       .0 63239.4       .0       .0       .0      .0      .0
 10     20.0 223594.0       .0 40175.2       .0       .0       .0      .0      .0
 11     40.0 442573.3       .0 96587.2       .0       .0       .0      .0      .0
 12    124.0 ********       .0 *******       .0       .0       .0      .0      .0
 13     16.7 207753.1       .0 74713.8       .0       .0       .0      .0      .0
 14     30.5 393792.8       .0 *******       .0       .0       .0      .0      .0
 15     18.8 221786.7       .0 *******       .0       .0       .0      .0      .0
 16     15.0 136546.5       .0 88730.8       .0       .0       .0      .0      .0
 17     34.1 155135.6       .0 82767.9       .0       .0       .0      .0      .0
 18       .9   1119.5       .0      .0       .0       .0       .0      .0      .0
 19      6.8   4116.2       .0      .0       .0       .0       .0      .0      .0
```

RUN # 40

TT 53425; 23-23', CS-13 + CS-14, Qls R&R/TQs Cut w 150' x 24' Buttress; PseudoSt

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T23PS1B.PL2 Run By: BPG 3/25/2003 12:33PM



#	FS
a	**1.13**
b	1.14
c	1.14
d	1.15
e	1.15
f	1.16
g	1.16
h	1.17
i	1.17
j	1.17

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qal	2	115.0	120.0	50.0	28.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=1.13

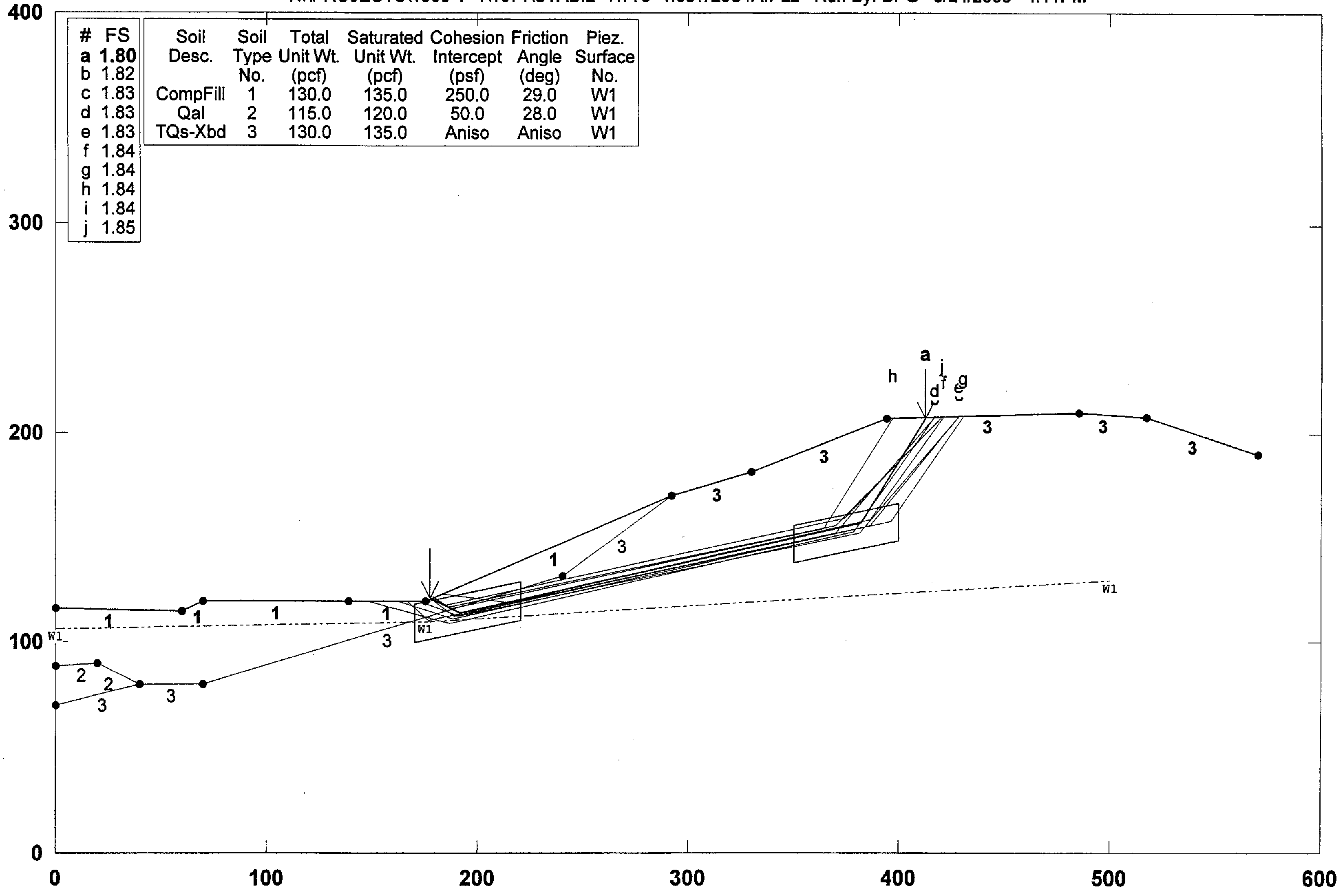
Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #40

TT 53425; 28-28', CS-2, Qls R&R/TQs Cut w RUA, Above Daylight Fill Pad; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T28S1A.PL2 Run By: BPG 3/24/2003 4:11PM



#	FS
a	**1.80**
b	1.82
c	1.83
d	1.83
e	1.83
f	1.84
g	1.84
h	1.84
i	1.84
j	1.85

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qal	2	115.0	120.0	50.0	28.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.80

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #41

```
                    ** PCSTABL5M **
                          by
                   Purdue University
               --Slope Stability Analysis--
            Simplified Janbu, Simplified Bishop
               or Spencer`s Method of Slices
Run Date:                 3/24/2003
Time of Run:              4:11PM
Run By:                   BPG
Input Data Filename:      N:t28s1a.in
Output Filename:          N:t28s1a.OUT
Unit:                     ENGLISH
Plotted Output Filename:  N:t28s1a.PLT
PROBLEM DESCRIPTION   TT 53425; 28-28', CS-2, Qls R&R/TQs Cut
                      w RUA, Above Daylight Fill Pad; Static
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 0.00 to X-values and 0.00 to Y-values listed.

   10 Top   Boundaries
   16 Total Boundaries
Boundary    X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.       (ft)       (ft)       (ft)       (ft)     Below Bnd
   1           .00     116.00      60.00     115.00        1
   2         60.00     115.00      70.00     120.00        1
   3         70.00     120.00     139.00     120.00        1
   4        139.00     120.00     175.00     120.00        1
   5        175.00     120.00     292.00     170.00        1
   6        292.00     170.00     330.00     182.00        3
   7        330.00     182.00     394.00     207.00        3
   8        394.00     207.00     485.00     210.00        3
   9        485.00     210.00     517.00     208.00        3
  10        517.00     208.00     570.00     190.00        3
  11           .00      88.00      20.00      90.00        2
  12         20.00      90.00      40.00      80.00        2
  13           .00      70.00      40.00      80.00        3
  14         40.00      80.00      70.00      80.00        3
  15         70.00      80.00     240.00     132.00        3
  16        240.00     132.00     292.00     170.00        3
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   130.0    135.0     250.0     29.0     .00        .0       1
   2   115.0    120.0      50.0     28.0     .00        .0       1
   3   130.0    135.0     400.0     38.0     .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit    Intercept      Angle
    No.            (deg)           (psf)         (deg)
     1             11.0            400.0          38.0
     2             13.0            450.0          19.0
     3             90.0            400.0          38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  3 Coordinate Points
   Point      X-Water     Y-Water
    No.         (ft)        (ft)
     1           .00      106.00
     2        175.00      110.00
     3        500.00      130.00
 Janbus Empirical Coef is being used for the case of  c & phi both > 0
 A Critical Failure Surface Searching Method, Using A Random
```

RUN #41

```
      Technique For Generating Sliding Block Surfaces, Has Been
      Specified.
      400 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 150.0
      Box         X-Left     Y-Left     X-Right    Y-Right      Height
      No.          (ft)       (ft)       (ft)       (ft)         (ft)
       1          170.00     109.00     220.00     119.63       18.00
       2          350.00     147.26     400.00     157.89       18.00
      Factor Of Safety Calculation Has Gone Through Ten Iterations
      The Trial Failure Surface In Question Is Defined
      By The Following  4 Coordinate Points
        Point      X-Surf      Y-Surf
         No.        (ft)        (ft)
          1        179.62      121.98
          2        196.60      112.10
          3        355.48      143.51
          4        355.63      192.01
      Factor Of Safety For The Preceding Specified Surface =  3.540
      Factor Of Safety Calculation Has Gone Through Ten Iterations
      The Trial Failure Surface In Question Is Defined
      By The Following  4 Coordinate Points
        Point      X-Surf      Y-Surf
         No.        (ft)        (ft)
          1        181.69      122.86
          2        196.79      115.31
          3        350.99      141.78
          4        352.03      190.61
      Factor Of Safety For The Preceding Specified Surface =  6.137
      Factor Of Safety Calculation Has Gone Through Ten Iterations
      The Trial Failure Surface In Question Is Defined
      By The Following  4 Coordinate Points
        Point      X-Surf      Y-Surf
         No.        (ft)        (ft)
          1        181.19      122.64
          2        192.47      114.14
          3        387.88      150.99
          4        388.25      204.75
      Factor Of Safety For The Preceding Specified Surface =  5.996
      Factor Of Safety Calculation Has Gone Through Ten Iterations
      The Trial Failure Surface In Question Is Defined
      By The Following  4 Coordinate Points
        Point      X-Surf      Y-Surf
         No.        (ft)        (ft)
          1        196.95      129.38
          2        207.11      119.23
          3        394.99      149.67
          4        395.68      207.06
      Factor Of Safety For The Preceding Specified Surface =  6.737
      Following Are Displayed The Ten Most Critical Of The Trial
            Failure Surfaces Examined.  They Are Ordered - Most Critical
            First.
            * * Safety Factors Are Calculated By The Modified Janbu Method * *
            Failure Surface Specified By  4 Coordinate Points
              Point      X-Surf      Y-Surf
               No.        (ft)        (ft)
                1        177.54      121.08
                2        191.64      114.01
                3        381.97      157.52
                4        412.81      207.62
                  ***     1.804    ***
                 Individual data on the     8  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)
```

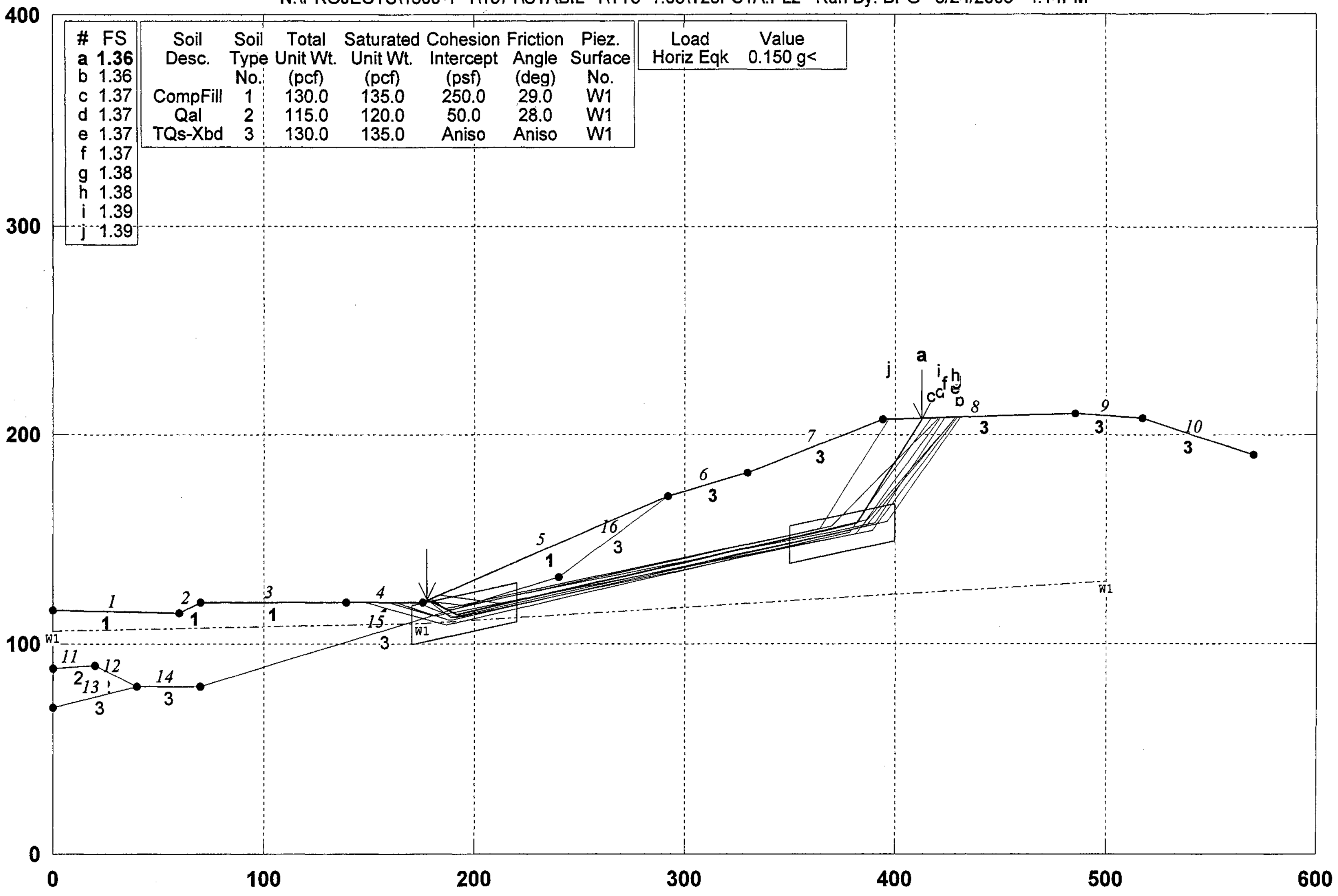
RUN #41

```
   1      10.1    6213.5      .0      .0      .0      .0      .0      .0      .0
   2       4.0    5792.7      .0      .0      .0      .0      .0      .0      .0
   3      48.4  112563.1      .0      .0      .0      .0      .0      .0      .0
   4      52.0  188461.2      .0      .0      .0      .0      .0      .0      .0
   5      38.0  171436.8      .0      .0      .0      .0      .0      .0      .0
   6      52.0  274088.2      .0      .0      .0      .0      .0      .0      .0
   7      12.0   58439.0      .0      .0      .0      .0      .0      .0      .0
   8      18.8   36601.6      .0      .0      .0      .0      .0      .0      .0
```

RUN #41

TT 53425; 28-28', CS-2, Qls R&R/TQs Cut w RUA, Above Daylight Fill Pad; PseudoSt

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T28PS1A.PL2 Run By: BPG 3/24/2003 4:14PM



#	FS
a	**1.36**
b	1.36
c	1.37
d	1.37
e	1.37
f	1.37
g	1.38
h	1.38
i	1.39
j	1.39

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qal	2	115.0	120.0	50.0	28.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=1.36

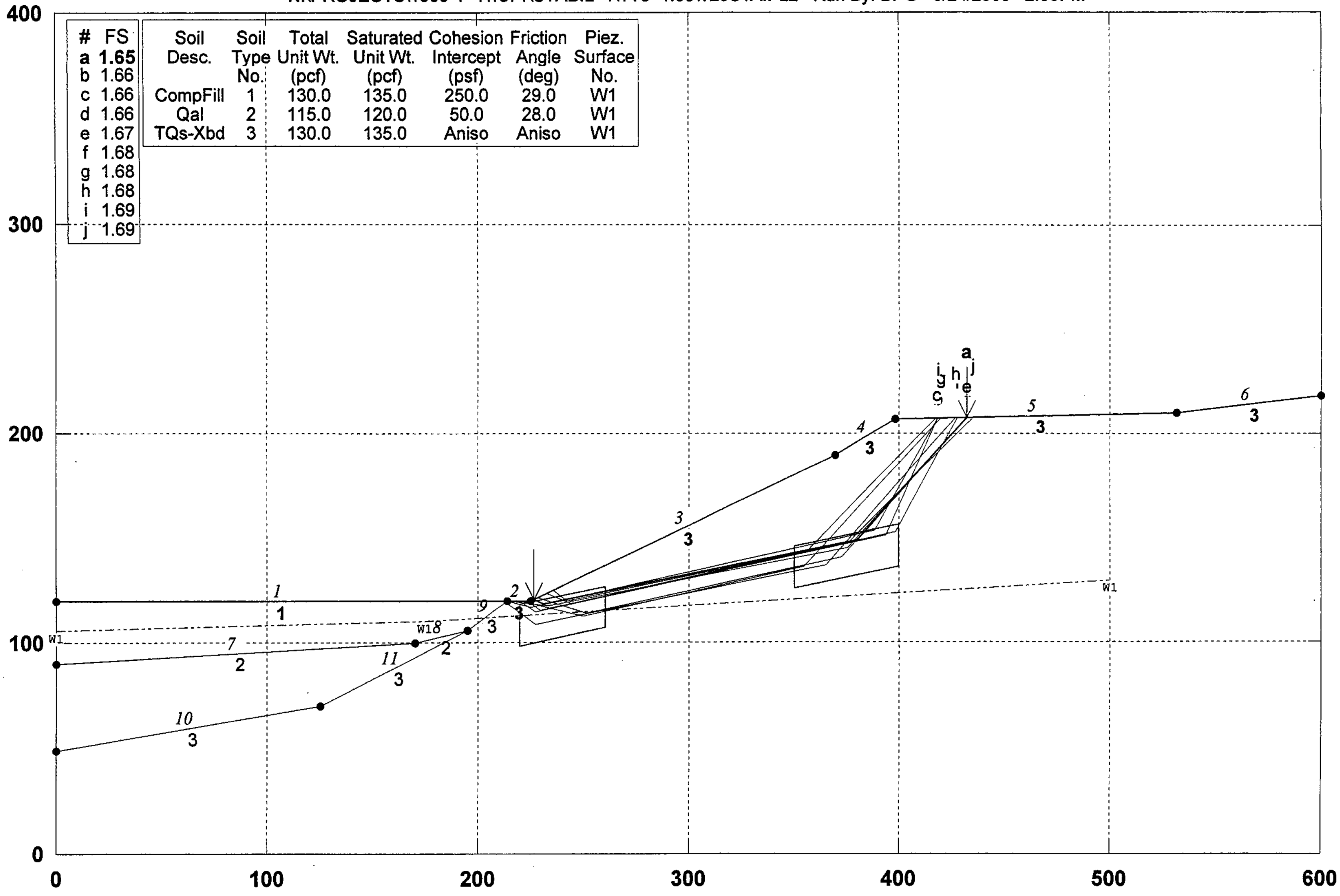
Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #41

TT 53425; 29-29', CS-3, TQs Cut w RUA over Daylight Fill Pad; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T29S1A.PL2 Run By: BPG 3/24/2003 2:06PM



PCSTABL5M/si FSmin=1.65

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #42

```
                         ** PCSTABL5M **
                                by
                        Purdue University
                  --Slope Stability Analysis--
               Simplified Janbu, Simplified Bishop
                  or Spencer`s Method of Slices
 Run Date:                  3/24/2003
 Time of Run:               2:06PM
 Run By:                    BPG
 Input Data Filename:       N:t29s1a.in
 Output Filename:           N:t29s1a.OUT
 Unit:                      ENGLISH
 Plotted Output Filename:   N:t29s1a.PLT
 PROBLEM DESCRIPTION    TT 53425; 29-29', CS-3, TQs Cut w RUA ov
                        er Daylight Fill Pad; Static
 BOUNDARY COORDINATES
      Note: User origin value specified.
      Add 0.00 to X-values and 0.00 to Y-values listed.

     6 Top   Boundaries
    11 Total Boundaries
 Boundary     X-Left     Y-Left     X-Right     Y-Right     Soil Type
    No.        (ft)       (ft)        (ft)        (ft)      Below Bnd
     1          .00      120.00      214.00      120.00         1
     2       214.00      120.00      225.00      120.00         3
     3       225.00      120.00      370.00      190.00         3
     4       370.00      190.00      398.00      207.00         3
     5       398.00      207.00      532.00      210.00         3
     6       532.00      210.00      600.00      218.00         3
     7          .00       90.00      170.00      100.00         2
     8       170.00      100.00      195.00      106.00         2
     9       195.00      106.00      214.00      120.00         3
    10          .00       49.00      125.00       70.00         3
    11       125.00       70.00      195.00      106.00         3
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   130.0    135.0     250.0     29.0      .00        .0       1
   2   115.0    120.0      50.0     28.0      .00        .0       1
   3   130.0    135.0     400.0     38.0      .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction     Counterclockwise     Cohesion      Friction
   Range       Direction Limit     Intercept       Angle
    No.            (deg)             (psf)         (deg)
     1              11.0             400.0          38.0
     2              13.0             450.0          19.0
     3              90.0             400.0          38.0
 1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
 Unit Weight of Water =  62.40
 Piezometric Surface No.  1 Specified by  3 Coordinate Points
   Point      X-Water     Y-Water
    No.        (ft)        (ft)
     1          .00       106.00
     2       175.00       110.00
     3       500.00       130.00
 Janbus Empirical Coef is being used for the case of  c & phi both > 0
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 400 Trial Surfaces Have Been Generated.
 2 Boxes Specified For Generation Of Central Block Base
 Length Of Line Segments For Active And Passive Portions Of
```

RUN #42

```
Sliding Block Is 150.0
Box         X-Left      Y-Left     X-Right     Y-Right       Height
No.          (ft)        (ft)        (ft)        (ft)         (ft)
 1          220.00      108.50      260.00      117.00        20.00
 2          350.00      136.13      400.00      146.76        20.00
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        226.29      120.62
    2        229.65      117.27
    3        396.12      153.19
    4        396.50      206.09
Factor Of Safety For The Preceding Specified Surface =  2.968
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        229.49      122.17
    2        238.13      116.27
    3        383.38      137.56
    4        384.93      199.07
Factor Of Safety For The Preceding Specified Surface =  6.138
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        244.77      129.54
    2        250.00      124.51
    3        386.01      134.11
    4        389.26      201.69
Factor Of Safety For The Preceding Specified Surface =  6.454
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        222.35      120.00
    2        229.88      112.60
    3        389.38      140.47
    4        391.54      203.08
Factor Of Safety For The Preceding Specified Surface =  5.067
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        197.10      120.00
    2        246.31      108.17
    3        379.64      145.56
    4        379.97      196.05
Factor Of Safety For The Preceding Specified Surface =  4.612
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
By The Following  4 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        229.64      122.24
    2        241.59      117.29
    3        396.49      138.84
    4        399.19      207.03
Factor Of Safety For The Preceding Specified Surface =  5.404
Factor Of Safety Calculation Has Gone Through Ten Iterations
The Trial Failure Surface In Question Is Defined
```

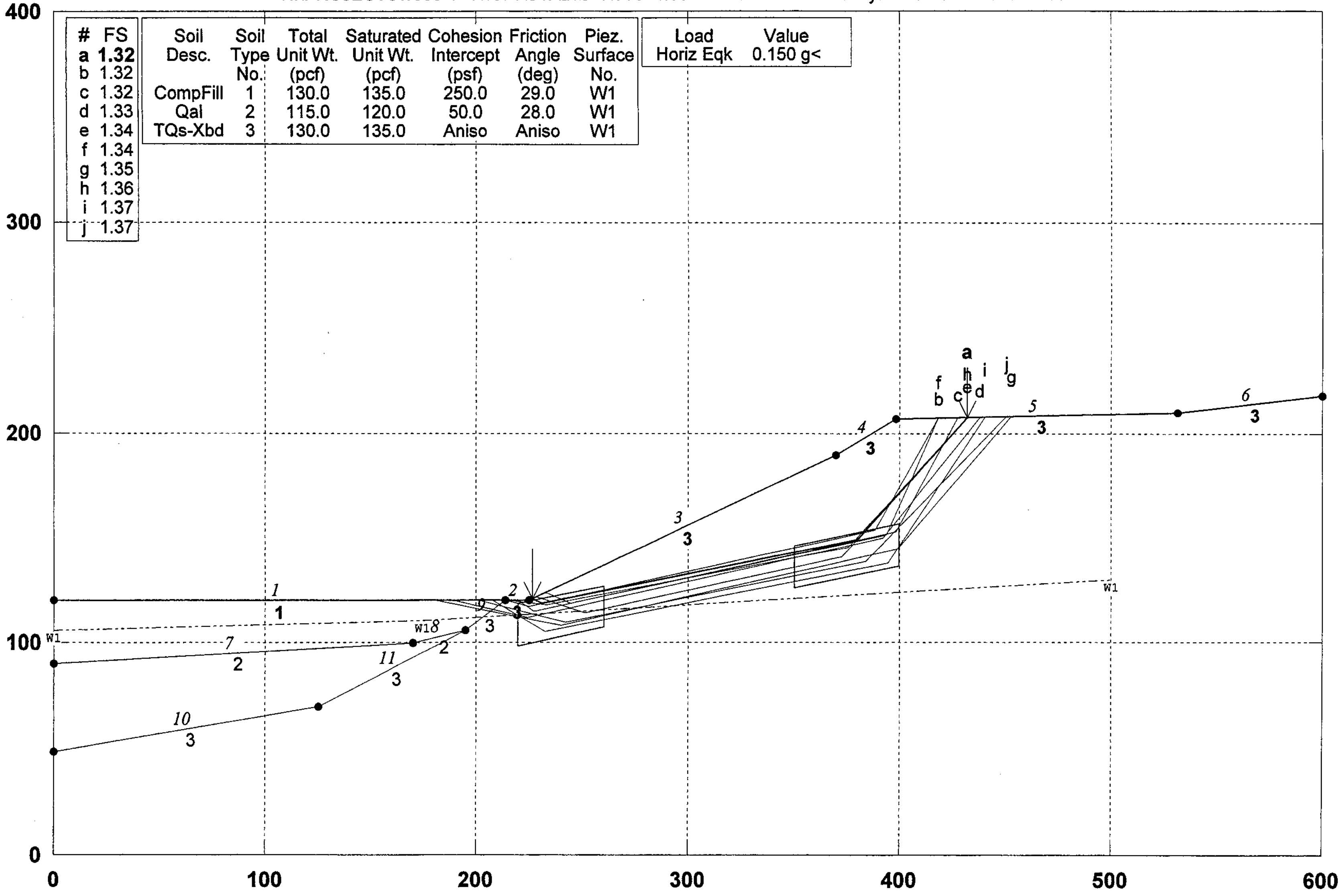
RUN #42

```
     By The Following  4 Coordinate Points
       Point      X-Surf      Y-Surf
        No.        (ft)        (ft)
         1        230.33      122.57
         2        234.83      118.80
         3        365.78      134.47
         4        367.35      188.72
     Factor Of Safety For The Preceding Specified Surface =  6.808
     Factor Of Safety Calculation Has Gone Through Ten Iterations
     The Trial Failure Surface In Question Is Defined
     By The Following  4 Coordinate Points
       Point      X-Surf      Y-Surf
        No.        (ft)        (ft)
         1        215.40      120.00
         2        244.73      111.21
         3        368.59      133.11
         4        369.59      189.80
     Factor Of Safety For The Preceding Specified Surface =  6.293
     Factor Of Safety Calculation Has Gone Through Ten Iterations
     The Trial Failure Surface In Question Is Defined
     By The Following  4 Coordinate Points
       Point      X-Surf      Y-Surf
        No.        (ft)        (ft)
         1        233.23      123.97
         2        251.34      106.14
         3        353.79      128.65
         4        354.33      182.44
     Factor Of Safety For The Preceding Specified Surface =  4.636
     Factor Of Safety Calculation Has Gone Through Ten Iterations
     The Trial Failure Surface In Question Is Defined
     By The Following  4 Coordinate Points
       Point      X-Surf      Y-Surf
        No.        (ft)        (ft)
         1        218.74      120.00
         2        233.02      106.52
         3        361.47      134.74
         4        362.13      186.20
     Factor Of Safety For The Preceding Specified Surface =  3.375
     Following Are Displayed The Ten Most Critical Of The Trial
           Failure Surfaces Examined.  They Are Ordered - Most Critical
           First.
           * * Safety Factors Are Calculated By The Modified Janbu Method * *
           Failure Surface Specified By  4 Coordinate Points
             Point      X-Surf      Y-Surf
              No.        (ft)        (ft)
               1        226.24      120.60
               2        230.85      118.30
               3        380.33      149.48
               4        431.83      207.76
                 ***     1.648   ***
                Individual data on the     5  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      4.6   1352.8       .0     .0       .0      .0      .0      .0      .0
  2    139.2 426850.6       .0     .0       .0      .0      .0      .0      .0
  3     10.3  60079.1       .0     .0       .0      .0      .0      .0      .0
  4     17.7  96832.7       .0     .0       .0      .0      .0      .0      .0
  5     33.8  82511.8       .0     .0       .0      .0      .0      .0      .0
```

RUN #42

TT 53425; 29-29', CS-3, TQs Cut w RUA over Daylight Fill Pad; PseudoStatic

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T29PS1A.PL2 Run By: BPG 3/24/2003 2:09PM



#	FS
a	**1.32**
b	1.32
c	1.32
d	1.33
e	1.34
f	1.34
g	1.35
h	1.36
i	1.37
j	1.37

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CompFill	1	130.0	135.0	250.0	29.0	W1
Qal	2	115.0	120.0	50.0	28.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=1.32

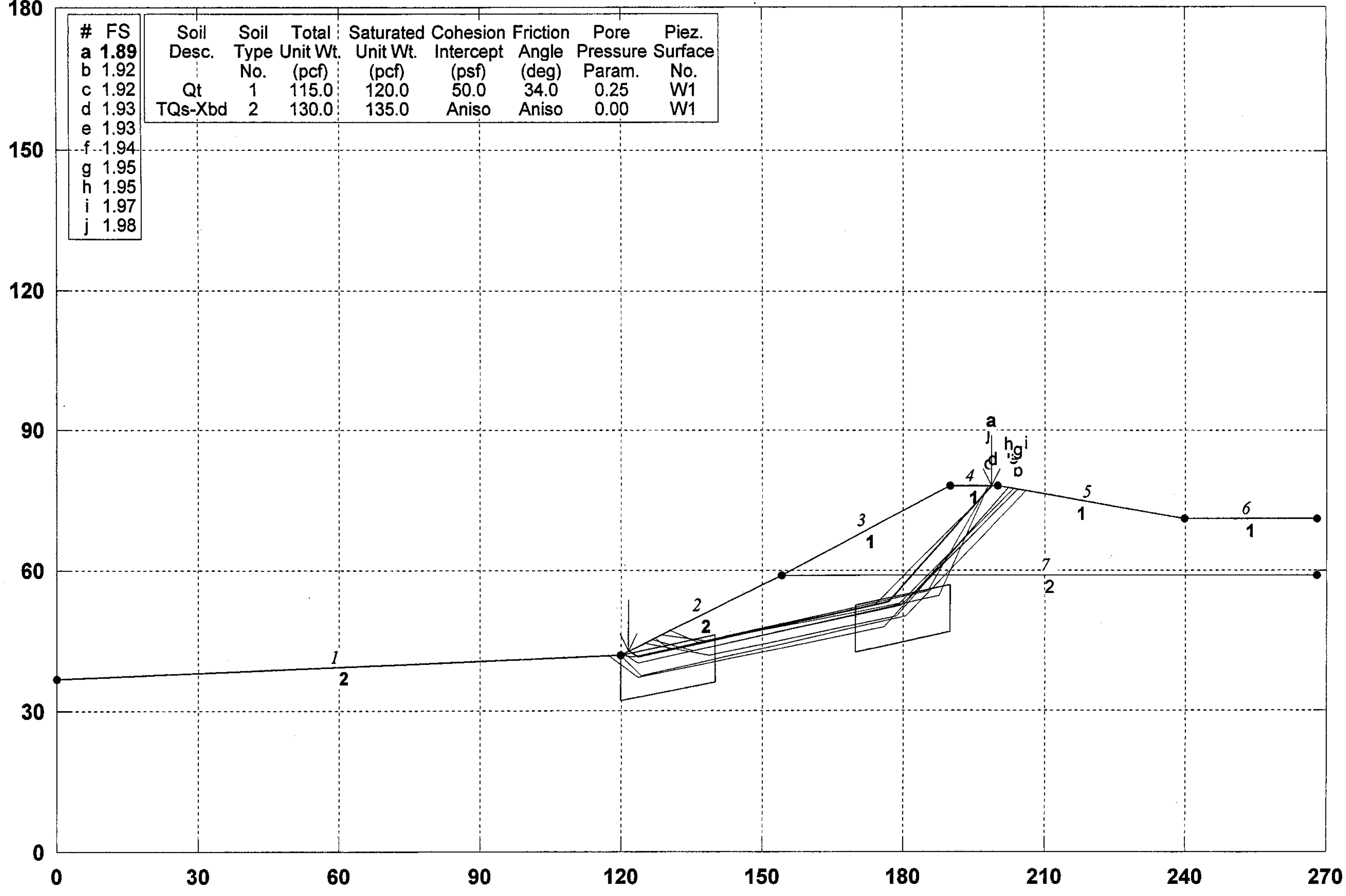
Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #42

TT 53425; 30-30', CS-8, Qt/TQs Cut, As Designed; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T30S1A.PL2 Run By: BPG 3/31/2003 9:27AM



#	FS
a	**1.89**
b	1.92
c	1.92
d	1.93
e	1.93
f	1.94
g	1.95
h	1.95
i	1.97
j	1.98

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
Qt	1	115.0	120.0	50.0	34.0	0.25	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	0.00	W1

PCSTABL5M/si FSmin=1.89

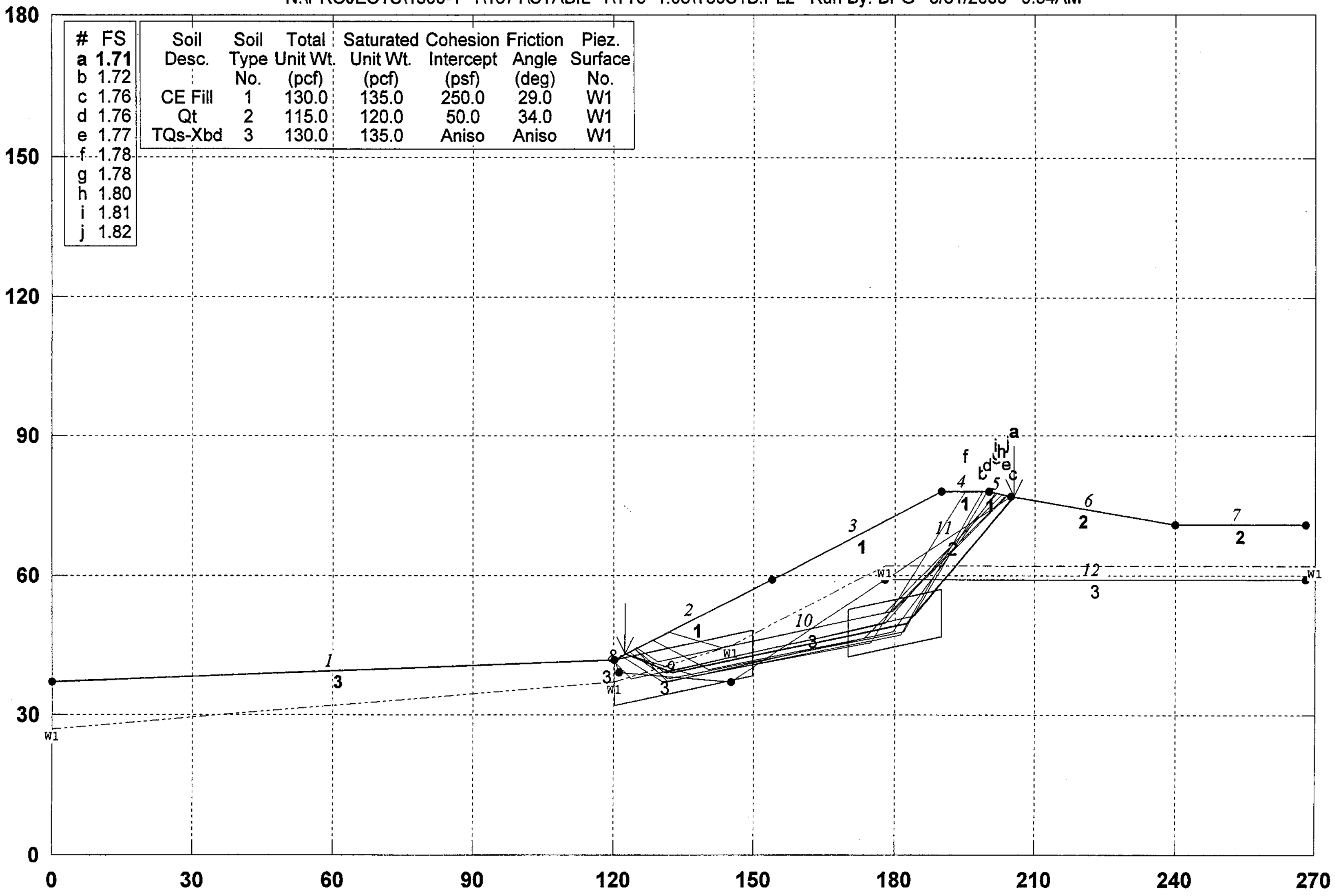
Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #43

TT 53425; 30-30', CS-8, Qt/TQs Cut with 25' Stability Fill; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T30S1B.PL2 Run By: BPG 3/31/2003 9:54AM



#	FS
a	**1.71**
b	1.72
c	1.76
d	1.76
e	1.77
f	1.78
g	1.78
h	1.80
i	1.81
j	1.82

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CE Fill	1	130.0	135.0	250.0	29.0	W1
Qt	2	115.0	120.0	50.0	34.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

PCSTABL5M/si FSmin=1.71

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #44

```
                     ** PCSTABL5M **
                           by
                    Purdue University
               --Slope Stability Analysis--
            Simplified Janbu, Simplified Bishop
               or Spencer`s Method of Slices
Run Date:                 3/31/2003
Time of Run:              9:54AM
Run By:                   BPG
Input Data Filename:      N:T30S1B.IN
Output Filename:          N:T30S1B.OUT
Unit:                     ENGLISH
Plotted Output Filename:  N:T30S1B.PLT
PROBLEM DESCRIPTION    TT 53425; 30-30', CS-8, Qt/TQs Cut with
                       25' Stability Fill; Static
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 0.00 to X-values and 0.00 to Y-values listed.

    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          .00       37.00     120.00       42.00          3
    2       120.00       42.00     154.00       59.00          1
    3       154.00       59.00     190.00       78.00          1
    4       190.00       78.00     200.00       78.00          1
    5       200.00       78.00     205.00       77.00          1
    6       205.00       77.00     240.00       71.00          2
    7       240.00       71.00     268.00       71.00          2
    8       120.00       42.00     121.00       39.00          3
    9       121.00       39.00     145.00       37.00          3
   10       145.00       37.00     178.00       59.00          3
   11       178.00       59.00     205.00       77.00          2
   12       178.00       59.00     268.00       59.00          3
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   130.0    135.0     250.0     29.0      .00        .0       1
  2   115.0    120.0      50.0     34.0      .00        .0       1
  3   130.0    135.0     400.0     38.0      .00        .0       1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  3 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise     Cohesion     Friction
  Range      Direction Limit     Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1             11.0             400.0         38.0
    2             13.0             450.0         19.0
    3             90.0             400.0         38.0
1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
Unit Weight of Water =  62.40
Piezometric Surface No.  1 Specified by  5 Coordinate Points
  Point       X-Water      Y-Water
   No.         (ft)         (ft)
    1           .00        27.00
    2        120.00        37.00
    3        145.00        45.00
    4        178.00        62.00
    5        270.00        62.00
Janbus Empirical Coef is being used for the case of  c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
```

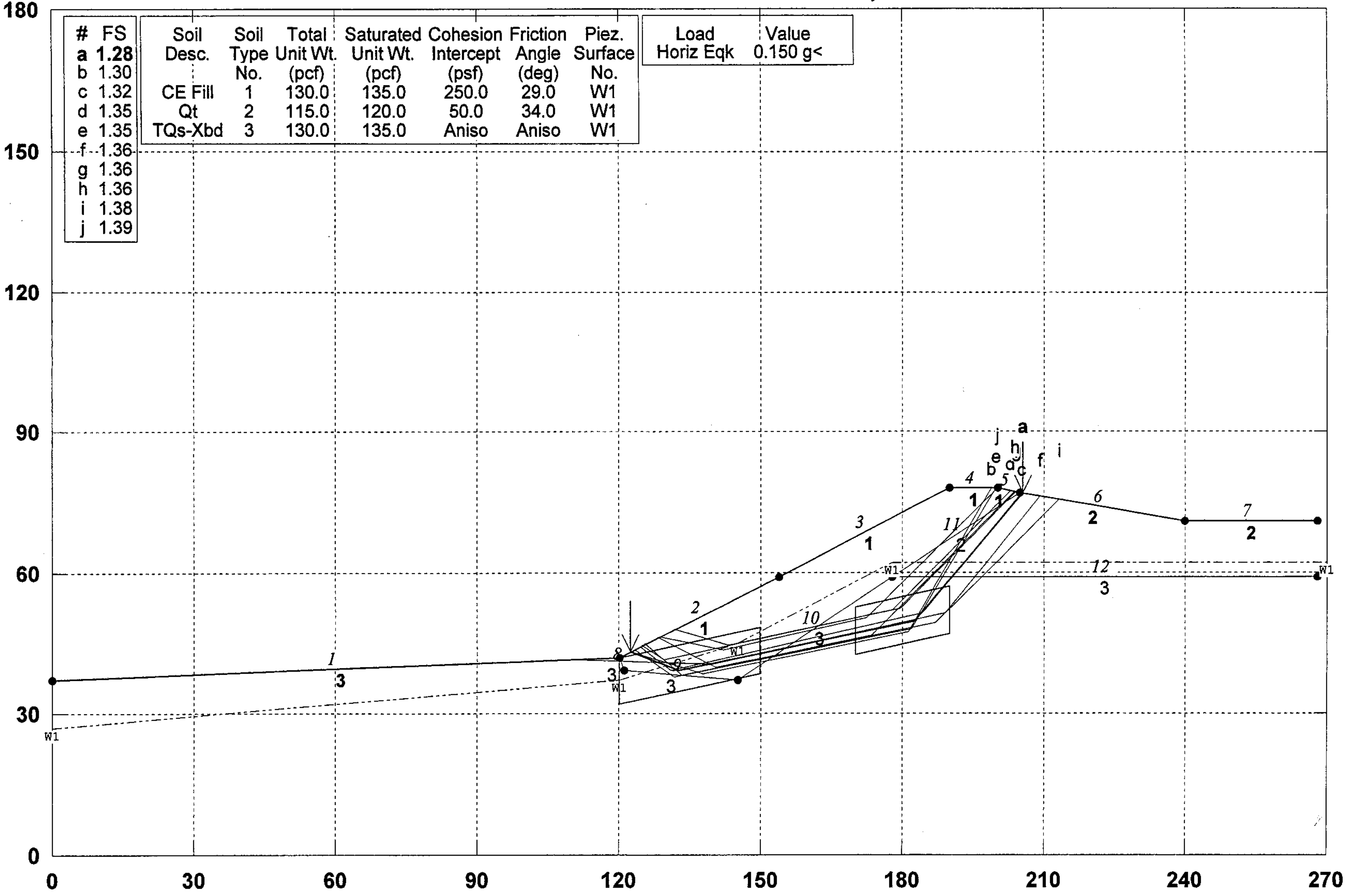
RUN #44

```
400 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  50.0
Box         X-Left      Y-Left     X-Right     Y-Right       Height
No.          (ft)        (ft)        (ft)        (ft)         (ft)
 1          120.00       37.00      150.00       43.38        10.00
 2          170.00       47.63      190.00       51.88        10.00
Factor Of Safety Calculation Has Gone Through Ten Iterations
```

RUN #44

TT 53425; 30-30', CS-8, Qt/TQs Cut with 25' Stability Fill; PseudoStatic

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T30PS1B.PL2 Run By: BPG 3/31/2003 9:58AM



#	FS
a	**1.28**
b	1.30
c	1.32
d	1.35
e	1.35
f	1.36
g	1.36
h	1.36
i	1.38
j	1.39

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
CE Fill	1	130.0	135.0	250.0	29.0	W1
Qt	2	115.0	120.0	50.0	34.0	W1
TQs-Xbd	3	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=1.28

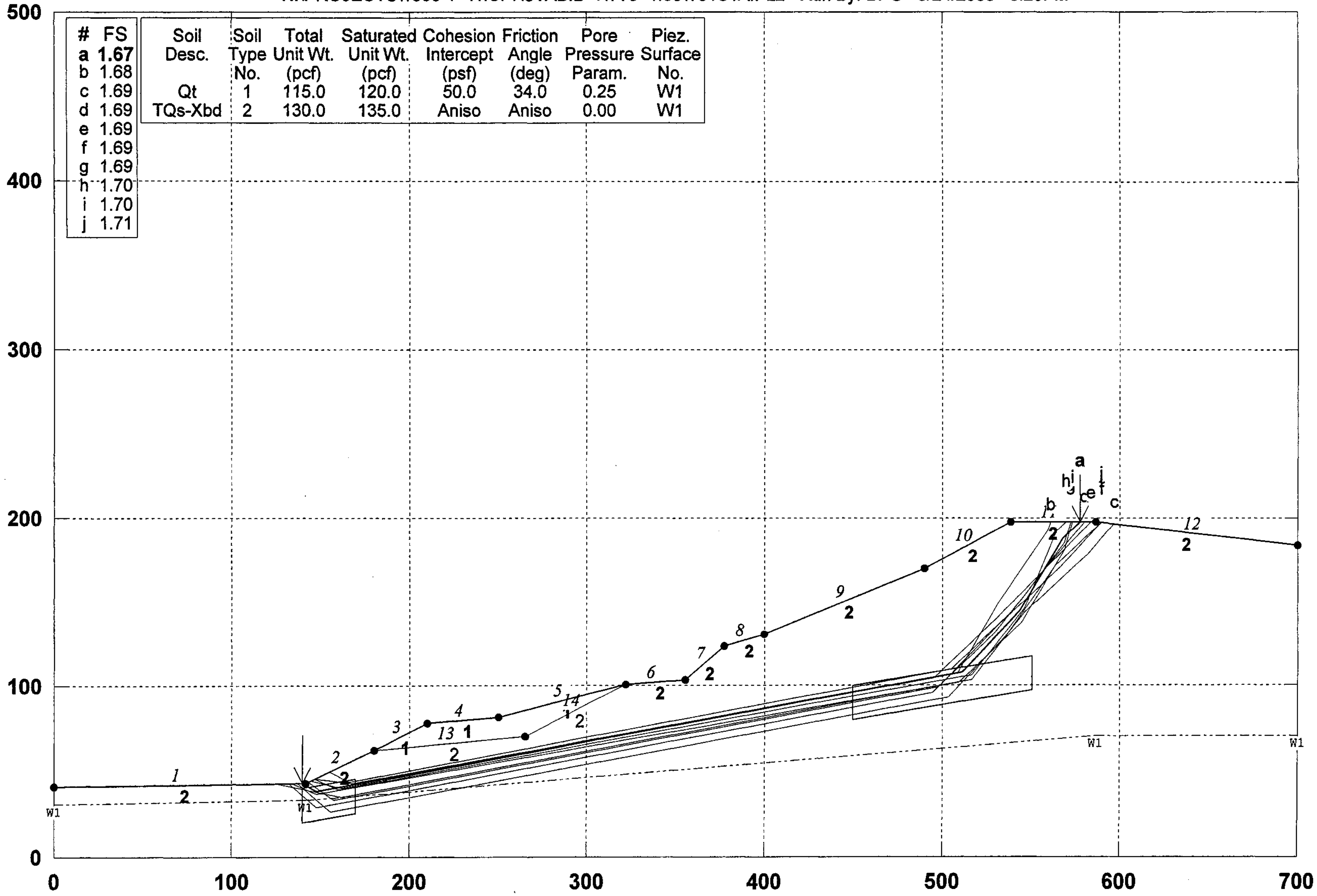
Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

RUN #44

TT 53425; 31-31', CS-16, Qt/TQs Cut on Toe of TQs Ridge w LA Aqueduct; Static

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T31S1A.PL2 Run By: BPG 3/24/2003 3:23PM



#	FS
a	**1.67**
b	1.68
c	1.69
d	1.69
e	1.69
f	1.69
g	1.69
h	1.70
i	1.70
j	1.71

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Piez. Surface No.
Qt	1	115.0	120.0	50.0	34.0	0.25	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	0.00	W1

PCSTABL5M/si FSmin=1.67

Safety Factors Are Calculated By The Modified Janbu Method for the case of c & phi both > 0

STED

Run #45

```
                    ** PCSTABL5M **
                          by
                   Purdue University
               --Slope Stability Analysis--
           Simplified Janbu, Simplified Bishop
              or Spencer`s Method of Slices
Run Date:                3/24/2003
Time of Run:             3:23PM
Run By:                  BPG
Input Data Filename:     N:T31S1A.IN
Output Filename:         N:T31S1A.OUT
Unit:                    ENGLISH
Plotted Output Filename: N:T31S1A.PLT
PROBLEM DESCRIPTION   TT 53425; 31-31', CS-16, Qt/TQs Cut on T
                      oe of TQs Ridge w LA Aqueduct; Static
BOUNDARY COORDINATES
     Note: User origin value specified.
     Add 0.00 to X-values and 0.00 to Y-values listed.

   12 Top   Boundaries
   14 Total Boundaries
Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
   No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
    1          .00       41.00     142.00      43.00        2
    2       142.00       43.00     180.00      62.00        2
    3       180.00       62.00     210.00      78.00        1
    4       210.00       78.00     250.00      81.00        1
    5       250.00       81.00     322.00     101.00        1
    6       322.00      101.00     355.00     103.00        2
    7       355.00      103.00     377.00     123.00        2
    8       377.00      123.00     400.00     130.00        2
    9       400.00      130.00     490.00     170.00        2
   10       490.00      170.00     538.00     198.00        2
   11       538.00      198.00     586.00     198.00        2
   12       586.00      198.00     700.00     184.00        2
   13       180.00       62.00     265.00      70.00        2
   14       265.00       70.00     322.00     101.00        2
ISOTROPIC SOIL PARAMETERS
  2 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    120.0      50.0     34.0     .25        .0      1
  2   130.0    135.0     400.0     38.0     .00        .0      1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
Soil Type  2 Is Anisotropic
Number Of Direction Ranges Specified =  3
Direction    Counterclockwise    Cohesion     Friction
  Range       Direction Limit    Intercept      Angle
   No.            (deg)            (psf)        (deg)
    1               9.0            400.0         38.0
    2              11.0            450.0         19.0
    3              90.0            400.0         38.0
1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED
Unit Weight of Water =  62.40
Piezometric Surface No.  1 Specified by  4 Coordinate Points
  Point      X-Water     Y-Water
   No.         (ft)        (ft)
    1          .00        31.00
    2       142.00        33.00
    3       586.00        70.00
    4       700.00        70.00
Janbus Empirical Coef is being used for the case of  c & phi both > 0
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Sliding Block Surfaces, Has Been
Specified.
```

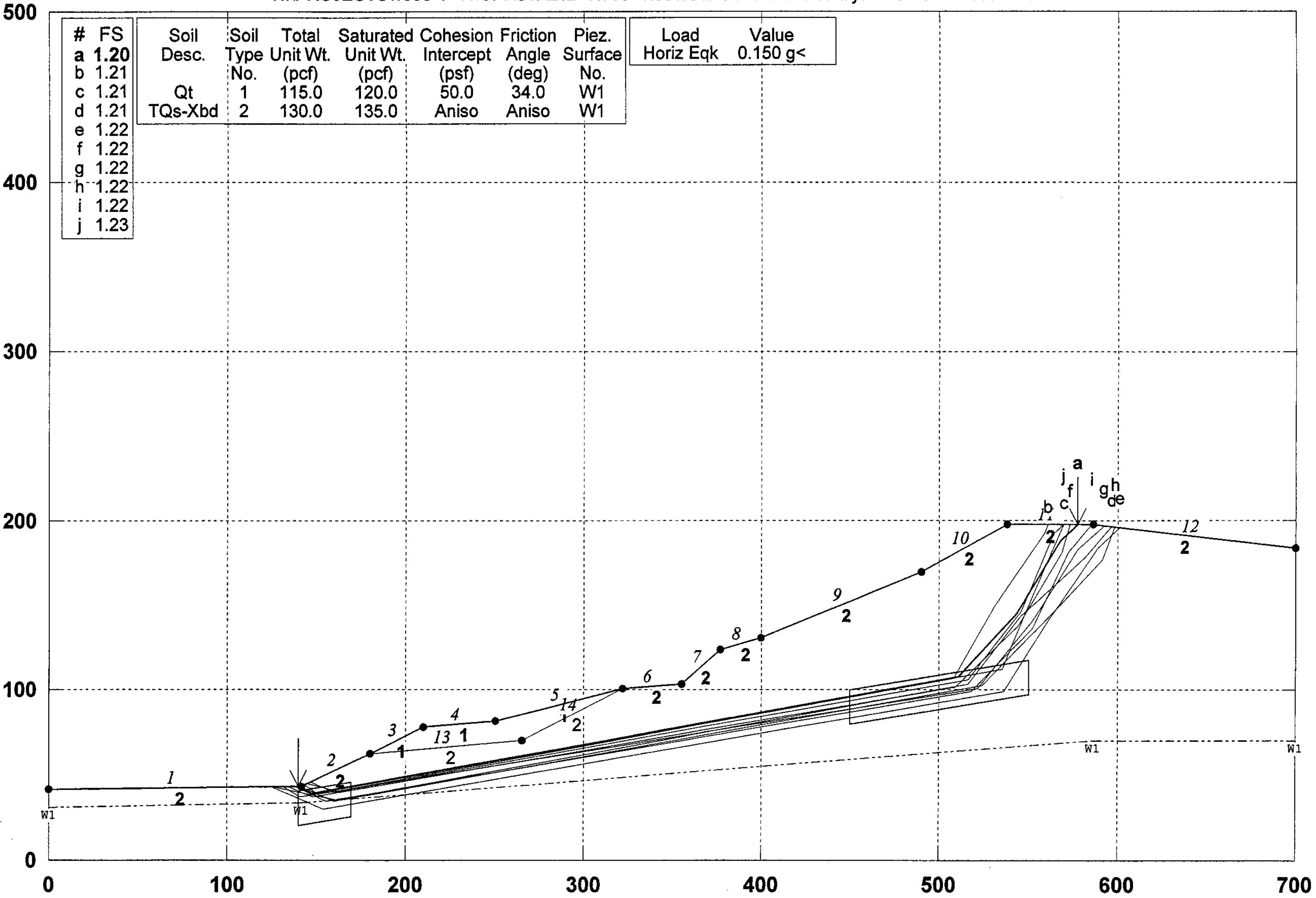
RUN #45

```
    400 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  50.0
    Box        X-Left     Y-Left     X-Right    Y-Right      Height
    No.         (ft)       (ft)       (ft)       (ft)         (ft)
     1         140.00      30.00     170.00      35.29        20.00
     2         450.00      89.66     550.00     107.29        20.00
    Following Are Displayed The Ten Most Critical Of The Trial
          Failure Surfaces Examined.  They Are Ordered - Most Critical
          First.
          * * Safety Factors Are Calculated By The Modified Janbu Method * *
          Failure Surface Specified By  6 Coordinate Points
            Point      X-Surf      Y-Surf
             No.        (ft)        (ft)
              1        140.03       42.97
              2        148.14       38.93
              3        510.66      107.26
              4        543.77      144.72
              5        568.11      188.40
              6        577.70      198.00
               ***      1.670    ***
               Individual data on the    16  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     2.0    129.0      .0      .0      .0      .0      .0      .0      .0
   2     6.1   3247.4      .0      .0      .0      .0      .0      .0      .0
   3    31.9  50114.0      .0      .0      .0      .0      .0      .0      .0
   4    30.0  83748.8      .0      .0      .0      .0      .0      .0      .0
   5    40.0 123040.4      .0      .0      .0      .0      .0      .0      .0
   6    15.0  42797.2      .0      .0      .0      .0      .0      .0      .0
   7    57.0 191759.9      .0      .0      .0      .0      .0      .0      .0
   8    33.0 116641.5      .0      .0      .0      .0      .0      .0      .0
   9    22.0  94398.0      .0      .0      .0      .0      .0      .0      .0
  10    23.0 126374.7      .0      .0      .0      .0      .0      .0      .0
  11    90.0 644873.3      .0      .0      .0      .0      .0      .0      .0
  12    20.7 189954.8      .0      .0      .0      .0      .0      .0      .0
  13    27.3 239176.5      .0      .0      .0      .0      .0      .0      .0
  14     5.8  42426.3      .0      .0      .0      .0      .0      .0      .0
  15    24.3  99456.3      .0      .0      .0      .0      .0      .0      .0
  16     9.6   5981.8      .0      .0      .0      .0      .0      .0      .0
```

RUN #45

TT 53425; 31-31', CS-16, Qt/TQs Cut on Toe of TQs Ridge w LA Aqueduct; PseudoStc

N:\PROJECTS\1500-1~1\1571\STABIL~1\TT3~1.03\T31PS1A.PL2 Run By: BPG 3/24/2003 3:32PM



#	FS
a	**1.20**
b	1.21
c	1.21
d	1.21
e	1.22
f	1.22
g	1.22
h	1.22
i	1.22
j	1.23

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Qt	1	115.0	120.0	50.0	34.0	W1
TQs-Xbd	2	130.0	135.0	Aniso	Aniso	W1

Load	Value
Horiz Eqk	0.150 g<

PCSTABL5M/si FSmin=1.20
Safety Factors Are Calculated By The Modified Janbu Method

STED

RUN #45

INFINITE SLOPE STABILITY ANALYSIS

ALLAN E. SEWARD ENGINEERING GEOLOGY AND SOILS, INC.

Baylor Gibson Spreadsheet Written 14-Mar-02

CLIENT Newhall Land PROJECT NAME River Park
PROJECT ANALYSIS DATE: 20-May-02 PROJECT NUMBER: 02-1571-4

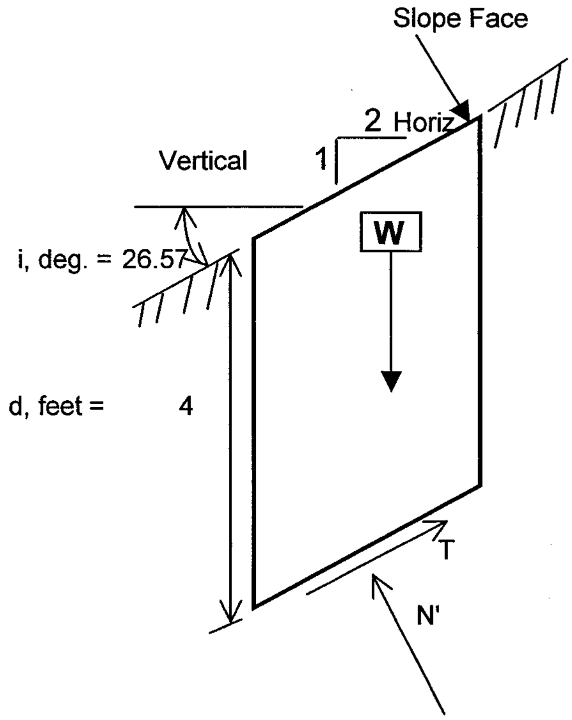
OBJECTIVE: To determine the surficial stability of the given slope.

GIVEN: This 2H: 1V slope consists of certified engineered general fill.

Slope inclination, i, deg = 26.57 Fill Angle of Internal Friction, Φ', deg. = 29
Fill Total Density, γ_t, pcf = 130 Fill Cohesion, c, psf = 250
Fill Bouyant Density, γ_b, pcf = 67.6 Depth of Interest, d, ft = 4

REFERENCE: Lambe and Whitman, *Soil Mechanics* , John Wiley and Sons, Inc., 1969

ANALYSIS: per Figures 24.1, 24.2 and 24.3 of Lambe and Whitman,



for a 4 ft deep slice of the given slope with unit width and length,

$N' = \gamma_b$ ad cos i

$T = \gamma_t$ ad sin i

$$FS = \frac{c + N' \tan \Phi'}{T}$$

FS = 1.65

RUN # 46

Appendix 4.1

See Geologic/Geotechnical Maps in Map Box

(DEIR Map 19)

Appendix 4.1

See Geologic/Geotechnical Maps in Map Box

(DEIR Map 20)

Appendix 4.1

See Geologic/Geotechnical Maps in Map Box

(DEIR Map 21)

Appendix 4.1

See Geologic/Geotechnical Maps in Map Box

(DEIR Map 22)

Appendix 4.1

See Geologic/Geotechnical Maps in Map Box

(DEIR Map 23)

Appendix 4.1

See Geologic/Geotechnical Maps in Map Box

(DEIR Map 24)

Appendix 4.1

See Geologic/Geotechnical Maps in Map Box

(DEIR Map 25)

Appendix 4.1

See Geologic/Geotechnical Maps in Map Box

(DEIR Map 26)

Appendix 4.1

See Geologic/Geotechnical Maps in Map Box

(DEIR Map 27)

Appendix 4.1

See Geologic/Geotechnical Maps in Map Box

(DEIR Map 28)

Appendix 4.1

See Geologic/Geotechnical Maps in Map Box

(DEIR Map 29)

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

GEOLOGIC AND GEOTECHNICAL REPORT - Addendum No. 1

Revised Tentative Tract Map (Revised June 11, 2003)

Tentative Tract No. 53425
River Park Development
City of Santa Clarita, California

Prepared for:

Newhall Land
23823 West Valencia Boulevard
Valencia, California 91355

Job No: 03-1571-4
Dated June 30, 2003

TABLE OF CONTENTS

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

June 30, 2003 Job No: 03-1571-4

Newhall Land
23823 West Valencia Boulevard
Valencia, California 91355

Attention: Mr. Glenn Adamick

Subject: **GEOLOGIC AND GEOTECHNICAL REPORT - Addendum No. 1**
Review of Tentative Tract Map (Revised June 11, 2003)

Project: Tentative Tract 53425
River Park
City of Santa Clarita,
California

References: At end of text

Gentlemen:

This report presents our opinions on the existing geologic and geotechnical conditions on TT 53245 relative to the revised map dated June 11, 2003 and their effects on the proposed development. This report supplements and updates our April 4, 2003 report for TT 53425, hereinafter called "Previous Report", and the conclusions and recommendations presented therein are still applicable except where they are superseded in this report.

1.0 SCOPE OF WORK FOR REVISED TT 53425 (06/11/03)

1. Geologic/Geotechnical Review of revised Tentative Tract Map 53425 dated June 11, 2003.

2. Coordination with the Supervising Civil Engineer, Psomas.

3. Review of the geologic and geotechnical review sheet dated June 18, 2003 prepared for the City of Santa Clarita Transportation and Engineering Services by their reviewing

geologic and geotechnical consultant Arroyo Geotechnical. This review sheet is presented after the text portion of this report.

4. Geologic and geotechnical engineering analyses and preparation of Conclusions and Recommendations based on the existing site conditions and future use intended.

5. Geologic Preparation of the Revised Geologic/Geotechnical Maps, Revised Recommendations and Removal Maps, Revised Geologic Legend, Geotechnical Cross Sections (slope stability analysis), revised Cross Sections and this report.

2.0 BACKGROUND

Geologic and geotechnical aspects of the February 25, 2003 Tentative Map for TT 53425 were previously addressed in our report dated April 4, 2003. This report was reviewed and approved from a geologic and geotechnical standpoint within the City of Santa Clarita Transportation and Engineering Services review sheet dated June 18, 2003. This review sheet was prepared by Arroyo Geotechnical, the City of Santa Clarita geologic and geotechnical reviewing consultant, and is included after the text portion of this report. A revised Tentative Tract Map dated June 11, 2003 has been prepared by Psomas and is attached as the base map for our 100-Scale and 200-Scale Geologic/Geotechnical Maps (Sheets 1 through 4 of 5) as well as our Removal Map (**Plate I**).

3.0 REVISIONS TTM 53425

We have reviewed the latest revised Tentative Tract Map dated June 11, 2003. Lot locations and numbering designations have been revised relative to the original February 25, 2003 Tentative Tract Map design. A total of 439 Single Family Residential Lots, 5 Apartment Lots, 3 Recreation Lots, 2 Commercial Lots, 1 Private Street Lot, 67 Home Owners Association Lots and 28 Lots dedicated to the City of Santa Clarita. The 28 Lots dedicated to the City consist of 1 Park Site, 10 River Trail Lots, 2 Bridge Lots, 1 Water Quality Basin Lot, 8 Maintained Slope Lots and 6 Open Space Lots. In general only minor revisions to the proposed grades and cut-slopes are proposed relative to the original February 25, 2003 Tentative Map. Since relatively minor revisions to the cut-slopes greater than 25 feet in height are proposed, cut-slope designations have remained the same (CS-1 through CS-19). In general the cut-slope locations and orientations, gradients, slope heights, have remained the same with the exception of proposed cut-slopes CS-6 and CS-7. A discussion of these Cut-Slopes is presented in Section 8.1 Stability of Proposed Slopes and Proposed Grades as well as presented within the Summary of Cut-Slopes Table 1. The proposed bridge abutments for Newhall Ranch Road spanning the Santa Clara River are now included on the Tentative Map.

4.0 FIELD EXPLORATION

Additional field mapping was performed in the vicinity of the proposed bridge abutments and we have revised our Geologic/Geotechnical maps (Sheets 1-4 of 5) and Removal Map (**Plate I**) accordingly.

5.0 GEOLOGY

For specific details on the existing site geologic and geotechnical conditions see our previous report dated April 4, 2003.

6.0 GENERALLIZED GEOLOGIC/GEOTECHNICAL SUBSURFACE CONDITIONS AND SOIL PROPERTIES

The specific details of the site geologic/geotechnical subsurface conditions and soil properties are addressed within our previous report dated 4/4/03.

7.0 GENERAL CONSLUSIONS AND RECOMMENDATIONS

7.1 Feasibility of Development

Tentative Tract 53425 is feasible for development from the standpoint of geology/geotechnical conditions provided our recommendations are followed and implemented during construction. The conclusions and recommendations presented within our 4/4/03 report are still applicable, except where they are superceded in this report.

8.0 GENERAL DESIGN CONSIDERATIONS & RECOMMENDATIONS

8.1 Stability of Proposed Slopes

Since relatively minor revisions to the proposed cut-slopes greater than 25± feet in height are indicated on the revised Tentative Tract Map, cut-slope designations have remained the same (CS-1 through CS-19). We have revised Cross Sections 8-8', 9-9' and 22-22' (see **Plate II**) based on the new revised design grades presented on the Tentative Tract Map. The tentative tract map indicates designated Cut-Slopes, CS-6 and CS-7 within area A1 have been revised relative to the original 2/25/03 Tentative Tract Map. The revisions to these slopes are discussed below. We have revised our Summary of Landslides Table 1 and Summary of Cut-Slopes Table 2 relative to the revised Lot number designations.

Proposed Cut-Slope CS-6 was originally designed (2/25/03) to be a maximum 30 feet high south and west facing slope with a 2:1 gradient. This slope has been lowered 5 feet to 25 feet in height and the west-facing portion of the slope has been eliminated. Slope stability analysis performed on Cross Section 8-8' for Cut-Slope CS-6 within our previous 4/4/03 report indicate that a 30 feet high slope satisfies the City of Santa Clarita Factor of Safety requirement, therefore the current design (25 feet high) proposed Cut-Slope CS-6 is still considered to be grossly stable as designed. A Stability Fill is recommended for this slope due to the anticipated water seepage from the adjacent Castaic Lake Water Agency water pipeline located within Newhall Ranch Road.

Proposed Cut –Slope CS-7 has been lowered approximately 5 feet to 25 feet in height and has minor changes in orientation relative to the original 2/25/03 Tentative Map design. Previously performed slope stability analysis on Cross Sections 8-8' and 22-22' for the previous design indicate that this slope satisfies the City of Santa Clarita Factor of Safety requirement for slope stability. However, a Stability Fill is recommended for this slope due to anticipated seepage and surficial stability due to the adjacent CLWA pipelines located within Newhall Ranch Road.

8.2 Proposed Removals

Only minor vertical grade changes (0 to 5 feet) are indicated on the revised Tentative Tract Map, therefore our previous removal recommendations still apply. Due to the addition of the proposed bridge abutments for Newhall Ranch Road spanning the Santa Clara River, we have revised our Removal limits. For details, see the Removal Map **Plate I.**

9.0 LIMITATIONS

This report has been prepared for the exclusive use of Newhall Land and their design consultants for the specific site discussed herein. This report should not be considered transferable. Prior to use by others, we should be notified, as additional work may be required to update this report.

In the event that any modifications in the design or location of the proposed development, as discussed herein, are planned, the conclusions and recommendations contained in this report will require a written review by this firm with respect to the planned modifications.

In performing these professional services, we have used the degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineering geologists and geotechnical engineers practicing in this or similar localities.

The analyses and interpretations presented in this report have been based on the results of pertinent field and laboratory soil investigations. It should be recognized that subsurface conditions can vary in time and laterally and with depth at a given site. Our conclusions and recommendations are based on the data available and our interpretation of the data based on our experience and background. Hence, our **conclusions** and **recommendations** are **professional opinions** and are **not meant** to be a control of nature; therefore, **no warranty** is herein **expressed** or **implied.**

It should be noted that faulting is normally confined to the area immediately adjacent to a known fault, or within a few feet of the last fault movement. Regardless of what criteria is used however, absolute assurance against future fault displacement or strong ground motion cannot be obtained in tectonically active areas. New faults can form, as the orientation and magnitude of deformational forces in the earth's crust change with time. Therefore, the location of new breaks or ground motions during a seismic event cannot be located or anticipated.

This report may not be duplicated without the written consent of this firm.

This opportunity to be of service is appreciated. Please contact us if you would like to discuss this report further.

Respectfully submitted,

Allan E. Seward, CEG 246
Principal Engineering Geologist
President

Allan E. Seward
No. 246
CERTIFIED
ENGINEERING
GEOLOGIST

Baylor P. Gibson

Baylor P. Gibson, RCE 41568, RGE 2061
Principal Geotechnical Engineer

BAYLOR PRICE GIBSON III
#GE 2061
Exp. 12/31/03

The following attachments and appendices complete this report.

References	
City of Santa Clarita Geologic and Geotechnical Review Sheet (6/18/03)	
Summary of Landslides	Table 1
Summary of Cut-Slopes	Table 2

APPENDIX A - Maps and Cross Sections

• **Maps** (In pockets)	
Geologic and Geotechnical Maps (1"=100')	Sheets 2-4 of 5
Geologic and Geotechnical Map (1"=200')	Sheet 1 of 5
Geologic and Geotechnical Removal Map (1"=200')	**Plate I**
• **Cross Sections** (In pockets)	
Revised Geologic Cross Sections 1-1' to 4-4' and 7-7'	**Plate II**

Distribution: (4) Newhall Land
Attn: Glenn Adamick
(2) Psomas
1 - Attn: Jeannine Giem – Santa Clarita Office
1 - Attn: Matt Heideman – Costa Mesa Office
(3) City of Santa Clarita
(2) Castaic Lake Water Agency c/o Kennedy/Jenks Consultants
Attn: Lynn Takaichi
(1) Impact Sciences
Attn: Ms. Susan Tebo

REFERENCES

Reports by: Allan E. Seward Engineering Geology, Inc.

(1) **Geologic and Geotechnical Report**
Review of Tentative Tract Map (Dated February 25, 2003)
Tentative Tract 53425
River Park
City of Santa Clarita, California
Dated April 4, 2003 - JN: 03-1571-4

Published

Blake, T.F., 1998, FRISKSP - Version 4.00: A computer program for the probabilistic estimation of peak acceleration and uniform hazard spectra using 3-D faults as earthquake sources: Thomas F. Blake, Computer Services & Software.

Blake, T.F., 1999, EQSEARCH - Version 3.00: A computer program for the estimation of peak horizontal acceleration from California historical earthquake catalogs: Thomas F. Blake, Computer Services & Software.

Boore, D.M., Joyner, W.B., and Fumal, T.E., 1997, Equations for estimating horizontal response spectra and peak acceleration from western North American earthquakes: A summary of recent work: Seismological Research Letters, v. 68, no. 1, p. 128-153.

Campbell, K.W., 1997, Empirical near-source attenuation relationships for horizontal and vertical components of peak ground acceleration, peak ground velocity, and pseudo-absolute acceleration response spectra: Seismological Research Letters, v. 68, no. 1., p. 154-179.

CDCDMG, 1995, Checklists for the review of geologic/seismic reports for California public schools, hospitals, and essential services buildings: CDMG Note 48, 3 p.

CDCDMG, 1997, Guidelines for evaluating and mitigating seismic hazards in California: California Department of Conservation Division of Mines and Geology Special Publication 117.

CDCDMG, 1998, Seismic Hazard Zones Map for the Newhall Quadrangle Released February 1, 1998, California

CDCDMG, 1997, Seismic Hazard Evaluation of the Newhall 7.5-Minute Quadrangle, Los Angeles County, California: Open-File Report 97-11.

Dibblee, T.W., Jr., 1996, Geologic Map of the Newhall Quadrangle, Los Angeles County, California: Dibblee Geological Foundation, Map DF-56.

Golden Software, Inc., 1998, Grapher^{TM}, Golden Software, Inc.

REFERENCES

Hart, E.W., 1997, Fault-rupture hazard zones in California: California Division of Mines and Geology Special Publication 42, 24 p.

Jennings, C.W., 1988, Fault map of California with locations of volcanoes, thermal springs, and thermal wells: California Division of Mines and Geology, Geologic Data Map No. 1, 4th Printing.

Kew, W.S.W., 1924, Geology and oil resources of a part of Los Angeles and Ventura Counties, California: U.S. Geological Survey Bulletin 753, 202 p.

Martin, G.R., and Lew, M., 1999, Recommended procedures for implementation of DMG Special Publication 117 - Guidelines for analyzing and mitigating liquefaction hazards in California: Southern California Earthquake Center, 63p.

Morton, D.M., 1976, Reconnaissance surficial geologic maps of the Newhall, Oat Mountain, Santa Susana and Val Verde 7.5' Quadrangles, Los Angeles and Ventura Counties, southern California: U.S. Geological Survey Open File Map 76-211.

Peabody, A.W., 1969, Principles of cathodic protection, Chapter 5, NACE Corrosion Course: National Academy of Corrosion Engineers

Petersen, M.D., Bryant, W.A., Cramer, C.H., Cao, T., Reichle, M.S., Frankel, A.D., Lienkaemper, J.J., McCrory, P.A., and Schwartz, D.P., 1996, Probabilistic seismic hazard assessment for the State of California: California Department of Conservation Division of Mines and Geology Open-File Report 96-08, 33 p.

Real, C.R., Toppozada, T.R., and Parke, D.L., 1978, Earthquake epicenter map of California, showing events from 1900 through 1974 equal to or greater than magnitude 4.0 or intensity V: California Division of Mines and Geology Map Sheet 39.

Robson, S.G., 1972, Water-Resources Investigation Using Analog Model Techniques in the Saugus-Newhall Area, Los Angeles County, California.

Sadigh, K., Chang, C.Y., Egan, J.A., Makdisi, F., and Youngs, R.R., 1997, Attenuation relations for shallow crustal earthquakes based on California strong motion data: Seismological Research Letters, v. 68, no. 1, p. 180-189.

Stein, R.S., and Yeats, R.S., 1989, Hidden earthquakes, Scientific American, v. 260, no. 6, p. 48-57.

Stewart, J.P. et al., 1994, Preliminary report on the principal geotechnical aspects of the January 17, 1994 Northridge Earthquake: EERC, U.C. Berkeley, Report No. UCB/EERC-94/08, 245 pages.

REFERENCES

Treiman, J., and Saul, R., 1986, The mid-Pleistocene inception of the Santa Susana Mountains: in Ehlig, P.L. (trip leader): Neotectonics in the area between the central and western Transverse Ranges, southern California: Geological Society of America Field Trip Number 10, p. 7-12.

Uniform Building Code (UBC), 1997.

Wells, D.L., and Coppersmith, K.J., 1994, New empirical relationships among magnitude, rupture length, rupture area, and surface displacement: Bulletin of the Seismological Society of America, v. 84, no. 4, p. 974-1002.

Winterer, E.L., and Durham, D.L., 1962, Geology of southeastern Ventura Basin, Los Angeles County, California: U.S. Geological Survey Professional Paper 334-H, p. 275-366.

Youd, T.L, and Idriss, I.M., eds., 1997, Proceedings of the NCEER workshop on evaluation of liquefaction resistance of soils: National Center for Earthquake Engineering Research Technical Report NCEER-97-0022, 276 p.

Ziony, J.I., and Jones, L.M., 1989, Map showing late Quaternary faults and 1978-84 Seismicity of the Los Angeles region, California: Miscellaneous Field Studies Map, MF 1964, scale 1:250,000.

SUMMARY OF LANDSLIDES

LANDSLIDE NO.	SHEET NO.	MITIGATION
1	2 of 5	It is recommended that this landslide be **completely removed** and reconstructed to its approximate original configuration using Certified Engineered Fill utilizing a keyway and backdrains designed by the soils engineer. The design of this keyway will be based on the configuration of the future removal. It is anticipated that the removal depth will range up to 35 feet. In areas to receive fill the removal bottoms should be surveyed in order to document the removal for future reference.
2 and 3	2 of 5	These landslides are located partially within existing cut-slopes and will be subject to periodic maintenance. These landslides are located in an area where they do not impact the proposed development and are safe for the use intended. At the completion of grading, these landslides will be designated as **Restricted Use Areas** on the Final Map.
4	2 of 5	Located in the vicinity of Lots 83 and 84 within a proposed fill area. It is recommended that this landslide be **completely removed** under the continuous observation of the Project Engineering Geologist. It is anticipated that the removal depth will range up to 25 feet below native grade. In areas to receive fill, the removal bottoms should be surveyed in order to document the removal for future reference and/or later additional grading.
5a	3 of 5	This landslide is located north of Newhall Ranch Road and was buttressed during the grading and construction of the CLWA facility and associated water line. This landslide is located in an area where it does not impact the proposed development and is safe for the use intended. At the completion of grading, this landslide will be designated as a **Restricted Use Area** on the **Final Map**.

SUMMARY OF LANDSLIDES

LANDSLIDE NO.	SHEET NO.	MITIGATION
5b	3 of 54	This large landslide is located south of Newhall Ranch Road. Stability calculations performed at Cross Section 9-9' indicate this landslide at the proposed Tentative Map grading configuration does not satisfy the City of Santa Clarita requirements for factor of safety. Due to the large size of this landslide, mitigation options are provided. Option 1 - construct a designed buttress utilizing a 150-foot wide by 45-foot deep keyway (at the toe). Option 2 – Construct a designed shear keyway located within the landslide mass. This shear keyway would be based on additional subsurface exploration and analysis. Option 3 – redesign such that proposed structures are not proposed on this landslide (avoidance). At the completion of grading, this landslide would be designated as a **Restricted Use Area** on the Final Map. Option 4 – completely remove the landslide and replace it with certified engineered fill. In areas to receive fill, the removal bottoms should be surveyed in order to document the removal for future reference. If complete removal is performed, it is anticipated that removals will range up to 106 feet deep.
6	3 of 5	This landslide is located east of Landslide Qls-5b. Stability evaluation on Cross Section 10-10' indicates that previous grading for Newhall Ranch Road is grossly stable but the landslide mass south of Newhall Ranch Road does not satisfy the City of Santa Clarita factor of safety requirement. This area will be subject to deformation and settlement in the event that the landslide moves. A park trail with grading is currently proposed. It is recommended that grading be performed such that the existing topography is only minimally altered. It is recommended that this trail not be paved and that minimal watering be performed. At the completion of grading, this landslide would be designated as a **Restricted Use Area** on the **Final Map**.
7	2 of 5	This landslide is located in the vicinity of Lot 130 in a proposed fill area. It is recommended that this landslide be **completely removed** under the continuous observation of the Project Engineering Geologist. The removal bottoms should be surveyed in order to document the removal for future reference and/or later additional grading. It is anticipated that the removal will range up to 24 feet.

SUMMARY OF LANDSLIDES

LANDSLIDE NO.	SHEET NO.	MITIGATION
8	3 of 5	This landslide is located beneath proposed Santa Clarita Parkway mostly within a proposed fill area. It is recommended that this landslide be **completely removed** under the continuous observation of the Project Engineering Geologist. The removal bottoms should be surveyed in order to document the removal for future reference and/or later additional grading. It is anticipated that the removal will range up to 24 feet.
9	3 of 5	This landslide is located in a proposed cut and proposed fill area. It is recommended that this landslide be **completely removed** under the continuous observation of the Project Engineering Geologist. The removal bottoms should be surveyed in order to document the removal for future reference and/or later additional grading. It is anticipated that the removal will range up to 45 feet.
10	3 of 5	This landslide is located in a proposed cut and proposed fill area. It is recommended that this landslide be **completely removed** under the continuous observation of the Project Engineering Geologist. The removal bottoms should be surveyed in order to document the removal for future reference and/or later additional grading. It is anticipated that the removal will range up to 35 feet.
11	3 of 5	This landslide is located in proposed cut and proposed fill areas in the vicinity of proposed cut-slopes CS-13 and CS-14. Slope stability analysis on cross section 23-23' indicates this slope/area does not satisfy the city of Santa Clarita factor of safety requirement for slope stability. A remedial buttress fill utilizing a 150 feet wide keyway is required to obtain slope stability factor of safety requirement. Prior to construction of the remedial buttress, it is recommended that this landslide be **completely removed.** It is anticipated that the removal will range up to 40 feet. In areas to receive fill, the removal bottoms should be surveyed in order to document the removal for future reference.
12	3 of 4	It is recommended that the portions of this landslide located beneath the proposed bike trail be **completely removed** during the grading operations and replaced with Certified Engineered Fill. It is anticipated that the removal will range up to 24 feet. At the completion of grading, the remaining portion of this landslide will be designated as a **Restricted Use Area** on the **Final Map**.

SUMMARY OF LANDSLIDES

LANDSLIDE NO.	SHEET NO.	MITIGATION
13	4 of 5	This landslide is located in the vicinity between proposed cut-slopes CS-16 and CS-19. A portion of this landslide is located in an area where grading is proposed. It is recommended that the portion of this landslide within the graded area be **removed** under the continuous observation of the Project Engineering Geologist prior to placing certified engineered fill. It is anticipated that the removal will range up to 35 feet. In areas to receive fill, the removal bottoms should be surveyed in order to document the removal for future reference and/or later additional grading.
14	4 of 5	This landslide is located in the vicinity of proposed Cut-Slope CS-19. It is recommended that this landslide be **completely removed** under the continuous observation of the Project Engineering Geologist. The removal bottoms should be surveyed in order to document the removal for future reference and/or later additional grading. It is anticipated that the removal will range up to 24 feet.

SUMMARY OF CUT-SLOPES

Proposed Cut-Slope CS-1

Location: Sheet 2 of 5 – Vicinity of Lot 525 within Area D

Direction Slope Faces: Semicircular facing west to southwest to south

Slope Parameters: 120± feet high with a 2:1 gradient

Cross Sections: 1-1', 2-2'

Anticipated Geologic Conditions: West facing portion - TQs bedrock anticipated to be dipping 4 - 15° towards the south which is neutral to the proposed slope face; Southwesterly facing portion – TQs bedding anticipated to be oriented such that the bedding planes are dipping out of the proposed slope face. Slope stability analysis of this slope indicates this slope has a safety factor greater than the City of Santa Clarita requirements for slope stability and therefore **grossly stable as designed.**

Mitigation Measures: **Not required**

Proposed Cut-Slope CS-2

Location: Sheet 2 of 5 – Vicinity of Lot 524 within Area D

Direction Slope Faces: Southwest

Slope Parameters: 60± feet high with a 2:1 gradient

Cross Sections: 4-4', 28-28'

Anticipated Geologic Conditions: The eastern portion of the slope is anticipated to expose landslide (Qls-1) material within the proposed cut-slope face; **grossly unstable** due to fractured and broken nature of the landslide material. The western portion of the slope is anticipated to expose Saugus Formation bedrock bedding planes dipping out of the proposed slope face. Slope stability analysis performed on Cross Sections 4-4' and 28-28' indicate this slope has a safety factor greater than the City of Santa Clarita requirements for slope stability and therefore **grossly stable as designed.**

Mitigation Measures: It is recommended that this landslide be **completely removed** from the proposed cut-slope face and replaced using Certified Engineered Fill utilizing a keyway and backdrains designed by the soils engineer. The design of this keyway will be based on the configuration of the future removal. It is anticipated that the removal depth will range up to 35 feet. In areas to receive fill the removal bottoms should be surveyed in order to document the removal for future reference. A Restricted Use Area has been recommended in order to permanently limit groundwater levels to those found to be necessary for stability. Within this Restricted Use Area, it is recommended that no permanent piped water be allowed above elevation 1250 on the existing natural ridge north of Lot 513.

SUMMARY OF CUT-SLOPES

Proposed Cut-Slope CS-3

Location: Sheet 2 of 5 - Lot 524 just westerly of the existing water tank
Direction Slope Faces: South
Slope Parameters: 55± feet high with a 2:1 gradient
Cross Sections: 29-29'
Anticipated Geologic Conditions: TQs bedding anticipated to be dipping out of the proposed slope face. Slope stability analysis indicates this slope has a safety factor greater than the City of Santa Clarita requirements for slope stability. **Grossly stable as designed.**
Mitigation Measures: **No mitigation required**.

Proposed Cut-Slope CS-4

Location: Sheet 2 of 5 - Northeast of Lot 524 just westerly of the existing water tank
Direction Slope Faces: Westerly
Slope Parameters: 35± feet high with a 2:1 gradient
Cross Sections: None
Anticipated Geologic Conditions: TQs bedrock is anticipated to be oriented neutral to the proposed cut-slope face. **Grossly stable**
Mitigation Measures: **No mitigation required**. A Restricted Use Area has been recommended in order to permanently limit groundwater levels to those found to be necessary for stability. Within this Restricted Use Area it is recommended that no permanent piped water be allowed above elevation 1250 on the existing natural ridge north of Lot 513.

Proposed Cut-Slope CS-5

Location: Sheet 2 of 5 – Vicinity of Lots 60-73 within Area A1
Direction Slope Faces: Southerly
Slope Parameters: 25± feet high with a 2:1 gradient
Cross Sections: None; see section 8-8' for cut-slope CS-6 for similar configuration
Anticipated Geologic Conditions: TQs bedrock anticipated to be dipping out of the proposed slope face. Slope stability analysis on cross section 8-8', which depicts similar geologic conditions, indicates this slope satisfies the City of Santa Clarita factor of safety requirement for slope stability. However, due to anticipated seepage from the existing adjacent CLWA pipelines, this slope may be subject to surficial instability. **Grossly stable but surficially unstable**
Mitigation Measures: **Stability fill required** utilizing a 20 feet wide keyway for the south facing portion of the slope.

SUMMARY OF CUT-SLOPES

Proposed Cut-Slope CS-6

Location: Sheet 2 of 5 – Vicinity of Lots 158-176 within Area A1

Direction Slope Faces: South

Slope Parameters: 25± feet high with a 2:1 gradient

Cross Sections: 8-8'

Anticipated Geologic Conditions:

- West facing portion - TQs bedrock anticipated to be oriented neutral to the proposed cut-slope face with the exception of a small portion of the slope which may expose landslide (Qls-5b) material. The portion of the slope exposing the TQs bedrock is anticipated to be **grossly stable**; the portion of the slope exposing the landslide material will be **grossly unstable**.
- South facing portion - TQs bedrock anticipated to be dipping out of the proposed slope face. Slope stability analysis performed on the previous design (4/4/03) indicates this slope will satisfy the City of Santa Clarita factor of safety requirement for slope stability. However, due to potential seepage from the existing adjacent CLWA pipelines, this slope may be subject to surficial instability. **Grossly stable but surficially unstable**

Mitigation Measures: All landslide material exposed within the slope will require complete removal and replacement with certified engineered fill. **Stability fill required** utilizing a 20 feet wide keyway for the south-facing portion of the proposed cut-slope. See landslide summary (Table 1) for mitigation options for landslide Qls-5b.

Proposed Cut-Slope CS-7

Location: Sheet 2 of 5 – Vicinity of Lots 181-194 within Area A1

Direction Slope Faces: Southeast

Slope Parameters: 25± feet high with a 2:1 gradient

Cross Sections: 8-8', 22-22'

Anticipated Geologic Conditions: TQs bedrock anticipated to be dipping out of the proposed cut-slope face with the exception of a small portion of the slope, which may expose landslide (Qls-5b) material. Slope stability analysis performed for the previous design of this cut-slope, at 30 feet high, indicates this slope will satisfy the City of Santa Clarita factor of safety requirement for slope stability. However, due to anticipated seepage from the existing adjacent CLWA pipelines, this slope may be subject to surficial instability. **Grossly stable but surficially unstable**

Mitigation Measures: All landslide material exposed within the slope will require complete removal and replacement with certified engineered fill. **Stability fill**

required utilizing a 20 feet wide keyway for the remaining portion of the proposed cut-slope exposing TQs material. See landslide summary (Table 1) for mitigation options for landslide Qls-5b.

Proposed Cut-Slope CS-8

Location: Sheet 3 of 5 – Vicinity of Lots 276 and 277 Area A2
Direction Slope Faces: Semicircular – south to east to northeast
Slope Parameters: 35± feet high with a 2:1 gradient
Cross Sections: 30-30'
Anticipated Geologic Conditions: Anticipated to expose Quaternary Terrace Deposits over TQs bedrock dipping up to 12 degrees out of the south to southeast facing portion of the proposed slope face and oriented neutral to the east facing portion of the proposed slope face. Quaternary Terrace Deposits are subject to surficial instability due to their friable nature. Slope stability analysis of this slope indicates this slope satisfies the City of Santa Clarita factor of safety requirement for slope stability. **Grossly stable but surficially unstable**
Mitigation Measures: **Stability fill required** utilizing a 25 feet wide keyway.

Proposed Cut-Slope CS-9

Location: Sheet 3 of 5 – Vicinity of Santa Clarita Parkway and Lot 260 Area A2
Direction Slope Faces: Westerly
Slope Parameters: 32± feet high with a 2:1 gradient
Cross Sections: None
Anticipated Geologic Conditions: Anticipated to expose crudely bedded horizontally oriented Quaternary Terrace Deposits. Quaternary Terrace Deposits are subject to surficial instability due to their friable nature. **Grossly stable but surficially unstable**
Mitigation Measures: **Stability fill required.**

Proposed Cut-Slope CS-10

Location: Sheet 3 of 5 – Lots 388 – 397 Area B
Direction Slope Faces: Southeast
Slope Parameters: 50± feet high with a 2:1 gradient
Cross Sections: 16-16', 17-17', 18-18' & 19-19'
Anticipated Geologic Conditions: Anticipated to expose Quaternary Terrace Deposits over TQs bedrock dipping neutral to 3 degrees out of the proposed slope face. Quaternary Terrace Deposits are subject to surficial instability due to their

SUMMARY OF CUT-SLOPES

friable nature. Slope stability analysis of this slope performed on Cross Sections 16-16', 17-17' and 18-18' indicates this slope satisfies the City of Santa Clarita factor of safety requirement for slope stability. **Grossly stable but surficially unstable**
Mitigation Measures: **Stability fill required.**

Proposed Cut-Slope CS-11

Location: Sheet 3 of 5 – South of Lots 466 and 467 within Area B
Direction Slope Faces: Southeast
Slope Parameters: 70± feet high with a 2:1 gradient
Cross Sections: 11-11'
Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping out of the proposed slope face. Slope stability analysis of this slope indicates this slope does not satisfy the City of Santa Clarita factor of safety requirement for slope stability. **Grossly unstable.**
Mitigation Measures: **Buttress fill required** utilizing an 80 feet wide keyway.

Proposed Cut-Slope CS-12

Location: Sheet 3 of 5 – Vicinity of Lots 403-420 within Area B
Direction Slope Faces: South to southeast
Slope Parameters: 30± feet high with a 2:1 gradient
Cross Sections: 11-11', 27-27'
Anticipated Geologic Conditions: Anticipated to expose landslide (Qls-9) material within the proposed slope face in the vicinity of Lots 407-414 and TQs bedrock dipping out of the proposed slope face in the vicinity of Lots 415-420. Subsurface exploration indicates that perched ground water conditions exist in this vicinity. Slope stability analyses performed on Cross Section 11-11' indicate that this slope satisfies the City of Santa Clarita factor of safety requirement for slope stability. Thus, proposed cut-slope CS-12 is considered to be **grossly stable but surficially unstable** due to anticipated surficial instability due to the anticipated elevated ground water conditions.
Mitigation Measures: **Remove landslide Qls-9** and replace with certified engineered fill. The remaining bedrock portions will require a Stability fill utilizing a 20 feet wide keyway.

Proposed Cut-Slope CS-13

Location: Sheet 4 of 5 – Vicinity of Lots 475 and 420- 429 – Area B
Direction Slope Faces: South to southeast

SUMMARY OF CUT-SLOPES

Slope Parameters: 50± feet high with a 2:1 to 3:1 gradient

Cross Sections: 11-11', 14-14' & 23-23'

Anticipated Geologic Conditions: Anticipated to expose TQs Bedrock dipping out of the proposed cut-slope face. Landslide Qls-11 material is anticipated to be exposed within the eastern portion of the slope. Subsurface exploration indicates perched ground water conditions exist in this vicinity. Slope stability analysis indicates the western portion of this slope satisfies the City of Santa Clarita factor of safety requirement and is considered grossly stable as designed, but potentially **surficially unstable** due to expected surficial instability due to the anticipated perched ground water conditions. Slope stability analysis performed on the eastern portion of this slope indicates this portion of the slope does not satisfy the factor of safety requirement for slope stability. This portion of the slope is considered **grossly unstable** as designed.

Mitigation Measures: Remove entire landslide Qls-11. **Stability fill required** utilizing a 20 to 30 feet wide keyway is proposed for the western portion of this slope. The eastern portion requires **buttress fill** utilizing a 150 feet wide and 24 feet deep keyway constructed at the toe of proposed cut-slope CS-14 in the vicinity of the proposed bike trail. This designed keyway and backcut at the toe of proposed cut-slope CS-14 encompasses the eastern portion of cut-slope CS-13.

Proposed Cut-Slope CS-14

Location: Sheet 4 of 5 – East of Lot 475 adjacent to the Pedestrian/Bike Trail easement.

Direction Slope Faces: Southeast

Slope Parameters: 25± feet high with a 2:1 gradient

Cross Sections: 23-23'

Anticipated Geologic Conditions: Anticipated to expose landslide Qls-11 material within the proposed cut-slope face. The underlying geologic structure of the Saugus Formation bedrock is dipping towards the proposed cut-slope face. Perched groundwater conditions were encountered within bucket auger boring BA-6. Slope stability analysis of this slope indicates this slope does not satisfy the City of Santa Clarita factor of safety requirement for slope stability. **Grossly unstable.**

Mitigation Measures: Remove entire landslide Qls-11 and construct a **Buttress fill** utilizing a 150 feet wide keyway starting from the toe of proposed cut-slope CS-14. This buttress fill encompasses portions of proposed cut-slope CS-13.

SUMMARY OF CUT-SLOPES

Proposed Cut-Slope CS-15

Location: Within the CLWA property north of Newhall Ranch Road Sheets 3 and 4 of 5

Direction Slope Faces: Southeast

Slope Parameters: 95± feet high with a 2:1 gradient

Cross Sections: 11-11', 12-12', 13-13' & 14-14'

Anticipated Geologic Conditions: Quaternary Terrace Deposits over TQs bedrock. The TQs bedrock is anticipated to be dipping out of the proposed cut-slope face. Subsurface exploration indicates perched ground water conditions exist in this vicinity. Slope stability analysis of this slope indicates this slope does not satisfy the City of Santa Clarita factor of safety requirement for slope stability. **Grossly unstable**

Mitigation Measures: **Buttress fill required** utilizing a designed keyway. This keyway is proposed to be 40 feet wide along the western portion and 95 feet wide along the eastern portion of the slope.

Proposed Cut-Slope CS-16

Location: Sheet 4 of 5 – North of Lot 521 in the vicinity of the proposed debris basin within Area C.

Direction Slope Faces: Southeast

Slope Parameters: 50± feet high with a 2:1 gradient

Cross Sections: 15-15', 20-20', & 31-31'

Anticipated Geologic Conditions: An anticlinal axial trace within the Saugus Formation bedrock is anticipated to be exposed within the northern portion of the proposed cut-slope face. South of the axial trace, the TQs bedrock is anticipated to be dipping out of the proposed slope face. North of the axial trace, the TQs bedrock is anticipated to be dipping into the proposed slope face. Local deformation including faulting and fracturing may be present within the core of the anticline axis and may be subject to surficial failures. Quaternary Terrace Deposits are also anticipated to be exposed within the proposed cut-slope and are also subject to surficial failures. Slope stability analysis utilizing rapid drawdown condition indicates this slope satisfies the City of Santa Clarita factor of safety requirement for slope stability and is **grossly stable but surficially unstable.**

Mitigation Measures: **Stability fill required** utilizing a 25 feet wide keyway.

SUMMARY OF CUT-SLOPES

Proposed Cut-Slope CS-17

Location: Sheet 4 of 5 – South of Newhall Ranch Road within open space Lot 515

Direction Slope Faces: Southeast

Slope Parameters: 65± feet high with a 2:1 gradient

Cross Sections: 15-15'

Anticipated Geologic Conditions: Anticipated to expose TQs bedrock dipping out of the proposed slope face as well as a fill over bedrock situation. Slope stability analysis of this slope indicates this slope does not satisfy the City of Santa Clarita factor of safety requirement for slope stability. **Grossly unstable.**

Mitigation Measures: **Buttress fill required** utilizing a 30 feet wide keyway.

Proposed Cut-Slope CS-18

Location: Sheet 4 of 5 – Vicinity of Lot 509 within Area C.

Direction Slope Faces: South

Slope Parameters: 28± feet high with a 2:1 gradient

Cross Sections: None

Anticipated Geologic Conditions: An anticlinal axial trace within the Saugus Formation bedrock is anticipated to be exposed within the western portion of the proposed cut-slope face. South of the axial trace, the TQs bedrock is anticipated to be dipping out of the proposed slope face. North of the axial trace, the TQs bedrock is anticipated to be dipping into the proposed slope face. Local deformation including faulting and fracturing may be present within the core of the anticline axis and may be subject to surficial failures. Quaternary Terrace Deposits are also anticipated to be exposed within the upper portion of the proposed cut-slope and are also subject to surficial failures. **Grossly stable but surficially unstable.**

Mitigation Measures: **Stability fill required** utilizing a 20 feet wide keyway.

Proposed Cut-Slope CS-19

Location: Sheet 4 of 5 –Lot 520 within Area C

Direction Slope Faces: South to southeast

Slope Parameters: 30± feet high with a 2:1 gradient

Cross Sections: 24-24'

Anticipated Geologic Conditions: Anticipated to expose Quaternary Terrace Deposits over TQs bedrock dipping into the proposed slope face. Quaternary Terrace Deposits are subject to surficial instability due to their friable nature. Landslide Qls-14 anticipated to be exposed within the lower portion of the proposed cut-slope. Potential minor faults and fractures may be present due to a mapped minor fault zone located in this vicinity. Lower portion of the cut-slope **grossly unstable** due to the presence of landslide material and **surficially unstable** due to the Qt deposits and potential minor fault zone located in this vicinity.

Mitigation Measures: Remove landslide Qls-14 and construct a **Stability fill.**

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Santa Clarita, CA 91355
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CITY OF SANTA CLARITA
TRANSPORTATION AND ENGINEERING SERVICES

Geology/Geotechnical Engineering Review Sheet

Project Address:	Vacant Land		
Tentative Tract:	53425 River Park	**Lots:**	524
Owner/Developer:	Newhall Land		
Geologist:	Allen E. Seward, Inc.	**Geology Report Dated:**	4/4/03
Soils Engineer:	Allen E. Seward, Inc.	**Soils Report Dated:**	4/4/03
Review Sheet No.:	1	**Review Date:**	6/18/03
City Representative:	Hoon Hahn		

Recommended Action: *Report approved from a geotechnical standpoint for environmental document*

The consultant has produced a comprehensive document related to this project. On several pages of Volume I it has been indicated that additional recommendations will be forthcoming at the grading plan stage. That is acceptable. In addition we offer several comments to be addressed at the grading plan stage. They are:

1. In several cross-sections it is called for slope toe protection at the edge of the Santa Clara River. Please provide recommendations and details.
2. On page 25 of Volume I it is stated fill slopes were analyzed under rapid draw down conditions. Where are the calculations?
3. The liquefaction evaluation, which has been provided, is for the uphill property. Describe the liquefaction potential for the Santa Clara River bed with high water conditions.
4. Page C-5 of Volume I stated no lateral spreading is expected, as there is no free-face toward which liquefied soils could move. If there is a liquefaction potential in the riverbed, doesn't that create a weakened free-face?

Leonard T. Evans Jr.

Leonard T. Evans, Jr., Ph.D., GE 302
Vice President

LEONARD T. EVANS, JR.
No. 302
Exp. 3/31/05

Appendix A

Appendix 4.1

See Geologic/Geotechnical Maps in Map Box

(DEIR Maps 7 through 10)

Appendix 4.1

See Geologic/Geotechnical Maps in Map Box

(DEIR Map 30)

Appendix 4.1

See Geologic/Geotechnical Maps in Map Box

(DEIR Map 31)

APPENDIX 4.2

Flood

FLOOD
TECHNICAL REPORT

For:
Riverpark

Prepared for:
Impact Sciences, Inc.
30343 Canwood Street
Suite 210
Agoura Hills, CA 91301

Prepared by:
PSOMAS
11444 W. Olympic Blvd
Suite 750
West Los Angeles, CA 90064
Tel: 310-954-9700
Fax: 310-954-3777

Date: February 2004

Psomas Job No: 1VAL021505

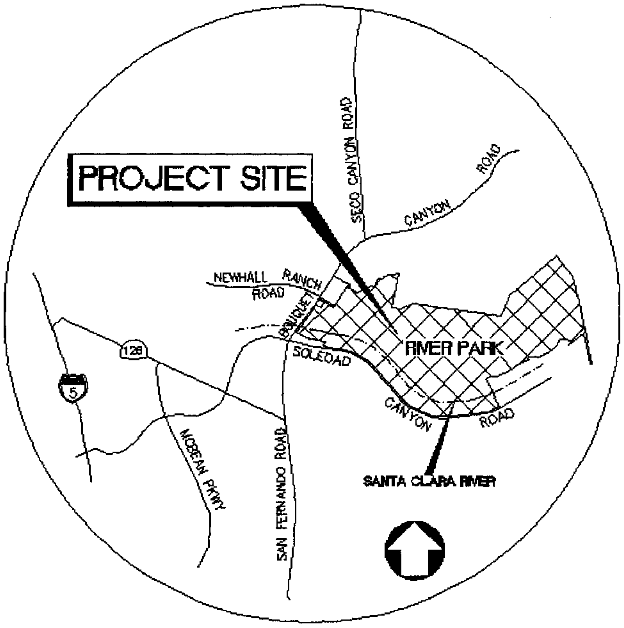
TABLE OF CONTENTS

1 INTRODUCTION

1.1 PROJECT DESCRIPTION

1.1.1 Project Site

The Riverpark project lies in the center of the City of Santa Clarita, and within the watershed of an unnamed and roughly 835-acre tributary of the 1,634 square-mile Santa Clara River Basin Watershed (see Vicinity Map). The Santa Clara River flows through and adjacent to the project. The project site is located north of Soledad Canyon Road, east of Bouquet Canyon Road, and west of Golden Valley Road.



VICINITY MAP
NOT TO SCALE

The site is currently vacant except for a small portion that is being used by a contractor as a temporary storage yard with several temporary buildings. The proposed Riverpark project lies within the Valley Center Concept ("VCC") area of the City's General Plan, which specifically outlines the type and intensity of development in the core of the City of Santa Clarita. The proposed project consists of 744 apartment units, 439 single-family detached units, and a maximum of 40,000 square feet of retail commercial. Site preparation will include a cut and fill grading operation totaling 5.2 million cubic yards for both project development and construction of master-planned roadways (Newhall Ranch Road and Santa Clarita Parkway) within the project boundaries. Additional remedial grading is proposed. Earthwork is proposed to be balanced onsite. The project also includes buried bank stabilization, erosion protection, and the construction of the Newhall Ranch Road/Golden Valley Road Bridge over the Santa Clara River. The bridge would include abutments and bank stabilization on the north and south side of the bridge, as well as piers within the River. The project does not include the Santa Clarita Parkway Bridge, which is part of the City's General Plan and is expected to be constructed in the future; however, this latter bridge is included in the cumulative analysis because it is a City-planned improvement and much of its construction would occur within the project site boundaries.

1.1.2 Proposed Improvements

The proposed improvements on the project site that would provide flood and erosion control, and which would occur in and adjacent to the Santa Clara River, include buried bank stabilization, and erosion protection. The Newhall Ranch Road/Golden Valley Road Bridge over the Santa Clara River would also affect the hydraulics of the river.

At project buildout, runoff from the seven drainage areas would continue to flow through the site, but would be channeled through a storm system that would be constructed from the developed upland areas of the site down to the Santa Clara River. As required in the Los Angeles County Department of PublicWorks memorandum entitled, "Level of Flood Protection and Drainage Protection Standards," all on-site drainage systems carrying runoff from developed areas will be designed for the 25-year Design Storm (Urban Flood), while storm drains under major and secondary highways, open channels (main channels), debris carrying systems, and sumps will be designed for the 50-year Capital Flood. The City of Santa Clarita conforms to these Los Angeles County guidelines.

Runoff through the site would be controlled through a combination of grading, storm drainpipes, channels, catch basins, outlet structures, and bank stabilization along the river. The proposed drainage improvements are described below and their locations are illustrated in **Figure 1, Drainage Concept Map**, which also illustrates the post-development drainage patterns for the project site.

Project facilities are described below:

- *Storm Drains*
  Storm drains (pipes and reinforced concrete boxes) designed for either the 25-year or 50-year Capital storm would consist of both privately (Homeowner's Associations, Assessment Districts etc.)- and publicly (City of Santa Clarita and County of Los Angeles)-maintained systems. The minimum publicly-maintained mainline pipe size would be 18-inch connector pipes for clear flows.

- *Open Channels*
  Small open channels would consist of rectangular and trapezoidal concrete channels and would be designed for either the 25-year or 50-year Capital storm, depending on the source of the runoff. The channels sized for the 50-year Capital storm will have greater capacity than those sized for the 25-year storm.

- *Low Flow Pipes and Outlets*
  To reduce pollution impacts from the low flow runoff, a series of pipes and outlets will be provided to intercept first flush runoff from paved project areas. Pollutants expected to be generated on the project site, their potential water quality impacts, and water quality control are addressed in the Water Quality Technical Report.

- *Catch Basins*
  Catch basins would be provided to intercept flows beyond the 10- and 25-year storms and at strategic locations to minimize flooding at street intersections and at sump locations.

- *Debris Basins*
  To reduce debris being discharged through and from the site, debris basins are proposed to intercept flows from undeveloped upland areas prior to their discharge into the on-site storm system.

- *Energy Dissipaters*
  To reduce storm flow velocities and to prevent erosion at stormwater discharge points into the river, energy dissipaters consisting of either rip-rap or larger standard impact type energy dissipaters would be constructed wherever necessary at storm system outlets into the river. These energy dissipaters would slow the rate of flow of runoff into the river in order to prevent erosion of the stream channel.

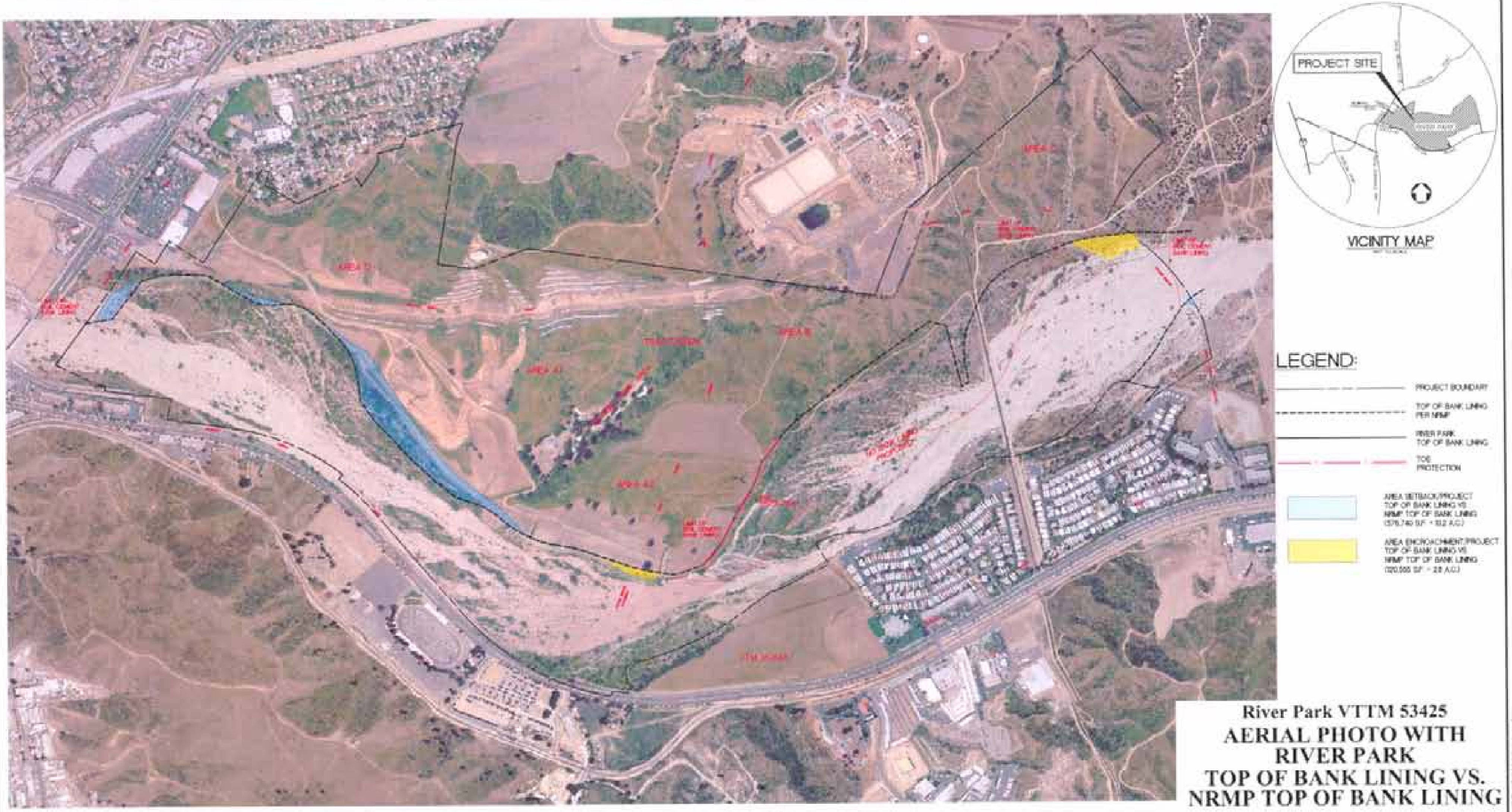
- *Bank Stabilization*
  The project would include bank stabilization along the Santa Clara River totaling approximately 6,000 linear feet for residential, park and commercial project development (not including approximately 1,500 feet of toe protection [e.g. A-Jacks™, soil cement or equivalent]), and approximately 3,000 linear feet to allow for the construction of Newhall Ranch Road.

- The Newhall Ranch Road/Golden Valley Road bridge, including bridge abutments (on both the north and south side), and piers is also analyzed.

Improvements along the Santa Clara River were analyzed and approved in the Natural River Management Plan (NRMP). Differences between the project improvements and those permitted under the NRMP are illustrated in **Figure 2, Bank Stabilization.**

Figure 1, Drainage Concept Map

(Please see Map Box for Drainage Concept Map)



River Park VTTM 53425

AERIAL PHOTO WITH RIVER PARK TOP OF BANK LINING VS. NRMP TOP OF BANK LINING

Figure 2

PSOMAS

NEWHALL LAND

RP102-01.DWG

1.2 MATERIALS AND DOCUMENTS INCORPORATED BY REFERENCE

The following list of references identified in this report is provided for convenience. The portions of documents referred to, referenced or cited in this report are incorporated by reference and are available for review at the City of Santa Clarita, Planning and Building Services Department, Suite 302, Santa Clarita, CA 91355.

- Center for Watershed Protection. The Practice of Watershed Protection (2000).
- Chow, VT. Open Channel Hydraulics (pg 165 and pg 185). McGraw Hill Civil Engineering Series (1959).
- *Federal Emergency Management Agency (FEMA) Flood Insurance Map 060729 0345C (September 9, 1989).*
- John M. Tettemer & Associates, Natural River Management Plan for Santa Clara River from Castaic Creek to One-Half Mile Above the Los Angeles Aqueduct and Portions of the San Francisquito Creek and the Santa Clara River, South Fork [of the Santa Clara River] (May 1997).
- Los Angeles County Department of Public Works Hydrology Manual (December 1991) and Sedimentation Manual (June 1993)
- *Los Angeles County Department of Public Works, Hydrology Manual & Appendix, 1991*
- Los Angeles County of Public Works. Development Planning for Storm Water Management, A Manual for the Standard Urban Storm Water Mitigation Plan (SUSMP) (September 2002).
- Los Angeles County of Public Works, "Level of Flood Protection and Drainage Protection Standards" (1986).
- *Psomas. Surveyed topography data for Riverpark, November 20, 1998*
- *Psomas/CH2MHill. City of Santa Clarita Project Study Report Equivalent Cross Valley Connector Between Soledad Canyon Road and Bouquet Canyon Road (PSRE) (February 1, 2001, Revised in February, 2003).*
- United States Army Corps of Engineers. Santa Clara River Adopted Discharge Frequency Values (adopted May 3, 1994 by the United States Army Corps of Engineers, the Ventura County Flood Control Department and the Los Angeles County Department of Public Works).
- Valencia Company, Natural River Management Plan (Permitted Projects and Activities under the United States Corps of Engineers 404 Permit, California Department of Fish and Game 1603 Agreement and 2081 Permit (November 1998).

1.3 DEFINITIONS

The following are definitions to several acronyms and terms, which will be frequently used in this section of the Flood Technical Report.

100-year storm	Precipitation event corresponding to a flood that has a 1/100, or one percent, chance of occurring in any given year.
ACOE	Army Corps of Engineers
Burned and Bulked	

Runoff (Qbb)	Runoff from burned areas that are laden with burned vegetation, fines, rocks, mud and other debris.
Capital Flood (Qcap)	The runoff resulting from a theoretical storm based on Los Angeles County Department of Public Works methodology. The "model" storm is derived from 50-year frequency rainfall values, which occur in a time sequence patterned after actual major extra-tropical storms occurring in the Los Angeles Region. The calculations of runoff are also based on the soil types and amount of impervious surfaces in a watershed area, and on the assumption that undeveloped portions of the watershed are burned, resulting in significant amounts of debris and sediment being added to the runoff.
CDFG	California Department of Fish and Game
Clear Runoff (Qc)	Runoff that is absent of fines (finely crushed or powdered material), mud, rocks, vegetation, and other debris.
Coefficient of Runoff	Variable in the rational and modified rational method runoff formula, which is dependent upon soil type, rainfall intensity, and the percent of imperviousness.
CWA	Federal Clean Water Act
Detention Basin	Physical flood control structure that captures storm flows and temporarily stores these flows in man-made surface depressions and, therefore, not available for producing surface runoff during storm events. See also Water Quality Detention Basins.
Depression Storage	Upstream runoff that is captured by and settles in a natural or manmade depression and does not continue downstream.
Erosion	The wearing away of land surfaces by water, wind, and ice
First Flush	First flush is defined in Los Angeles County as the runoff volume generated from 0.75-inches of rainfall in a 24 hour period.
Floodplain	Nearly level land situated on either or both sides of a channel that is subject to flooding during infrequent events.
Impervious	A description of a substance that will not permit water to flow through it.
Infiltration	The penetration of water through the ground surface into sub-surface soil or the penetration of water from the soil into sewer or other pipes through defective joints, connections, or manhole walls.

Interception	That portion of precipitation intercepted by vegetation. Intercepted precipitation is disposed of by drip, stem flow, or evaporation (or sometimes sublimation, in the case of snow, sleet, hail, or freezing rain).
LACDPW	Los Angeles County Department of Public Works
Peak Flow	Peak runoff rate measured in cubic feet per second (cfs).
Percolation	The downward flow or filtering of water through pores or spaces in rock or soil.
Q	Runoff rates measured in cubic feet per second.
Q50bb	Peak runoff from a 50-year rainfall intensity storm from undeveloped areas that is laden with burned vegetation, fines, rocks, and other debris.
Q50c	Peak runoff from a 50-year rainfall intensity storm from developed areas or from undeveloped areas that are not assumed to be burned or bulked.
Runoff	The portion of rainfall, melted snow, or irrigation water that flows across the ground surface rather than filtrating into the soil.
RWQCBLAR	Regional Water Quality Control Board, Los Angeles Region
Sedimentation	Deposition of waterborne sediments due to a decrease in water velocity and a corresponding reduction in the size and amount of sediment, which can be carried by the flowing water.
Sump	An area from which there is no surface flow outlet.
SWRCB	State Water Resources Control Board
Transpiration	The process by which water vapor is lost to the atmosphere from living plants.
Velocity	The rate or speed at which surface runoff water flows either over land or through a channel, measured in feet per second (fps).
Watershed	All land and water within the confines of a drainage divide.
Waters of the U.S.	Although the definition may change in 2003 to exclude non-navigable, isolated water bodies, in 1986 (U.S. Federal Register), Waters of the U.S. was defined as follows:

All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; all interstate waters including interstate wetlands; all other waters, such as interstate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce including any such waters: (1) which are or could be used by interstate or foreign travelers for recreational or other purposes; or (2) from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (3) which are used or could be used for industrial purposes by industries in interstate commerce. Also included are all impoundments of waters otherwise defined as waters of the United States under the definition; tributaries of waters identified above; the territorial seas; and wetlands adjacent to waters (other than the waters that are themselves wetlands) identified above.[1]

By United States Army Corps of Engineers definition, "Waters of the United States" are defined by the "ordinary high water mark," which can be identified by physical characteristics, such as channel scouring, bank "shelving," areas cleared of terrestrial vegetation, litter and debris, or other indications that may be appropriate.

Wetlands[2]	Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

2 METHODOLOGY

Three development scenarios are addressed in this report:

1. Existing,
2. Existing With Project, and
3. Cumulative Buildout.

Brief summaries of hydrologic and hydraulic methodology are presented in this section to provide the reader with background information and understanding of the methodology used to calculate pre- and post-development runoff quantities, the capacities of proposed improvements, and the effects of development on the Santa Clara River.

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[1] 33 C.F.R. §328.3(a)(2004)

[2] 33 C.F.R. §328.3(b)(2004)

2.1 HYDROLOGY BACKGROUND AND METHODOLOGY

2.1.1 City of Santa Clarita and Los Angeles County Criteria

The City of Santa Clarita and the Flood Control Division of the Los Angeles County Department of Public Works (LACDPW) regulates storm runoff,. The LACDPW issued a memorandum in 1986 entitled "Level of Flood Protection and Drainage Protection Standards" for development projects in Los Angeles County. The memorandum established Los Angeles County policy on levels of flood protection and requires that the following facilities be designed for the Capital Flood: all facilities not under State of California jurisdiction that intercept flood waters from natural drainage courses, all areas mapped as floodways, all facilities that are constructed to drain natural depressions or sumps, and all culverts under major and secondary highways. All facilities in developed areas that are not covered by the Capital Flood protection conditions must be designed for the Urban Flood, or runoff from a 25-year frequency design storm. Because the project would also intercept flood flows from natural areas, its storm drainage facilities that accept these flows must be sized and designed for the Capital Flood.

In addition to meeting this required level of flood protection, all development in the Santa Clara River watershed must meet standards adopted by the LACDPW for the Santa Clara River and its major tributaries in the County <u>Sedimentation Manual</u> (pp. 2-2 to 2-6). Further, properties owned by The Newhall Land & Farming Company (including the Riverpark project site) adjacent to the Santa Clara River that include improvements along and across a segment of the river must also meet standards outlined in the EIS/EIR for the <u>Natural River Management Plan</u>, which addresses potential impacts associated with such development .

2.1.2 Explanation of the County Capital Flood

In 1931, the Los Angeles County Flood Control District (LACFCD) (now the Flood Control Division of the County's Department of Public Works) began development of a Comprehensive Plan of flood control facilities to collect and convey flows from the mountainous canyons, the alluvial fans, and the urbanized coastal plain.

The major needs in designing the system were: the reduction of damage due to high canyon flows, the conveyance of large volumes of water in a major storm, and the ability to meet future flood control needs. The design of the flood protection system for the County is based upon the Department of Public Works' Capital Flood hydrology.

The Department's 50-year Capital Flood (or Qcap) hydrology is based on a "design," or theoretical storm event that is derived from 50-year frequency rainfall values and is patterned after actual major extra-tropical storms observed in the Los Angeles region. The 50-year frequency design storm is assumed to occur over a period of four days, with the maximum rainfall falling on the fourth day.

Analysis of recorded major storms reveals that, during the twenty-four-hour period of maximum rainfall, rainfall intensity typically increases during the first 70 to 90 percent of the period and decreases in the remaining time. Furthermore, approximately 80 percent of the amount of the twenty-four-hour rainfall occurs within the same 70 to 90 percent of the period. In developing the Capital Flood (or Qcap), the 50-year frequency design storm is assumed to fall on saturated soils. In converting rainfall to runoff, rainfall that is not lost due to the hydrologic processes of interception, evaporation, transpiration, depression storage, infiltration, or percolation is assumed to be surface runoff. The effect of snowfall or snow melt on rainfall-runoff relationships is a consideration in only a very limited portion of the County (i.e., the higher elevations) where snowfall accumulates in winter.

Another assumption made in developing a Capital Flood design flow rate is that natural portions of the watershed have been burned by fire. When a watershed burns, the soil infiltration rate decreases due to the loss of vegetation and physical changes in the soil. The County has run field infiltrometer tests in order to quantify the effect that burning has on the coefficient of runoff. The effect of burning the watershed can increase the design runoff rate from 10 percent to 20 percent.

The final factor in adjusting the Capital Flood design flow rate is referred to as a bulking factor. In the area where a watershed is burned, the runoff would carry with it a large layer of eroded topsoil. This sediment, along with the associated burned trees and brush, is referred to as debris. In order to account for these quantities of debris, the design flow rate is artificially increased using a prescribed bulking factor, which is a function of not only soil type, but also the steepness of the terrain and the size of the drainage basin. The bulking factors for larger drainage basins range from about 1.20 to 1.50, or from 20 percent to 50 percent over and above the burned flow rate.

In summary, the County's Qcap is based on a theoretical four-day storm event occurring right after the watershed has been burned with the resulting flow rate being increased again by a bulking factor, thereby yielding a peak flow rate that is 32 to 80 percent higher than a 50-year storm over an unburned-unbulked drainage basin. The probability of all of the theoretical assumptions identified in the County's Capital Flood happening at the same time is extremely small, and yields greater design flows than the Federal Insurance Administration's methodology for calculating the 100-year and 500-year floods. As a result, the County's methodology is more conservative than that of the Federal Emergency Management Agency. The City has adopted the County's Qcap requirements for projects within its jurisdiction.

2.1.3 Method of Drainage Analysis

The engineering term for the methods used to properly size pipes and channels is "hydraulic analysis." To determine the proper sizes of pipes and channels, assumptions must be made regarding the amount of rainfall to design for and the amount and type of development that would take place in a drainage basin. An estimate must also be made as to how often that amount of rainfall could occur. This is referred to as the storm recurrence interval, or its reciprocal value – storm frequency. For example, a storm that has a 10 percent recurrence interval is a storm that has a 10 percent chance of occurring in any given year. The reciprocal of this number (1/10) is also known as a 10-year frequency. The most important concept to keep in mind is that a pipe or channel is "designed" for a rate of flow (measured in cubic feet per second), not a volume of flow (measured in cubic feet or acre-feet). A dam or a lake is designed for storing or containing a fixed volume of water. A pipe of a fixed size, on the other hand, can carry different flow rates, depending on the pressure placed on the water.

In designing a storm drain system, the size of a pipe that would safely carry a predicted rate of flow (expressed in cubic feet per second - cfs) must be calculated. A 1-foot square box which is 1-foot deep (a cubic-foot) can hold 7.5 gallons of water. From this fact, the amount of storm water passing through a pipe or channel in one second can, very simply put, be calculated by multiplying the cross sectional area of the flow in the pipe (in square feet) by the rate of storm flows through the pipe in feet per second. This three-dimensional rate of flow is referred to as "cubic feet per second."

With the above concepts in mind, the effects of development on natural ground can be considered. Buildings, driveways, patios, sidewalks, and roads all create new impervious covers to the natural ground, and prevent water from being absorbed into the ground. The water that would normally infiltrate into the ground, therefore, runs off at higher than normal flow rates, referred to as "Q." Therefore, the flow rates from developed areas are greater than from undeveloped areas.

2.1.4 Explanation of Design Hydrology

The following provides a more discussion of the effects of soil type, imperviousness, and burning and bulking on storm runoff quantities.

(a) Effects of Soil Type and Amount of Imperviousness on Runoff Rates

The rate of runoff in undeveloped areas is directly related to the type of soil. Certain soil types accept water faster (are more pervious) than other soils. Therefore, the types of soils present on a site are used in the calculations of runoff. Different soil types have very different water infiltration (or absorption) rates. If a sandy soil (highly pervious) is paved over, the coefficient of runoff (C) would greatly increase, whereas if a clay soil (not highly pervious) is paved over, runoff values would go up, but not as high as in the case of sandy soil because the sandy soil absorbs water faster. In small storms, some soils can absorb 100 percent of the rainfall. For example, soil type 015, Tujunga Fine Sandy Loam, can completely absorb a 0.5-inch per hour (in/hr) storm and almost completely absorb a 1.0 in/hr storm, thereby yielding extremely low runoff rates. For a 200-acre parcel with soil types 015 (Tujunga Fine Sandy Loam) and 012 (Ramona Clay Loam), radically different runoff quantities for the same rainfall events occur. For an intense storm, $I = 1.0$ inch per hour, and the very pervious soil type 015 (Tujunga Fine Sandy Loam), the runoff rate would be 20 cfs. For the same size parcel on a very impervious soil, such as soil type 012 (Ramona Clay Loam), the runoff rate would be 168 cfs.

(b) Effects of Burning and Bulking

In an undeveloped watershed, Capital Flood flow rates assume a burned condition, which causes the coefficient of runoff to increase. Further, after increasing the coefficient of runoff for burning, the flow rate is then multiplied by a bulking factor, which is used to account for the amount of mud, and debris that would be contained within the flow from the burned watershed. In the case of the project, the increase in runoff, or flow rates, due to an increase in the coefficient of runoff (C) to account for burning is from 10 to 20 percent. Application of the bulking factor to account for debris production would increase runoff quantities by 20 to 50 percent over and above the burned flow rate.

(c) Effects of Development

As previously mentioned, development places impervious materials over soils that had previously absorbed storm water. Once the impervious materials are placed over the soil, no direct percolation occurs and runoff takes place. Because development does not typically completely over cover the ground surface, portions of each developed parcel (e.g., front, side, and rear yards, landscaping, open space, etc.) remain pervious to infiltration by storm water. Percent imperviousness for each land use existing on or proposed for the site is presented in **Table 1, Percent Imperviousness for Selected Land Uses.**

Table 1
Percent Imperviousness for Selected Land Uses

Land Use	Percent Imperviousness (%)
Agricultural[3]	10[2]
Transportation	100[2]
Single Family Residential	42[1]
Multi Family Residential	68[1]
Commercial	92[1]
Open Space	10[2]

[1] *Values are from the Los Angeles County Hydrology Manual (Appendix F).*
[2] *Values are from GeoSyntec Consultants (2002).*
[3] *Values are presented for non-irrigated and grassland agricultural use.*

2.2 SANTA CLARA RIVER HYDRAULICS

The floodplain conditions of the Santa Clara River were modeled using River Analysis System (RAS) software developed by the United States Army Corps of Engineers (U.S. ACOE) Hydrologic Engineering Center (HEC). Inputs to the HEC-RAS model include channel geometry, boundary conditions, hydraulic roughness, and hydrology. HEC-GeoRAS is a HEC-developed pre-/post-processor to the hydraulic model HEC-RAS and was used to compile and store a three dimensional representation of the land surface for defining channel and floodplain geometry. A Triangular Irregular Network (TIN) was created from surveyed 2-foot topographic data using the ArcInfo program Topogrid. The TIN was used to extract geometric data for hydraulic analysis. The geometric data were then imported to the hydraulic model HEC-RAS. The modeling prepared for the Riverpark project is consistent with that prepared for the NRMP.

The project and cumulative condition models for the river were created by modifying existing cross section geometrics of the river to simulate the hydraulic effects of the proposed project bank stabilization, erosion protection and Newhall Ranch Road, including the Newhall Ranch Road/Golden Valley Road bridge (project scenario) and Santa Clarita Parkway Bridges (cumulative scenario) on the river. The encroachment due to the bank stabilization was conservatively approximated with levees in the hydraulic model (model levees set at equivalent elevation on slope of channel invert). The proposed Newhall Ranch Road/Golden Valley Road Bridge is modeled on the conservative assumption that the bridge span, bank stabilization and abutment locations are consistent with the Vesting Tentative Tract Map and the pier spacing is conservatively modeled from the City of Santa Clarita Project Study Report Equivalent Cross Valley Connector Between Soledad Canyon Road and Bouquet Canyon Road configuration that would have the greatest impact on river hydraulics.

Existing Santa Clara River discharge rates for the 2-, 5-, 10-, 20-, 50-, and 100-year storm events were obtained from a 1994 U.S. ACOE study entitled, Santa Clara River Adopted Discharge Frequency Values. This study is based upon a frequency analysis of stream flow data along the Santa Clara River and, therefore, approximates river flows from observed data.

Using the Los Angeles County Flood Control District formula provided below the increase in flow resulting from development was estimated for each storm frequency in the proposed scenario.

$$Q_y = \left(\frac{y}{x}\right)^{0.223} \cdot Q_x \text{ where,}$$

Qy = target flow

Qx = known flow

y = target storm event frequency

x = known storm event frequency

These calculated increases in flow were then added to the Santa Clara River existing discharge rates in order to approximate the proposed discharge rates. Because the calculations for the proposed clear flows do not account for proposed debris collection facilities, these increases in flows represent a conservative upper limit used for impact analysis.

Six of the seven recurrence intervals included in the analysis were obtained from this Los Angeles County study; the seventh, the Los Angeles County Capital flood, is referenced from the NRMP. Because the NRMP flow represents the full-buildout of the drainage area (i.e. cumulative development), this flow represents a upper limit and therefore is conservative when used for the existing and proposed scenarios.

The following parameters apply to all three model settings: Existing, Proposed, and Cumulative.

- Bank stations
- Hydraulic roughness
- Boundary conditions

The bank station locations are approximated as the water surface elevation level of the runoff from an existing scenario 2-year storm event. The 2-year return interval approximates typical bankfull conditions.

Hydraulic roughness is estimated by coefficients in the Manning's equation (metric units) below:

$$Q = \frac{1}{n} \bullet A \bullet R^{\frac{2}{3}} \bullet S^{\frac{1}{2}}, \text{where}$$

n is the Manning's Roughness Coefficient
A is the cross-sectional area
R is the ration of A divided by the wetted perimeter and,
S is the energy slope

For this report, the Manning's roughness coefficients were estimated from local condition observations of in-stream and floodplain vegetation, mapped by field biologists (Impact Sciences, 2002). The following **Table 2, Hydraulic Roughness Coefficients** shows the variation of Manning's roughness coefficients based on vegetation and how those compare to published values.

Table 2.
Hydraulic Roughness Coefficients

Vegetation/Land Use	**Manning's Roughness Coefficient [used in this study]**	**Reference Manning's Coefficient (Chow 1959)**
Sand with no vegetation	0.025	0.025-0.033
Sand with Sporadic Growth/Grass Pasture	0.035	0.03-0.05
Scattered Brush/Heavy Weeds/Light Brush and Trees	0.050	0.035-0.07

Boundary conditions represent the flow conditions at the limits of the hydraulic analysis. Model reach limits were established such that the boundary conditions do not affect model results. In this study, boundary conditions reflect normal depth and an approximate channel slope of 1 percent at the upstream boundary and critical depth at the downstream boundary. The input hydrology is the flow rate data for the seven return periods as documented in **Table 3, Existing Drainages and Runoff Quantities.**

The proposed project and cumulative condition models were created by modifying existing condition cross section geometries to simulate the proposed project bank stabilization and bridges. The encroachment due to the bank stabilization was approximated with levees in the hydraulic model (model levees set at equivalent elevation on slope of channel invert). The Newhall Ranch Road Bridge is modeled on the conservative assumption that the bridge span is consistent with the Vesting Tentative Tract Map and the pier spacing is modeled from the Project Study Report Equivalent Cross Valley Connector between Soledad Canyon Road and Bouquet Canyon Road (PSRE) configuration that results in the most severe impacts to flood waters.

3 EXISTING CONDITIONS

3.1 DRAINAGE AREAS AND WATERCOURSES

The Santa Clara River traverses the southern portion of the site, which is located within an unnamed approximately 834-acre tributary watershed of the 1,634 square mile Santa Clara River basin. The area of this tributary watershed represents 0.08 percent of the Santa Clara River basin and consists primarily of open space and vacant land. Annual rainfall in the tributary area is typically low (an annual average of 17 inches) and generally occurs in the winter months. Runoff flows to and through eight drainage areas on the site via sheet flows and natural concentrated flows.

3.1.1 Santa Clara River

The reach of the Santa Clara River at the Project site has intermittent low surface flows created by larger storm events. Downstream of the project site, flows are created by tertiary treated effluent discharges from two downstream water reclamation plants operated by the County Sanitation Districts of Los Angeles County and storm water runoff. Completely natural flows in the river only occur in the winter due to storm runoff. The flows vary significantly from year-to-year. In addition, there are short-term releases from Castaic Lake during summer months that reach the river via Castaic Creek, which joins the river several miles downstream of the Project site.

The reach of the river within and adjacent to the site has multiple channels (braided). This kind of system is characterized by high sediment loads, high bank erodibility, and intense and intermittent runoff conditions. Combined with the relatively flat gradient of the river at this point (less than one percent), it has a high potential to aggrade (deposit sediment) at low flow velocities.

Flows eventually discharge from the project to the Santa Clara River from the eight areas. The acreage for each of the drainage areas is provided in **Table 3, Existing Drainages and Runoff Quantities**. There are currently no existing drainage or erosion/sedimentation control improvements located within the site.

Capital Flood runoff quantities for each of the eight drainage areas and are provided in **Table 3, Existing Drainages and Runoff Quantities**. Under existing conditions, combined clear flows total 1,396 cubic feet per second (cfs), while burned and bulked flows total 2,225 cfs. The calculated total debris volume is 31,770 cubic yards (cy).

Table 3
Existing Drainages and Runoff Quantities

Drainage Area	Acreage	Q50c[1] (cfs)	Q50bb[2] (cfs)	Debris Volume (cy)
100 series[3]	49.2	103	163	1,270
200 series	22.5	46	72	581
300/400 series	263.3	406	640	12,722
500 series	101.3	193	306	5,572
600 series	351.7	509	840	10,107
700 series	6.3	22	34	347
800 series	17.5	41	64	962
900 series	22.2	76	106	209
Totals	**834**	**1,396**	**2,225**	**31,770**

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[1] *Q50c - 50-year rainfall intensity clear flow.*

[2] Q50bb - 50-year rainfall intensity burned and bulked flow.

[3] *"Series" is intended to represent that there is more than one number in succession. For example in the 100 series there is 100, 101, 102, etc that as a whole make up the 100 series drainage area. Instead of listing each individual number of the subarea only the series is listed. It should be noted that series designations for existing and proposed conditions do not represent identical drainage conditions*

Existing flow rates from observed data for the Santa Clara River during 2-, 5-, 10-, 20-, 50-, and 100-year storm events are compiled in **Table 4, Existing River Flows upstream of confluence at Bouquet Canyon.**

Table 4
Existing River Flows upstream of confluence at Bouquet Canyon.

Recurrence Interval	Flow (Discharge) Rate (cfs)
2-Year[1]	1,300
5-Year[1]	4,100
10-Year[1]	7,400
20-Year[1]	12,100
50-Year[1]	21,400
100-Year[1]	31,300
Capital Flood[2]	52,100

[1] *Existing flows from United States Army Corps of Engineers, Santa Clara River Adopted Discharge Frequency Values. Adopted May 3, 1994 by the United States Army Corps of Engineers, the Ventura County Flood Control Department and the Los Angeles County Department of Public Works.*

[2] *United States Army Corps of Engineers & California Department of Fish and Game. Final Environmental Impact Statement/Environmental Impact Report. 404 1603 Streambed Alteration Agreement for Portions of the Santa Clara River and its Tributaries Los Angeles County, Natural River Management Plan. Applicant, Valencia Company. August 1998.*

3.1.2 On-Site Drainages

The total tributary area that drains through the project site and to the river at the project boundaries is approximately 834 acres. This runoff flows to and through the site via sheet flows and natural concentrated flows. When compared with the Capital Flood on the Santa Clara River, the project peak (burned and bulked) flow rate represents approximately 5 percent of the Santa Clara River peak discharge rate.

There are a total of seven jurisdictional drainages located on-site, excluding the Santa Clara River.

3.2 FLOOD HAZARDS

A portion of the site lies within the 100-year floodplain of the Santa Clara River and within the Federal Emergency Management Administration (FEMA) 100-year floodplain. Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) number 060729 0345C dated September 9, 1989 for the Unincorporated Areas of Los Angeles County, California. The map is included in the Appendix. The 100-year floodplain boundaries are based on historical runoff records as actually measured with stream gauges. Mapping the 100-year floodplain is important because FEMA and the Federal Insurance Administration (FIA) uses it to establish standards for flood insurance coverage. Under FIA criteria, the 100-year flood elevation is the "base flood" and any land that is outside of this 100-year, or base flood, elevation would be considered reasonably safe and free from flood hazard.

Table 5, Existing Floodplain/Stream Area Within the Project Tributary Watershed, shows the areas of each existing floodplain and stream for seven storm events. The existing floodplains for the seven storm events are shown in **Figures 3** through **9**.

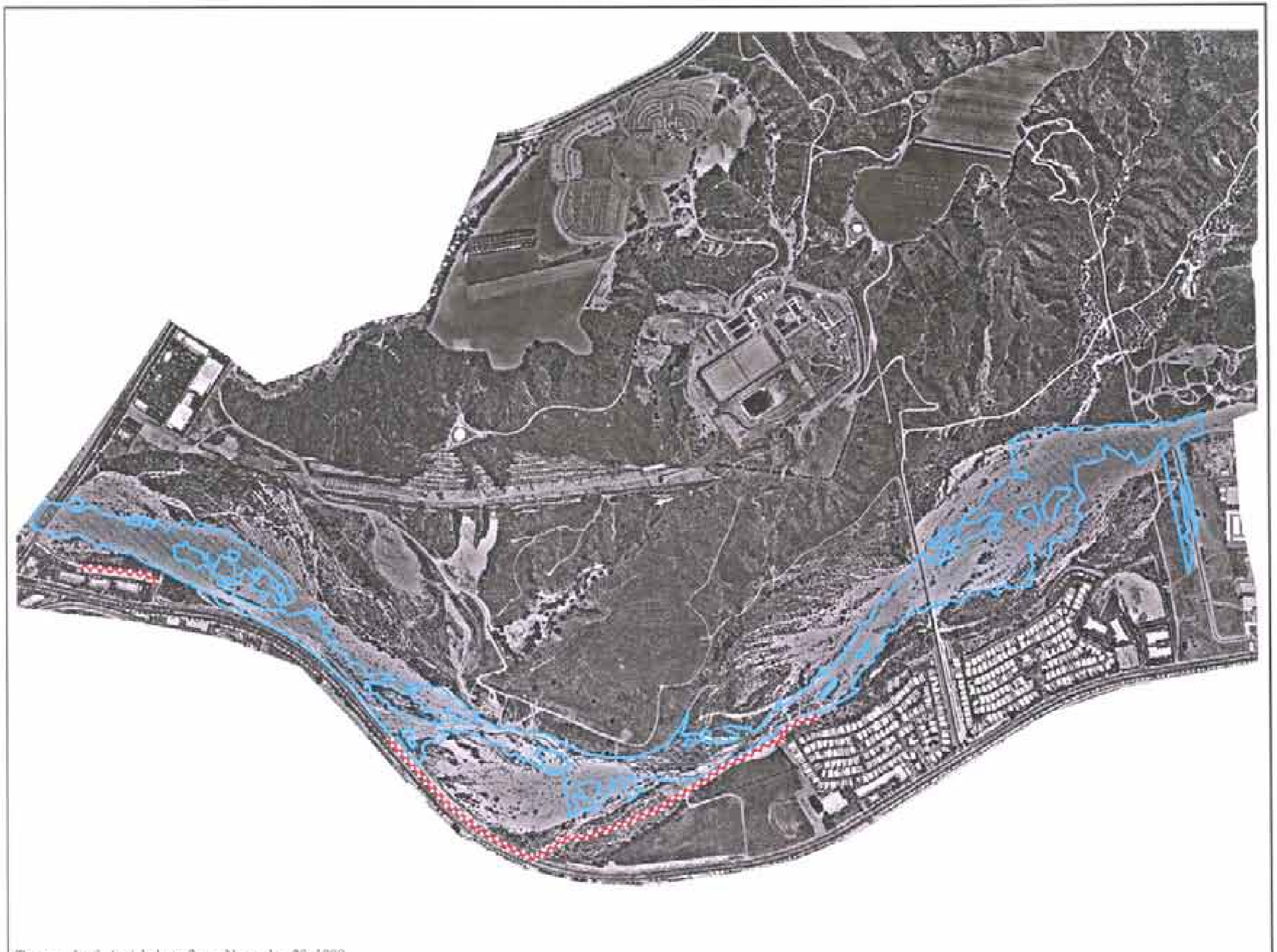
Table 5
Existing Floodplain/Stream Area
Within the Project Tributary Watershed

Storm Event	Study Area Floodplain (acres)
2-Year	109.4
5-Year	187.6
10-Year	266.0
20-Year	300.5
50-Year	325.0
100-Year	337.4
Capital Flood	355.5

NEWHALL LAND
RIVERPARK

Legend

⁓	Approximate Location of Existing Bank Stabilization
☐	2 Year Flood Levels

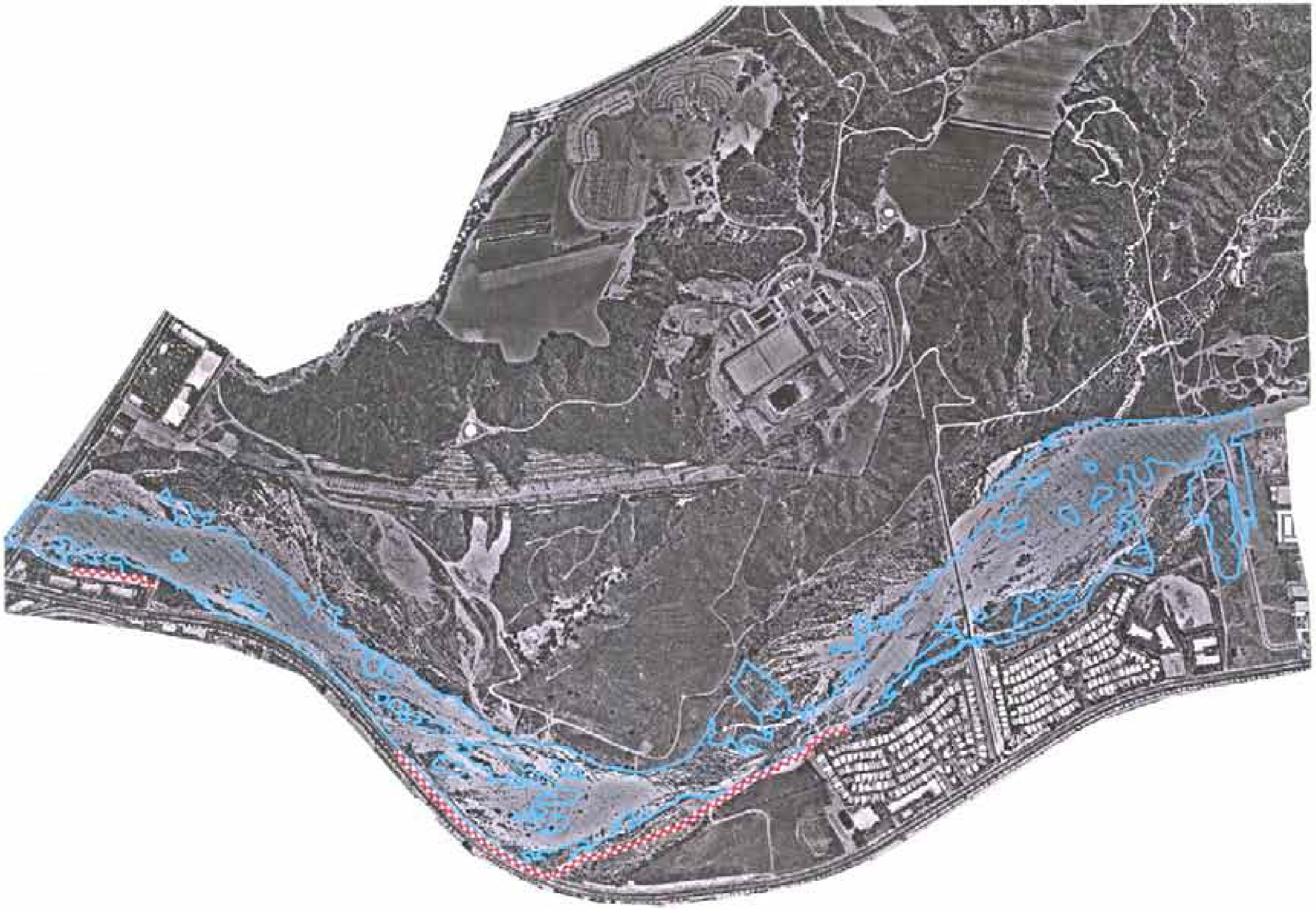


Topography & Aerial photo flown November 20, 1998
Habitat survey completed April 27, 2002

Figure 3
Santa Clara River
Existing Conditions
2 Year Flood Event

M:/northriv-mp/54325mp/engr/exhib/gis/floodplain.apr Jan 27, 2004

NEWHALL LAND
RIVERPARK

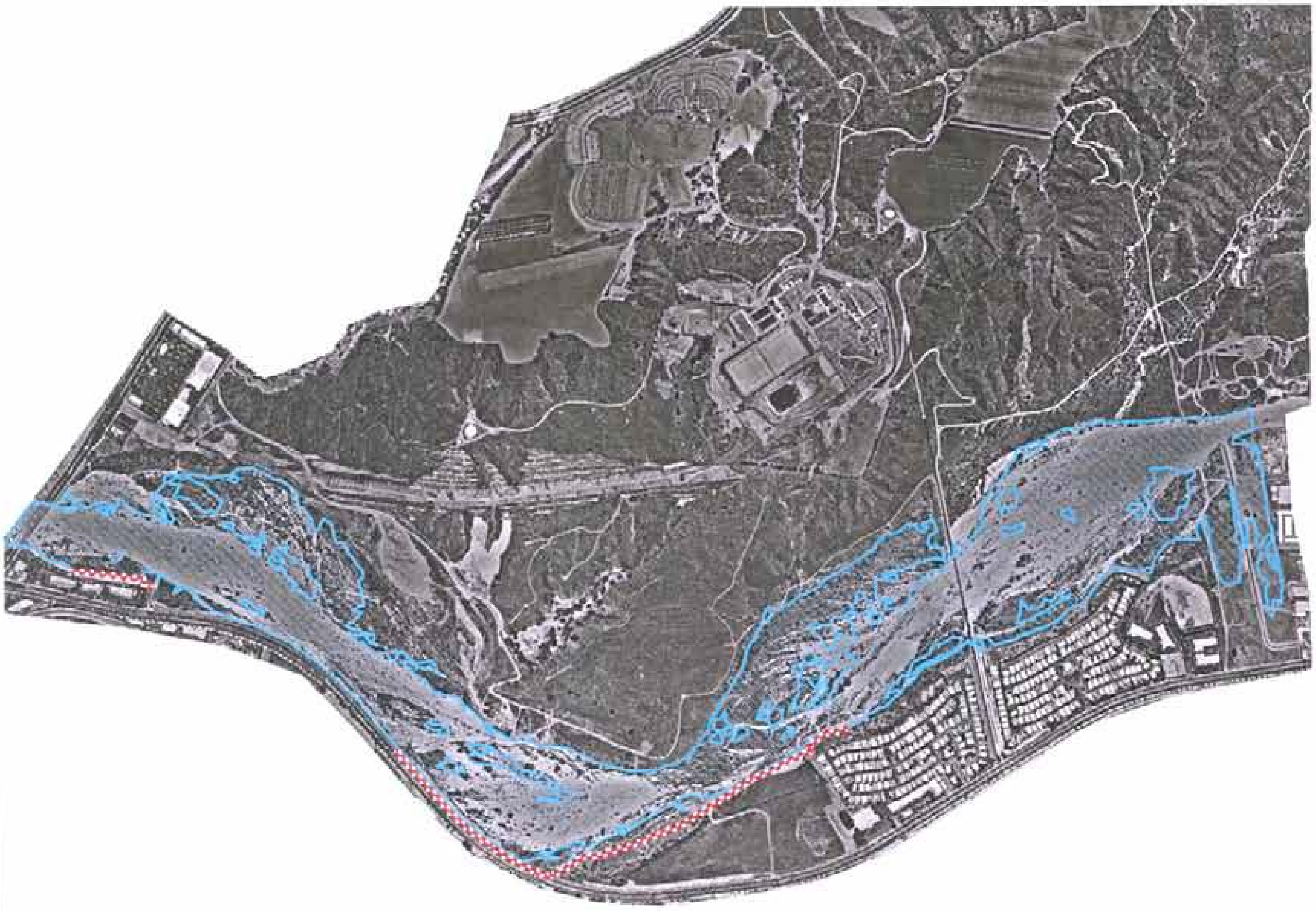


Topography & Aerial photo flown November 20, 1998
Habitat survey completed April 27, 2002

Figure 4

Santa Clara River
Existing Conditions
5 Year Flood Event

M:/northriv-mp/54325mp/engr/exhib/gis/floodplain.apr Jan 27, 2004



Topography & Aerial photo flown November 20, 1998
Habitat survey completed April 27, 2002

NEWHALL LAND
RIVERPARK

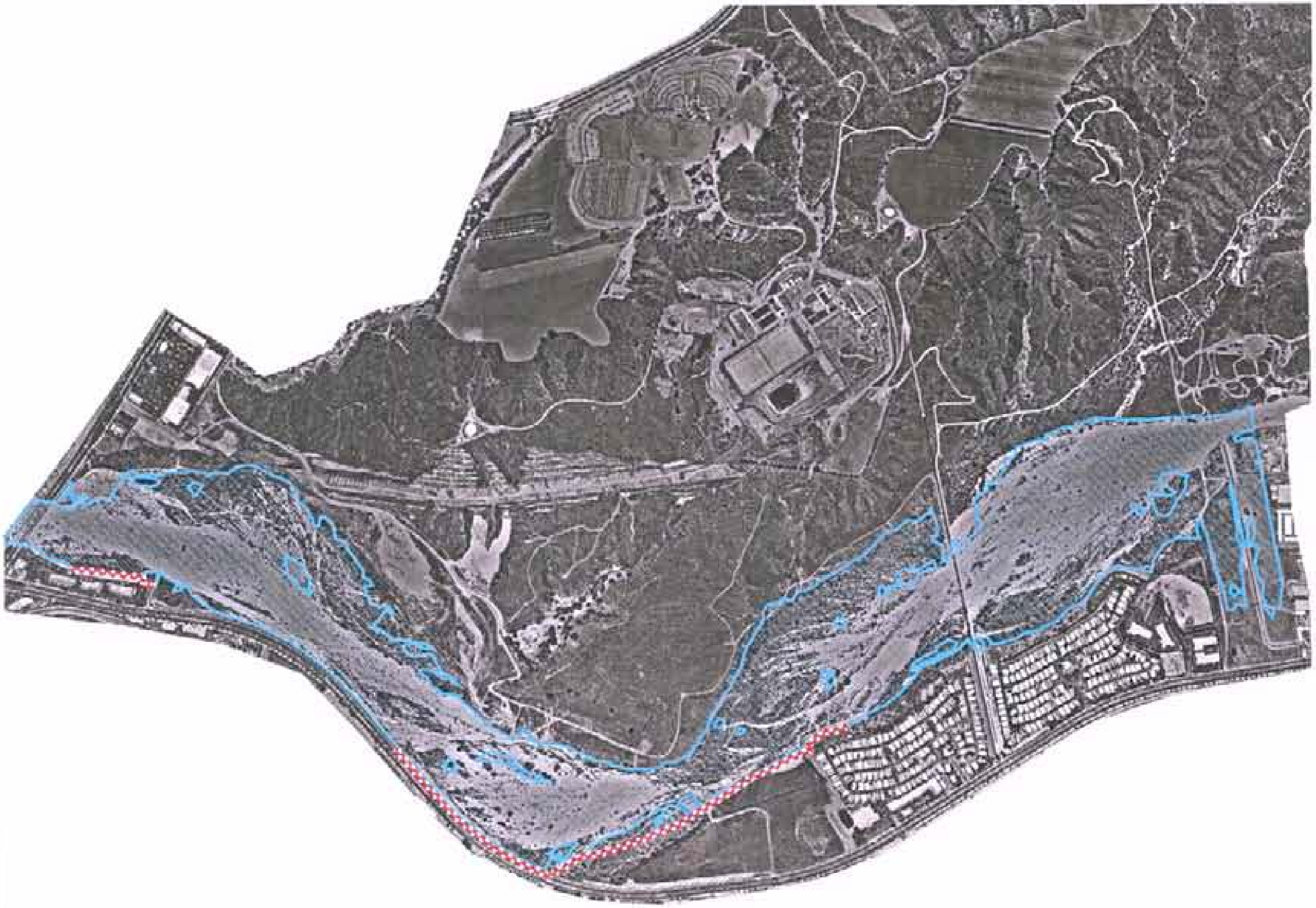
Legend

- 🟥 Approximate Location of Existing Bank Stabilization
- ▭ 10 Year Flood Levels

Figure 5

Santa Clara River
Existing Conditions
10 Year Flood Event

M:/northriv-mp/54325mp/engr/exhib/gis/floodplain.apr Jan 27, 2004

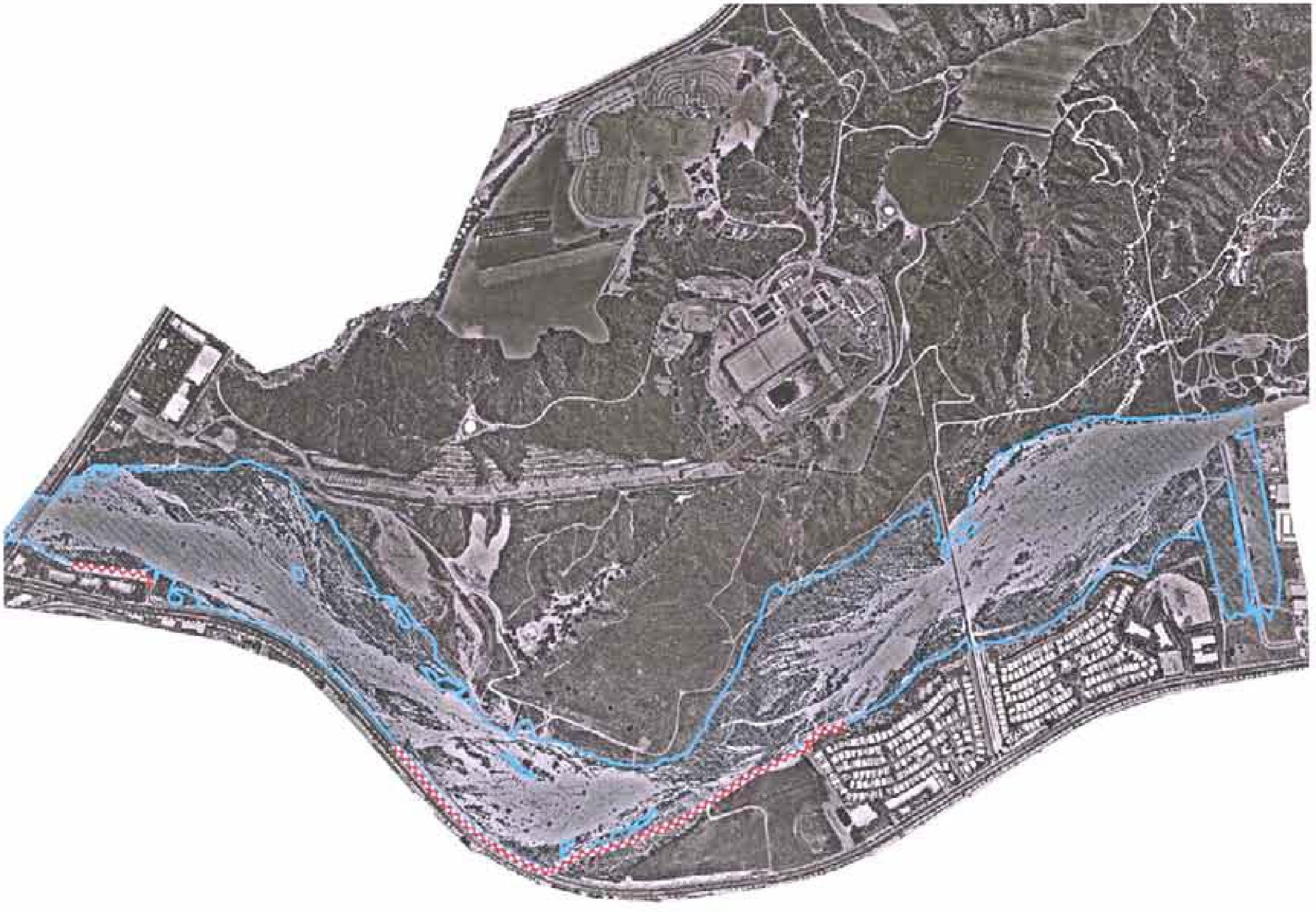


Topography & Aerial photo flown November 20, 1998
Habitat survey completed April 27, 2002

Figure 6

Santa Clara River
Existing Conditions
20 Year Flood Event

M:/northriv-mp/54325mp/engr/exhib/gis/floodplain.apr Jan 27, 2004



Topography & Aerial photo flown November 20, 1998
Habitat survey completed April 27, 2002

NEWHALL LAND
RIVERPARK

Legend

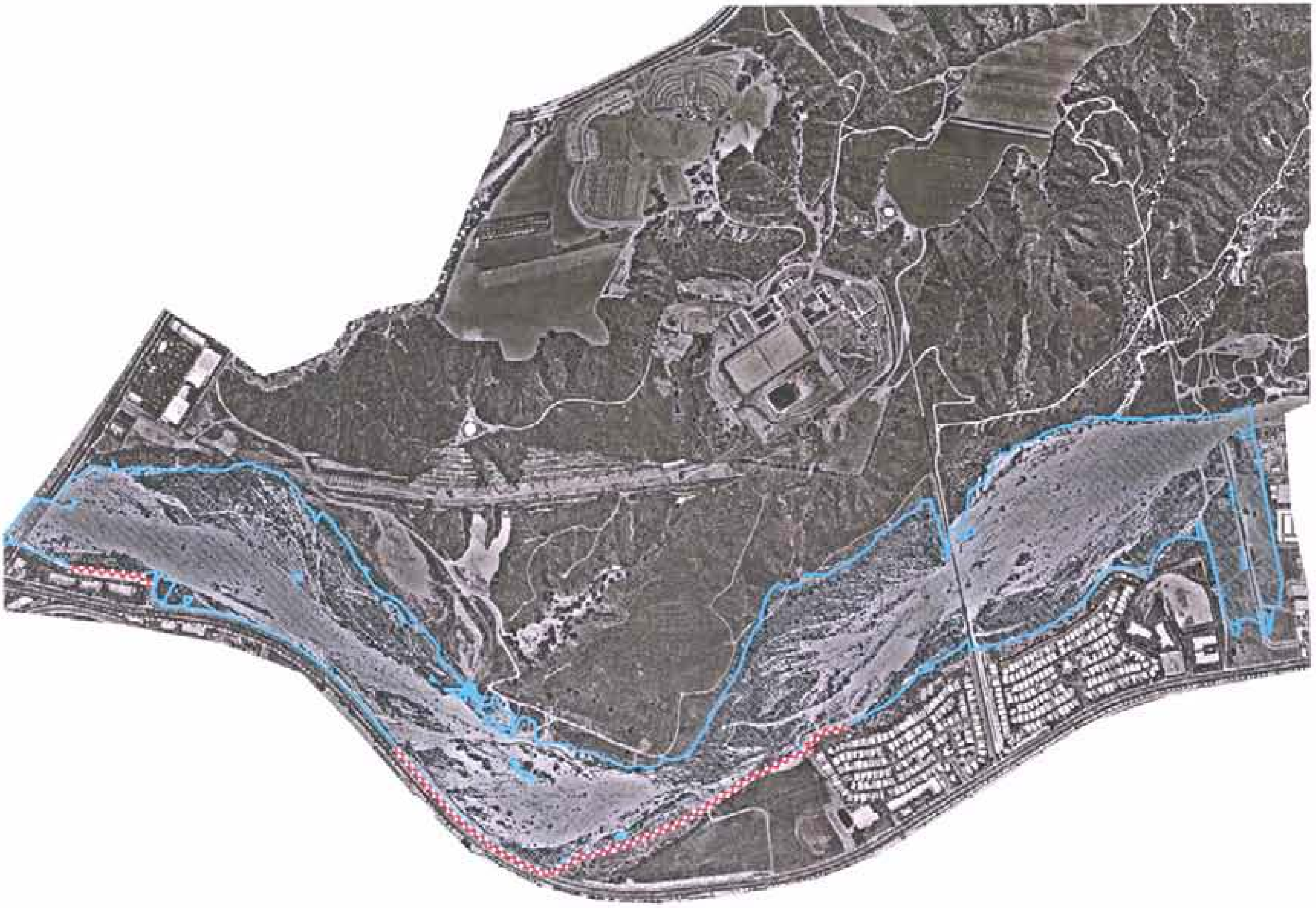
- Approximate Location of Existing Bank Stabilization
- ▭ 50 Year Flood Levels

PSOMAS

Figure 7

Santa Clara River Existing Conditions 50 Year Flood Event

M:/northriv-mp/54325mp/engr/exhib/gis/floodplain.apr Jan 27, 2004



NEWHALL LAND
RIVERPARK

Legend

Figure 8

Santa Clara River
Existing Conditions
100 Year Flood Event

M:/northriv-rmp/54325mp/engr/exhib/gis/floodplain.apr Jan 27, 2004

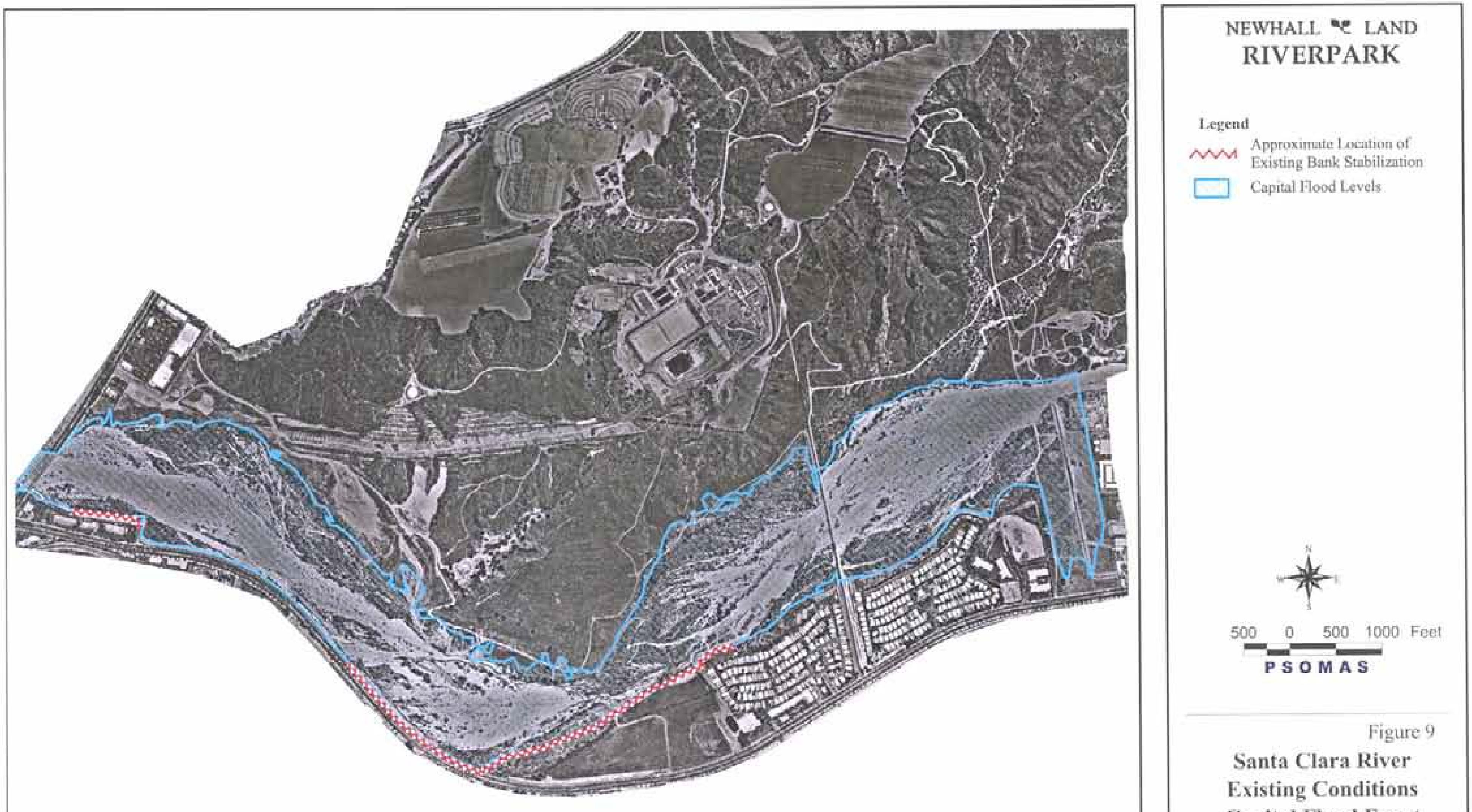


Figure 9

Santa Clara River Existing Conditions Capital Flood Event

Topography & Aerial photo flown November 20, 1998
Habitat survey completed April 27, 2002

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4 PROJECT CONDITIONS

The impacts of project implementation are discussed below. In summary, the project includes the construction of approximately 9,000 linear feet of bank stabilization which is necessary to protect Newhall Ranch Road and the residential and commercial development. In addition, approximately, 1,500 linear feet of toe or erosion protection would be installed adjacent to the project's Area B. The impacts of installing bank protection, bridge piers and abutments (Newhall Ranch Road/Golden Valley Road Bridge) and erosion protection on the Santa Clara River are analyzed in this section This project condition analysis focuses only on the potential hydrologic and hydraulic impacts of the project.

4.1 ALTERATION OF EXISTING DRAINAGE PATTERNS

4.1.1 Santa Clara River

The Santa Clara River will be altered with the placement of the bank stabilization, erosion protection, bridge abutments and piers, storm drain outlets and energy dissipators as proposed by the project.

Impacts associated with erosion and sediment deposition and therefore streambed modification within the river are evaluated as a function of in-stream velocities, which are indicators for potential riverbed scouring. While this is discussed in Section 4.5, in summary, there would be no increases in velocity during the 5- and 10-year storm events, and decreases in river velocity for the 20- to 100-year storm events. **Table 11, Pre- and Post-Development River Velocities,** indicates that increases in areas of the floodplain that would be subject to velocities over 4 feet/second during a 2-year storm event would be minimal, localized, and would be caused only by the smallest event scenario.

Additionally, **Table 6, Summary of Water Surface Elevations** shows that there are no significant increases in water surface elevation due to project improvements.

Table 6.
Summary of Water Surface Elevations

Storm Event	Modeled Scenario	Cross-Section (XS) Location (approximate distance in feet upstream from Bouquet Canyon Bridge)										
		Proposed Newhall Ranch Road/ Golden Valley Road Bridge						Between Areas A-2 and B.		Existing Bouquet Canyon Bridge		
		XS 11101	**XS 10215**	**XS 8293**	**XS 7349**	**XS 6229**	**XS 5812**	**XS 5243**	**XS 3206**	**XS 2183**	**XS 1187**	**XS 13**
	Existing	1252.1	1241.5	1224.2	1216.5	1206.7	1204.1	1198.9	1179.4	1171.6	1163.1	1151
2YEAR	Proposed	1252.1	1241.7	1224.2	1216.6	1206.6	1204.1	1198.9	1179.5	1171.6	1163.2	1151.1
	Difference	0	0.2	0	0.1	-0.1	0	0	0.1	0	0.1	0.1
		XS 11101	**XS 10215**	**XS 8293**	**XS 7349**	**XS 6229**	**XS 5812**	**XS 5243**	**XS 3206**	**XS 2183**	**XS 1187**	**XS 13**
	Existing	1252.3	1242.2	1225.7	1217.5	1207.2	1204.6	1199.3	1180.7	1172.6	1163.9	1152.1
5YEAR	Proposed	1252.3	1242.2	1225.7	1217.5	1207.2	1204.6	1199.3	1180.7	1172.6	1163.9	1152.1
	Difference	0	0	0	0	0	0	0	0	0	0	0
		XS 11101	**XS 10215**	**XS 8293**	**XS 7349**	**XS 6229**	**XS 5812**	**XS 5243**	**XS 3206**	**XS 2183**	**XS 1187**	**XS 13**
	Existing	1252.6	1242.6	1225.8	1217.7	1207.8	1205.1	1199.7	1181.1	1173.2	1164.5	1152.7
10YEAR	Proposed	1252.6	1242.6	1225.5	1217.7	1207.8	1205.1	1199.7	1181.1	1173	1164.5	1152.9
	Difference	0	0	-0.3	0	0	0	0	0	-0.2	0	0.2
		XS 11101	**XS 10215**	**XS 8293**	**XS 7349**	**XS 6229**	**XS 5812**	**XS 5243**	**XS 3206**	**XS 2183**	**XS 1187**	**XS 13**
	Existing	1252.7	1243.1	1226.9	1218.5	1208.4	1205.4	1200.1	1181.7	1173.5	1165.4	1153.3
20YEAR	Proposed	1252.7	1243.1	1227.2	1218.5	1208.4	1205.4	1200.1	1181.7	1173.5	1165.4	1153.4
	Difference	0	0	0.3	0	0	0	0	0	0	0	0.1
		XS 11101	**XS 10215**	**XS 8293**	**XS 7349**	**XS 6229**	**XS 5812**	**XS 5243**	**XS 3206**	**XS 2183**	**XS 1187**	**XS 13**
	Existing	1253.4	1243.7	1227.4	1219.4	1209.3	1206	1200.4	1182.5	1174.2	1166.1	1154.3
50YEAR	Proposed	1253.4	1243.7	1227.4	1219.4	1209.3	1206	1200.4	1182.5	1174.2	1166.2	1154.2
	Difference	0	0	0	0	0	0	0	0	0	0.1	-0.1
		XS 11101	**XS 10215**	**XS 8293**	**XS 7349**	**XS 6229**	**XS 5812**	**XS 5243**	**XS 3206**	**XS 2183**	**XS 1187**	**XS 13**
	Existing	1254	1244.5	1228.3	1220.3	1210	1206.7	1201.1	1183.2	1174.8	1166.8	1155.1
100YEAR	Proposed	1254	1246.2	1228.3	1220.3	1210.1	1206.8	1201.1	1183.2	1174.9	1166.8	1155
	Difference	0	1.7	0	0	0.1	0.1	0	0	0.1	0	-0.1

4.1.2 On-site drainage

Implementation of the project (with the associated storm drain system) would affect the natural tributary drainage channels described previously. While existing discharges from the project site are not concentrated into centralized outlet structures (as proposed by the project), surface water flows will naturally form paths of least resistance and will either concentrate at existing topographic depressions or cut channels that serve as concentrated discharge locations. Therefore, while the project includes development of the storm drain system and will have pre-defined outlets, this will not significantly alter drainage patterns. Further, the project includes the use of energy dissipators at the storm drain outlets to the Santa Clara River. The installation of these improvements will dissipate the energy that could cause erosion at the project outlet.

4.2 WHETHER RUNOFF VOLUMES WOULD EXCEED EXISTING OR PLANNED SYSTEMS

The Riverpark project would increase the amount of runoff from those areas of the site that would be covered by roads, buildings, paved parking areas, and other relatively impermeable or impervious features (see **Table 1, Percent Imperviousness for Selected Land Uses**, for the assumed percent imperviousness for each land use proposed for the site). Specifically, impervious surfaces on the site would increase the amount of clear flow runoff from the site. Burned and bulked runoff and debris volumes, however, would be reduced because the developed portions of the site would be covered with impervious surfaces and non-erodable vegetation, and because debris basins that would reduce the amount of debris and sediment in the runoff are proposed at upstream locations.

The post-development runoff quantities provided in **Table 7, Post-Development Runoff Quantities**, would total 1,687 cfs for the tributary area during a 50-year storm. A comparison of this table with **Table 3, Existing Drainages and Runoff Quantities**, demonstrates that clear flows would increase over existing conditions. Burned and bulked flows being discharged from the site would total 2,112 cfs, which is a 5.0 percent reduction in Capital Flood flows, from the site [(2,225 – 2,112)/2,225 = 0.05], when compared to pre-development conditions. This reduction in burned and bulked flows is largely due to project debris basins that would capture upstream bulk flows and allow debris to settle out from the runoff before it enters the storm system through the developed portion of the site.

The County and City-defined criteria for design of flood control systems establish the more severe hydrologic conditions (i.e., burned and bulked)as the basis of impact evaluation (see Sections 2.1.1 and 2.1.2 of this report). Therefore, because the 50-year Capital Flood burned and bulked runoff from the project would decrease, the project would not result in downstream flooding.

Table 7
Post-Development Runoff Quantities

Drainage Area[4]	Acreage	Q50c[2] (cfs)	Q50bb[3] (cfs)	Debris Volume (cy)
100 series	34.8	108	111	363
200 series	79.6	180	187	902
300 series	201	440	510	2668
400 series	17.2	34	34	0
500 series	116.5	281	295	1424
600 series	356.5	538	854	9982
700 series	2.1	7	11	116
800 series	4.0	14	25	103
900 series	22.2	85	85	0
Totals[1]	**833.9**	**1,687**	**2,112**	**15,558**

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[1] *Slight reduction (about 2 acres) in total area from existing conditions is due to on-site grading and rounding of numbers.*

[2] *Q50c - 50-year rainfall intensity clear flow.*

[3] *Q50bb - 50-year Capital Flood burned and bulked flow.*

[4] *When compared to the pre-development conditions, typically more drainage areas are called out because the proposed project provides detail on how the hydrologic would be addressed*

[5] *When compared to pre-development conditions the acreage of the drainage area actually changes due to several factors: rounding of numbers and by altering some of the slopes on the site, some of drainage areas causing them to drain away from the river instead of toward the river.*

Note.Drainage conditions for specific areas should not be compared with existing-condition series, but should be reviewed as a whole. Changes to series-specific flows are largely a function of modifications to drainage subareas.

4.3 HOUSING OR STRUCTURES WITHIN A 100-YEAR FLOOD HAZARD AREA

The project encroaches upon the existing FEMA flood hazard area, and residential lots 338 through 352 along the southern site boundary would be located within the 100-year flood hazard area. As previously indicated, the project proposes buried bank stabilization which would protect the affected residential units from flood waters.

The bank stabilization improvements and the proposed Newhall Ranch Road/Golden Valley Road Bridge would be placed within the 100-year flood hazard area of the Santa Clara River. The Santa Clara River will be slightly altered by the placement of the bank stabilization, erosion protection and the Newhall Ranch/Golden Valley Road Bridge. The bank stabilization and erosion protection would provide adequate protection to the developed areas from flood danger; therefore, a modification to the FEMA flood hazard boundary will be necessary and appropriate to correspond to the location of the bank stabilization improvements. As shown above, their locations and dimensions are such that neither the bank stabilization, erosion protection nor the bridge would impede or redirect flood flows within the river. .

4.4 EXPOSURE TO SIGNIFICANT RISK OF LOSS, INJURY, OR DEATH

The project site is located inland from the Pacific Ocean and not in proximity to any large, continuously-filled bodies of surface water; therefore, it is not subject to seiche or tsunamis. There are no dams upstream of the Riverpark site. There is no indication that the proposed project, or other existing or planned projects in the project area, would be at risk due to a failure of a dam. Furthermore, although the site is subject to some debris and mud flows, adequate building setbacks from natural slopes and debris control facilities proposed in upstream areas of the site would protect the project development from debris and mudflow hazards. Therefore, the following impact analysis focuses on potential impacts associated with flooding within the river.

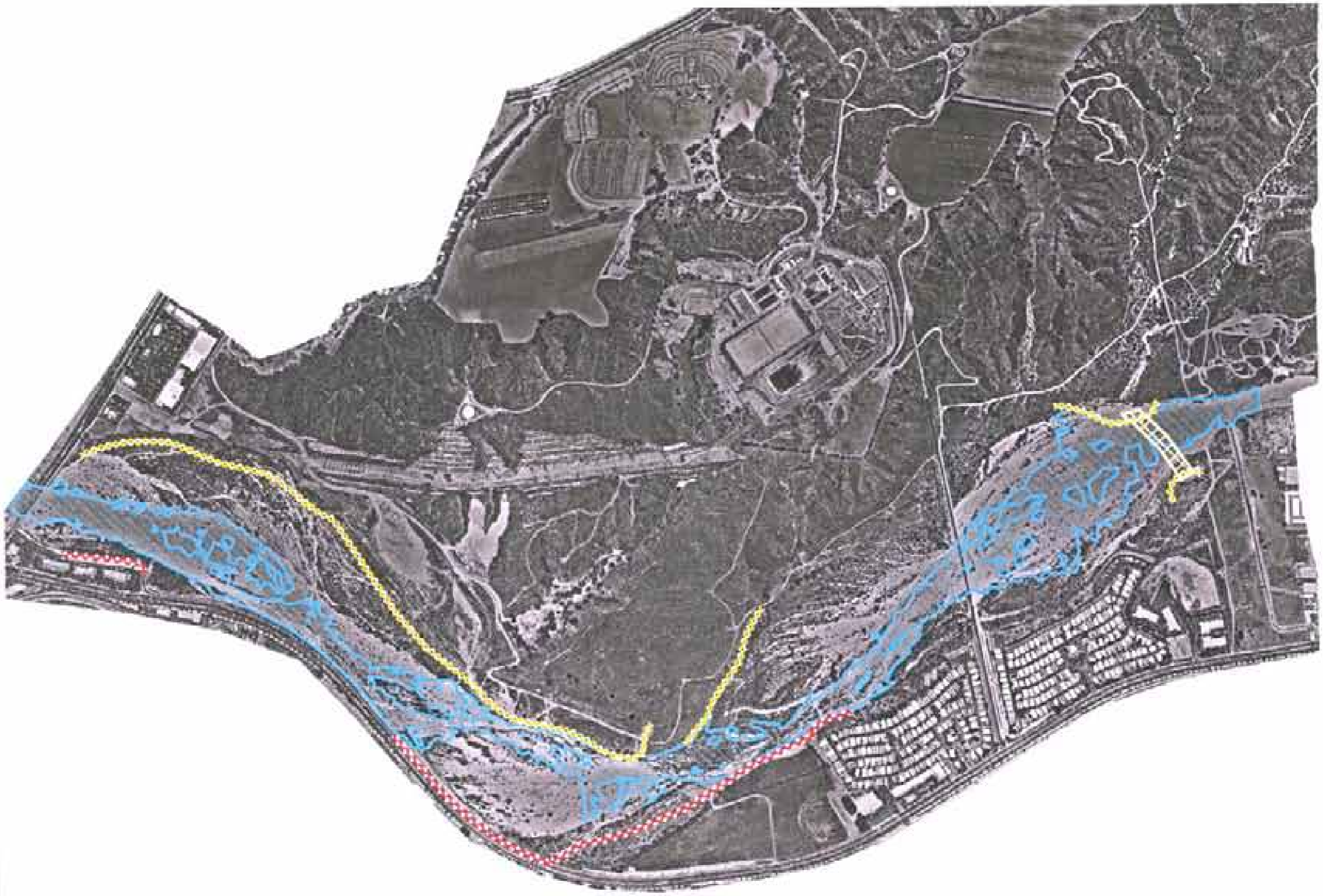
As designed, the proposed bank stabilization will protect the development areas on the site from the 100-year and 50-year Capital Flood events in the Santa Clara River and would only slightly increase the water surface elevation of the river on-site (by less than a foot).

Under both existing and developed conditions, floodplain areas would be inundated during extreme events (i.e., the 50-Year, 100-Year and Capital floods). **Table 8, Pre- and Post-Development Floodplain/Stream Area,** compares the pre- and post-development acreages of the floodplain for the seven storm events. The floodplain of the river in this analysis begins at the Bouquet Canyon Road Bridge and ends 3,040 feet upstream of the California Aqueduct pipeline crossing, or directly north of the Newhall Ranch Road/Golden Valley Road Bridge. As shown, the acreage within the river study area that would be subject to flooding would decrease with project development by as much as 42.3 acres. As indicated the project includes bank stabilization and erosion protection, which would protect the development areas from flood waters.

Table 8
Pre- and Post-Development Floodplain/Stream Area

Storm Event	Existing Conditions Acreage	Post Development Acreage	Difference
2-Year	109.4	105.0	-4.4
5-Year	187.6	179.3	-8.3
10-Year	266.0	250.8	-15.2
20-Year	300.5	278.7	-21.8
50-Year	325.0	295.2	-29.8
100-Year	337.4	303.7	-33.7
Capital Flood	355.5	313.2	-42.3

Figures 10 through 16 graphically illustrate the effects of the installation of the proposed bank stabilization, erosion protection and the Newhall Ranch Road/Golden Valley Road Bridge. Water surface elevations on-site would increase slightly with construction of the proposed bank stabilization, but would dissipate. These increases are not considered significant as they are less than one foot and would not expose people or structures to a significant risk of loss, injury or death involving flooding.



Topography & Aerial photo flown November 20, 1998
Habitat survey completed April 27, 2002

NEWHALL LAND
RIVERPARK

Legend

- Project Bank Stabilization
- Approximate Location of Existing Bank Stabilization
- Newhall Ranch Road Bridge
- ▭ 2 Year Flood Levels

500 0 500 1000 Feet

PSOMAS

Figure 10

Santa Clara River
Proposed Conditions
2 Year Flood Event

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Figure 11

Santa Clara River
Proposed Conditions
5 Year Flood Event

Topography & Aerial photo flown November 20, 1998
Habitat survey completed April 27, 2002

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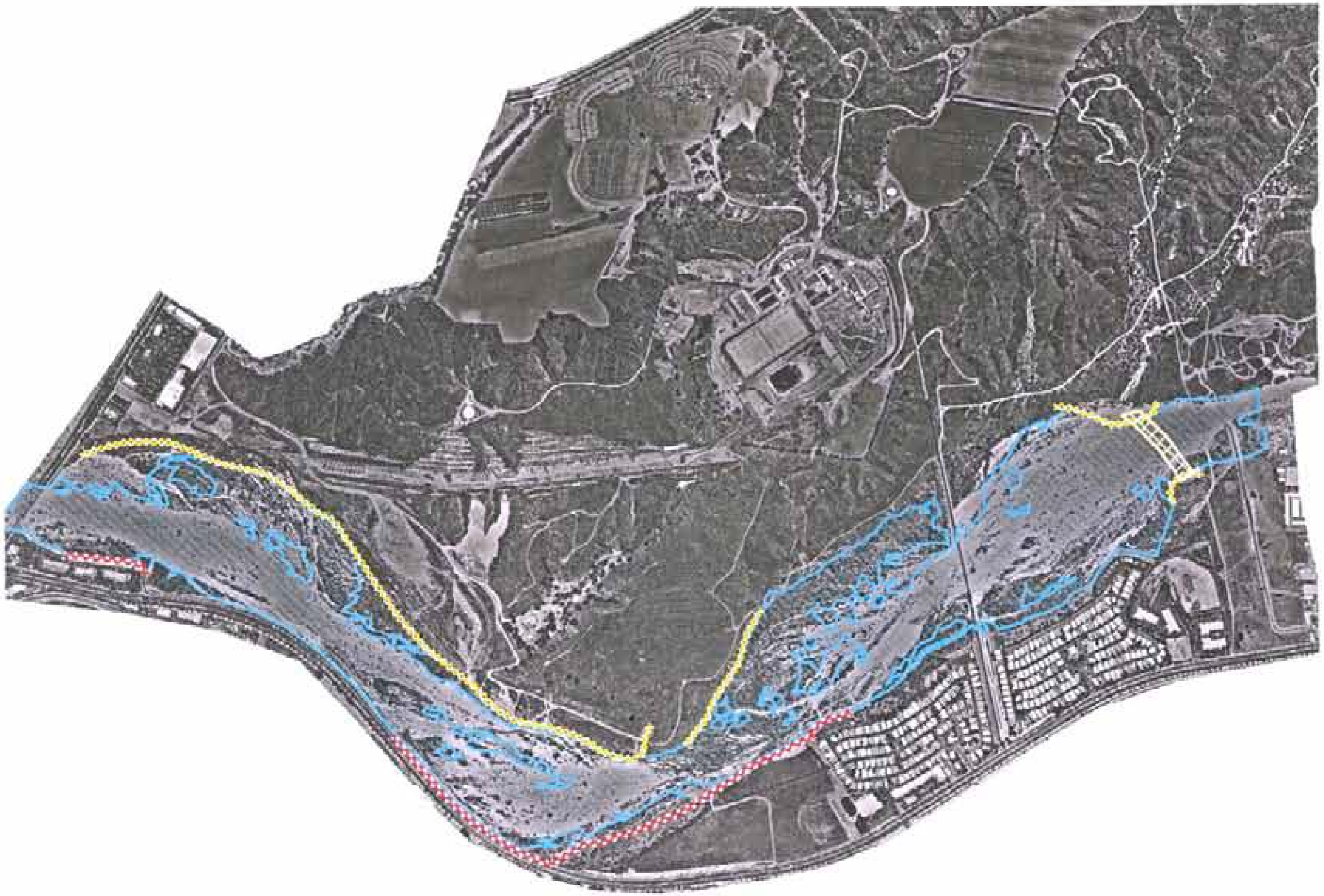

Topography & Aerial photo flown November 20, 1998
Habitat survey completed April 27, 2002

Figure 12

Santa Clara River
Proposed Conditions
10 Year Flood Event

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NEWHALL LAND
RIVERPARK

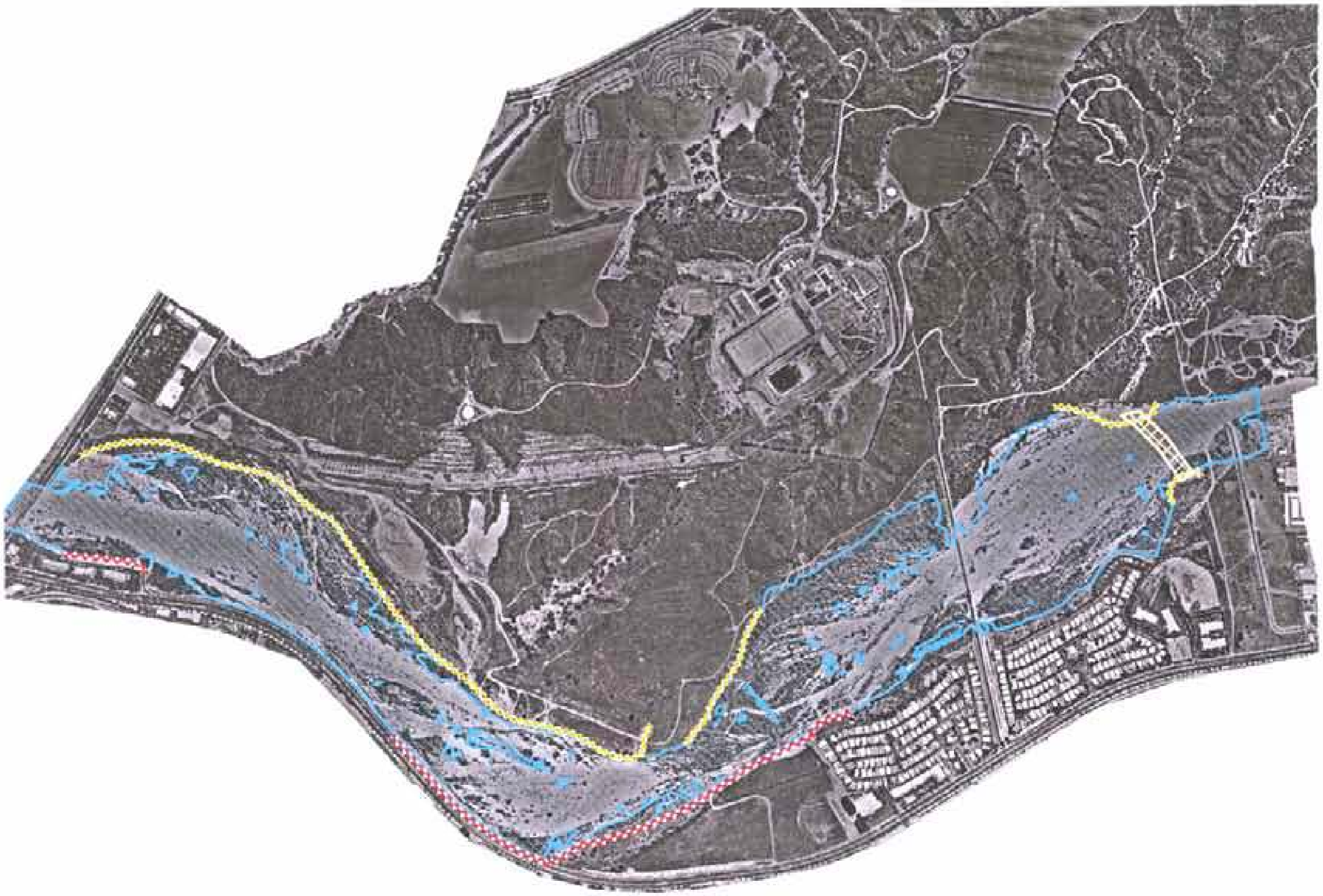

Figure 13

Santa Clara River
Proposed Conditions
20 Year Flood Event

Topography & Aerial photo flown November 20, 1998
Habitat survey completed April 27, 2002

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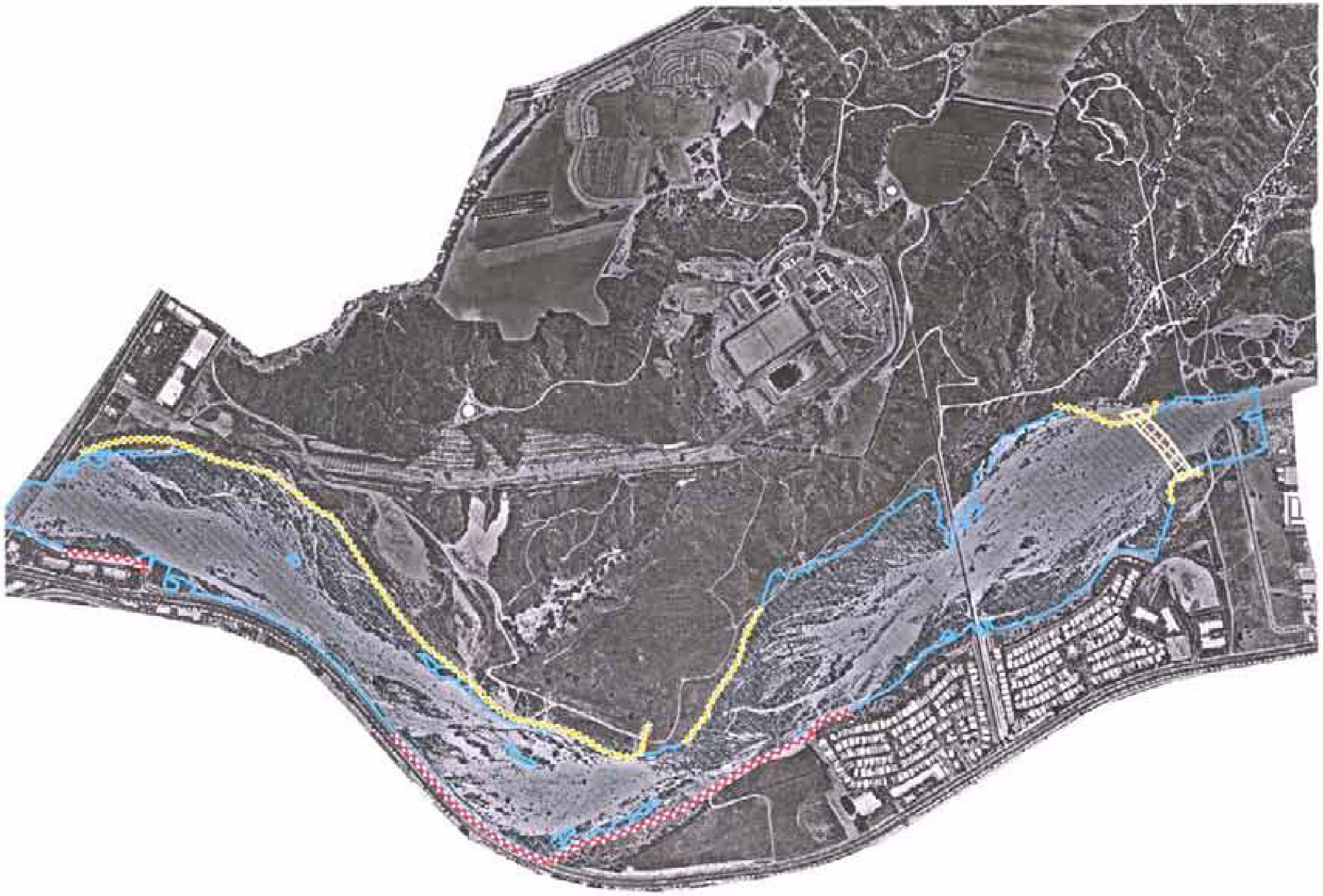

Figure 14
Santa Clara River
Proposed Conditions
50 Year Flood Event

Topography & Aerial photo flown November 20, 1998
Habitat survey completed April 27, 2002

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NEWHALL LAND
RIVERPARK

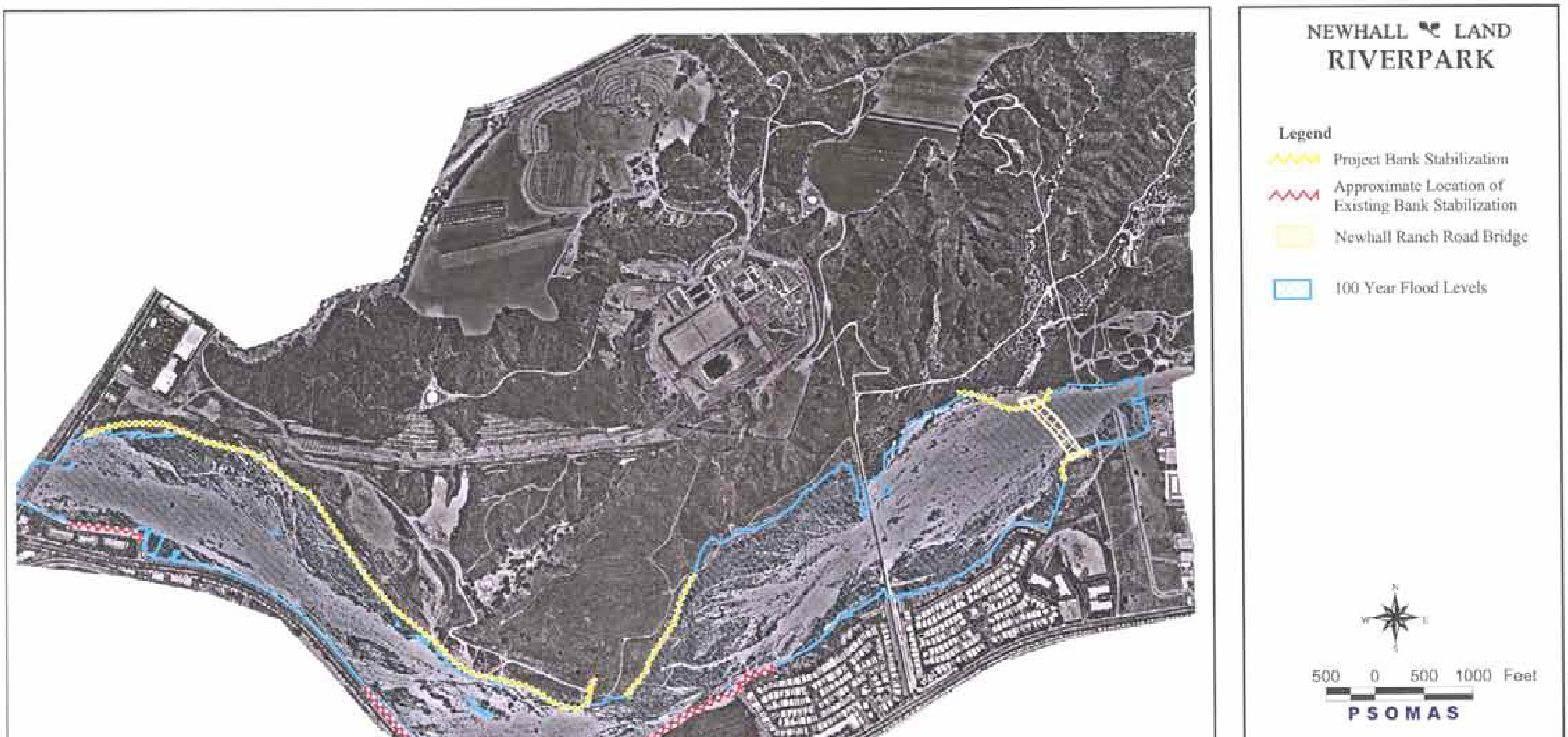

Figure 15

Santa Clara River
Proposed Conditions
100 Year Flood Event

Topography & Aerial photo flown November 20, 1998
Habitat survey completed April 27, 2002

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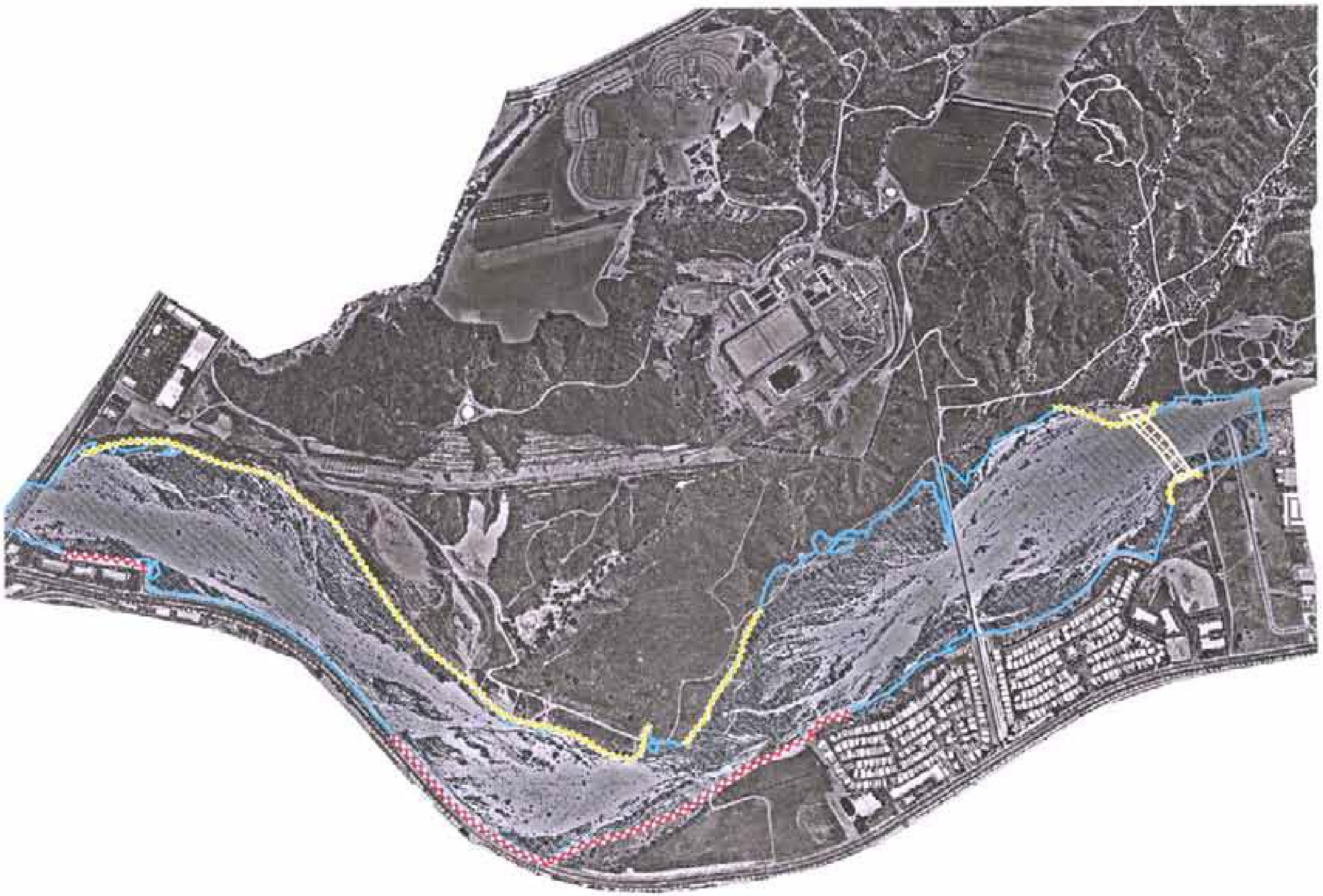

Figure 16

Santa Clara River
Proposed Conditions
Capital Flood Event

Topography & Aerial photo flown November 20, 1998
Habitat survey completed April 27, 2002

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4.5 WHETHER SUBSTANTIAL ALTERATION OF AN EXISTING DRAINAGE PATTERN WOULD RESULT IN SUBSTANTIAL EROSION OR SILTATION AND HARMFUL INCREASES IN EROSION

4.5.1 Santa Clara River

Erosion is not anticipated to be a concern on developed portions on the site. Potential for erosion within the river can be evaluated by reviewing changes to hydraulic shear stress or flow velocities, in conjunction with potentially erodible materials. In Los Angeles County, velocities are the preferred indicator for potential streambed erosion. Because the Santa Clara Riverbed is composed of alluvial materials such as alluvial silts, sands, and gravels, the nonerodible velocities (velocities below which no erosion would occur) range from 2.5 feet per second (fine gravels under clear flow conditions) to 5.0 feet per second (alluvial silts transporting colloidal materials) (Chow, 1959). Therefore, a representative velocity of 4.0 feet per second was determined to be the appropriate indicator for potential erosion.

If a significant amount of floodplain area were in the 0-4-foot/second range, but as a result of the project (including the Newhall Ranch Road/Golden Valley Road Bridge), would be subjected to velocities greater than 4 feet/second, it would be considered potentially significant. However, **Table 9, Pre- and Post-Development River Velocities**, indicates that increases in areas of the river that would be subject to velocities over 4 feet/second during a 2-year storm event would be minimal (increase of two acres), localized (in the immediate vicinity of the abutments and piers), and would be caused only by the smallest event scenario. There would be no net increases in areas affected by velocity during the 5- and 10-year storm events, and, decreases in river velocity for the 20- to 100-year storm events.

Table 9
Pre- and Post-Development River Velocities

Storm Event	Area (acres) with Velocities Greater than 4 ft/sec		Impacts (Percent Increase from Existing)
	Existing Scenario	Post-Development	
2-Year	32	34	6%
5-Year	86	86	0%
10-Year	137	137	0%
20-Year	174	168	-3%
50-Year	228	223	-2%
100-Year	276	264	-4%

4.5.2 Siltation

A comparison between **Table 3, Existing Drainages and Runoff Quantities**, and **Table 7, Post-Development Runoff Quantities**, demonstrates that total debris volume from the approximately 835-acre tributary watershed would decrease from 31,770 cy to 15,688 cy, which is approximately a 50 percent decrease . This reduction in sedimentation and debris production is a result of reduced erosion of the site due to coverage of much of the development area with pavement, roofs, vegetation, and other non-erosive surfaces. It is also a result of the proposed debris basins that would capture sediment and debris from project runoff.

With these improvements in place, the project would reduce post-construction impacts on on- and off-site erosion, downstream sedimentation, and debris production and transport.

4.5.3 On-Site Drainage Discharge Points

The Los Angeles MS4 Permit notes that increased volume, velocity, and discharge duration of storm water runoff from developed areas could potentially accelerate downstream erosion and impair stream habitat. As a result, the Permit stipulates that "Permittees shall control post-peak storm water runoff in Natural Drainage Systems to prevent accelerated stream erosion and protect stream habitat." The following discussion supports the conclusion that there are no significant downstream impacts potentially accelerating erosion and stream habitat:

- In smaller natural riverine systems, frequent discharges (on the order of the average annual and 2-year flows) dictate stream geomorphology. Extended and frequent discharges at these critical flow rates would potentially impact stream health. The project proposes water quality basins, which will capture small, frequent storms and release flows at non-erosive rates.
- To reduce storm flow velocities during smaller, more frequent flows (i.e., 2-year storm events) and to prevent erosion at stormwater discharge points into the river, the project has incorporated energy dissipaters consisting of either rip-rap or larger standard impact type energy dissipaters would be constructed at affected storm system outlets in the River.. These energy dissipaters would slow the rate of flow of runoff into the river in order to prevent erosion of the stream channel.

5 CUMULATIVE ANALYSIS

It has been estimated that approximately 4 percent of that portion of the Santa Clara River watershed found in Los Angeles County would be developed and approximately 2.5 percent of the portion of the watershed found in Ventura County would be developed.[3] Each development project in the Santa Clara River watershed (1,634 sq. miles) will be of varying character and size, will have its own unique topographic and geologic characteristics, will have flood impacts that will be unique to the geologic/soil conditions of the site and the tributary watershed in which it is located, and will be subject to the development criteria of the jurisdiction in which it is located.

All development within the portion of the watershed of the Santa Clara River located in Los Angeles County, including that within the City of Santa Clarita, is required to comply with the LACFWD Qcap requirements to ensure that upstream or downstream flooding does not occur. Compliance with these requirements ensures consistency with the County's Qcap model. Pursuant to LACDPW requirements, all drainage systems in developments that carry runoff from developed areas must be designed for the 25-year Urban Design storm, while storm drains under major and secondary highways, open channels (main channels), debris carrying systems, and sumps must be designed for the 50-year Capital Flood storm. LACDPW also prohibits significant increases in off-site post-development storm flows and significant increases in storm

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[3] Alex Sheydayi, Deputy Director, Ventura County Public Works Agency, Flood Control Department, statement made at the Santa Clara River Enhancement and Management Plan Steering Committee Meeting, May 30, 1995.

flow velocities. Development in the Los Angeles County portion of the watershed must also comply with LACDPW design criteria. As a result of compliance, overall storm runoff discharge quantities from the watershed under post-development runoff conditions would be less than or equal to existing conditions largely because the runoff would be free of the debris that is typical of undeveloped watersheds and flow velocities would not increase significantly. Because on-site facilities would already have been built for burned and bulked flows from undeveloped areas, they would have more than adequate capacity to accommodate off-site flows as the off-site portions of the drainage areas develop.

As the analysis of project development demonstrates, development in minor drainage courses within the portions of the watershed located in Los Angeles County in compliance with these requirements would experience a decrease in burned and bulked runoff as the hillsides of the watershed develop.[4] Discharge quantities into the Santa Clara River from these minor drainages under post-development conditions would be less than under existing conditions because the runoff would be free of the debris that is typical of undeveloped watersheds. As a policy, both the City of Santa Clarita and the LACDPW prohibit significant increases in flow velocity from a project site; therefore, adherence to this policy would result in no significant cumulative increases in velocity or erosion/sedimentation impacts along that portion of the Santa Clara River which drains to this watershed.

Other projects within the City of Santa Clarita and Los Angeles County would be subject not only to the same general requirements as the proposed Riverpark project, but also to such other requirements as the City of Santa Clarita (as applicable) and LACDPW would specifically identify for them based on their unique topographic and geologic characteristics.

The analysis of project conditions, above, demonstrates that project development, which must comply with all of these City and County requirements, would not create any significant impacts. Compliance with the applicable regulations results in the less discharge from the project post-development as compared to pre-development levels, and thus runoff from the project causes no incremental increase in the cumulative impact of watershed-wide development.

The City of Santa Clarita General Plan provides for additional development within this tributary watershed. However, the only probable future development within the approximate 835-acre tributary drainage in which the project is located is the Santa Clarita Parkway Bridge. As shown by the analysis below, the addition of that Bridge to the tributary drainage also would not cause any significant impacts. Therefore, cumulative development within this tributary drainage would not cause any cumulative impacts.

Because the cumulative project drainage improvements in the City of Santa Clarita and Los Angeles County would be required to conform to the requirements of the City of Santa Clarita Department of Engineering Services and the LACDPW in order to handle the Capital Flood from the affected watershed, no potentially significant cumulative project flooding impacts are expected to occur from the incremental impacts of the project. The development criteria of each jurisdiction will ensure that no potentially significant cumulative impacts will occur.

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[4] **See sections 2.1.1 amd 2.1.2 for reference discussion.**

5.1 LACDPW DESIGN CRITERIA

Because on-site drainage facilities would have adequate capacity to capture and convey off-site flows from developed upstream areas and because the storm drainage improvements in the remainder of the watershed would be required to comply with LACDPW design criteria, no significant increases in velocity and related scouring, and no potentially significant cumulative project flooding impacts are expected to occur downstream of the site as the watershed builds out.

5.2 FLOODPLAIN

Table 10, Pre-, Post-Development, and Cumulative Floodplain/Stream Area, compares the pre- and post-development acreages of the floodplain for seven storm events. As shown, the acreage subject to flooding under would decrease with cumulative project development for all storm events except the 2-year. In the cumulative scenario, the already constructed bank stabilization associated with Tract 20838 would protect Soledad Canyon Road from flooding in all storm events.

Table 10
Pre-, Post-Development, and Cumulative Floodplain/Stream Area

Storm Event	Pre-Development (acres)	Post-Development (acres)	Cumulative (including Santa Clarita Parkway Bridge) (acres)
2-Year	109.4	105	106.2
5-Year	187.6	179.3	178.4
10-Year	266.0	250.8	250.7
20-Year	300.5	278.7	278.3
50-Year	325	295.2	295.1
100-Year	337.4	303.7	302.9
Capital Flood	355.5	313.2	310.7

As shown in **Table 11,** there would be no significant increases in water surface elevation in the Santa Clara River under the cumulative impacts scenario, which assumes full buildout upstream from the project site. No potentially significant floodplain impacts are anticipated as a result of cumulative buildout.

Table 11
Water Surface Elevation at Selected River Locations from Upstream to Downstream

Storm Event	Modeled Scenario	Cross-Section (XS) and station (approximate distance in feet upstream from Bouquet Canyon Bridge)														
		Proposed Newhall Ranch Rd/Golden Valley Road Br							Future Santa Clarita Parkway Bridge							Existing Bouquet Canyon Bridge
		XS 12207	**XS 11101**	**XS 10215**	**XS 9100**	**XS 8293**	**XS 7349**	**XS 6229**	**XS 5812**	**XS 5243**	**XS 4198**	**XS 3206**	**XS 2183**	**XS 1187**	**XS 342**	**XS 13**
2YEAR	Existing	1261.6	1252.1	1241.5	1231.6	1224.2	1216.5	1206.7	1204.1	1198.9	1189.2	1179.4	1171.6	1163.1	1155.4	1151.0
	Proposed	1262.9	1252.1	1241.7	1231.6	1224.2	1216.6	1206.6	1204.1	1198.9	1189.2	1179.5	1171.6	1163.2	1155.1	1151.1
	Cumulative	1262.9	1252.1	1241.7	1231.6	1224.2	1216.6	1206.8	1204.1	1198.9	1189.2	1179.5	1171.6	1163.2	1155.1	1151.1
Difference between Existing and Cumulative		0	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0
		XS 12207	**XS 11101**	**XS 10215**	**XS 9100**	**XS 8293**	**XS 7349**	**XS 6229**	**XS 5812**	**XS 5243**	**XS 4198**	**XS 3206**	**XS 2183**	**XS 1187**	**XS 342**	**XS 13**
5YEAR	Existing	1262.5	1252.3	1242.2	1232.7	1225.7	1217.5	1207.2	1204.6	1199.3	1189.8	1180.7	1172.6	1163.9	1156.1	1152.1
	Proposed	1264.4	1252.3	1242.2	1232.8	1225.7	1217.5	1207.2	1204.6	1199.3	1189.8	1180.7	1172.6	1163.9	1156.1	1152.1
	Cumulative	1264.1	1252.3	1242.2	1232.8	1225.7	1217.5	1207.2	1204.6	1199.3	1189.8	1180.7	1172.6	1163.9	1156.1	1152.1
Difference between Existing and Cumulative		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		XS 12207	**XS 11101**	**XS 10215**	**XS 9100**	**XS 8293**	**XS 7349**	**XS 6229**	**XS 5812**	**XS 5243**	**XS 4198**	**XS 3206**	**XS 2183**	**XS 1187**	**XS 342**	**XS 13**
10YEAR	Existing	1262.7	1252.6	1242.6	1233.0	1225.8	1217.7	1207.8	1205.1	1199.7	1190.4	1181.1	1173.2	1164.5	1156.7	1152.7
	Proposed	1264.7	1252.6	1242.6	1233.0	1225.5	1217.7	1207.8	1205.1	1199.7	1190.5	1181.1	1173.0	1164.5	1156.7	1152.9
	Cumulative	1264.7	1252.6	1242.6	1233.0	1225.5	1217.7	1207.8	1205.1	1199.7	1190.5	1181.1	1173.0	1164.5	1156.7	1152.9
Difference between Existing and Cumulative		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		XS 12207	**XS 11101**	**XS 10215**	**XS 9100**	**XS 8293**	**XS 7349**	**XS 6229**	**XS 5812**	**XS 5243**	**XS 4198**	**XS 3206**	**XS 2183**	**XS 1187**	**XS 342**	**XS 13**
20YEAR	Existing	1263.3	1252.7	1243.1	1233.5	1226.9	1218.5	1208.4	1205.4	1200.1	1191.0	1181.7	1173.5	1165.4	1157.3	1153.3
	Proposed	1265.6	1252.7	1243.1	1233.5	1227.2	1218.5	1208.4	1205.4	1200.1	1191.1	1181.7	1173.5	1165.4	1157.3	1153.4
	Cumulative	1265.6	1252.7	1243.1	1233.5	1227.2	1218.5	1208.4	1205.5	1200.1	1191.1	1181.7	1173.5	1165.4	1157.3	1153.4
Difference between Existing and Cumulative		0	0	0	0	0.2	0	0	0.1	0	0	0	0	0	0	0
		XS 12207	**XS 11101**	**XS 10215**	**XS 9100**	**XS 8293**	**XS 7349**	**XS 6229**	**XS 5812**	**XS 5243**	**XS 4198**	**XS 3206**	**XS 2183**	**XS 1187**	**XS 342**	**XS 13**
50YEAR	Existing	1264.1	1253.4	1243.7	1234.1	1227.4	1219.4	1209.3	1206.0	1200.4	1191.6	1182.5	1174.2	1166.1	1158.5	1154.3
	Proposed	1265.9	1253.4	1243.7	1234.2	1227.4	1219.4	1209.3	1206.0	1200.4	1191.6	1182.5	1174.2	1166.2	1158.5	1154.2
	Cumulative	1265.9	1253.4	1243.7	1234.2	1227.4	1219.4	1209.3	1206.2	1200.4	1191.9	1182.5	1174.2	1166.2	1158.5	1154.2

Difference between Existing and Cumulative	0	0	0	0	0	0	0	0.2	0	0.3	0	0	0	0	0

	XS 12207	XS 11101	XS 10215	XS 9100	XS 8293	XS 7349	XS 6229	XS 5812	XS 5243	XS 4198	XS 3206	XS 2183	XS 1187	XS 342	XS 13
100YR Existing	1264.6	1254.0	1244.5	1234.8	1228.3	1220.3	1210.0	1206.7	1201.1	1192.8	1183.2	1174.8	1166.8	1159.4	1155.1
Proposed	1266.9	1254.0	1246.2	1234.8	1228.3	1220.3	1210.1	1206.8	1201.1	1192.8	1183.2	1174.9	1166.8	1159.4	1155.0
Cumulative	1266.9	1254.0	1244.5	1234.8	1228.3	1220.3	1210.1	1206.7	1201.1	1192.8	1183.2	1174.9	1166.8	1159.4	1155.0
Difference between Existing and Cumulative	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

5.3 STREAM EROSION AND DEBRIS DEPOSITION

Using the benchmark of increases in areas with velocities of 4 feet/second, **Table 12, Cumulative Impacts on Erosion**, demonstrates no appreciable increases in potentially eroded areas due to buildout of the study area during the 2- and 5-year storm events, and a decrease in area during the 10-year and greater storm events. Any increase is for relatively small storm events and local mitigation measures would be required in specific locations. Unlike larger storm events, which would transport sediment downstream, for smaller storms it is probable that many of these localized conditions will equilibrate. Therefore no potentially significant stream erosion and debris deposition impacts are anticipated due to the project, subject to mitigation.

Table 12
Cumulative Impacts on Erosion

Storm Event	Area (acres) with Velocities Greater than 4 ft/sec		Difference in Acreage
	Existing Conditions	Cumulative Conditions (including Santa Clarita Parkway Bridge)	
2-Year	31	35	+4
5-Year	85	86	+1
10-Year	136	133	-3
20-Year	176	172	-4
50-Year	229	223	-6
100-Year	286	267	-19

Because the cumulative project drainage improvements in the City of Santa Clarita and Los Angeles County would be required to conform to the requirements of the City of Santa Clarita Department of Engineering Services and the LACDPW in order to handle the Capital Flood from the affected watershed, no potentially significant cumulative project flooding impacts are expected to occur when the watershed reaches buildout. Erosion and sedimentation, when controlled as required by the City and County, would also not result in potentially significant cumulative impacts.

5.4 CONCLUSION

Other projects within Santa Clarita and Los Angeles County would not only be subject to the same general requirements as the proposed Riverpark project, but to other requirements that the City of Santa Clarita (as applicable) and LACDPW would specifically identify for them. All development within the watershed of the Santa Clara River within the City of Santa Clarita is already required to comply with the City of Santa Clarita Department of Engineering Services' requirements and locations within the unincorporated Los Angeles County would comply with the Los Angeles County. Department of Public Works Flood Control Division requirements have been established specifically to ensure that upstream or downstream flooding does not occur.. Erosion and sedimentation, when controlled as required by the City and County, would also not result in potentially significant cumulative impacts.

Therefore no unavoidable potential significant cumulative flooding, erosion and sedimentation impacts would be created. Compliance with these requirements ensures consistency with the County's Qcap model.

APPENDIX

- FEMA MAP

APPENDIX 4.3

Traffic and Circulation Report

RIVERPARK - VTTM 53425

Traffic Impact Analysis

February 2004

AUSTIN-FOUST ASSOCIATES, INC.

RIVERPARK - VTTM 53425

TRAFFIC IMPACT ANALYSIS

Prepared by:

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2020 North Tustin Avenue
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(714) 667-0496

February 5, 2004

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1.0 INTRODUCTION

This report presents the results of a traffic study carried out to evaluate the Riverpark project (VTTM 53425) and associated entitlements located in the City of Santa Clarita. It provides the traffic and circulation material for the Environmental Impact Report (EIR) prepared for this project.

1.1 PROJECT DESCRIPTION

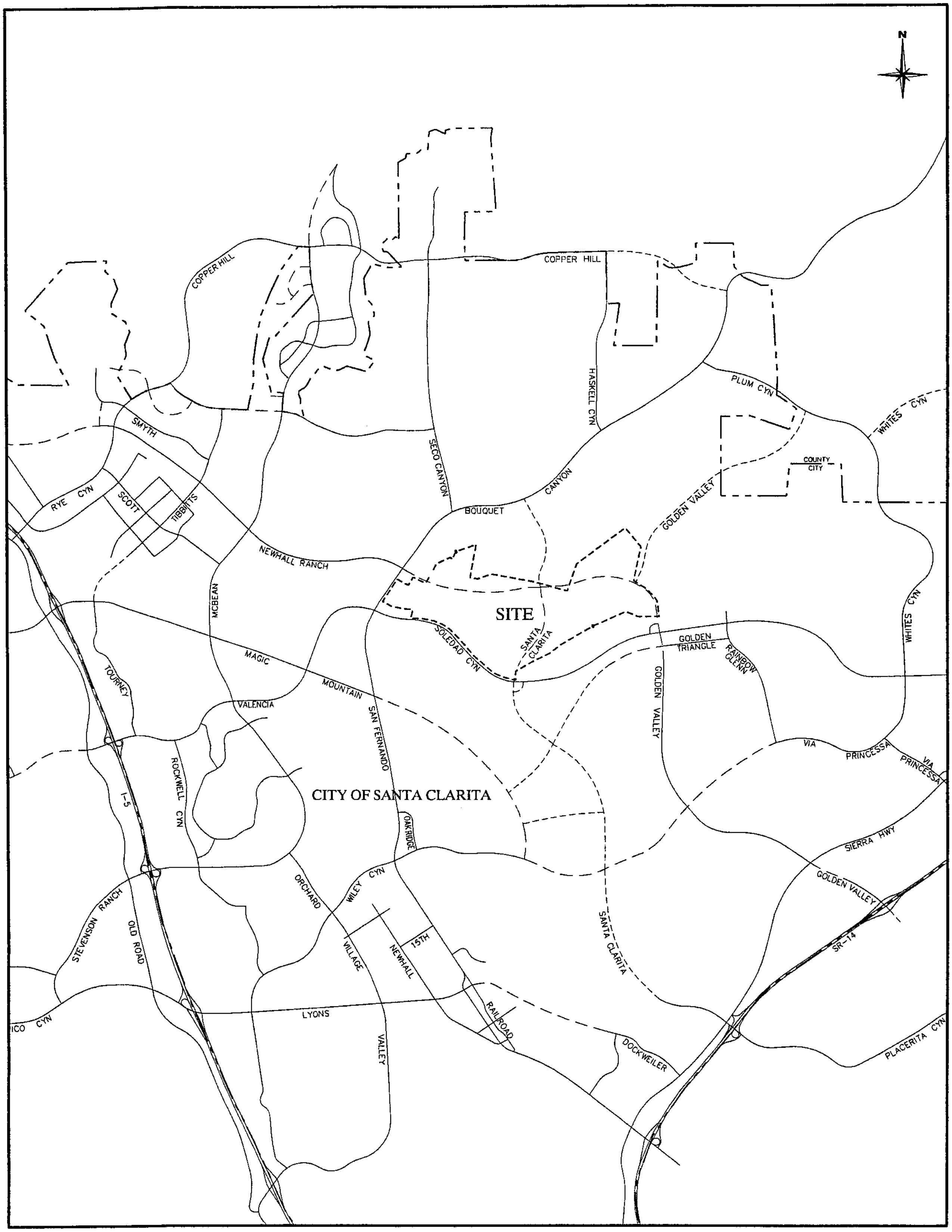
A detailed description of this project and the resulting California Environmental Quality Act (CEQA) requirements addressed here can be found in the Notice of Preparation and in the EIR itself. The proposed project is located on an approximately 695 acre site and consists of 1,183 residential dwelling units, a maximum of 40,000 square feet of retail commercial uses and a neighborhood park. The site is generally bounded by Bouquet Canyon Road to the west and the Santa Clara River to the south. Newhall Ranch Road will bisect the site and will provide the primary means of access. Figure 1-1 illustrates the location of the site in relation to the surrounding roadway system.

1.2 STUDY AREA

The study area includes the roadways and intersections near to the project site and those locations where project generated traffic could cause a significant impact. Figure 1-2 illustrates the intersections selected for study through consultations with City Transportation and Engineering Services staff.

1.3 METHODOLOGY

The traffic analysis evaluates the proposed project for both interim year and long-range timeframes using the Santa Clarita Valley Consolidated Traffic Model (SCVCTM). The SCVCTM was developed jointly by the City of Santa Clarita and the County of Los Angeles and is the primary tool used for forecasting traffic volumes for the Santa Clarita Valley.



Legend

———————— Existing Roadway
— — — — — — Interim Year Roadway
- - - - - - - - - - - Long-Range/Buildout Roadway
——— - - ——— City Boundary

Figure 1-1

PROJECT SITE LOCATION

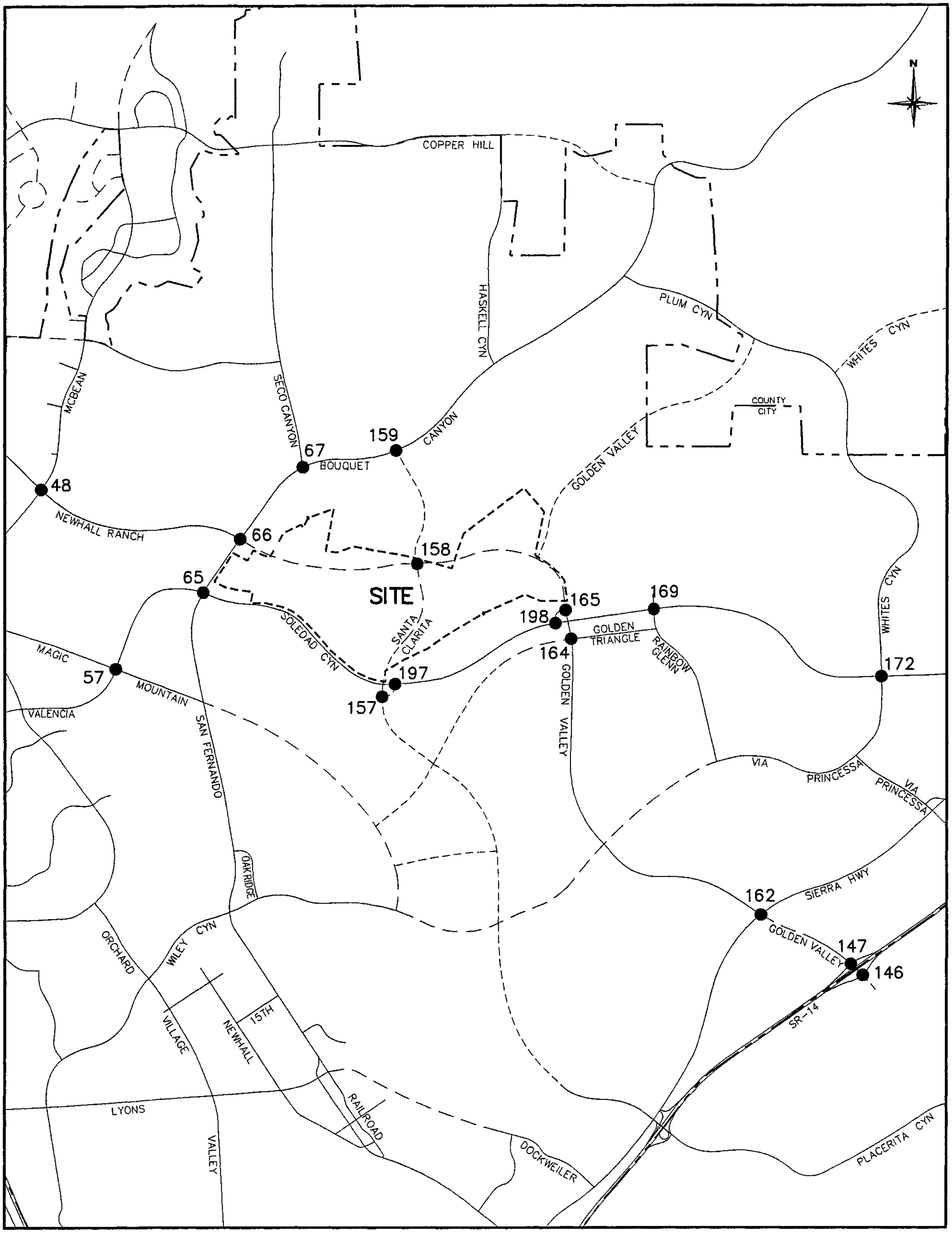


Figure 1-2

INTERSECTION STUDY LOCATIONS

The SCVCTM has the ability to provide traffic volume forecasts for two future scenarios; Interim Year which generally corresponds to a horizon of ten years in the future and Long-Range Cumulative which represents buildout conditions. As part of the development of this traffic impact analysis, an update to the traffic model was prepared which involved a review of current related project information from both the City and County. The SCVCTM land use database was then updated where necessary in order to include the most current information (see Section 2.2 for related project information).

The development of the full project (i.e., 1,183 residential dwelling units, a maximum of 40,000 square feet of retail commercial uses and a neighborhood park) includes the planned extension of Newhall Ranch Road over the Santa Clara River to connect with the planned and substantially funded extension of Golden Valley Road (referred to collectively as segments of the Cross-Valley Connector). Planned for completion in 2006/2007, the Cross-Valley Connector will provide a continuous route from the State Route 14 (SR-14) freeway at Golden Valley Road to Interstate 5 (I-5) at the SR-126 interchange. Since this major infrastructure improvement will result in significant and complex changes to existing travel patterns, an analysis scenario in which project traffic is added to existing conditions would not adequately analyze reasonably foreseeable future conditions and potential impacts. Therefore, this analysis adds project traffic to background conditions that include the future traffic patterns that will occur as a result of this new roadway.

An analysis of a partial occupancy of the project (occupancy of a maximum of 500 residential units) is also provided for a scenario with assumptions that do not include the completion of the Cross-Valley Connector.

The impact analysis is based on specific performance criteria which are outlined in the following section. Where appropriate, mitigation measures are identified for those scenarios in which one or more locations do not meet the performance criteria.

1.4 PERFORMANCE CRITERIA

For CEQA purposes, defined performance criteria are utilized to determine if a proposed project causes a significant impact. In most traffic studies, performance criteria are based on two primary measures. The first is "capacity" which establishes the vehicle carrying ability of a roadway and the second is "volume." The volume measure is either a traffic count (in the case of existing volumes) or a forecast for a future point in time. The ratio between the volume and the capacity gives a volume/capacity (V/C) ratio and based on that V/C ratio, a corresponding level of service (LOS) is defined. The end of this chapter contains level of service descriptions for arterial roadways and freeways as contained in the 2000 Highway Capacity Manual (see Reference 1 at the end of this chapter and referred to as "HCM 2000" in this report).

Table 1-1 summarizes the V/C ranges that correspond to LOS "A" through "F" for arterial roads and freeway segments. The V/C ranges listed for arterial roads within the study area are designated in the General Plan for the City of Santa Clarita (see Reference 10 at the end of this chapter). The V/C ranges listed for freeway segments are based on the V/C and LOS relationships specified in the HCM 2000 for basic freeway sections.

Both the V/C ratio and the LOS are used in determining impact significance. Certain LOS values are deemed unacceptable by the City and increases in the V/C ratio which cause or contribute to the LOS being unacceptable are defined as a significant impact.

In establishing V/C based performance criteria, there are certain items that need to be addressed to obtain suitable V/C estimates and relate them to LOS. For instance, while average daily traffic (ADT) is a useful measure to show general levels of traffic on a facility and to provide data for other related aspects such as noise and air quality, highway congestion is largely a peak hour or peak period occurrence and ADT does not reflect peak period conditions very effectively. Because of this, ADT is not used here as the basis for capacity evaluation but instead this evaluation focuses on those parts of the day when such congestion can occur, specifically the AM and PM peak hours.

The performance criteria are based on defined criteria for three fundamental components of the circulation system; freeway mainline segments, arterial roads (including intersections), and freeway ramps. Peak hour data (AM and PM) is used in each case to establish V/C and LOS measures and to define what constitutes a significant impact. The following section outlines the impact criteria for the facilities within the project study area.

1.4.1 Freeways

The impact analysis for freeway mainline segments uses peak hour volumes by direction as the basis for the analysis. Capacities for calculating peak hour V/C ratios for freeway mainline segments are based on information contained in the July 1995 Caltrans Highway Design Manual (see Reference 3 in

Table 1-1

VOLUME/CAPACITY RATIO LEVEL OF SERVICE RANGES

VOLUME/CAPACITY (V/C) RATIO RANGE	LEVEL OF SERVICE (LOS)
ARTERIAL ROADS	
0.00 – 0.60	A
0.61 – 0.70	B
0.71 – 0.80	C
0.81 – 0.90	D
0.91 – 1.00	E
Above 1.00	F
FREEWAY SEGMENTS	
0.00 – 0.30	A
0.31 – 0.50	B
0.51 – 0.71	C
0.72 – 0.89	D
0.90 – 1.00	E
Above 1.00	F

Section 1.7) and have been verified through discussions with Caltrans staff (see Appendix F). A capacity of 2,000 vehicles per hour per lane (vphpl) is used for mixed-flow (general purpose) mainline freeway lanes, a capacity that corresponds to LOS E conditions. HOV capacities used for this analysis are lower than the capacity for a mixed-flow freeway lane and reflect the objective for HOV facilities to operate better than LOS E. Consistent with this objective, a desirable operating capacity of 1,600 vphpl is applied for a one-lane "buffer-separated" HOV facility.

For this analysis, any additional mainline capacity that may be realized due to the existence of an auxiliary lane (the portion of the roadway for weaving, truck climbing, speed change, or for other purposes supplementary to through traffic movement) was not included in order to provide a conservative estimate of overall capacity. The capacity of a freeway auxiliary lane is difficult to define since auxiliary lanes are typically implemented to preserve standard freeway capacities at locations where the geometric design is below standard (for example, between interchanges that are spaced less than one mile apart or where heavy on/off ramp volumes occur between interchanges). While an auxiliary lane can increase the overall capacity of a mainline freeway segment, the practical increase depends on such key factors as the length of the auxiliary lane and the on/off ramp volumes at the beginning and end of the auxiliary lane.

The capacity assumptions for freeway mixed-flow and HOV lanes are summarized in Table 1-2 together with the overall impact criteria for analyzing freeway mainline segments within the traffic analysis study area. The LOS E performance standard listed here had been established by Caltrans (see Appendix F) as the operating standard for freeway mainline segments and is also consistent with Los Angeles County Congestion Management Program (CMP) requirements (see Reference 9 in Section 1.7).

1.4.2 Arterial Roads

For the arterial system, the peak hour is the accepted time period used for impact evaluation and a number of techniques are available to establish suitable V/C ratios and define the corresponding LOS. These definitions and procedures are established by individual local jurisdictions and by regional programs such as the CMP.

The analysis of the arterial road system is based on intersection capacity since this is the defining capacity limitation on an arterial highway system. Levels of service for arterial roadway intersections are determined based on operating conditions during the AM and PM peak hours. The intersection capacity

Table 1-2

FREEWAY MAINLINE PERFORMANCE CRITERIA

V/C Calculation Methodology

Level of service to be based on peak hour volume/capacity (V/C) ratios calculated using the following capacities:

2,000 vehicles per hour per lane (vphpl) for mixed-flow (general purpose) lanes under stable flow conditions.

1,600 vphpl for a one-lane high occupancy vehicle (HOV) facility under stable flow conditions.

Performance Standard

Level of Service E (peak hour V/C less than or equal to 1.00).

Threshold of Significance

If based on a comparison with existing conditions, a project related V/C increase is greater than or equal to .02 (the impact threshold specified in the CMP) for a freeway mainline segment that is forecast to operate worse than the performance standard, then the impact of that project scenario or alternative is considered significant.

Abbreviations: CMP – Los Angeles County Congestion Management Program utilization (ICU) methodology is applied using peak hour volumes and the geometric configuration of the intersection. This methodology sums the V/C ratios for the critical movements of an intersection and is the preferred procedure for intersection analysis by the City of Santa Clarita (see Reference 5 in Section 1.7). The ICU methodology is comparable to the intersection capacity analysis methodology outlined in the HCM 2000.

The ICU calculation methodology and associated impact criteria proposed for the study area arterial system are summarized in Table 1-3. The City utilizes LOS D (ICU not to exceed 0.90) as the accepted standard and target level of service for future intersections. The City's *General Plan Circulation Element*, updated in December 1997 (see Reference 10 in Section 1.7), establishes the basis for the thresholds of significance for traffic impacts used in this analysis. These thresholds supercede the thresholds specified in the 1990 *Preliminary Traffic Impact Report Guidelines* (see Reference 5 in Section 1.7). Discussions with City staff in the Transportation and Engineering Services Department provided the detailed impact thresholds listed in the previously referenced Table 1-3.

1.4.3 Freeway Ramps

Similar to the arterial system evaluation, the peak hour is also the accepted time period used for impact evaluation of freeway interchange ramps. For this study, levels of service for freeway ramps within the traffic analysis study area are based on AM and PM peak hour V/C ratios. Capacities for the various ramp configurations that either exist or are anticipated on the freeway system within the traffic analysis study area are based on information contained in the July 1995 *Caltrans Highway Design Manual* and the January 2000 *Caltrans Ramp Meter Design Manual* (see References 3 and 4, respectively, in Section 1.7) and have been verified through discussions with Caltrans staff (see Appendix F).

The capacities for calculating ramp V/C ratios are summarized in Table 1-4 together with the overall impact criteria for freeway ramps within the study area. The LOS E performance standard listed in the table has been established by Caltrans as the operating standard for freeway ramps.

1.5 LEVEL OF SERVICE DESCRIPTIONS

Tables 1-5, 1-6, and 1-7 summarize the level of service descriptions for arterial highways, intersections and freeways, respectively. These descriptions are taken from material contained in HCM 2000.

1.6 DEFINITIONS

Certain terms used throughout this report are defined below to clarify their intended meaning:

ADT	Average Daily Traffic. Generally used to measure the total two-directional traffic volumes passing a given point on a roadway.
CMP	Congestion Management Program. A state mandated program administered by the Los Angeles County Metropolitan Transportation Authority (MTA) that provides a mechanism for coordinating land use and development decisions.
ICU	Intersection Capacity Utilization. A measure of the volume to capacity ratio for an intersection. Typically used to determine the peak hour level of service for a given set of intersection volumes.
LOS	Level of Service. A scale used to evaluate circulation system performance based on intersection ICU values or volume/capacity ratios of arterial segments.
Peak Hour	This refers to the hour during the AM peak period (typically 7 AM - 9 AM) or the PM peak period (typically 3 PM - 6 PM) in which the greatest number of vehicle trips are generated by a given land use or are traveling on a given roadway.
Tripend	A trip generation measure which represents the total trips entering and leaving a location.
V/C	Volume to Capacity Ratio. This is typically used to describe the percentage of capacity utilized by existing or projected traffic on a segment of an arterial or intersection.

Table 1-3

ARTERIAL INTERSECTION PERFORMANCE CRITERIA

ICU Calculation Methodology

Level of service to be based on peak hour ICU values calculated using the following assumptions:

Saturation Flow Rate: 1,750 vehicles/hour/lane
Clearance Interval: .10
RTOR Allowed: Yes*
RTOR Saturation Factor: .75
No minimum volume/capacity assumed

Performance Standard

LOS D

Thresholds of Significance

A significant impact occurs when any of the following conditions are met:

With-Project ICU	Project Increment
.81-.90 (LOS D)	greater than or equal to .02
.91 or more (LOS E or F)	greater than or equal to .01

Mitigation must be identified that results in an ICU less than or equal to pre-project conditions.

Sources: City of Santa Clarita Traffic Impact Report Guidelines and December 1997 City of Santa Clarita General Plan Circulation Element (See Reference 5 & 10, respectively, in Section 1.7), and the City Transportation and Engineering Services Department.

* "De facto" right-turn lane is used in the ICU calculation if 19 feet from edge of pavement to inside of through-lane exists and parking is prohibited during peak hours.

Abbreviations:	ICU – Intersection Capacity Utilization
	RTOR – Right-turn On Red
	LOS – Level of Service

Table 1-4

FREEWAY RAMP PERFORMANCE CRITERIA

V/C Calculation Methodology

Level of service to be based on peak hour volume/capacity (V/C) ratios calculated using the following ramp capacities:

Freeway to Arterial Road Interchanges

Metered On-Ramps

A maximum capacity of 900 vehicles per hour (vph) for a one-lane metered on-ramp with only one mixed-flow lane at the meter.

A maximum capacity of 1,080 (20 percent greater than 900) vph for a one-lane metered on-ramp with one mixed-flow lane at the meter plus one HOV preferential lane at the meter.

A maximum capacity of 1,500 vph for a one-lane metered on-ramp with two mixed-flow lanes at the meter.

A maximum capacity of 1,800 vph for a two-lane metered on-ramp with two mixed-flow lanes at the meter.

Non-Metered On-Ramps and Off-Ramps

A maximum capacity of 1,500 vph for a one-lane ramp.

A maximum capacity of 2,250 (50 percent greater than 1,500) vph for a two-lane on-ramp that tapers to one merge lane at or beyond the freeway mainline gore point and for a two-lane off-ramp with only one auxiliary lane.

A maximum capacity of 3,000 vph for a two-lane on-ramp that does not taper to one merge lane and for a two-lane off-ramp with two auxiliary lanes.

Performance Standard

Level of Service E (peak hour V/C less than or equal to 1.00).

Thresholds of Significance

If based on a comparison with existing conditions, a project related V/C increase is greater than or equal to .02 (the impact threshold specified in the CMP) for a freeway ramp that is forecast to operate worse than the performance standard, then the impact of that project scenario or alternative is considered significant.

Abbreviations:	V/C – Volume to Capacity Ratio
	VPH – Vehicles per Hour

Table 1-5

LEVEL OF SERVICE DESCRIPTIONS – URBAN STREETS

The average travel speed along an urban street is the determinant of the operating level of service (LOS). The travel speed along a segment, section, or entire length of an urban street is dependent on the running speed between signalized intersections and the amount of control delay incurred at signalized intersections. The following general statements characterize LOS along urban streets and show the relationship to free flow speeds (FFS)

LOS	DESCRIPTION	PERCENT OF FFS
A	LOS A describes primarily free-flow operations at average travel speeds, usually about 90 percent of the FFS for the given street class. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at signalized intersections is normal.	90
B	LOS B describes reasonably unimpeded operations at average travel speeds, usually about 70 percent of the FFS for the street class. Vehicles are completely unimpeded in their ability to maneuver with the traffic stream. Control delay at signalized intersections is minimal.	70
C	LOS C describes stable operations; however, ability to maneuver and change lanes in midblock locations may be more restricted that at LOS B, and longer queues, adverse signal coordination, or both may contribute to lower average travel speeds of about 50 percent of the FFS for the street class.	50
D	LOS D borders on a range in which small increases in flow may cause substantial increases in delay and decreases in travel speed. LOS D may be due to adverse signal progression, inappropriate signal timing, high volumes, or a combination of these factors. Average travel speeds are about 40 percent of FFS	40
E	LOS E is characterized by significant delays and average travel speeds of 33 percent or less of the FFS. Such operations are caused by a combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections, and inappropriate signal timing.	33
F	LOS F is characterized by urban street flow at extremely low speeds, typically one-third to one-fourth of the FFS. Intersection congestion is likely at critical signalized locations, with high delays, high volumes, and extensive queuing.	25

Source: Highway Capacity Manual 2000, Transportation Research Board, National Research Council

Table 1-6

LEVEL OF SERVICE DESCRIPTIONS – SIGNALIZED INTERSECTIONS

Levels of service (LOS) for signalized intersections are defined in terms of control delay as follows:

LOS	DESCRIPTION	DELAY PER VEHICLE (sec)	ICU RANGE
A	LOS A describes operations with low control delay, up to 10 seconds per vehicle. This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.	< 10	.00-.60
B	LOS B describes operations with control delay greater than 10 and up to 20 seconds per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than the LOS A, causing higher levels of delay.	10 – 20	.61-.70
C	LOS C describes operations with control delay greater than 20 and up to 35 seconds per vehicle. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles, and overflows occur. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.	20 – 35	.71-.80
D	LOS D describes operations with control delay greater than 35 and up to 55 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and high V/C ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	35 – 55	.81-.90
E	LOS E describes operations with control delay greater than 55 and up to 80 seconds per vehicle. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent.	55 – 80	.91-1.00
F	LOS F describes operations with control delay in excess of 80 seconds per vehicle. This level, considered unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of lane groups. It may also occur at high V/C ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.	> 80	>1.00

Source: Highway Capacity Manual 2000, Transportation Research Board, National Research Council

Table 1-7

LEVEL OF SERVICE DESCRIPTIONS - FREEWAYS

LOS	DESCRIPTION
A	LOS A describes free-flow operations. Free-flow speeds (FFS) prevail. Vehicles are almost completely unimpeded in their ability to maneuver with the traffic stream. The effects of incidents or point breakdowns are easily absorbed at this level.
B	LOS B represents reasonably free-flow, and FFS are maintained. The ability to maneuver with the traffic stream is only slightly restricted, and the general level of physical and psychological comfort provided to drivers is still high. The effects of minor incidents and point breakdowns are still easily absorbed.
C	LOS C provides for flow with speeds at or near the FFS of the freeway. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more care and vigilance on the part of the driver. Minor incidents may still be absorbed, but the local deterioration in service will be substantial. Queues may be expected to form behind any significant blockage.
D	LOS D is the level at which speeds begin to decline slightly with increasing flows and density begins to increase somewhat more quickly. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort levels. Even minor incidents can be expected to create queuing, because the traffic stream has little space to absorb disruptions.
E	At its highest density value, LOS E describes operation at capacity. Operations at this level are volatile, because there are virtually no usable gaps in the traffic stream. Vehicles are closely spaces, leaving little room to maneuver with the traffic stream at speeds that still exceed 49 miles per hour. Any disruption of the traffic stream, such as vehicles entering from a ramp or a vehicle changing lanes, can establish a disruption wave that propagates throughout the upstream traffic flow. At capacity, the traffic stream has no ability to dissipate even the most minor disruption, and any incident can be expected to produce a serious breakdown with extensive queuing. Maneuverability with the traffic stream is extremely limited, and the level of physical and psychological comfort afforded the driver is poor.
F	LOS F describes breakdowns in vehicular flow. Such conditions generally exist within queues forming behind breakdown points, and are the result of a bottleneck downstream point. LOS F is also used to describe conditions at the point of the breakdown or bottleneck and the queue discharge flow that occurs at speeds lower than the lowest speed for LOS E, as well as the operations within the queue that forms upstream. Whenever LOS F conditions exist, they have the potential to extend upstream for significant distances.

Source: Highway Capacity Manual 2000, Transportation Research Board, National Research Council

VPH	Vehicles Per Hour. Used for roadway volumes (counts or forecasts) and trip generation estimates. Measures the number of vehicles in a one hour period, typically the AM or PM peak hour.
VPHPL	Vehicles Per Hour Per Lane. Similar to VPH but with the roadway volume averaged to the total number of roadway lanes.

1.7 REFERENCES

Copies of the references used in this report are available for review at the City of Santa Clarita Planning and Building Services Department located at 23920 West Valencia Blvd, Suite 302, Santa Clarita, CA 91355

1. "Highway Capacity Manual 2000," Transportation Research Board, National Research Council, 2000.
2. "Trip Generation 6th Edition," Institute of Transportation Engineers, 1997.
3. "Caltrans Highway Design Manual," Caltrans, July 1995.
4. "Caltrans Ramp Meter Design Manual," Caltrans, January 2000.
5. "Preliminary Traffic Impact Report Guidelines," City of Santa Clarita, August 1990.
6. "Santa Clarita Valley Consolidated Traffic Model Report," County of Los Angeles Department of Public Works, 1994.
7. "Santa Clarita Valley Consolidated Traffic Model 1995 Update and Validation," City of Santa Clarita and County of Los Angeles Department of Public Works, April 1995.
8. "Draft Santa Clarita Valley Consolidated Traffic Model Version 3.3," City of Santa Clarita and County of Los Angeles Department of Public Works, March 2003.
9. "2002 Congestion Management Program for Los Angeles County," Los Angeles County Metropolitan Transportation Authority, June 2002.
10. "City of Santa Clarita General Plan Circulation Element," City of Santa Clarita, December 1997.

2.0 TRANSPORTATION SETTING

This chapter describes the transportation setting for the traffic analysis. Existing conditions are first discussed, followed by a description of the future circulation system as outlined in the City's Circulation Element.

2.1 EXISTING CONDITIONS

The following section describes existing traffic conditions in the study area. It includes a description of the study area roadway system, existing traffic volumes and corresponding levels of service as defined by the performance criteria outlined in the previous chapter.

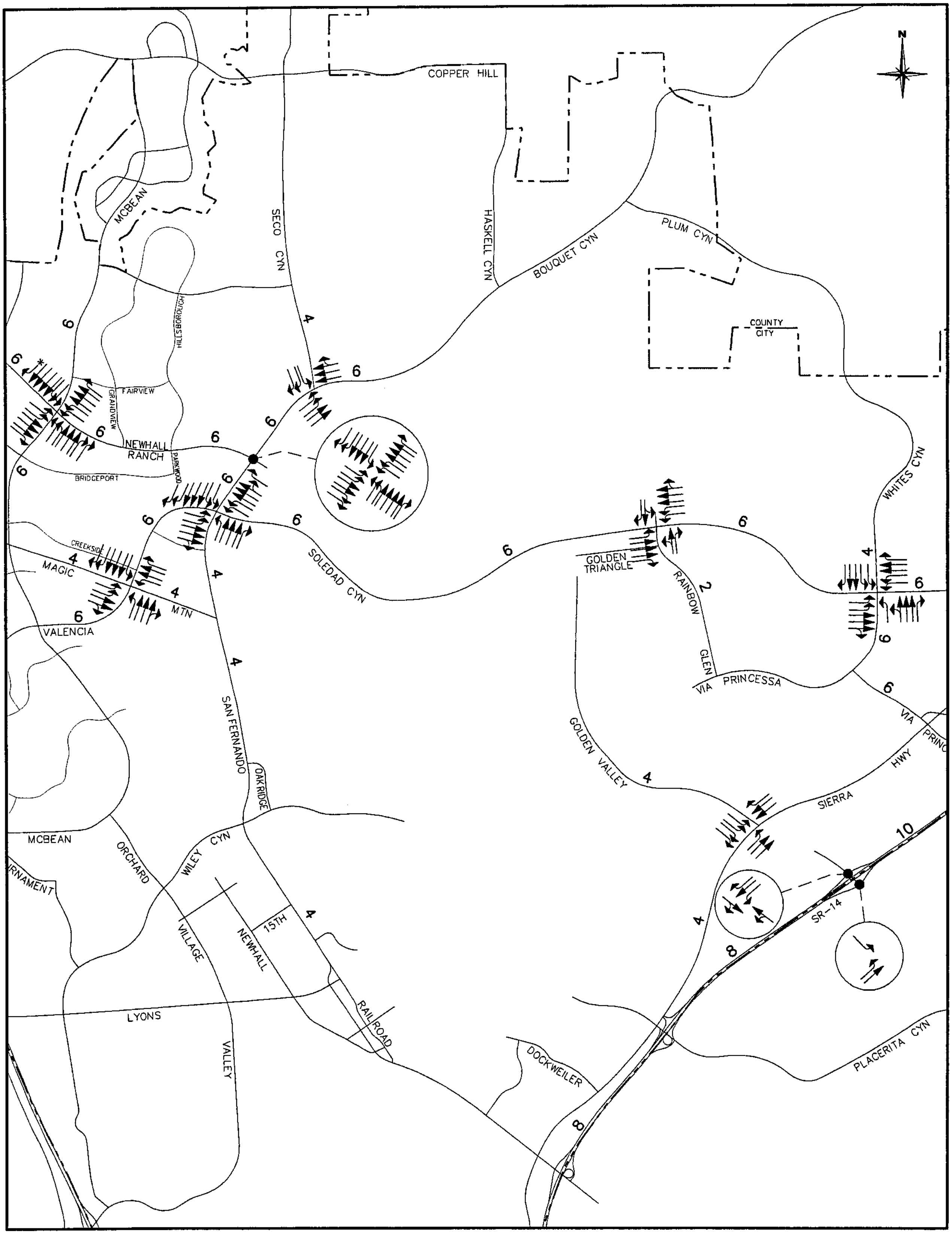
2.1.1 Existing Roadway System

The existing roadway network in the study area is illustrated in Figure 2-1 in the form of mid-block lanes and intersection lane configurations for the intersections being studied. Major arterial streets near to the project site consist of Bouquet Canyon Road, Newhall Ranch Road, Soledad Canyon Road, Valencia Parkway and Golden Valley Road.

The SR-14 Freeway provides regional access for residents of the site and is located approximately 3.5 miles south of the project site. The I-5 Freeway is located approximately 3.5 miles west of the project site.

2.1.2 Existing Traffic Volumes and Levels of Service

The existing average daily traffic (ADT) volumes on the study area roadway system are illustrated in Figure 2-2. Illustrations of peak hour turning movement volumes for each study area intersection can be found in Figures 2-3 and 2-4 for the AM and PM peak hours, respectively. The peak hour counts were collected at various times during the past year and a half and in most cases during the second half of 2002 (see Table 2-1 for dates).



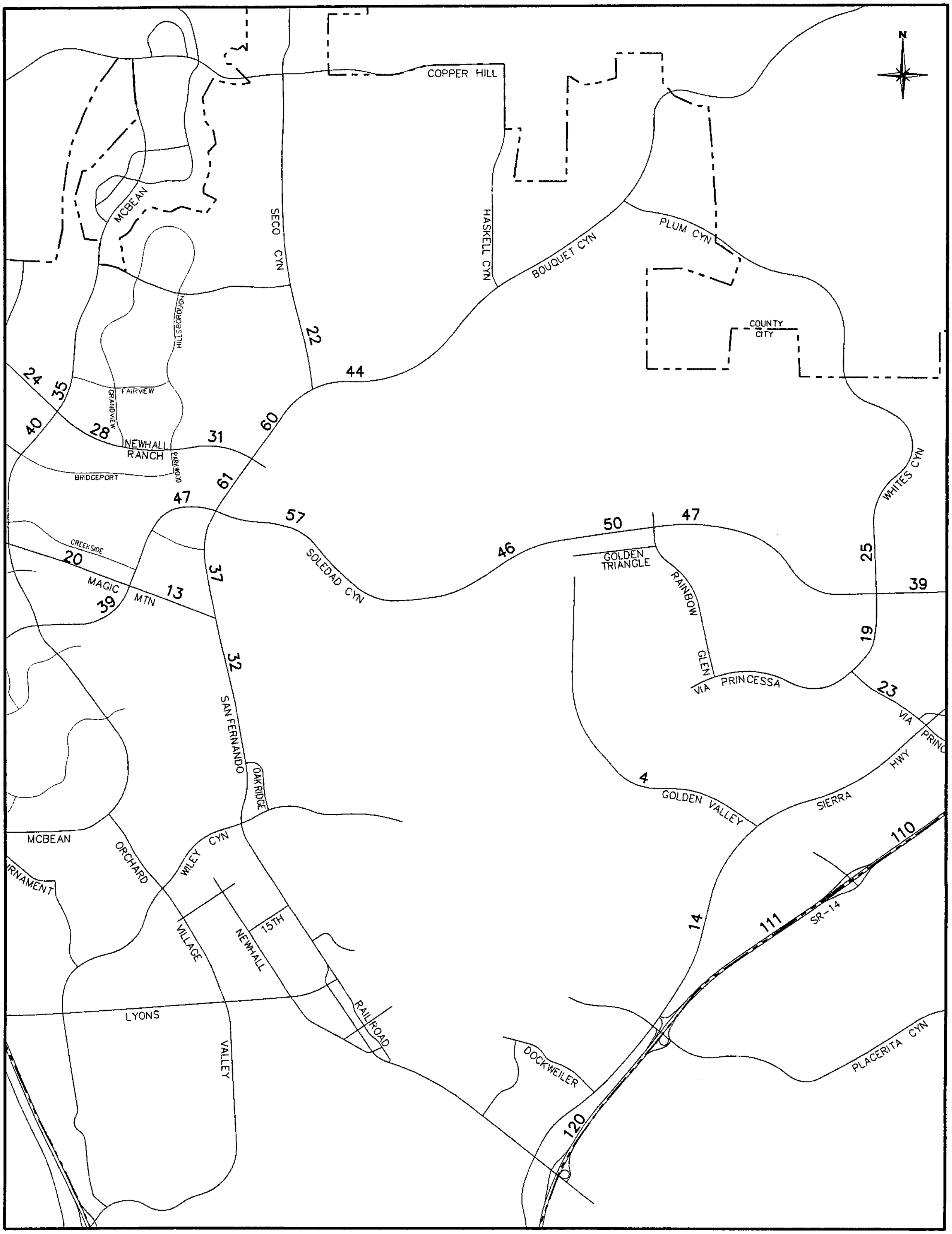
Legend

X Mid-block Lanes

↙ Intersection Lane

Figure 2-1

EXISTING ROADWAY NETWORK



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XX ADT (thousands)

Figure 2-2

AVERAGE DAILY TRAFFIC VOLUMES
- EXISTING CONDITIONS

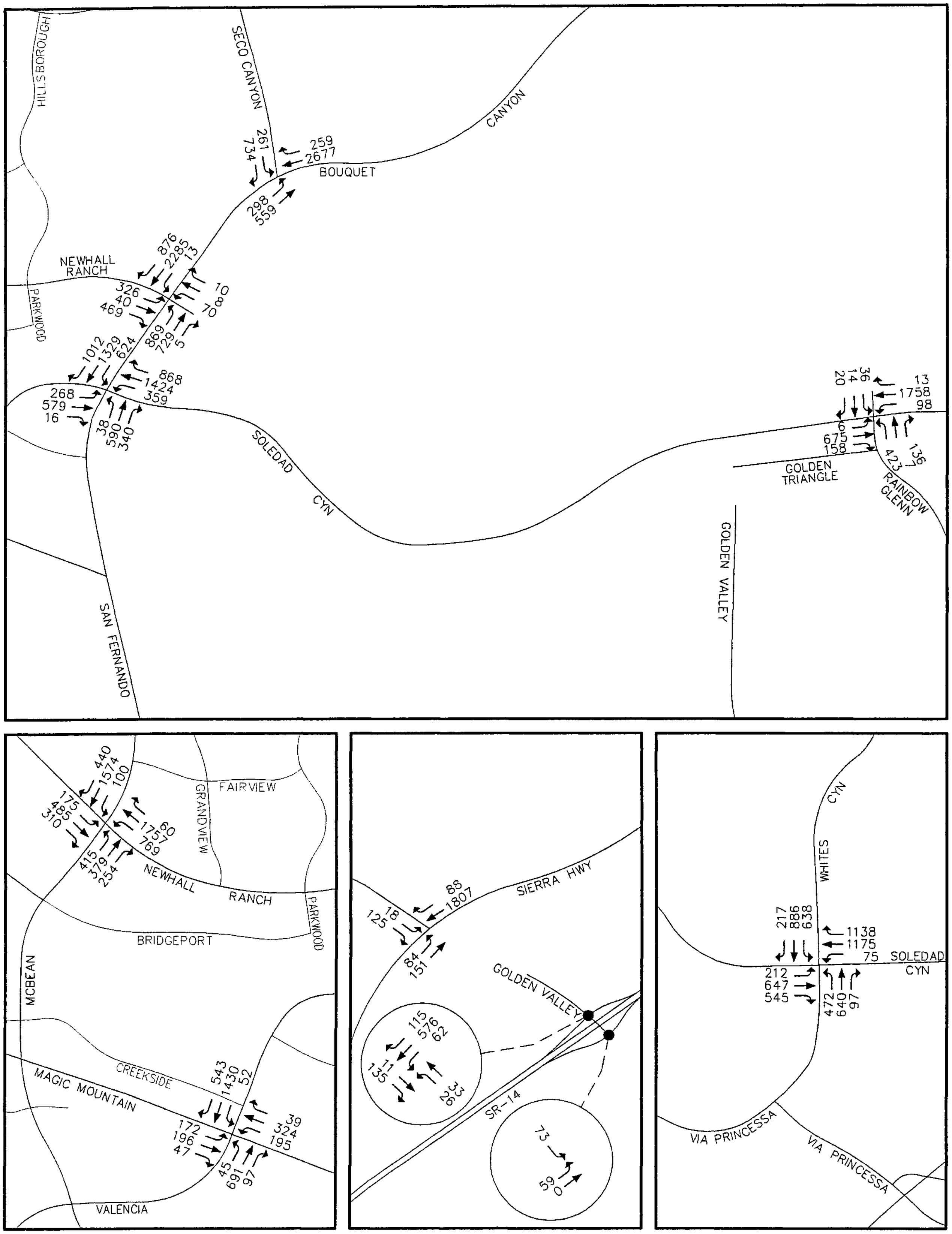


Figure 2-3

AM PEAK HOUR TURNING MOVEMENT VOLUMES - EXISTING CONDITIONS

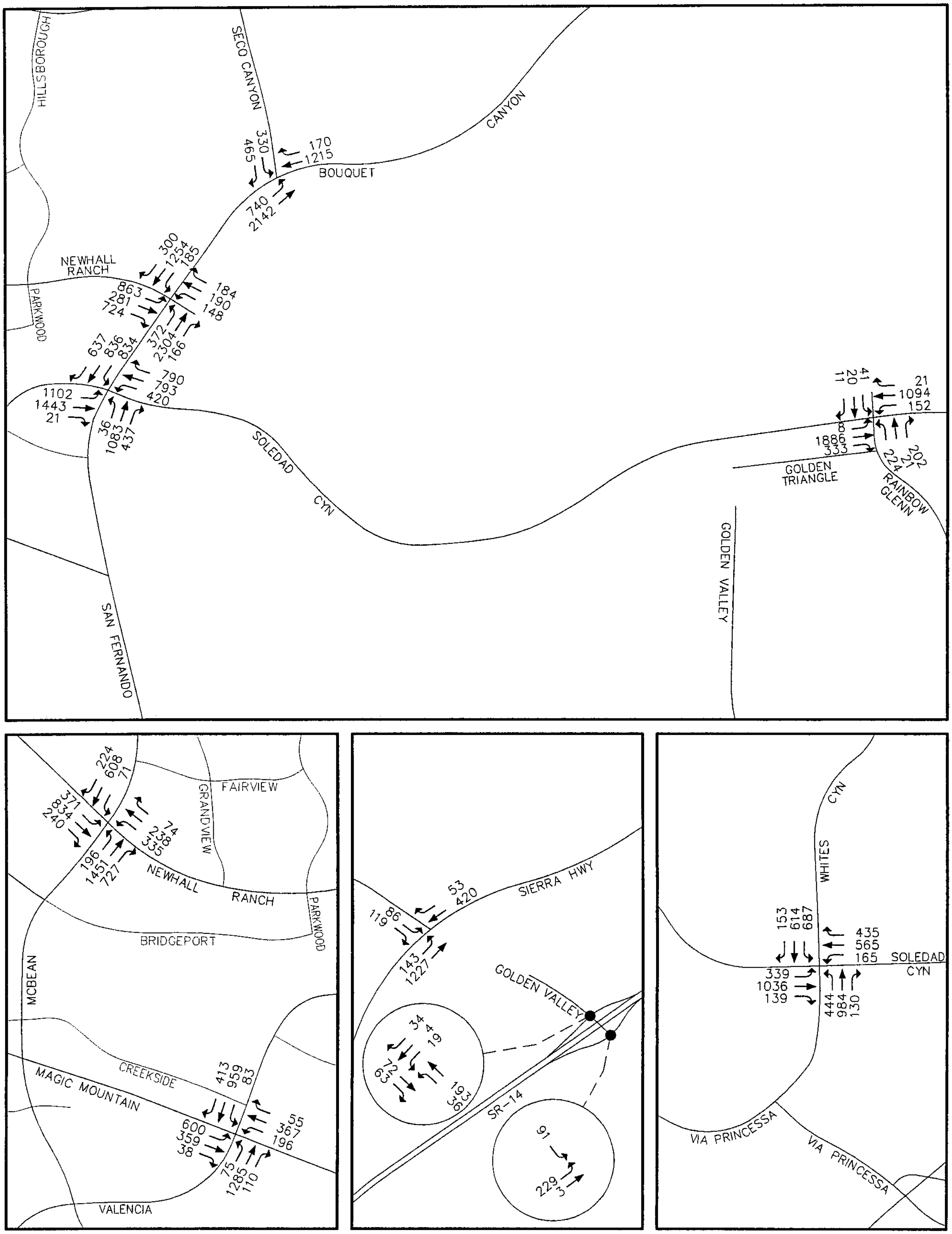


Figure 2-4

PM PEAK HOUR TURNING MOVEMENT VOLUMES - EXISTING CONDITIONS

As discussed in the section on performance criteria in Chapter 1.0, level of service (LOS) is a concept developed to quantify the degree of comfort afforded to drivers as they travel on a given roadway. The degree of comfort includes such elements as travel time, number of stops, total amount of stopped delay, etc. As defined in the HCM 2000, six grades are used to denote the various LOS. The six are denoted A through F and a discussion on these was also given in Chapter 1.0.

The results of the ICU LOS analyses for project area intersections are shown in Table 2-1 (ICU worksheets are provided in Appendix A). The table shows how the following intersections on Soledad Canyon Road do not currently meet the City's performance standard:

- Bouquet Canyon Road & Soledad Canyon Road (LOS F in PM Peak Hour)
- Whites Canyon Road & Soledad Canyon Road (LOS E in AM Peak Hour)

2.1.3 Public Transportation

Santa Clarita Transit currently operates six fixed-route transit lines (Routes 3, 4, 502, 503, 504 and 507) which provide service near to the project site. Each route passes the project site via the intersection of Bouquet Canyon Road and Newhall Ranch Road.

In addition to the bus routes, there is a Metrolink rail station just south of the project site on Soledad Canyon Road which provides regional transit access to the site.

2.2 INTERIM YEAR TRANSPORTATION SYSTEM

The Interim Year transportation system consists of roadway improvements and future infrastructure consistent with the related projects included within the horizon year. Generally, this horizon year corresponds to a level of development approximately 10 years in the future. While this horizon does not coincide specifically with the buildout of the project site (estimated to occur by 2008), it represents the best timeframe for planning purposes since it includes a comprehensive set of cumulative development projects that have been incorporated into the SCVCTM. With this, a conservative scenario is established for analyzing the impacts of the proposed project combined with projected and approved growth on a reasonably expanded circulation system. This approach is supported by the City Transportation and Engineering Services staff and was established through consultation with Ian Pari of the Transportation and Engineering Services Department.

Future roadways that affect the study area include the extension of Newhall Ranch Road west to I-5 (estimated completion in 2006), the extension of Newhall Ranch Road east to Golden Valley Road/Soledad Canyon Road (est. 2006), the connection of Via Princessa between its current western terminus (near San Fernando Road) and its current eastern terminus (near Rainbow Glenn Drive) (est. post-2010), and the extension of Magic Mountain Parkway to Via Princessa (est. post-2010). Figure 2-5 illustrates the general location of these future arterial roadways.

At the direction of the City, an alternative Interim Year scenario is also analyzed that includes the construction and operation of Santa Clarita Parkway between Bouquet Canyon Road and Placerita Canyon Road. While Santa Clarita Parkway is not usually included within the Interim Year horizon, the City Planning and Transportation and Engineering Services staff requested this special analysis as a portion of the roadway passes through the project site.

Interim Year land use is based on data provided by the City and County. For this analysis, the Interim Year land use database was updated to include the most recent data from the City and County regarding approved, pending and planned projects. See Appendix C for the list of Related Projects in the vicinity of the proposed project and Appendix H for the complete Interim Year land use database.

2.3 LONG-RANGE TRANSPORTATION SYSTEM

The City's Circulation Element includes significant future roadway projects near the project site in addition to those included in the Interim Year scenario. Specifically, Santa Clarita Parkway which will bisect the project site in a north/south alignment and is planned to connect Bouquet Canyon Road with SR-14 at Placerita Canyon Road. Also shown in the Circulation Element is a northerly extension of Golden Valley Road that intersects with Newhall Ranch Road within the project site, just north of the Santa Clara River, and extends to Plum Canyon Road.

The previously referenced Figure 2-5 illustrates the general location of these future facilities.

Table 2-1

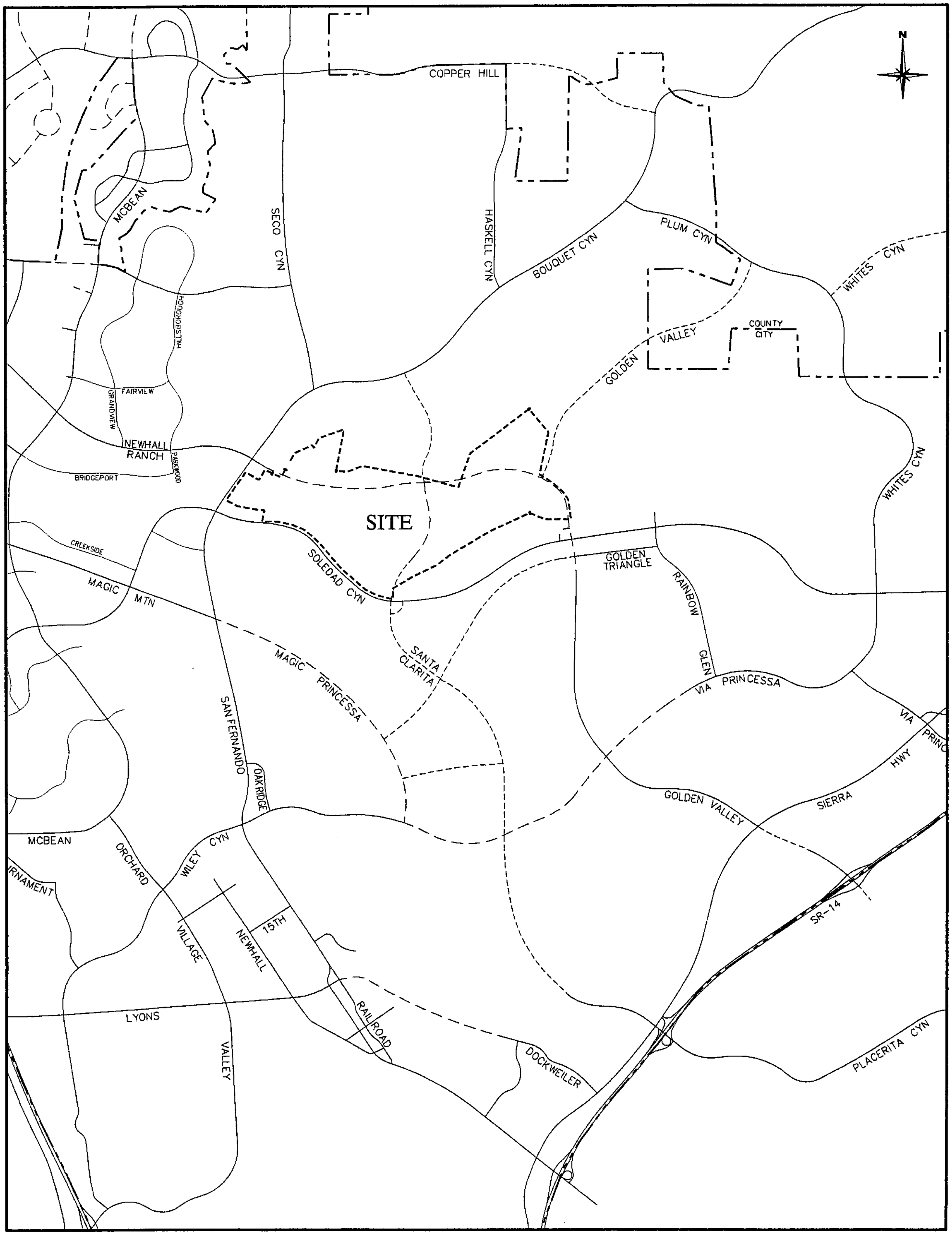
ICU SUMMARY – EXISTING (2002) CONDITIONS

INTERSECTION	AM PEAK HOUR ICU	AM PEAK HOUR LOS	PM PEAK HOUR ICU	PM PEAK HOUR LOS	COUNT DATE
48. McBean & Newhall Ranch	.82	D	.66	B	8/26/02
57. Valencia & Magic Mountain	.58	A	.69	B	12/3/01
65. Bouquet & Soledad	.76	C	1.04*	F	6/3/02
66. Bouquet & Newhall Ranch	.88	D	.83	D	6/3/02
67. Seco & Bouquet	.90	D	.90	D	10/23/02
146. SR-14 NB Ramp & Golden Valley	.17	A	.28	A	10/24/02
147. SR-14 SB Ramp & Golden Valley	.52	A	.25	A	10/24/02
162. Sierra & Golden Valley	.68	B	.47	A	8/5/02
169. Rainbow Glen & Soledad	.72	C	.67	B	10/23/02
172. Whites Canyon & Soledad	.97*	E	.77	C	10/24/02

* Exceeds performance standard (see Table 1-3)

Level of service ranges:

.00 - .60	A
.61 - .70	B
.71 - .80	C
.81 - .90	D
.91 – 1.00	E
Above 1.00	F



Legend

——— Existing Roadway

— — — Interim Year Roadway

- - - - - Long-Range Roadway

—·—·— City Boundary

Figure 2-5

FUTURE TRANSPORTATION SYSTEM
- INTERIM YEAR AND LONG-RANGE

3.0 PROJECT DESCRIPTION

This chapter describes the project in terms of its transportation characteristics. Trip generation is summarized and the distribution of project trips on the study area roadway network is presented.

3.1 PROJECT OVERVIEW

The site plan for the proposed Riverpark project can be seen in Figure 3-1. The project site is located entirely within in the City of Santa Clarita, just north of Soledad Canyon Road and just east of Bouquet Canyon Road.

Riverpark is currently being planned as a development consisting of 1,183 dwelling units and a maximum of 40,000 square feet of retail commercial uses. A total of 439 dwelling units are single-family detached units with the remaining 744 dwelling units consisting of apartments. The project applicant estimates that first occupancies will occur in 2006 with the project building out over a period of two to three years.

There are four potential points of access to the site, two of which will be available prior to buildout of the project. One is the existing intersection of Bouquet Canyon Road and Newhall Ranch Road. Newhall Ranch Road currently terminates just east of Bouquet Canyon Road but will be extended into the site. This segment of Newhall Ranch Road (a portion of the Cross Valley Connector) is shown on the City's Circulation Element as a major highway and ultimately extends via a bridge, across the Santa Clara River, further to the east to connect with the planned extension of Golden Valley Road in the vicinity of Soledad Canyon Road. This access from Golden Valley Road and Soledad Canyon Road is the second point of access into the site.

Two additional potential access points result from the future extensions of Santa Clarita Parkway. This future roadway is shown on the City's Circulation Element as a major highway that would provide a north/south connection between Bouquet Canyon Road and Sierra Highway. The alignment of Santa Clarita Parkway bisects the Riverpark site and will ultimately provide southerly access to the site from

Soledad Canyon Road and northerly access from Bouquet Canyon Road. The project includes the construction of a portion of Santa Clarita Parkway (from Newhall Ranch Road south approximately 1,500 feet). The timeframe for the construction of these future segments of Santa Clarita Parkway has not been established by the City at this time.

The proposed commercial uses are located near the southeast corner of the Bouquet Canyon Road/Newhall Ranch Road intersection. Detailed development plans for these commercial uses are not being proposed at this time, therefore exact driveway locations are unknown. For this analysis, it is assumed that the center will have a full access driveway on Newhall Ranch road (approximately 500 feet east of Bouquet Canyon Road) as well as a right-turn-in/right-turn-out driveway on Bouquet Canyon Road (approximately 250 feet south of Newhall Ranch Road).

3.2 PROJECT TRIP GENERATION

Trip generation estimates for the proposed project are shown in Table 3-1. The trip generation for the non-commercial uses is calculated using trip rates from the SCVCTM which are based on published data from the Institute of Transportation Engineers (ITE) Sixth Edition Trip Generation Manual (see Reference 2 in Section 1.7). The commercial center trip generation is calculated using the ITE equation based shopping center trip rate.

The proposed project is estimated to generate approximately 13,300 total average daily trips with approximately 800 occurring in the AM peak hour (600 outbound) and approximately 1,250 occurring in the PM peak hour (760 inbound).

3.3 PROJECT TRIP DISTRIBUTION

The geographic distribution of project generated trips was determined using the SCVCTM to prepare a project only select zone run. The Interim Year version of the SCVCTM provided the background conditions for this select zone run. The model takes into account the specific type of land use proposed for the site and how that land use would interact with the other land uses in the City.

Table 3-1

TRIP GENERATION AND TRIP RATE SUMMARY

		--------- AM PEAK HOUR --------			-------- PM PEAK HOUR --------			
LAND USE	UNITS	IN	OUT	TOTAL	IN	OUT	TOTAL	ADT
TRIP GENERATION								
Residential								
Area A1- Single Family	225 DU	43	126	169	146	81	227	2,228
Area A2/B - Single Family	214 DU	41	120	161	139	77	216	2,119
Area C - Apartment	420 DU	34	181	215	172	88	260	2,898
Area D - Apartment	324 DU	26	139	165	133	68	201	2,236
Area A1- Developed Park	4.25 AC	0	0	0	0	0	0	11
Sub-total Residential	1,183 DU	144	566	710	590	314	904	9,492
Commercial								
Retail Commercial	40.00 TSF	57	36	93	165	178	343	3,782
Total		**201**	**602**	**803**	**755**	**492**	**1,247**	**13,274**
TRIP RATES								
Single Family Detached [1]	DU	.19	.56	.75	.65	.36	1.01	9.90
Apartment [2]	DU	.08	.43	.51	.41	.21	.62	6.90
Developed Park [3]	ACRE	.00	.00	.00	.03	.04	.07	2.60
Retail Commercial [4]	TSF	ADT: LN(T) = 0.643*LN(X) + 5.866						
		AM: LN(T) = 0.596*LN(X) + 2.329 (61% IB/39% OB)						
		PM: LN(T) = 0.660*LN(X) + 3.403 (48% IB/52% OB)						

Notes:

[1] SCVCTM Category 3 (Single Family 6-10 DU/Acre)

[2] SCVCTM Category 5 (Apartment)

[3] SCVCTM Category 51 (Developed Park)

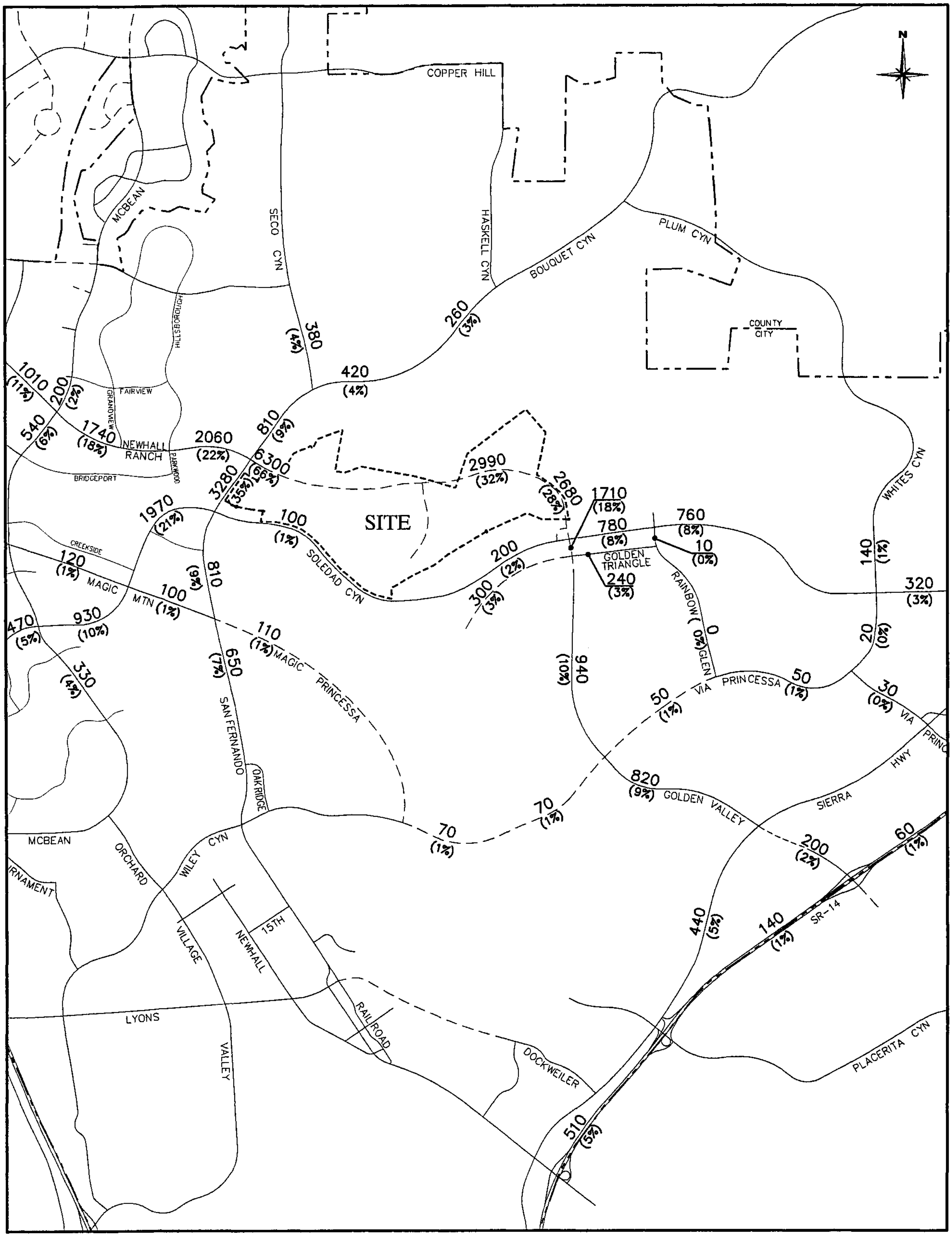
[4] Institute of Transportation Engineers (ITE) Category 820 (Shopping Center)

DU = Dwelling Unit
AC = ACRE
TSF = Thousand Square Feet

Figure 3-2 illustrates the project only average daily trips (ADT) and distribution percentages for the residential portion of the site. Figures 3-3 and 3-4 illustrate the residential generated trips for the AM and PM peak hours, respectively. Approximately two thirds of the project's residential traffic accesses the site via the Newhall Ranch Road/Bouquet Canyon Road intersection and approximately 30 percent access the site via the Newhall Ranch Road/Golden Valley Road intersection at Soledad Canyon Road. Approximately five percent of the residential trips are local interaction with the project's commercial center and with the existing commercial center located on the northeast corner of the Bouquet Canyon Road/Newhall Ranch Road intersection.

At the regional level, over 90 percent of the project's residential generated traffic stays within the Santa Clarita Valley. This is due in part to the substantial employment base that has developed within the area as well as to the majority of residential daily trip generation being non-work based (i.e. work trips typically account for only two to four of the average ten trips generated each day by a single family residence). The remaining traffic is oriented outside the Valley with approximately five percent south on SR-14/I-5, approximately one percent east on SR-14, approximately one percent north on I-5 and less than one percent west on SR-126.

Figure 3-5 illustrates the ADT and distribution percentages for the commercial center. Figures 3-6 and 3-7 illustrate the retail commercial generated trips for the AM and PM peak hours, respectively. The distribution of traffic generated by the retail commercial center will be more localized than the project's residential component, as is depicted in the distribution illustration.



Legend

XXXX Project ADT
(Y%) Distribution Percentage

Figure 3-2

AVERAGE DAILY TRAFFIC VOLUMES
- PROJECT RESIDENTIAL TRIPS ONLY

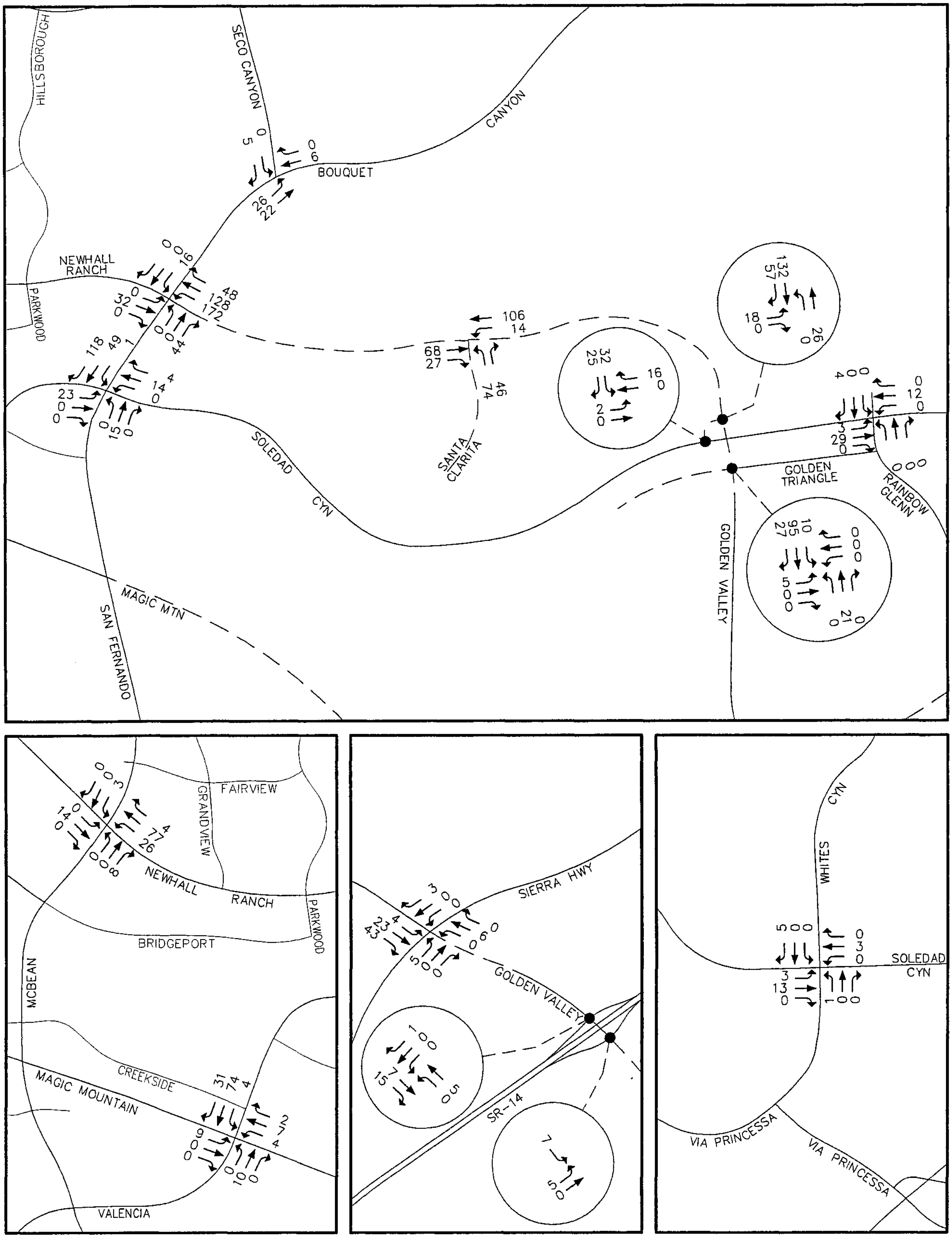


Figure 3-3

AM PEAK HOUR VOLUMES
- PROJECT RESIDENTIAL TRIPS ONLY

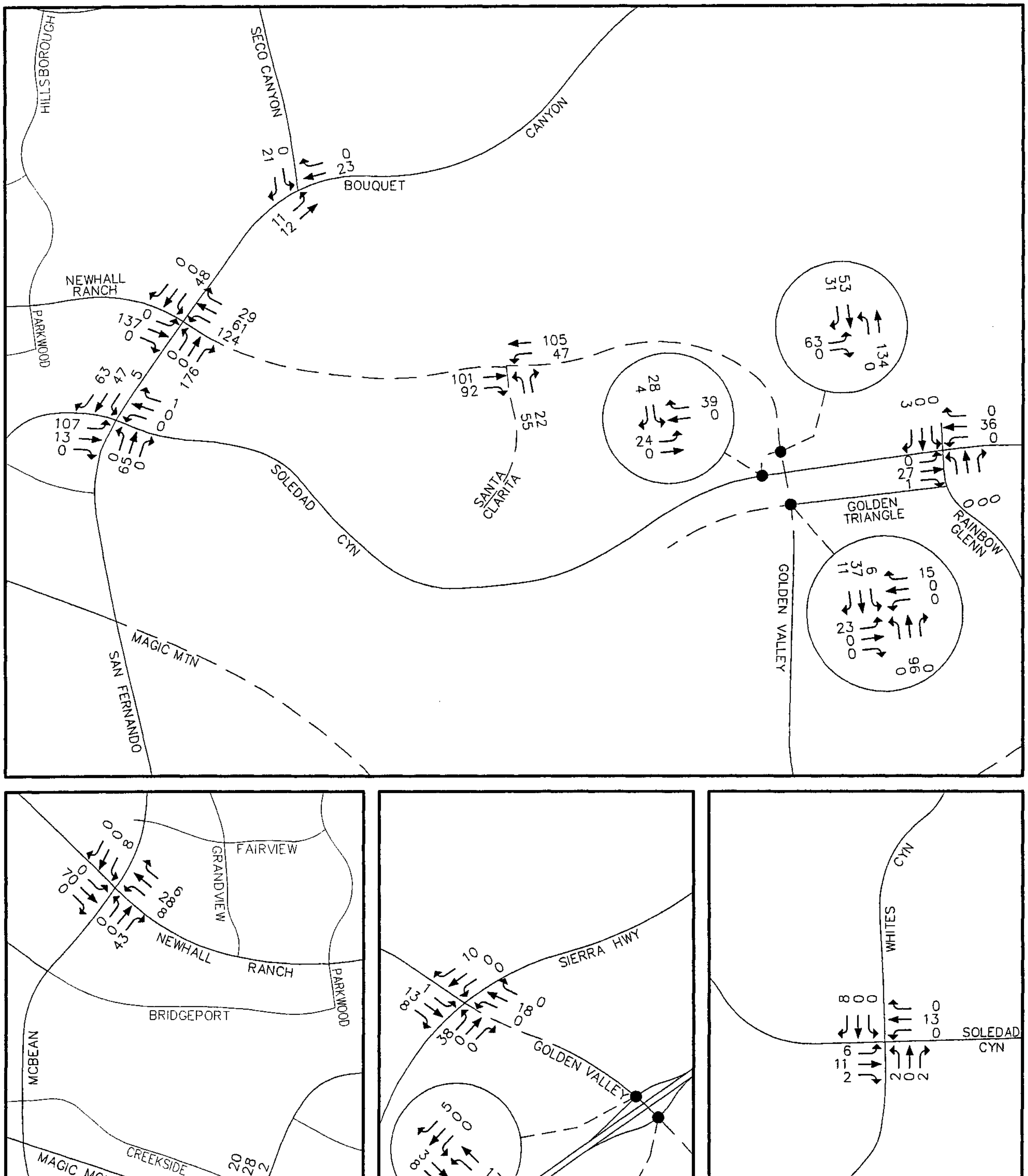
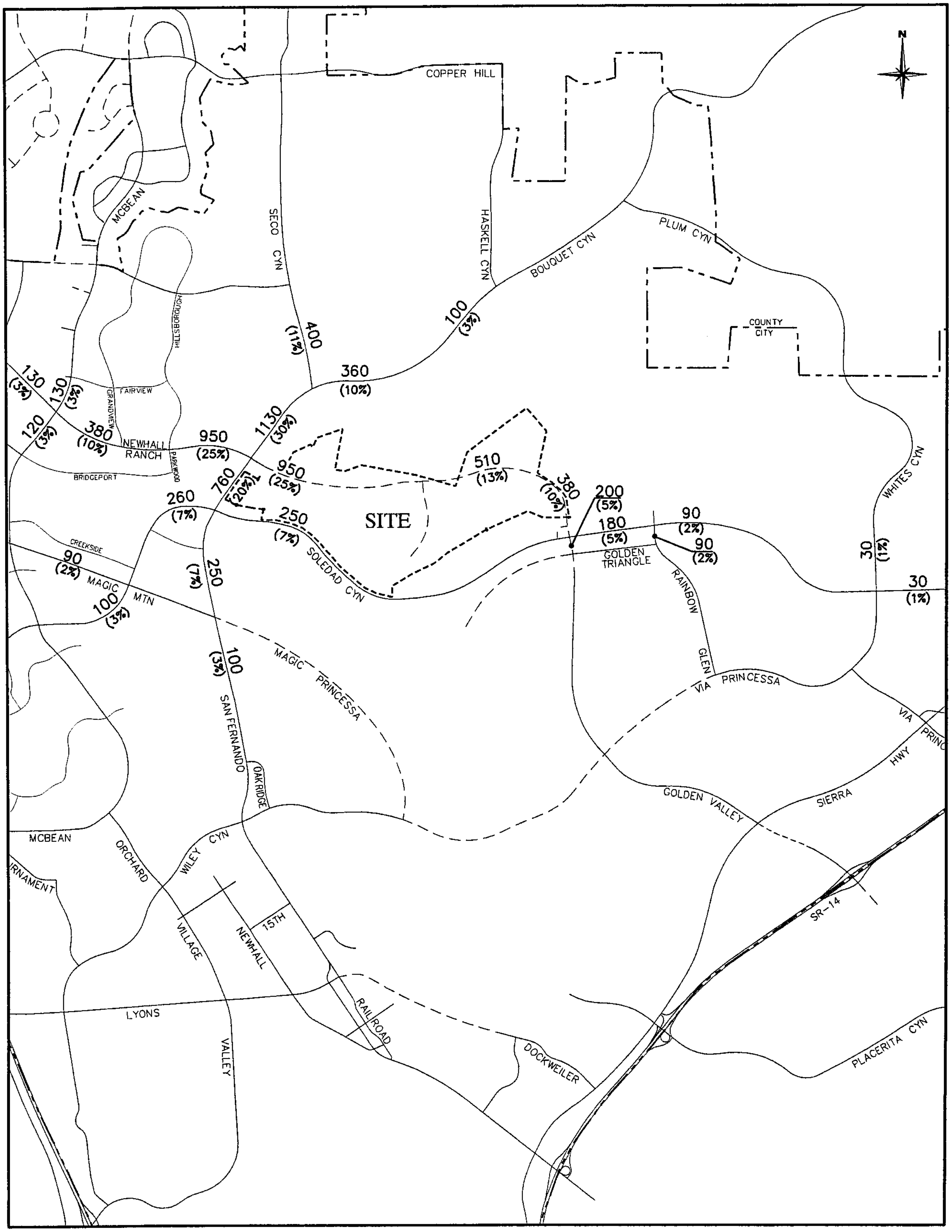


Figure 3-4

PM PEAK HOUR VOLUMES
- PROJECT RESIDENTIAL TRIPS ONLY



Legend

XXXX Project ADT
(Y%) Distribution Percentage

Figure 3-5

AVERAGE DAILY TRAFFIC VOLUMES
- PROJECT COMMERCIAL TRIPS ONLY

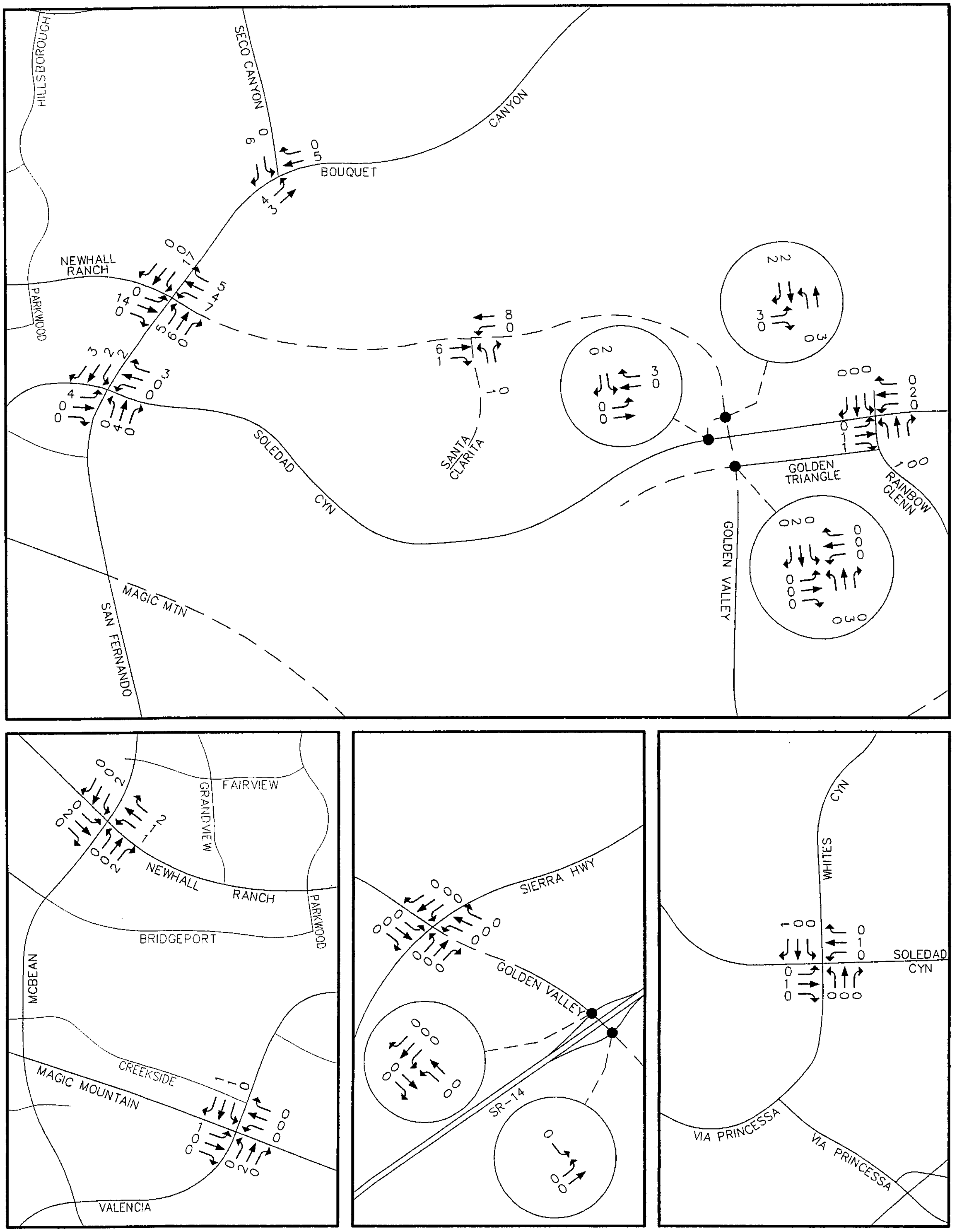


Figure 3-6

AM PEAK HOUR VOLUMES
- PROJECT COMMERCIAL TRIPS ONLY

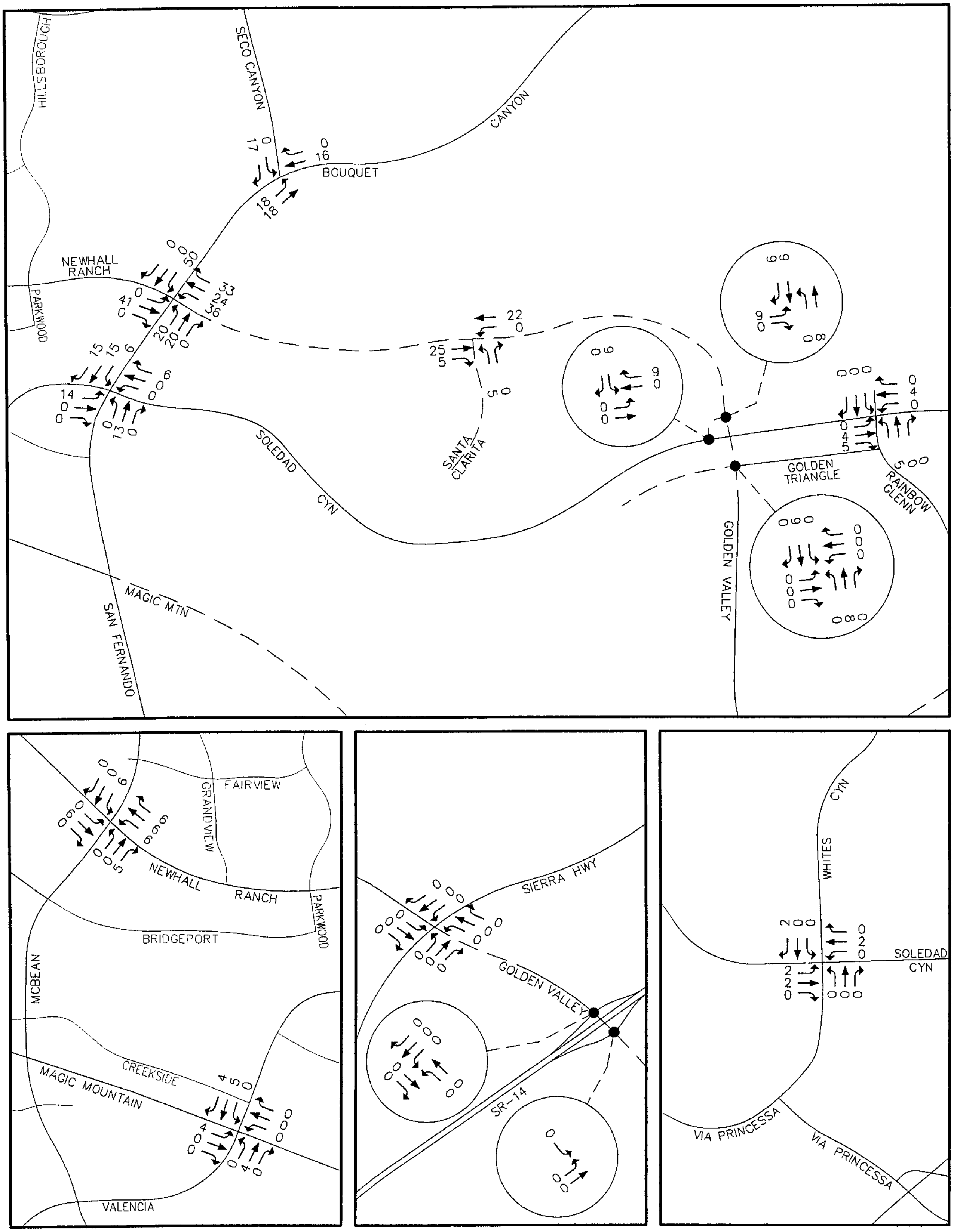


Figure 3-7

PM PEAK HOUR VOLUMES
- PROJECT COMMERCIAL TRIPS ONLY

4.0 IMPACT ANALYSIS

This chapter addresses the traffic impacts of the proposed project. As discussed in Section 1.3, an interim year and long-range horizon are the time frames used for this analysis. Traffic conditions with and without the proposed project are described in the following sections. Project impacts are identified using the criteria outlined in Chapter 1.0.

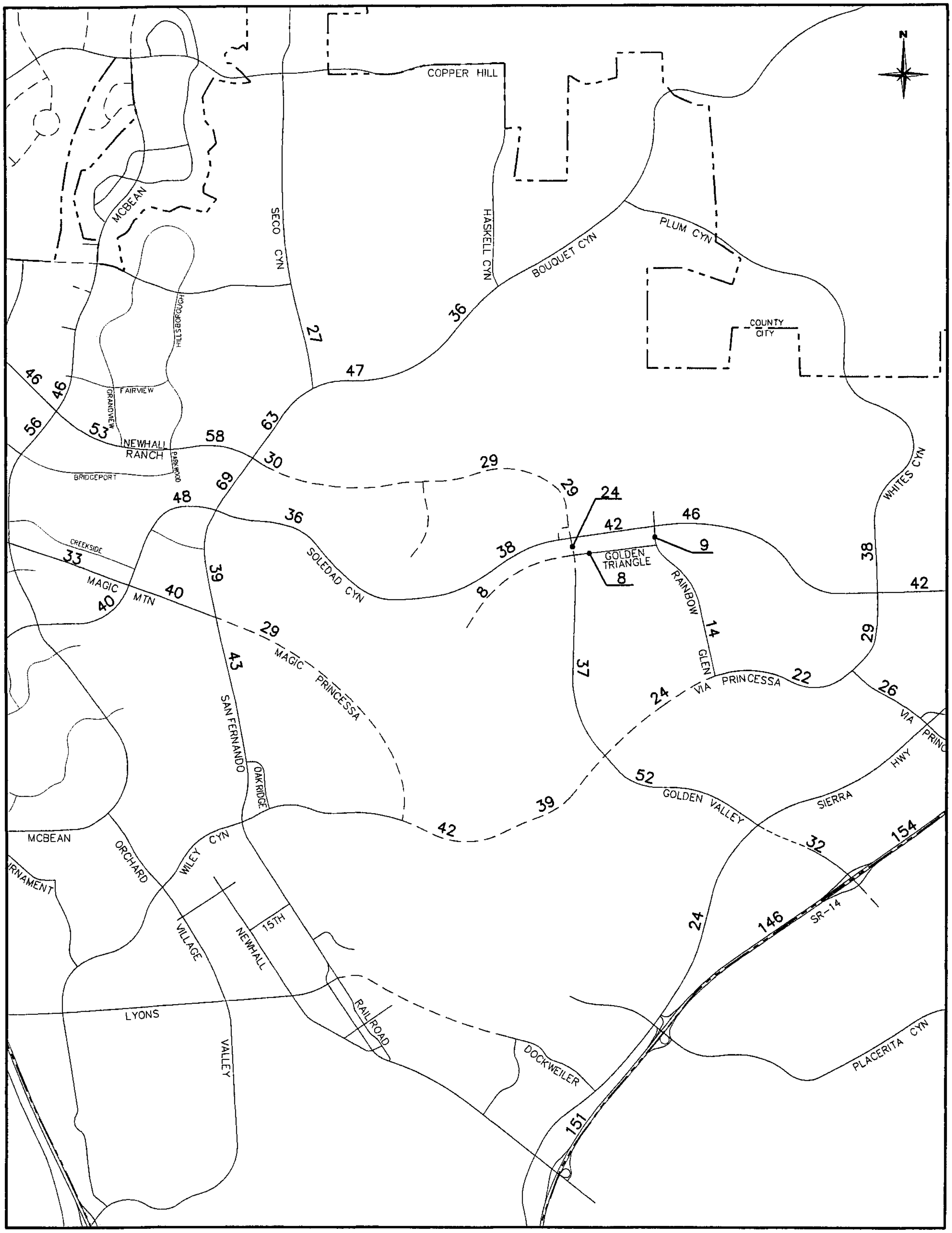
4.1 INTERIM YEAR ANALYSIS

The Interim Year traffic conditions are based on the Interim Year setting described in Section 2.2. This setting forms the basis for identifying the potential Interim Year traffic impacts of the proposed project. The following sections discuss Interim Year no-project and with-project conditions.

4.1.1 Interim Year No-Project Traffic Conditions

Interim Year no-project ADT volumes within the study area are shown in Figure 4-1. The Interim Year no-project peak hour turning movement volumes for the intersections in the study area are illustrated in Figures 4-2 and 4-3 for the AM and PM peak hours, respectively.

Table 4-1 provides the corresponding ICU values and also listed for comparison purposes are the ICUs for existing conditions. The ICU tabulations indicate that deficiencies at three additional intersections (McBean Parkway/Newhall Ranch Road, Valencia Boulevard/Magic Mountain Parkway, and Seco Canyon Road/Bouquet Canyon Road) are forecast to occur by the Interim Year when compared to existing conditions. The Bouquet Canyon Road/Soledad Canyon Road intersection and the Whites Canyon Road/Soledad Canyon Road intersection, which have been shown to be deficient for existing conditions, are forecast to remain deficient for Interim Year conditions without the proposed project. While remaining deficient, conditions improve from LOS F to LOS E at the Bouquet Canyon Road/Soledad Canyon Road intersection due to the planned improvement project at this location. Specifically, the planned improvements consist of adding a third left-turn lane in the eastbound direction.



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XX ADT (thousands)

Figure 4-1

AVERAGE DAILY TRAFFIC VOLUMES
- INTERIM YEAR WITHOUT PROJECT

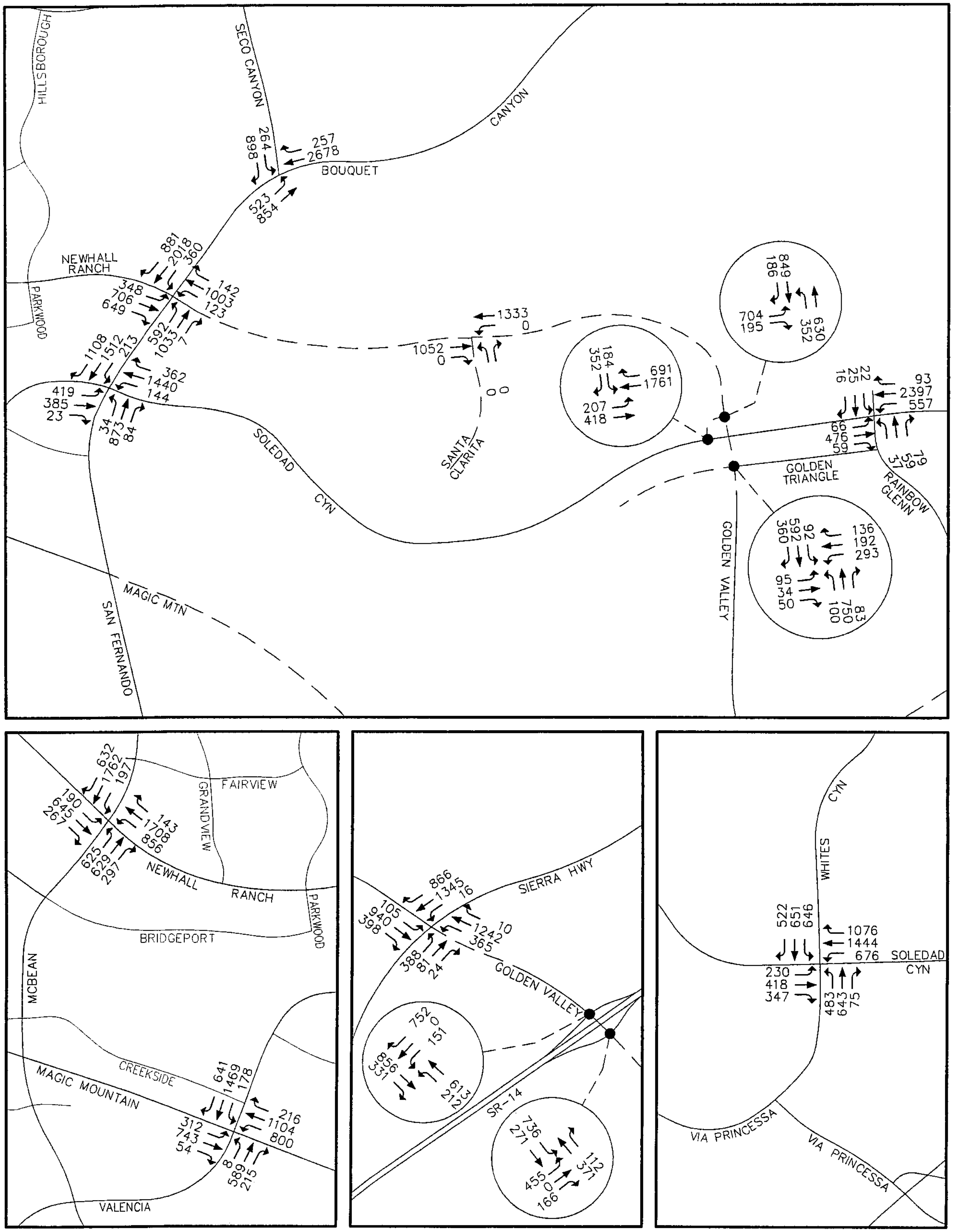


Figure 4-2

AM PEAK HOUR TURNING MOVEMENT VOLUMES - INTERIM YEAR WITHOUT PROJECT

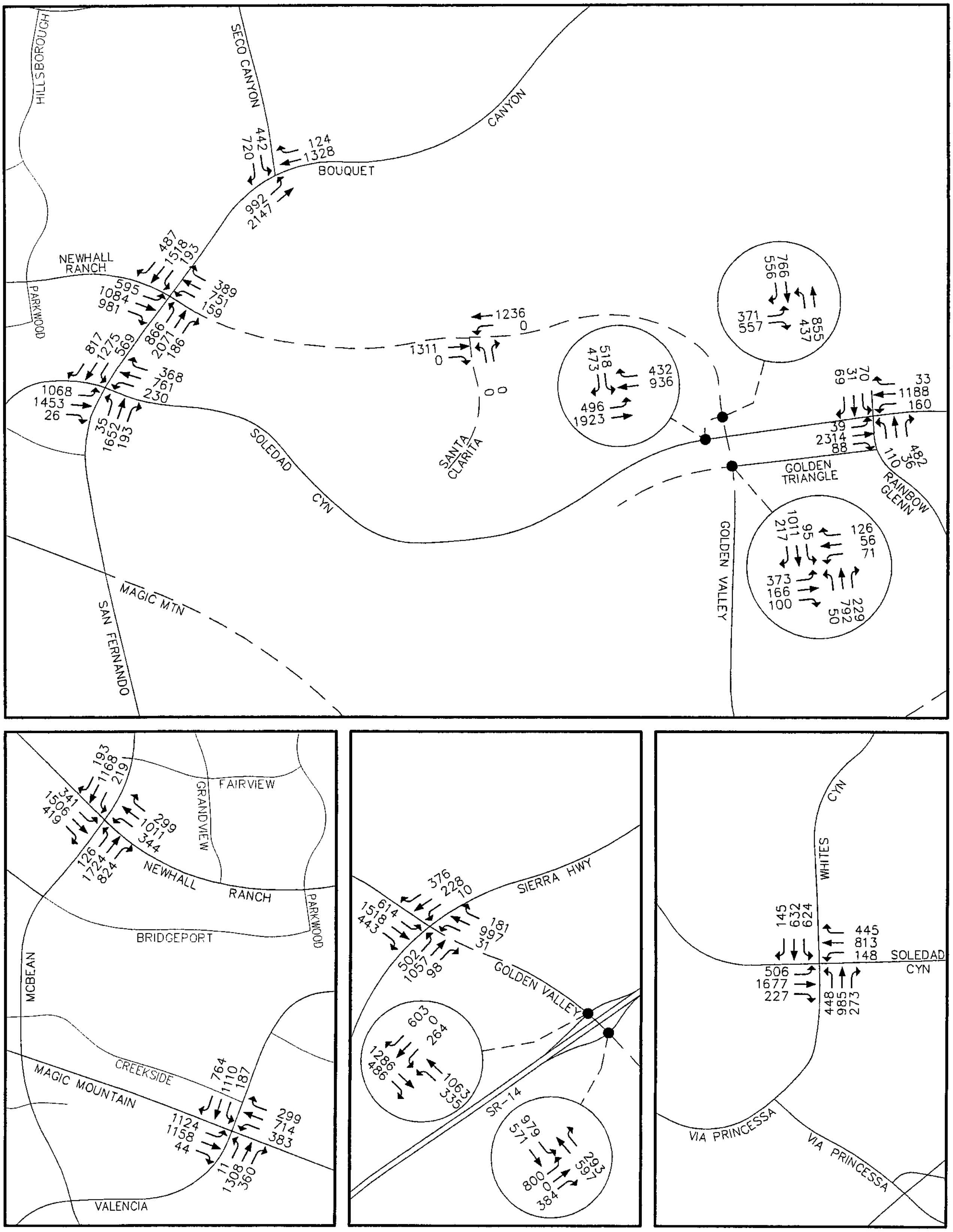


Figure 4-3

PM PEAK HOUR TURNING MOVEMENT VOLUMES - INTERIM YEAR WITHOUT PROJECT

Table 4-1

ICU AND LOS SUMMARY – EXISTING AND INTERIM YEAR WITHOUT PROJECT

INTERSECTION	EXISTING AM		EXISTING PM		INTERIM YEAR WITHOUT PROJECT AM		INTERIM YEAR WITHOUT PROJECT PM		INCREASE AM	INCREASE PM
48. McBean & Newhall Ranch	.82	D	.66	B	.91	E*	.88	D	.09	.22
57. Valencia & Magic Mountain	.58	A	.69	B	1.07	F*	1.09	F*	.49	.40
65. Bouquet & Soledad	.76	C	1.04	F*	.76	C	.92	E*	.00	-.12
66. Bouquet & Newhall Ranch	.88	D	.83	D	.85	D	.88	D	-.03	.05
67. Seco & Bouquet	.90	D	.90	D	.96	E*	.96	E*	.06	.06
146. SR-14 NB Ramp & Golden Valley	.17	A	.28	A	.55	A	.78	C	.38	.50
147. SR-14 SB Ramp & Golden Valley	.52	A	.25	A	.61	B	.81	D	.07	.56
162. Sierra & Golden Valley	.68	B	.47	A	.87	D	.84	D	.19	.37
164. Golden Valley & Golden Triangle					.52	A	.60	A		
165. Golden Valley & Valley Center					.56	A	.60	A		
169. Rainbow Glen & Soledad	.72	C	.67	B	.69	B	.89	D	-.03	.22
172. Whites Canyon & Soledad	.97	E*	.77	C	.98	E*	.88	D	.01	.11
198. Valley Center & Soledad					.65	B	.62	B		

* Exceeds performance standard (see Table 1-3)

Level of service ranges:		
	.00 - .60	A
	.61 - .70	B
	.71 - .80	C
	.81 - .90	D
	.91 – 1.00	E
	Above 1.00	F

4.1.2 Interim Year With Project Traffic Conditions

As discussed in Chapter 3.0, the proposed project would generate approximately 13,300 vehicle trips per day, with approximately 800 trips in the AM peak hour and approximately 1,250 trips in the PM peak hour.

Interim Year volumes that include project generated traffic are provided in Figure 4-4 for the ADT volumes and in Figures 4-5 and 4-6 for the AM and PM peak hours, respectively. Peak hour ICU values can be found in Table 4-2 which provides a comparison between Interim Year no-project and Interim Year with-project conditions. The table shows that six intersections experience a significant impact due to the project generated traffic (see Table 1-3 for significant impact criteria) with four of those intersections forecast to exceed LOS "D". The following intersections are those significantly impacted:

Intersections with Significant Project Impact at LOS "E" or LOS "F":

- McBean Parkway and Newhall Ranch Road (both a.m. and p.m. peak)
- Valencia Boulevard and Magic Mountain Parkway (both a.m. and p.m. peak)
- Bouquet Canyon Road and Soledad Canyon Road (p.m. peak)
- Seco Canyon Road and Bouquet Canyon Road (both a.m. and p.m. peak)

Intersections with Significant Project Impact at LOS "D":

- Bouquet Canyon Road and Newhall Ranch Road (both a.m. and p.m. peak)
- Whites Canyon Road and Soledad Canyon Road (p.m. peak)

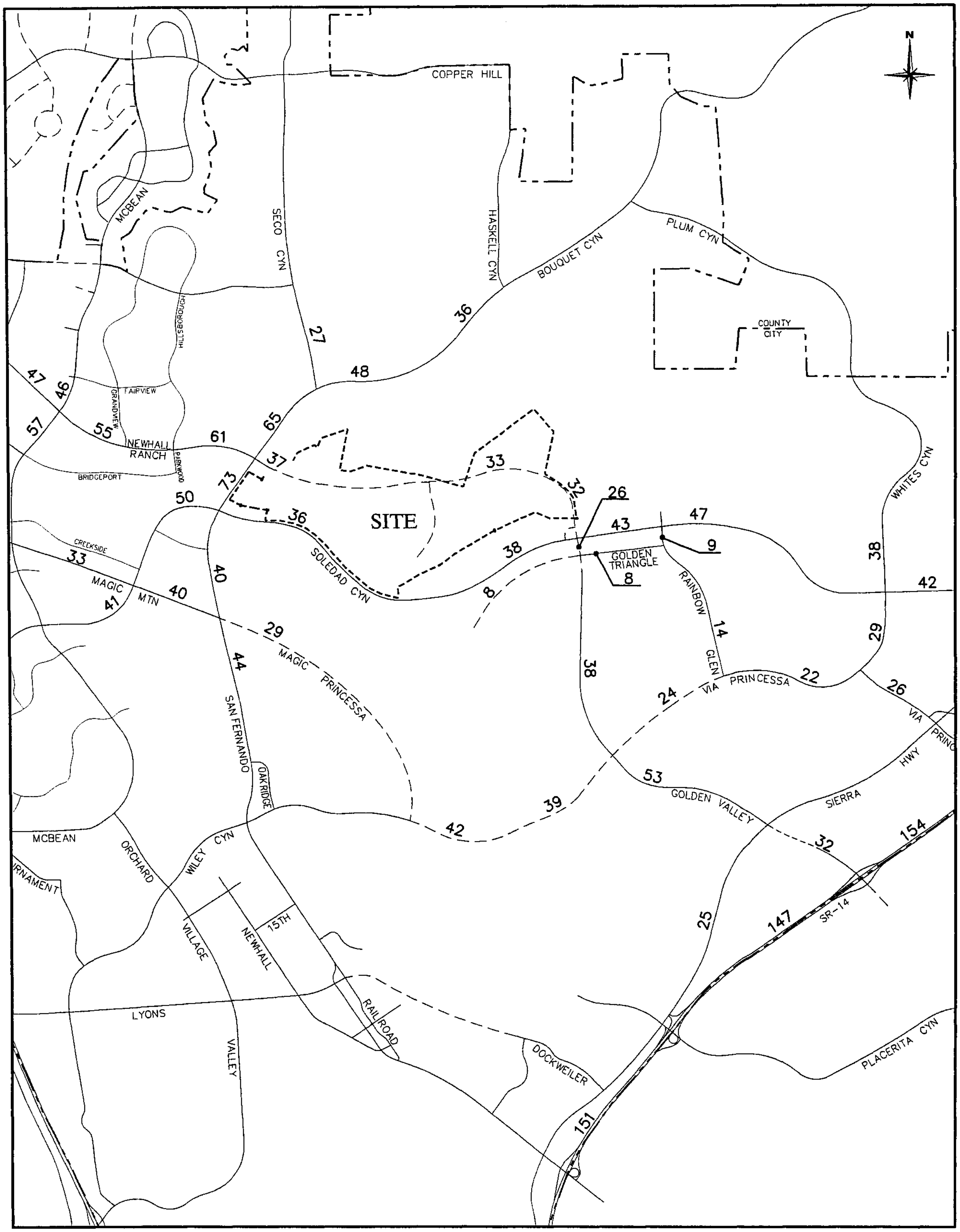
4.1.3 Interim Year With Mitigation

The previous section identified the six intersections that are significantly impacted by the proposed project under Interim Year conditions. Four result in conditions of LOS "E" or worse and two result in LOS "D". Mitigation measures that address these impacts are as follows:

Mitigation not requiring acquisition of right-of-way:

48. McBean & Newhall Ranch	Add 4th Eastbound Through Lane, and Add 4th Westbound Through Lane
66. Bouquet & Newhall Ranch	Add 4th Eastbound Through Lane, and Add 4th Westbound Through Lane
67. Seco & Bouquet	Convert 1st Southbound Right-Turn Lane to a shared Left-Turn/Right-Turn Lane (for 1 Left-Turn Lane, 1 shared Left-Turn/Right-Turn Lane, 1 Right-Turn Lane)

(mitigation continued on Page 4-11)



Legend

XX ADT (thousands)

Figure 4-4

AVERAGE DAILY TRAFFIC VOLUMES
- INTERIM YEAR WITH PROJECT

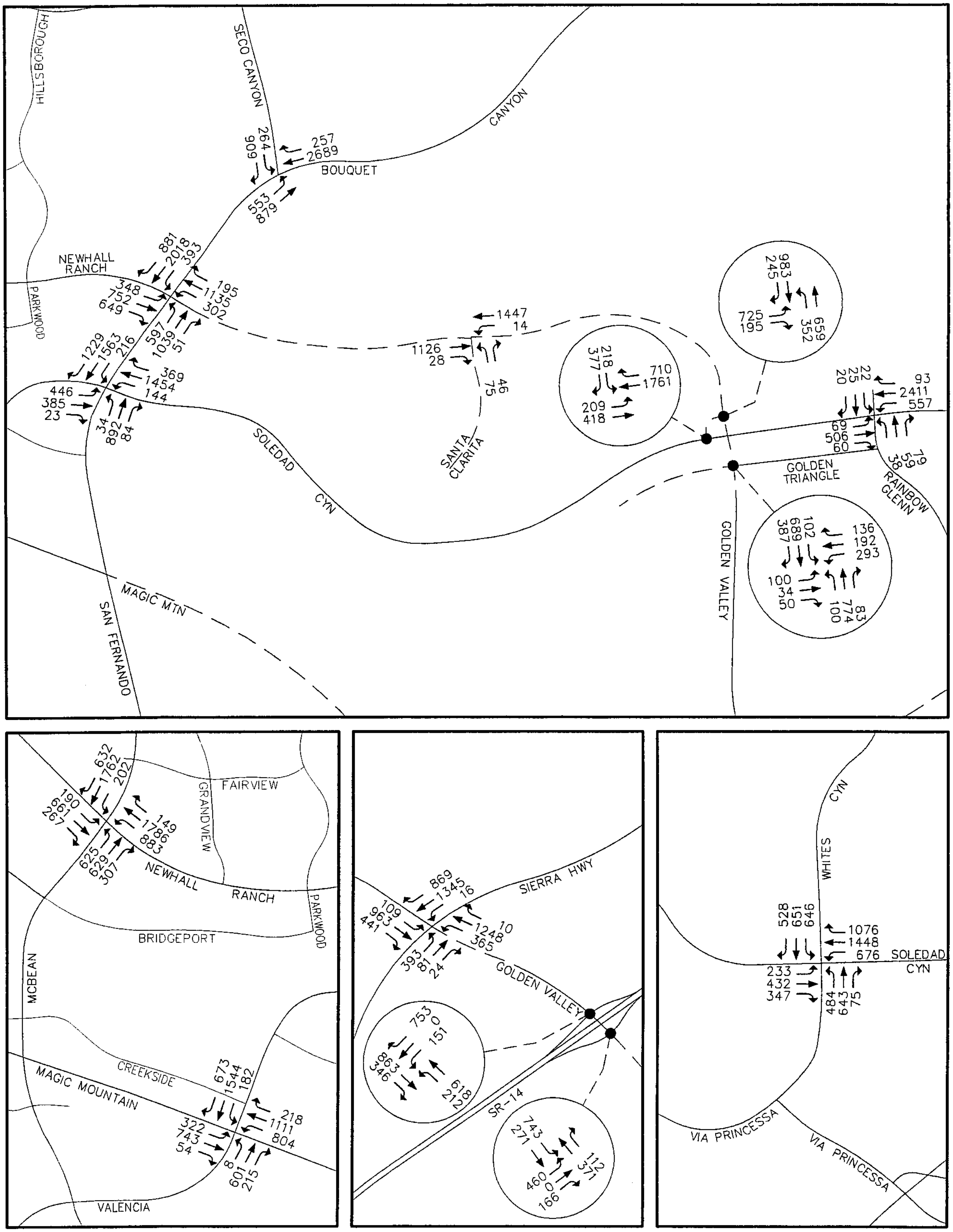


Figure 4-5

AM PEAK HOUR TURNING MOVEMENT VOLUMES - INTERIM YEAR WITH PROJECT

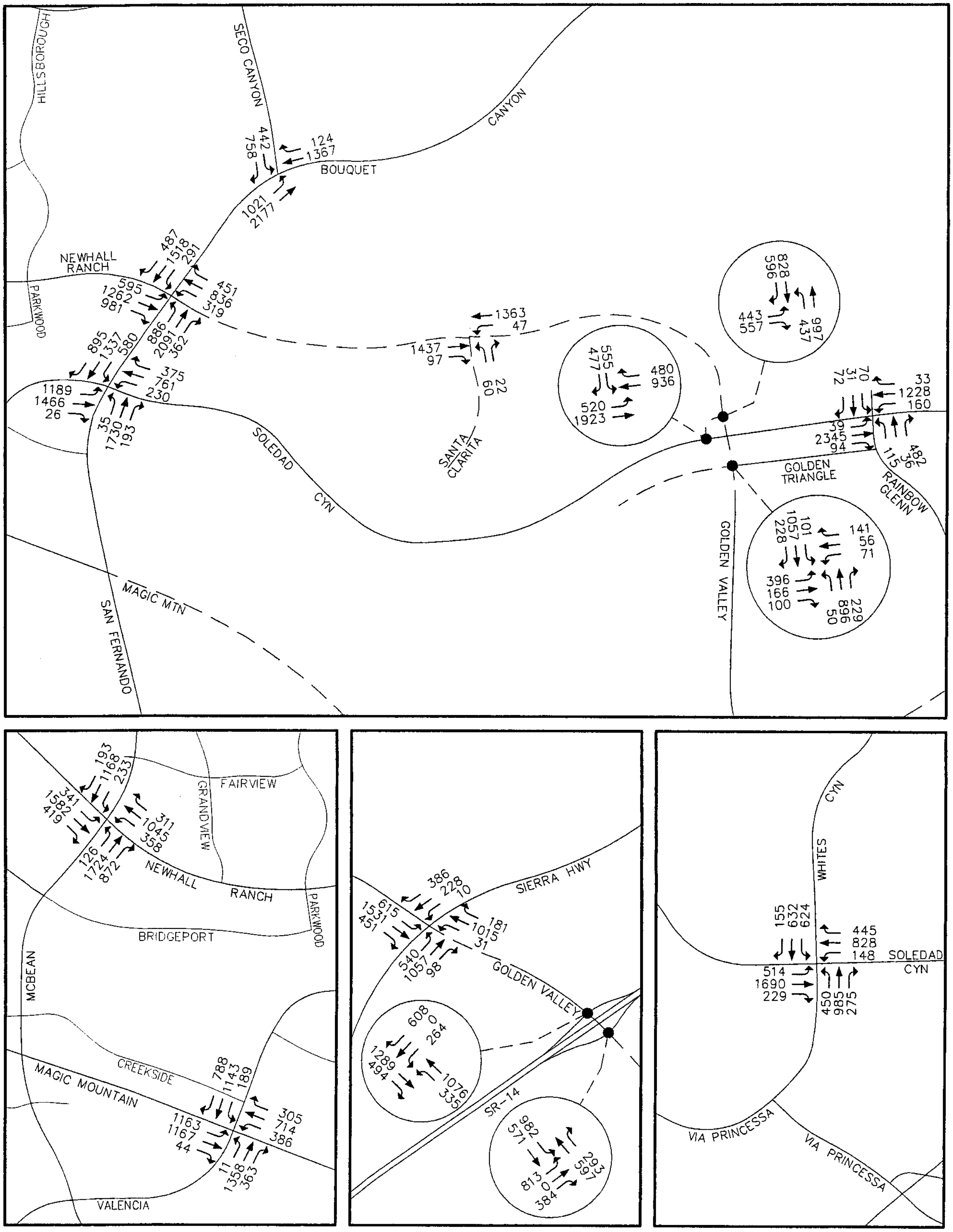


Figure 4-6

PM PEAK HOUR TURNING MOVEMENT VOLUMES - INTERIM YEAR WITH PROJECT

Table 4-2

ICU AND LOS SUMMARY – INTERIM YEAR WITH AND WITHOUT PROJECT

	INTERIM YEAR WITHOUT PROJECT				INTERIM YEAR WITH PROJECT				INCREASE	
INTERSECTION	AM		PM		AM		PM		AM	PM
48. McBean & Newhall Ranch	.91	E	.88	D	.92	E	.90	D	.01**	.02*
57. Valencia & Magic Mountain	1.07	F	1.09	F	1.08	F	1.11	F	.01**	.02**
65. Bouquet & Soledad	.76	C	.92	E	.78	C	.97	E	.02	.05**
66. Bouquet & Newhall Ranch	.85	D	.88	D	.88	D	.90	D	.03*	.02*
67. Seco & Bouquet	.96	E	.96	E	.97	E	.97	E	.01**	.01**
146. SR-14 NB Ramp & Golden Valley	.55	A	.78	C	.55	A	.78	C	.00	.00
147. SR-14 SB Ramp & Golden Valley	.61	B	.81	D	.61	B	.81	D	.00	.00
158. Santa Clarita & Newhall Ranch					.42	A	.43	A		
162. Sierra & Golden Valley	.87	D	.84	D	.87	D	.85	D	.00	.01
164. Golden Valley & Golden Triangle	.52	A	.60	A	.55	A	.63	B	.03	.03
165. Golden Valley & Valley Center	.56	A	.60	A	.60	A	.61	B	.04	.01
169. Rainbow Glen & Soledad	.69	B	.89	D	.71	C	.90	D	.02	.01
172. Whites Canyon & Soledad	.98	E	.88	D	.98	E	.90	D	.00	.02*
198. Valley Center & Soledad	.65	B	.62	B	.67	B	.63	B	.02	.01

* Significant Project Impact (see Table 1-3) at LOS "D"
** Significant Project Impact (see Table 1-3) at LOS "E" or "F"

Level of service ranges: .00 - .60 A
.61 - .70 B
.71 - .80 C
.81 - .90 D
.91 – 1.00 E
Above 1.00 F

(mitigation continued from Page 4-6)

Mitigation requiring acquisition of right-of-way:

57. Valencia & Magic Mountain	Add 3rd Eastbound Through Lane
65. Bouquet & Soledad	Add 4th Northbound Through Lane
67. Seco & Bouquet	Add 1st Westbound Right-Turn Lane
172. Whites Canyon & Soledad	Add 2nd dedicated Northbound Left-Turn Lane & convert shared Northbound Left-Turn/Through Lane to 3rd dedicated Through Lane, Or, Add 1st Eastbound Right-Turn Lane

Table 4-3 summarizes the resulting ICUs and LOS with this mitigation. As shown above, most of these improvements require the acquisition of right-of-way which is out of the applicant's control.

The project's percentage impact (as shown by the ICU) on the affected intersections, based on mitigation only where right-of-way is not required, is as follows:

- McBean & Newhall Ranch (mitigated) AM: -.04 PM: -.05
- Bouquet & Newhall Ranch (mitigated) AM: -.03 PM: -.01
- Seco & Bouquet (partially mitigated) AM: .01 PM: -.10
- Valencia & Magic Mountain (unmitigated) AM: .01 PM: .02
- Bouquet & Soledad (unmitigated) AM: .02 PM: .05
- Whites Canyon & Soledad (unmitigated) AM: .00 PM: .02

The Riverpark project is located within the Bouquet Canyon Bridge and Thoroughfare District (Bouquet B & T District). This district is considered a full-mitigation district, that is, traffic improvements identified in the district mitigate traffic impacts created by planned growth within the district. In summary, the District has been designed to accommodate the needs of future development anticipated by the City and County General Plans.

Future identified improvements within the Bouquet Bridge and Thoroughfare District may result in improved operation at the impacted intersections. Various factors, including but not limited to, dedication of additional right-of-way at these affected intersections due to use alteration, expansion, or change, acquisition of the affected right-of-way by the City via funds from a Bridge and Thoroughfare

Table 4-3

COMPARISON OF CONDITIONS BEFORE AND AFTER MITIGATION – INTERIM YEAR

INTERSECTION	INTERIM YEAR WITHOUT PROJECT AM		PM		INTERIM YEAR WITH PROJECT & MITIGATION AM		PM		NET CHANGE AM	PM
48. McBean & Newhall Ranch	.91	E	.88	D	.87	D	.83	D	-.04	-.05
57. Valencia & Magic Mountain*	1.07	F	1.09	F	1.00	E	1.07	F	-.07	-.02
65. Bouquet & Soledad*	.76	C	.92	E	.78	C	.89	D	.02	-.03
66. Bouquet & Newhall Ranch	.85	D	.88	D	.82	D	.87	D	-.03	-.01
67. Seco & Bouquet*	.96	E	.96	E	.92	E	.86	D	-.04	-.10
172. Whites Canyon & Soledad*	.98	E	.88	D	.95	E	.88	D	-.03	.00

*See Section 4.1.3 for additional information regarding availability of right-of-way at these locations.

Level of service ranges:	
.00 - .60	A
.61 - .70	B
.71 - .80	C
.81 - .90	D
.91 – 1.00	E
Above 1.00	F

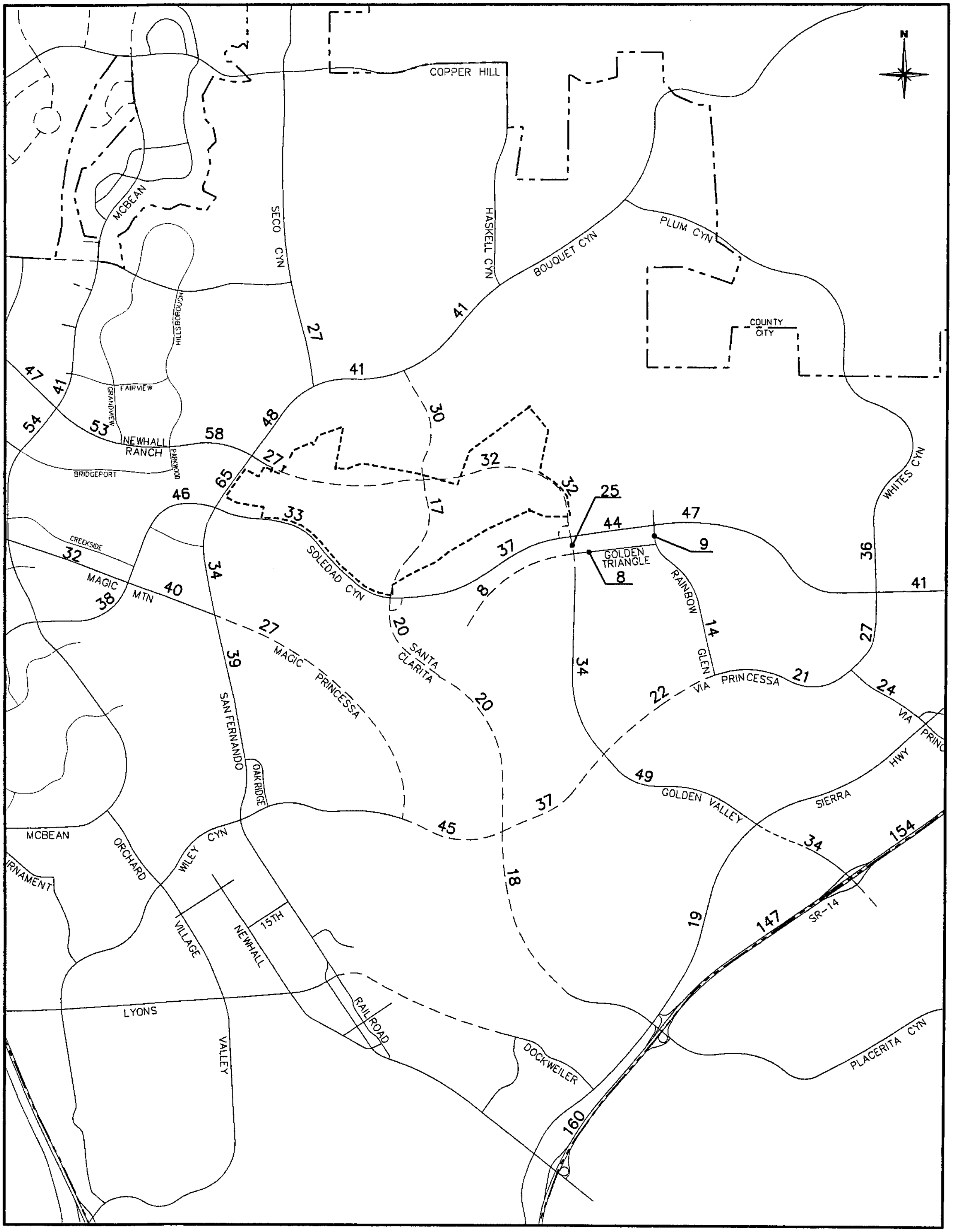
District, continued expansion of the Valley's circulation system (i.e. construction of regional roadway improvements), and increased public transit use may improve the operation of each of the affected intersections.

Without mitigation, the Valencia Boulevard/Magic Mountain Parkway intersection is forecast as LOS F (same as the no-project conditions), the Bouquet Canyon Road/Soledad Canyon Road intersection is forecast as LOS E (same as the no-project conditions), the Seco Canyon Road/Bouquet Canyon Road intersection is forecast as LOS E (same as the no-project conditions), and the Whites Canyon Road/Soledad Canyon Road intersection is forecast as LOS D (same as the no-project and the with project/with mitigation conditions). The remaining significantly impacted intersections will be fully mitigated with the proposed improvements and are forecast as LOS D.

4.1.4 Alternative Interim Year No-Project Traffic Conditions

An alternative Interim Year setting has been analyzed with and without the proposed project. This setting differs from the Interim Year setting analyzed in the previous section due to the inclusion of the entire length of the future Santa Clarita Parkway (for both the with- and without-project scenarios). No-project ADT volumes for this scenario are shown in Figure 4-7. The no-project peak hour turning movement volumes for the intersections in the study area are illustrated in Figures 4-8 and 4-9 for the AM and PM peak hours, respectively. Table 4-4 provides the corresponding ICU values and also listed for comparison purposes are the ICUs for existing conditions.

Under this alternative, the ICU tabulations indicate that deficiencies occur at two additional intersections (Valencia Boulevard/Magic Mountain Parkway, and Seco Canyon Road/Bouquet Canyon Road) when compared to existing conditions. The Bouquet Canyon Road/Soledad Canyon Road intersection and the Whites Canyon Road/Soledad Canyon Road intersection, which have been shown to be deficient for existing conditions, are forecast to remain deficient for the alternative Interim Year conditions without the proposed project. While remaining deficient, conditions improve from LOS F to LOS E at the Bouquet Canyon Road/Soledad Canyon Road intersection due to the planned improvement project at this location. Specifically, the planned improvements consist of adding a third left-turn lane in the eastbound direction.



Legend

XX ADT (thousands)

Figure 4-7

AVERAGE DAILY TRAFFIC VOLUMES
- ALTERNATIVE INTERIM YEAR
WITHOUT PROJECT

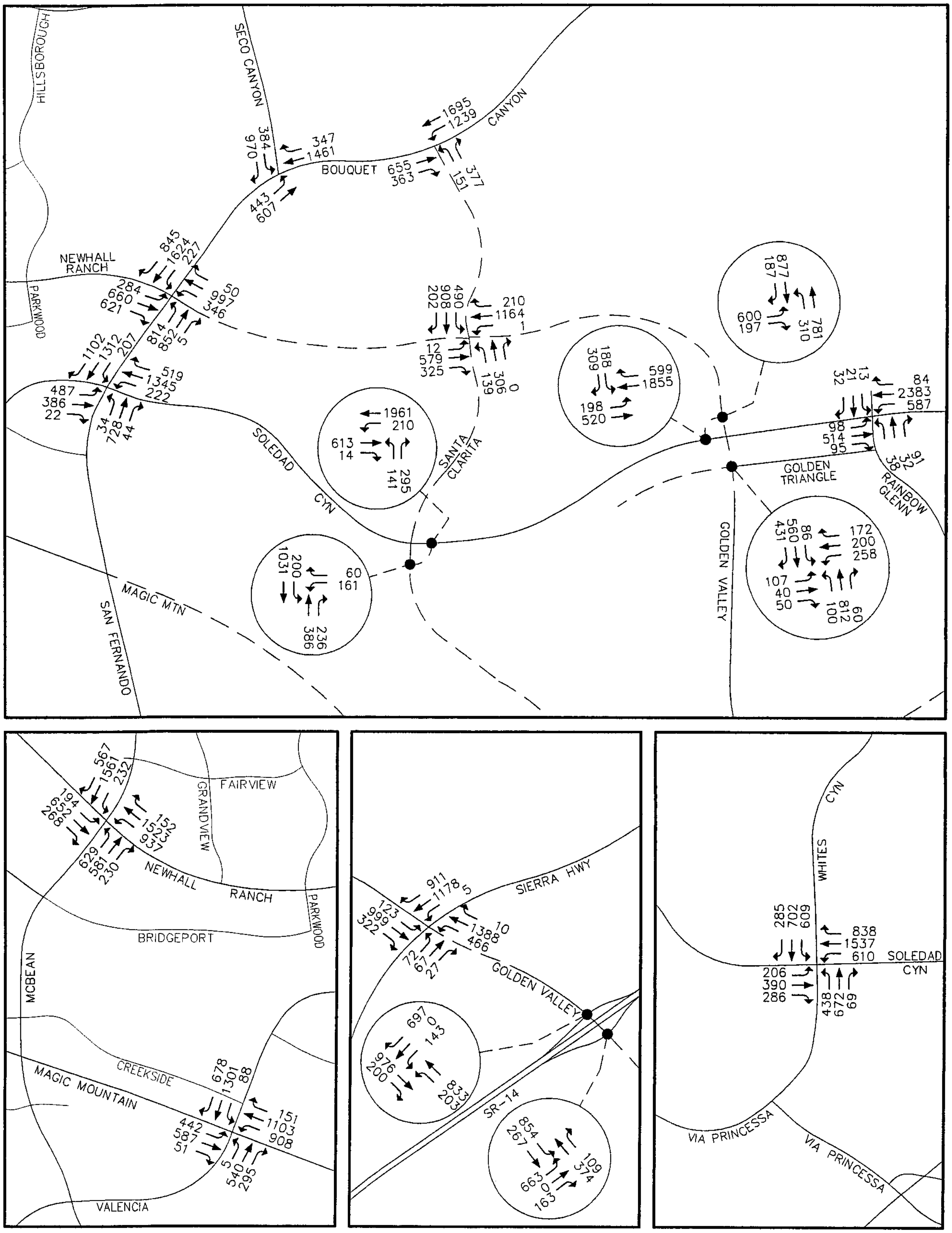


Figure 4-8

AM PEAK HOUR TURNING MOVEMENT VOLUMES - ALTERNATIVE INTERIM YEAR WITHOUT PROJECT

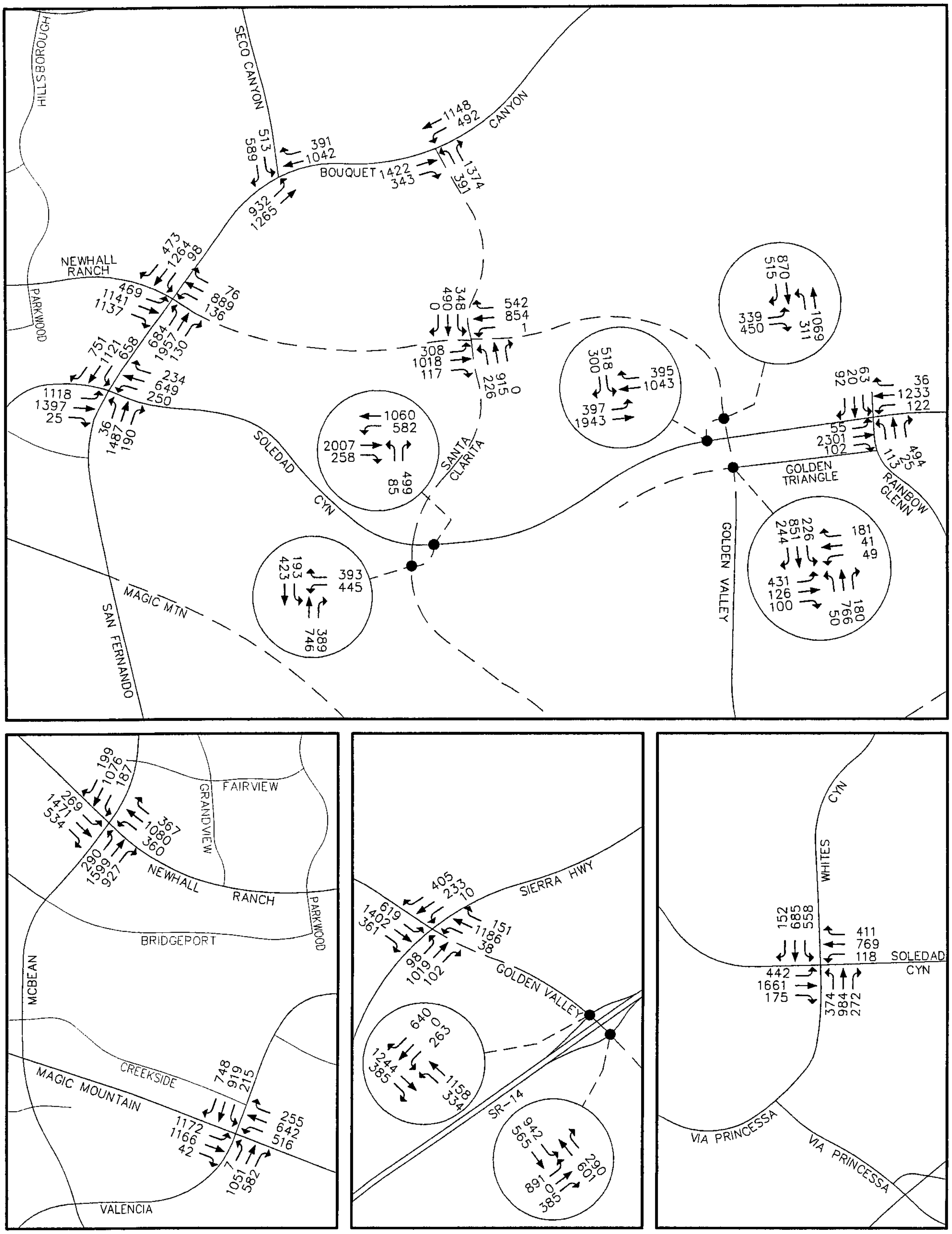


Figure 4-9

PM PEAK HOUR TURNING MOVEMENT VOLUMES - ALTERNATIVE INTERIM YEAR WITHOUT PROJECT

Table 4-4

ICU AND LOS SUMMARY – EXISTING AND ALTERNATIVE INTERIM YEAR WITHOUT PROJECT

INTERSECTION	EXISTING AM		EXISTING PM		ALT. INTERIM YEAR WITHOUT PROJECT AM		ALT. INTERIM YEAR WITHOUT PROJECT PM		INCREASE AM	INCREASE PM
48. McBean & Newhall Ranch	.82	D	.66	B	.89	D	.83	D	.07	.17
57. Valencia & Magic Mountain	.58	A	.69	B	1.05	F*	1.16	F*	.47	.47
65. Bouquet & Soledad	.76	C	1.04	F*	.72	C	.91	E*	-.04	-.13
66. Bouquet & Newhall Ranch	.88	D	.83	D	.83	D	.78	C	-.05	-.05
67. Seco & Bouquet	.90	D	.90	D	.79	C	.93	E*	-.11	.03
146. SR-14 NB Ramp & Golden Valley	.17	A	.28	A	.64	B	.79	C	.47	.51
147. SR-14 SB Ramp & Golden Valley	.52	A	.25	A	.64	B	.80	C	.12	.55
157. Santa Clarita & Soledad Access					.35	A	.44	A		
158. Santa Clarita & Newhall Ranch					.57	A	.69	B		
159. Santa Clarita & Bouquet					.66	B	.76	C		
162. Sierra & Golden Valley	.68	B	.47	A	.78	C	.86	D	.10	.39
164. Golden Valley & Golden Triangle					.53	A	.68	B		
165. Golden Valley & Valley Center					.53	A	.55	A		
169. Rainbow Glen & Soledad	.72	C	.67	B	.69	B	.88	D	-.03	.21
172. Whites Canyon & Soledad	.97	E*	.77	C	.96	E*	.87	D	-.01	.10
197. Santa Clarita Access & Soledad					.51	A	.70	B		
198. Valley Center & Soledad					.64	B	.62	B		
157b. Santa Clarita & Soledad (at grade)					.72	C	.76	C		

* Exceeds performance standard (see Table 1-3)

Level of service ranges:

.00 - .60	A
.61 - .70	B
.71 - .80	C
.81 - .90	D
.91 – 1.00	E
Above 1.00	F

4.1.5 Alternative Interim Year With Project Traffic Conditions

Alternative Interim Year volumes that include project generated traffic are provided in Figure 4-10 for the ADT volumes and in Figures 4-11 and 4-12 for the AM and PM peak hours, respectively. Peak hour ICU values can be found in Table 4-5 which provides a comparison between Interim Year no-project and Interim Year with-project conditions. The table shows that five intersections experience a significant impact due to the project generated traffic (see Table 1-3 for significant impact criteria) with four of those intersections forecast to exceed LOS "D". The following intersections are those significantly impacted:

Intersections with Significant Project Impact at LOS "E" or LOS "F":

- McBean Parkway and Newhall Ranch Road (both AM and PM peak)
- Valencia Boulevard and Magic Mountain Parkway (both AM and PM peak)
- Bouquet Canyon Road and Soledad Canyon Road (PM peak)
- Seco Canyon Road and Bouquet Canyon Road (PM peak)

Intersections with Significant Project Impact at LOS "D":

- Bouquet Canyon Road and Newhall Ranch Road (both AM and PM peak)

4.1.6 Alternative Interim Year With Mitigation

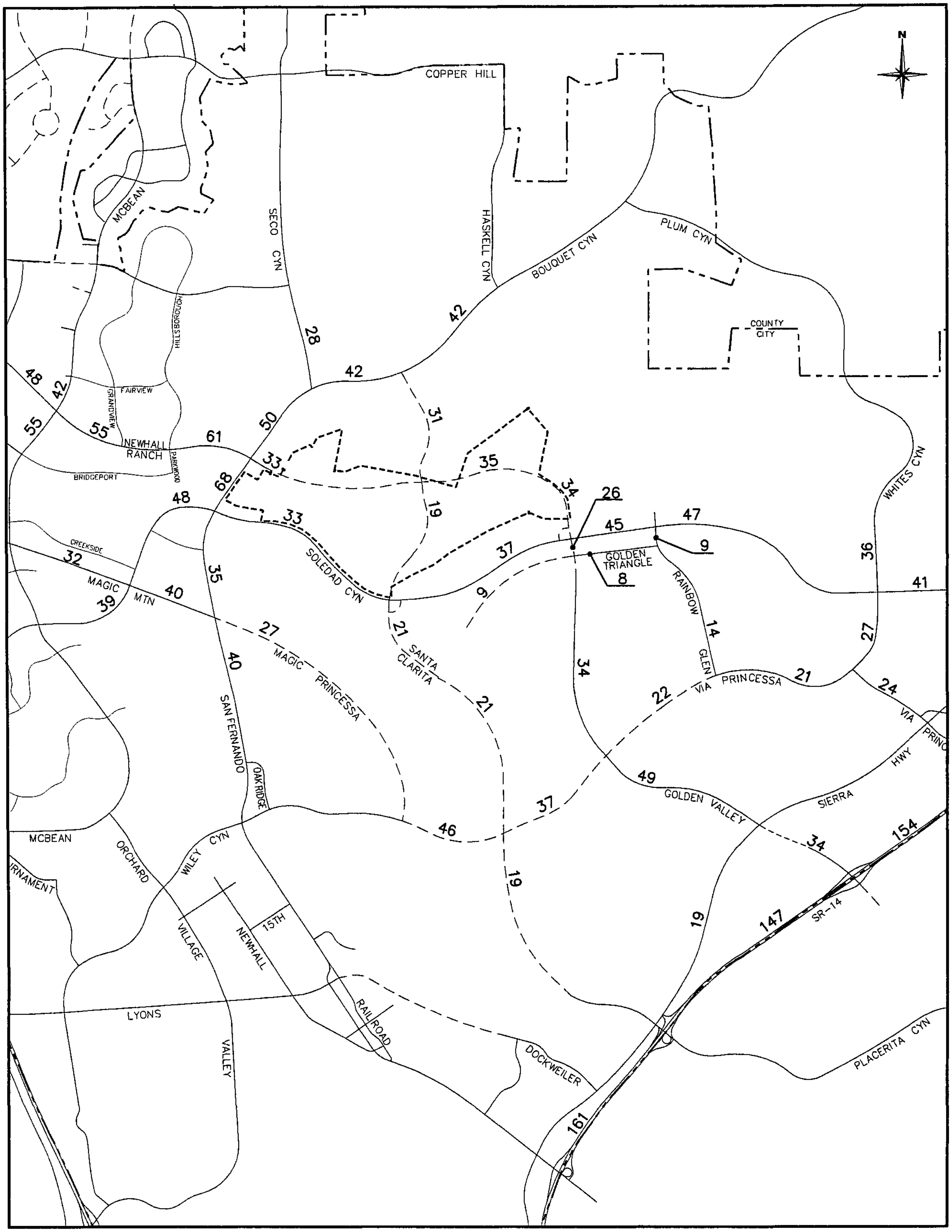
The previous section identified five intersections that are significantly impacted by the proposed project under the Alternative Interim Year conditions. Four result in conditions of LOS "E" or worse and one results in LOS "D". Mitigation measures that address these impacts are as follows:

Mitigation not requiring acquisition of right-of-way:

48. McBean & Newhall Ranch	Add 4th Eastbound Through Lane, and Add 4th Westbound Through Lane
66. Bouquet & Newhall Ranch	Add 4th Eastbound Through Lane, and Add 4th Westbound Through Lane
67. Seco & Bouquet	Convert 1st Southbound Right-Turn Lane to a shared Left-Turn/Right-Turn Lane (for 1 Left-Turn Lane, 1 shared Left-Turn/Right-Turn Lane, 1 Right-Turn Lane)

Mitigation requiring acquisition of right-of-way:

57. Valencia & Magic Mountain	Add 3rd Eastbound Through Lane
65. Bouquet & Soledad	Add 4th Northbound Through Lane



Legend

XX ADT (thousands)

Figure 4-10

AVERAGE DAILY TRAFFIC VOLUMES
- ALTERNATIVE INTERIM YEAR WITH PROJECT

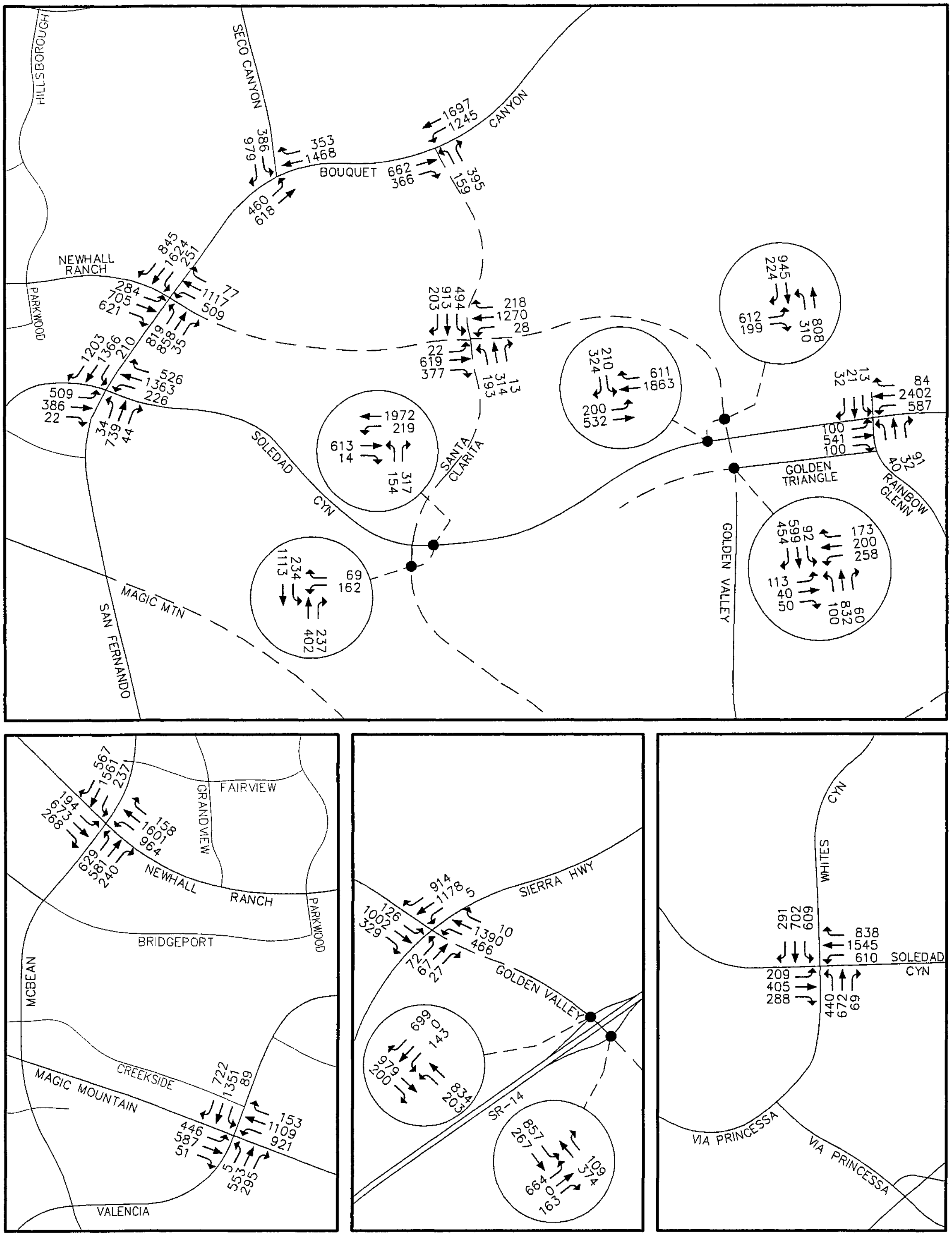


Figure 4-11

AM PEAK HOUR TURNING MOVEMENT VOLUMES - ALTERNATIVE INTERIM YEAR WITH PROJECT

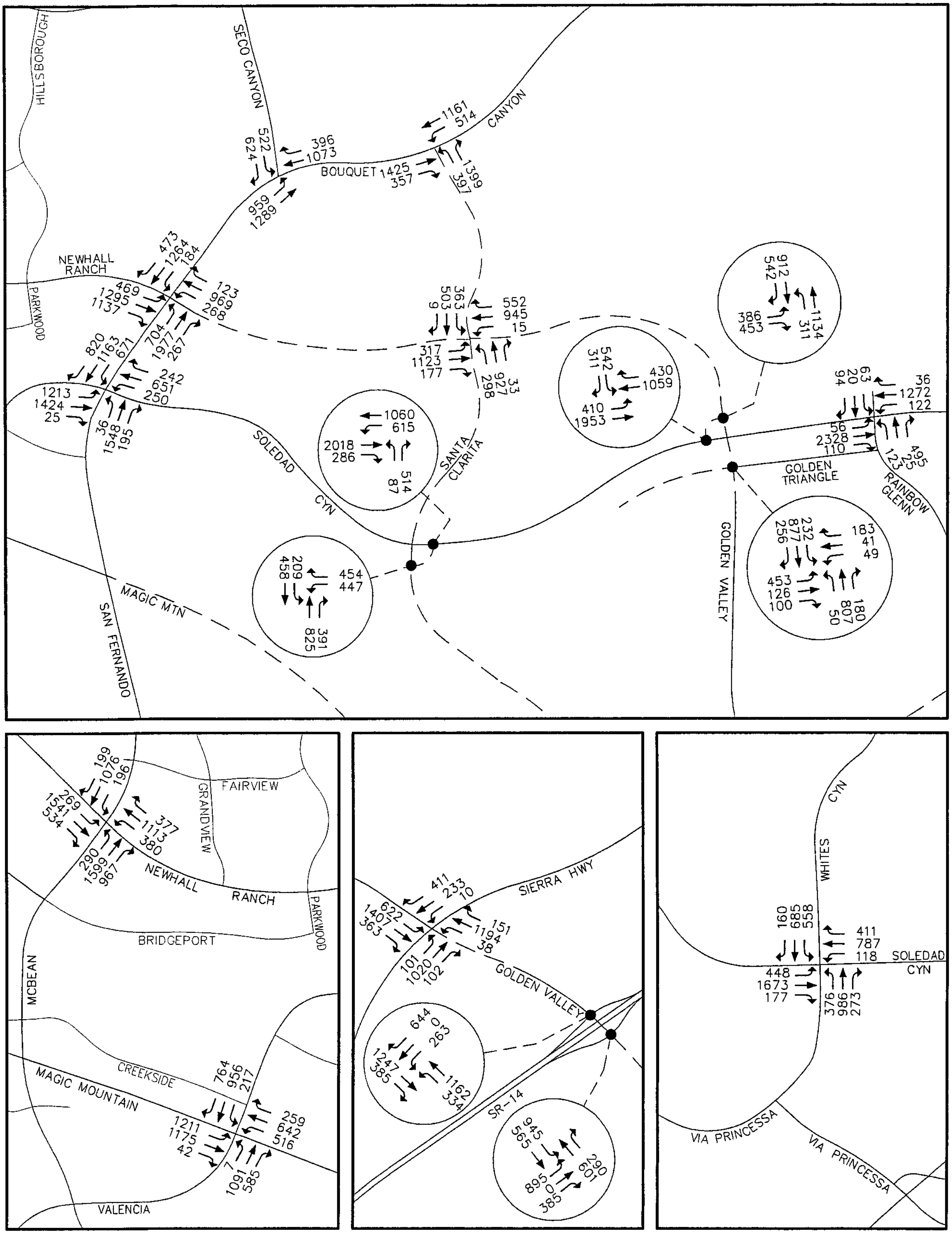


Figure 4-12

PM PEAK HOUR TURNING MOVEMENT VOLUMES - ALTERNATIVE INTERIM YEAR WITH PROJECT

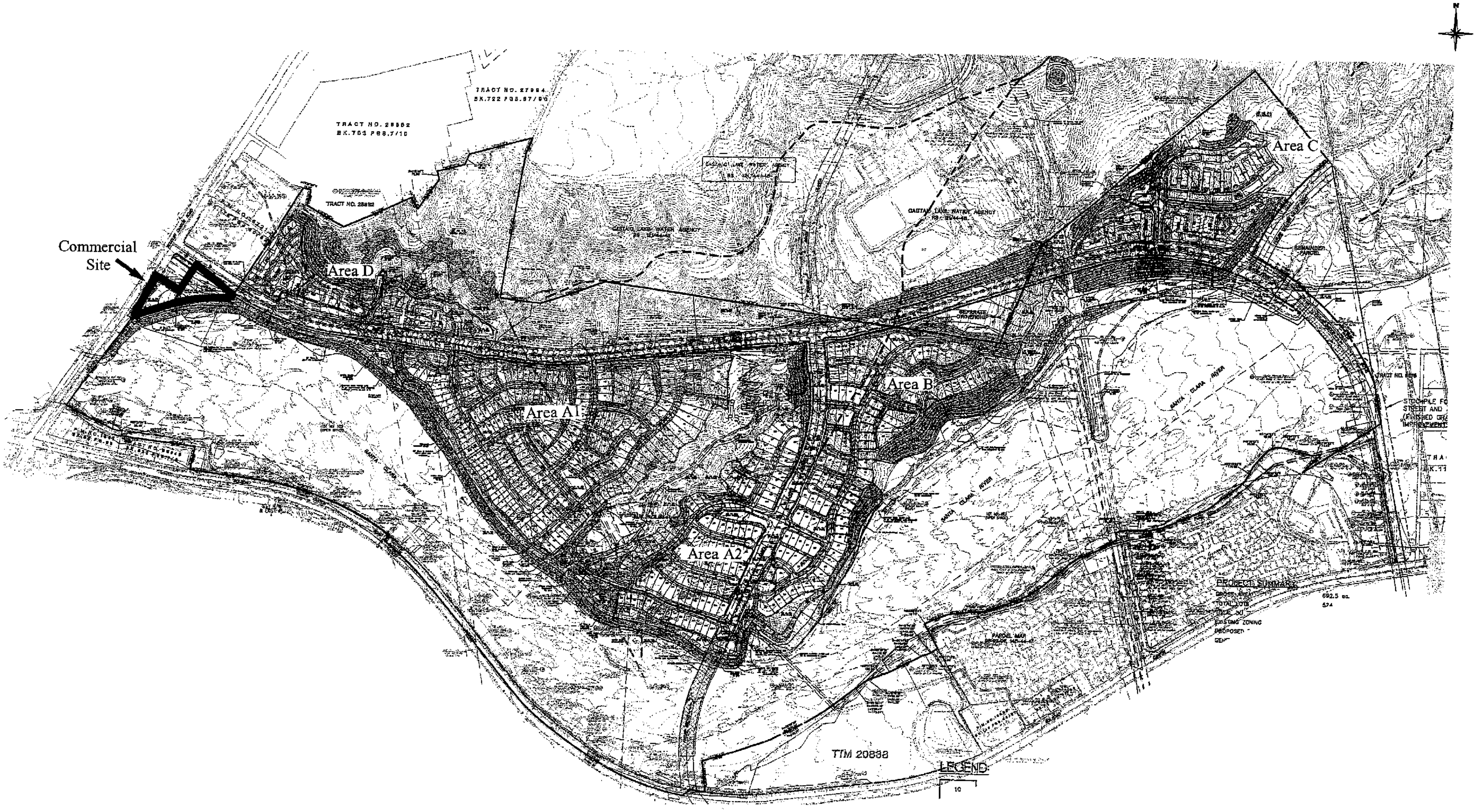


Figure 3-1

PROJECT SITE PLAN

Table 4-5

ICU AND LOS SUMMARY – ALTERNATIVE INTERIM YEAR WITH AND WITHOUT PROJECT

INTERSECTION	ALT. INTERIM YEAR WITHOUT PROJECT				ALT. INTERIM YEAR WITH PROJECT				INCREASE	
	AM		PM		AM		PM		AM	PM
48. McBean & Newhall Ranch	.89	D	.83	D	.91	E	.86	D	.02**	.03*
57. Valencia & Magic Mountain	1.05	F	1.16	F	1.07	F	1.17	F	.02**	.01**
65. Bouquet & Soledad	.72	C	.91	E	.74	C	.93	E	.02	.02**
66. Bouquet & Newhall Ranch	.83	D	.78	C	.85	D	.82	D	.02*	.04*
67. Seco & Bouquet	.79	C	.93	E	.80	C	.95	E	.01	.02**
146. SR-14 NB Ramp & Golden Valley	.64	B	.79	C	.64	B	.80	C	.00	.01
147. SR-14 SB Ramp & Golden Valley	.64	B	.80	C	.64	B	.80	C	.00	.00
157. Santa Clarita & Soledad Access	.35	A	.44	A	.36	A	.48	A	.01	.04
158. Santa Clarita & Newhall Ranch	.57	A	.69	B	.62	B	.71	C	.05	.02
159. Santa Clarita & Bouquet	.66	B	.76	C	.67	B	.77	C	.01	.01
162. Sierra & Golden Valley	.78	C	.86	D	.78	C	.87	D	.00	.01
164. Golden Valley & Golden Triangle	.53	A	.68	B	.54	A	.70	B	.01	.02
165. Golden Valley & Valley Center	.53	A	.55	A	.54	A	.55	A	.01	.00
169. Rainbow Glen & Soledad	.69	B	.88	D	.69	B	.88	D	.00	.00
172. Whites Canyon & Soledad	.96	E	.87	D	.96	E	.87	D	.00	.00
197. Santa Clarita Access & Soledad	.51	A	.70	B	.52	A	.71	C	.01	.01
198. Valley Center & Soledad	.64	B	.62	B	.65	B	.62	B	.01	.00
157b. Santa Clarita & Soledad (at grade)	.72	C	.76	C	.75	C	.78	C	.03	.02

* Significant Project Impact (see Table 1-3) at LOS "D"
** Significant Project Impact (see Table 1-3) LOS "E" or "F"

Level of service ranges:	
.00 - .60	A
.61 - .70	B
.71 - .80	C
.81 - .90	D
.91 – 1.00	E
Above 1.00	F

Table 4-6 summarizes the resulting ICUs and LOS with this mitigation. As shown above, some of these improvements require the acquisition of right-of-way, which is out of the applicants control.

The project's percentage impact (as shown by the ICU) on the affected intersections, based on mitigation only where right-of-way is not required, is as follows:

McBean & Newhall Ranch (mitigated)	AM: -.01	PM: -.04
Bouquet & Newhall Ranch (mitigated)	AM: -.02	PM: -.02
Seco & Bouquet (mitigated)	AM: .01	PM: -.13
Valencia & Magic Mountain (unmitigated)	AM: .02	PM: .01
Bouquet & Soledad (unmitigated)	AM: .02	PM: .02

The Riverpark project is located within the Bouquet Canyon Bridge and Thoroughfare District (Bouquet B & T District). This district is considered a full-mitigation district, that is, traffic improvements identified in the district mitigate traffic impacts created by planned growth within the district. In summary, the District has been designed to accommodate the needs of future development anticipated by the City and County General Plans.

Future identified improvements within the Bouquet Bridge and Thoroughfare District may result in improved operation at the impacted intersections. Various factors, including but not limited to, dedication of additional right-of-way at these affected intersections due to use alteration, expansion, or change, acquisition of the affected right-of-way by the City via funds from a Bridge and Thoroughfare District, continued expansion of the Valley's circulation system (i.e. construction of regional roadway improvements), and increased public transit use may improve the operation of each of the affected intersections.

Without mitigation, the Valencia Boulevard/Magic Mountain Parkway intersection is forecast as LOS F (same as the no-project and the with project/with mitigation conditions) and the Bouquet Canyon Road/Soledad Canyon Road intersection is forecast as LOS E (same as the no-project conditions). The remaining significantly impacted intersections will be fully mitigated with the proposed improvements and are forecast as LOS D or better.

Table 4-6

COMPARISON OF CONDITIONS BEFORE AND AFTER MITIGATION - ALTERNATIVE INTERIM YEAR

	ALT. INTERIM YEAR WITHOUT PROJECT				ALT. INTERIM YEAR WITH PROJECT & MITIGATION				NET CHANGE	
INTERSECTION	AM		PM		AM		PM		AM	PM
48. McBean & Newhall Ranch	.89	D	.83	D	.88	D	.79	C	-.01	-.04
57. Valencia & Magic Mountain*	1.05	F	1.16	F	1.01	F	1.06	F	-.04	-.10
65. Bouquet & Soledad*	.72	C	.91	E	.74	C	.86	D	.00	-.05
66. Bouquet & Newhall Ranch	.83	D	.78	C	.81	D	.76	C	-.02	-.02
67. Seco & Bouquet	.79	C	.93	E	.80	C	.80	C	.01	-.13

*See Section 4.1.6 for additional information regarding availability of right-of-way at this location.

Level of service ranges:		
	.00 - .60	A
	.61 - .70	B
	.71 - .80	C
	.81 - .90	D
	.91 – 1.00	E
	Above 1.00	F

4.2 LONG-RANGE ANALYSIS

Since the proposed project involves a General Plan amendment, an evaluation of long-range conditions is provided. The long-range conditions are obtained from the SCVCTM and are based on long-range cumulative (buildout) land use projections for the Santa Clarita Valley and a roadway network that is consistent with the City's General Plan Circulation Element. The purpose of this analysis is to determine if the proposed project results in significant changes in roadway volumes when compared to the forecasts used to develop the City's General Plan Circulation Element. This forms the basis for identifying the potential long-range traffic impacts of the proposed project.

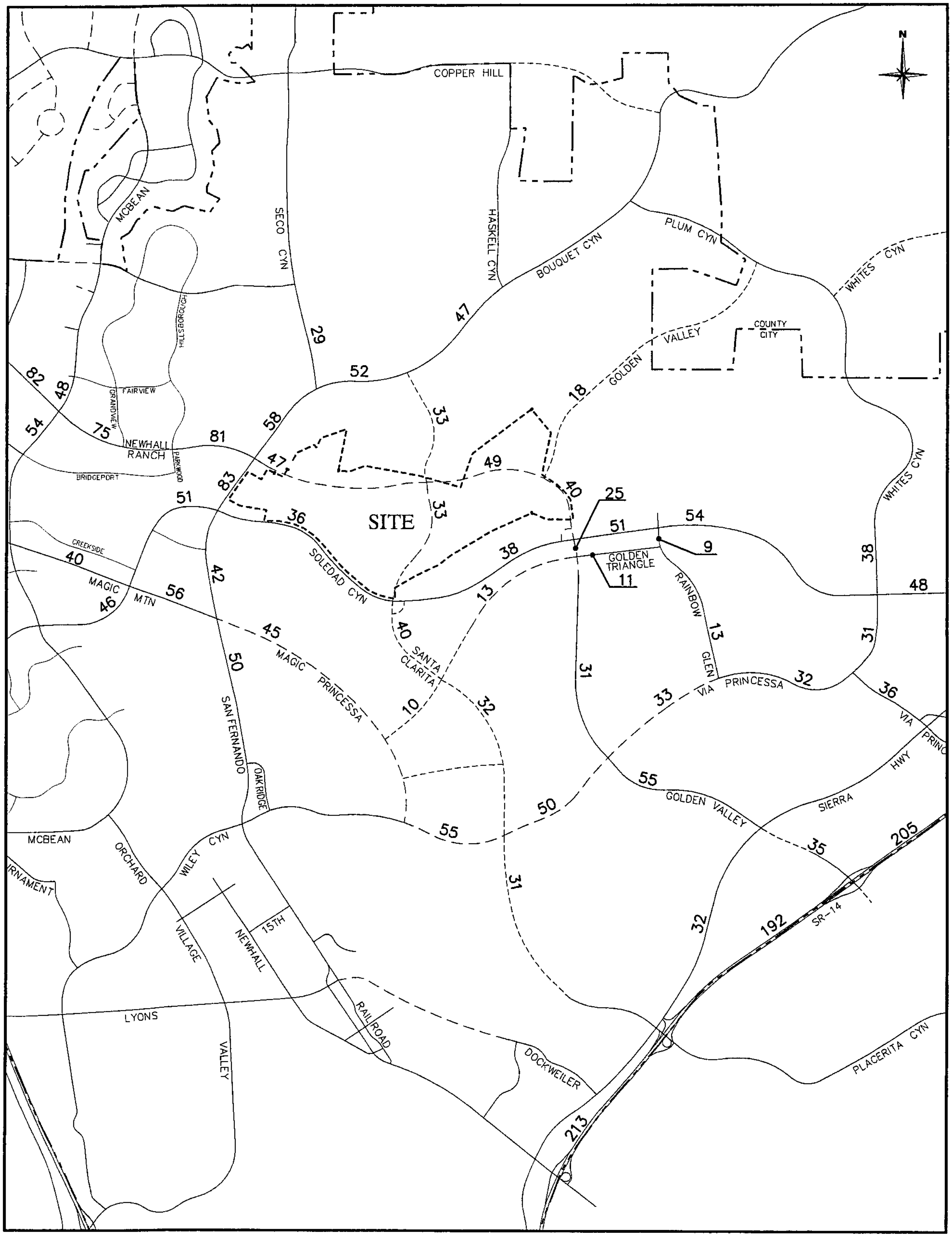
The following sections discuss conditions with and without the project for this scenario as well as an alternative long-range scenario which does not include the future Santa Clarita Parkway and a scenario for a four lane Santa Clarita Parkway between Bouquet Canyon Road and Soledad Canyon Road. Consistent with the City's previous General Plan studies which only address ADT volumes, ADT volumes are forecast for Long Range Cumulative conditions in the following analyses. Peak hour intersection turning movement volumes are used to compare the four lane and deletion scenarios to the current Circulation Element.

4.2.1 Long-Range Cumulative Traffic Conditions

Long-range Cumulative ADT volumes within the study area are shown in Figure 4-13. These forecasts are based on the project site being developed with the land use that has historically been used by the City and the County for long-range planning (see following section for details). Figure 4-14 illustrates the Long Range Cumulative ADT volumes without Santa Clarita Parkway.

4.2.2 Long-Range Cumulative With Project Traffic Conditions

The proposed project represents a net reduction in traffic generation when compared to the land uses allowed by the current General Plan. Table 4-7 compares the proposed project to the General Plan land use and shows that the proposed project generates approximately 68,000 ADT less than what was planned for the property under the City's General Plan. Likewise, when compared to the land use that has historically been used by the City and the County for long-range planning in the SCVCTM, the proposed project generates approximately 14,000 ADT less, as shown in Table 4-8.

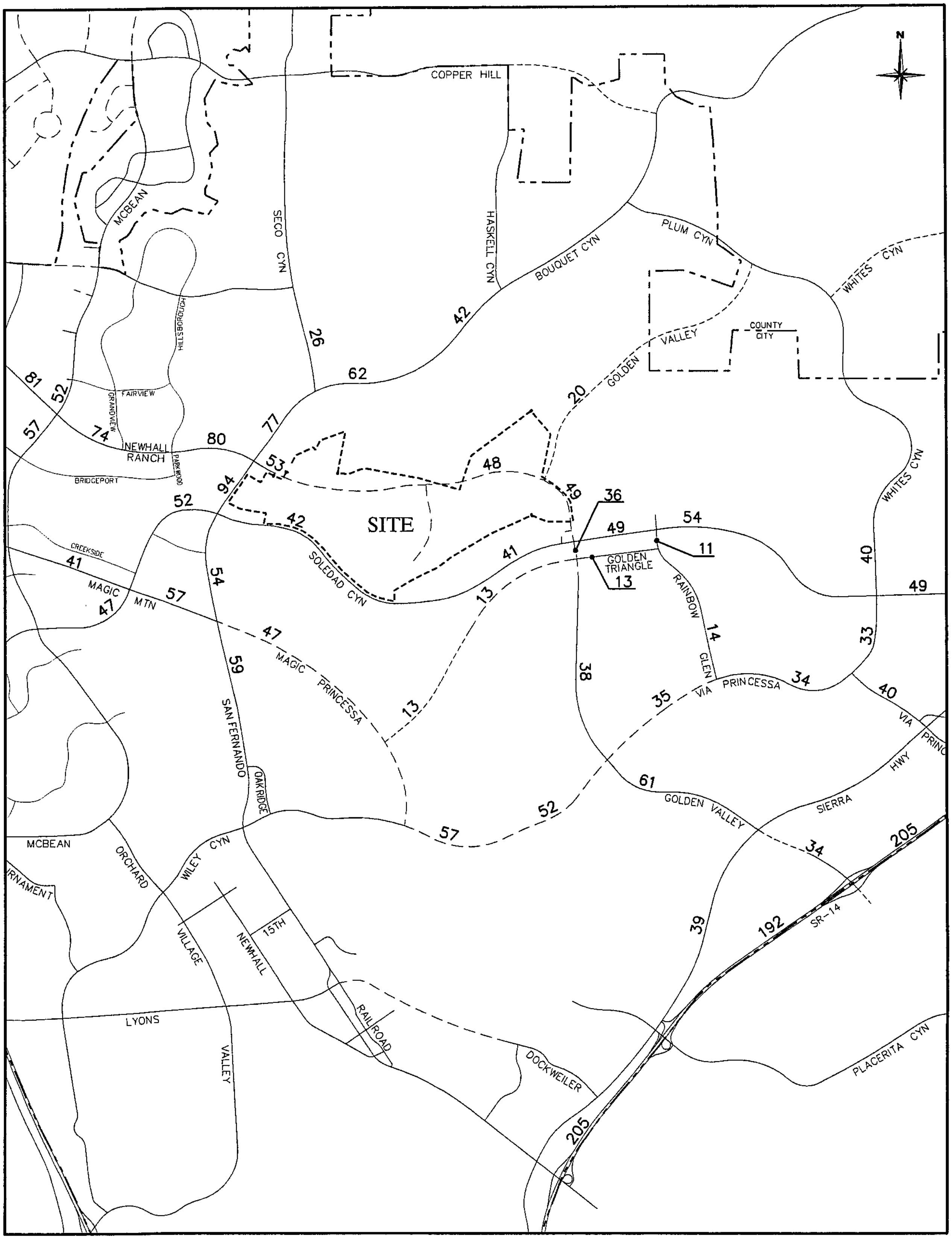


Legend

XX ADT (thousands)

Figure 4-13

AVERAGE DAILY TRAFFIC VOLUMES
- LONG-RANGE WITH PREVIOUS PLAN ON SITE



Legend

XX ADT (thousands)

Figure 4-14

AVERAGE DAILY TRAFFIC VOLUMES
- LONG-RANGE WITH PREVIOUS PLAN ON SITE
WITHOUT SANTA CLARITA PARKWAY

Table 4-7

TRIP GENERATION COMPARISON – GENERAL PLAN VS. PROPOSED PROJECT

		General Plan		Proposed Project		Difference	
Land Use		Units	ADT	Units	ADT	Units	ADT
Single Family Residential	DU	2,642	26,156	439	4,347	-2,203	-21,809
Apartment	DU	--	--	744	5,134	744	5,134
Mobile Home	DU	360	2,484	--	--	-360	-2,484
Commercial Center (>30 ac)	TSF	537.54	21,534	--	--	-537	-21,534
Commercial Center (<10 ac)	TSF	23.95	2,037	40	3,782	16.05	1,745
Industrial Park	TSF	304.87	1,829	--	--	-304.87	-1,829
Commercial Office	TSF	2,381.54	27,531	--	--	-2,381.54	-27,531
Neighborhood Park	AC	--		4.25	11	4.25	11
TOTAL			81,571		13,274		-68,297

Notes:
DU = Dwelling Unit
TSF = Thousand Square Feet
AC = Acres

Table 4-8

TRIP GENERATION COMPARISON – LONG-RANGE CUMULATIVE VS. PROPOSED PROJECT

		Long-Range Cumulative		Proposed Project		Difference	
Land Use		Units	ADT	Units	Units	ADT	Units
Single Family Residential	DU	1,180	11,682	439	4,347	-741	-7,335
Condominium/Townhouse	DU	700	5,600	--	--	-700	-5,600
Apartment	DU	--	--	744	5,134	744	5,134
Commercial Center	TSF	162	8,588	40	3,782	-112	-4,806
Golf Course	AC	150	1,194	--	--	-150	-1,194
Neighborhood Park	AC	--		4.25	11	4.25	11
TOTAL			27,064		13,274		-13,790

Notes:
DU = Dwelling Unit
TSF = Thousand Square Feet
AC = Acres

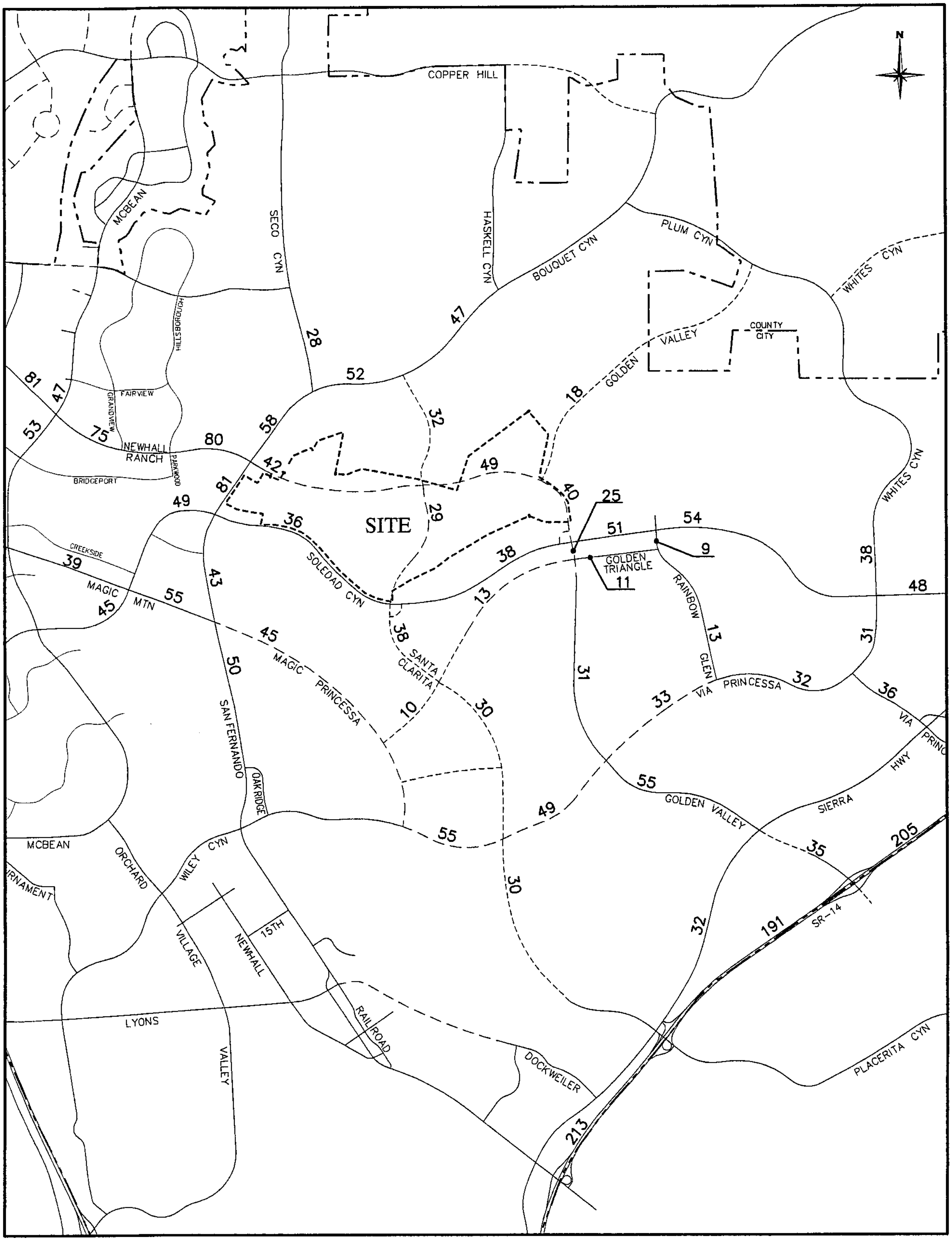
Figure 4-15 illustrates Long-range Cumulative conditions based on development of the site with the proposed project. Figure 4-16 illustrates the proposed project with the removal of Santa Clarita Parkway. When compared to the figures presented in the previous section, these figures illustrate how the net reduction in trip generation for the project site results in lower traffic volumes than would be realized if the site were to be developed as previously anticipated by the City in the SCVCTM. In the vicinity of the project site, volumes along Bouquet Canyon Road would reduce by 2 percent, Newhall Ranch Road volumes would reduce by 1 percent, volumes on Valencia Boulevard would reduce by 4 percent and on Santa Clarita Parkway, volumes would reduce by 12 percent.

However, the magnitude of difference between the land uses, as shown on the roadway network, isn't as evident as it is in the trip generation tables. Since each scenario is modeled independent of the other, two distinct volume assignments result. Each assignment is unique and optimizes the available roadway capacity in order to minimize total travel times. Therefore, high demand roadways such as Bouquet Canyon Road and Soledad Canyon Road will be utilized nearly the same given either land use scenario. Nonetheless, the proposed plan results in a significant reduction of traffic volume on the City's roadways as compared to the City's General Plan designations for the site and the long-range uses identified in the SCVCTM.

4.2.3 Long-Range Cumulative With Project and Santa Clarita Parkway Alternatives

The previous sections presented Long-range Cumulative ADT volumes consistent with the City's Circulation Element, which includes Santa Clarita Parkway as a six lane major highway from Bouquet Canyon Road to SR-14. This section evaluates two alternative configurations for the segment of Santa Clarita Parkway between Bouquet Canyon Road and Soledad Canyon Road. The first alternative changes this segment to a four lane secondary highway and the second alternative removes this segment altogether. Since each of these alternatives would represent a permanent change to the City's Circulation Element, they are evaluated in the context of long-range (buildout) conditions.

To determine the impacts of each of these scenarios, peak hour turning movement volumes at affected intersections were derived. Table 4-9 summarizes the ICU values and LOS for intersections in the vicinity of this section of Santa Clarita Parkway that are affected by implementation of one of the

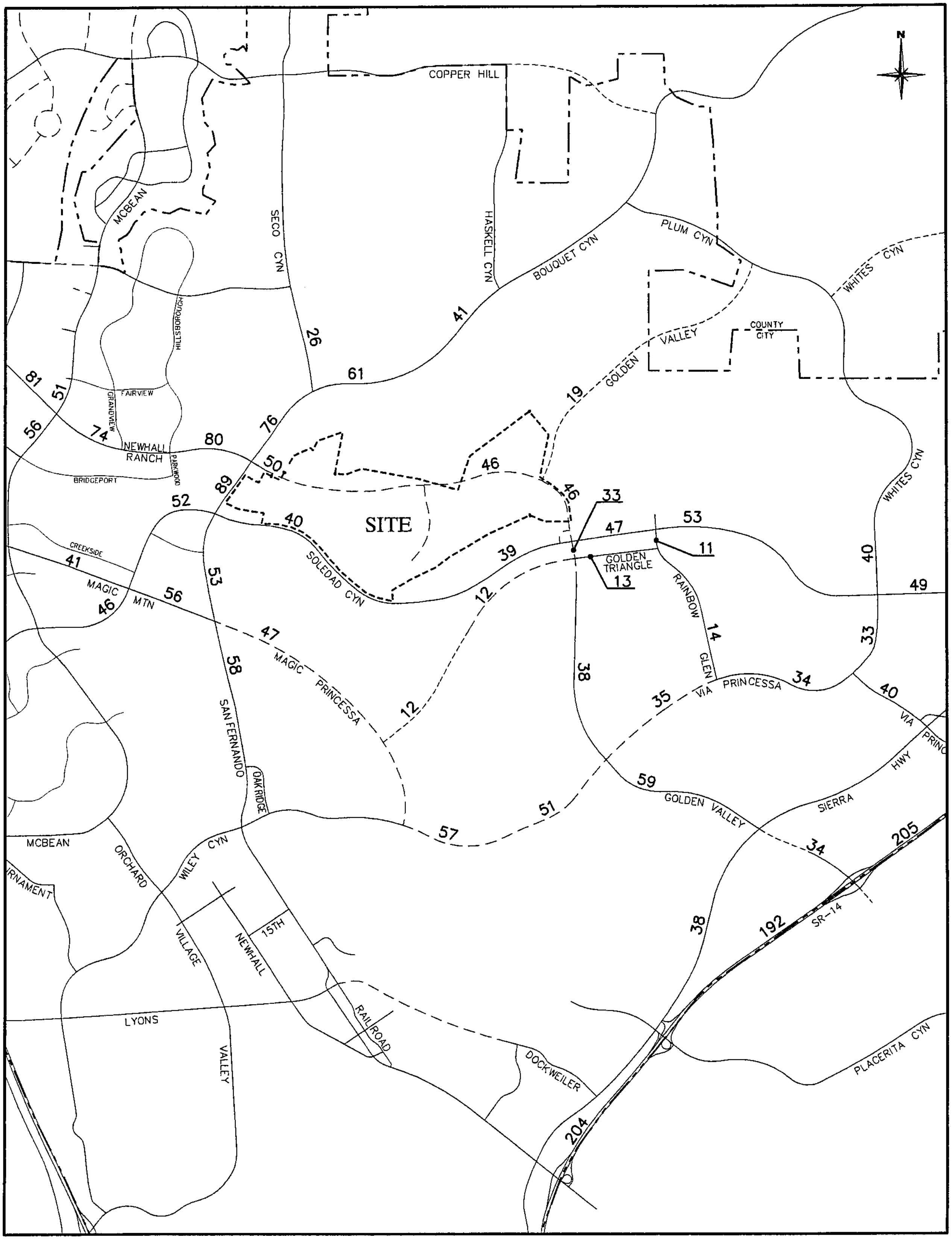


Legend

XX ADT (thousands)

Figure 4-15

AVERAGE DAILY TRAFFIC VOLUMES
- LONG-RANGE WITH PROPOSED PROJECT ON SITE



Legend

XX ADT (thousands)

Figure 4-16

AVERAGE DAILY TRAFFIC VOLUMES
- LONG-RANGE WITH PROPOSED PROJECT ON SITE
WITHOUT SANTA CLARITA PARKWAY

Table 4-9

ICU AND LOS SUMMARY – LONG-RANGE CUMULATIVE WITH SANTA CLARITA PARKWAY ALTERNATIVES

	LONG-RANGE WITH 6 LANE HIGHWAY[1]				LONG-RANGE WITH 4 LANE SEGMENT[2]				LONG-RANGE WITHOUT SEGMENT[3]			
INTERSECTION	AM		PM		AM		PM		AM		PM	
65. Bouquet & Soledad	.79	C	.90 (.99)	D (E*)	.79	C	.87 (.96)	D (E*)	.82	D	.92 (1.01)	E* (F*)
66. Bouquet & Newhall Ranch	.84	D	.83	D	.87	D	.87	D	.90	D	.98	E*
67. Seco & Bouquet	.84	D	.84	D	.84	D	.86	D	.93	E*	.87	D
157. Santa Clarita & Soledad	.80	C	.88	D	.83	D	.83	D	.53	A	.73	C
158. Santa Clarita & Newhall Ranch	.75	C	.80	C	.80	C	.88	D	.53	A	.59	A
159. Santa Clarita & Bouquet	.72	C	.87	D	.65	B	.82	D				
165. Golden Valley & Valley Center	.64	B	.58	A	.66	B	.62	B	.68	B	.66	B
198. Valley Center & Soledad	.72	C	.64	B	.69	B	.66	B	.72	C	.67	B

[1] As shown in Circulation Element
[2] 4 Lanes between Bouquet Canyon Road & Soledad Canyon Road, 6 Lanes South of Soledad Canyon Road
[3] Segment between Bouquet Canyon Road & Soledad Canyon Road deleted, 6 Lanes South of Soledad Canyon Road

Values in parenthesis indicate ICU and LOS without a 4th Northbound Through Lane at the Bouquet/Soledad intersection.

*Exceeds Performance Standard

Level of service ranges:

.00 - .60	A
.61 - .70	B
.71 - .80	C
.81 - .90	D
.91 – 1.00	E
Above 1.00	F

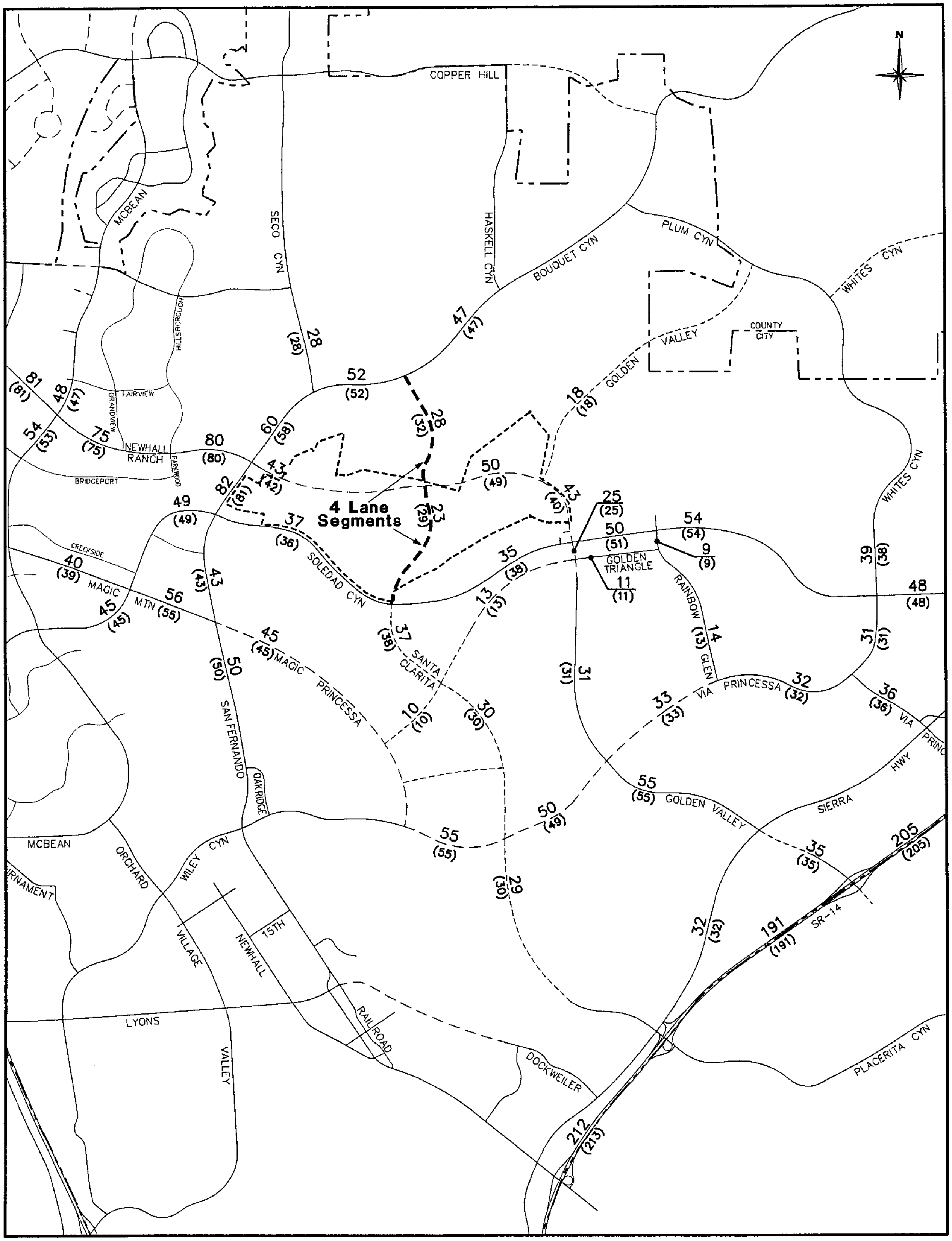
Santa Clarita Parkway alternatives. ADT volumes for each scenario with a comparison to the six lane baseline scenario are provided in Figures 4-17 and 4-18 for the four lane and deletion scenarios, respectively.

The peak hour analysis indicates that the downgrade to a four lane roadway, or secondary highway, between Bouquet Canyon Road and Soledad Canyon Road, yields results very similar to the baseline six lane scenario. This is to be expected since the forecasts that are based on a six lane roadway indicate a demand for Santa Clarita Parkway that can be accommodated by just a four lane roadway. Some shifting of traffic patterns does occur during the peak hours due to the downgrade and this is indicated by intersection ICU values that increase in some instances and decrease in others. Overall, no deficiencies occur and the LOS either remains the same or changes slightly. For example, the Santa Clarita Parkway intersections at Soledad Canyon Road and at Newhall Ranch Road each increase from LOS C to LOS D during one peak hour and remain the same in the other peak hour. Conversely, the intersections of Santa Clarita Parkway/Bouquet Canyon Road and Valley Center/Soledad Canyon Road each experience an improvement in LOS during the AM peak hour with a change from LOS C to LOS B. All intersections remain at LOS D or better and ADT volumes for the surrounding roadways are relatively unaffected by the change to the roadway. No significant impacts would occur with implementation of this alternative.

Deleting the segment altogether has a much greater effect on the surrounding roadway system. With the deletion, the following three intersections are forecast to have a deficient LOS (E or worse):

- Bouquet Canyon Road and Soledad Canyon Road
- Bouquet Canyon Road and Newhall Ranch Road
- Seco Canyon Road and Bouquet Canyon Road

Likewise, ADT volumes with the deletion scenario have a much greater effect on the surrounding roadways. Bouquet Canyon Road north of Newhall Ranch Road increases by 20,000 ADT (from 58,000 ADT to 78,000 ADT) when compared to the six lane baseline scenario. The segment of Bouquet Canyon Road between Newhall Ranch Road and Soledad Canyon Road increases by 11,000 ADT (from 81,000 ADT to 92,000 ADT). The deletion also effects a larger geographical area with notable increases to ADT volumes on McBean Parkway (4,000 ADT), Whites Canyon Road (2,000 ADT) and San Fernando Road (3,000 ADT).

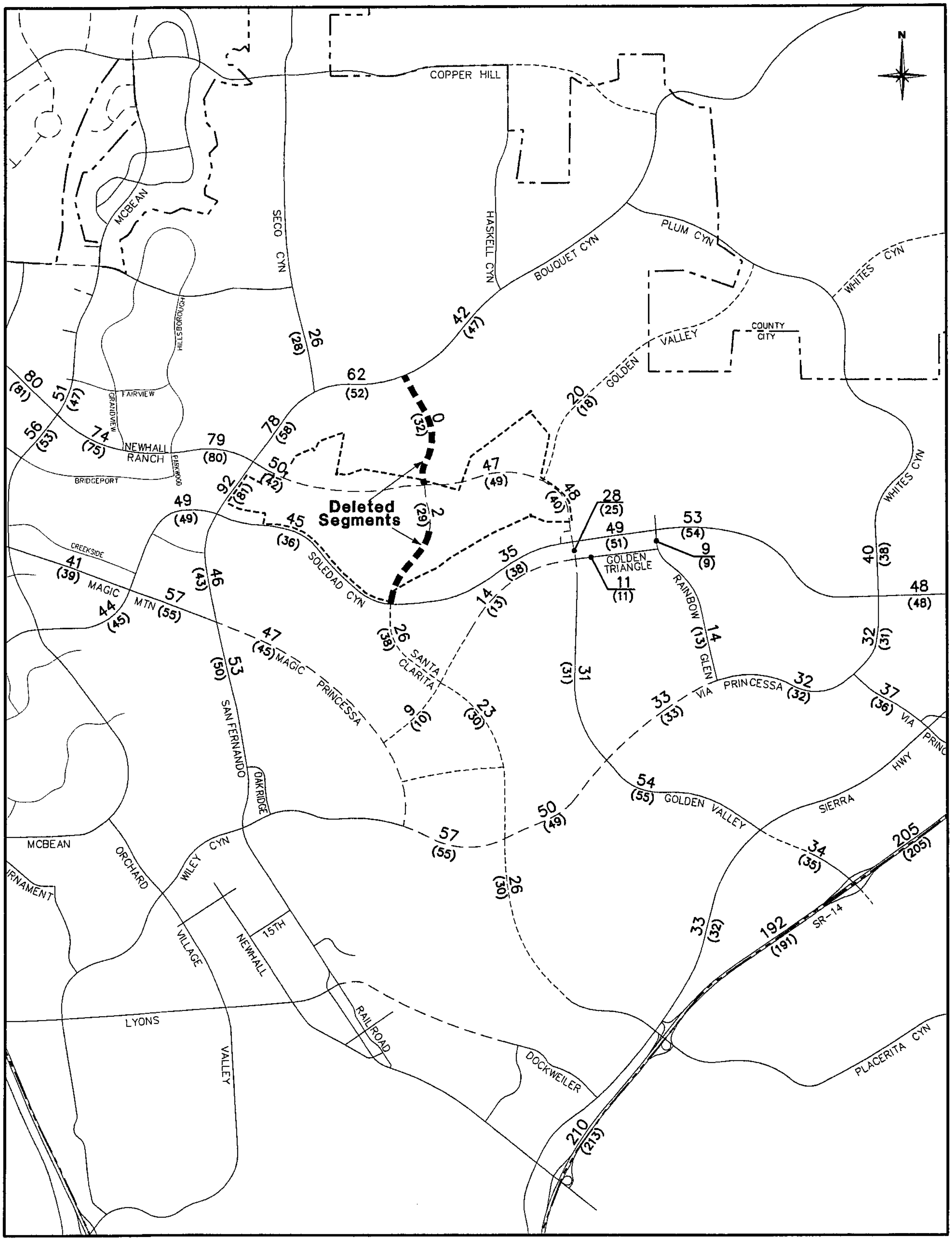


Legend

XX ADT - 4 Lane Scenario (thousands)
(XX) ADT - 6 Lane Scenario (thousands)

Figure 4-17

AVERAGE DAILY TRAFFIC VOLUMES
- LONG-RANGE WITH PROJECT ON SITE AND 4
LANE SEGMENT OF SANTA CLARITA PARKWAY



Legend

XX ADT - Deleted Scenario (thousands)
(XX) ADT - 6 Lane Scenario (thousands)

Figure 4-18

AVERAGE DAILY TRAFFIC VOLUMES
- LONG-RANGE WITH PROJECT ON SITE AND
DELETED SEGMENT OF SANTA CLARITA PKWY

The long-range forecasts presented above indicate that there would be no detrimental effects to the roadway system if the segment of Santa Clarita Parkway between Bouquet Canyon Road and Soledad Canyon Road were to be downgraded from a six lane roadway to a four lane roadway, or from a major highway to secondary highway. All intersections affected by the change are forecast to operate at an acceptable LOS.

In contrast to the four lane scenario, the deletion scenario has a significant negative effect on the roadway system. Three intersections along Bouquet Canyon Road become deficient and ADT volumes along Bouquet Canyon Road increase by as much as 20,000 ADT. The deletion scenario affects a wider area with notable ADT increases from McBean Parkway to Whites Canyon Road. For the LOS calculations, the three intersections shown as deficient in the deletion scenario have been assumed to be constructed to their maximum (buildout) configuration. For example, the intersection of Newhall Ranch Road and Bouquet Canyon Road, which is forecast as LOS E, consists of four through lanes in each direction. Mitigation that would result in LOS D for any of the deficient intersections would require significant measures such as two additional lanes through the intersection.

4.3 SPECIAL ISSUES

4.3.1 Freeway Analysis

Freeway mainline segments and ramps have been analyzed using the criteria outlined in Sections 1.4.1 and 1.4.3, respectively. Table 4-10 summarizes the comparison of future conditions with and without the proposed project for Interim Year conditions. The Alternative Interim Year conditions are summarized in Table 4-11. Detailed V/C calculations, including a summary of existing conditions, are located in Appendix C.

The southbound SR-14 freeway experiences significant congestion in the southbound direction during the AM peak hour and in the northbound direction during the PM peak hour. This is quantified in the above referenced tables which indicate LOS “F” for those time periods. Peak hour volumes on the freeway on and off ramps are forecast as LOS “C” or better.

Table 4-10

FREEWAY LEVEL OF SERVICE SUMMARY – INTERIM YEAR CONDITIONS

		INTERIM YEAR WITHOUT-PROJECT				INTERIM YEAR WITH PROJECT			
LOCATION		CAPACITY	VOLUME	V/C	LOS	CAPACITY	VOLUME	V/C	LOS
I. AM PEAK HOUR									
A. Freeway Ramps									
Golden Valley Road & SR-14	NB On	2,250	848	.377	A	2,250	855	.380 (.003)	A
	SB On	1,500	543	.362	A	1,500	558	.372 (.010)	A
	NB Off	1,500	621	.414	A	1,500	626	.417 (.003)	A
	SB Off	1,500	903	.602	B	1,500	904	.603 (.001)	B
Placerita Canyon Road & SR-14	NB On (d)	2,250	6	.003	A	2,250	6	.003 (.000)	A
	NB On (l)	1,500	353	.235	A	1,500	353	.235 (.000)	A
	SB On[1]	1,500	734	.489	A	1,500	763	.509 (.020)	A
	SB On[2]	1,500	261	.174	A	1,500	261	.174 (.000)	A
	NB Off	1,500	532	.355	A	1,500	536	.357 (.002)	A
	SB Off	1,500	942	.628	B	1,500	944	.629 (.001)	B
B. Freeway Mainline Segments									
SR-14 s/o Placerita Cyn	NB	7,600	3,519	.463	B	7,600	3,527	.464 (.001)	B
SR-14 s/o Golden Valley	NB	7,600	3,344	.440	B	7,600	3,349	.441 (.001)	B
SR-14 n/o Golden Valley	NB	9,600	3,571	.372	B	9,600	3,578	.373 (.001)	B
SR-14 s/o Placerita Cyn	SB	8,000	8,176	1.022	F	8,000	8,220	1.028 (.006)	F
SR-14 s/o Golden Valley	SB	7,600	8,123	1.069	F	7,600	8,138	1.071 (.002)	F
SR-14 n/o Golden Valley	SB	9,600	8,482	.844	D	9,600	8,483	.884 (.000)	D
II. PM PEAK HOUR									
A. Freeway Ramps									
Golden Valley Road & SR-14	NB On	2,250	1,272	.565	A	2,250	1,275	.567 (.002)	A
	SB On	1,500	821	.547	A	1,500	829	.553 (.006)	A
	NB Off	1,500	1,184	.789	C	1,500	1,197	.798 (.009)	C
	SB Off	1,500	867	.578	A	1,500	872	.581 (.003)	A
Placerita Canyon Road & SR-14	NB On (d)	2,250	1	.000	A	2,250	1	.000 (.000)	A
	NB On (l)	1,500	560	.373	A	1,500	560	.373 (.000)	A
	SB On[1]	1,500	392	.261	A	1,500	398	.265 (.004)	A
	SB On[2]	1,500	299	.199	A	1,500	302	.201 (.002)	A
	NB Off	1,500	644	.429	A	1,500	669	.446 (.017)	A
	SB Off	1,500	748	.499	A	1,500	748	.499 (.000)	A
B. Freeway Mainline Segments									
SR-14 s/o Placerita Cyn	NB	7,600	8,327	1.096	F	7,600	8,365	1.101 (.005)	F
SR-14 s/o Golden Valley	NB	7,600	8,244	1.085	F	7,600	8,257	1.086 (.001)	F
SR-14 n/o Golden Valley	NB	9,600	8,330	.868	D	9,600	8,333	.868 (.000)	D
SR-14 s/o Placerita Cyn	SB	8,000	4,983	.623	C	8,000	5,000	.625 (.002)	C
SR-14 s/o Golden Valley	SB	7,600	5,039	.663	C	7,600	5,047	.664 (.001)	C
SR-14 n/o Golden Valley	SB	9,600	5,084	.530	C	9,600	5,089	.530 (.000)	C

Notes:
V/C shown in parentheses represent the project's increment of the total V/C
(d) = Direct Ramp
(l) = Loop Ramp
[1] SB On-ramp from Sierra Highway
[2] SB On-ramp from Placerita Canyon Road

Table 4-11

FREEWAY LEVEL OF SERVICE SUMMARY – ALTERNATIVE INTERIM YEAR CONDITIONS

		ALTERNATIVE INTERIM YEAR WITHOUT-PROJECT				ALTERNATIVE INTERIM YEAR WITH PROJECT			
LOCATION		CAPACITY	VOLUME	V/C	LOS	CAPACITY	VOLUME	V/C	LOS
I. AM PEAK HOUR									
A. Freeway Ramps									
Golden Valley Road & SR-14	NB On	2,250	963	.428	A	2,250	966	.429 (.001)	A
	SB On	1,500	403	.269	A	1,500	403	.269 (.000)	A
	NB Off	1,500	826	.551	A	1,500	827	.551 (.000)	A
	SB Off	1,500	840	.560	A	1,500	842	.561 (.001)	A
Placerita Canyon Road & SR-14	NB On (d)	2,250	7	.003	A	2,250	7	.003 (.000)	A
	NB On (l)	1,500	213	.142	A	1,500	213	.142 (.000)	A
	SB On[1]	1,500	826	.551	A	1,500	843	.562 (.001)	A
	SB On[2]	1,500	758	.505	A	1,500	795	.530 (.015)	A
	NB Off	1,500	612	.408	A	1,500	619	.413 (.005)	A
	SB Off	1,500	887	.591	A	1,500	887	.591 (.000)	A
B. Freeway Mainline Segments									
SR-14 s/o Placerita Cyn	NB	7,600	3,781	.498	B	7,600	3,789	.499 (.001)	B
SR-14 s/o Golden Valley	NB	7,600	3,389	.446	B	7,600	3,390	.446 (.000)	B
SR-14 n/o Golden Valley	NB	9,600	3,527	.367	B	9,600	3,530	.368 (.001)	B
SR-14 s/o Placerita Cyn	SB	8,000	8,643	1.080	F	8,000	8,696	1.087 (.007)	F
SR-14 s/o Golden Valley	SB	7,600	7,942	1.045	F	7,600	7,942	1.045 (.000)	F
SR-14 n/o Golden Valley	SB	9,600	8,378	.873	D	9,600	8,380	.873 (.000)	D
II. PM PEAK HOUR									
A. Freeway Ramps									
Golden Valley Road & SR-14	NB On	2,250	1,232	.548	A	2,250	1,235	.549 (.001)	A
	SB On	1,500	719	.479	A	1,500	719	.479 (.000)	A
	NB Off	1,500	1,276	.851	D	1,500	1,280	.853 (.002)	D
	SB Off	1,500	903	.602	B	1,500	907	.605 (.003)	B
Placerita Canyon Road & SR-14	NB On (d)	2,250	2	.001	A	2,250	2	.001 (.000)	A
	NB On (l)	1,500	596	.397	A	1,500	596	.397 (.000)	A
	SB On[1]	1,500	790	.527	A	1,500	804	.536 (.009)	A
	SB On[2]	1,500	228	.152	A	1,500	234	.156 (.004)	A
	NB Off	1,500	958	.639	B	1,500	997	.665 (.026)	B
	SB Off	1,500	701	.467	A	1,500	702	.468 (.001)	A
B. Freeway Mainline Segments									
SR-14 s/o Placerita Cyn	NB	7,600	8,611	1.133	F	7,600	8,653	1.139 (.006)	F
SR-14 s/o Golden Valley	NB	7,600	8,250	1.086	F	7,600	8,254	1.086 (.000)	F
SR-14 n/o Golden Valley	NB	9,600	8,204	.855	D	9,600	8,207	.855 (.000)	D
SR-14 s/o Placerita Cyn	SB	8,000	5,337	.667	C	8,000	5,356	.670 (.003)	C
SR-14 s/o Golden Valley	SB	7,600	5,022	.661	C	7,600	5,023	.661 (.000)	C
SR-14 n/o Golden Valley	SB	9,600	5,205	.542	C	9,600	5,210	.543 (.001)	C

Notes:
V/C shown in parentheses represent the project's increment of the total V/C
(d) = Direct Ramp
(l) = Loop Ramp
[1] SB On-ramp from Sierra Highway
[2] SB On-ramp from Placerita Canyon Road

The amount of project traffic forecast for the SR-14 freeway segments is generally less than 50 vehicles per hour. For those segments forecast as LOS "F", the project's component of the future V/C is .007 or less which is under the threshold of significance (.020) established by the County CMP (see Table 1-2). Likewise, the project does not cause a significant impact on the freeway on and off ramps since those locations remain at an acceptable LOS with the project traffic.

4.3.2 CMP Analysis

The Los Angeles County Congestion Management Program (CMP) (see Reference 9 in Section 1.7) requires that a proposed development address two major subject areas with respect to traffic impacts. These are the project's impacts on the CMP highway system and on the local and regional transit systems. Also included is a debit/credit analysis that uses the CMP's New Development Activity Debits and the CMP's Countywide Deficiency Plan Credits to assess the project's impacts and benefits.

According to the CMP guidelines, the geographical area examined in a CMP traffic impact analysis (TIA) consists of the CMP monitoring locations that meet the following criteria:

1. CMP intersections where the proposed project will add 50 or more trips during the AM or PM weekday peak hours (of adjacent street traffic).
2. Mainline freeway locations where the project will add 150 or more trips, in either direction, during either the AM or PM weekday peak hours.

Two CMP intersections and no mainline freeway locations meet the above criteria. The following list indicates the two CMP intersections:

- Valencia Boulevard & Magic Mountain Parkway
- Sierra Highway and Placerita Canyon Road

Table 4-12 summarizes the intersection ICUs and LOS for the two intersections based on the CMP ICU calculation methodology. The CMP ICU methodology differs from the City methodology used elsewhere in this report in regards to the per lane capacity used in the calculations (2,880 vphpl for dual left-turn lanes and 1,600 vphpl for all other lane configurations). Included in the table are the relevant ICUs and LOS after taking into account the project mitigation identified in previous sections.

Table 4-12

ICU AND LOS SUMMARY – CMP MONITORING INTERSECTIONS

	WITHOUT PROJECT				WITH PROJECT				INCREASE	
INTERSECTION	AM		PM		AM		PM		AM	PM
INTERIM YEAR										
57. Valencia & Magic Mountain	1.17	F	1.19	F	1.18	F	1.20	F	.01	.01
					(1.10)	(F)	(1.20)	(F)	(-.07)	(.01)
145. Sierra Hwy & Placerita Canyon	.92	E	1.10	F	.93	E	1.11	F	.01	.01
ALTERNATIVE INTERIM YEAR										
57. Valencia & Magic Mountain	1.14	F	1.26	F	1.16	F	1.28	F	.02*	.02*
					(1.09)	(F)	(1.20)	(F)	(-.05)	(-.06)
145. Sierra Hwy & Placerita Canyon	1.13	F	1.27	F	1.13	F	1.28	F	.00	.01

* Significant Project Impact – CMP Criteria (V/C increase ≥ .02 causing or worsening LOS "F")

Note: Values in parenthesis indicate ICU and LOS with the project mitigation identified in previous sections.
ICUs calculated using Los Angeles County CMP methodology (see Section 4.3.2 for description).

Level of service ranges:

.00 - .60	A
.61 - .70	B
.71 - .80	C
.81 - .90	D
.91 – 1.00	E
Above 1.00	F

CMP methodology states that a significant project impact occurs when the proposed project increases traffic demand at a CMP monitoring location by two percent of capacity ($V/C \geq .02$), causing or worsening LOS "F". Without mitigation, the project causes a significant impact at the intersection of Valencia Boulevard & Magic Mountain Parkway for the Alternative Interim Year scenario since it worsens LOS "F" conditions. With the mitigation previously identified in section 4.1.6, the project has no significant impacts since the project results in an improvement over no-project conditions.

Another component of the CMP transportation impact analysis is a review of transit impacts. This review includes evidence that transit operators received the Notice of Preparation (included in the project EIR), identification of existing transit services near the project (see Section 2.1.3), estimation of the number of project trips assigned to transit, information on facilities and/or programs that will encourage public transit use, and an analysis of project impacts on transit service.

The proposed project is forecast to generate 13,274 ADT. The conversion to person trips is accomplished by using the CMP guidelines (multiplying the ADT by an occupancy factor of 1.4) which results in a total of 18,584 average daily person trips. Applying the CMP's factor for converting total person trips to transit trips (.035) results in approximately 650 total daily transit trips and approximately 65 peak hour transit trips (based on the peak hour representing ten percent of the total daily trips).

The City of Santa Clarita does not have level of service standards for transit service that are applicable to future development such as the proposed project. Transit service is evaluated and funded on an as-needed basis. If additional fixed route service will be needed near the project site in the future, the project should coordinate with the transit provider to identify appropriate bus stop/turnout locations.

One purpose of the CMP is to track new development activity. This is accomplished by using established impact values (debits) for each type of land use developed. Conversely, credits are applied for transportation improvement strategies that have been identified as beneficial to the transportation system. Table 4-13 summarizes the CMP debits and credits associated with the proposed project and its mitigation. The table shows that the proposed project results in a net credit surplus of 95,430 points. These surplus credit points can be transferred to other jurisdictions or can be pooled through sub-regional forums to offset impacts at other locations as determined by the County in cooperation with other local jurisdictions.

Table 4-13

CMP DEBIT AND CREDIT SUMMARY

CATEGORY	UNITS	DEBIT VALUE	SUBTOTAL
Single-Family Residential	1,183 DU	6.80	8,044
Commercial 0-299 TSF	40.00 TSF	22.23	889
Total Debits			8,933

IMPROVEMENT	QUANTITY	CREDIT VALUE	SUBTOTAL
General Use Highway Lane			
Newhall Ranch Road	1.75 miles x 4 lanes	11,500	80,500
Santa Clarita Parkway	.50 miles x 4 lanes	11,500	23,000
Intersection Modification (CMP Route)			
Valencia & Magic Mountain	1	575	575
Intersection Modification (Non-CMP Major Arterial)			
McBean & Newhall Ranch	1	144	144
Seco Canyon & Bouquet Canyon	1	144	144
Total Credits			104,363
TOTAL MITIGATION GOAL (DEBIT POINTS)			8,933
TOTAL DEFICIENCY PLAN IMPROVEMENTS (CREDIT POINTS)			104,363
SURPLUS CREDIT POINTS			**95,430**

4.3.3 Pre-Interim Year Analysis

This section evaluates an occupancy of up to 500 units of the project without the Newhall Ranch Road extension to Golden Valley Road, including the Newhall Ranch Road/Golden Valley Road bridge across the Santa Clara River. This scenario differs from the interim year analyses of previous sections by not including any future development in the Whitaker-Bermite area and only including development of the Valencia Commerce Center (an approved industrial park development located east of I-5 and north of SR-126 that will ultimately consist of approximately 13,500,000 square feet of development) up through the currently approved "Phase 3" (approximately 9,400,000 total square feet of development). Roadway infrastructure also does not include the future extensions of Via Princessa and Magic Mountain Parkway through the Whitaker-Bermite site since these improvements are not anticipated to occur before the development of the Whitaker-Bermite property.

Included in this analysis is the development of project's first 500 dwelling units. Table 4-14 summarizes the land use and trip generation characteristics for the 500 units. The table shows that the first 500 units will generate 4,260 total average daily trips with 319 occurring in the AM peak hour (250 outbound) and 415 occurring in the PM peak hour (270 inbound). The distribution of these trips is illustrated in Figures 4-19 and 4-20 which show the project-only traffic turning movement volumes for the AM and PM peak hours, respectively.

Pre-Interim Year volumes without the proposed project are illustrated in Figures 4-21 and 4-22 for the AM and PM peak hours, respectively. Corresponding volumes for "with project" conditions are shown in Figures 4-23 and 4-24.

Table 4-14

TRIP GENERATION SUMMARY FOR 500 DWELLING UNITS

			------ AM PEAK HOUR ------			------ PM PEAK HOUR ------			
LOCATION	LAND USE	UNITS	IN	OUT	TOTAL	IN	OUT	TOTAL	ADT
Area A	Single Family	270 DU	51	151	202	176	97	273	2,673
Area D	Apartment	230 DU	18	99	117	94	48	142	1,587
Total		**500 DU**	**69**	**250**	**319**	**270**	**145**	**415**	**4,260**

See Table 3-1 for source of trip rates.

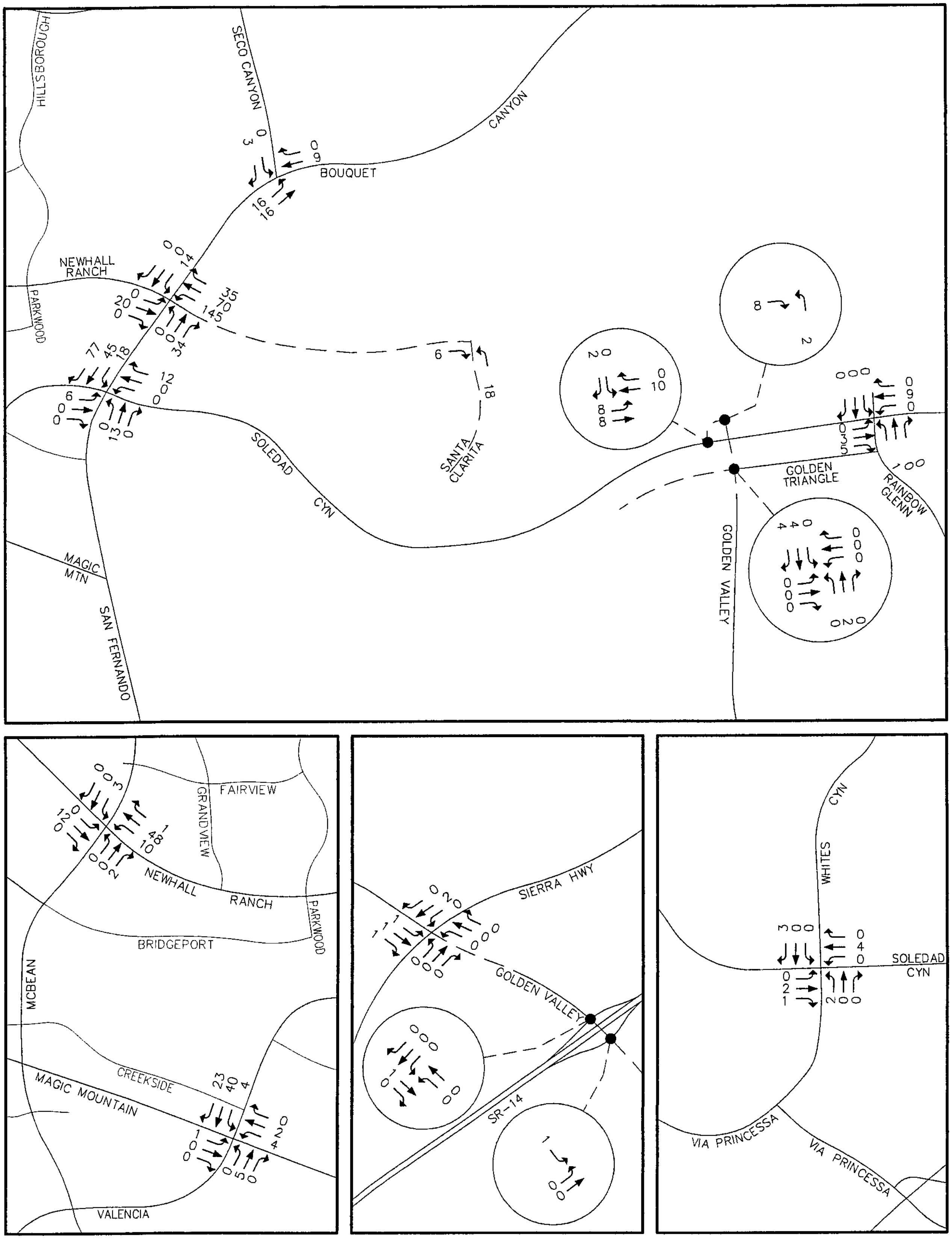


Figure 4-19

AM PEAK HOUR TURNING MOVEMENT VOLUMES - PROJECT WITH 500 DWELLING UNITS ONLY

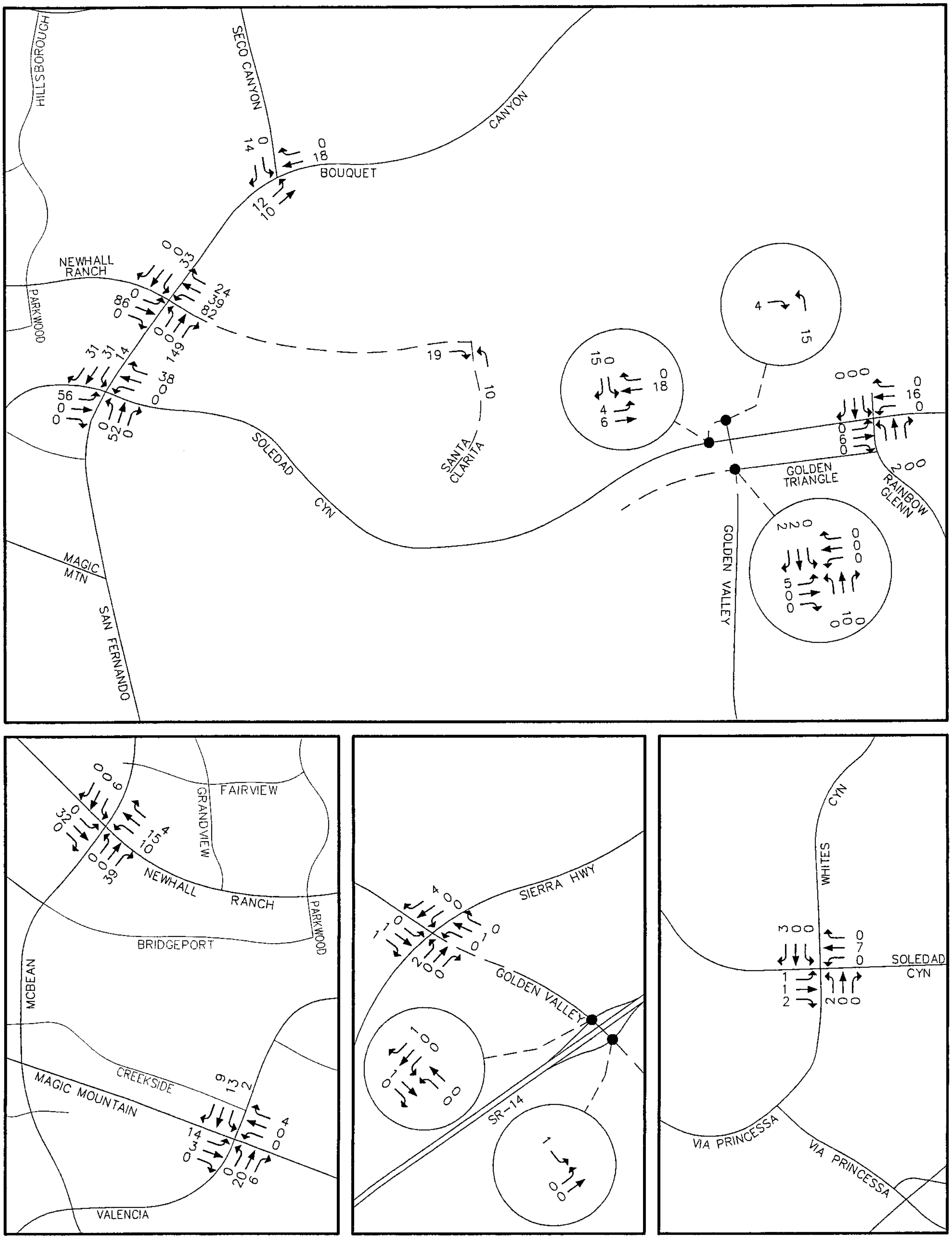


Figure 4-20

PM PEAK HOUR TURNING MOVEMENT VOLUMES - PROJECT WITH 500 DWELLING UNITS ONLY

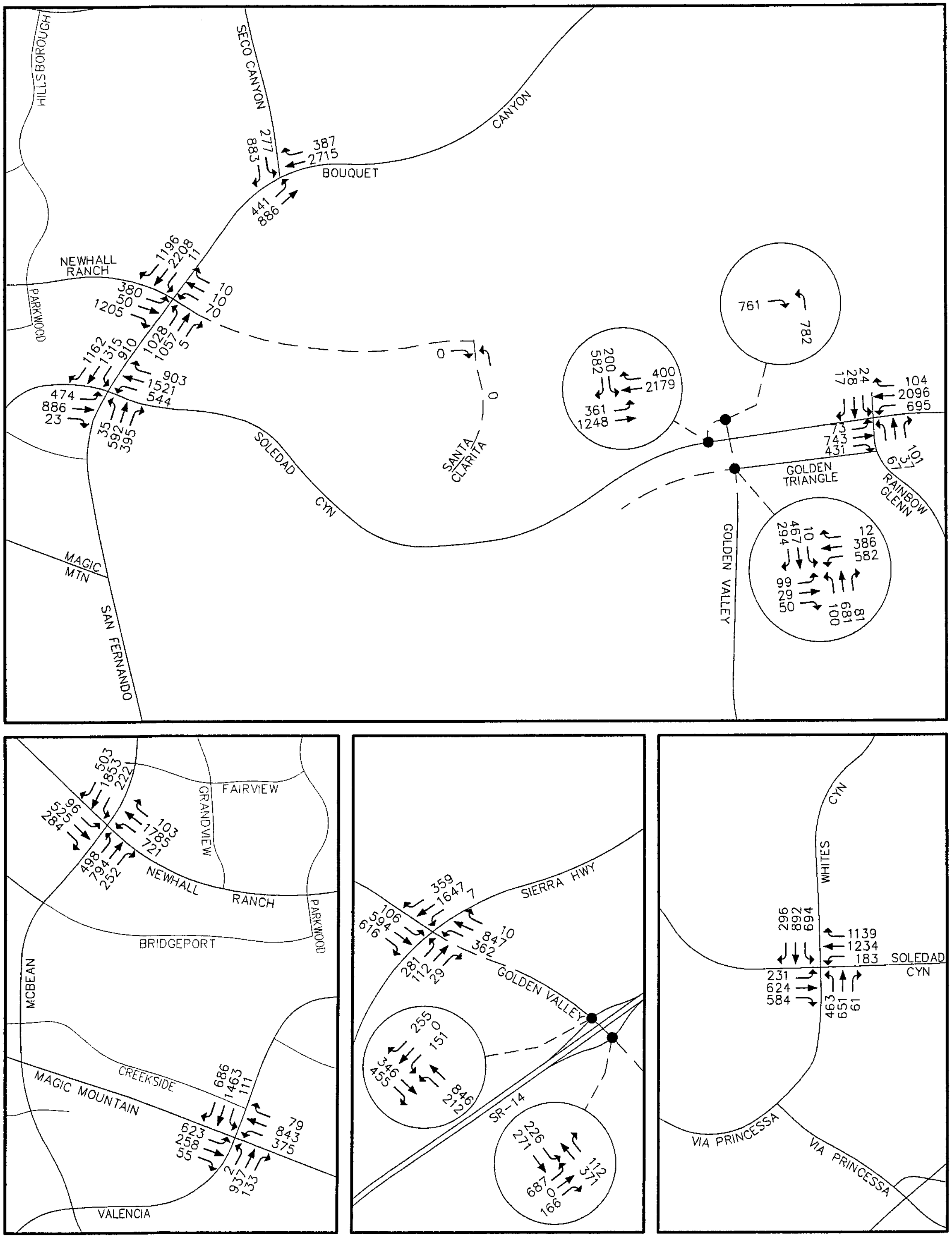


Figure 4-21

AM PEAK HOUR TURNING MOVEMENT VOLUMES - PRE-INTERIM YEAR WITHOUT PROJECT

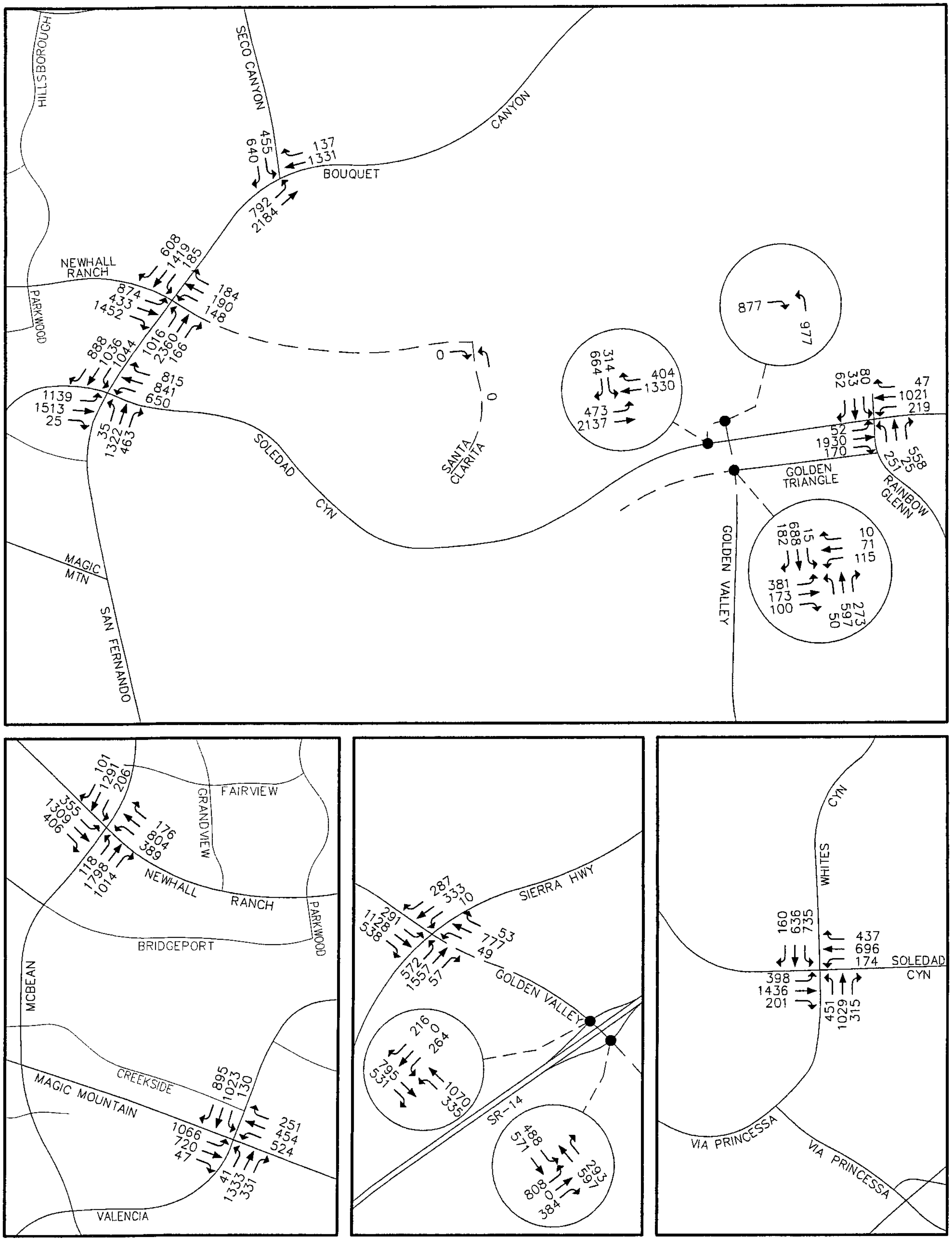


Figure 4-22

PM PEAK HOUR TURNING MOVEMENT VOLUMES - PRE-INTERIM YEAR WITHOUT PROJECT

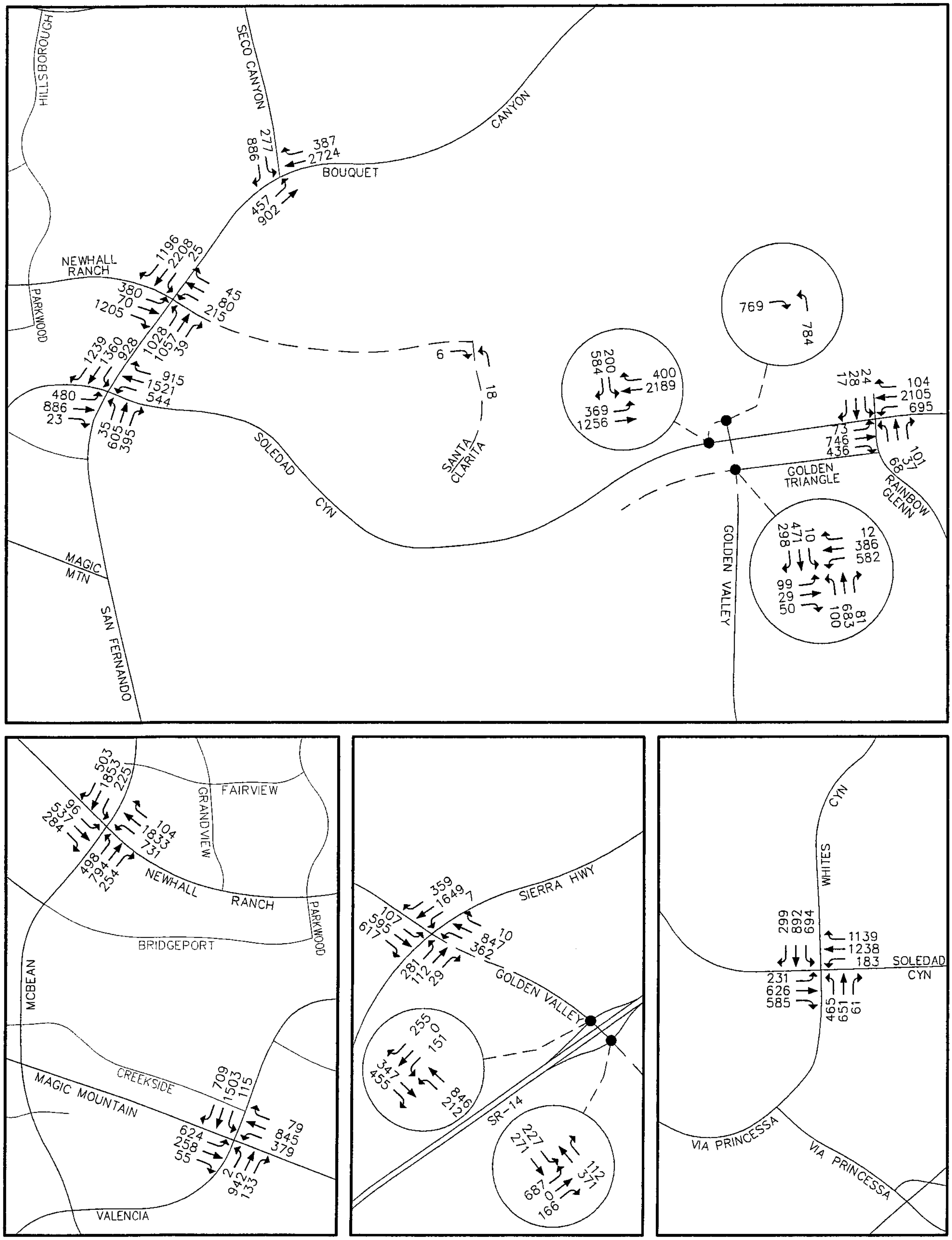


Figure 4-23

AM PEAK HOUR TURNING MOVEMENT VOLUMES - PRE-INTERIM YEAR WITH PROJECT

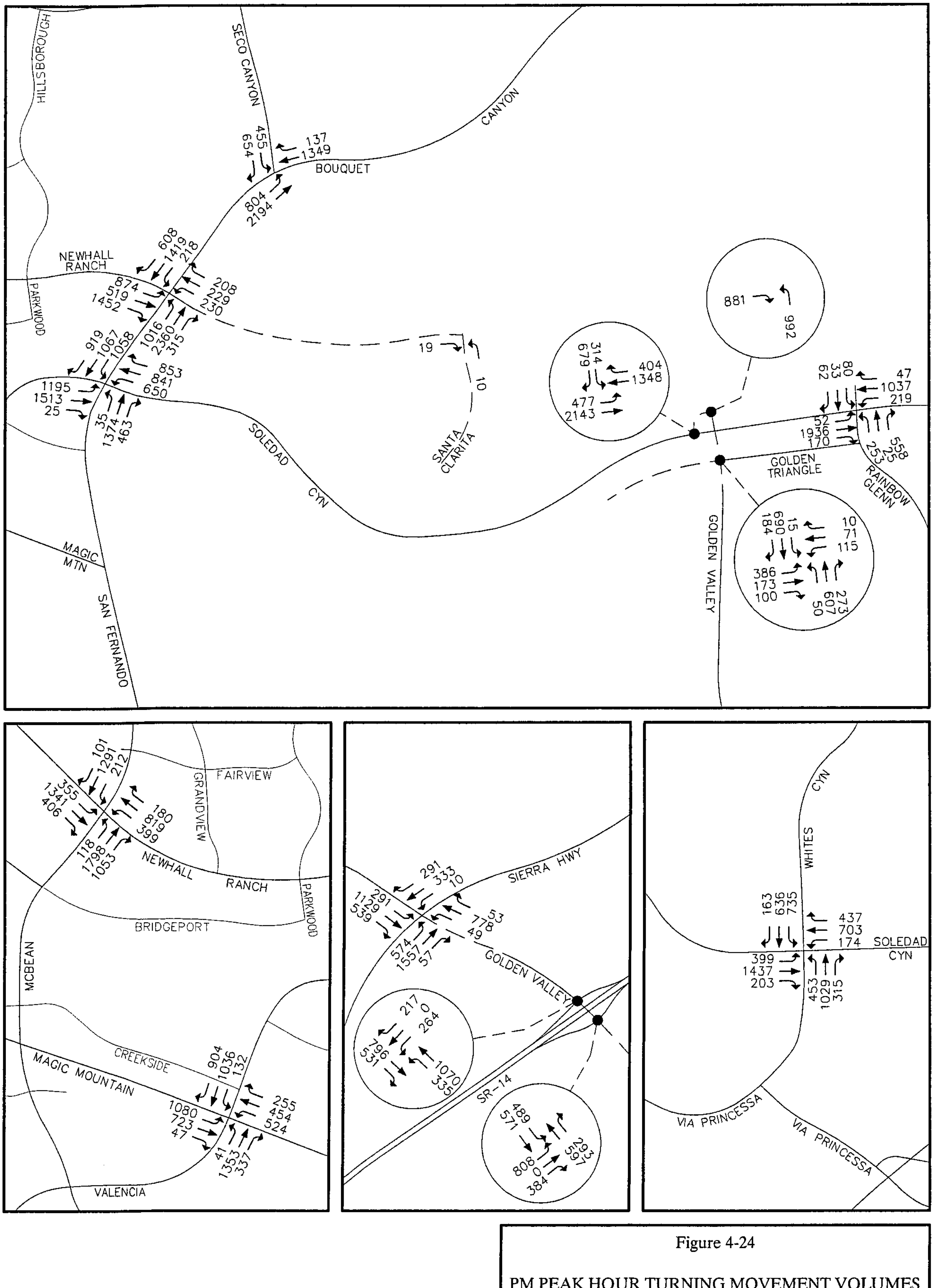


Figure 4-24

PM PEAK HOUR TURNING MOVEMENT VOLUMES - PRE-INTERIM YEAR WITH PROJECT

Table 4-15 summarizes the ICUs and LOS for the study area intersections for the Pre-Interim Year scenario. The table shows that four intersections experience a significant impact due to the project generated traffic (see Table 1-3 for significant impact criteria) with three of those intersections forecast to exceed LOS "D". The following intersections are those significantly impacted:

Intersections with Significant Project Impact at LOS "E" or LOS "F":

- Valencia Boulevard and Magic Mountain Parkway
- Bouquet Canyon Road and Soledad Canyon Road
- Seco Canyon Road and Bouquet Canyon Road

Intersections with Significant Project Impact at LOS "D":

- Bouquet Canyon Road and Newhall Ranch Road

Mitigation that addresses the above impacts is summarized as follows:

Mitigation not requiring acquisition of right-of-way:

65. Bouquet & Soledad	Temporary configuration to consist of 3 Southbound Left-Turn Lanes and 2 Southbound Through Lanes. Will revert to 2 Southbound Left-Turn Lanes and 3 Southbound Through Lanes (existing configuration) when Cross-Valley Connector is completed.
66. Bouquet & Newhall Ranch	Add 2nd Southbound Left-Turn Lane Temporary configuration to consist of 3 Northbound Left-Turn Lanes, 3 Northbound Through Lanes and 2 Westbound Right-Turn Lanes. Will revert to 2 Northbound Left-Turn Lanes, 4 Northbound Through Lanes, and 1 Westbound Right-Turn Lane (existing configuration) when Cross-Valley Connector is completed.
67. Seco & Bouquet	Convert 1st Southbound Right-Turn Lane to a shared Left-Turn/Right-Turn Lane (for 1 Left-Turn Lane, 1 shared Left-Turn/Right-Turn Lane, 1 Right-Turn Lane)

Mitigation requiring acquisition of right-of-way:

57. Valencia & Magic Mountain	Add 3rd Eastbound Through Lane

Table 4-16 summarizes the resulting ICUs and LOS with this mitigation. As shown above, some of these improvements require the acquisition of right-of-way which is out of the applicant's control.

The improvements at the Bouquet Canyon Road/Soledad Canyon Road intersection consist of reconfiguring the southbound approach to include three left-turn lanes and two through lanes. Similarly, the improvements at the Bouquet Canyon Road/Newhall Ranch Road intersection consist of

Table 4-15

ICU AND LOS SUMMARY – PRE-INTERIM YEAR CONDITIONS

INTERSECTION	PRE-INTERIM YEAR WITHOUT PROJECT AM		PM		PRE-INTERIM YEAR WITH PROJECT AM		PM		INCREASE AM	PM
48. McBean & Newhall Ranch	.87	D	.86	D	.88	D	.87	D	.01	.01
57. Valencia & Magic Mountain	.80	C	1.01	F	.81	D	1.02	F	.01	.01**
65. Bouquet & Soledad	.86	D	1.13	F	.88	D	1.14	F	.02*	.01**
66. Bouquet & Newhall Ranch	.82	D	.88	D	.84	D	.88	D	.02*	.00
67. Seco & Bouquet	.98	E	.98	E	.98	E	.99	E	.00	.01**
146. SR-14 NB Ramp & Golden Valley	.47	A	.64	B	.47	A	.64	B	.00	.00
147. SR-14 SB Ramp & Golden Valley	.55	A	.67	B	.55	A	.67	B	.00	.00
162. Sierra & Golden Valley	1.06	F	.90	D	1.06	F	.90	D	.00	.00
164. Golden Valley & Golden Triangle	.64	B	.54	A	.64	B	.54	A	.00	.00
165. Golden Valley & Valley Center	.53	A	.60	A	.54	A	.60	A	.01	.00
169. Rainbow Glen & Soledad	.65	B	.86	D	.65	B	.86	D	.00	.00
172. Whites Canyon & Soledad	.98	E	.98	E	.98	E	.98	E	.00	.00
198. Valley Center & Soledad	.85	D	.73	C	.85	D	.75	C	.00	.02

* Significant Project Impact (see Table 1-3) at LOS "D"
** Significant Project Impact (see Table 1-3) at LOS "E" or "F"

Level of service ranges:	
.00 - .60	A
.61 - .70	B
.71 - .80	C
.81 - .90	D
.91 – 1.00	E
Above 1.00	F

Table 4-16

COMPARISON OF CONDITIONS BEFORE AND AFTER MITIGATION – PRE-INTERIM YEAR

INTERSECTION	PRE-INTERIM YEAR WITHOUT PROJECT AM		PRE-INTERIM YEAR WITHOUT PROJECT PM		PRE-INTERIM YEAR WITH PROJECT & MITIGATION AM		PRE-INTERIM YEAR WITH PROJECT & MITIGATION PM		NET CHANGE AM	NET CHANGE PM
57. Valencia & Magic Mountain*	.80	C	1.01	F	.81	D	.95	E	.01	-.06
65. Bouquet & Soledad	.86	D	1.13	F	.89	D	1.04	F	.03	-.09
66. Bouquet & Newhall Ranch	.82	D	.88	D	.82	D	.89	D	.00	.01
67. Seco & Bouquet	.98	E	.98	E	.98	E	.86	D	.00	-.12

*See Section 4.3.3 for additional information regarding availability of right-of-way at this location.

Level of service ranges:		
	.00 - .60	A
	.61 - .70	B
	.71 - .80	C
	.81 - .90	D
	.91 – 1.00	E
	Above 1.00	F

reconfiguring the northbound approach to include three left-turn lanes and three through lanes. This configuration is necessary only until the segment of Newhall Ranch Road from Bouquet to Golden Valley Road, including the construction of the Newhall Ranch Road/Golden Valley Road Bridge, across the Santa Clara River is constructed. The construction of this bridge results in a connection between Soledad Canyon Road and Newhall Ranch Road that reduces the volume of traffic through these left-turn movements. With the reduction in traffic, the northbound and southbound triple left-turn lanes are not required and these approaches should be reconfigured back to their planned ultimate configuration which consists of two left-turn lanes, three through lanes and two right-turn lanes at Bouquet Canyon Road/Soledad Canyon Road and two left-turn lanes, four through lanes and one right-turn lane at Bouquet Canyon Road/Newhall Ranch Road.

The project's percentage impact (as shown by the ICU) on the affected intersections, based on mitigation only where right-of-way is not required, is as follows:

o Bouquet & Soledad (mitigated)	AM: .03	PM: -.09
o Bouquet & Newhall Ranch (mitigated)	AM: .00	PM: .01
o Seco & Bouquet (mitigated)	AM: .00	PM: -.12
o Valencia & Magic Mountain (unmitigated)	AM: .01	PM: .01

The Riverpark project is located within the Bouquet Canyon Bridge and Thoroughfare District (Bouquet B & T District). This district is considered a full-mitigation district, that is, traffic improvements identified in the district mitigate traffic impacts created by planned growth within the district. In summary, the District has been designed to accommodate the needs of future development anticipated by the City and County General Plans.

Future identified improvements within the Bouquet Bridge and Thoroughfare District may result in improved operation at the impacted intersections. Various factors, including but not limited to, dedication of additional right-of-way at these affected intersections due to use alteration, expansion, or change, acquisition of the affected right-of-way by the City via funds from a Bridge and Thoroughfare District, continued expansion of the Valley's circulation system (i.e. construction of regional roadway improvements), and increased public transit use may improve the operation of each of the affected intersections.

4.4 MITIGATION

4.4.1 On-site Mitigation

The project is responsible for providing vehicular access onto and within the site that is compliant with City codes and regulations. Appropriate traffic control devices will be employed at each location where a project driveway intersects a public roadway.

Two future major arterial roadways pass through the project site (Newhall Ranch Road and Santa Clarita Parkway). The project will construct the portion of these arterials that are located within the site boundary to the arterial standards established by the City. Since the funding of these arterials is included in the Bridge and Thoroughfare (B&T) District improvement program (see Section 4.4.3), the project's B&T payments will be credited with the cost of the construction of these arterials.

4.4.2 Off-site Mitigation

The preceding sections show how a significant impact occurs at the following intersections for the indicated scenarios:

Intersection	Interim Year	Alternative Interim Year	Pre-Interim Year
McBean Parkway and Newhall Ranch Road	X	X	
Valencia Boulevard and Magic Mountain Parkway	X	X	X
Bouquet Canyon Road and Soledad Canyon Road	X	X	X
Bouquet Canyon Road and Newhall Ranch Road	X	X	X
Seco Canyon Road and Bouquet Canyon Road	X	X	X
Whites Canyon Road and Soledad Canyon Road	X		

Each of the off-site impacts occurs in one or more of the Interim Year analysis scenarios. There are no significant impacts due to the project for the Long-Range scenario.

Intersection improvements that fully mitigate the impacts of the proposed project were identified in the applicable section and are summarized in Table 4-17. Locations are noted where mitigation measures will require the acquisition of right-of-way that is not under the control of the project applicant. Therefore, the implementation of these mitigation measures may require the condemnation of property by the City in order to acquire the necessary right-of-way.

Table 4-17

MITIGATION SUMMARY

LOCATION	SCENARIO	MITIGATION
48. McBean & Newhall Ranch	IY, AIY	Add 4th Eastbound Through Lane Add 4th Westbound Through Lane
57. Valencia & Magic Mountain	IY, AIY, PIY	Add 3rd Eastbound Through Lane (requires right-of-way on south side of Valencia Boulevard)
65. Bouquet & Soledad	IY, AIY	Add 4th Northbound Through Lane (requires right-of-way on southeast corner of intersection along Bouquet Canyon Road)
	PIY	Temporary configuration to consist of 3 Southbound Left-Turn Lanes and 2 Southbound Through Lanes. Would revert to 2 Southbound Left-Turn Lanes and 3 Southbound Through Lanes (existing configuration) when Cross-Valley Connector is completed.
66. Bouquet & Newhall Ranch	IY, AIY	Add 4th Eastbound Through Lane Add 4th Westbound Through Lane
	PIY	Add 2nd Southbound Left-Turn Lane Temporary configuration to consist of 3 Northbound Left-Turn Lanes, 3 Northbound Through Lanes and 2 Westbound Right-Turn Lanes. Would revert to 2 Northbound Left-Turn Lanes, 4 Northbound Through Lanes, and 1 Westbound Right-Turn Lane (existing configuration) when Cross-Valley Connector is completed.
67. Seco & Bouquet	IY, AIY, PIY	Convert 1st Southbound Right-Turn Lane to a shared Left-Turn/Right-Turn Lane (for 1 Left-Turn Lane, 1 shared Left-Turn/Right-Turn Lane, 1 Right-Turn Lane)
	IY	Add 1st Westbound Right-Turn Lane (requires right-of-way on northeast corner of intersection along Bouquet Canyon Road)
172. Whites Canyon & Soledad	IY	Add 2nd dedicated Northbound Left-Turn Lane & convert shared Northbound Left-Turn/Through Lane to 3rd dedicated Northbound Through Lane (requires right-of-way on southeast side of intersection along Whites Canyon Road) Or Add 1st Eastbound Right-Turn Lane (requires right-of-way on southwest corner of intersection along Soledad Canyon Road)

IY = Interim Year Scenario
AIY = Alternative Interim Year Scenario
PIY = Pre-Interim Year Scenario

See Appendix G for drawings of each intersection improvement.

At the intersections of Valencia Boulevard/Magic Mountain Parkway, Bouquet Canyon Road/Soledad Canyon Road, Seco Canyon Road/Bouquet Canyon Road, and Whites Canyon Road/Soledad Canyon Road, the City has determined that improvements to reduce the project's impact to a level less than significant require additional right-of-way. These intersections are currently built to their ultimate size. Since the project and these intersections are in a full improvement Bridge and Thoroughfare (B&T) district, the project will pay B&T fees that can be used by the district to acquire additional right-of-way at these intersections. For Interim Year conditions, without mitigation, the Valencia Boulevard/Magic Mountain Parkway intersection is forecast as LOS F (same as the no-project conditions), the Bouquet Canyon Road/Soledad Canyon Road intersection is forecast as LOS E (same as the no-project conditions), the Seco Canyon Road/Bouquet Canyon Road intersection is forecast as LOS E (same as the no-project conditions), and the Whites Canyon Road/Soledad Canyon Road intersection is forecast as LOS D (same as the no-project and the with project with mitigation conditions). The remaining significantly impacted intersections will be fully mitigated with the proposed improvements and are forecast as LOS D or better. The project's share of the future traffic for each location requiring mitigation is provided in Table 4-18.

The first 500 units of the project can be occupied with the Newhall Ranch Road extension from Bouquet Canyon Road as the point of access and does not require the construction of the Newhall Ranch Road/Golden Valley Road bridge across the Santa Clara River. The full buildout of the project necessitates the construction of the Newhall Ranch Road extension to Golden Valley Road, including the Newhall Ranch Road/Golden Valley Road bridge across the Santa Clara River. While a two lane road and bridge would accommodate the project generated traffic alone (approximately 3,000 ADT at the bridge), four to six lanes are required to accommodate the additional non-project traffic that will use the road and bridge (an additional 29,000 ADT).

Table 4-18

PROJECT SHARE AT SIGNIFICANTLY IMPACTED LOCATIONS

INTERSECTION	INTERIM YEAR	ALTERNATIVE INTERIM YEAR
48. McBean & Newhall Ranch	8%	8%
57. Valencia & Magic Mountain	5%	5%
65. Bouquet & Soledad	4%	4%
66. Bouquet & Newhall Ranch	22%	26%
67. Seco & Bouquet	13%	2%
172. Whites Canyon & Soledad	4%	N/A

See Appendix E for share calculations

4.4.3 Bridge and Thoroughfare District Fee

Within the Santa Clarita Valley, the County and the City have established Bridge and Thoroughfare (B&T) Districts to manage the many significant infrastructure improvements planned to occur within the valley. The project site is located within the Bouquet Canyon District and the B&T fee for the Bouquet Canyon District is $14,200 per factored dwelling unit.

The Bouquet Canyon B&T District has recently been updated and is considered a full improvement district. The implication of this is that the B&T fees collected within the district have been calculated to cover all the anticipated improvements necessary to build out the arterial roadway network as outlined in the City's General Plan Circulation Element. Since most of the mitigation identified for the project is included in the B&T program, B&T improvements constructed directly by the project should be credited against the project's total B&T fee.

APPENDIX A
INTERSECTION CAPACITY UTILIZATION WORKSHEETS

Peak hour intersection volume/capacity ratios are calculated by means of intersection capacity utilization (ICU) values. ICU calculations were performed for the intersections shown in Figure A-1.

The procedure is based on the critical movement methodology, and shows the amount of capacity utilized by each critical move. A "de-facto" right-turn lane is used in the ICU calculation for cases where a curb lane is wide enough to separately serve both through and right-turn traffic (typically with a width of 19 feet from curb to outside of through-lane with parking prohibited during peak periods). Such lanes are treated the same as striped right-turn lanes during the ICU calculations, but they are denoted on the ICU calculation worksheets using the letter "d" in place of a numerical entry for right-turn lanes.

The methodology also incorporates a check for right-turn capacity utilization. Both right-turn-on-green (RTOG) and right-turn-on-red (RTOR) capacity availability are calculated and checked against the total right-turn capacity need. If insufficient capacity is available, then an adjustment is made to the total capacity utilization value. The following example shows how this adjustment is made.

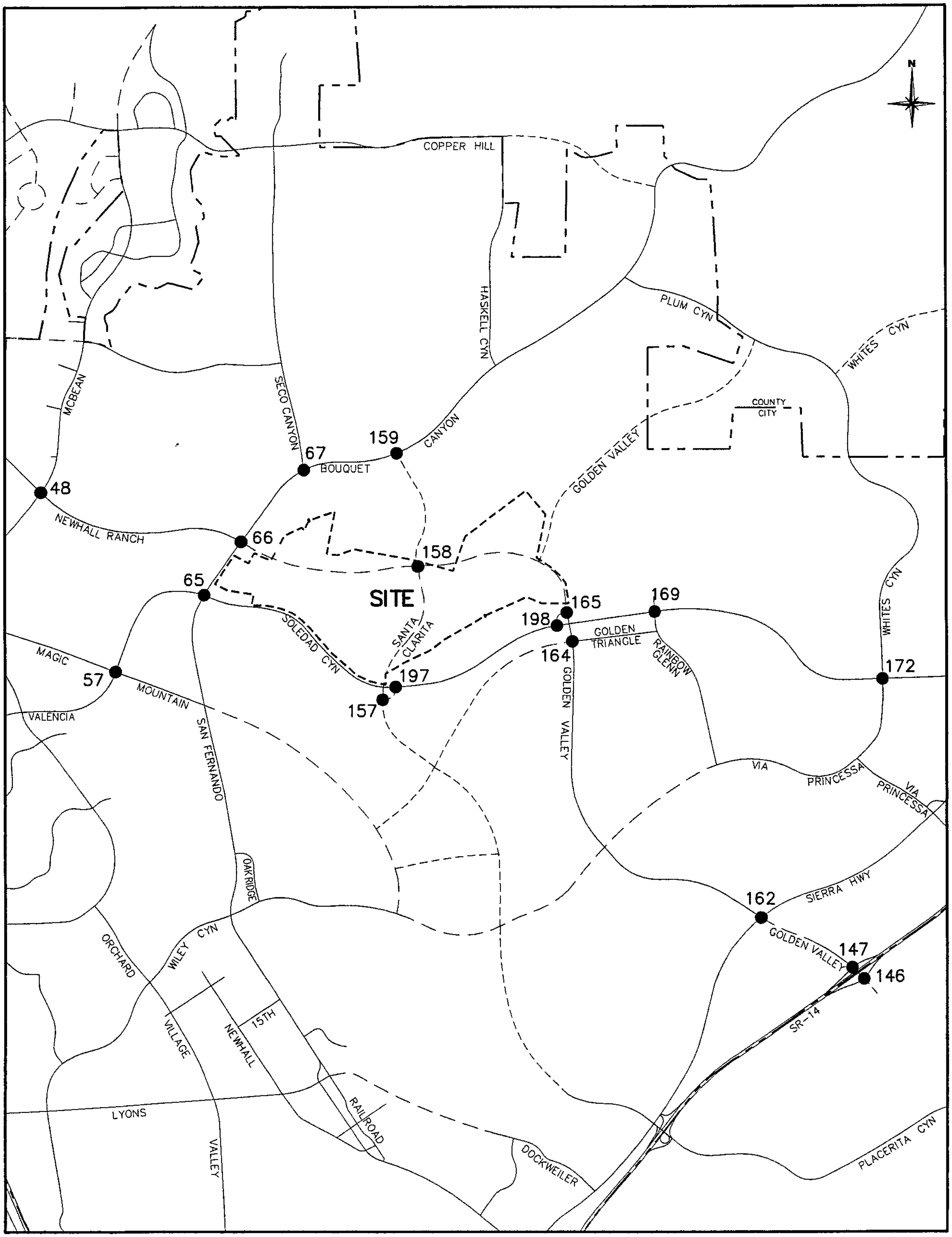
Example of Right-turn Capacity Utilization For Northbound Right

1. Right-Turn-On-Green (RTOG)

If NBT is critical move, then:
RTOG = V/C (NBT)
Otherwise,
RTOG = V/C (NBL) + V/C (SBT) - V/C (SBL)

2. Right-Turn-On-Red (RTOR)

If WBL is critical move, then:
RTOR = V/C (WBL)
Otherwise,
RTOR = V/C (EBL) + V/C (WBT) - V/C (EBT)



Legend

● Study Location

------ Site Boundary

——— Existing Roadway

— — — Interim Year Roadway

- - - - - Long-Range Roadway

— - - — City Boundary

Figure A-1

INTERSECTION STUDY LOCATIONS

3. Right-Turn Overlap Adjustment

If the northbound right is assumed to overlap with the adjacent westbound left, adjustments to the RTOG and RTOR values are made as follows:

RTOG = RTOG + V/C (WBL)
RTOR = RTOR - V/C (WBL)

4. Total Right-Turn Capacity (RTC) Availability For NBR

RTC = RTOG + factor x RTOR
Where factor = RTOR saturation flow factor (typically 75%)

5. Right-turn Adjustment for ICU Calculation

Right-turn adjustment is then as follows: Additional ICU = V/C (NBR) - RTC

A zero or negative value indicates that adequate capacity is available and no adjustment is necessary. A positive value indicates that the available RTOR and RTOG capacity does not adequately accommodate the right-turn V/C, therefore the right-turn is essentially considered to be a critical movement. In such cases, the right-turn adjustment is noted on the ICU worksheet and it is included in the total capacity utilization value. When it is determined that a right-turn adjustment is required for more than one right-turn movement, the word "multi" is printed on the worksheet instead of an actual right-turn movement reference, and the right-turn adjustments are cumulatively added to the total capacity utilization value. In such cases, further operational evaluation is typically carried out to determine if under actual operational conditions, the critical right-turns would operate simultaneously, and therefore a right-turn adjustment credit should be applied.

Shared Lane V/C Methodology

For intersection approaches where shared usage of a lane is permitted by more than one turn movement (e.g., left/through, through/right, left/through/right), the individual turn volumes are evaluated to determine whether dedication of the shared lane is warranted to any one given turn movement. The following example demonstrates how this evaluation is carried out:

Example of Shared Lane Utilization for Shared Left/Through Lane

1. Average Lane Volume (ALV)

$$\text{ALV} = \frac{\text{Left-Turn Volume + Through Volume}}{\text{Total Left + Through Approach Lanes (including shared lane)}}$$

2. ALV for Each Approach

$$\text{ALV (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Lanes (including shared lane)}}$$

$$\text{ALV (Through)} = \frac{\text{Through Volume}}{\text{Through Approach Lanes (including shared lane)}}$$

3. Lane Dedication is Warranted

If ALV (Left) is greater than ALV then full dedication of the shared lane to the left-turn approach is warranted. Left-turn and through V/C ratios for this case are calculated as follows:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Capacity (including shared lane)}}$$

$$\text{V/C (Through)} = \frac{\text{Through Volume}}{\text{Through Approach Capacity (excluding shared lane)}}$$

Similarly, if ALV (Through) is greater than ALV then full dedication to the through approach is warranted, and left-turn and through V/C ratios are calculated as follows:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Capacity (excluding shared lane)}}$$

$$\text{V/C (Through)} = \frac{\text{Through Volume}}{\text{Through Approach Capacity (including shared lane)}}$$

4. Lane Dedication is not Warranted

If ALV (Left) and ALV (Through) are both less than ALV, the left/through lane is assumed to be truly shared and each left, left/through or through approach lane carries an evenly distributed volume of traffic equal to ALV. A combined left/through V/C ratio is calculated as follows:

$$\text{V/C (Left/Through)} = \frac{\text{Left-Turn Volume + Through Volume}}{\text{Total Left + Through Approach Capacity (including shared lane)}}.$$

This V/C (Left/Through) ratio is assigned as the V/C (Through) ratio for the critical movement analysis and ICU summary listing.

If split phasing has not been designated for this approach, the relative proportion of V/C (Through) that is attributed to the left-turn volume is estimated as follows:

If approach has more than one left-turn (including shared lane), then:

$$\text{V/C (Left)} = \text{V/C (Through)}$$

If approach has only one left-turn lane (shared lane), then:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Single Approach Lane Capacity}}.$$

If this left-turn movement is determined to be a critical movement, the V/C (Left) value is posted in brackets on the ICU summary printout.

These same steps are carried out for shared through/right lanes. If full dedication of a shared through/right lane to the right-turn movement is warranted, the right-turn V/C value calculated in step three is checked against the RTOR and RTOG capacity availability if the option to include right-turns in the V/C ratio calculations is selected. If the V/C value that is determined using the shared lane methodology described here is reduced due to RTOR and RTOG capacity availability, the V/C value for the through/right lanes is posted in brackets.

When an approach contains more than one shared lane (e.g., left/through and through/right), steps one and two listed above are carried out for the three turn movements combined. Step four is carried out if dedication is not warranted for either of the shared lanes. If dedication of one of the shared lanes is warranted to one movement or another, step three is carried out for the two movements involved, and then steps one through four are repeated for the two movements involved in the other shared lane.

48. McBean & Newhall Ranch

Existing Count (2002)

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	415	.12*	196	.06
NBT	3	5250	379	.07	1451	.28*
NBR	2	3500	254	.07	727	.21
SBL	2	3500	100	.03	71	.02*
SBT	4	7000	1574	.22*	608	.09
SBR	f		440		224	
EBL	2	3500	175	.05*	371	.11
EBT	3	5250	485	.09	834	.16*
EBR	1	1750	310	.18	240	.14
WBL	2	3500	769	.22	335	.10*
WBT	3	5250	1757	.33*	238	.05
WBR	1	1750	60	.03	74	.04
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.82		.66

Pre-Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	498	.14*	118	.03
NBT	3	5250	794	.15	1798	.34*
NBR	2	3500	252	.07	1014	.29
SBL	2	3500	222	.06	206	.06*
SBT	4	7000	1853	.26*	1291	.18
SBR	f		503		101	
EBL	2	3500	96	.03*	355	.10
EBT	3	5250	525	.10	1309	.25*
EBR	1	1750	284	.16	406	.23
WBL	2	3500	721	.21	389	.11*
WBT	3	5250	1785	.34*	804	.15
WBR	1	1750	103	.06	176	.10
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.87		.86

Pre-Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	498	.14*	118	.03
NBT	3	5250	794	.15	1798	.34*
NBR	2	3500	254	.07	1053	.30
SBL	2	3500	225	.06	212	.06*
SBT	4	7000	1853	.26*	1291	.18
SBR	f		503		101	
EBL	2	3500	96	.03*	355	.10
EBT	3	5250	537	.10	1341	.26*
EBR	1	1750	284	.16	406	.23
WBL	2	3500	731	.21	399	.11*
WBT	3	5250	1833	.35*	819	.16
WBR	1	1750	104	.06	180	.10
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.88		.87

Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	625	.18*	126	.04
NBT	3	5250	629	.12	1724	.33*
NBR	2	3500	297	.08	824	.24
SBL	2	3500	197	.06	219	.06*
SBT	4	7000	1762	.25*	1168	.17
SBR	f		632		193	
EBL	2	3500	190	.05*	341	.10
EBT	3	5250	645	.12	1506	.29*
EBR	1	1750	267	.15	419	.24
WBL	2	3500	856	.24	344	.10*
WBT	3	5250	1708	.33*	1011	.19
WBR	1	1750	143	.08	299	.17
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.91		.88

48. McBean & Newhall Ranch

Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	625	.18*	126	.04
NBT	3	5250	629	.12	1724	.33*
NBR	2	3500	307	.09	872	.25
SBL	2	3500	202	.06	233	.07*
SBT	4	7000	1762	.25*	1168	.17
SBR	f		632		193	
EBL	2	3500	190	.05*	341	.10
EBT	3	5250	661	.13	1582	.30*
EBR	1	1750	267	.15	419	.24
WBL	2	3500	883	.25	358	.10*
WBT	3	5250	1786	.34*	1045	.20
WBR	1	1750	149	.09	311	.18
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .92 .90

Interim Year with Project with Mitigation

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	625	.18*	126	.04
NBT	3	5250	629	.12	1724	.33*
NBR	2	3500	307	.09	872	.25
SBL	2	3500	202	.06	233	.07*
SBT	4	7000	1762	.25*	1168	.17
SBR	f		632		193	
EBL	2	3500	190	.05	341	.10
EBT	4	7000	661	.09*	1582	.23*
EBR	1	1750	267	.15	419	.24
WBL	2	3500	883	.25*	358	.10*
WBT	4	7000	1786	.26	1045	.15
WBR	1	1750	149	.09	311	.18
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .87 .83

Interim Year w/Santa Clarita Pkwy w/out Proj

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	629	.18*	290	.08
NBT	3	5250	581	.11	1599	.30*
NBR	2	3500	230	.07	927	.26
SBL	2	3500	232	.07	187	.05*
SBT	4	7000	1561	.22*	1076	.15
SBR	f		567		199	
EBL	2	3500	194	.06	269	.08
EBT	3	5250	652	.12*	1471	.28*
EBR	1	1750	268	.15	534	.31
WBL	2	3500	937	.27*	360	.10*
WBT	3	5250	1523	.29	1080	.21
WBR	1	1750	152	.09	367	.21
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .89 .83

Interim Year w/Santa Clarita Pkwy w/Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	629	.18*	290	.08
NBT	3	5250	581	.11	1599	.30*
NBR	2	3500	240	.07	967	.28
SBL	2	3500	237	.07	196	.06*
SBT	4	7000	1561	.22*	1076	.15
SBR	f		567		199	
EBL	2	3500	194	.06	269	.08
EBT	3	5250	673	.13*	1541	.29*
EBR	1	1750	268	.15	534	.31
WBL	2	3500	964	.28*	380	.11*
WBT	3	5250	1601	.30	1113	.21
WBR	1	1750	158	.09	377	.22
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .91 .86

48. McBean & Newhall Ranch

Int Year w/Sta Clarita Pkwy w/Proj w/Mitigation

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	629	.18*	290	.08
NBT	3	5250	581	.11	1599	.30*
NBR	2	3500	240	.07	967	.28
SBL	2	3500	237	.07	196	.06*
SBT	4	7000	1561	.22*	1076	.15
SBR	f		567		199	
EBL	2	3500	194	.06	269	.08
EBT	4	7000	673	.10*	1541	.22*
EBR	1	1750	268	.15	534	.31
WBL	2	3500	964	.28*	380	.11*
WBT	4	7000	1601	.23	1113	.16
WBR	1	1750	158	.09	377	.22
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .88 .79

57. Valencia & Magic Mtn

Existing Count (2002)

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	45	.03*	75	.04
NBT	3	5250	691	.15	1285	.27*
NBR	0	0	97		110	
SBL	1	1750	52	.03	83	.05*
SBT	3	5250	1430	.27*	959	.18
SBR	2	3500	543	.16	413	.12
EBL	2	3500	172	.05	600	.17*
EBT	2	3500	196	.07*	359	.11
EBR	0	0	47		38	
WBL	1	1750	195	.11*	196	.11
WBT	2	3500	324	.09	367	.10*
WBR	1	1750	39	.02	55	.03
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.58		.69

Pre-Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	2	.00	41	.02
NBT	3	5250	937	.20	1333	.32*
NBR	0	0	133		331	
SBL	1	1750	111	.06	130	.07*
SBT	3	5250	1463	.28*	1023	.19
SBR	2	3500	686	.20	895	.26
EBL	2	3500	623	.18*	1066	.30
EBT	2	3500	258	.09	720	.22*
EBR	0	0	55		47	
WBL	1	1750	375	.21	524	.30*
WBT	2	3500	843	.24*	454	.13
WBR	1	1750	79	.05	251	.14
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.80		1.01

Pre-Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	2	.00	41	.02
NBT	3	5250	942	.20	1353	.32*
NBR	0	0	133		337	
SBL	1	1750	115	.07	132	.08*
SBT	3	5250	1503	.29*	1036	.20
SBR	2	3500	709	.20	904	.26
EBL	2	3500	624	.18*	1080	.31
EBT	2	3500	258	.09	723	.22*
EBR	0	0	55		47	
WBL	1	1750	379	.22	524	.30*
WBT	2	3500	845	.24*	454	.13
WBR	1	1750	79	.05	255	.15
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.81		1.02

Pre-Interim Year with Project with Mitigation

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	2	.00	41	.02
NBT	3	5250	942	.20	1353	.32*
NBR	0	0	133		337	
SBL	1	1750	115	.07	132	.08*
SBT	3	5250	1503	.29*	1036	.20
SBR	2	3500	709	.20	904	.26
EBL	2	3500	624	.18*	1080	.31
EBT	3	5250	258	.06	723	.15*
EBR	0	0	55		47	
WBL	1	1750	379	.22	524	.30*
WBT	2	3500	845	.24*	454	.13
WBR	1	1750	79	.05	255	.15
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.81		.95

57. Valencia & Magic Mtn

Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	8	.00	11	.01
NBT	3	5250	589	.15	1308	.32*
NBR	0	0	215		360	
SBL	1	1750	178	.10	187	.11*
SBT	3	5250	1469	.28*	1110	.21
SBR	2	3500	641	.18	764	.22
EBL	2	3500	312	.09	1124	.32
EBT	2	3500	743	.23*	1158	.34*
EBR	0	0	54		44	
WBL	1	1750	800	.46*	383	.22*
WBT	2	3500	1104	.32	714	.20
WBR	1	1750	216	.12	299	.17
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				1.07		1.09

Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	8	.00	11	.01
NBT	3	5250	601	.16	1358	.33*
NBR	0	0	215		363	
SBL	1	1750	182	.10	189	.11*
SBT	3	5250	1544	.29*	1143	.22
SBR	2	3500	673	.19	788	.23
EBL	2	3500	322	.09	1163	.33
EBT	2	3500	743	.23*	1167	.35*
EBR	0	0	54		44	
WBL	1	1750	804	.46*	386	.22*
WBT	2	3500	1111	.32	714	.20
WBR	1	1750	218	.12	305	.17
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				1.08		1.11

Interim Year with Project with Mitigation

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	8	.00	11	.01
NBT	3	5250	601	.16	1358	.33*
NBR	0	0	215		363	
SBL	1	1750	182	.10	189	.11*
SBT	3	5250	1544	.29*	1143	.22
SBR	2	3500	673	.19	788	.23
EBL	2	3500	322	.09	1163	.33*
EBT	3	5250	743	.15*	1167	.23
EBR	0	0	54		44	
WBL	1	1750	804	.46*	386	.22
WBT	2	3500	1111	.32	714	.20*
WBR	1	1750	218	.12	305	.17
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				1.00		1.07

Interim Year w/Santa Clarita Pkwy w/out Proj

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	5	.00	7	.00
NBT	3	5250	540	.15	1051	.30*
NBR	0	0	295	.17	582	.33
SBL	1	1750	88	.05	215	.12*
SBT	3	5250	1301	.25*	919	.18
SBR	2	3500	678	.19	748	.21
EBL	2	3500	442	.13	1172	.33
EBT	2	3500	587	.18*	1166	.35*
EBR	0	0	51		42	
WBL	1	1750	908	.52*	516	.29*
WBT	2	3500	1103	.32	642	.18
WBR	1	1750	151	.09	255	.15
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				1.05		1.16

57. Valencia & Magic Mtn

Interim Year w/Santa Clarita Pkwy w/Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	5	.00	7	.00
NBT	3	5250	553	.16	1091	.31*
NBR	0	0	295	.17	585	.33
SBL	1	1750	89	.05	217	.12*
SBT	3	5250	1351	.26*	956	.18
SBR	2	3500	722	.21	764	.22
EBL	2	3500	446	.13	1211	.35
EBT	2	3500	587	.18*	1175	.35*
EBR	0	0	51		42	
WBL	1	1750	921	.53*	516	.29*
WBT	2	3500	1109	.32	642	.18
WBR	1	1750	153	.09	259	.15
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION 1.07 1.17

Int Year w/Sta Clarita Pkwy w/Proj w/Mitigation

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	5	.00	7	.00
NBT	3	5250	553	.16	1091	.31*
NBR	0	0	295	.17	585	.33
SBL	1	1750	89	.05	217	.12*
SBT	3	5250	1351	.26*	956	.18
SBR	2	3500	722	.21	764	.22
EBL	2	3500	446	.13	1211	.35*
EBT	3	5250	587	.12*	1175	.23
EBR	0	0	51		42	
WBL	1	1750	921	.53*	516	.29
WBT	2	3500	1109	.32	642	.18*
WBR	1	1750	153	.09	259	.15
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION 1.01 1.06

65. Bouquet & Soledad

Existing Count (2002)

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	38	.02	36	.02
NBT	3	5250	590	.11*	1083	.21*
NBR	1	1750	340	.19	437	.25
SBL	2	3500	624	.18*	834	.24*
SBT	3	5250	1329	.25	836	.16
SBR	2	3500	1012	.29	637	.18
EBL	2	3500	268	.08*	1102	.31*
EBT	3	5250	579	.11	1443	.28
EBR	0	0	16		21	
WBL	2	3500	359	.10	420	.12
WBT	2.5	7000	1424	{.29}*	793	{.18}*
WBR	1.5		868		790	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .76 1.04

Pre-Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	35	.02	35	.02
NBT	3	5250	592	.11*	1322	.25*
NBR	1	1750	395	.23	463	.26
SBL	2	3500	910	.26*	1044	.30*
SBT	3	5250	1315	.25	1036	.20
SBR	2	3500	1162	.33	888	.25
EBL	3	5250	474	.09*	1139	.22
EBT	3	5250	886	.17	1513	.29*
EBR	0	0	23		25	
WBL	2	3500	544	.16	650	.19*
WBT	2.5	7000	1521	{.30}*	841	{.18}
WBR	1.5		903		815	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .86 1.13

Pre-Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	35	.02	35	.02
NBT	3	5250	605	.12*	1374	.26*
NBR	1	1750	395	.23	463	.26
SBL	2	3500	928	.27*	1058	.30*
SBT	3	5250	1360	.26	1067	.20
SBR	2	3500	1239	.35	919	.26
EBL	3	5250	480	.09*	1195	.23
EBT	3	5250	886	.17	1513	.29*
EBR	0	0	23		25	
WBL	2	3500	544	.16	650	.19*
WBT	2.5	7000	1521	{.30}*	841	{.19}
WBR	1.5		915		853	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .88 1.14

Pre-Interim Year with Project with Mitigation

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	35	.02*	35	.02
NBT	3	5250	605	.12	1374	.26*
NBR	1	1750	395	.23	463	.26
SBL	3	5250	928	.18	1058	.20*
SBT	2	3500	1360	.39*	1067	.30
SBR	2	3500	1239	.35	919	.26
EBL	3	5250	480	.09*	1195	.23
EBT	3	5250	886	.17	1513	.29*
EBR	0	0	23		25	
WBL	2	3500	544	.16	650	.19*
WBT	2.5	7000	1521	{.29}*	841	{.20}
WBR	1.5		915		853	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .89 1.04

65. Bouquet & Soledad

Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	34	.02*	35	.02
NBT	3	5250	873	.17	1652	.31*
NBR	1	1750	84	.05	193	.11
SBL	2	3500	213	.06	569	.16*
SBT	3	5250	1512	.29*	1275	.24
SBR	2	3500	1108	.32	817	.23
EBL	3	5250	419	.08*	1068	.20
EBT	3	5250	385	.08	1453	.28*
EBR	0	0	23		26	
WBL	2	3500	144	.04	230	.07*
WBT	2.5	7000	1440	.27*	761	{.14}
WBR	1.5		362	.21	368	{.09}
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .76 .92

Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	34	.02*	35	.02
NBT	3	5250	892	.17	1730	.33*
NBR	1	1750	84	.05	193	.11
SBL	2	3500	216	.06	580	.17*
SBT	3	5250	1563	.30*	1337	.25
SBR	2	3500	1229	.35	895	.26
EBL	3	5250	446	.08*	1189	.23*
EBT	3	5250	385	.08	1466	.28
EBR	0	0	23		26	
WBL	2	3500	144	.04	230	.07
WBT	2.5	7000	1454	.28*	761	{.14}*
WBR	1.5		369	.21	375	{.09}
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .78 .97

Interim Year with Project with Mitigation

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	34	.02*	35	.02
NBT	4	7000	892	.13	1730	.25*
NBR	1	1750	84	.05	193	.11
SBL	2	3500	216	.06	580	.17*
SBT	3	5250	1563	.30*	1337	.25
SBR	2	3500	1229	.35	895	.26
EBL	3	5250	446	.08*	1189	.23*
EBT	3	5250	385	.08	1466	.28
EBR	0	0	23		26	
WBL	2	3500	144	.04	230	.07
WBT	2.5	7000	1454	.28*	761	{.14}*
WBR	1.5		369	.21	375	{.09}
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .78 .89

Interim Year w/Santa Clarita Pkwy w/out Proj

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	34	.02*	36	.02
NBT	3	5250	728	.14	1487	.28*
NBR	1	1750	44	.03	190	.11
SBL	2	3500	207	.06	658	.19*
SBT	3	5250	1312	.25*	1121	.21
SBR	2	3500	1102	.31	751	.21
EBL	3	5250	487	.09*	1118	.21
EBT	3	5250	386	.08	1397	.27*
EBR	0	0	22		25	
WBL	2	3500	222	.06	250	.07*
WBT	2.5	7000	1345	{.26}*	649	{.12}
WBR	1.5		519	{.20}	234	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .72 .91

65. Bouquet & Soledad

Interim Year w/Santa Clarita Pkwy w/Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	34	.02*	36	.02
NBT	3	5250	739	.14	1548	.29*
NBR	1	1750	44	.03	195	.11
SBL	2	3500	210	.06	671	.19*
SBT	3	5250	1366	.26*	1163	.22
SBR	2	3500	1203	.34	820	.23
EBL	3	5250	509	.10*	1213	.23*
EBT	3	5250	386	.08	1424	.28
EBR	0	0	22		25	
WBL	2	3500	226	.06	250	.07
WBT	2.5	7000	1363	{.26}*	651	{.12}*
WBR	1.5		526	{.20}	242	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .74 .93

Int Year w/Sta Clarita Pkwy w/Proj w/Mitigation

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	34	.02*	36	.02
NBT	4	7000	739	.11	1548	.22*
NBR	1	1750	44	.03	195	.11
SBL	2	3500	210	.06	671	.19*
SBT	3	5250	1366	.26*	1163	.22
SBR	2	3500	1203	.34	820	.23
EBL	3	5250	509	.10*	1213	.23*
EBT	3	5250	386	.08	1424	.28
EBR	0	0	22		25	
WBL	2	3500	226	.06	250	.07
WBT	2.5	7000	1363	{.26}*	651	{.12}*
WBR	1.5		526	{.17}	242	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .74 .86

65. Bouquet & Soledad

Long-Range with 6 Lane SCP

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	10	.01*	20	.01
NBT	3	5250	670	.13	1880	.36*
NBR	1	1750	60	.03	260	.15
SBL	2	3500	400	.11	630	.18*
SBT	3	5250	1840	.35*	1360	.26
SBR	2	3500	1380	.39	910	.26
EBL	3	5250	410	.08*	1230	.23*
EBT	3	5250	400	.08	1160	.23
EBR	0	0	10		30	
WBL	2	3500	230	.07	180	.05
WBT	2.5	7000	1320	.25*	640	{.12}*
WBR	1.5		460	{.07}	440	{.12}
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .79 .99

Long-Range with 4 Lane SCP

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	10	.01*	30	.02
NBT	3	5250	650	.12	2010	.38*
NBR	1	1750	50	.03	240	.14
SBL	2	3500	510	.15	410	.12*
SBT	3	5250	1900	.36*	1380	.26
SBR	2	3500	1280	.37	850	.24
EBL	3	5250	430	.08*	1170	.22*
EBT	3	5250	410	.08	1350	.26
EBR	0	0	20		30	
WBL	2	3500	140	.04	180	.05
WBT	2.5	7000	1240	.24*	600	{.14}*
WBR	1.5		440	{.04}	540	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .79 .96

Long-Range without SCP north of Soledad

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	10	.01*	50	.03
NBT	3	5250	740	.14	1890	.36*
NBR	1	1750	50	.03	200	.11
SBL	2	3500	730	.21	570	.16*
SBT	3	5250	2050	.39*	1590	.30
SBR	2	3500	1240	.35	880	.25
EBL	3	5250	380	.07*	1130	.22*
EBT	3	5250	420	.08	1280	.25
EBR	0	0	10		30	
WBL	2	3500	120	.03	180	.05
WBT	2.5	7000	1330	{.25}*	550	.16*
WBR	1.5		520	{.08}	1030	.29
Right Turn Adjustment					WBR	.01*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .82 1.01

65. Bouquet & Soledad

Long-Range with 6 Lane SCP

	LANES	CAPACITY	AM PK HOUR VOL	V/C	PM PK HOUR VOL	V/C
NBL	1	1750	10	.01*	20	.01
NBT	4	7000	670	.10	1880	.27*
NBR	1	1750	60	.03	260	.15
SBL	2	3500	400	.11	630	.18*
SBT	3	5250	1840	.35*	1360	.26
SBR	2	3500	1380	.39	910	.26
EBL	3	5250	410	.08*	1230	.23*
EBT	3	5250	400	.08	1160	.23
EBR	0	0	10		30	
WBL	2	3500	230	.07	180	.05
WBT	2.5	7000	1320	.25*	640	{.12}*
WBR	1.5		460	{.07}	440	{.12}
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .79 .90

Long-Range with 4 Lane SCP

	LANES	CAPACITY	AM PK HOUR VOL	V/C	PM PK HOUR VOL	V/C
NBL	1	1750	10	.01*	30	.02
NBT	4	7000	650	.09	2010	.29*
NBR	1	1750	50	.03	240	.14
SBL	2	3500	510	.15	410	.12*
SBT	3	5250	1900	.36*	1380	.26
SBR	2	3500	1280	.37	850	.24
EBL	3	5250	430	.08*	1170	.22*
EBT	3	5250	410	.08	1350	.26
EBR	0	0	20		30	
WBL	2	3500	140	.04	180	.05
WBT	2.5	7000	1240	.24*	600	{.14}*
WBR	1.5		440	{.04}	540	
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .79 .87

Long-Range without SCP north of Soledad

	LANES	CAPACITY	AM PK HOUR VOL	V/C	PM PK HOUR VOL	V/C
NBL	1	1750	10	.01*	50	.03
NBT	4	7000	740	.11	1890	.27*
NBR	1	1750	50	.03	200	.11
SBL	2	3500	730	.21	570	.16*
SBT	3	5250	2050	.39*	1590	.30
SBR	2	3500	1240	.35	880	.25
EBL	3	5250	380	.07*	1130	.22*
EBT	3	5250	420	.08	1280	.25
EBR	0	0	10		30	
WBL	2	3500	120	.03	180	.05
WBT	2.5	7000	1330	{.25}*	550	.16*
WBR	1.5		520	{.08}	1030	.29
Right Turn Adjustment					WBR	.01*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .82 .92

66. Bouquet & Newhall Ranch

Existing Count (2002)

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	869	.25*	372	.11
NBT	4	7000	729	.10	2304	.33*
NBR	1	1750	5	.00	166	.09
SBL	1	1750	13	.01	185	.11*
SBT	3	5250	2285	.44*	1254	.24
SBR	2	3500	876	.25	300	.09
EBL	2	3500	326	.09*	863	.25*
EBT	2	3500	40	.01	281	.08
EBR	2	3500	469	.13	724	.21
WBL	2	3500	70	.02	148	.04
WBT	3	5250	8	.00*	190	.04*
WBR	1	1750	10	.01	184	.11
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR EBR

TOTAL CAPACITY UTILIZATION .88 .83

Pre-Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	1028	.29*	1016	.29*
NBT	4	7000	1057	.15	2360	.34
NBR	1	1750	5	.00	166	.09
SBL	1	1750	11	.01	185	.11
SBT	4	7000	2208	.32*	1419	.20*
SBR	2	3500	1196	.34	608	.17
EBL	2	3500	380	.11*	874	.25*
EBT	2	3500	50	.01	433	.12
EBR	2	3500	1205	.34	1452	.41
WBL	2	3500	70	.02	148	.04
WBT	3	5250	10	.00*	190	.04*
WBR	1	1750	10	.01	184	.11
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR EBR

TOTAL CAPACITY UTILIZATION .82 .88

Pre-Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	1028	.29*	1016	.29*
NBT	4	7000	1057	.15	2360	.34
NBR	1	1750	39	.02	315	.18
SBL	1	1750	25	.01	218	.12
SBT	4	7000	2208	.32*	1419	.20*
SBR	2	3500	1196	.34	608	.17
EBL	2	3500	380	.11*	874	.25*
EBT	2	3500	70	.02	519	.15
EBR	2	3500	1205	.34	1452	.41
WBL	2	3500	215	.06	230	.07
WBT	3	5250	80	.02*	229	.04*
WBR	1	1750	45	.03	208	.12
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR EBR

TOTAL CAPACITY UTILIZATION .84 .88

Pre-Interim Year with Project with Mitigation

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	3	5250	1028	.20*	1016	.19
NBT	3	5250	1057	.20	2360	.45*
NBR	1	1750	39	.02	315	.18
SBL	2	3500	25	.01	218	.06*
SBT	4	7000	2208	.32*	1419	.20
SBR	2	3500	1196	.34	608	.17
EBL	2	3500	380	.11*	874	.25*
EBT	2	3500	70	.02	519	.15
EBR	2	3500	1205	.34	1452	.41
WBL	2	3500	215	.06	230	.07
WBT	4	7000	80	.01*	229	.03*
WBR	2	3500	45	.01	208	.06
Right Turn Adjustment			EBR	.08*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR EBR

TOTAL CAPACITY UTILIZATION .82 .89

66. Bouquet & Newhall Ranch

Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	592	.17*	866	.25*
NBT	4	7000	1033	.15	2071	.30
NBR	1	1750	7	.00	186	.11
SBL	1	1750	360	.21	193	.11
SBT	4	7000	2018	.29*	1518	.22*
SBR	2	3500	881	.25	487	.14
EBL	2	3500	348	.10*	595	.17*
EBT	3	5250	706	.13	1084	.21
EBR	2	3500	649	.19	981	.28
WBL	2	3500	123	.04	159	.05
WBT	3	5250	1003	.19*	751	.14*
WBR	1	1750	142	.08	389	.22
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.85		.88

Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	597	.17*	886	.25
NBT	4	7000	1039	.15	2091	.30*
NBR	1	1750	51	.03	362	.21
SBL	1	1750	393	.22	291	.17*
SBT	4	7000	2018	.29*	1518	.22
SBR	2	3500	881	.25	487	.14
EBL	2	3500	348	.10*	595	.17*
EBT	3	5250	752	.14	1262	.24
EBR	2	3500	649	.19	981	.28
WBL	2	3500	302	.09	319	.09
WBT	3	5250	1135	.22*	836	.16*
WBR	1	1750	195	.11	451	.26
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.88		.90

Interim Year with Project with Mitigation

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	597	.17*	886	.25
NBT	4	7000	1039	.15	2091	.30*
NBR	1	1750	51	.03	362	.21
SBL	1	1750	393	.22	291	.17*
SBT	4	7000	2018	.29*	1518	.22
SBR	2	3500	881	.25	487	.14
EBL	2	3500	348	.10*	595	.17*
EBT	4	7000	752	.11	1262	.18
EBR	2	3500	649	.19	981	.28
WBL	2	3500	302	.09	319	.09
WBT	4	7000	1135	.16*	836	.12*
WBR	1	1750	195	.11	451	.26
Right Turn Adjustment					WBR	.01*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.82		.87

Interim Year w/Santa Clarita Pkwy w/out Proj

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	814	.23*	684	.20*
NBT	4	7000	852	.12	1957	.28
NBR	1	1750	5	.00	130	.07
SBL	1	1750	227	.13	98	.06
SBT	4	7000	1624	.23*	1264	.18*
SBR	2	3500	845	.24	473	.14
EBL	2	3500	284	.08*	469	.13*
EBT	3	5250	660	.13	1141	.22
EBR	2	3500	621	.18	1137	.32
WBL	2	3500	346	.10	136	.04
WBT	3	5250	997	.19*	889	.17*
WBR	1	1750	50	.03	76	.04
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.83		.78

66. Bouquet & Newhall Ranch

Interim Year w/Santa Clarita Pkwy w/Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	819	.23*	704	.20
NBT	4	7000	858	.12	1977	.28*
NBR	1	1750	35	.02	267	.15
SBL	1	1750	251	.14	184	.11*
SBT	4	7000	1624	.23*	1264	.18
SBR	2	3500	845	.24	473	.14
EBL	2	3500	284	.08*	469	.13
EBT	3	5250	705	.13	1295	.25*
EBR	2	3500	621	.18	1137	.32
WBL	2	3500	509	.15	268	.08*
WBT	3	5250	1117	.21*	969	.18
WBR	1	1750	77	.04	123	.07
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.85		.82

Int Year w/Sta Clarita Pkwy w/Proj w/Mitigation

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	819	.23*	704	.20
NBT	4	7000	858	.12	1977	.28*
NBR	1	1750	35	.02	267	.15
SBL	1	1750	251	.14	184	.11*
SBT	4	7000	1624	.23*	1264	.18
SBR	2	3500	845	.24	473	.14
EBL	2	3500	284	.08	469	.13*
EBT	4	7000	705	.10*	1295	.19
EBR	2	3500	621	.18	1137	.32
WBL	2	3500	509	.15*	268	.08
WBT	4	7000	1117	.16	969	.14*
WBR	1	1750	77	.04	123	.07
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.81		.76

66. Bouquet & Newhall Ranch

Long-Range with 6 Lane SCP

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	600	.17*	700	.20*
NBT	4	7000	810	.12	2470	.35
NBR	1	1750	80	.05	340	.19
SBL	2	3500	70	.02	90	.03
SBT	4	7000	1980	.28*	1250	.18*
SBR	2	3500	1160	.33	620	.18
EBL	2	3500	330	.09*	500	.14
EBT	4	7000	760	.11	1850	.26*
EBR	2	3500	980	.28	1280	.37
WBL	2	3500	640	.18	300	.09*
WBT	4	7000	1400	.20*	1400	.20
WBR	1	1750	40	.02	160	.09
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR EBR

TOTAL CAPACITY UTILIZATION .84 .83

Long-Range with 4 Lane SCP

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	520	.15*	740	.21
NBT	4	7000	900	.13	2590	.37*
NBR	1	1750	70	.04	360	.21
SBL	2	3500	240	.07	90	.03*
SBT	4	7000	1900	.27*	1210	.17
SBR	2	3500	1230	.35	670	.19
EBL	2	3500	320	.09*	640	.18
EBT	4	7000	650	.09	1950	.28*
EBR	2	3500	1040	.30	1060	.30
WBL	2	3500	710	.20	310	.09*
WBT	4	7000	1430	.20*	1270	.18
WBR	1	1750	40	.02	210	.12
Right Turn Adjustment			EBR	.06*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR EBR

TOTAL CAPACITY UTILIZATION .87 .87

Long-Range without SCP north of Soledad

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	390	.11*	800	.23
NBT	4	7000	1130	.16	2840	.41*
NBR	1	1750	80	.05	390	.22
SBL	2	3500	330	.09	300	.09*
SBT	4	7000	2380	.34*	1580	.23
SBR	2	3500	1160	.33	590	.17
EBL	2	3500	390	.11*	750	.21
EBT	4	7000	760	.11	1900	.27*
EBR	2	3500	950	.27	1030	.29
WBL	2	3500	660	.19	380	.11*
WBT	4	7000	1370	.20*	1220	.17
WBR	1	1750	200	.11	370	.21
Right Turn Adjustment			EBR	.04*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR EBR

TOTAL CAPACITY UTILIZATION .90 .98

67. Seco & Bouquet

Existing Count (2002)

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	261	.15*	330	.19*
SBT	0	0	0		0	
SBR	2	3500	734	.21	465	.13
EBL	2	3500	298	.09*	740	.21
EBT	2	3500	559	.16	2142	.61*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	2677	.56*	1215	.26
WBR	0	0	259		170	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .90 .90

Pre-Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	277	.16*	455	.26*
SBT	0	0	0		0	
SBR	2	3500	883	.25	640	.18
EBL	2	3500	441	.13*	792	.23
EBT	2	3500	886	.25	2184	.62*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	2715	.59*	1331	.28
WBR	0	0	387		137	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .98 .98

Pre-Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	277	.16*	455	.26*
SBT	0	0	0		0	
SBR	2	3500	886	.25	654	.19
EBL	2	3500	457	.13*	804	.23
EBT	2	3500	902	.26	2194	.63*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	2724	.59*	1349	.28
WBR	0	0	387		137	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .98 .99

Pre-Interim Year with Project with Mitigation

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		277	.16*	455	.13*
SBT	0	5250	0		0	
SBR	1.5		886	.25	654	{.11}
EBL	2	3500	457	.13*	804	.23
EBT	2	3500	902	.26	2194	.63*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	2724	.59*	1349	.28
WBR	0	0	387		137	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .98 .86

67. Seco & Bouquet

Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	264	.15*	442	.25*
SBT	0	0	0		0	
SBR	2	3500	898	.26	720	.21
EBL	2	3500	523	.15*	992	.28
EBT	2	3500	854	.24	2147	.61*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	2678	.56*	1328	.28
WBR	0	0	257		124	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.96		.96

Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	264	.15*	442	.25*
SBT	0	0	0		0	
SBR	2	3500	909	.26	758	.22
EBL	2	3500	553	.16*	1021	.29
EBT	2	3500	879	.25	2177	.62*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	2689	.56*	1367	.28
WBR	0	0	257		124	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.97		.97

Interim Year with Project with Mitigation

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		264	.15*	442	
SBT	0	5250	0		0	{.14}*
SBR	1.5		909	.26	758	
EBL	2	3500	553	.16*	1021	.29
EBT	2	3500	879	.25	2177	.62*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	2689	.51*	1367	.26
WBR	1	1750	257	.15	124	.07
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.92		.86

Interim Year w/Santa Clarita Pkwy w/out Proj

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	384	.22*	513	.29*
SBT	0	0	0		0	
SBR	2	3500	970	.28	589	.17
EBL	2	3500	443	.13*	932	.27*
EBT	2	3500	607	.17	1265	.36
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1461	.34*	1042	.27*
WBR	0	0	347		391	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.79		.93

67. Seco & Bouquet

Interim Year w/Santa Clarita Pkwy w/Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	386	.22*	522	.30*
SBT	0	0	0		0	
SBR	2	3500	979	.28	624	.18
EBL	2	3500	460	.13*	959	.27*
EBT	2	3500	618	.18	1289	.37
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1468	.35*	1073	.28*
WBR	0	0	353		396	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .80 .95

Int Year w/Sta Clarita Pkwy w/Proj w/Mitigation

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		386	.22*	522	
SBT	0	5250	0		0	{.15}*
SBR	1.5		979	.28	624	
EBL	2	3500	460	.13*	959	.27*
EBT	2	3500	618	.18	1289	.37
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1468	.35*	1073	.28*
WBR	0	0	353		396	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .80 .80

67. Seco & Bouquet

Long-Range with 6 Lane SCP

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		440		610	.17*
SBT	0	5250	0	{.23}*	0	
SBR	1.5		910		550	{.07}
EBL	2	3500	430	.12*	1120	.32*
EBT	3	5250	600	.11	1670	.32
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	2050	.39*	1300	.25*
WBR	1	1750	510	.29	330	.19
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .84 .84

Long-Range with 4 Lane SCP

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		250	.14*	590	.17*
SBT	0	5250	0		0	
SBR	1.5		1140	.33	550	{.06}
EBL	2	3500	460	.13*	1200	.34*
EBT	3	5250	660	.13	1900	.36
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1990	.38*	1310	.25*
WBR	1	1750	480	.27	200	.11
Right Turn Adjustment			SBR	.09*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .84 .86

Long-Range without SCP north of Soledad

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1.5		100	.06*	480	
SBT	0	5250	0		0	{.15}*
SBR	1.5		1100	.31	700	
EBL	2	3500	540	.15*	1060	.30*
EBT	3	5250	1030	.20	2610	.50
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	2500	.48*	1700	.32*
WBR	1	1750	560	.32	140	.08
Right Turn Adjustment			SBR	.14*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .93 .87

146. SR-14 NB Rp & Golden Valley

Existing Count (2002)

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	59	.03*	229	.13*
NBT	1	1750	0	.00	3	.00
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1750	73	.04*	91	.05*
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .17 .28

Pre-Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	687	.20*	808	.23*
NBT	0	0	0		0	
NBR	1	1750	166	.09	384	.22
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	226	.06*	488	.14*
EBT	2	3500	271	.08	571	.16
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3500	371	.11*	597	.17*
WBR	1	1750	112	.06	293	.17
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .47 .64

Pre-Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	687	.20*	808	.23*
NBT	0	0	0		0	
NBR	1	1750	166	.09	384	.22
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	227	.06*	489	.14*
EBT	2	3500	271	.08	571	.16
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3500	371	.11*	597	.17*
WBR	1	1750	112	.06	293	.17
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .47 .64

Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	455	.13*	800	.23*
NBT	0	0	0		0	
NBR	1	1750	166	.09	384	.22
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	736	.21*	979	.28*
EBT	2	3500	271	.08	571	.16
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3500	371	.11*	597	.17*
WBR	1	1750	112	.06	293	.17
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .55 .78

146. SR-14 NB Rp & Golden Valley

Interim Year with Project

	LANES	CAPACITY	AM PK HOUR		PM PK HOUR	
			VOL	V/C	VOL	V/C
NBL	2	3500	460	.13*	813	.23*
NBT	0	0	0		0	
NBR	1	1750	166	.09	384	.22
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	743	.21*	982	.28*
EBT	2	3500	271	.08	571	.16
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3500	371	.11*	597	.17*
WBR	1	1750	112	.06	293	.17
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.55		.78

Interim Year w/Santa Clarita Pkwy w/out Proj

	LANES	CAPACITY	AM PK HOUR		PM PK HOUR	
			VOL	V/C	VOL	V/C
NBL	2	3500	663	.19*	891	.25*
NBT	0	0	0		0	
NBR	1	1750	163	.09	385	.22
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	854	.24*	942	.27*
EBT	2	3500	267	.08	565	.16
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3500	374	.11*	601	.17*
WBR	1	1750	109	.06	290	.17
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.64		.79

Interim Year w/Santa Clarita Pkwy w/Project

	LANES	CAPACITY	AM PK HOUR		PM PK HOUR	
			VOL	V/C	VOL	V/C
NBL	2	3500	664	.19*	895	.26*
NBT	0	0	0		0	
NBR	1	1750	163	.09	385	.22
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	2	3500	857	.24*	945	.27*
EBT	2	3500	267	.08	565	.16
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3500	374	.11*	601	.17*
WBR	1	1750	109	.06	290	.17
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.64		.80

147. SR-14 SB Rp & Golden Valley

Existing Count (2002)

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	62	.04	19	.01*
SBT	1	1750	576	.33*	4	.00
SBR	1	1750	115	.07	34	.02
EBL	0	0	0		0	
EBT	1	1750	11	.08*	72	.08
EBR	0	0	135		63	
WBL	0	0	26	{.01}*	36	
WBT	1	1750	33	.03	193	.13*
WBR	0	0	0		0	
Right Turn Adjustment					SBR	.01*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .52 .25

Pre-Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	151	.09*	264	.15*
SBT	0.5	3500	0	.07	0	{.02}
SBR	1.5		255		216	
EBL	0	0	0		0	
EBT	2	3500	346	.10	795	.23*
EBR	1	1750	455	.26	531	.30
WBL	1	1750	212	.12	335	.19*
WBT	2	3500	846	.24*	1070	.31
WBR	0	0	0		0	
Right Turn Adjustment			EBR	.12*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .55 .67

Pre-Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	151	.09*	264	.15*
SBT	0.5	3500	0	.07	0	{.02}
SBR	1.5		255		217	
EBL	0	0	0		0	
EBT	2	3500	347	.10	796	.23*
EBR	1	1750	455	.26	531	.30
WBL	1	1750	212	.12	335	.19*
WBT	2	3500	846	.24*	1070	.31
WBR	0	0	0		0	
Right Turn Adjustment			EBR	.12*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .55 .67

Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	151	.09	264	.15*
SBT	0.5	3500	0	{.15}*	0	{.07}
SBR	1.5		752		603	
EBL	0	0	0		0	
EBT	2	3500	856	.24*	1286	.37*
EBR	1	1750	331	.19	486	.28
WBL	1	1750	212	.12*	335	.19*
WBT	2	3500	613	.18	1063	.30
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .61 .81

147. SR-14 SB Rp & Golden Valley

Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	151	.09	264	.15*
SBT	0.5	3500	0	{.14}*	0	{.08}
SBR	1.5		753		608	
EBL	0	0	0		0	
EBT	2	3500	863	.25*	1289	.37*
EBR	1	1750	346	.20	494	.28
WBL	1	1750	212	.12*	335	.19*
WBT	2	3500	618	.18	1076	.31
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.61		.81

Interim Year w/Santa Clarita Pkwy w/out Proj

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	143	.08	263	.15*
SBT	0.5	3500	0	{.14}*	0	{.10}
SBR	1.5		697		640	
EBL	0	0	0		0	
EBT	2	3500	976	.28*	1244	.36*
EBR	1	1750	200	.11	385	.22
WBL	1	1750	203	.12*	334	.19*
WBT	2	3500	833	.24	1158	.33
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.64		.80

Interim Year w/Santa Clarita Pkwy w/Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1750	143	.08	263	.15*
SBT	0.5	3500	0	{.14}*	0	{.10}
SBR	1.5		699		644	
EBL	0	0	0		0	
EBT	2	3500	979	.28*	1247	.36*
EBR	1	1750	200	.11	385	.22
WBL	1	1750	203	.12*	334	.19*
WBT	2	3500	834	.24	1162	.33
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.64		.80

157. Santa Clarita & Soledad Acc

Interim Year w/Santa Clarita Pkwy w/out Proj

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	3	5250	386	.07	746	.14*
NBR	f		236		389	
SBL	2	3500	200	.06	193	.06*
SBT	3	5250	1031	.20*	423	.08
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		161	.05*	445	
WBT	0	5250	0		0	{.14}*
WBR	1.5		60		393	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.35		.44

Interim Year w/Santa Clarita Pkwy w/Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	3	5250	402	.08	825	.16*
NBR	f		237		391	
SBL	2	3500	234	.07	209	.06*
SBT	3	5250	1113	.21*	458	.09
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		162	.05*	447	
WBT	0	5250	0		0	{.16}*
WBR	1.5		69		454	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.36		.48

157. Santa Clarita & Soledad (at Grade)

Interim Year w/Santa Clarita Pkwy w/out Proj

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	76	.04*	57	.03
NBT	3	5250	386	.07	746	.14*
NBR	1	1750	160	.09	332	.19
SBL	2	3500	135	.04	165	.05*
SBT	3	5250	1031	.21*	423	.09
SBR	0	0	65		28	
EBL	2	3500	4	.00	121	.03
EBT	3	5250	613	.12	2007	.38*
EBR	1	1750	10	.01	137	.08
WBL	2	3500	153	.04	309	.09*
WBT	3	5250	1961	.37*	1060	.20
WBR	1	1750	57	.03	273	.16
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.72		.76

Interim Year w/Santa Clarita Pkwy w/Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	77	.04*	57	.03
NBT	3	5250	402	.08	825	.16*
NBR	1	1750	160	.09	334	.19
SBL	2	3500	157	.04	179	.05*
SBT	3	5250	1113	.23*	458	.09
SBR	0	0	77		30	
EBL	2	3500	4	.00	144	.04
EBT	3	5250	613	.12	2018	.38*
EBR	1	1750	10	.01	142	.08
WBL	2	3500	154	.04	305	.09*
WBT	3	5250	1972	.38*	1060	.20
WBR	1	1750	65	.04	310	.18
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.75		.78

157. Santa Clarita & Soledad

Long-Range with 6 Lane SCP

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	190	.05*	170	.05
NBT	3	5250	530	.10	1460	.28*
NBR	1	1750	270	.15	440	.25
SBL	2	3500	170	.05	140	.04*
SBT	3	5250	1480	.28*	770	.15
SBR	1	1750	120	.07	60	.03
EBL	1	1750	30	.02*	140	.08
EBT	3	5250	640	.12	1800	.34*
EBR	1	1750	120	.07	260	.15
WBL	2	3500	320	.09	420	.12*
WBT	3	5250	1860	.35*	960	.18
WBR	1	1750	80	.05	220	.13
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.80		.88

Long-Range with 4 Lane SCP

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	360	.10*	380	.11
NBT	2	3500	380	.11	900	.26*
NBR	1	1750	280	.16	570	.33
SBL	2	3500	180	.05	180	.05*
SBT	2	3500	1100	.31*	640	.18
SBR	1	1750	80	.05	40	.02
EBL	1	1750	30	.02*	100	.06
EBT	3	5250	600	.11	1550	.30*
EBR	1	1750	270	.15	500	.29
WBL	2	3500	400	.11	410	.12*
WBT	3	5250	1560	.30*	840	.16
WBR	1	1750	80	.05	250	.14
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.83		.83

Long-Range without SCP north of Soledad

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	430	.12*	690	.20*
NBT	0	0	0		0	
NBR	2	3500	280	.08	660	.19
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	630	.12	1550	.30*
EBR	1	1750	470	.27	600	.34
WBL	2	3500	450	.13	460	.13*
WBT	3	5250	1650	.31*	960	.18
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.53		.73

Note: Assumes Right-Turn Overlap for EBR

158. Santa Clarita & Newhall Rch

Pre-Interim Year without Project

	LANES	CAPACITY	AM PK HOUR		PM PK HOUR	
			VOL	V/C	VOL	V/C
NBL	1	1750	0	.00	0	.00
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	1	1750	0	.00	0	.00
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.10		.10

Pre-Interim Year with Project

	LANES	CAPACITY	AM PK HOUR		PM PK HOUR	
			VOL	V/C	VOL	V/C
NBL	1	1750	18	.01*	10	.01*
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	1	1750	6	.00	19	.01
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.11		.11

Interim Year without Project

	LANES	CAPACITY	AM PK HOUR		PM PK HOUR	
			VOL	V/C	VOL	V/C
NBL	1	1750	0	.00	0	.00
NBT	0	0	0		0	
NBR	1	1750	0	.00	0	.00
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1052	.20	1311	.25*
EBR	1	1750	0	.00	0	.00
WBL	1	1750	0	.00	0	.00
WBT	3	5250	1333	.25*	1236	.24
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.35		.35

Interim Year with Project

	LANES	CAPACITY	AM PK HOUR		PM PK HOUR	
			VOL	V/C	VOL	V/C
NBL	1	1750	75	.04*	60	.03*
NBT	0	0	0		0	
NBR	1	1750	46	.03	22	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1126	.21	1437	.27*
EBR	1	1750	28	.02	97	.06
WBL	1	1750	14	.01	47	.03*
WBT	3	5250	1447	.28*	1363	.26
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.42		.43

158. Santa Clarita & Newhall Rch

Interim Year w/Santa Clarita Pkwy w/out Proj

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	139	.04*	226	.06
NBT	3	5250	306	.06	915	.17*
NBR	0	0	0		0	
SBL	2	3500	490	.14	348	.10*
SBT	3	5250	908	.21*	490	.09
SBR	0	0	202		0	
EBL	2	3500	12	.00	308	.09*
EBT	3	5250	579	.11	1018	.19
EBR	1	1750	325	.19	117	.07
WBL	1	1750	1	.00	1	.00
WBT	3	5250	1164	.22*	854	.16*
WBR	1	1750	210	.12	542	.31
Right Turn Adjustment					WBR	.07*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .57 .69

Interim Year w/Santa Clarita Pkwy w/Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	193	.06*	298	.09
NBT	3	5250	314	.06	927	.18*
NBR	0	0	13		33	
SBL	2	3500	494	.14	363	.10*
SBT	3	5250	913	.21*	503	.10
SBR	0	0	203		9	
EBL	2	3500	22	.01*	317	.09*
EBT	3	5250	619	.12	1123	.21
EBR	1	1750	377	.22	177	.10
WBL	1	1750	28	.02	15	.01
WBT	3	5250	1270	.24*	945	.18*
WBR	1	1750	218	.12	552	.32
Right Turn Adjustment					WBR	.06*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .62 .71

158. Santa Clarita & Newhall Rch

Long-Range with 6 Lane SCP

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	200	.06*	350	.10
NBT	3	5250	430	.08	1200	.23*
NBR	1	1750	50	.03	240	.14
SBL	2	3500	450	.13	370	.11*
SBT	3	5250	1270	.24*	660	.13
SBR	1	1750	40	.02	20	.01
EBL	2	3500	40	.01*	290	.08
EBT	3	5250	690	.13	1750	.33*
EBR	1	1750	190	.11	210	.12
WBL	2	3500	270	.08	120	.03*
WBT	3	5250	1760	.34*	1440	.27
WBR	1	1750	200	.11	490	.28
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.75		.80

Long-Range with 4 Lane SCP

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	110	.03*	180	.05
NBT	2	3500	360	.10	900	.26*
NBR	1	1750	40	.02	130	.07
SBL	2	3500	340	.10	310	.09*
SBT	2	3500	1060	.30*	610	.17
SBR	1	1750	120	.07	20	.01
EBL	2	3500	20	.01*	100	.03
EBT	3	5250	840	.16	2090	.40*
EBR	1	1750	90	.05	150	.09
WBL	2	3500	160	.05	110	.03*
WBT	3	5250	1870	.36*	1540	.29
WBR	1	1750	200	.11	450	.26
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.80		.88

Long-Range without SCP north of Soledad

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	70	.04*	40	.02*
NBT	0	0	0		0	
NBR	1	1750	40	.02	30	.02
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	1120	.21	2370	.45*
EBR	1	1750	20	.01	80	.05
WBL	1	1750	20	.01	40	.02*
WBT	3	5250	2040	.39*	1810	.34
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.53		.59

159. Santa Clarita & Bouquet

Interim Year w/Santa Clarita Pkwy w/out Proj

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	151	.04*	391	.11*
NBT	0	0	0		0	
NBR	2	3500	377	.11	1374	.39
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	655	.12*	1422	.27*
EBR	1	1750	363	.21	343	.20
WBL	2	3500	1239	.35*	492	.14*
WBT	3	5250	1695	.32	1148	.22
WBR	0	0	0		0	
Right Turn Adjustment			EBR	.05*	NBR	.14*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR EBR

TOTAL CAPACITY UTILIZATION .66 .76

Interim Year w/Santa Clarita Pkwy w/Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	159	.05*	397	.11*
NBT	0	0	0		0	
NBR	2	3500	395	.11	1399	.40
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	662	.13*	1425	.27*
EBR	1	1750	366	.21	357	.20
WBL	2	3500	1245	.36*	514	.15*
WBT	3	5250	1697	.32	1161	.22
WBR	0	0	0		0	
Right Turn Adjustment			EBR	.03*	NBR	.14*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR EBR

TOTAL CAPACITY UTILIZATION .67 .77

159. Santa Clarita & Bouquet

Long-Range with 6 Lane SCP

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	220	.06*	340	.10*
NBT	0	0	0		0	
NBR	2	3500	440	.13	1570	.45
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	630	.12*	1680	.32*
EBR	1	1750	440	.25	470	.27
WBL	2	3500	1250	.36*	560	.16*
WBT	3	5250	2220	.42	1270	.24
WBR	0	0	0		0	
Right Turn Adjustment			EBR	.08*	NBR	.19*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .72 .87

Long-Range with 4 Lane SCP

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3500	170	.05*	180	.05*
NBT	0	0	0		0	
NBR	2	3500	390	.11	1200	.34
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	710	.14*	1970	.38*
EBR	1	1750	210	.12	370	.21
WBL	2	3500	1250	.36*	540	.15*
WBT	3	5250	2190	.42	1290	.25
WBR	0	0	0		0	
Right Turn Adjustment					NBR	.14*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .65 .82

162. Sierra & Golden Valley

Existing Count (2002)

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	84	.05*	143	.08
NBT	2	3500	151	.04	1227	.35*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3500	1807	.52*	420	.12
SBR	1	1750	88	.05	53	.03
EBL	2	3500	18	.01*	86	.02*
EBT	0	0	0		0	
EBR	2	3500	125	.04	119	.03
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.68		.47

Pre-Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	281	.16*	572	.33
NBT	2	3500	112	.04	1557	.46*
NBR	0	0	29		57	
SBL	1	1750	7	.00	10	.01*
SBT	2	3500	1647	.47*	333	.10
SBR	1	1750	359	.21	287	.16
EBL	2	3500	106	.03	291	.08
EBT	3	5250	594	.17*	1128	.32*
EBR	0	0	616	.35	538	
WBL	2	3500	362	.10*	49	.01*
WBT	3	5250	847	.16	777	.16
WBR	0	0	10		53	
Right Turn Adjustment			EBR	.06*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				1.06		.90

Pre-Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	281	.16*	574	.33
NBT	2	3500	112	.04	1557	.46*
NBR	0	0	29		57	
SBL	1	1750	7	.00	10	.01*
SBT	2	3500	1649	.47*	333	.10
SBR	1	1750	359	.21	291	.17
EBL	2	3500	107	.03	291	.08
EBT	3	5250	595	.17*	1129	.32*
EBR	0	0	617	.35	539	
WBL	2	3500	362	.10*	49	.01*
WBT	3	5250	847	.16	778	.16
WBR	0	0	10		53	
Right Turn Adjustment			EBR	.06*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				1.06		.90

Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	388	.11*	502	.14
NBT	2	3500	81	.03	1057	.33*
NBR	0	0	24		98	
SBL	1	1750	16	.01	10	.01*
SBT	2	3500	1345	.38*	228	.07
SBR	2	3500	866	.25	376	.11
EBL	2	3500	105	.03	614	.18*
EBT	3	5250	940	.18*	1518	.29
EBR	1	1750	398	.23	443	.25
WBL	2	3500	365	.10*	31	.01
WBT	3	5250	1242	.24	997	.22*
WBR	0	0	10		181	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.87		.84

162. Sierra & Golden Valley

Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	393	.11*	540	.15
NBT	2	3500	81	.03	1057	.33*
NBR	0	0	24		98	
SBL	1	1750	16	.01	10	.01*
SBT	2	3500	1345	.38*	228	.07
SBR	2	3500	869	.25	386	.11
EBL	2	3500	109	.03	615	.18*
EBT	3	5250	963	.18*	1531	.29
EBR	1	1750	441	.25	451	.26
WBL	2	3500	365	.10*	31	.01
WBT	3	5250	1248	.24	1015	.23*
WBR	0	0	10		181	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.87		.85

Interim Year w/Santa Clarita Pkwy w/out Proj

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	72	.02*	98	.03
NBT	2	3500	67	.03	1019	.32*
NBR	0	0	27		102	
SBL	1	1750	5	.00	10	.01*
SBT	2	3500	1178	.34*	233	.07
SBR	2	3500	911	.26	405	.12
EBL	2	3500	123	.04	619	.18*
EBT	3	5250	999	.19*	1402	.27
EBR	1	1750	322	.18	361	.21
WBL	2	3500	466	.13*	38	.01
WBT	3	5250	1388	.27	1186	.25*
WBR	0	0	10		151	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.78		.86

Interim Year w/Santa Clarita Pkwy w/Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	72	.02*	101	.03
NBT	2	3500	67	.03	1020	.32*
NBR	0	0	27		102	
SBL	1	1750	5	.00	10	.01*
SBT	2	3500	1178	.34*	233	.07
SBR	2	3500	914	.26	411	.12
EBL	2	3500	126	.04	622	.18*
EBT	3	5250	1002	.19*	1407	.27
EBR	1	1750	329	.19	363	.21
WBL	2	3500	466	.13*	38	.01
WBT	3	5250	1390	.27	1194	.26*
WBR	0	0	10		151	
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.78		.87

164. Golden Valley & Golden Tri

Pre-Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	100	.06*	50	.03*
NBT	3	5250	681	.15	597	.17
NBR	0	0	81		273	
SBL	1	1750	10	.01	15	.01
SBT	3	5250	467	.13*	688	.17*
SBR	0	0	294	.17	182	
EBL	1	1750	99	.06	381	.22*
EBT	2	3500	29	.02*	173	.08
EBR	0	0	50	.03	100	
WBL	1	1750	582	.33*	115	.07
WBT	2	3500	386	.11	71	.02*
WBR	0	0	12		10	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .64 .54

Pre-Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	100	.06*	50	.03*
NBT	3	5250	683	.15	607	.17
NBR	0	0	81		273	
SBL	1	1750	10	.01	15	.01
SBT	3	5250	471	.13*	690	.17*
SBR	0	0	298	.17	184	
EBL	1	1750	99	.06	386	.22*
EBT	2	3500	29	.02*	173	.08
EBR	0	0	50	.03	100	
WBL	1	1750	582	.33*	115	.07
WBT	2	3500	386	.11	71	.02*
WBR	0	0	12		10	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .64 .54

Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	100	.06*	50	.03*
NBT	3	5250	750	.16	792	.19
NBR	0	0	83		229	
SBL	1	1750	92	.05	95	.05
SBT	3	5250	592	.17*	1011	.23*
SBR	0	0	360	.21	217	
EBL	1	1750	95	.05	373	.21*
EBT	2	3500	34	.02*	166	.08
EBR	0	0	50	.03	100	
WBL	1	1750	293	.17*	71	.04
WBT	2	3500	192	.09	56	.03*
WBR	0	0	136		126	.07
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .52 .60

Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	100	.06*	50	.03*
NBT	3	5250	774	.16	896	.21
NBR	0	0	83		229	
SBL	1	1750	102	.06	101	.06
SBT	3	5250	689	.20*	1057	.24*
SBR	0	0	387	.22	228	
EBL	1	1750	100	.06	396	.23*
EBT	2	3500	34	.02*	166	.08
EBR	0	0	50	.03	100	
WBL	1	1750	293	.17*	71	.04
WBT	2	3500	192	.09	56	.03*
WBR	0	0	136		141	.08
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .55 .63

164. Golden Valley & Golden Tri

Interim Year w/Santa Clarita Pkwy w/out Proj

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	100	.06	50	.03
NBT	3	5250	812	.17*	766	.18*
NBR	0	0	60		180	
SBL	1	1750	86	.05*	226	.13*
SBT	3	5250	560	.16	851	.21
SBR	0	0	431	.25	244	
EBL	1	1750	107	.06	431	.25*
EBT	2	3500	40	.02*	126	.06
EBR	0	0	50	.03	100	
WBL	1	1750	258	.15*	49	.03
WBT	2	3500	200	.11	41	.02*
WBR	0	0	172		181	.10
Right Turn Adjustment			SBR	.04*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.53		.68

Interim Year w/Santa Clarita Pkwy w/Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	100	.06*	50	.03
NBT	3	5250	832	.17	807	.19*
NBR	0	0	60		180	
SBL	1	1750	92	.05	232	.13*
SBT	3	5250	599	.17*	877	.22
SBR	0	0	454	.26	256	
EBL	1	1750	113	.06	453	.26*
EBT	2	3500	40	.02*	126	.06
EBR	0	0	50	.03	100	
WBL	1	1750	258	.15*	49	.03
WBT	2	3500	200	.11	41	.02*
WBR	0	0	173		183	.10
Right Turn Adjustment			SBR	.04*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.54		.70

165. Golden Valley & Valley Cntr

Pre-Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	782	.22*	977	.28*
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	1	1750	761	.43	877	.50
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Right Turn Adjustment			EBR	.21*	EBR	.22*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for EBR

TOTAL CAPACITY UTILIZATION .53 .60

Pre-Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	784	.22*	992	.28*
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	1	1750	769	.44	881	.50
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Right Turn Adjustment			EBR	.22*	EBR	.22*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for EBR

TOTAL CAPACITY UTILIZATION .54 .60

Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	352	.10*	437	.12*
NBT	3	5250	630	.12	855	.16
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	3	5250	849	.16*	766	.15*
SBR	f		186		556	
EBL	2	3500	704	.20*	371	.11*
EBT	0	0	0		0	
EBR	1	1750	195	.11	557	.32
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Right Turn Adjustment					EBR	.12*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .56 .60

Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	352	.10*	437	.12*
NBT	3	5250	659	.13	997	.19
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	3	5250	983	.19*	828	.16*
SBR	f		245		596	
EBL	2	3500	725	.21*	443	.13*
EBT	0	0	0		0	
EBR	1	1750	195	.11	557	.32
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Right Turn Adjustment					EBR	.10*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .60 .61

165. Golden Valley & Valley Cntr

Interim Year w/Santa Clarita Pkwy w/out Proj

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	310	.09*	311	.09*
NBT	3	5250	781	.15	1069	.20
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	3	5250	877	.17*	870	.17*
SBR	f		187		515	
EBL	2	3500	600	.17*	339	.10*
EBT	0	0	0		0	
EBR	1	1750	197	.11	450	.26
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Right Turn Adjustment					EBR	.09*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.53**		**.55**

Interim Year w/Santa Clarita Pkwy w/Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	310	.09*	311	.09*
NBT	3	5250	808	.15	1134	.22
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	3	5250	945	.18*	912	.17*
SBR	f		224		542	
EBL	2	3500	612	.17*	386	.11*
EBT	0	0	0		0	
EBR	1	1750	199	.11	453	.26
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Right Turn Adjustment					EBR	.08*
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.54**		**.55**

165. Golden Valley & Valley Cntr

Long-Range with 6 Lane SCP						
			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	380	.11*	210	.06
NBT	3	5250	570	.11	1210	.23*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	3	5250	1140	.22*	810	.15
SBR	f		370		730	
EBL	2	3500	740	.21*	880	.25*
EBT	0	0	0		0	
EBR	1	1750	60	.03	270	.15
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .64 .58

Long-Range with 4 Lane SCP						
			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	390	.11*	180	.05
NBT	3	5250	630	.12	1310	.25*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	3	5250	1200	.23*	930	.18
SBR	f		430		850	
EBL	2	3500	760	.22*	930	.27*
EBT	0	0	0		0	
EBR	1	1750	100	.06	220	.13
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .66 .62

Long-Range without SCP north of Soledad						
			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	390	.11*	170	.05
NBT	3	5250	750	.14	1470	.28*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	3	5250	1420	.27*	1090	.21
SBR	f		510		1000	
EBL	2	3500	690	.20*	990	.28*
EBT	0	0	0		0	
EBR	1	1750	90	.05	230	.13
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .68 .66

169. Rainbow Glen & Soledad

Existing Count (2002)

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0.5		423		224	
NBT	0.5	1750	7	.25*	21	.14*
NBR	1	1750	136	.08	202	.12
SBL	0.5		36		41	
SBT	0.5	1750	14	.03*	20	.03*
SBR	d	1750	20	.01	11	.01
EBL	1	1750	6	.00	8	.00
EBT	3	5250	675	.13	1886	.36*
EBR	1	1750	158	.09	333	.19
WBL	2	3500	98	.03	152	.04*
WBT	3	5250	1758	.34*	1094	.21
WBR	0	0	13		21	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

TOTAL CAPACITY UTILIZATION .72 .67

Pre-Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0.5		67		251	
NBT	0.5	1750	37	.06*	25	.16*
NBR	1	1750	101	.06	558	.32
SBL	0.5		24		80	
SBT	0.5	1750	28	.03*	33	.06*
SBR	d	1750	17	.01	62	.04
EBL	1	1750	73	.04*	52	.03
EBT	3	5250	743	.14	1930	.37*
EBR	1	1750	431	.25	170	.10
WBL	2	3500	695	.20	219	.06*
WBT	3	5250	2096	.42*	1021	.20
WBR	0	0	104		47	
Right Turn Adjustment					NBR	.11*
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

TOTAL CAPACITY UTILIZATION .65 .86

Pre-Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0.5		68		253	
NBT	0.5	1750	37	.06*	25	.16*
NBR	1	1750	101	.06	558	.32
SBL	0.5		24		80	
SBT	0.5	1750	28	.03*	33	.06*
SBR	d	1750	17	.01	62	.04
EBL	1	1750	73	.04*	52	.03
EBT	3	5250	746	.14	1936	.37*
EBR	1	1750	436	.25	170	.10
WBL	2	3500	695	.20	219	.06*
WBT	3	5250	2105	.42*	1037	.21
WBR	0	0	104		47	
Right Turn Adjustment					NBR	.11*
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

TOTAL CAPACITY UTILIZATION .65 .86

Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0.5		37		110	
NBT	0.5	1750	59	.05*	36	.08*
NBR	1	1750	79	.05	482	.28
SBL	0.5		22		70	
SBT	0.5	1750	25	.03*	31	.06*
SBR	d	1750	16	.01	69	.04
EBL	1	1750	66	.04*	39	.02
EBT	3	5250	476	.09	2314	.44*
EBR	1	1750	59	.03	88	.05
WBL	2	3500	557	.16	160	.05*
WBT	3	5250	2397	.47*	1188	.23
WBR	0	0	93		33	
Right Turn Adjustment					NBR	.16*
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

TOTAL CAPACITY UTILIZATION .69 .89

169. Rainbow Glen & Soledad

Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0.5		38		115	
NBT	0.5	1750	59	.06*	36	.09*
NBR	1	1750	79	.05	482	.28
SBL	0.5		22		70	
SBT	0.5	1750	25	.03*	31	.06*
SBR	d	1750	20	.01	72	.04
EBL	1	1750	69	.04*	39	.02
EBT	3	5250	506	.10	2345	.45*
EBR	1	1750	60	.03	94	.05
WBL	2	3500	557	.16	160	.05*
WBT	3	5250	2411	.48*	1228	.24
WBR	0	0	93		33	
Right Turn Adjustment					NBR	.15*
Clearance Interval				.10*		.10*
Note: Assumes N/S Split Phasing						
TOTAL CAPACITY UTILIZATION				.71		.90

Interim Year w/Santa Clarita Pkwy w/out Proj

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0.5		38		113	
NBT	0.5	1750	32	.04*	25	.08*
NBR	1	1750	91	.05	494	.28
SBL	0.5		13		63	
SBT	0.5	1750	21	.02*	20	.05*
SBR	d	1750	32	.02	92	.05
EBL	1	1750	98	.06*	55	.03
EBT	3	5250	514	.10	2301	.44*
EBR	1	1750	95	.05	102	.06
WBL	2	3500	587	.17	122	.03*
WBT	3	5250	2383	.47*	1233	.24
WBR	0	0	84		36	
Right Turn Adjustment					NBR	.18*
Clearance Interval				.10*		.10*
Note: Assumes N/S Split Phasing						
TOTAL CAPACITY UTILIZATION				.69		.88

Interim Year w/Santa Clarita Pkwy w/Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0.5		40		123	
NBT	0.5	1750	32	.04*	25	.08*
NBR	1	1750	91	.05	495	.28
SBL	0.5		13		63	
SBT	0.5	1750	21	.02*	20	.05*
SBR	d	1750	32	.02	94	.05
EBL	1	1750	100	.06*	56	.03
EBT	3	5250	541	.10	2328	.44*
EBR	1	1750	100	.06	110	.06
WBL	2	3500	587	.17	122	.03*
WBT	3	5250	2402	.47*	1272	.25
WBR	0	0	84		36	
Right Turn Adjustment					NBR	.18*
Clearance Interval				.10*		.10*
Note: Assumes N/S Split Phasing						
TOTAL CAPACITY UTILIZATION				.69		.88

172. Whites Cyn & Soledad

Existing Count (2002)

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1.5		472		444	
NBT	2.5	7000	640	.16*	984	.20*
NBR	1	1750	97	.06	130	.07
SBL	2	3500	638	.18	687	.20*
SBT	2	3500	886	.25*	614	.18
SBR	1	1750	217	.12	153	.09
EBL	2	3500	212	.06*	339	.10
EBT	3	5250	647	.18	1036	.22*
EBR	0	0	545	.31	139	
WBL	2	3500	75	.02	165	.05*
WBT	2	3500	1175	.34*	565	.16
WBR	1	1750	1138	.65	435	.25
Right Turn Adjustment			WBR	.06*		
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for SBR WBR

TOTAL CAPACITY UTILIZATION .97 .77

Pre-Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1.5		463		451	
NBT	2.5	7000	651	.16*	1029	.21*
NBR	1	1750	61	.03	315	.18
SBL	2	3500	694	.20	735	.21*
SBT	2	3500	892	.25*	636	.18
SBR	1	1750	296	.17	160	.09
EBL	2	3500	231	.07*	398	.11
EBT	2	3500	624	.18	1436	.41*
EBR	1	1750	584	.33	201	.11
WBL	2	3500	183	.05	174	.05*
WBT	2	3500	1234	.35*	696	.20
WBR	1	1750	1139	.65	437	.25
Right Turn Adjustment			WBR	.05*		
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for SBR WBR

TOTAL CAPACITY UTILIZATION .98 .98

Pre-Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1.5		465		453	
NBT	2.5	7000	651	.16*	1029	.21*
NBR	1	1750	61	.03	315	.18
SBL	2	3500	694	.20	735	.21*
SBT	2	3500	892	.25*	636	.18
SBR	1	1750	299	.17	163	.09
EBL	2	3500	231	.07*	399	.11
EBT	2	3500	626	.18	1437	.41*
EBR	1	1750	585	.33	203	.12
WBL	2	3500	183	.05	174	.05*
WBT	2	3500	1238	.35*	703	.20
WBR	1	1750	1139	.65	437	.25
Right Turn Adjustment			WBR	.05*		
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for SBR WBR

TOTAL CAPACITY UTILIZATION .98 .98

Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1.5		483		448	
NBT	2.5	7000	643	.16*	985	.20*
NBR	1	1750	75	.04	273	.16
SBL	2	3500	646	.18	624	.18
SBT	2	3500	651	.19*	632	.18*
SBR	1	1750	522	.30	145	.08
EBL	2	3500	230	.07*	506	.14
EBT	3	5250	418	.12	1677	.36*
EBR	0	0	347	.20	227	
WBL	2	3500	676	.19	148	.04*
WBT	2	3500	1444	.41*	813	.23
WBR	1	1750	1076	.61	445	.25
Right Turn Adjustment			Multi	.05*		
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes Right-Turn Overlap for SBR WBR

TOTAL CAPACITY UTILIZATION .98 .88

172. Whites Cyn & Soledad

Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1.5		484		450	
NBT	2.5	7000	643	.16*	985	.21*
NBR	1	1750	75	.04	275	.16
SBL	2	3500	646	.18	624	.18
SBT	2	3500	651	.19*	632	.18*
SBR	1	1750	528	.30	155	.09
EBL	2	3500	233	.07*	514	.15
EBT	3	5250	432	.12	1690	.37*
EBR	0	0	347	.20	229	
WBL	2	3500	676	.19	148	.04*
WBT	2	3500	1448	.41*	828	.24
WBR	1	1750	1076	.61	445	.25
Right Turn Adjustment			Multi	.05*		
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

Note: Assumes Right-Turn Overlap for SBR WBR

TOTAL CAPACITY UTILIZATION .98 .90

Interim Year with Project with Mitigation

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	484	.14*	450	.13
NBT	3	5250	643	.12	985	.19*
NBR	1	1750	75	.04	275	.16
SBL	2	3500	646	.18	624	.18*
SBT	2	3500	651	.19*	632	.18
SBR	1	1750	528	.30	155	.09
EBL	2	3500	233	.07*	514	.15
EBT	3	5250	432	.12	1690	.37*
EBR	0	0	347	.20	229	
WBL	2	3500	676	.19	148	.04*
WBT	2	3500	1448	.41*	828	.24
WBR	1	1750	1076	.61	445	.25
Right Turn Adjustment			SBR	.04*		
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR WBR

TOTAL CAPACITY UTILIZATION .95 .88

Interim Year w/Santa Clarita Pkwy w/out Proj

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1.5		438		374	
NBT	2.5	7000	672	.16*	984	.19*
NBR	1	1750	69	.04	272	.16
SBL	2	3500	609	.17	558	.16
SBT	2	3500	702	.20*	685	.20*
SBR	1	1750	285	.16	152	.09
EBL	2	3500	206	.06*	442	.13
EBT	3	5250	390	.11	1661	.35*
EBR	0	0	286	.16	175	
WBL	2	3500	610	.17	118	.03*
WBT	2	3500	1537	.44*	769	.22
WBR	1	1750	838	.48	411	.23
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

Note: Assumes Right-Turn Overlap for SBR WBR

TOTAL CAPACITY UTILIZATION .96 .87

Interim Year w/Santa Clarita Pkwy w/Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1.5		440		376	
NBT	2.5	7000	672	.16*	986	.19*
NBR	1	1750	69	.04	273	.16
SBL	2	3500	609	.17	558	.16
SBT	2	3500	702	.20*	685	.20*
SBR	1	1750	291	.17	160	.09
EBL	2	3500	209	.06*	448	.13
EBT	3	5250	405	.12	1673	.35*
EBR	0	0	288	.16	177	
WBL	2	3500	612	.17	118	.03*
WBT	2	3500	1545	.44*	787	.22
WBR	1	1750	838	.48	411	.23
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

Note: Assumes Right-Turn Overlap for SBR WBR

TOTAL CAPACITY UTILIZATION .96 .87

172. Whites Cyn & Soledad

Interim Year with Proj with Alt Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1.5		484		450	
NBT	2.5	7000	643	.16*	985	.21*
NBR	1	1750	75	.04	275	.16
SBL	2	3500	646	.18	624	.18
SBT	2	3500	651	.19*	632	.18*
SBR	1	1750	528	.30	155	.09
EBL	2	3500	233	.07*	514	.15*
EBT	3	5250	432	.08	1690	.32
EBR	1	1750	347	.20	229	.13
WBL	2	3500	676	.19	148	.04
WBT	2	3500	1448	.41*	828	.24*
WBR	1	1750	1076	.61	445	.25
Right Turn Adjustment			Multi	.05*		
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing

Note: Assumes Right-Turn Overlap for SBR WBR

TOTAL CAPACITY UTILIZATION .98 .88

197. Santa Clarita Acc & Soledad

Interim Year w/Santa Clarita Pkwy w/out Proj

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1.5		141	.04*	85	.05*
NBT	0	5250	0		0	
NBR	1.5		295		499	.14
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	613	.12	2007	.38*
EBR	f		14		258	
WBL	2	3500	210	.06	582	.17*
WBT	3	5250	1961	.37*	1060	.20
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .51 .70

Interim Year w/Santa Clarita Pkwy w/Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1.5		154	.04*	87	.05*
NBT	0	5250	0		0	
NBR	1.5		317		514	.15
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5250	613	.12	2018	.38*
EBR	f		14		286	
WBL	2	3500	219	.06	615	.18*
WBT	3	5250	1972	.38*	1060	.20
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .52 .71

198. Valley Center & Soledad

Pre-Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	200	.06*	314	.09*
SBT	0	0	0		0	
SBR	1	1750	582	.33	664	.38
EBL	2	3500	361	.10*	473	.14
EBT	3	5250	1248	.24	2137	.41*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	2179	.42*	1330	.25
WBR	f		400		404	
Right Turn Adjustment			SBR	.17*	SBR	.13*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .85 .73

Pre-Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	200	.06*	314	.09*
SBT	0	0	0		0	
SBR	1	1750	584	.33	679	.39
EBL	2	3500	369	.11*	477	.14
EBT	3	5250	1256	.24	2143	.41*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	2189	.42*	1348	.26
WBR	f		400		404	
Right Turn Adjustment			SBR	.16*	SBR	.15*
Clearance Interval				.10*		.10*

Note: Assumes Right-Turn Overlap for SBR

TOTAL CAPACITY UTILIZATION .85 .75

Interim Year without Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	184	.05*	518	.15*
SBT	0	0	0		0	
SBR	1	1750	352	.20	473	.27
EBL	2	3500	207	.06*	496	.14
EBT	3	5250	418	.08	1923	.37*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1761	.34*	936	.18
WBR	f		691		432	
Right Turn Adjustment			SBR	.10*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .65 .62

Interim Year with Project

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	218	.06*	555	.16*
SBT	0	0	0		0	
SBR	1	1750	377	.22	477	.27
EBL	2	3500	209	.06*	520	.15
EBT	3	5250	418	.08	1923	.37*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1761	.34*	936	.18
WBR	f		710		480	
Right Turn Adjustment			SBR	.11*		
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .67 .63

198. Valley Center & Soledad

Interim Year w/Santa Clarita Pkwy w/out Proj

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	188	.05*	518	.15*
SBT	0	0	0		0	
SBR	1	1750	309	.18	300	.17
EBL	2	3500	198	.06*	397	.11
EBT	3	5250	520	.10	1943	.37*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1855	.35*	1043	.20
WBR	f		599		395	
Right Turn Adjustment			SBR	.08*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.64		.62

Interim Year w/Santa Clarita Pkwy w/Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	210	.06*	542	.15*
SBT	0	0	0		0	
SBR	1	1750	324	.19	311	.18
EBL	2	3500	200	.06*	410	.12
EBT	3	5250	532	.10	1953	.37*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1863	.35*	1059	.20
WBR	f		611		430	
Right Turn Adjustment			SBR	.08*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				.65		.62

198. Valley Center & Soledad

Long-Range with 6 Lane SCP

	LANES	CAPACITY	AM PK HOUR		PM PK HOUR	
			VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	250	.07*	690	.20*
SBT	0	0	0		0	
SBR	1	1750	500	.29	240	.14
EBL	2	3500	70	.02*	420	.12
EBT	3	5250	740	.14	1810	.34*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1730	.33*	1060	.20
WBR	f		740		730	
Right Turn Adjustment			SBR	.20*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.72**		**.64**

Long-Range with 4 Lane SCP

	LANES	CAPACITY	AM PK HOUR		PM PK HOUR	
			VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	300	.09*	820	.23*
SBT	0	0	0		0	
SBR	1	1750	520	.30	200	.11
EBL	2	3500	90	.03*	360	.10
EBT	3	5250	680	.13	1740	.33*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1470	.28*	970	.18
WBR	f		770		790	
Right Turn Adjustment			SBR	.19*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.69**		**.66**

Long-Range without SCP north of Soledad

	LANES	CAPACITY	AM PK HOUR		PM PK HOUR	
			VOL	V/C	VOL	V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	2	3500	350	.10*	880	.25*
SBT	0	0	0		0	
SBR	1	1750	550	.31	290	.17
EBL	2	3500	110	.03*	460	.13
EBT	3	5250	570	.11	1680	.32*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	3	5250	1560	.30*	930	.18
WBR	f		670		760	
Right Turn Adjustment			SBR	.19*		
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.72**		**.67**

APPENDIX B
PEAK HOUR FREEWAY RAMP AND MAINLINE LEVEL OF SERVICE CALCULATIONS

Freeway Mainline LOS Summary Table

Existing Conditions (2001)

			AM Peak Hour				PM Peak Hour			
Location	**Direction**	**Lanes**	**Capacity**	**Volume**	**V/C**	**LOS**	**Capacity**	**Volume**	**V/C**	**LOS**
SR-14 s/o Placerita Cyn	NB	3+1H	7,600		.000	A	7,600	7,250	.954	E
SR-14 s/o Golden Valley	NB	3+1H	7,600		.000	A	7,600	6,786	.893	E
SR-14 n/o Golden Valley	NB	4+1H	9,600		.000	A	9,600	6,786	.707	C
SR-14 s/o Placerita Cyn	SB	4	8,000	8,125	1.016	F	8,000		.000	A
SR-14 s/o Golden Valley	SB	3+1H	7,600	7,605	1.001	F	7,600		.000	A
SR-14 n/o Golden Valley	SB	4+1H	9,600	7,605	.792	D	9,600		.000	A

Interim Year without Project

			AM Peak Hour				PM Peak Hour			
Location	**Direction**	**Lanes**	**Capacity**	**Volume**	**V/C**	**LOS**	**Capacity**	**Volume**	**V/C**	**LOS**
SR-14 s/o Placerita Cyn	NB	3+1H	7,600	3,519	.463	B	7,600	8,327	1.096	F
SR-14 s/o Golden Valley	NB	3+1H	7,600	3,344	.440	B	7,600	8,244	1.085	F
SR-14 n/o Golden Valley	NB	4+1H	9,600	3,571	.372	B	9,600	8,330	.868	D
SR-14 s/o Placerita Cyn	SB	4	8,000	8,176	1.022	F	8,000	4,983	.623	C
SR-14 s/o Golden Valley	SB	3+1H	7,600	8,123	1.069	F	7,600	5,039	.663	C
SR-14 n/o Golden Valley	SB	4+1H	9,600	8,482	.884	D	9,600	5,084	.530	C

Interim Year with Project

			AM Peak Hour				PM Peak Hour			
Location	**Direction**	**Lanes**	**Capacity**	**Volume**	**V/C**	**LOS**	**Capacity**	**Volume**	**V/C**	**LOS**
SR-14 s/o Placerita Cyn	NB	3+1H	7,600	3,527	.464	B	7,600	8,365	1.101	F
SR-14 s/o Golden Valley	NB	3+1H	7,600	3,349	.441	B	7,600	8,257	1.086	F
SR-14 n/o Golden Valley	NB	4+1H	9,600	3,578	.373	B	9,600	8,333	.868	D
SR-14 s/o Placerita Cyn	SB	4	8,000	8,220	1.028	F	8,000	5,000	.625	C
SR-14 s/o Golden Valley	SB	3+1H	7,600	8,138	1.071	F	7,600	5,047	.664	C
SR-14 n/o Golden Valley	SB	4+1H	9,600	8,483	.884	D	9,600	5,089	.530	C

Project's Increment

			AM Peak Hour				PM Peak Hour			
Location	**Direction**			**Volume**	**V/C**			**Volume**	**V/C**	
SR-14 s/o Placerita Cyn	NB			8	.001			38	.005	
SR-14 s/o Golden Valley	NB			5	.001			13	.001	
SR-14 n/o Golden Valley	NB			7	.001			3	.000	
SR-14 s/o Placerita Cyn	SB			44	.006			17	.002	
SR-14 s/o Golden Valley	SB			15	.002			8	.001	
SR-14 n/o Golden Valley	SB			1	.000			5	.000	

Freeway Mainline LOS Summary Table

Existing Conditions (2001)

			AM Peak Hour				PM Peak Hour			
Location	Direction	Lanes	Capacity	Volume	V/C	LOS	Capacity	Volume	V/C	LOS
SR-14 s/o Placerita Cyn	NB	3+1H	7,600		.000	A	7,600	7,250	.954	E
SR-14 s/o Golden Valley	NB	3+1H	7,600		.000	A	7,600	6,786	.893	E
SR-14 n/o Golden Valley	NB	4+1H	9,600		.000	A	9,600	6,786	.707	C
SR-14 s/o Placerita Cyn	SB	4	8,000	8,125	1.016	F	8,000		.000	A
SR-14 s/o Golden Valley	SB	3+1H	7,600	7,605	1.001	F	7,600		.000	A
SR-14 n/o Golden Valley	SB	4+1H	9,600	7,605	.792	D	9,600		.000	A

Interim Year Alternative without Project

			AM Peak Hour				PM Peak Hour			
Location	Direction	Lanes	Capacity	Volume	V/C	LOS	Capacity	Volume	V/C	LOS
SR-14 s/o Placerita Cyn	NB	3+1H	7,600	3,781	.498	B	7,600	8,611	1.133	F
SR-14 s/o Golden Valley	NB	3+1H	7,600	3,389	.446	B	7,600	8,250	1.086	F
SR-14 n/o Golden Valley	NB	4+1H	9,600	3,527	.367	B	9,600	8,204	.855	D
SR-14 s/o Placerita Cyn	SB	4	8,000	8,643	1.080	F	8,000	5,337	.667	C
SR-14 s/o Golden Valley	SB	3+1H	7,600	7,942	1.045	F	7,600	5,022	.661	C
SR-14 n/o Golden Valley	SB	4+1H	9,600	8,378	.873	D	9,600	5,205	.542	C

Interim Year Alternative with Project

			AM Peak Hour				PM Peak Hour			
Location	Direction	Lanes	Capacity	Volume	V/C	LOS	Capacity	Volume	V/C	LOS
SR-14 s/o Placerita Cyn	NB	3+1H	7,600	3,789	.499	B	7,600	8,653	1.139	F
SR-14 s/o Golden Valley	NB	3+1H	7,600	3,390	.446	B	7,600	8,254	1.086	F
SR-14 n/o Golden Valley	NB	4+1H	9,600	3,530	.368	B	9,600	8,207	.855	D
SR-14 s/o Placerita Cyn	SB	4	8,000	8,696	1.087	F	8,000	5,356	.670	C
SR-14 s/o Golden Valley	SB	3+1H	7,600	7,942	1.045	F	7,600	5,023	.661	C
SR-14 n/o Golden Valley	SB	4+1H	9,600	8,380	.873	D	9,600	5,210	.543	C

Project's Increment

			AM Peak Hour				PM Peak Hour			
Location	Direction			Volume	V/C			Volume	V/C	
SR-14 s/o Placerita Cyn	NB			8	.001			42	.006	
SR-14 s/o Golden Valley	NB			1	.000			4	.000	
SR-14 n/o Golden Valley	NB			3	.001			3	.000	
SR-14 s/o Placerita Cyn	SB			53	.007			19	.003	
SR-14 s/o Golden Valley	SB			0	.000			1	.000	
SR-14 n/o Golden Valley	SB			2	.000			5	.001	

Freeway Ramp LOS Summary Table

				Interim Year No Project						Interim Year With Project					
			Peak Hour	AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
Interchange	Ramp	Lanes	Capacity	Volume	V/C	LOS	Volume	V/C	LOS	Volume	V/C	LOS	Volume	V/C	LOS
Golden Valley &	NB On	2	2,250	848	.377	A	1,272	.565	A	855	.380	A	1,275	.567	A
SR-14	SB On	1	1,500	543	.362	A	821	.547	A	558	.372	A	829	.553	A
	NB Off	1	1,500	621	.414	A	1,184	.789	C	626	.417	A	1,197	.798	C
	SB Off	1	1,500	903	.602	B	867	.578	A	904	.603	B	872	.581	A
Placerita Canyon &	NB Direct On	2	2,250	6	.003	A	1	.000	A	6	.003	A	1	.000	A
SR-14	NB Loop On	1	1,500	353	.235	A	560	.373	A	353	.235	A	560	.373	A
	SB On (Sierra)	1	1,500	734	.489	A	392	.261	A	763	.509	A	398	.265	A
	SB On (Placerita)	1	1,500	261	.174	A	299	.199	A	261	.174	A	302	.201	A
	NB Off	1	1,500	532	.355	A	644	.429	A	536	.357	A	669	.446	A
	SB Off	1	1,500	942	.628	B	748	.499	A	944	.629	B	748	.499	A

Freeway Ramp LOS Summary Table

				Interim Year Alternative No Project						Interim Year Alternative With Project					
			Peak Hour	AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
Interchange	Ramp	Lanes	Capacity	Volume	V/C	LOS	Volume	V/C	LOS	Volume	V/C	LOS	Volume	V/C	LOS
Golden Valley &	NB On	2	2,250	963	.428	A	1,232	.548	A	966	.429	A	1,235	.549	A
SR-14	SB On	1	1,500	403	.269	A	719	.479	A	403	.269	A	719	.479	A
	NB Off	1	1,500	826	.551	A	1,276	.851	D	827	.551	A	1,280	.853	D
	SB Off	1	1,500	840	.560	A	903	.602	B	842	.561	A	907	.605	B
Placerita Canyon &	NB Direct On	2	2,250	7	.003	A	2	.001	A	7	.003	A	2	.001	A
SR-14	NB Loop On	1	1,500	213	.142	A	596	.397	A	213	.142	A	596	.397	A
	SB On (Sierra)	1	1,500	826	.551	A	790	.527	A	843	.562	A	804	.536	A
	SB On (Placerita)	1	1,500	758	.505	A	228	.152	A	795	.530	A	234	.156	A
	NB Off	1	1,500	612	.408	A	958	.639	B	619	.413	A	997	.665	B
	SB Off	1	1,500	887	.591	A	701	.467	A	887	.591	A	702	.468	A

APPENDIX C
RELATED PROJECTS

Gate King Industrial Park - Subdivide 584 acres into 88 industrial lots for 4.4 million square feet of industrial building square footage. The project would also dedicate 239 acres of open space to the City-South of San Fernando Road between Pine Street and Sierra Highway - Master Case 99-264

Western Pacific Housing (Lyons Ranch) - subdivide 384 acres into 3 commercial lots, 831 residential units, a 6 acre park site, and dedicate 211 acres of open space to the City of Santa Clarita. - West of Interstate 5 at Calgrove and The Old Road. Master Case 02-349

Rice Development - development for a 84,000 square foot self storage facility- southwest corner of Bouquet Canyon Road and Newhall Ranch Road – Master Case 02-231

Carl's Jr. - development for a new 3000 square foot drive through restaurant
Northwest corner of Via Princessa and Sierra Highway - Master Case 02-309

Aspen Investment Company - development for eight new industrial buildings totaling 109,000 square feet - north corner of Soledad Canyon Road and Valley Center Drive - Master Case 02-273

Rodgers Development - development for a new 34,000 square foot commercial shopping center - northeast corner of Bouquet Canyon Road and Plum Canyon Road- Master Case 02-232

Motezuma Land Development - subdivision of 90 acres for 174 single family homes, a park site, and four open space lots - southeast corner of Golden Valley Road and Sierra Highway - Master Case 02-063

HH Seco II LLC - development for a new 40,000 square foot commercial shopping center - southwest corner of Seco Canyon Road and Copper Hill - Master Case 01-317

California Canyons Annexation - located in the northeast corner of City. Total area 43.10 acres. 68 existing single family homes. Master Case 96-206

North Valencia No. 2: 1,900 dwelling units (1,400 sfd and 500 multifamily), 210,000 commercial square feet, 15.9 acre community park and 4.1 acres private recreation areas.

West Creek: 2,545 dwelling units (1806 sfd and 739 multi-family), 180,000 commercial retail, 10 acre elementary school, 6.4 acres of recreational facilities.

Lost Canyon Road Annexation - located west of the Sand Canyon area, south of 14 Freeway. 38.8 acres of vacant Business park zoning. Master Case 02-235

Northpark Annexation - north park of the City (north and south portions of Decoro Drive. 1351 existing residential units on 457 acres. Master Case 98-183

Stonecrest Annexation - west of Pinetree area, north of 14 Freeway. 425 existing residential units on 215.9 acres. Master Case 01-068

Whitney Canyon Annexation - located east of 14 Freeway extending east at the terminus of San Fernando Road and into a portion of the Angeles National Forest. 481.75 acres of open space. Master Case 02-345

Golden Valley Ranch – located southeast of the City, east of SR-14 and north of Placerita Canyon Road. 1311 acres of planned community (488 sfr, 2 commercial lots, 1 school lot, 1 fire station site). Master Case 97-212

Towsley Canyon Annexation - located southwest of the City, west of Interstate 5. 60 acres of open space. Master Case 89-016

Porta Bella or Whitaker-Bermite(partial) – located south of Soledad Canyon Road, east of Circle J Ranch area. Approximately 50% of the project land use is included in the Interim Year database. 100% of the project land use is included in the long-range database. 2,911 dwelling units and 92 acres of commercial development on 996 total acres.

Tesoro del Valle – located north of Copper Hill Drive, west of McBean Parkway. 1,791 dwelling units, 10 acre commercial center and elementary school.

Synergy Ermine Street – 116.71 acres site located just west of existing Ermine Street, east of Riverpark site and north of the Santa Clara River. Residential site zoned RVL, ½ to 1 unit/acre.

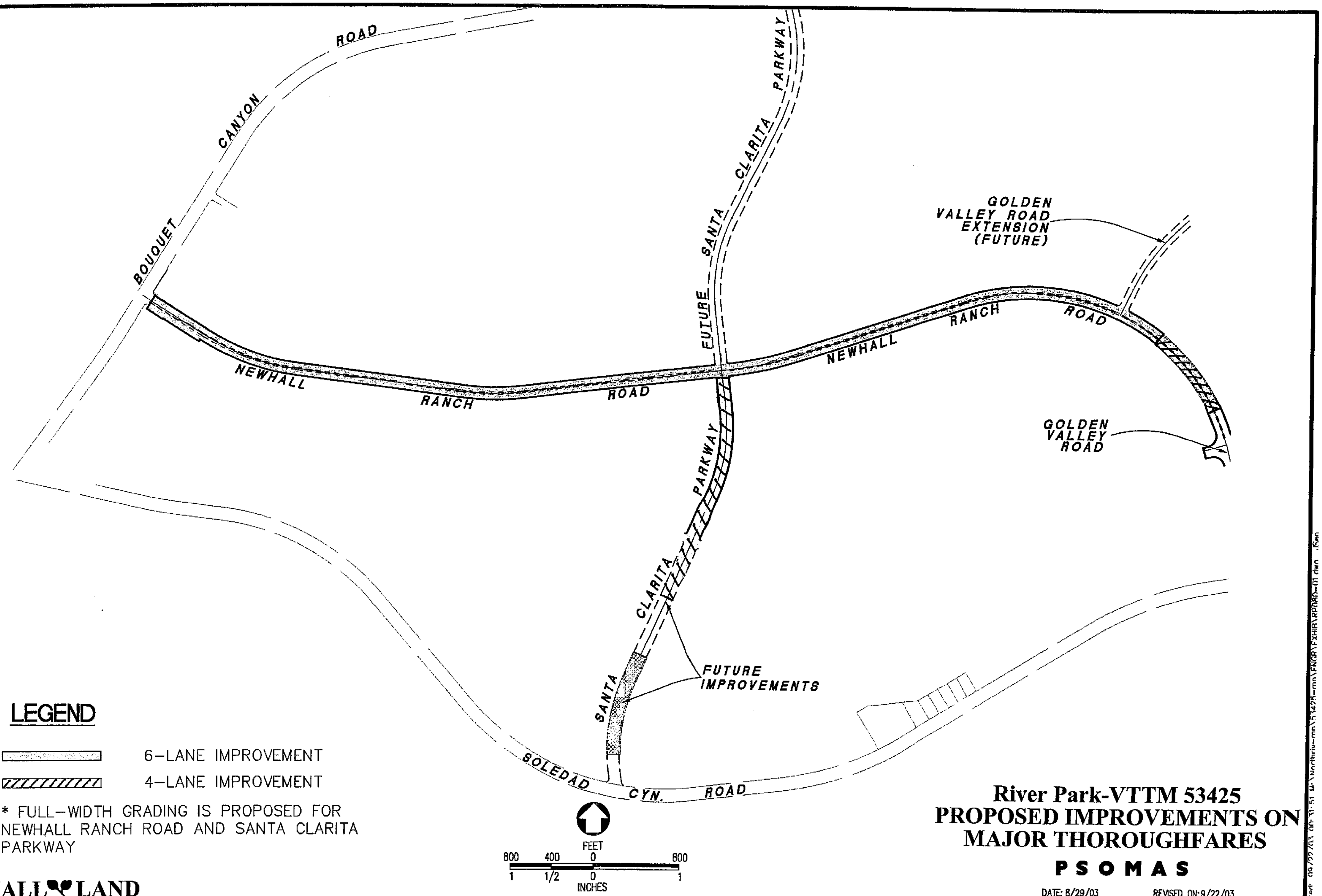
Valencia Town Center – located east of McBean Parkway, north of Valencia Boulevard, south of Magic Mountain Parkway and west of Citrus Street. Expansion of the existing shopping mall to consist of a 250,000 square foot Department Store.

TPM 20838 – Located north of Bouquet Canyon Road and south of the Santa Clara River. 168 apartment units.

APPENDIX D
NEWHALL RANCH ROAD INTERIM DESIGN

Newhall Ranch Road will be constructed as a six lane roadway between Bouquet Canyon Road and the Santa Clara River Bridge and the bridge will initially be constructed to accommodate four lanes. The following exhibit illustrates this interim configuration. Ultimately, the bridge will be improved to six lanes as envisioned by the City Circulation Element.

Traffic volume forecasts presented in the previous sections of this report indicate that the interim 6 lane/4 lane configuration results in acceptable levels of service as shown in the following intersection capacity utilization worksheets.



LEGEND

▭ 6-LANE IMPROVEMENT

▨ 4-LANE IMPROVEMENT

* FULL-WIDTH GRADING IS PROPOSED FOR NEWHALL RANCH ROAD AND SANTA CLARITA PARKWAY

NEWHALL LAND

River Park-VTTM 53425
PROPOSED IMPROVEMENTS ON MAJOR THOROUGHFARES

PSOMAS

DATE: 8/29/03 REVISED ON: 9/22/03
JOB No: 1VAL021504 TASK: 3 SHEET NO. 1 OF 1

RP080-01

Plotted: 09/22/03 09:31:51 M:\Northriv-mn\53425-mn\ENGR\EXHIB\RP080-01.dwg JSen

158. Santa Clarita & Newhall Rch

Interim Year w/Proj & 4 Lane NRR

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1750	75	.04*	60	.03*
NBT	0	0	0		0	
NBR	1	1750	46	.03	22	.01
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3500	1126	.32	1437	.41*
EBR	1	1750	28	.02	97	.06
WBL	1	1750	14	.01	47	.03*
WBT	2	3500	1447	.41*	1363	.39
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .55 .57

Interim Year w/Proj & SCP & 4 Lane NRR

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	193	.06*	298	.09
NBT	2	3500	314	.09	927	.26*
NBR	1	1750	13	.01	33	.02
SBL	2	3500	494	.14	363	.10*
SBT	2	3500	913	.26*	503	.14
SBR	1	1750	203	.12	9	.01
EBL	2	3500	22	.01*	317	.09*
EBT	2	3500	619	.18	1123	.32
EBR	1	1750	377	.22	177	.10
WBL	1	1750	28	.02	15	.01
WBT	2	3500	1270	.36*	945	.27*
WBR	1	1750	218	.12	552	.32
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .79 .82

165. Golden Valley & Valley Cntr

Interim Year w/Proj & 4 Lane NRR

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	352	.10*	437	.12*
NBT	2	3500	659	.19	997	.28
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3500	983	.28*	828	.24*
SBR	f		245		596	
EBL	2	3500	725	.21*	443	.13*
EBT	0	0	0		0	
EBR	1	1750	195	.11	557	.32
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Right Turn Adjustment					EBR	.10*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .69 .69

Interim Year w/Proj & SCP & 4 Lane NRR

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	2	3500	310	.09*	311	.09*
NBT	2	3500	808	.23	1134	.32
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3500	945	.27*	912	.26*
SBR	f		224		542	
EBL	2	3500	612	.17*	386	.11*
EBT	0	0	0		0	
EBR	1	1750	199	.11	453	.26
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Right Turn Adjustment					EBR	.08*
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .63 .64

APPENDIX E
PROJECT SHARE CALCULATIONS

PROJECT SHARE CALCULATIONS

	Existing	Interim Year without Project	Interim Year with Project	Ave.Share	Alt Interim Year without Project	Alt Interim Year with Project	Ave.Share
48. McBean & Newhall Ranch				8%			8%
AM	6718	7951	8093		7526	7673	
PM	5369	8174	8372		8359	8541	
57. Valencia & Magic Mtn				5%			5%
AM	3831	6329	6475		6149	6282	
PM	4540	7462	7631		7315	7465	
65. Bouquet & Soledad				*4%*			*4%*
AM	7447	6597	6839		6408	6628	
PM	8432	8447	8817		7916	8238	
66. Bouquet & Newhall Ranch				22%			26%
AM	5700	7862	8360		7325	7745	
PM	6971	9280	10079		8454	9130	
67. Seco & Bouquet				13%			*2%*
AM	4788	5474	5551		4212	4264	
PM	5062	5753	5889		4732	4863	
145. Sierra & Placerita Canyon				2%			4%
AM	2308	3571	3586		4310	4384	
PM	2836	4089	4127		4923	5000	
146. SR-14 NB Rp & Golden Valley				1%			0%
AM	132	2111	2123		2430	2434	
PM	323	3624	3640		3674	3681	
147. SR-14 SB Rp & Golden Valley				1%			0%
AM	958	2915	2943		3052	3058	
PM	421	4037	4066		4024	4035	
157. Santa Clarita & Soledad Acc				n/a			7%
AM					2074	2217	
PM					2589	2784	
158. Santa Clarita & Newhall Rch				*14%*			*8%*
AM		2385	2736		4336	4664	
PM		2547	3026		4819	5262	
159. Santa Clarita & Bouquet				n/a			*1%*
AM					4480	4524	
PM					5170	5253	
162. Sierra & Golden Valley				2%			1%
AM	2273	5780	5864		5568	5586	
PM	2048	6055	6143		5624	5652	
164. Golden Valley & Golden Tri				6%			3%
AM		2777	2940		2876	2971	
PM		3286	3491		3245	3354	
165. Golden Valley & Valley Cntr				8%			5%
AM		2916	3159		2952	3098	
PM		3542	3858		3554	3738	

PROJECT SHARE CALCULATIONS

	Existing	Interim Year without Project	Interim Year with Project	Ave.Share	Alt Interim Year without Project	Alt Interim Year with Project	Ave.Share
169. Rainbow Glen & Soledad				11%			10%
AM	3344	3886	3939		3988	4043	
PM	4013	4620	4705		4656	4744	
172. Whites Cyn & Soledad				4%			10%
AM	6742	7211	7239		6642	6680	
PM	5691	6923	6975		6601	6652	
197. Santa Clarita Acc & Soledad							*2%*
AM					3234	3289	
PM					4491	4580	
198. Valley Center & Soledad				*2%*			*2%*
AM		3613	3693		3669	3740	
PM		4778	4891		4596	4705	

Average share is calculated by dividing the volume of project traffic in the AM and PM peak hours by the total increase in traffic (future conditions minus existing conditions) forecast to occur during the AM and PM peak hours. For intersections not existing today, or for intersections in which future parallel facilities will effect a net reduction in traffic volumes when compared to existing conditions, average share is calculated by dividing the volume of project traffic by the total volume of future traffic.

APPENDIX F
CALTRANS CAPACITY – MEETING NOTES

Meeting Notes – August 10, 2000 Meeting to Discuss Caltrans' Comment Letter on Draft EIR No. 573

Meeting Attendees:	Terry Austin, Austin-Foust Associates, Inc. Joe El Harake, Caltrans Kendall Elmer, Austin-Foust Associates, Inc. Everett Evans, Caltrans Michael Haberkorn, County of Orange Firooz Hamedani, Caltrans Bob Joseph, Caltrans Aileen Kennedy, Caltrans Bryan Speegle, County of Orange
Meeting Location:	Caltrans District 12 Headquarters, Irvine

The primary topic of discussion during the meeting pertained to methodologies for performing level of service analysis on the freeway system within the EIR No. 573 traffic analysis study area. The primary objective of the discussion was to develop a general consensus on a set of freeway facility capacities, level of service standards, and project impact thresholds for the County to apply in order to address freeway impact comments contained in Caltrans' February 22, 2000 DEIR comment letter as well as DEIR comment letters received from others. Two basic components of the freeway system were discussed in-depth during the meeting: 1) the freeway mainline, and 2) freeway ramps. By the end of the meeting a general consensus had been reached as to the assumptions and standards to apply in an updated impact analysis of these two basic freeway components. These assumptions and standards are summarized below.

Freeway Mainline

A maximum capacity of 2,000 vehicles per hour per lane (vphpl) is to be assumed for mixed-flow mainline freeway lanes, a capacity that is cited in the Caltrans Highway Design Manual. A maximum capacity of 1,600 vphpl is to be assumed for high occupancy vehicle (HOV) freeway lanes, a capacity that Caltrans has applied in the past when performing freeway capacity analyses. It should be assumed that no additional mainline capacity is provided by auxiliary lanes that are located between the on-ramp and off-ramp of two adjacent interchanges (i.e., auxiliary lanes that do not extend beyond two adjacent interchanges).

These capacities, which correspond to level of service (LOS) "E" conditions, are to be applied to calculate existing volume-to-capacity (V/C) ratios and future demand-to-capacity (D/C) ratios. LOS "E" (V/C or D/C less than or equal to 1.00) is the performance standard that is to be applied to the freeway mainline (i.e., a freeway mainline segment is considered deficient (LOS "F") when the V/C or D/C ratio is greater than 1.00). Project mitigation is required for freeway mainline segments that are forecast to operate at LOS "F" if the project contribution to the V/C or D/C ratio is greater than 0.03 (the impact threshold specified in the Orange County Congestion Management Program).

For existing traffic conditions which are reported based on observed traffic volumes, existing levels of service based on V/C ratios will be validated against Caltrans' 1998 Freeway Traffic Conditions publication in order to ensure that the V/C methodology accurately depicts existing levels of service, particularly for freeway segments which are currently deficient according to the Caltrans publication. Modeled future traffic forecasts that are applied in the DEIR No. 573 traffic analysis represent the future volume demand on the freeway system. The corresponding future D/C ratios can therefore be directly utilized to accurately portray future levels of service on the freeway mainline.

Freeway Ramps

Carrying capacities for ramps of various configurations were developed based on information contained in the Caltrans Highway Design Manual and the Caltrans Ramp Meter Design Manual. The various ramp configurations and their associated capacities are summarized below.

Metered On-Ramps

A maximum capacity of 900 vehicles per hour (vph) is to be assumed for a one-lane metered on-ramp with only one mixed-flow lane at the meter.

A maximum capacity of 1,080 (20 percent greater than 900) vph is to be assumed for a one-lane metered on-ramp with one mixed-flow lane at the meter plus one HOV preferential lane at the meter.

A maximum capacity of 1,500 vph is to be assumed for a one-lane metered on-ramp with two mixed-flow lanes at the meter.

A maximum capacity of 1,800 vph is to be assumed for a two-lane metered on-ramp with two mixed-flow lanes at the meter.

A maximum capacity of 2,250 (50 percent greater than 1,500) vph is to be assumed for a two-lane metered on-ramp with three mixed-flow lanes at the meter.

Toll Ramps

A maximum capacity of 1,500 vph is to be assumed for a one-lane toll ramp with one cash (stopped) lane and one FasTrak (unstopped) lane.

Non-Metered and Non-Tolled On-Ramps and Off-Ramps

A maximum capacity of 1,500 vph is to be assumed for a one-lane ramp.

A maximum capacity of 2,250 (50 percent greater than 1,500) vph is to be assumed for a two-lane on-ramp that tapers to one merge lane at or beyond the freeway mainline gore point and for a two-lane off-ramp with only one auxiliary lane.

A maximum capacity of 3,000 vph is to be assumed for a two-lane on-ramp that does not taper to one merge lane and for a two-lane off-ramp with two auxiliary lanes.

These capacities, which correspond to level of service (LOS) "E" conditions, are to be applied to calculate ramp V/C ratios. LOS "E" (V/C less than or equal to 1.00) is the performance standard that is to be applied to freeway/tollway ramps (i.e., a ramp is considered deficient (LOS "F") when the V/C ratio is greater than 1.00). Project mitigation is required for ramps that are forecast to operate at LOS "F" if the project contribution to the V/C ratio is greater than 0.03 for ramps at CMP intersections and 0.01 or greater for ramps at non-CMP intersections.

APPENDIX G
ILLUSTRATIONS OF MITIGATION MEASURES

MAGIC MTN/VALENCIA BLVD/(MAGIC MTN EASTBOUND)

STATE OF CALIFORNIA · DEPARTMENT OF TRANSPORTATION
Caltrans TRAFFIC DESIGN

PROJECT ENGINEER
CALCULATED/ DESIGNED BY
CHECKED BY
DATE REVISED
REVISED BY
DATE REVISED

GENERAL NOTES

1. UTILITIES SHOWN ON THESE PLANS ARE CORRECT AND ACCURATE TO THE EXTENT OF AVAILABLE RECORDS AND KNOWLEDGE. THE CONTRACTOR IS REQUIRED TO TAKE STEPS TO ASCERTAIN THE EXACT LOCATION OF THE UNDERGROUND FACILITIES PRIOR TO DOING THE WORK THAT MAY DAMAGE SUCH FACILITIES OR INTERFERE WITH THEIR SERVICE.
2. ALL MATERIAL AND EQUIPMENT SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
3. ALL WIRING SHALL BE MARKED (TAGGED) WITHIN THE CONTROLLER CABINET FOR PHASE IDENTIFICATION.
4. ALL SIGNAL EQUIPMENT SHALL BE WIRED IN ACCORDANCE WITH THE SIGNAL PHASE DIAGRAM.
5. EACH LOOP ASSIGNMENT SHALL HAVE A SEPARATE LEAD-IN CABLE TO THE CONTROLLER.
6. LOOPS SHALL BE TYPE E AND CENTERED IN LANES UNLESS OTHERWISE SPECIFIED.
7. PEDESTRIAN HEADS SHALL BE MODULAR TYPE III WITH INTERNATIONAL SYMBOLS.
8. CONDUIT SHALL BE 2" UNLESS OTHERWISE SPECIFIED.
9. PULL BOXES SHALL BE SIZE No. 5 UNLESS OTHERWISE SPECIFIED.
10. ALL WORK IS TO BE DONE IN ACCORDANCE WITH CALTRANS STANDARD PLANS AND SPECIFICATIONS, LATEST EDITION.
11. POLE LOCATIONS SHOWN HEREON ARE APPROXIMATE. PRECISE LOCATIONS SHALL BE ESTABLISHED IN THE FIELD AND VERIFIED BY THE PROJECT ENGINEER.

CONDUCTOR AND CONDUIT SCHEDULE

AWG. OR CABLE	CONDUCTOR RUN	1	2	3	4	5	6	7	8	9	10	11	12
#14	#1	-	3	3	3	3	3	-	-	-	-	-	-
	#2	3	-	-	-	-	3	3	3	3	3	3	3
	#2+#3	2	-	-	-	-	2	2	2	2	2	2	2
	#3	-	-	-	-	3	6	-	-	-	-	-	-
	#4	3	3	3	3	3	3	-	-	-	-	-	-
	#5	-	-	-	-	-	3	3	3	3	-	-	-
	#6	-	-	-	3	3	6	3	-	-	-	-	-
	#7	-	-	-	-	-	3	3	3	3	3	3	3
	#8	-	-	-	-	-	3	3	3	3	3	-	-
	#2P	2	-	-	-	-	2	2	2	2	2	2	2
	#4P	2	2	2	2	2	2	-	-	-	-	-	-
	#6P	-	-	-	2	2	4	2	-	-	-	-	-
	#8P	-	-	-	-	-	4	2	2	2	2	-	-
	#2PPB	-	-	-	-	-	1	1	1	1	1	1	1
	#4PPB	-	1	1	1	1	1	-	-	-	-	-	-
	#6PPB	-	-	-	-	1	2	-	-	-	-	-	-
	#8PPB	-	-	-	-	-	1	1	1	1	-	-	-
	PPB Common	1	1	1	1	1	2	1	1	1	1	1	1
	Spares	3	3	3	3	3	6	3	3	3	3	3	3
	TOTAL #14	16	13	13	18	22	57	29	24	24	20	15	15
#10	Int. Illum. Street Name Sign	-	-	-	2	2	4	2	2	2	2	2	2
	Luminaires	-	2	2	2	2	4	2	2	2	2	2	2
	Signal Common	1	1	1	1	1	2	1	1	1	1	1	1
	TOTAL #10	1	3	3	5	5	10	5	5	5	5	5	5
#6	Signal Service	-	-	-	-	-	-	-	-	-	-	-	-
Detector Lead-in Cable	#1 Detectors	-	-	-	-	-	1	1	1	-	-	-	-
	#2 Detectors	-	6	6	6	6	6	-	-	-	-	-	-
	#3 Detectors	-	-	-	-	-	2	2	2	2	2	-	-
	#4 Detectors	-	-	-	-	4	4	-	-	-	-	-	-
	#5 Detectors	-	-	1	1	1	1	-	-	-	-	-	-
	#6 Detectors	-	-	-	-	-	5	5	-	-	-	-	-
	#7 Detectors	-	-	-	-	1	1	-	-	-	-	-	-
	#8 Detectors	-	-	-	-	-	4	4	4	4	4	-	-
	TOTAL DLC	0	6	7	7	12	24	12	7	6	6	0	0
CONDUIT SIZE		3"(N)	3"	3"	3"	3"	3-3"	3"	3"	3"	3"	3"(N)	3"(N)

(N) = NEW

POLE AND EQUIPMENT SCHEDULE

NO.	STANDARD			VEH SIG MTG		PED. SIGNAL MTG	PPB		HPS LUMINAIRE	SPECIAL REQUIREMENTS
	TYPE	SIG M.A.	LUM. ARM	MAST	POLE		Ø	ARROW		
Ⓐ	25-4-80	45'	15'	MAS MAT	SV-1-T	SP-1-T	6	←	200W	IISNS "Valencia"
Ⓑ	15		12'		TV-2-T	SP-1-T	8	←	200W	
Ⓒ	PPB POST						8	⇄		
Ⓓ	26-5-100	50'	15'	MAS MAT	SV-1-T	SP-1-T	8	←	200W	IISNS "Magic Mtn"
Ⓔ	15		12'		TV-2-T	SP-1-T	2	←	200W	
Ⓕ	25-4-80(R)	40'(R)	15'(R)	MAS MAT	SV-1-T(R)	SP-1-T(R)	2	←	200W(R)	IISNS "Valencia"
Ⓖ	15(R)		12'(R)		TV-2-T(R)	SP-1-T(R)	4	←	200W(R)	
Ⓗ	PPB POST						4	⇄		
Ⓘ	25-4-80	45'	15'	MAS MAT	SV-1-T	SP-1-T	4	←	200W	IISNS "Magic Mtn"
Ⓙ	15		12'		TV-2-T	SP-1-T	6	←	200W	
Ⓚ	PPB POST(N)10'						2	⇄		R7, TYPE N-4

IISNS = INTERNALLY ILLUMINATED STREET NAME SIGN
(N) = NEW
(R) = RELOCATED

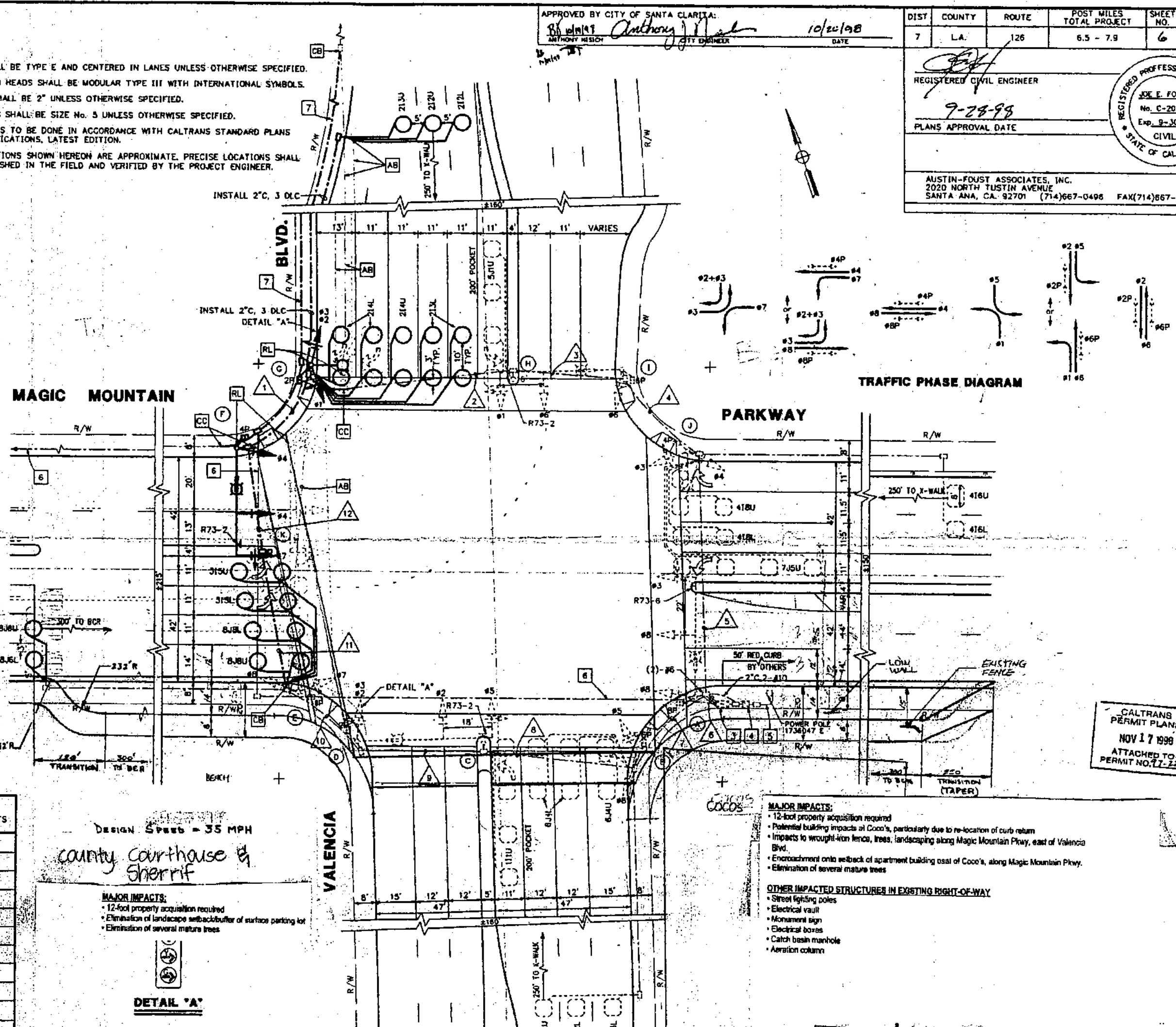
APPROVED BY CITY OF SANTA CLARITA:		
BB 10/19/98 Anthony J. Nisich	10/20/98	
ANTHONY NISICH, CITY ENGINEER	DATE	

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
7	L.A.	126	6.5 - 7.9	6	6

REGISTERED CIVIL ENGINEER
9-28-98
PLANS APPROVAL DATE

JOE E. FOUST
No. C-20258
Exp. 9-30-01
CIVIL

AUSTIN-FOUST ASSOCIATES, INC.
2020 NORTH TUSTIN AVENUE
SANTA ANA, CA. 92701 (714)667-0496 FAX(714)667-7952



CALTRANS
PERMIT PLANS
NOV 17 1998
ATTACHED TO
PERMIT NO. 77-228

Design Speed = 35 MPH

county Courthouse & Sherrif

MAJOR IMPACTS:
- 12-foot property acquisition required
- Elimination of landscape setback/buffer of surface parking lot
- Elimination of several mature trees

MAJOR IMPACTS:
- 12-foot property acquisition required
- Potential building impacts at Coco's, particularly due to re-location of curb return
- Impacts to wrought-iron fence, trees, landscaping along Magic Mountain Pkwy, east of Valencia Blvd.
- Encroachment onto setback of apartment building east of Coco's, along Magic Mountain Pkwy.
- Elimination of several mature trees

OTHER IMPACTED STRUCTURES IN EXISTING RIGHT-OF-WAY
- Street lighting poles
- Electrical vault
- Monument sign
- Electrical boxes
- Catch basin manhole
- Aeration column

CALTRANS: ELECTRICAL		
REVIEWED BY:	REVIEWED BY:	DATE:
		11/13/98

SIGNAL AND LIGHTING
MAGIC MOUNTAIN PARKWAY
VALENCIA BOULEVARD
SCALE: 1"=20'

E-2

FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES 0 1 2 3

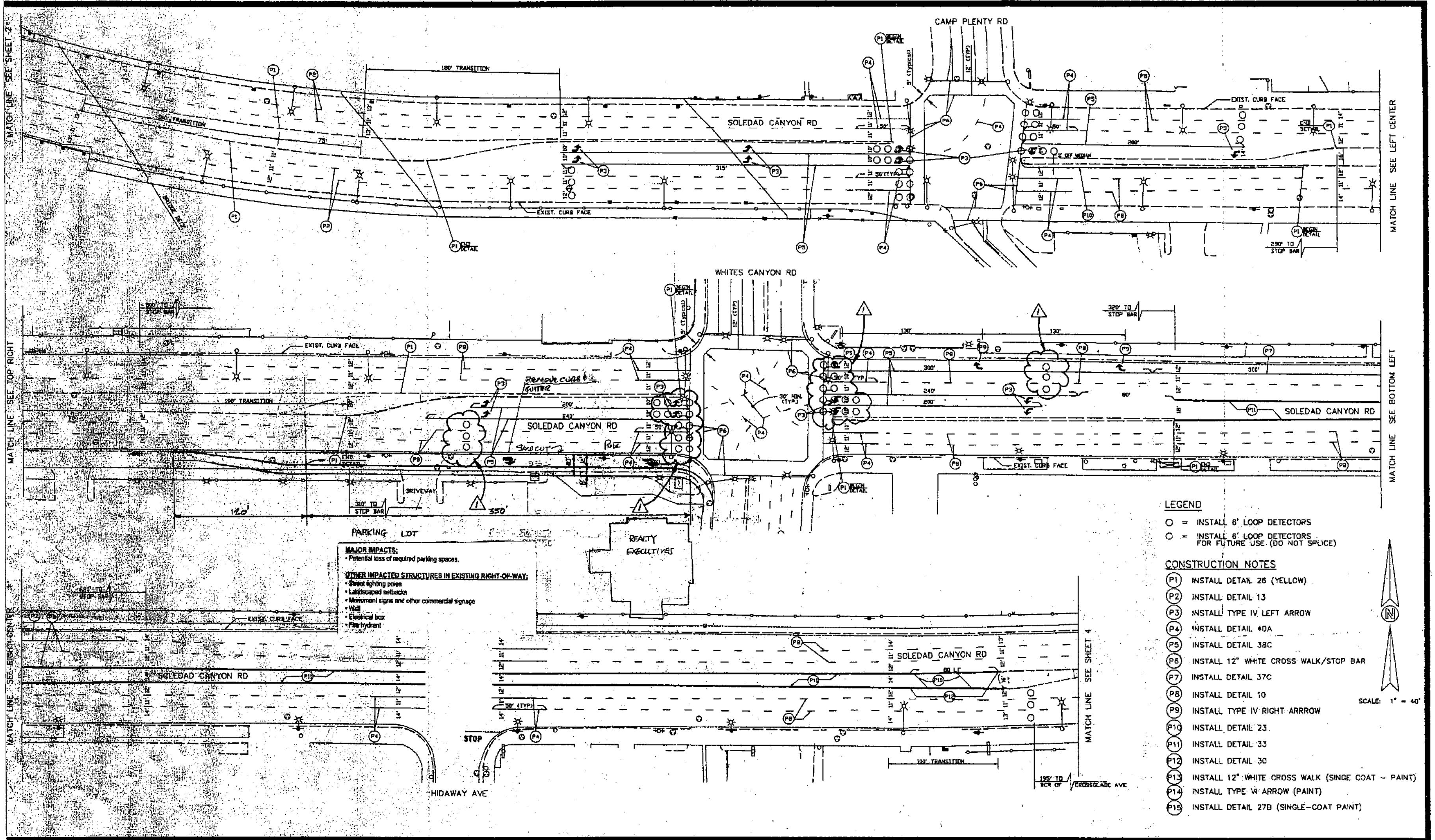
CU 07283
EA 07-118581

FORM DC-DE-92-PF (REV. 3/88)

PERMIT 77-6MC-2282

WHITE CANYON & SOLEDAD 1Y

SS-2053
Soledad Canyon Rd
800' Camp Plenty to 500' e/o Hidaway
Jun-95



MAJOR IMPACTS:
- Potential loss of required parking spaces.

OTHER IMPACTED STRUCTURES IN EXISTING RIGHT-OF-WAY:
- Street lighting poles
- Landscaped setbacks
- Monument signs and other commercial signage
- Wall
- Electrical box
- Fire hydrant

LEGEND

○ = INSTALL 6' LOOP DETECTORS
○ = INSTALL 6' LOOP DETECTORS FOR FUTURE USE (DO NOT SPLICE)

CONSTRUCTION NOTES

(P1) INSTALL DETAIL 26 (YELLOW)
(P2) INSTALL DETAIL 13
(P3) INSTALL TYPE IV LEFT ARROW
(P4) INSTALL DETAIL 40A
(P5) INSTALL DETAIL 38C
(P6) INSTALL 12" WHITE CROSS WALK/STOP BAR
(P7) INSTALL DETAIL 37C
(P8) INSTALL DETAIL 10
(P9) INSTALL TYPE IV RIGHT ARRROW
(P10) INSTALL DETAIL 23
(P11) INSTALL DETAIL 33
(P12) INSTALL DETAIL 30
(P13) INSTALL 12" WHITE CROSS WALK (SINGE COAT – PAINT)
(P14) INSTALL TYPE VI ARROW (PAINT)
(P15) INSTALL DETAIL 27B (SINGLE-COAT PAINT)

REVISIONS				
DESCRIPTION	REVISED BY	REVISED DATE	APPROVED BY	APPROVED DATE
DELETE TRAFFIC LOOPS DO NOT INSTALL	[illegible]	6/15/95	[illegible]	6/6/95

REVIEWED BY:
Calvin T. Rahman 6-7-95
SIGNATURE DATE

APPROVED FOR CONSTRUCTION BY:
Anthony J. Nisich 6/8/95
CITY ENGINEER, RCE 28550 DATE

DESIGNED BY: NORM BACULINAO NB 6-7-95
DRAWN BY: BONNIE JOSEPH

UNDER SUPERVISION OF:
6/8/95
ROBERT G. NEWMAN, R.C.E. 51733 DATE

REGISTERED PROFESSIONAL ENGINEER
ROBERT G. NEWMAN
No. C051733
6/30/98
CIVIL
STATE OF CALIFORNIA

CITY OF SANTA CLARITA

COMMUNITY DEVELOPMENT DEPARTMENT
23920 VALENCIA BLVD., SUITE 300
SANTA CLARITA, CALIFORNIA 91355
PHONE (805) 259-CITY/FAX (805) 259-8125

TITLE:
STRIPING PLAN

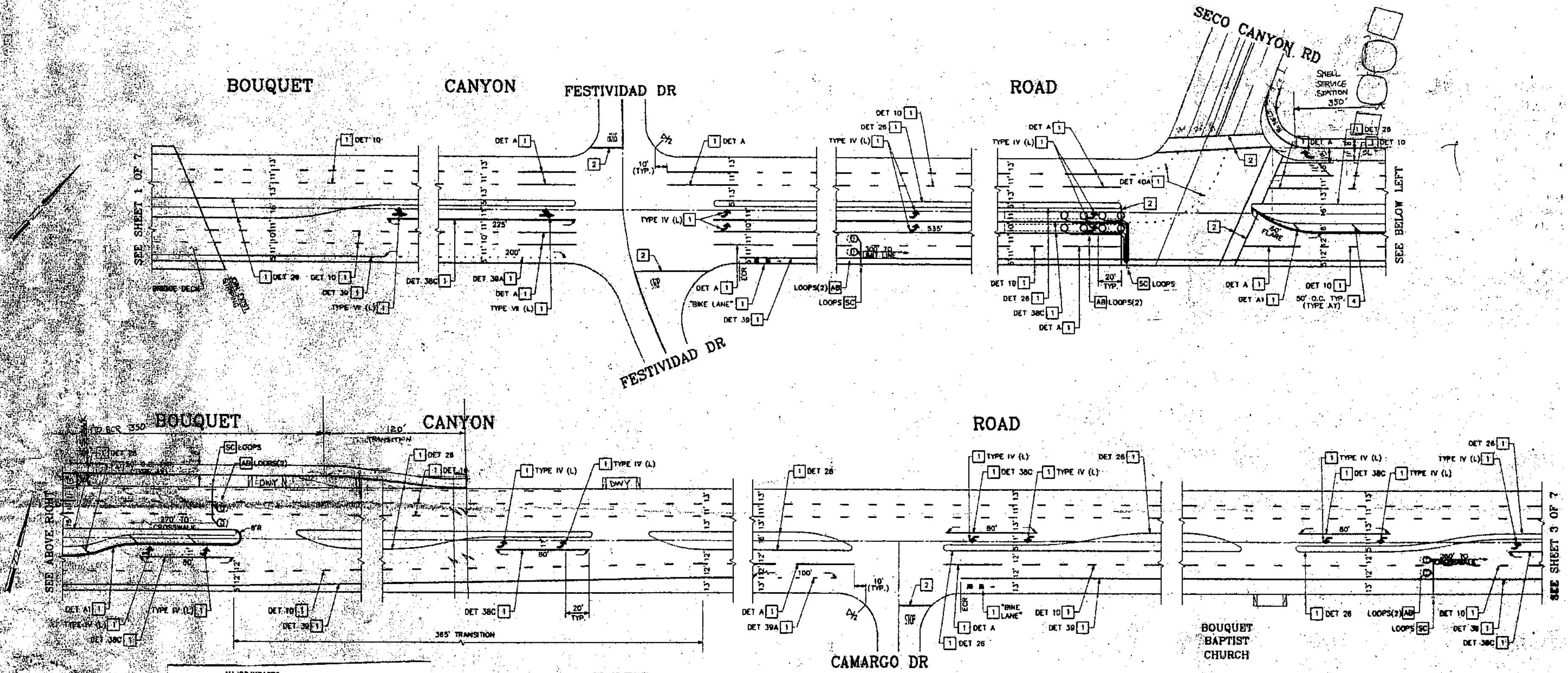
DESCRIPTION:
SOLEDAD CANYON ROAD
FROM 800' W/O CAMP PLENTY RD TO 500' E/O HIDAWAY AVE

205B

PROJECT:
95-906

SHT. of SHTS.
3 4

REVIEWED		SUBMITTED		APPROVED FOR CONSTRUCTION	
5/29/97 DATE		DATE		CITY ENGINEER	5/29/97 DATE

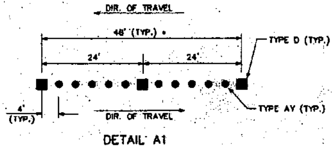


MAJOR IMPACTS:

- Potential impact to underground fuel storage
- Encroachment to area underneath gas pump canopy
- Reduction of gas pump and storage tank fueling areas
- Reduction of landscaped setback

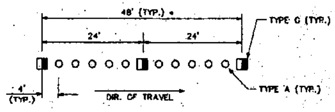
OTHER IMPACTED STRUCTURES IN EXISTING RIGHT-OF-WAY:

- Street lighting poles
- Landscaping
- Monument sign
- Wall
- Fire hydrant
- Bus shelter
- Water meter, catch basin, storm drain manhole



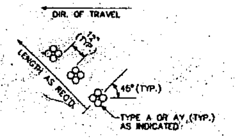
DETAIL A1

* UNLESS OTHERWISE SHOWN

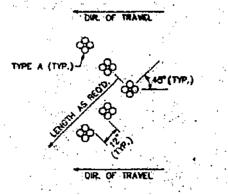


DETAIL A

* UNLESS OTHERWISE SHOWN



DETAIL B



DETAIL C

GENERAL NOTES

1. TRAFFIC STRIPING SHALL CONFORM TO CALTRANS STANDARD PLANS AND SPECIFICATIONS, DATED JULY 1992, CALTRANS TRAFFIC MANUAL, LATEST EDITION, THIS PLAN, AND THE SPECIAL PROVISIONS.
2. INDUCTIVE LOOP DETECTORS SHALL BE 6' DIAMETER. PLACE LIMIT LINE OR CROSSWALK LOOPS 2' BEYOND LIMIT LINE OR CROSSWALK. NEW STRIPING SHALL BE LOCATED AND APPROVED BY THE ENGINEER IN THE FIELD PRIOR TO POSITIONING LOOPS.
3. INSTALL TWO-WAY BLUE REFLECTIVE MARKER AT EVERY FIRE HYDRANT.
4. ALL ARROW, LEGEND, CROSSWALK, LIMIT LINE, AND STOP BAR PAVEMENT MARKINGS SHALL BE THERMOPLASTIC. ALL BIKE LANE LINES AND BIKE PAVEMENT MARKINGS SHALL BE PAINT.
5. BIKE LANE PAVEMENT MARKINGS SHALL BE INSTALLED AT EVERY [illegible] AS INDICATED ON PLANS, AND AS INSTRUCTED BY THE ENGINEER IN THE FIELD.
6. LIMIT LINES & ARROW LEGENDS SHALL BE INSTALLED AFTER LOOP INSTALLATIONS ARE COMPLETED.

CONSTRUCTION NOTES

1. INSTALL STRIPING DETAIL, (INCLUDING PLACEMENT OF RAISED PAVEMENT MARKERS), ARROW, OR PAVEMENT LEGEND AS SHOWN.
2. ~~[illegible]~~ 12" WHITE LINE AS SHOWN.
3. ~~[illegible]~~ 12" YELLOW LINE AS SHOWN.
4. INSTALL DETAIL B, SPACED AS INDICATED.
5. INSTALL DETAIL C, SPACED AS INDICATED.
6. INSTALL TYPE K-4 OBJECT MARKERS SPACED 10' O.C.

No. C048591
Exp. 6-30-00

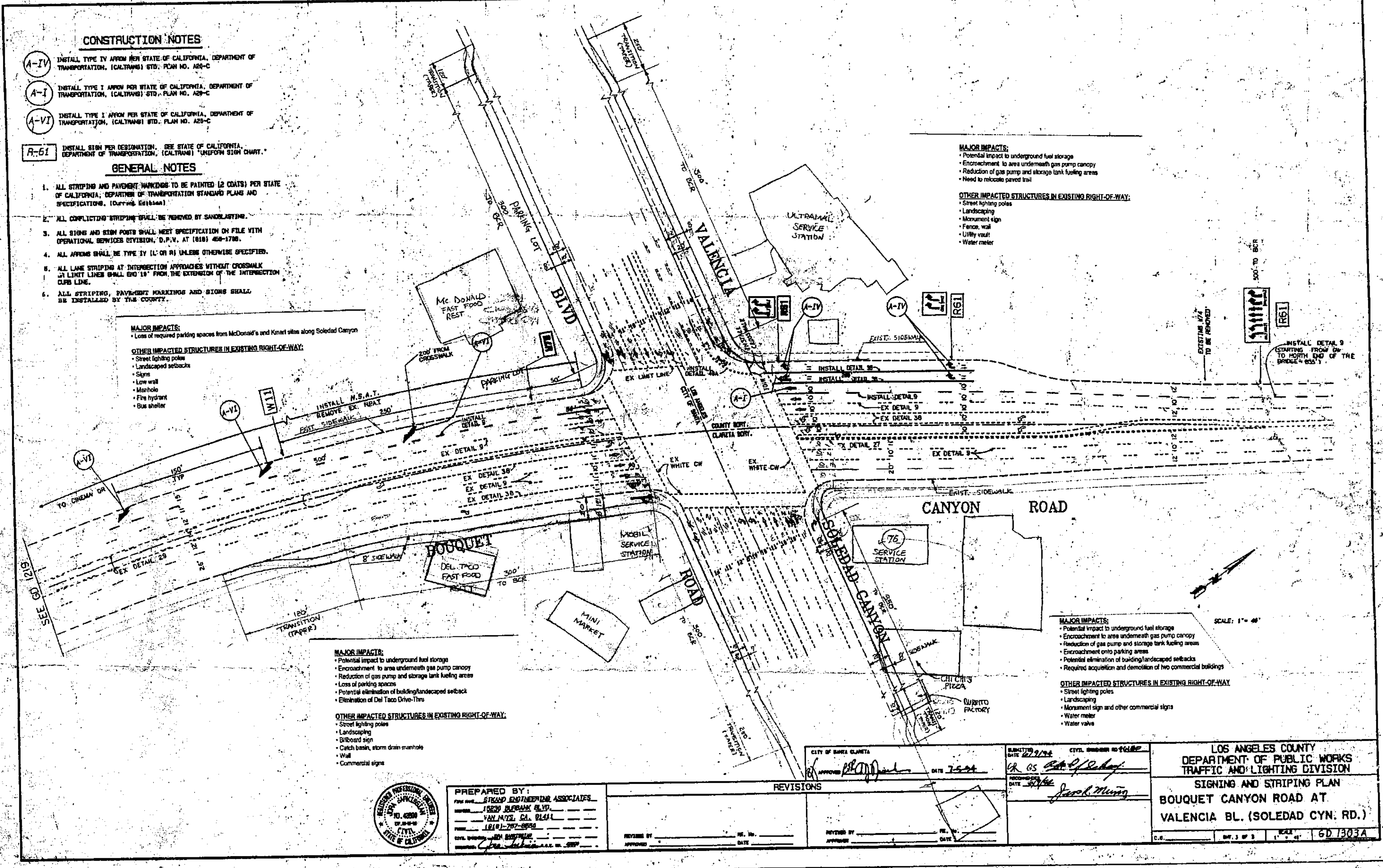
PLANS PREPARED BY:
WILLDAN ASSOCIATES
12900 CROSSROADS PARKWAY SOUTH
SUITE 200, INDUSTRY, CA 91746-3499
(310) 908-6200
UNDER THE SUPERVISION OF
5/29/97
MONICA M. SUTER RCE 48591 DATE

REVISIONS			
NO.	DESCRIPTION	APP.	DATE

DESIGNED BY BB/SI	**CITY OF SANTA CLARITA**
DRAWN BY BB/SI	SIGNING, STRIPING, AND LOOP REPLACEMENT PLAN
CHECKED BY MMS	BOUQUET CANYON ROAD
DATE 5/97	FROM FESTIVIDAD DR.
SCALE 1"=40'	TO CAMARGO DR.
T.G.	SHT. 2 OF 7 SHTS. — PLAN NO. 11A

C7. Seco #Bouquet. 14

65. BOUQUET/SOLEDAD = IV, A/V BOTH SOLUTIONS



CONSTRUCTION NOTES

(A-IV) INSTALL TYPE IV ARROW PER STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION, (CALTRANS) STD. PLAN NO. A20-C

(A-I) INSTALL TYPE I ARROW PER STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION, (CALTRANS) STD. PLAN NO. A20-C

(A-VI) INSTALL TYPE I ARROW PER STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION, (CALTRANS) STD. PLAN NO. A20-C

R-61 INSTALL SIGN PER DESIGNATION. SEE STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION, (CALTRANS) "UNIFORM SIGN CHART."

GENERAL NOTES

1. ALL STRIPING AND PAVEMENT MARKINGS TO BE PAINTED (2 COATS) PER STATE OF CALIFORNIA, DEPARTMEN OF TRANSPORTATION STANDARD PLANS AND SPECIFICATIONS. (Current Edition)
2. ALL CONFLICTING STRIPING SHALL BE REMOVED BY SANDBLASTING.
3. ALL SIGNS AND SIGN POSTS SHALL MEET SPECIFICATION ON FILE WITH OPERATIONAL SERVICES DIVISION, D.P.W. AT (818) 458-1700.
4. ALL ARROWS SHALL BE TYPE IV (L OR R) UNLESS OTHERWISE SPECIFIED.
5. ALL LANE STRIPING AT INTERSECTION APPROACHES WITHOUT CROSSWALK OR LIMIT LINES SHALL END 10' FROM THE EXTENSION OF THE INTERSECTION CURB LINE.
6. ALL STRIPING, PAVEMENT MARKINGS AND SIGNS SHALL BE INSTALLED BY THE COUNTY.

MAJOR IMPACTS:
- Loss of required parking spaces from McDonald's and Kmart sites along Soledad Canyon

OTHER IMPACTED STRUCTURES IN EXISTING RIGHT-OF-WAY:
- Street lighting poles
- Landscaped setbacks
- Signs
- Low wall
- Manhole
- Fire hydrant
- Bus shelter

MAJOR IMPACTS:
- Potential impact to underground fuel storage
- Encroachment to area underneath gas pump canopy
- Reduction of gas pump and storage tank fueling areas
- Need to relocate paved trail

OTHER IMPACTED STRUCTURES IN EXISTING RIGHT-OF-WAY:
- Street lighting poles
- Landscaping
- Monument sign
- Fence, wall
- Utility vault
- Water meter

MAJOR IMPACTS:
- Potential impact to underground fuel storage
- Encroachment to area underneath gas pump canopy
- Reduction of gas pump and storage tank fueling areas
- Loss of parking spaces
- Potential elimination of building/landscaped setback
- Elimination of Del Taco Drive-Thru

OTHER IMPACTED STRUCTURES IN EXISTING RIGHT-OF-WAY:
- Street lighting poles
- Landscaping
- Billboard sign
- Catch basin, storm drain manhole
- Wall
- Commercial signs

MAJOR IMPACTS:
- Potential impact to underground fuel storage
- Encroachment to area underneath gas pump canopy
- Reduction of gas pump and storage tank fueling areas
- Encroachment onto parking areas
- Potential elimination of building/landscaped setbacks
- Required acquisition and demolition of two commercial buildings

OTHER IMPACTED STRUCTURES IN EXISTING RIGHT-OF-WAY
- Street lighting poles
- Landscaping
- Monument sign and other commercial signs
- Water meter
- Water valve

SCALE: 1" = 40'

JORA SARKISSIAN
NO. 42800

PREPARED BY:
STRAND ENGINEERING ASSOCIATES
15230 BURBANK BLVD.
VAN NUYS, CA. 91411
(818)-787-8550
CIVIL ENGINEER JORA SARKISSIAN

REVISIONS

REVISED BY ______ RE. No. ______
APPROVED ______ DATE ______

REVISED BY ______ RE. No. ______
APPROVED ______ DATE ______

CITY OF SANTA CLARITA
APPROVED ______ DATE 7-5-94

SUBMITTED DATE 6/29/94 CIVIL ENGINEER NO.
GR GS
RECOMMENDED DATE 5/9/94

LOS ANGELES COUNTY
DEPARTMENT OF PUBLIC WORKS
TRAFFIC AND LIGHTING DIVISION

SIGNING AND STRIPING PLAN
BOUQUET CANYON ROAD AT VALENCIA BL. (SOLEDAD CYN. RD.)

C.G. ______ SHT. 1 OF 1 SCALE 1" = 40' 6D 1303A

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APPENDIX H
SCVCTM LAND USE DATA

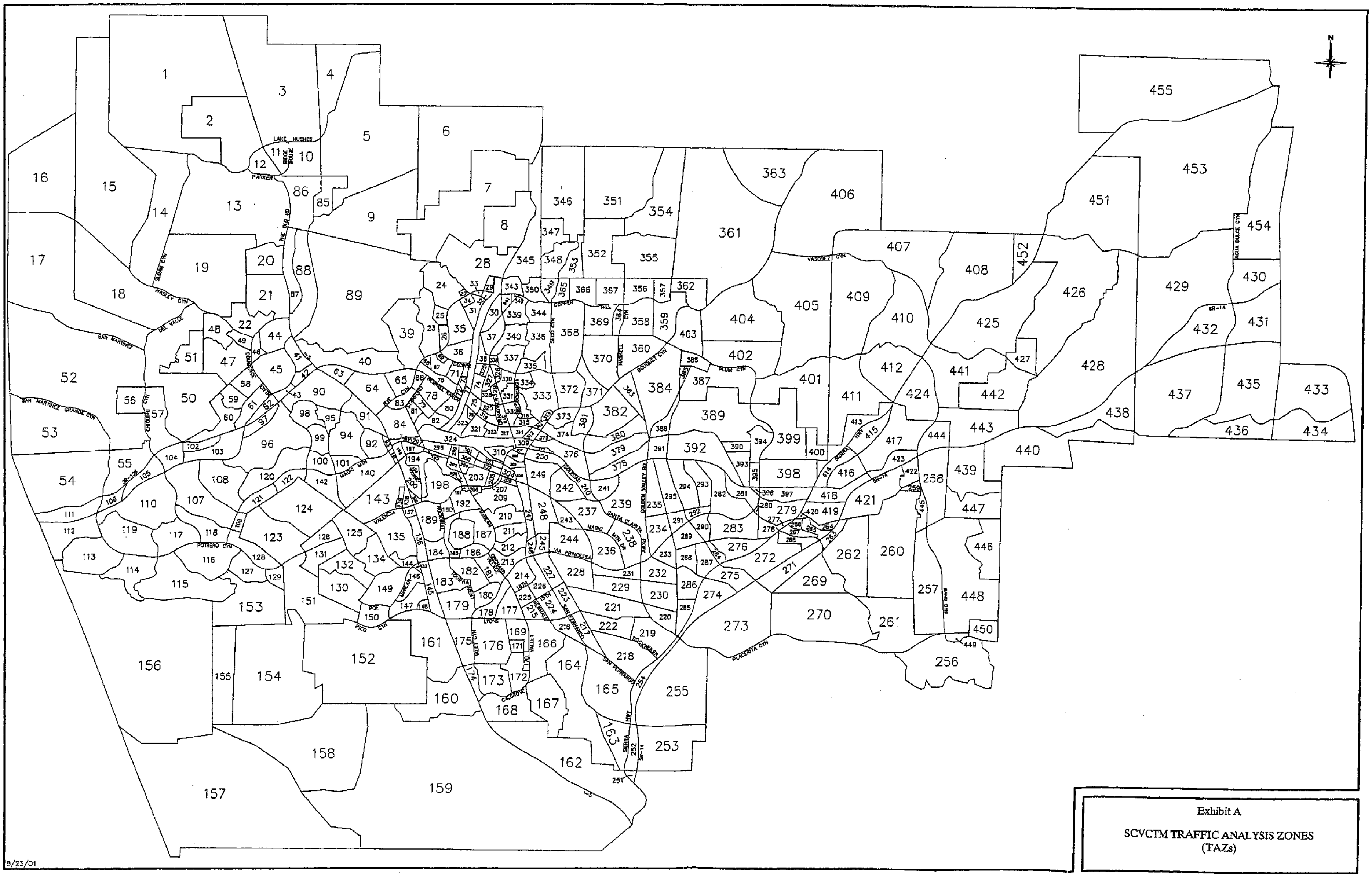


Exhibit A

SCVCTM TRAFFIC ANALYSIS ZONES
(TAZs)

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
1	2. Single Family (1-5du/ac)	154.00 DU	29	86	115	100	55	155	1525
	SUB-TOTAL		29	86	115	100	55	155	1525
2	2. Single Family (1-5du/ac)	320.00 DU	61	179	240	208	115	323	3168
	SUB-TOTAL		61	179	240	208	115	323	3168
3	2. Single Family (1-5du/ac)	3842.00 DU	730	2152	2882	2497	1383	3880	38036
	4. Condominium/Townhouse	633.00 DU	38	304	342	298	165	463	5064
	11. Commercial Center(10-30a)	361.27 TSF	264	170	434	860	932	1792	19530
	20. Elementary/Middle School	1848.00 STU	480	370	850	148	166	314	2680
	30. Industrial Park	200.00 TSF	110	20	130	26	104	130	1200
	SUB-TOTAL		1622	3016	4638	3829	2750	6579	66510
5	2. Single Family (1-5du/ac)	651.00 DU	124	365	489	423	234	657	6445
	4. Condominium/Townhouse	100.00 DU	6	48	54	47	26	73	800
	12. Commercial Center (<10ac)	25.00 TSF	27	17	44	83	90	173	2127
	13. Commercial Shops	2.01 TSF	1	1	2	4	4	8	74
	SUB-TOTAL		158	431	589	557	354	911	9446
7	2. Single Family (1-5du/ac)	320.00 DU	61	179	240	208	115	323	3168
	3. Single Family (6-10du/ac)	480.00 DU	91	269	360	312	173	485	4752
	4. Condominium/Townhouse	134.00 DU	8	64	72	63	35	98	1072
	20. Elementary/Middle School	1848.00 STU	480	370	850	148	166	314	2680
	SUB-TOTAL		640	882	1522	731	489	1220	11672
8	2. Single Family (1-5du/ac)	70.00 DU	13	39	52	46	25	71	693
	SUB-TOTAL		13	39	52	46	25	71	693
10	2. Single Family (1-5du/ac)	12.00 DU	2	7	9	8	4	12	119
	4. Condominium/Townhouse	184.00 DU	11	88	99	86	48	134	1472
	12. Commercial Center (<10ac)	20.86 TSF	23	14	37	69	75	144	1774
	15. Sit-Down Restaurant	12.78 TSF	62	57	119	83	55	138	1666
	SUB-TOTAL		98	166	264	246	182	428	5031
11	2. Single Family (1-5du/ac)	23.00 DU	4	13	17	15	8	23	228
	4. Condominium/Townhouse	138.00 DU	8	66	74	65	36	101	1104
	12. Commercial Center (<10ac)	19.46 TSF	21	13	34	65	70	135	1655
	13. Commercial Shops	2.46 TSF	2	1	3	4	4	8	91
	15. Sit-Down Restaurant	7.75 TSF	37	34	71	51	34	85	1010
	30. Industrial Park	41.82 TSF	23	4	27	5	22	27	251
	40. Commercial Office	1.23 TSF	2	0	2	0	2	2	14
	SUB-TOTAL		97	131	228	205	176	381	4353
12	2. Single Family (1-5du/ac)	213.00 DU	40	119	159	138	77	215	2109
	14. Hotel	121.00 ROOM	41	27	68	39	35	74	996
	SUB-TOTAL		81	146	227	177	112	289	3105
13	2. Single Family (1-5du/ac)	408.00 DU	78	228	306	265	147	412	4039

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
13	4. Condominium/Townhouse	54.00 DU	3	26	29	25	14	39	432
	30. Industrial Park	32.93 TSF	18	3	21	4	17	21	198
	SUB-TOTAL		99	257	356	294	178	472	4669
14	2. Single Family (1-5du/ac)	291.00 DU	55	163	218	189	105	294	2881
	50. Golf Course	150.00 AC	23	9	32	15	30	45	1194
	SUB-TOTAL		78	172	250	204	135	339	4075
15	2. Single Family (1-5du/ac)	90.00 DU	17	50	67	58	32	90	891
	SUB-TOTAL		17	50	67	58	32	90	891
17	2. Single Family (1-5du/ac)	148.00 DU	28	83	111	96	53	149	1465
	SUB-TOTAL		28	83	111	96	53	149	1465
18	2. Single Family (1-5du/ac)	246.00 DU	47	138	185	160	89	249	2435
	SUB-TOTAL		47	138	185	160	89	249	2435
19	2. Single Family (1-5du/ac)	1306.00 DU	248	731	979	849	470	1319	12929
	20. Elementary/Middle School	1848.00 STU	480	370	850	148	166	314	2680
	21. High School	2232.00 STU	714	312	1026	134	201	335	3995
	SUB-TOTAL		1442	1413	2855	1131	837	1968	19604
20	2. Single Family (1-5du/ac)	245.00 DU	47	137	184	159	88	247	2426
	4. Condominium/Townhouse	136.00 DU	8	65	73	64	35	99	1088
	30. Industrial Park	174.00 TSF	96	17	113	23	90	113	1044
	SUB-TOTAL		151	219	370	246	213	459	4558
21	2. Single Family (1-5du/ac)	620.00 DU	118	347	465	403	223	626	6138
	12. Commercial Center (<10ac)	70.00 TSF	76	48	124	232	252	484	5954
	SUB-TOTAL		194	395	589	635	475	1110	12092
22	2. Single Family (1-5du/ac)	350.00 DU	67	196	263	227	126	353	3465
	SUB-TOTAL		67	196	263	227	126	353	3465
23	2. Single Family (1-5du/ac)	302.00 DU	57	169	226	196	109	305	2990
	SUB-TOTAL		57	169	226	196	109	305	2990
24	2. Single Family (1-5du/ac)	422.00 DU	80	236	316	274	152	426	4178
	SUB-TOTAL		80	236	316	274	152	426	4178
25	20. Elementary/Middle School	500.00 STU	130	100	230	40	45	85	725
	SUB-TOTAL		130	100	230	40	45	85	725
26	13. Commercial Shops	72.90 TSF	52	35	87	131	131	262	2702
	SUB-TOTAL		52	35	87	131	131	262	2702
27	5. Apartment	181.00 DU	14	78	92	74	38	112	1249
	SUB-TOTAL		14	78	92	74	38	112	1249

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
28	3. Single Family (6-10du/ac)	400.00 DU	76	224	300	260	144	404	3960
	4. Condominium/Townhouse	457.00 DU	27	219	246	215	119	334	3656
	SUB-TOTAL		103	443	546	475	263	738	7616
29	5. Apartment	115.00 DU	9	49	58	47	24	71	794
	SUB-TOTAL		9	49	58	47	24	71	794
30	4. Condominium/Townhouse	275.00 DU	17	132	149	129	72	201	2200
	SUB-TOTAL		17	132	149	129	72	201	2200
31	3. Single Family (6-10du/ac)	65.00 DU	12	36	48	42	23	65	644
	4. Condominium/Townhouse	200.00 DU	12	96	108	94	52	146	1600
	20. Elementary/Middle School	1200.00 STU	312	240	552	96	108	204	1740
	SUB-TOTAL		336	372	708	232	183	415	3984
32	4. Condominium/Townhouse	94.00 DU	6	45	51	44	24	68	752
	SUB-TOTAL		6	45	51	44	24	68	752
33	12. Commercial Center (<10ac)	61.00 TSF	66	42	108	203	220	423	5189
	SUB-TOTAL		66	42	108	203	220	423	5189
34	12. Commercial Center (<10ac)	107.10 TSF	117	74	191	356	386	742	9110
	SUB-TOTAL		117	74	191	356	386	742	9110
35	3. Single Family (6-10du/ac)	616.00 DU	117	345	462	400	222	622	6098
	4. Condominium/Townhouse	60.00 DU	4	29	33	28	16	44	480
	5. Apartment	200.00 DU	16	86	102	82	42	124	1380
	SUB-TOTAL		137	460	597	510	280	790	7958
36	2. Single Family (1-5du/ac)	190.00 DU	36	106	142	123	68	191	1881
	4. Condominium/Townhouse	268.00 DU	16	129	145	126	70	196	2144
	SUB-TOTAL		52	235	287	249	138	387	4025
37	2. Single Family (1-5du/ac)	212.00 DU	40	119	159	138	76	214	2099
	4. Condominium/Townhouse	128.00 DU	8	61	69	60	33	93	1024
	25. Church	20.00 TSF	8	7	15	7	6	13	186
	SUB-TOTAL		56	187	243	205	115	320	3309
38	4. Condominium/Townhouse	105.00 DU	6	50	56	49	27	76	840
	5. Apartment	226.00 DU	18	97	115	93	47	140	1559
	12. Commercial Center (<10ac)	50.00 TSF	55	35	90	166	180	346	4253
	SUB-TOTAL		79	182	261	308	254	562	6652
39	11. Commercial Center(10-30a)	134.00 TSF	98	63	161	319	346	665	7244
	30. Industrial Park	4016.00 TSF	2209	402	2611	522	2088	2610	24096
	SUB-TOTAL		2307	465	2772	841	2434	3275	31340
40	34. Utilities	10.00 TSF	0	0	0	0	0	0	24
	SUB-TOTAL		0	0	0	0	0	0	24

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
41	30. Industrial Park	1046.10 TSF	575	105	680	136	544	680	6277
	SUB-TOTAL		575	105	680	136	544	680	6277
42	30. Industrial Park	275.00 TSF	151	28	179	36	143	179	1650
	SUB-TOTAL		151	28	179	36	143	179	1650
43	30. Industrial Park	273.90 TSF	151	27	178	36	142	178	1643
	SUB-TOTAL		151	27	178	36	142	178	1643
44	2. Single Family (1-5du/ac)	445.00 DU	85	249	334	289	160	449	4406
	13. Commercial Shops	10.00 TSF	7	5	12	18	18	36	371
	20. Elementary/Middle School	500.00 STU	130	100	230	40	45	85	725
	SUB-TOTAL		222	354	576	347	223	570	5502
45	30. Industrial Park	1960.20 TSF	1078	196	1274	255	1019	1274	11761
	SUB-TOTAL		1078	196	1274	255	1019	1274	11761
46	13. Commercial Shops	77.00 TSF	55	37	92	139	139	278	2854
	30. Industrial Park	368.00 TSF	202	37	239	48	191	239	2208
	SUB-TOTAL		257	74	331	187	330	517	5062
47	30. Industrial Park	4254.10 TSF	2340	425	2765	553	2212	2765	25525
	SUB-TOTAL		2340	425	2765	553	2212	2765	25525
48	30. Industrial Park	720.00 TSF	396	72	468	94	374	468	4320
	SUB-TOTAL		396	72	468	94	374	468	4320
49	30. Industrial Park	764.30 TSF	420	76	496	99	397	496	4586
	SUB-TOTAL		420	76	496	99	397	496	4586
50	2. Single Family (1-5du/ac)	100.00 DU	19	56	75	65	36	101	990
	SUB-TOTAL		19	56	75	65	36	101	990
51	30. Industrial Park	1300.00 TSF	715	130	845	169	676	845	7800
	SUB-TOTAL		715	130	845	169	676	845	7800
52	2. Single Family (1-5du/ac)	211.00 DU	40	118	158	137	76	213	2089
	SUB-TOTAL		40	118	158	137	76	213	2089
54	2. Single Family (1-5du/ac)	26.00 DU	5	15	20	17	9	26	257
	3. Single Family (6-10du/ac)	416.00 DU	79	233	312	270	150	420	4118
	SUB-TOTAL		84	248	332	287	159	446	4375
55	2. Single Family (1-5du/ac)	108.00 DU	21	60	81	70	39	109	1069
	3. Single Family (6-10du/ac)	377.00 DU	72	211	283	245	136	381	3732
	4. Condominium/Townhouse	530.00 DU	32	254	286	249	138	387	4240
	20. Elementary/Middle School	460.00 STU	120	92	212	37	41	78	667
	40. Commercial Office	143.00 TSF	222	27	249	30	184	214	1653

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

				-- AM Peak Hour --			-- PM Peak Hour --			
Zone		Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
55	51.	Developed Park	15.00 AC	0	0	0	0	1	1	39
		SUB-TOTAL		467	644	1111	631	539	1170	11400
56	2.	Single Family (1-5du/ac)	64.00 DU	12	36	48	42	23	65	634
		SUB-TOTAL		12	36	48	42	23	65	634
57	3.	Single Family (6-10du/ac)	30.00 DU	6	17	23	20	11	31	297
	12.	Commercial Center (<10ac)	71.00 TSF	77	49	126	236	256	492	6039
	40.	Commercial Office	214.00 TSF	332	41	373	45	276	321	2474
		SUB-TOTAL		415	107	522	301	543	844	8810
58	30.	Industrial Park	1051.50 TSF	578	105	683	137	547	684	6309
		SUB-TOTAL		578	105	683	137	547	684	6309
59	30.	Industrial Park	764.00 TSF	420	76	496	99	397	496	4584
		SUB-TOTAL		420	76	496	99	397	496	4584
60	30.	Industrial Park	411.60 TSF	226	41	267	54	214	268	2470
		SUB-TOTAL		226	41	267	54	214	268	2470
61	30.	Industrial Park	852.90 TSF	469	85	554	111	444	555	5117
		SUB-TOTAL		469	85	554	111	444	555	5117
62	30.	Industrial Park	627.30 TSF	345	63	408	82	326	408	3764
		SUB-TOTAL		345	63	408	82	326	408	3764
63	30.	Industrial Park	575.00 TSF	316	58	374	75	299	374	3450
		SUB-TOTAL		316	58	374	75	299	374	3450
64	30.	Industrial Park	2742.00 TSF	1508	274	1782	356	1426	1782	16452
		SUB-TOTAL		1508	274	1782	356	1426	1782	16452
65	10.	Commercial Center (>30ac)	150.00 TSF	71	45	116	246	267	513	6009
	30.	Industrial Park	329.00 TSF	181	33	214	43	171	214	1974
		SUB-TOTAL		252	78	330	289	438	727	7983
66	10.	Commercial Center (>30ac)	170.45 TSF	80	51	131	280	303	583	6828
	30.	Industrial Park	348.00 TSF	191	35	226	45	181	226	2088
		SUB-TOTAL		271	86	357	325	484	809	8916
67	3.	Single Family (6-10du/ac)	291.00 DU	55	163	218	189	105	294	2881
		SUB-TOTAL		55	163	218	189	105	294	2881
68	5.	Apartment	208.00 DU	17	89	106	85	44	129	1435
		SUB-TOTAL		17	89	106	85	44	129	1435
69	3.	Single Family (6-10du/ac)	35.00 DU	7	20	27	23	13	36	347
		SUB-TOTAL		7	20	27	23	13	36	347

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
70	11. Commercial Center(10-30a)	147.00 TSF	107	69	176	350	379	729	7947
	26. Day Care	150.00 STU	65	57	122	60	69	129	678
	30. Industrial Park	600.00 TSF	330	60	390	78	312	390	3600
	32. Manufacturing/Warehouse	75.00 TSF	42	13	55	20	35	55	383
	SUB-TOTAL		544	199	743	508	795	1303	12608
71	21. High School	2500.00 STU	800	350	1150	150	225	375	4475
	SUB-TOTAL		800	350	1150	150	225	375	4475
72	13. Commercial Shops	60.00 TSF	43	29	72	108	108	216	2224
	SUB-TOTAL		43	29	72	108	108	216	2224
74	3. Single Family (6-10du/ac)	153.00 DU	29	86	115	99	55	154	1515
	4. Condominium/Townhouse	147.00 DU	9	71	80	69	38	107	1176
	SUB-TOTAL		38	157	195	168	93	261	2691
75	4. Condominium/Townhouse	149.00 DU	9	72	81	70	39	109	1192
	51. Developed Park	17.50 AC	0	0	0	1	1	2	46
	SUB-TOTAL		9	72	81	71	40	111	1238
76	5. Apartment	188.00 DU	15	81	96	77	39	116	1297
	12. Commercial Center (<10ac)	11.00 TSF	12	8	20	37	40	77	936
	SUB-TOTAL		27	89	116	114	79	193	2233
78	30. Industrial Park	1776.00 TSF	977	178	1155	231	924	1155	10656
	SUB-TOTAL		977	178	1155	231	924	1155	10656
79	30. Industrial Park	685.00 TSF	377	69	446	89	356	445	4110
	SUB-TOTAL		377	69	446	89	356	445	4110
80	30. Industrial Park	880.00 TSF	484	88	572	114	458	572	5280
	SUB-TOTAL		484	88	572	114	458	572	5280
81	30. Industrial Park	711.00 TSF	391	71	462	92	370	462	4266
	SUB-TOTAL		391	71	462	92	370	462	4266
82	30. Industrial Park	1007.55 TSF	554	101	655	131	524	655	6045
	SUB-TOTAL		554	101	655	131	524	655	6045
83	30. Industrial Park	876.00 TSF	482	88	570	114	456	570	5256
	SUB-TOTAL		482	88	570	114	456	570	5256
84	30. Industrial Park	333.00 TSF	183	33	216	43	173	216	1998
	SUB-TOTAL		183	33	216	43	173	216	1998
86	2. Single Family (1-5du/ac)	346.00 DU	66	194	260	225	125	350	3425
	12. Commercial Center (<10ac)	15.00 TSF	16	10	26	50	54	104	1276
	14. Hotel	36.00 ROOM	12	8	20	12	10	22	296

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
86	15. Sit-Down Restaurant	47.26 TSF	228	210	438	308	205	513	6160
	SUB-TOTAL		322	422	744	595	394	989	11157
89	53. Wayside Honor Ranch	20.00 SG	60	40	100	80	80	160	2000
	SUB-TOTAL		60	40	100	80	80	160	2000
90	12. Commercial Center (<10ac)	65.29 TSF	71	45	116	217	235	452	5554
	30. Industrial Park	1511.20 TSF	831	151	982	196	786	982	9067
	31. Business Park	533.68 TSF	640	123	763	160	528	688	5444
	SUB-TOTAL		1542	319	1861	573	1549	2122	20065
91	11. Commercial Center(10-30a)	113.38 TSF	83	53	136	270	293	563	6129
	SUB-TOTAL		83	53	136	270	293	563	6129
92	10. Commercial Center (>30ac)	580.00 TSF	273	174	447	951	1032	1983	23235
	14. Hotel	700.00 ROOM	238	154	392	224	203	427	5761
	SUB-TOTAL		511	328	839	1175	1235	2410	28996
93	13. Commercial Shops	20.00 TSF	14	10	24	36	36	72	741
	14. Hotel	169.00 ROOM	57	37	94	54	49	103	1391
	SUB-TOTAL		71	47	118	90	85	175	2132
94	54. Six Flags Magic Mtn	240.00 SG	720	480	1200	960	960	1920	24000
	SUB-TOTAL		720	480	1200	960	960	1920	24000
97	55. Travel Village	26.20 SG	79	52	131	105	105	210	2620
	SUB-TOTAL		79	52	131	105	105	210	2620
101	31. Business Park	200.00 TSF	240	46	286	60	198	258	2040
	SUB-TOTAL		240	46	286	60	198	258	2040
102	3. Single Family (6-10du/ac)	319.00 DU	61	179	240	207	115	322	3158
	4. Condominium/Townhouse	267.00 DU	16	128	144	125	69	194	2136
	5. Apartment	145.00 DU	12	62	74	59	30	89	1001
	13. Commercial Shops	60.30 TSF	43	29	72	109	109	218	2235
	20. Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
	25. Church	10.00 TSF	4	3	7	4	3	7	93
	26. Day Care	100.00 STU	43	38	81	40	46	86	452
	40. Commercial Office	17.30 TSF	27	3	30	4	22	26	200
	51. Developed Park	21.20 AC	0	0	0	1	1	2	55
	SUB-TOTAL		401	592	993	609	463	1072	10418
103	3. Single Family (6-10du/ac)	270.00 DU	51	151	202	176	97	273	2673
	4. Condominium/Townhouse	123.00 DU	7	59	66	58	32	90	984
	5. Apartment	320.00 DU	26	138	164	131	67	198	2208
	SUB-TOTAL		84	348	432	365	196	561	5865
104	11. Commercial Center(10-30a)	153.00 TSF	112	72	184	364	395	759	8271

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

				-- AM Peak Hour --			-- PM Peak Hour --			
Zone		Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
104	40.	Commercial Office	99.00 TSF	153	19	172	21	128	149	1144
		SUB-TOTAL		265	91	356	385	523	908	9415
105	11.	Commercial Center(10-30a)	77.90 TSF	57	37	94	185	201	386	4211
	40.	Commercial Office	245.00 TSF	380	47	427	51	316	367	2832
		SUB-TOTAL		437	84	521	236	517	753	7043
125	20.	Elementary/Middle School	1200.00 STU	312	240	552	96	108	204	1740
	21.	High School	2400.00 STU	768	336	1104	144	216	360	4296
		SUB-TOTAL		1080	576	1656	240	324	564	6036
130	2.	Single Family (1-5du/ac)	708.00 DU	135	396	531	460	255	715	7009
		SUB-TOTAL		135	396	531	460	255	715	7009
132	2.	Single Family (1-5du/ac)	436.00 DU	83	244	327	283	157	440	4316
	20.	Elementary/Middle School	900.00 STU	234	180	414	72	81	153	1305
		SUB-TOTAL		317	424	741	355	238	593	5621
133	11.	Commercial Center(10-30a)	27.00 TSF	20	13	33	64	70	134	1460
		SUB-TOTAL		20	13	33	64	70	134	1460
134	2.	Single Family (1-5du/ac)	482.00 DU	92	270	362	313	174	487	4772
		SUB-TOTAL		92	270	362	313	174	487	4772
135	2.	Single Family (1-5du/ac)	167.00 DU	32	94	126	109	60	169	1653
	4.	Condominium/Townhouse	172.00 DU	10	83	93	81	45	126	1376
	50.	Golf Course	208.00 AC	31	12	43	21	42	63	1656
		SUB-TOTAL		73	189	262	211	147	358	4685
137	12.	Commercial Center (<10ac)	72.00 TSF	78	50	128	239	259	498	6124
		SUB-TOTAL		78	50	128	239	259	498	6124
138	11.	Commercial Center(10-30a)	120.00 TSF	88	56	144	286	310	596	6487
		SUB-TOTAL		88	56	144	286	310	596	6487
139	5.	Apartment	474.00 DU	38	204	242	194	100	294	3271
		SUB-TOTAL		38	204	242	194	100	294	3271
140	2.	Single Family (1-5du/ac)	339.00 DU	64	190	254	220	122	342	3356
	4.	Condominium/Townhouse	414.00 DU	25	199	224	195	108	303	3312
	5.	Apartment	280.00 DU	22	120	142	115	59	174	1932
	11.	Commercial Center(10-30a)	130.00 TSF	95	61	156	309	335	644	7028
	31.	Business Park	250.00 TSF	300	58	358	75	248	323	2550
		SUB-TOTAL		506	628	1134	914	872	1786	18178
141	15.	Sit-Down Restaurant	20.30 TSF	98	90	188	132	88	220	2646
	16.	Fast Food Restaurant	10.10 TSF	257	247	504	176	162	338	5011
		SUB-TOTAL		355	337	692	308	250	558	7657

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
143	3. Single Family (6-10du/ac)	478.00 DU	91	268	359	311	172	483	4732
	4. Condominium/Townhouse	218.00 DU	13	105	118	102	57	159	1744
	20. Elementary/Middle School	462.00 STU	120	92	212	37	42	79	670
	51. Developed Park	4.80 AC	0	0	0	0	0	0	12
	SUB-TOTAL		224	465	689	450	271	721	7158
144	2. Single Family (1-5du/ac)	6.00 DU	1	3	4	4	2	6	59
	SUB-TOTAL		1	3	4	4	2	6	59
145	10. Commercial Center (>30ac)	763.00 TSF	359	229	588	1251	1358	2609	30566
	13. Commercial Shops	45.74 TSF	33	22	55	82	82	164	1695
	SUB-TOTAL		392	251	643	1333	1440	2773	32261
146	2. Single Family (1-5du/ac)	314.00 DU	60	176	236	204	113	317	3109
	4. Condominium/Townhouse	296.00 DU	18	142	160	139	77	216	2368
	SUB-TOTAL		78	318	396	343	190	533	5477
147	3. Single Family (6-10du/ac)	136.00 DU	26	76	102	88	49	137	1346
	4. Condominium/Townhouse	697.00 DU	42	335	377	328	181	509	5576
	20. Elementary/Middle School	750.00 STU	195	150	345	60	68	128	1088
	51. Developed Park	5.00 AC	0	0	0	0	0	0	13
	SUB-TOTAL		263	561	824	476	298	774	8023
148	11. Commercial Center(10-30a)	150.00 TSF	110	71	181	357	387	744	8109
	SUB-TOTAL		110	71	181	357	387	744	8109
149	2. Single Family (1-5du/ac)	535.00 DU	102	300	402	348	193	541	5297
	4. Condominium/Townhouse	500.00 DU	30	240	270	235	130	365	4000
	12. Commercial Center (<10ac)	34.85 TSF	38	24	62	116	125	241	2964
	SUB-TOTAL		170	564	734	699	448	1147	12261
150	2. Single Family (1-5du/ac)	114.00 DU	22	64	86	74	41	115	1129
	SUB-TOTAL		22	64	86	74	41	115	1129
152	2. Single Family (1-5du/ac)	279.00 DU	53	156	209	181	100	281	2762
	SUB-TOTAL		53	156	209	181	100	281	2762
159	2. Single Family (1-5du/ac)	4.00 DU	1	2	3	3	1	4	40
	SUB-TOTAL		1	2	3	3	1	4	40
160	3. Single Family (6-10du/ac)	170.00 DU	32	95	127	110	61	171	1683
	4. Condominium/Townhouse	281.00 DU	17	135	152	132	73	205	2248
	5. Apartment	380.00 DU	30	163	193	156	80	236	2622
	11. Commercial Center(10-30a)	110.00 TSF	80	52	132	262	284	546	5947
	51. Developed Park	7.98 AC	0	0	0	0	0	0	21
	SUB-TOTAL		159	445	604	660	498	1158	12521
161	2. Single Family (1-5du/ac)	533.00 DU	101	298	399	346	192	538	5277

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

				-- AM Peak Hour --			-- PM Peak Hour --			
Zone		Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
161	4.	Condominium/Townhouse	531.00 DU	32	255	287	250	138	388	4248
	11.	Commercial Center(10-30a)	48.00 TSF	35	23	58	114	124	238	2595
	12.	Commercial Center (<10ac)	40.22 TSF	44	28	72	134	145	279	3421
	13.	Commercial Shops	12.05 TSF	9	6	15	22	22	44	447
	14.	Hotel	283.00 ROOM	96	62	158	91	82	173	2329
	40.	Commercial Office	282.41 TSF	438	54	492	59	364	423	3265
	56.	CHP Office	55.74 SG	167	111	278	223	223	446	5574
		SUB-TOTAL		922	837	1759	1239	1290	2529	27156
162	2.	Single Family (1-5du/ac)	83.00 DU	16	46	62	54	30	84	822
		SUB-TOTAL		16	46	62	54	30	84	822
163	30.	Industrial Park	2567.08 TSF	1412	257	1669	334	1335	1669	15402
		SUB-TOTAL		1412	257	1669	334	1335	1669	15402
164	2.	Single Family (1-5du/ac)	121.00 DU	23	68	91	79	44	123	1198
	50.	Golf Course	145.00 AC	22	9	31	15	29	44	1154
		SUB-TOTAL		45	77	122	94	73	167	2352
165	2.	Single Family (1-5du/ac)	36.00 DU	7	20	27	23	13	36	356
	4.	Condominium/Townhouse	80.00 DU	5	38	43	38	21	59	640
	12.	Commercial Center (<10ac)	30.23 TSF	33	21	54	100	109	209	2571
	13.	Commercial Shops	7.60 TSF	5	4	9	14	14	28	282
	15.	Sit-Down Restaurant	23.95 TSF	115	107	222	156	104	260	3122
	23.	Hospital	24.66 TSF	18	6	24	5	17	22	414
	30.	Industrial Park	1890.89 TSF	1040	189	1229	246	983	1229	11345
	32.	Manufacturing/Warehouse	2.47 TSF	1	0	1	1	1	2	13
	40.	Commercial Office	13.81 TSF	21	3	24	3	18	21	160
		SUB-TOTAL		1245	388	1633	586	1280	1866	18903
166	2.	Single Family (1-5du/ac)	431.00 DU	82	241	323	280	155	435	4267
	4.	Condominium/Townhouse	217.00 DU	13	104	117	102	56	158	1736
	12.	Commercial Center (<10ac)	48.64 TSF	53	34	87	161	175	336	4137
	13.	Commercial Shops	1.38 TSF	1	1	2	2	2	4	51
	15.	Sit-Down Restaurant	4.34 TSF	21	19	40	28	19	47	566
	23.	Hospital	38.58 TSF	27	10	37	8	27	35	648
	32.	Manufacturing/Warehouse	11.00 TSF	6	2	8	3	5	8	56
	40.	Commercial Office	30.10 TSF	47	6	53	6	39	45	348
		SUB-TOTAL		250	417	667	590	478	1068	11809
167	2.	Single Family (1-5du/ac)	327.00 DU	62	183	245	213	118	331	3237
		SUB-TOTAL		62	183	245	213	118	331	3237
168	2.	Single Family (1-5du/ac)	59.00 DU	11	33	44	38	21	59	584
		SUB-TOTAL		11	33	44	38	21	59	584
169	2.	Single Family (1-5du/ac)	124.00 DU	24	69	93	81	45	126	1228
	4.	Condominium/Townhouse	94.00 DU	6	45	51	44	24	68	752

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
169	10. Commercial Center (>30ac)	200.00 TSF	94	60	154	328	356	684	8012
	SUB-TOTAL		124	174	298	453	425	878	9992
170	2. Single Family (1-5du/ac)	163.00 DU	31	91	122	106	59	165	1614
	SUB-TOTAL		31	91	122	106	59	165	1614
171	2. Single Family (1-5du/ac)	32.00 DU	6	18	24	21	12	33	317
	20. Elementary/Middle School	157.00 STU	41	31	72	13	14	27	228
	SUB-TOTAL		47	49	96	34	26	60	545
172	2. Single Family (1-5du/ac)	185.00 DU	35	104	139	120	67	187	1831
	SUB-TOTAL		35	104	139	120	67	187	1831
173	2. Single Family (1-5du/ac)	336.00 DU	64	188	252	218	121	339	3326
	SUB-TOTAL		64	188	252	218	121	339	3326
174	11. Commercial Center(10-30a)	35.00 TSF	26	16	42	83	90	173	1892
	SUB-TOTAL		26	16	42	83	90	173	1892
175	2. Single Family (1-5du/ac)	162.00 DU	31	91	122	105	58	163	1604
	4. Condominium/Townhouse	160.00 DU	10	77	87	75	42	117	1280
	11. Commercial Center(10-30a)	98.01 TSF	72	46	118	233	253	486	5298
	20. Elementary/Middle School	74.00 STU	19	15	34	6	7	13	107
	34. Utilities	87.12 TSF	0	0	0	0	0	0	207
	SUB-TOTAL		132	229	361	419	360	779	8496
176	2. Single Family (1-5du/ac)	686.00 DU	130	384	514	446	247	693	6791
	4. Condominium/Townhouse	135.00 DU	8	65	73	63	35	98	1080
	10. Commercial Center (>30ac)	196.02 TSF	92	59	151	321	349	670	7853
	13. Commercial Shops	141.57 TSF	102	68	170	255	255	510	5247
	SUB-TOTAL		332	576	908	1085	886	1971	20971
177	2. Single Family (1-5du/ac)	477.00 DU	91	267	358	310	172	482	4722
	4. Condominium/Townhouse	264.00 DU	16	127	143	124	69	193	2112
	11. Commercial Center(10-30a)	81.68 TSF	60	38	98	194	211	405	4415
	20. Elementary/Middle School	92.00 STU	24	18	42	7	8	15	133
	SUB-TOTAL		191	450	641	635	460	1095	11382
178	2. Single Family (1-5du/ac)	333.00 DU	63	186	249	216	120	336	3297
	11. Commercial Center(10-30a)	21.78 TSF	16	10	26	52	56	108	1177
	13. Commercial Shops	6.53 TSF	5	3	8	12	12	24	242
	40. Commercial Office	14.81 TSF	23	3	26	3	19	22	171
	SUB-TOTAL		107	202	309	283	207	490	4887
179	2. Single Family (1-5du/ac)	167.00 DU	32	94	126	109	60	169	1653
	13. Commercial Shops	21.78 TSF	16	10	26	39	39	78	807
	34. Utilities	87.12 TSF	0	0	0	0	0	0	207
	42. Medical Office	24.83 TSF	48	12	60	25	66	91	849
	SUB-TOTAL		96	116	212	173	165	338	3516

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

Zone	Land Use Type		Units	-- AM Peak Hour --			-- PM Peak Hour --			ADT
				In	Out	Total	In	Out	Total	
180	2.	Single Family (1-5du/ac)	428.00 DU	81	240	321	278	154	432	4237
		SUB-TOTAL		81	240	321	278	154	432	4237
181	3.	Single Family (6-10du/ac)	282.00 DU	54	158	212	183	102	285	2792
	20.	Elementary/Middle School	37.00 STU	10	7	17	3	3	6	54
		SUB-TOTAL		64	165	229	186	105	291	2846
182	3.	Single Family (6-10du/ac)	276.00 DU	52	155	207	179	99	278	2732
	4.	Condominium/Townhouse	229.00 DU	14	110	124	108	60	168	1832
	6.	Mobile Home	238.00 DU	19	76	95	83	50	133	1642
	11.	Commercial Center(10-30a)	76.23 TSF	56	36	92	181	197	378	4121
	20.	Elementary/Middle School	83.00 STU	22	17	39	7	7	14	120
	25.	Church	17.25 TSF	7	6	13	6	5	11	160
		SUB-TOTAL		170	400	570	564	418	982	10607
183	4.	Condominium/Townhouse	634.00 DU	38	304	342	298	165	463	5072
	12.	Commercial Center (<10ac)	3.50 TSF	4	2	6	12	13	25	298
	22.	College	3274.00 STU	426	33	459	393	164	557	5042
	50.	Golf Course	100.00 AC	15	6	21	10	20	30	796
		SUB-TOTAL		483	345	828	713	362	1075	11208
184	40.	Commercial Office	250.00 TSF	388	48	436	53	323	376	2890
		SUB-TOTAL		388	48	436	53	323	376	2890
185	2.	Single Family (1-5du/ac)	133.00 DU	25	74	99	86	48	134	1317
	3.	Single Family (6-10du/ac)	211.00 DU	40	118	158	137	76	213	2089
		SUB-TOTAL		65	192	257	223	124	347	3406
186	3.	Single Family (6-10du/ac)	150.00 DU	29	84	113	98	54	152	1485
	23.	Hospital	125.24 TSF	89	33	122	28	88	116	2104
	42.	Medical Office	108.90 TSF	211	53	264	108	291	399	3724
		SUB-TOTAL		329	170	499	234	433	667	7313
187	2.	Single Family (1-5du/ac)	111.00 DU	21	62	83	72	40	112	1099
	4.	Condominium/Townhouse	307.00 DU	18	147	165	144	80	224	2456
	34.	Utilities	217.80 TSF	0	0	0	0	0	0	518
	51.	Developed Park	14.00 AC	0	0	0	0	1	1	36
		SUB-TOTAL		39	209	248	216	121	337	4109
188	2.	Single Family (1-5du/ac)	72.00 DU	14	40	54	47	26	73	713
	4.	Condominium/Townhouse	216.00 DU	13	104	117	102	56	158	1728
		SUB-TOTAL		27	144	171	149	82	231	2441
189	22.	College	20000.00 STU	2600	200	2800	2400	1000	3400	30800
	40.	Commercial Office	28.44 TSF	44	5	49	6	37	43	329
		SUB-TOTAL		2644	205	2849	2406	1037	3443	31129
190	2.	Single Family (1-5du/ac)	171.00 DU	32	96	128	111	62	173	1693
		SUB-TOTAL		32	96	128	111	62	173	1693

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
191	12. Commercial Center (<10ac)	50.00 TSF	55	35	90	166	180	346	4253
	SUB-TOTAL		55	35	90	166	180	346	4253
192	2. Single Family (1-5du/ac)	164.00 DU	31	92	123	107	59	166	1624
	4. Condominium/Townhouse	660.00 DU	40	317	357	310	172	482	5280
	SUB-TOTAL		71	409	480	417	231	648	6904
193	31. Business Park	250.00 TSF	300	58	358	75	248	323	2550
	SUB-TOTAL		300	58	358	75	248	323	2550
194	50. Golf Course	100.00 AC	15	6	21	10	20	30	796
	SUB-TOTAL		15	6	21	10	20	30	796
195	3. Single Family (6-10du/ac)	76.00 DU	14	43	57	49	27	76	752
	SUB-TOTAL		14	43	57	49	27	76	752
196	13. Commercial Shops	16.00 TSF	12	8	20	29	29	58	593
	SUB-TOTAL		12	8	20	29	29	58	593
197	31. Business Park	376.64 TSF	452	87	539	113	373	486	3842
	SUB-TOTAL		452	87	539	113	373	486	3842
198	2. Single Family (1-5du/ac)	179.00 DU	34	100	134	116	64	180	1772
	3. Single Family (6-10du/ac)	152.00 DU	29	85	114	99	55	154	1505
	SUB-TOTAL		63	185	248	215	119	334	3277
199	14. Hotel	237.00 ROOM	81	52	133	76	69	145	1951
	15. Sit-Down Restaurant	5.00 TSF	24	22	46	33	22	55	652
	SUB-TOTAL		105	74	179	109	91	200	2603
200	31. Business Park	434.28 TSF	521	100	621	130	430	560	4430
	SUB-TOTAL		521	100	621	130	430	560	4430
201	31. Business Park	200.00 TSF	240	46	286	60	198	258	2040
	SUB-TOTAL		240	46	286	60	198	258	2040
202	5. Apartment	560.00 DU	45	241	286	230	118	348	3864
	13. Commercial Shops	22.00 TSF	16	11	27	40	40	80	815
	14. Hotel	250.00 ROOM	85	55	140	80	73	153	2058
	18. Health Club	54.00 TSF	52	35	87	117	78	195	2160
	40. Commercial Office	13.00 TSF	20	2	22	3	17	20	150
	SUB-TOTAL		218	344	562	470	326	796	9047
203	10. Commercial Center (>30ac)	956.00 TSF	449	287	736	1568	1702	3270	38297
	SUB-TOTAL		449	287	736	1568	1702	3270	38297
204	13. Commercial Shops	62.00 TSF	45	30	75	112	112	224	2298
	17. Movie Theater	3300.00 SEAT	0	0	0	165	66	231	5808

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

				-- AM Peak Hour --			-- PM Peak Hour --			
Zone		Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
204	40.	Commercial Office	400.00 TSF	620	76	696	84	516	600	4624
		SUB-TOTAL		665	106	771	361	694	1055	12730
205	24.	Library	112.39 TSF	85	34	119	382	415	797	9550
	40.	Commercial Office	93.31 TSF	145	18	163	20	120	140	1079
		SUB-TOTAL		230	52	282	402	535	937	10629
206	11.	Commercial Center(10-30a)	166.11 TSF	121	78	199	395	429	824	8980
	15.	Sit-Down Restaurant	21.50 TSF	104	96	200	140	93	233	2802
		SUB-TOTAL		225	174	399	535	522	1057	11782
207	40.	Commercial Office	230.00 TSF	357	44	401	48	297	345	2659
		SUB-TOTAL		357	44	401	48	297	345	2659
208	4.	Condominium/Townhouse	234.00 DU	14	112	126	110	61	171	1872
		SUB-TOTAL		14	112	126	110	61	171	1872
209	2.	Single Family (1-5du/ac)	414.00 DU	79	232	311	269	149	418	4099
	4.	Condominium/Townhouse	352.00 DU	21	169	190	165	92	257	2816
		SUB-TOTAL		100	401	501	434	241	675	6915
210	2.	Single Family (1-5du/ac)	205.00 DU	39	115	154	133	74	207	2029
	4.	Condominium/Townhouse	208.00 DU	12	100	112	98	54	152	1664
	11.	Commercial Center(10-30a)	148.10 TSF	108	70	178	352	382	734	8007
		SUB-TOTAL		159	285	444	583	510	1093	11700
211	2.	Single Family (1-5du/ac)	167.00 DU	32	94	126	109	60	169	1653
		SUB-TOTAL		32	94	126	109	60	169	1653
212	2.	Single Family (1-5du/ac)	252.00 DU	48	141	189	164	91	255	2495
	4.	Condominium/Townhouse	272.00 DU	16	131	147	128	71	199	2176
	25.	Church	18.03 TSF	7	6	13	6	5	11	168
	51.	Developed Park	4.20 AC	0	0	0	0	0	0	11
		SUB-TOTAL		71	278	349	298	167	465	4850
213	2.	Single Family (1-5du/ac)	275.00 DU	52	154	206	179	99	278	2723
	25.	Church	25.09 TSF	10	8	18	9	8	17	233
		SUB-TOTAL		62	162	224	188	107	295	2956
214	3.	Single Family (6-10du/ac)	183.00 DU	35	102	137	119	66	185	1812
		SUB-TOTAL		35	102	137	119	66	185	1812
215	2.	Single Family (1-5du/ac)	105.00 DU	20	59	79	68	38	106	1040
	4.	Condominium/Townhouse	52.00 DU	3	25	28	24	14	38	416
	11.	Commercial Center(10-30a)	100.00 TSF	73	47	120	238	258	496	5406
	13.	Commercial Shops	43.56 TSF	31	21	52	78	78	156	1614
	21.	High School	1016.00 STU	325	142	467	61	91	152	1819
	25.	Church	50.18 TSF	20	17	37	18	15	33	467

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

Zone	Land Use Type	Units	-- AM Peak Hour --			-- PM Peak Hour --			ADT
			In	Out	Total	In	Out	Total	
215	34. Utilities	47.92 TSF	0	0	0	0	0	0	114
	SUB-TOTAL		472	311	783	487	494	981	10876
216	3. Single Family (6-10du/ac)	22.00 DU	4	12	16	14	8	22	218
	4. Condominium/Townhouse	128.00 DU	8	61	69	60	33	93	1024
	11. Commercial Center(10-30a)	149.96 TSF	109	70	179	357	387	744	8107
	40. Commercial Office	10.45 TSF	16	2	18	2	13	15	121
	SUB-TOTAL		137	145	282	433	441	874	9470
217	2. Single Family (1-5du/ac)	202.00 DU	38	113	151	131	73	204	2000
	4. Condominium/Townhouse	28.00 DU	2	13	15	13	7	20	224
	11. Commercial Center(10-30a)	65.75 TSF	48	31	79	156	170	326	3555
	13. Commercial Shops	3.27 TSF	2	2	4	6	6	12	121
	14. Hotel	10.00 ROOM	3	2	5	3	3	6	82
	30. Industrial Park	22.44 TSF	12	2	14	3	12	15	135
	40. Commercial Office	22.44 TSF	35	4	39	5	29	34	259
	SUB-TOTAL		140	167	307	317	300	617	6376
218	4. Condominium/Townhouse	641.00 DU	38	308	346	301	167	468	5128
	6. Mobile Home	151.00 DU	12	48	60	53	32	85	1042
	11. Commercial Center(10-30a)	100.00 TSF	73	47	120	238	258	496	5406
	13. Commercial Shops	64.25 TSF	46	31	77	116	116	232	2381
	25. Church	9.41 TSF	4	3	7	3	3	6	88
	SUB-TOTAL		173	437	610	711	576	1287	14045
219	2. Single Family (1-5du/ac)	40.00 DU	8	22	30	26	14	40	396
	SUB-TOTAL		8	22	30	26	14	40	396
220	2. Single Family (1-5du/ac)	8.00 DU	2	4	6	5	3	8	79
	34. Utilities	566.28 TSF	0	0	0	0	0	0	1348
	SUB-TOTAL		2	4	6	5	3	8	1427
221	2. Single Family (1-5du/ac)	295.00 DU	56	165	221	192	106	298	2921
	4. Condominium/Townhouse	6.00 DU	0	3	3	3	2	5	48
	6. Mobile Home	30.00 DU	2	10	12	11	6	17	207
	20. Elementary/Middle School	28.00 STU	7	6	13	2	3	5	41
	22. College	362.00 STU	47	4	51	43	18	61	557
	25. Church	92.52 TSF	36	31	67	33	28	61	860
	30. Industrial Park	144.40 TSF	79	14	93	19	75	94	866
	SUB-TOTAL		227	233	460	303	238	541	5500
222	2. Single Family (1-5du/ac)	33.00 DU	6	18	24	21	12	33	327
	22. College	3164.00 STU	411	32	443	380	158	538	4873
	25. Church	16.70 TSF	7	6	13	6	5	11	155
	SUB-TOTAL		424	56	480	407	175	582	5355
223	2. Single Family (1-5du/ac)	19.00 DU	4	11	15	12	7	19	188
	11. Commercial Center(10-30a)	43.38 TSF	32	20	52	103	112	215	2345

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
223	23. Hospital	4.32 TSF	3	1	4	1	3	4	73
	30. Industrial Park	70.36 TSF	39	7	46	9	37	46	422
	40. Commercial Office	0.36 TSF	1	0	1	0	0	0	4
	SUB-TOTAL		79	39	118	125	159	284	3032
224	2. Single Family (1-5du/ac)	230.00 DU	44	129	173	150	83	233	2277
	4. Condominium/Townhouse	500.00 DU	30	240	270	235	130	365	4000
	6. Mobile Home	30.00 DU	2	10	12	11	6	17	207
	13. Commercial Shops	81.68 TSF	59	39	98	147	147	294	3027
	20. Elementary/Middle School	111.00 STU	29	22	51	9	10	19	161
	24. Library	16.73 TSF	13	5	18	57	62	119	1421
	SUB-TOTAL		177	445	622	609	438	1047	11093
225	2. Single Family (1-5du/ac)	136.00 DU	26	76	102	88	49	137	1346
	4. Condominium/Townhouse	77.00 DU	5	37	42	36	20	56	616
	20. Elementary/Middle School	296.00 STU	77	59	136	24	27	51	429
	51. Developed Park	14.00 AC	0	0	0	0	1	1	36
	SUB-TOTAL		108	172	280	148	97	245	2427
226	2. Single Family (1-5du/ac)	300.00 DU	57	168	225	195	108	303	2970
	4. Condominium/Townhouse	292.00 DU	18	140	158	137	76	213	2336
	13. Commercial Shops	69.70 TSF	50	33	83	125	125	250	2583
	25. Church	8.00 TSF	3	3	6	3	2	5	74
	SUB-TOTAL		128	344	472	460	311	771	7963
228	2. Single Family (1-5du/ac)	50.00 DU	10	28	38	33	18	51	495
	SUB-TOTAL		10	28	38	33	18	51	495
229	1. Single Family (<1du/ac)	74.00 DU	21	50	71	62	27	89	733
	SUB-TOTAL		21	50	71	62	27	89	733
234	11. Commercial Center(10-30a)	100.00 TSF	73	47	120	238	258	496	5406
	31. Business Park	470.24 TSF	564	108	672	141	466	607	4796
	SUB-TOTAL		637	155	792	379	724	1103	10202
235	11. Commercial Center(10-30a)	20.00 TSF	15	9	24	48	52	100	1081
	31. Business Park	130.00 TSF	156	30	186	39	129	168	1326
	SUB-TOTAL		171	39	210	87	181	268	2407
236	2. Single Family (1-5du/ac)	80.00 DU	15	45	60	52	29	81	792
	3. Single Family (6-10du/ac)	80.00 DU	15	45	60	52	29	81	792
	20. Elementary/Middle School	300.00 STU	78	60	138	24	27	51	435
	51. Developed Park	5.00 AC	0	0	0	0	0	0	13
	SUB-TOTAL		108	150	258	128	85	213	2032
237	2. Single Family (1-5du/ac)	100.00 DU	19	56	75	65	36	101	990
	5. Apartment	300.00 DU	24	129	153	123	63	186	2070
	40. Commercial Office	50.00 TSF	78	10	88	11	65	76	578

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
237	51. Developed Park	24.40 AC	0	0	0	1	1	2	63
	SUB-TOTAL		121	195	316	200	165	365	3701
238	2. Single Family (1-5du/ac)	80.00 DU	15	45	60	52	29	81	792
	3. Single Family (6-10du/ac)	110.00 DU	21	62	83	72	40	112	1089
	4. Condominium/Townhouse	60.00 DU	4	29	33	28	16	44	480
	10. Commercial Center (>30ac)	15.00 TSF	7	5	12	25	27	52	601
	12. Commercial Center (<10ac)	20.00 TSF	22	14	36	66	72	138	1701
	15. Sit-Down Restaurant	10.00 TSF	48	45	93	65	43	108	1303
	31. Business Park	100.00 TSF	120	23	143	30	99	129	1020
	51. Developed Park	25.90 AC	0	0	0	1	1	2	67
	SUB-TOTAL		237	223	460	339	327	666	7053
239	13. Commercial Shops	337.29 TSF	243	162	405	607	607	1214	12500
	30. Industrial Park	387.07 TSF	213	39	252	50	201	251	2322
	32. Manufacturing/Warehouse	1552.60 TSF	869	264	1133	419	730	1149	7918
	40. Commercial Office	262.87 TSF	407	50	457	55	339	394	3039
	SUB-TOTAL		1732	515	2247	1131	1877	3008	25779
243	2. Single Family (1-5du/ac)	100.00 DU	19	56	75	65	36	101	990
	4. Condominium/Townhouse	200.00 DU	12	96	108	94	52	146	1600
	5. Apartment	200.00 DU	16	86	102	82	42	124	1380
	10. Commercial Center (>30ac)	30.00 TSF	14	9	23	49	53	102	1202
	12. Commercial Center (<10ac)	10.00 TSF	11	7	18	33	36	69	851
	15. Sit-Down Restaurant	10.00 TSF	48	45	93	65	43	108	1303
	40. Commercial Office	70.00 TSF	109	13	122	15	90	105	809
	SUB-TOTAL		229	312	541	403	352	755	8135
244	1. Single Family (<1du/ac)	95.00 DU	28	64	92	80	34	114	940
	2. Single Family (1-5du/ac)	322.00 DU	61	180	241	209	116	325	3188
	3. Single Family (6-10du/ac)	95.00 DU	18	53	71	62	34	96	940
	4. Condominium/Townhouse	157.00 DU	9	75	84	74	41	115	1256
	11. Commercial Center(10-30a)	54.45 TSF	40	26	66	130	140	270	2944
	30. Industrial Park	40.00 TSF	22	4	26	5	21	26	240
	40. Commercial Office	86.16 TSF	134	16	150	18	111	129	996
	SUB-TOTAL		312	418	730	578	497	1075	10504
245	4. Condominium/Townhouse	148.00 DU	9	71	80	70	38	108	1184
	30. Industrial Park	345.58 TSF	190	35	225	45	180	225	2073
	32. Manufacturing/Warehouse	61.16 TSF	34	10	44	17	29	46	312
	SUB-TOTAL		233	116	349	132	247	379	3569
246	32. Manufacturing/Warehouse	58.81 TSF	33	10	43	16	28	44	300
	SUB-TOTAL		33	10	43	16	28	44	300
247	11. Commercial Center(10-30a)	71.37 TSF	52	34	86	170	184	354	3858
	SUB-TOTAL		52	34	86	170	184	354	3858

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
248	2. Single Family (1-5du/ac)	2.00 DU	0	1	1	1	1	2	20
	4. Condominium/Townhouse	4.00 DU	0	2	2	2	1	3	32
	30. Industrial Park	882.09 TSF	485	88	573	115	459	574	5293
	SUB-TOTAL		485	91	576	118	461	579	5345
249	32. Manufacturing/Warehouse	291.68 TSF	163	50	213	79	137	216	1488
	SUB-TOTAL		163	50	213	79	137	216	1488
250	13. Commercial Shops	58.00 TSF	42	28	70	104	104	208	2149
	SUB-TOTAL		42	28	70	104	104	208	2149
254	13. Commercial Shops	8.71 TSF	6	4	10	16	16	32	323
	SUB-TOTAL		6	4	10	16	16	32	323
255	1. Single Family (<1du/ac)	2.00 DU	1	1	2	2	1	3	20
	SUB-TOTAL		1	1	2	2	1	3	20
256	2. Single Family (1-5du/ac)	20.00 DU	4	11	15	13	7	20	198
	SUB-TOTAL		4	11	15	13	7	20	198
257	2. Single Family (1-5du/ac)	120.00 DU	23	67	90	78	43	121	1188
	4. Condominium/Townhouse	11.00 DU	1	5	6	5	3	8	88
	SUB-TOTAL		24	72	96	83	46	129	1276
258	2. Single Family (1-5du/ac)	74.00 DU	14	41	55	48	27	75	733
	32. Manufacturing/Warehouse	125.00 TSF	70	21	91	34	59	93	638
	SUB-TOTAL		84	62	146	82	86	168	1371
260	2. Single Family (1-5du/ac)	27.00 DU	5	15	20	18	10	28	267
	SUB-TOTAL		5	15	20	18	10	28	267
261	2. Single Family (1-5du/ac)	10.00 DU	2	6	8	7	4	11	99
	SUB-TOTAL		2	6	8	7	4	11	99
262	2. Single Family (1-5du/ac)	927.00 DU	176	519	695	603	334	937	9177
	4. Condominium/Townhouse	295.00 DU	18	142	160	139	77	216	2360
	SUB-TOTAL		194	661	855	742	411	1153	11537
264	2. Single Family (1-5du/ac)	63.00 DU	12	35	47	41	23	64	624
	SUB-TOTAL		12	35	47	41	23	64	624
265	2. Single Family (1-5du/ac)	600.00 DU	114	336	450	390	216	606	5940
	SUB-TOTAL		114	336	450	390	216	606	5940
266	11. Commercial Center(10-30a)	101.04 TSF	74	47	121	240	261	501	5462
	SUB-TOTAL		74	47	121	240	261	501	5462
267	11. Commercial Center(10-30a)	100.00 TSF	73	47	120	238	258	496	5406
	SUB-TOTAL		73	47	120	238	258	496	5406

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
268	2. Single Family (1-5du/ac)	13.00 DU	2	7	9	8	5	13	129
	11. Commercial Center(10-30a)	182.33 TSF	133	86	219	434	470	904	9857
	SUB-TOTAL		135	93	228	442	475	917	9986
269	2. Single Family (1-5du/ac)	393.00 DU	75	220	295	255	141	396	3891
	11. Commercial Center(10-30a)	90.66 TSF	66	43	109	216	234	450	4901
	21. High School	500.00 STU	160	70	230	30	45	75	895
	SUB-TOTAL		301	333	634	501	420	921	9687
270	1. Single Family (<1du/ac)	8.00 DU	2	5	7	7	3	10	79
	SUB-TOTAL		2	5	7	7	3	10	79
271	2. Single Family (1-5du/ac)	488.00 DU	93	273	366	317	176	493	4831
	10. Commercial Center (>30ac)	585.00 TSF	275	176	451	959	1041	2000	23435
	20. Elementary/Middle School	500.00 STU	130	100	230	40	45	85	725
	SUB-TOTAL		498	549	1047	1316	1262	2578	28991
272	2. Single Family (1-5du/ac)	531.00 DU	101	297	398	345	191	536	5257
	3. Single Family (6-10du/ac)	154.00 DU	29	86	115	100	55	155	1525
	4. Condominium/Townhouse	300.00 DU	18	144	162	141	78	219	2400
	12. Commercial Center (<10ac)	8.12 TSF	9	6	15	27	29	56	691
	SUB-TOTAL		157	533	690	613	353	966	9873
273	2. Single Family (1-5du/ac)	6.00 DU	1	3	4	4	2	6	59
	SUB-TOTAL		1	3	4	4	2	6	59
274	2. Single Family (1-5du/ac)	174.00 DU	33	97	130	113	63	176	1723
	SUB-TOTAL		33	97	130	113	63	176	1723
275	2. Single Family (1-5du/ac)	64.00 DU	12	36	48	42	23	65	634
	20. Elementary/Middle School	314.00 STU	82	63	145	25	28	53	455
	40. Commercial Office	1.65 TSF	3	0	3	0	2	2	19
	SUB-TOTAL		97	99	196	67	53	120	1108
276	3. Single Family (6-10du/ac)	5.00 DU	1	3	4	3	2	5	50
	4. Condominium/Townhouse	539.00 DU	32	259	291	253	140	393	4312
	12. Commercial Center (<10ac)	98.01 TSF	107	68	175	325	353	678	8337
	25. Church	7.84 TSF	3	3	6	3	2	5	73
	SUB-TOTAL		143	333	476	584	497	1081	12772
277	12. Commercial Center (<10ac)	4.91 TSF	5	3	8	16	18	34	418
	16. Fast Food Restaurant	3.00 TSF	76	73	149	52	48	100	1488
	SUB-TOTAL		81	76	157	68	66	134	1906
278	40. Commercial Office	10.00 TSF	16	2	18	2	13	15	116
	SUB-TOTAL		16	2	18	2	13	15	116
279	2. Single Family (1-5du/ac)	313.00 DU	59	175	234	203	113	316	3099

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
279	12. Commercial Center (<10ac)	26.33 TSF	29	18	47	87	95	182	2240
	40. Commercial Office	0.20 TSF	0	0	0	0	0	0	2
	SUB-TOTAL		88	193	281	290	208	498	5341
282	4. Condominium/Townhouse	486.00 DU	29	233	262	228	126	354	3888
	11. Commercial Center(10-30a)	17.90 TSF	13	8	21	43	46	89	968
	SUB-TOTAL		42	241	283	271	172	443	4856
283	4. Condominium/Townhouse	400.00 DU	24	192	216	188	104	292	3200
	SUB-TOTAL		24	192	216	188	104	292	3200
284	2. Single Family (1-5du/ac)	2.00 DU	0	1	1	1	1	2	20
	6. Mobile Home	346.00 DU	28	111	139	121	73	194	2387
	SUB-TOTAL		28	112	140	122	74	196	2407
285	30. Industrial Park	566.28 TSF	311	57	368	74	294	368	3398
	SUB-TOTAL		311	57	368	74	294	368	3398
286	32. Manufacturing/Warehouse	141.13 TSF	79	24	103	38	66	104	720
	SUB-TOTAL		79	24	103	38	66	104	720
290	2. Single Family (1-5du/ac)	1.00 DU	0	1	1	1	0	1	10
	SUB-TOTAL		0	1	1	1	0	1	10
291	2. Single Family (1-5du/ac)	55.00 DU	10	31	41	36	20	56	545
	31. Business Park	181.63 TSF	218	42	260	54	180	234	1853
	SUB-TOTAL		228	73	301	90	200	290	2398
292	2. Single Family (1-5du/ac)	161.00 DU	31	90	121	105	58	163	1594
	SUB-TOTAL		31	90	121	105	58	163	1594
293	2. Single Family (1-5du/ac)	90.00 DU	17	50	67	58	32	90	891
	4. Condominium/Townhouse	368.00 DU	22	177	199	173	96	269	2944
	SUB-TOTAL		39	227	266	231	128	359	3835
294	11. Commercial Center(10-30a)	364.00 TSF	266	171	437	866	939	1805	19678
	30. Industrial Park	210.00 TSF	116	21	137	27	109	136	1260
	31. Business Park	349.98 TSF	420	80	500	105	346	451	3570
	SUB-TOTAL		802	272	1074	998	1394	2392	24508
295	32. Manufacturing/Warehouse	1020.58 TSF	572	173	745	276	480	756	5205
	40. Commercial Office	56.00 TSF	87	11	98	12	72	84	647
	SUB-TOTAL		659	184	843	288	552	840	5852
298	5. Apartment	830.00 DU	66	357	423	340	174	514	5727
	SUB-TOTAL		66	357	423	340	174	514	5727
299	11. Commercial Center(10-30a)	184.00 TSF	134	86	220	438	475	913	9947
	SUB-TOTAL		134	86	220	438	475	913	9947

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
300	10. Commercial Center (>30ac)	272.00 TSF	128	82	210	446	484	930	10896
	SUB-TOTAL		128	82	210	446	484	930	10896
301	13. Commercial Shops	135.00 TSF	97	65	162	243	243	486	5003
	19. Car Dealership	150.00 TSF	242	90	332	168	252	420	5625
	SUB-TOTAL		339	155	494	411	495	906	10628
302	10. Commercial Center (>30ac)	384.42 TSF	181	115	296	630	684	1314	15400
	12. Commercial Center (<10ac)	30.00 TSF	33	21	54	100	108	208	2552
	SUB-TOTAL		214	136	350	730	792	1522	17952
303	19. Car Dealership	150.00 TSF	242	90	332	168	252	420	5625
	SUB-TOTAL		242	90	332	168	252	420	5625
304	11. Commercial Center(10-30a)	131.00 TSF	96	62	158	312	338	650	7082
	SUB-TOTAL		96	62	158	312	338	650	7082
305	11. Commercial Center(10-30a)	160.00 TSF	117	75	192	381	413	794	8650
	32. Manufacturing/Warehouse	100.00 TSF	56	17	73	27	47	74	510
	SUB-TOTAL		173	92	265	408	460	868	9160
306	11. Commercial Center(10-30a)	180.00 TSF	131	85	216	428	464	892	9731
	SUB-TOTAL		131	85	216	428	464	892	9731
307	11. Commercial Center(10-30a)	128.00 TSF	93	60	153	305	330	635	6920
	SUB-TOTAL		93	60	153	305	330	635	6920
308	4. Condominium/Townhouse	106.00 DU	6	51	57	50	28	78	848
	6. Mobile Home	168.00 DU	13	54	67	59	35	94	1159
	12. Commercial Center (<10ac)	50.00 TSF	55	35	90	166	180	346	4253
	32. Manufacturing/Warehouse	29.40 TSF	16	5	21	8	14	22	150
	SUB-TOTAL		90	145	235	283	257	540	6410
309	13. Commercial Shops	3.00 TSF	2	1	3	5	5	10	111
	SUB-TOTAL		2	1	3	5	5	10	111
310	19. Car Dealership	111.00 TSF	179	67	246	124	186	310	4163
	51. Developed Park	17.20 AC	0	0	0	1	1	2	45
	SUB-TOTAL		179	67	246	125	187	312	4208
311	3. Single Family (6-10du/ac)	104.00 DU	20	58	78	68	37	105	1030
	4. Condominium/Townhouse	156.00 DU	9	75	84	73	41	114	1248
	SUB-TOTAL		29	133	162	141	78	219	2278
312	11. Commercial Center(10-30a)	180.00 TSF	131	85	216	428	464	892	9731
	34. Utilities	84.00 TSF	0	0	0	0	0	0	200
	SUB-TOTAL		131	85	216	428	464	892	9931

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

Zone	Land Use Type	Units	-- AM Peak Hour --			-- PM Peak Hour --			ADT
			In	Out	Total	In	Out	Total	
313	4. Condominium/Townhouse	264.00 DU	16	127	143	124	69	193	2112
	SUB-TOTAL		16	127	143	124	69	193	2112
314	11. Commercial Center(10-30a)	178.00 TSF	130	84	214	424	459	883	9623
	SUB-TOTAL		130	84	214	424	459	883	9623
315	4. Condominium/Townhouse	166.00 DU	10	80	90	78	43	121	1328
	SUB-TOTAL		10	80	90	78	43	121	1328
316	2. Single Family (1-5du/ac)	121.00 DU	23	68	91	79	44	123	1198
	SUB-TOTAL		23	68	91	79	44	123	1198
317	20. Elementary/Middle School	924.00 STU	240	185	425	74	83	157	1340
	51. Developed Park	18.00 AC	0	0	0	1	1	2	47
	SUB-TOTAL		240	185	425	75	84	159	1387
318	2. Single Family (1-5du/ac)	21.00 DU	4	12	16	14	8	22	208
	4. Condominium/Townhouse	252.00 DU	15	121	136	118	66	184	2016
	SUB-TOTAL		19	133	152	132	74	206	2224
319	13. Commercial Shops	2.00 TSF	1	1	2	4	4	8	74
	20. Elementary/Middle School	250.00 STU	65	50	115	20	23	43	363
	25. Church	80.00 TSF	31	26	57	29	24	53	744
	40. Commercial Office	240.00 TSF	372	46	418	50	310	360	2774
	SUB-TOTAL		469	123	592	103	361	464	3955
320	2. Single Family (1-5du/ac)	125.00 DU	24	70	94	81	45	126	1238
	SUB-TOTAL		24	70	94	81	45	126	1238
321	3. Single Family (6-10du/ac)	62.00 DU	12	35	47	40	22	62	614
	4. Condominium/Townhouse	93.00 DU	6	45	51	44	24	68	744
	SUB-TOTAL		18	80	98	84	46	130	1358
322	3. Single Family (6-10du/ac)	40.00 DU	8	22	30	26	14	40	396
	4. Condominium/Townhouse	60.00 DU	4	29	33	28	16	44	480
	SUB-TOTAL		12	51	63	54	30	84	876
323	3. Single Family (6-10du/ac)	121.00 DU	23	68	91	79	44	123	1198
	4. Condominium/Townhouse	169.00 DU	10	81	91	79	44	123	1352
	SUB-TOTAL		33	149	182	158	88	246	2550
325	3. Single Family (6-10du/ac)	205.00 DU	39	115	154	133	74	207	2029
	SUB-TOTAL		39	115	154	133	74	207	2029
326	2. Single Family (1-5du/ac)	101.00 DU	19	57	76	66	36	102	1000
	SUB-TOTAL		19	57	76	66	36	102	1000
327	2. Single Family (1-5du/ac)	105.00 DU	20	59	79	68	38	106	1040
	SUB-TOTAL		20	59	79	68	38	106	1040

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

Zone	Land Use Type	Units	-- AM Peak Hour --			-- PM Peak Hour --			ADT
			In	Out	Total	In	Out	Total	
328	2. Single Family (1-5du/ac)	110.00 DU	21	62	83	72	40	112	1089
	SUB-TOTAL		21	62	83	72	40	112	1089
329	2. Single Family (1-5du/ac)	50.00 DU	10	28	38	33	18	51	495
	20. Elementary/Middle School	924.00 STU	240	185	425	74	83	157	1340
	SUB-TOTAL		250	213	463	107	101	208	1835
330	2. Single Family (1-5du/ac)	143.00 DU	27	80	107	93	51	144	1416
	SUB-TOTAL		27	80	107	93	51	144	1416
331	2. Single Family (1-5du/ac)	167.00 DU	32	94	126	109	60	169	1653
	SUB-TOTAL		32	94	126	109	60	169	1653
332	2. Single Family (1-5du/ac)	114.00 DU	22	64	86	74	41	115	1129
	4. Condominium/Townhouse	102.00 DU	6	49	55	48	27	75	816
	SUB-TOTAL		28	113	141	122	68	190	1945
333	2. Single Family (1-5du/ac)	803.00 DU	153	450	603	522	289	811	7950
	4. Condominium/Townhouse	360.00 DU	22	173	195	169	94	263	2880
	13. Commercial Shops	25.05 TSF	18	12	30	45	45	90	928
	20. Elementary/Middle School	924.00 STU	240	185	425	74	83	157	1340
	SUB-TOTAL		433	820	1253	810	511	1321	13098
334	2. Single Family (1-5du/ac)	164.00 DU	31	92	123	107	59	166	1624
	SUB-TOTAL		31	92	123	107	59	166	1624
335	2. Single Family (1-5du/ac)	194.00 DU	37	109	146	126	70	196	1921
	SUB-TOTAL		37	109	146	126	70	196	1921
336	2. Single Family (1-5du/ac)	589.00 DU	112	330	442	383	212	595	5831
	20. Elementary/Middle School	924.00 STU	240	185	425	74	83	157	1340
	51. Developed Park	7.30 AC	0	0	0	0	0	0	19
	SUB-TOTAL		352	515	867	457	295	752	7190
337	2. Single Family (1-5du/ac)	390.00 DU	74	218	292	253	140	393	3861
	SUB-TOTAL		74	218	292	253	140	393	3861
338	11. Commercial Center(10-30a)	92.00 TSF	67	43	110	219	237	456	4974
	SUB-TOTAL		67	43	110	219	237	456	4974
339	2. Single Family (1-5du/ac)	128.00 DU	24	72	96	83	46	129	1267
	3. Single Family (6-10du/ac)	161.00 DU	31	90	121	105	58	163	1594
	20. Elementary/Middle School	924.00 STU	240	185	425	74	83	157	1340
	51. Developed Park	7.00 AC	0	0	0	0	0	0	18
	SUB-TOTAL		295	347	642	262	187	449	4219
340	2. Single Family (1-5du/ac)	270.00 DU	51	151	202	176	97	273	2673
	3. Single Family (6-10du/ac)	124.00 DU	24	69	93	81	45	126	1228

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

				-- AM Peak Hour --			-- PM Peak Hour --			
Zone		Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
340	4.	Condominium/Townhouse	264.00 DU	16	127	143	124	69	193	2112
		SUB-TOTAL		91	347	438	381	211	592	6013
341	5.	Apartment	325.00 DU	26	140	166	133	68	201	2243
	26.	Day Care	260.00 STU	112	99	211	104	120	224	1175
		SUB-TOTAL		138	239	377	237	188	425	3418
342	4.	Condominium/Townhouse	168.00 DU	10	81	91	79	44	123	1344
		SUB-TOTAL		10	81	91	79	44	123	1344
343	2.	Single Family (1-5du/ac)	90.00 DU	17	50	67	58	32	90	891
	3.	Single Family (6-10du/ac)	89.00 DU	17	50	67	58	32	90	881
	4.	Condominium/Townhouse	132.00 DU	8	63	71	62	34	96	1056
		SUB-TOTAL		42	163	205	178	98	276	2828
344	2.	Single Family (1-5du/ac)	415.00 DU	79	232	311	270	149	419	4109
	11.	Commercial Center(10-30a)	40.00 TSF	29	19	48	95	103	198	2162
		SUB-TOTAL		108	251	359	365	252	617	6271
345	2.	Single Family (1-5du/ac)	23.00 DU	4	13	17	15	8	23	228
		SUB-TOTAL		4	13	17	15	8	23	228
347	2.	Single Family (1-5du/ac)	500.00 DU	95	280	375	325	180	505	4950
		SUB-TOTAL		95	280	375	325	180	505	4950
348	2.	Single Family (1-5du/ac)	675.00 DU	128	378	506	439	243	682	6682
		SUB-TOTAL		128	378	506	439	243	682	6682
349	4.	Condominium/Townhouse	83.00 DU	5	40	45	39	22	61	664
		SUB-TOTAL		5	40	45	39	22	61	664
350	25.	Church	25.00 TSF	10	8	18	9	8	17	233
		SUB-TOTAL		10	8	18	9	8	17	233
352	2.	Single Family (1-5du/ac)	592.00 DU	112	332	444	385	213	598	5861
		SUB-TOTAL		112	332	444	385	213	598	5861
353	2.	Single Family (1-5du/ac)	630.00 DU	120	353	473	410	227	637	6237
		SUB-TOTAL		120	353	473	410	227	637	6237
356	2.	Single Family (1-5du/ac)	385.00 DU	73	216	289	250	139	389	3811
		SUB-TOTAL		73	216	289	250	139	389	3811
357	2.	Single Family (1-5du/ac)	160.00 DU	30	90	120	104	58	162	1584
		SUB-TOTAL		30	90	120	104	58	162	1584
358	2.	Single Family (1-5du/ac)	421.00 DU	80	236	316	274	152	426	4168
	4.	Condominium/Townhouse	255.00 DU	15	122	137	120	66	186	2040

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
358	20. Elementary/Middle School	462.00 STU	120	92	212	37	42	79	670
	51. Developed Park	9.60 AC	0	0	0	0	0	0	25
	SUB-TOTAL		215	450	665	431	260	691	6903
359	2. Single Family (1-5du/ac)	570.00 DU	108	319	427	371	205	576	5643
	4. Condominium/Townhouse	192.00 DU	12	92	104	90	50	140	1536
	SUB-TOTAL		120	411	531	461	255	716	7179
360	2. Single Family (1-5du/ac)	538.00 DU	102	301	403	350	194	544	5326
	4. Condominium/Townhouse	248.00 DU	15	119	134	117	64	181	1984
	12. Commercial Center (<10ac)	119.00 TSF	130	82	212	395	428	823	10122
	20. Elementary/Middle School	462.00 STU	120	92	212	37	42	79	670
	SUB-TOTAL		367	594	961	899	728	1627	18102
361	2. Single Family (1-5du/ac)	188.00 DU	36	105	141	122	68	190	1861
	SUB-TOTAL		36	105	141	122	68	190	1861
362	2. Single Family (1-5du/ac)	173.00 DU	33	97	130	112	62	174	1713
	SUB-TOTAL		33	97	130	112	62	174	1713
364	3. Single Family (6-10du/ac)	199.00 DU	38	111	149	129	72	201	1970
	SUB-TOTAL		38	111	149	129	72	201	1970
365	2. Single Family (1-5du/ac)	201.00 DU	38	113	151	131	72	203	1990
	4. Condominium/Townhouse	102.00 DU	6	49	55	48	27	75	816
	SUB-TOTAL		44	162	206	179	99	278	2806
366	2. Single Family (1-5du/ac)	320.00 DU	61	179	240	208	115	323	3168
	SUB-TOTAL		61	179	240	208	115	323	3168
367	3. Single Family (6-10du/ac)	437.00 DU	83	245	328	284	157	441	4326
	SUB-TOTAL		83	245	328	284	157	441	4326
368	2. Single Family (1-5du/ac)	128.00 DU	24	72	96	83	46	129	1267
	20. Elementary/Middle School	462.00 STU	120	92	212	37	42	79	670
	25. Church	21.00 TSF	8	7	15	8	6	14	195
	SUB-TOTAL		152	171	323	128	94	222	2132
369	2. Single Family (1-5du/ac)	202.00 DU	38	113	151	131	73	204	2000
	SUB-TOTAL		38	113	151	131	73	204	2000
370	2. Single Family (1-5du/ac)	1080.00 DU	205	605	810	702	389	1091	10692
	20. Elementary/Middle School	1331.00 STU	346	266	612	106	120	226	1930
	SUB-TOTAL		551	871	1422	808	509	1317	12622
371	2. Single Family (1-5du/ac)	673.00 DU	128	377	505	437	242	679	6663
	SUB-TOTAL		128	377	505	437	242	679	6663

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
372	2. Single Family (1-5du/ac)	287.00 DU	55	161	216	187	103	290	2841
	4. Condominium/Townhouse	230.00 DU	14	110	124	108	60	168	1840
	11. Commercial Center(10-30a)	153.55 TSF	112	72	184	365	396	761	8301
	SUB-TOTAL		181	343	524	660	559	1219	12982
373	2. Single Family (1-5du/ac)	236.00 DU	45	132	177	153	85	238	2336
	20. Elementary/Middle School	462.00 STU	120	92	212	37	42	79	670
	25. Church	23.52 TSF	9	8	17	8	7	15	219
	SUB-TOTAL		174	232	406	198	134	332	3225
374	5. Apartment	324.00 DU	26	139	165	133	68	201	2236
	11. Commercial Center(10-30a)	150.00 TSF	110	71	181	357	387	744	8109
	SUB-TOTAL		136	210	346	490	455	945	10345
375	12. Commercial Center (<10ac)	40.00 TSF	44	28	72	133	144	277	3402
	16. Fast Food Restaurant	5.00 TSF	127	122	249	87	80	167	2481
	SUB-TOTAL		171	150	321	220	224	444	5883
376	3. Single Family (6-10du/ac)	225.00 DU	43	126	169	146	81	227	2228
	51. Developed Park	4.25 AC	0	0	0	0	0	0	11
	SUB-TOTAL		43	126	169	146	81	227	2239
377	13. Commercial Shops	57.50 TSF	41	28	69	103	103	206	2131
	SUB-TOTAL		41	28	69	103	103	206	2131
378	6. Mobile Home	332.00 DU	27	106	133	116	70	186	2291
	10. Commercial Center (>30ac)	500.00 TSF	235	150	385	820	890	1710	20030
	13. Commercial Shops	41.00 TSF	30	20	50	74	74	148	1519
	31. Business Park	56.00 TSF	67	13	80	17	55	72	571
	40. Commercial Office	110.00 TSF	171	21	192	23	142	165	1272
	SUB-TOTAL		530	310	840	1050	1231	2281	25683
379	3. Single Family (6-10du/ac)	214.00 DU	41	120	161	139	77	216	2119
	SUB-TOTAL		41	120	161	139	77	216	2119
380	5. Apartment	420.00 DU	34	181	215	172	88	260	2898
	SUB-TOTAL		34	181	215	172	88	260	2898
382	34. Utilities	21.00 TSF	0	0	0	0	0	0	50
	SUB-TOTAL		0	0	0	0	0	0	50
383	2. Single Family (1-5du/ac)	231.00 DU	44	129	173	150	83	233	2287
	13. Commercial Shops	8.71 TSF	6	4	10	16	16	32	323
	SUB-TOTAL		50	133	183	166	99	265	2610
384	2. Single Family (1-5du/ac)	354.00 DU	67	198	265	230	127	357	3505
	12. Commercial Center (<10ac)	23.07 TSF	25	16	41	77	83	160	1962
	SUB-TOTAL		92	214	306	307	210	517	5467

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
387	2. Single Family (1-5du/ac)	375.00 DU	71	210	281	244	135	379	3712
	SUB-TOTAL		71	210	281	244	135	379	3712
389	2. Single Family (1-5du/ac)	1025.00 DU	195	574	769	666	369	1035	10148
	3. Single Family (6-10du/ac)	126.00 DU	24	71	95	82	45	127	1247
	20. Elementary/Middle School	351.00 STU	91	70	161	28	32	60	509
	SUB-TOTAL		310	715	1025	776	446	1222	11904
390	2. Single Family (1-5du/ac)	150.00 DU	29	84	113	98	54	152	1485
	SUB-TOTAL		29	84	113	98	54	152	1485
391	13. Commercial Shops	16.33 TSF	12	8	20	29	29	58	605
	32. Manufacturing/Warehouse	376.36 TSF	211	64	275	102	177	279	1919
	SUB-TOTAL		223	72	295	131	206	337	2524
392	2. Single Family (1-5du/ac)	239.00 DU	45	134	179	155	86	241	2366
	20. Elementary/Middle School	102.00 STU	27	20	47	8	9	17	148
	SUB-TOTAL		72	154	226	163	95	258	2514
393	3. Single Family (6-10du/ac)	162.00 DU	31	91	122	105	58	163	1604
	4. Condominium/Townhouse	100.00 DU	6	48	54	47	26	73	800
	12. Commercial Center (<10ac)	52.27 TSF	57	36	93	174	188	362	4446
	25. Church	37.64 TSF	15	12	27	14	11	25	350
	SUB-TOTAL		109	187	296	340	283	623	7200
394	2. Single Family (1-5du/ac)	325.00 DU	62	182	244	211	117	328	3217
	20. Elementary/Middle School	92.00 STU	24	18	42	7	8	15	133
	21. High School	848.00 STU	271	119	390	51	76	127	1518
	51. Developed Park	3.20 AC	0	0	0	0	0	0	8
	SUB-TOTAL		357	319	676	269	201	470	4876
395	3. Single Family (6-10du/ac)	185.00 DU	35	104	139	120	67	187	1831
	11. Commercial Center(10-30a)	165.53 TSF	121	78	199	394	427	821	8948
	20. Elementary/Middle School	185.00 STU	48	37	85	15	17	32	268
	SUB-TOTAL		204	219	423	529	511	1040	11047
396	12. Commercial Center (<10ac)	76.23 TSF	83	53	136	253	274	527	6484
	SUB-TOTAL		83	53	136	253	274	527	6484
397	12. Commercial Center (<10ac)	74.00 TSF	81	51	132	246	266	512	6294
	SUB-TOTAL		81	51	132	246	266	512	6294
398	2. Single Family (1-5du/ac)	1120.00 DU	213	627	840	728	403	1131	11088
	4. Condominium/Townhouse	120.00 DU	7	58	65	56	31	87	960
	12. Commercial Center (<10ac)	117.57 TSF	128	81	209	390	423	813	10000
	13. Commercial Shops	2.68 TSF	2	1	3	5	5	10	99
	15. Sit-Down Restaurant	8.45 TSF	41	38	79	55	37	92	1102
	20. Elementary/Middle School	111.00 STU	29	22	51	9	10	19	161
	SUB-TOTAL		420	827	1247	1243	909	2152	23410

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

				-- AM Peak Hour --			-- PM Peak Hour --			
Zone		Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
399	2.	Single Family (1-5du/ac)	722.00 DU	137	404	541	469	260	729	7148
	20.	Elementary/Middle School	286.00 STU	74	57	131	23	26	49	415
		SUB-TOTAL		211	461	672	492	286	778	7563
401	2.	Single Family (1-5du/ac)	800.00 DU	152	448	600	520	288	808	7920
		SUB-TOTAL		152	448	600	520	288	808	7920
402	2.	Single Family (1-5du/ac)	1392.00 DU	264	780	1044	905	501	1406	13781
	11.	Commercial Center(10-30a)	98.02 TSF	72	46	118	233	253	486	5299
		SUB-TOTAL		336	826	1162	1138	754	1892	19080
403	2.	Single Family (1-5du/ac)	111.00 DU	21	62	83	72	40	112	1099
	12.	Commercial Center (<10ac)	46.00 TSF	50	32	82	153	166	319	3913
		SUB-TOTAL		71	94	165	225	206	431	5012
404	2.	Single Family (1-5du/ac)	170.00 DU	32	95	127	110	61	171	1683
		SUB-TOTAL		32	95	127	110	61	171	1683
405	2.	Single Family (1-5du/ac)	65.00 DU	12	36	48	42	23	65	644
		SUB-TOTAL		12	36	48	42	23	65	644
406	2.	Single Family (1-5du/ac)	38.00 DU	7	21	28	25	14	39	376
		SUB-TOTAL		7	21	28	25	14	39	376
407	2.	Single Family (1-5du/ac)	10.00 DU	2	6	8	7	4	11	99
		SUB-TOTAL		2	6	8	7	4	11	99
408	2.	Single Family (1-5du/ac)	53.00 DU	10	30	40	34	19	53	525
		SUB-TOTAL		10	30	40	34	19	53	525
410	2.	Single Family (1-5du/ac)	63.00 DU	12	35	47	41	23	64	624
		SUB-TOTAL		12	35	47	41	23	64	624
411	2.	Single Family (1-5du/ac)	800.00 DU	152	448	600	520	288	808	7920
		SUB-TOTAL		152	448	600	520	288	808	7920
412	1.	Single Family (<1du/ac)	120.00 DU	35	80	115	101	43	144	1188
		SUB-TOTAL		35	80	115	101	43	144	1188
413	2.	Single Family (1-5du/ac)	104.00 DU	20	58	78	68	37	105	1030
	4.	Condominium/Townhouse	246.00 DU	15	118	133	116	64	180	1968
	12.	Commercial Center (<10ac)	26.94 TSF	29	19	48	89	97	186	2292
	32.	Manufacturing/Warehouse	45.21 TSF	25	8	33	12	21	33	231
	40.	Commercial Office	36.59 TSF	57	7	64	8	47	55	423
		SUB-TOTAL		146	210	356	293	266	559	5944
414	2.	Single Family (1-5du/ac)	40.00 DU	8	22	30	26	14	40	396
	4.	Condominium/Townhouse	1358.00 DU	81	652	733	638	353	991	10864

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
414	6. Mobile Home	250.00 DU	20	80	100	88	53	141	1725
	13. Commercial Shops	95.83 TSF	69	46	115	172	172	344	3552
	SUB-TOTAL		178	800	978	924	592	1516	16537
415	2. Single Family (1-5du/ac)	250.00 DU	48	140	188	163	90	253	2475
	SUB-TOTAL		48	140	188	163	90	253	2475
416	2. Single Family (1-5du/ac)	579.00 DU	110	324	434	376	208	584	5732
	4. Condominium/Townhouse	148.00 DU	9	71	80	70	38	108	1184
	13. Commercial Shops	15.00 TSF	11	7	18	27	27	54	556
	20. Elementary/Middle School	760.00 STU	198	152	350	61	68	129	1102
	51. Developed Park	15.00 AC	0	0	0	0	1	1	39
	SUB-TOTAL		328	554	882	534	342	876	8613
417	2. Single Family (1-5du/ac)	579.00 DU	110	324	434	376	208	584	5732
	4. Condominium/Townhouse	149.00 DU	9	72	81	70	39	109	1192
	SUB-TOTAL		119	396	515	446	247	693	6924
418	2. Single Family (1-5du/ac)	107.00 DU	20	60	80	70	39	109	1059
	4. Condominium/Townhouse	619.00 DU	37	297	334	291	161	452	4952
	11. Commercial Center(10-30a)	100.56 TSF	73	47	120	239	259	498	5436
	SUB-TOTAL		130	404	534	600	459	1059	11447
419	2. Single Family (1-5du/ac)	554.00 DU	105	310	415	360	199	559	5485
	4. Condominium/Townhouse	816.00 DU	49	392	441	384	212	596	6528
	SUB-TOTAL		154	702	856	744	411	1155	12013
420	4. Condominium/Townhouse	40.00 DU	2	19	21	19	10	29	320
	SUB-TOTAL		2	19	21	19	10	29	320
421	30. Industrial Park	300.00 TSF	165	30	195	39	156	195	1800
	31. Business Park	300.00 TSF	360	69	429	90	297	387	3060
	SUB-TOTAL		525	99	624	129	453	582	4860
422	2. Single Family (1-5du/ac)	76.00 DU	14	43	57	49	27	76	752
	4. Condominium/Townhouse	80.00 DU	5	38	43	38	21	59	640
	12. Commercial Center (<10ac)	4.00 TSF	4	3	7	13	14	27	340
	20. Elementary/Middle School	416.00 STU	108	83	191	33	37	70	603
	SUB-TOTAL		131	167	298	133	99	232	2335
423	1. Single Family (<1du/ac)	353.00 DU	102	237	339	297	127	424	3495
	3. Single Family (6-10du/ac)	17.00 DU	3	10	13	11	6	17	168
	12. Commercial Center (<10ac)	98.01 TSF	107	68	175	325	353	678	8337
	40. Commercial Office	10.89 TSF	17	2	19	2	14	16	126
	SUB-TOTAL		229	317	546	635	500	1135	12126
424	2. Single Family (1-5du/ac)	114.00 DU	22	64	86	74	41	115	1129
	4. Condominium/Townhouse	84.00 DU	5	40	45	39	22	61	672
	SUB-TOTAL		27	104	131	113	63	176	1801

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

			-- AM Peak Hour --			-- PM Peak Hour --			
Zone	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
425	2. Single Family (1-5du/ac)	68.00 DU	13	38	51	44	24	68	673
	51. Developed Park	31.00 AC	0	0	0	1	1	2	81
	SUB-TOTAL		13	38	51	45	25	70	754
426	2. Single Family (1-5du/ac)	68.00 DU	13	38	51	44	24	68	673
	32. Manufacturing/Warehouse	39.60 TSF	22	7	29	11	19	30	202
	SUB-TOTAL		35	45	80	55	43	98	875
427	2. Single Family (1-5du/ac)	27.00 DU	5	15	20	18	10	28	267
	SUB-TOTAL		5	15	20	18	10	28	267
428	2. Single Family (1-5du/ac)	565.00 DU	107	316	423	367	203	570	5594
	SUB-TOTAL		107	316	423	367	203	570	5594
429	2. Single Family (1-5du/ac)	55.00 DU	10	31	41	36	20	56	545
	SUB-TOTAL		10	31	41	36	20	56	545
430	2. Single Family (1-5du/ac)	2.00 DU	0	1	1	1	1	2	20
	SUB-TOTAL		0	1	1	1	1	2	20
431	2. Single Family (1-5du/ac)	3.00 DU	1	2	3	2	1	3	30
	SUB-TOTAL		1	2	3	2	1	3	30
433	2. Single Family (1-5du/ac)	8.00 DU	2	4	6	5	3	8	79
	SUB-TOTAL		2	4	6	5	3	8	79
434	2. Single Family (1-5du/ac)	25.00 DU	5	14	19	16	9	25	247
	SUB-TOTAL		5	14	19	16	9	25	247
437	2. Single Family (1-5du/ac)	8.00 DU	2	4	6	5	3	8	79
	4. Condominium/Townhouse	13.00 DU	1	6	7	6	3	9	104
	SUB-TOTAL		3	10	13	11	6	17	183
438	4. Condominium/Townhouse	13.00 DU	1	6	7	6	3	9	104
	SUB-TOTAL		1	6	7	6	3	9	104
439	2. Single Family (1-5du/ac)	170.00 DU	32	95	127	110	61	171	1683
	3. Single Family (6-10du/ac)	660.00 DU	125	370	495	429	238	667	6534
	SUB-TOTAL		157	465	622	539	299	838	8217
440	2. Single Family (1-5du/ac)	568.00 DU	108	318	426	369	204	573	5623
	SUB-TOTAL		108	318	426	369	204	573	5623
441	2. Single Family (1-5du/ac)	150.00 DU	29	84	113	98	54	152	1485
	SUB-TOTAL		29	84	113	98	54	152	1485
442	2. Single Family (1-5du/ac)	72.00 DU	14	40	54	47	26	73	713
	3. Single Family (6-10du/ac)	216.00 DU	41	121	162	140	78	218	2138
	SUB-TOTAL		55	161	216	187	104	291	2851

SCVCTM INTERIM YEAR VER 3.3 ZONAL LAND USE AND TRIP GENERATION (cont.)

				-- AM Peak Hour --			-- PM Peak Hour --			
Zone		Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
443	2.	Single Family (1-5du/ac)	150.00 DU	29	84	113	98	54	152	1485
	20.	Elementary/Middle School	407.00 STU	106	81	187	33	37	70	590
	23.	Hospital	30.00 TSF	21	8	29	7	21	28	504
	40.	Commercial Office	108.90 TSF	169	21	190	23	140	163	1259
		SUB-TOTAL		325	194	519	161	252	413	3838
444	2.	Single Family (1-5du/ac)	775.00 DU	147	434	581	504	279	783	7672
	3.	Single Family (6-10du/ac)	87.00 DU	17	49	66	57	31	88	861
	11.	Commercial Center(10-30a)	110.00 TSF	80	52	132	262	284	546	5947
	25.	Church	4.00 TSF	2	1	3	1	1	2	37
		SUB-TOTAL		246	536	782	824	595	1419	14517
445	2.	Single Family (1-5du/ac)	29.00 DU	6	16	22	19	10	29	287
		SUB-TOTAL		6	16	22	19	10	29	287
446	2.	Single Family (1-5du/ac)	91.00 DU	17	51	68	59	33	92	901
		SUB-TOTAL		17	51	68	59	33	92	901
448	2.	Single Family (1-5du/ac)	395.00 DU	75	221	296	257	142	399	3910
		SUB-TOTAL		75	221	296	257	142	399	3910
449	2.	Single Family (1-5du/ac)	20.00 DU	4	11	15	13	7	20	198
		SUB-TOTAL		4	11	15	13	7	20	198
451	2.	Single Family (1-5du/ac)	40.00 DU	8	22	30	26	14	40	396
		SUB-TOTAL		8	22	30	26	14	40	396
453	2.	Single Family (1-5du/ac)	172.00 DU	33	96	129	112	62	174	1703
	20.	Elementary/Middle School	490.00 STU	127	98	225	39	44	83	711
		SUB-TOTAL		160	194	354	151	106	257	2414
454	2.	Single Family (1-5du/ac)	116.00 DU	22	65	87	75	42	117	1148
	13.	Commercial Shops	6.14 TSF	4	3	7	11	11	22	228
	57.	Agua Dulce Airport	34.06 SG	102	68	170	136	136	272	3406
		SUB-TOTAL		128	136	264	222	189	411	4782
455	2.	Single Family (1-5du/ac)	80.00 DU	15	45	60	52	29	81	792
		SUB-TOTAL		15	45	60	52	29	81	792

SCVCTM INTERIM YEAR VER 3.3 LAND USE AND TRIP GENERATION SUMMARY

			-- AM Peak Hour --			-- PM Peak Hour --		
	Land Use Type	Units	In	Out	Total	In	Out	Total	ADT
1.	Single Family (<1du/ac)	652.00 DU	189	437	626	549	235	784	6455
2.	Single Family (1-5du/ac)	54364.00 DU	10332	30436	40768	35333	19569	54902	538212
3.	Single Family (6-10du/ac)	9466.00 DU	1801	5304	7105	6151	3409	9560	93713
4.	Condominium/Townhouse	23233.00 DU	1396	11153	12549	10917	6047	16964	185864
5.	Apartment	5676.00 DU	454	2440	2894	2326	1191	3517	39166
6.	Mobile Home	1545.00 DU	123	495	618	542	325	867	10660
10.	Commercial Center (>30ac)	4801.89 TSF	2258	1442	3700	7874	8546	16420	192364
11.	Commercial Center(10-30a)	5809.94 TSF	4244	2732	6976	13825	14990	28815	314088
12.	Commercial Center (<10ac)	1719.61 TSF	1875	1190	3065	5710	6191	11901	146270
13.	Commercial Shops	1716.02 TSF	1233	826	2059	3089	3089	6178	63596
14.	Hotel	1806.00 ROOM	613	397	1010	579	524	1103	14864
15.	Sit-Down Restaurant	171.34 TSF	826	763	1589	1116	743	1859	22332
16.	Fast Food Restaurant	18.10 TSF	460	442	902	315	290	605	8980
17.	Movie Theater	3300.00 SEAT	0	0	0	165	66	231	5808
18.	Health Club	54.00 TSF	52	35	87	117	78	195	2160
19.	Car Dealership	411.00 TSF	663	247	910	460	690	1150	15413
20.	Elementary/Middle School	25507.00 STU	6630	5099	11729	2042	2297	4339	36989
21.	High School	9496.00 STU	3038	1329	4367	570	854	1424	16998
22.	College	26800.00 STU	3484	269	3753	3216	1340	4556	41272
23.	Hospital	222.80 TSF	158	58	216	49	156	205	3743
24.	Library	129.11 TSF	98	39	137	439	477	916	10971
25.	Church	466.19 TSF	184	155	339	167	139	306	4335
26.	Day Care	510.00 STU	220	194	414	204	235	439	2305
30.	Industrial Park	38933.61 TSF	21411	3894	25305	5062	20245	25307	233601
31.	Business Park	3832.44 TSF	4598	883	5481	1149	3795	4944	39092
32.	Manufacturing/Warehouse	3929.99 TSF	2199	668	2867	1063	1848	2911	20045
34.	Utilities	1121.24 TSF	0	0	0	0	0	0	2668
40.	Commercial Office	3151.92 TSF	4891	601	5492	662	4065	4727	36436
42.	Medical Office	133.73 TSF	259	65	324	133	357	490	4573
50.	Golf Course	703.00 AC	106	42	148	71	141	212	5596
51.	Developed Park	271.53 AC	0	0	0	7	11	18	705
53.	Wayside Honor Ranch	20.00 SG	60	40	100	80	80	160	2000
54.	Six Flags Magic Mtn	240.00 SG	720	480	1200	960	960	1920	24000
55.	Travel Village	26.20 SG	79	52	131	105	105	210	2620
56.	CHP Office	55.74 SG	167	111	278	223	223	446	5574
57.	Agua Dulce Airport	34.06 SG	102	68	170	136	136	272	3406
	TOTAL		74923	72386	147309	105406	103447	208853	2156874

Restaurant/Retail/Office (Former Coco's)

SOURCE: PSOMAS – February 2004

Photo 1 – Magic Mountain Parkway Southeast Corner at Valencia Boulevard Facing East

Restaurant/Retail/Office (Former Coco's)

SOURCE: PSOMAS – February 2004

Photo 2 – Magic Mountain Parkway East of Valencia Boulevard South Side Facing West

Apartment Building (EQR Valencia LLC)

SOURCE: PSOMAS – February 2004

Photo 3 – Magic Mountain Parkway East of Valencia Boulevard South Side Facing East

Restaurant/Retail/Office (Former Coco's)

SOURCE: PSOMAS – February 2004

Photo 4 – Magic Mountain Parkway East of Valencia Boulevard South Side Facing West

Apartment Building (EQR Valencia LLC)

SOURCE: PSOMAS - February 2004

Photo 5 – Magic Mountain Parkway East of Valencia Boulevard South Side Facing East

Restaurant/Retail/Office (Former Coco's)

SOURCE: PSOMAS – February 2004

Photo 6 – Magic Mountain Parkway East of Valencia Boulevard South Side Facing West

Restaurant/Retail/Office (Former Coco's)
Apartment Building (EQR Valencia LLC)

SOURCE: PSOMAS - February 2004

Photo 7 – Magic Mountain Parkway East of Valencia Boulevard South Side Facing West

112-16•02/04

County Courthouse and Sheriff's Department Adjacent

SOURCE: PSOMAS – February 2004

Photo 8 – Magic Mountain Parkway West of Valencia Boulevard South Side Facing East

112-16-02/04

County Courthouse and Sheriff's Department Adjacent

SOURCE: PSOMAS – February 2004

Photo 9 – Magic Mountain Parkway West of Valencia Boulevard South Side Facing West

Restaurant/Retail/Office (Former Coco's)

SOURCE: PSOMAS – February 2004

Photo 10 – Facing West along South Side of Magic Mountain Parkway East of Valencia Boulevard Intersection

Restaurant/Retail/Office (Former Coco's)

SOURCE: PSOMAS – February 2004

Photo 11 – Facing South along East Side of Valencia Boulevard South of Magic Mountain Parkway

Restaurant/Retail/Office (Former Coco's)

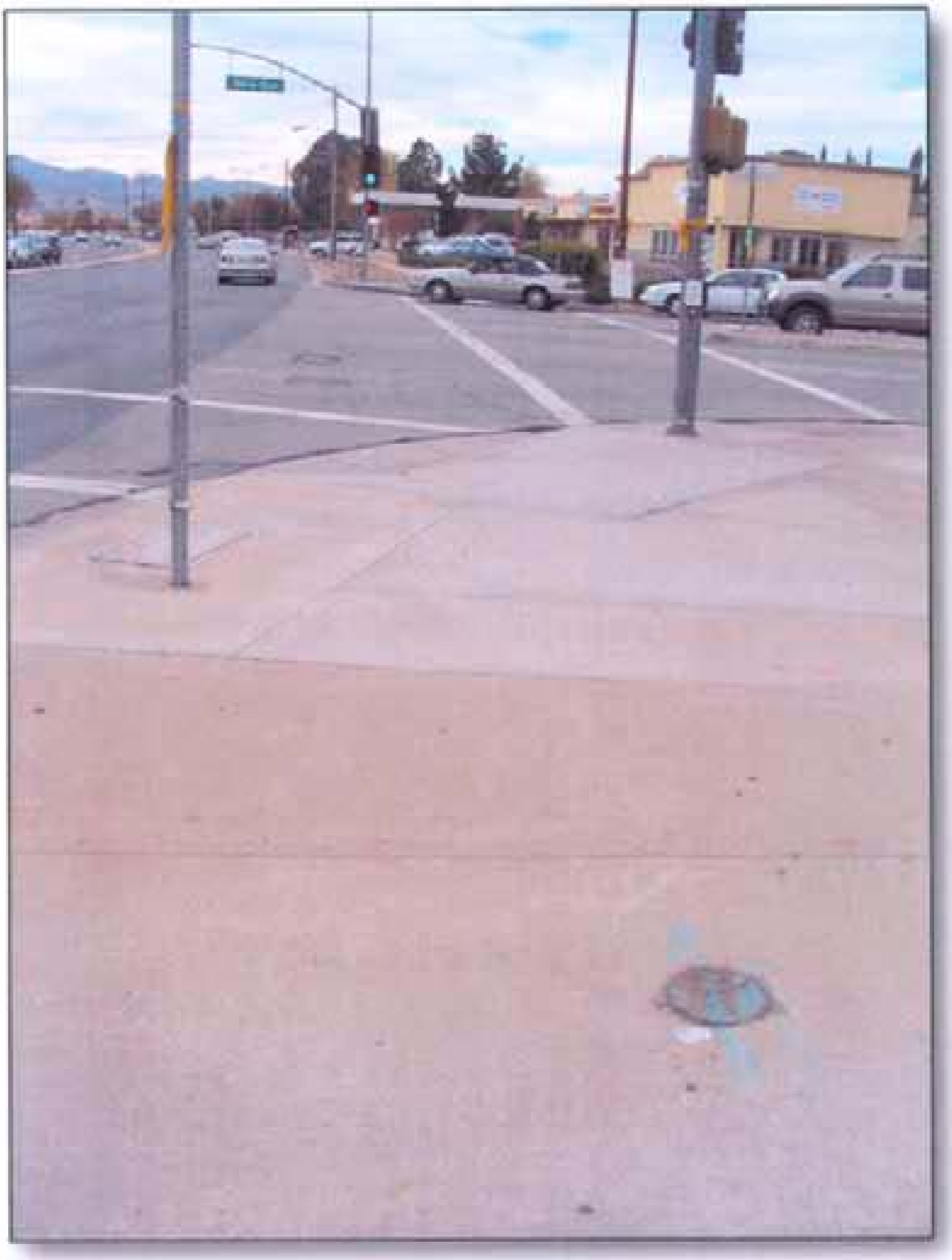
SOURCE: PSOMAS – February 2004

Photo 12 – Facing East along South Side of Magic Mountain Parkway East of Valencia Boulevard Intersection

Restaurant/Retail/Office (Former Coco's)

SOURCE: PSOMAS – February 2004

Photo 13 – Facing North along the East Side of Valencia Boulevard at Magic Mountain Parkway Intersection



Shell Gas Station

SOURCE: PSOMAS – February 2004

Photo 1 – Northeast Corner Bouquet Canyon Road and Seco Canyon Road Facing West

Shell Gas Station

SOURCE: PSOMAS – February 2004

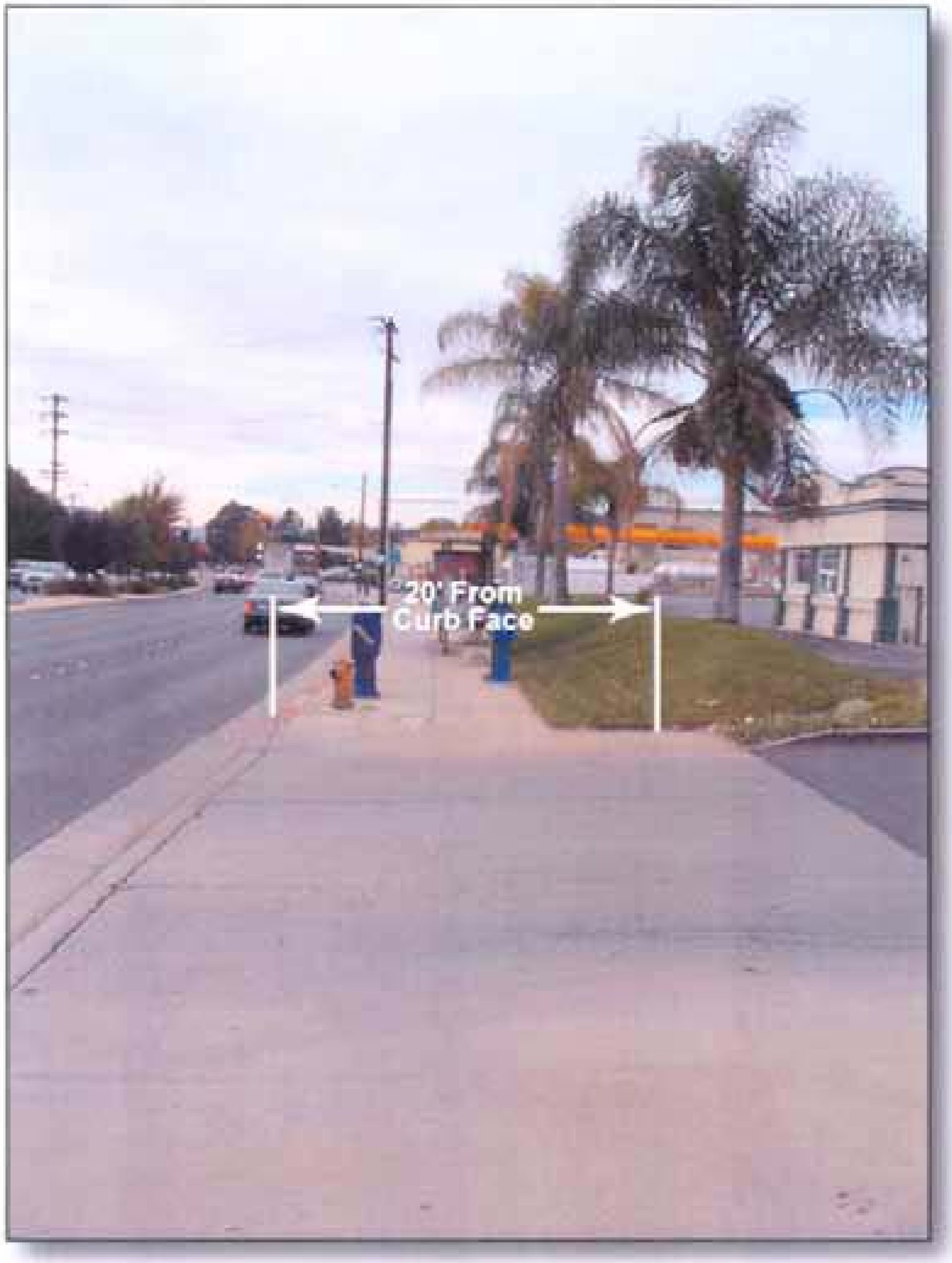
Photo 2 – Bouquet Canyon Road on North Side East of Seco Canyon Road Facing West

Shell Gas Station

SOURCE: PSOMAS – February 2004

Photo 3 – Seco Canyon Road and Bouquet Canyon Road Northeast Corner Facing South

112-16-02/04



Coffee Kiosk Drive-Thru Adjacent

SOURCE: PSOMAS – February 2004

Photo 4 – Bouquet Canyon Road North Side East of Seco Canyon Road Facing West

Coffee Kiosk Drive-Thru Adjacent

SOURCE: PSOMAS – February 2004

Photo 5 – Bouquet Canyon Road North Side East of Seco Canyon Road Facing West

112-16-02/04

Sav On, Ralph's, Realty Executives

SOURCE: PSOMAS - February 2004

Photo 1 – Soledad Canyon Road at Whites Canyon Road South Side Facing West

112-16-02/04

Sav On, Ralph's, Realty Executives

SOURCE: PSOMAS – February 2004

Photo 2 – Soledad Canyon Road at Whites Canyon Road South Side Facing West

112-16-02/04

Realty Executives

SOURCE: PSOMAS - February 2004

Photo 3 – Soledad Canyon Road at Whites Canyon Road South Side Facing East

Realty Executives

SOURCE: PSOMAS - February 2004

Photo 4 – Soledad Canyon Road at Whites Canyon Road South Side Facing East

112-14-02/04

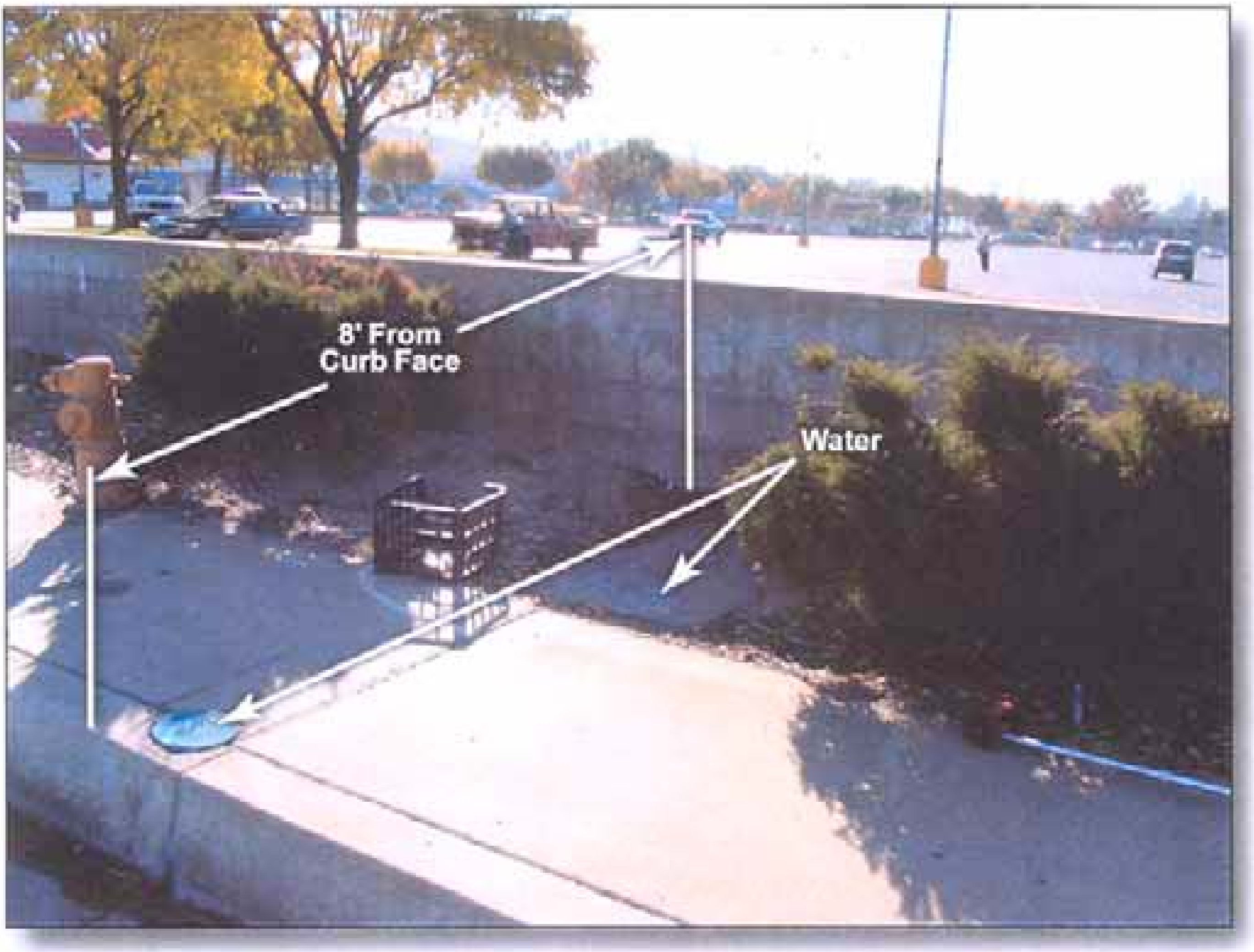
Mc Donald's

SOURCE: PSOMAS – February 2004

Photo 1 – Facing East Soledad Canyon Road, along South Side of Soledad Canyon Road , West of Bouquet Canyon Road

SOURCE: PSOMAS – February 2004

Photo 2 – Facing East Soledad Canyon Road, along South Side of Soledad Canyon Road, West of Bouquet Canyon Road



Mc Donald's

SOURCE: PSOMAS – February 2004

Photo 3 – Facing Southeast Soledad Canyon Road

SOURCE: PSOMAS – February 2004

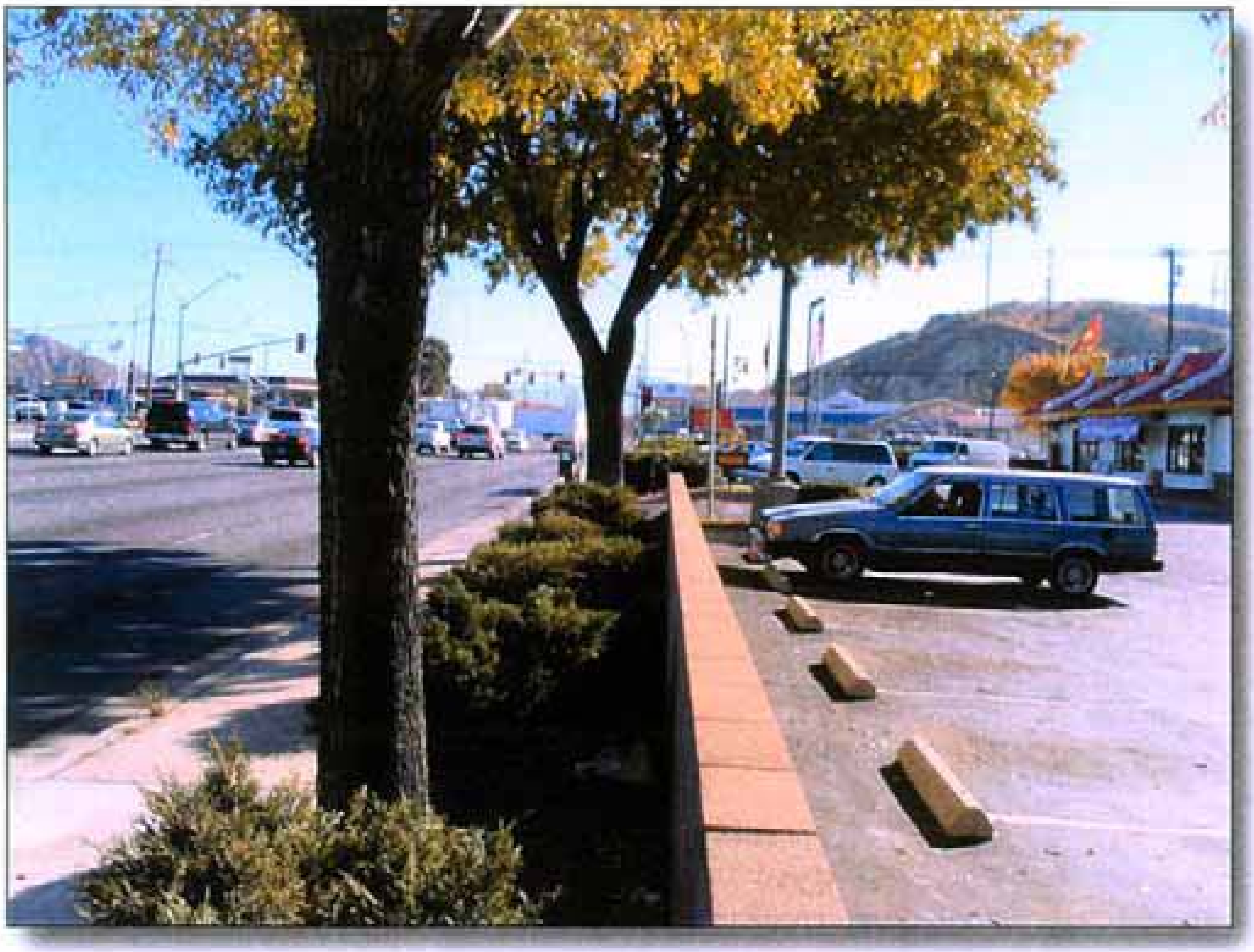
Photo 4 – Facing East Soledad Canyon Road, along South Side of Soledad Canyon Road, West of Bouquet Canyon Road

Mc Donald's

SOURCE: PSOMAS – February 2004

Photo 5 – Facing East Soledad Canyon Road, along South Side of Soledad Canyon Road, West of Bouquet Canyon Road

112-16-02/04



Mc Donald's

SOURCE: PSOMAS – February 2004

Photo 6 – Facing East Soledad Canyon Road

112-16-02/04

KMart Adjacent (Parking Lot)

SOURCE: PSOMAS – February 2004

Photo 7 – Facing West Soledad Canyon Road, along South Side of Soledad Canyon Road, West of Bouquet Canyon Road

KMart Adjacent (Parking Lot)

SOURCE: PSOMAS – February 2004

Photo 8 – Facing West Soledad Canyon Road, along South Side of Soledad Canyon Road, West of Bouquet Canyon Road

Mc Donald's

SOURCE: PSOMAS – February 2004

Photo 9 – Facing East Soledad Canyon Road, along South Side of Soledad Canyon Road, West of Bouquet Canyon Road

Mc Donald's

SOURCE: PSOMAS – February 2004

Photo 10 – Facing East Soledad Canyon Road

112-16-02/04

Mc Donald's

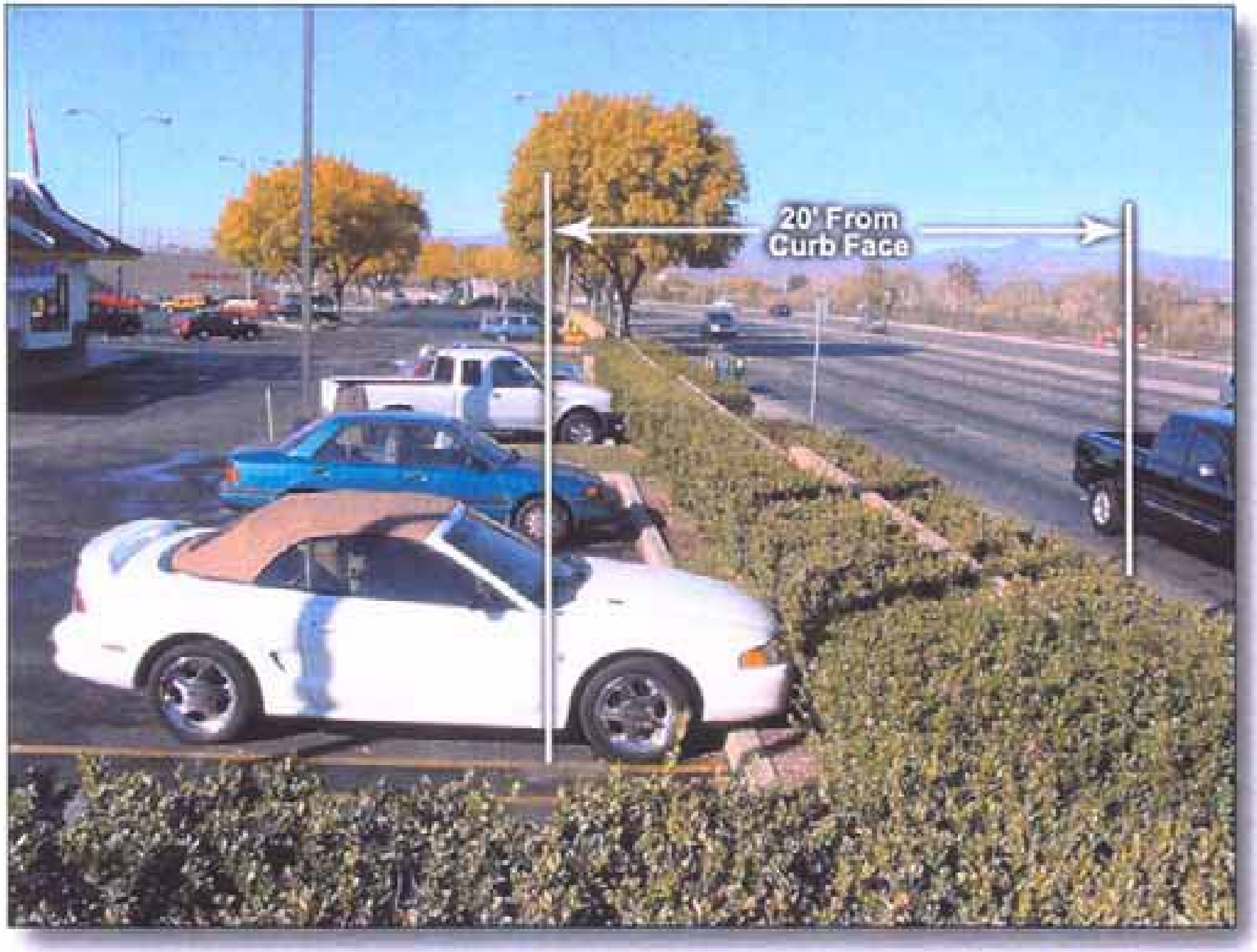
SOURCE: PSOMAS – February 2004

Photo 11 – Facing East Soledad Canyon Road, at Bouquet Canyon Road, along South Side of Soledad Canyon Road

Mc Donald's

SOURCE: PSOMAS – February 2004

Photo 12 – Facing East Soledad Canyon Road at Bouquet Canyon Road, South Side of Soledad Canyon Road



Mc Donald's

SOURCE: PSOMAS – February 2004

Photo 13 – Facing West Soledad Canyon Road, along South Side of Soledad Canyon Road, West of Bouquet Canyon Road

Mc Donalds Adjacent

SOURCE: PSOMAS - February 2004

Photo 14 – Facing North Bouquet Canyon Road, West of Valencia Boulevard/Soledad Canyon Road

sewer

Mc Donalds Adjacent

SOURCE: PSOMAS - February 2004

Photo 15 – Facing South Bouquet Canyon Road, West of Soledad Canyon Road, on North Side of Bouquet Canyon Road

KMart Parking Lot and Taco Bell

SOURCE: PSOMAS - February 2004

Photo 16 – Facing South Bouquet Canyon Road, South of Soledad Canyon Road

112-16-02/04

KMart Parking Lot and McDonald's

SOURCE: PSOMAS – February 2004

Photo 17 – Facing North Bouquet Canyon Road, South of Soledad Canyon Road

112-16-02/04

KMart Parking Lot

SOURCE: PSOMAS – February 2004

Photo 18 – Facing West (Soledad Canyon Road) Valencia Boulevard, South Side of Soledad Canyon Road, West of Bouquet Canyon Road

Mobile Gas Station

SOURCE: PSOMAS – February 2004

Photo 19 – Facing East Soledad Canyon Road, East of Bouquet Canyon Road, on South Side of Soledad Canyon Road

SOURCE: PSOMAS – February 2004

Photo 20 – Facing East Soledad Canyon Road, East of Bouquet Canyon Road, on South Side of Soledad Canyon Road

SOURCE: PSOMAS – February 2004

Photo 21 – Facing Southeast Soledad Canyon Road, East of Bouquet Canyon Road, on South Side of Soledad Canyon Road

SOURCE: PSOMAS – February 2004

Photo 22 – Facing West Soledad Canyon Road

Century 21

SOURCE: PSOMAS – February 2004

Photo 23 – Facing West Soledad Canyon Road

Mobil Station

SOURCE: PSOMAS – February 2004

Photo 24 – Facing West Soledad Canyon Road at Bouquet Canyon Road, East of Bouquet Canyon Road, South Side of Soledad Canyon Road

Mobil Station

SOURCE: PSOMAS - February 2004

Photo 25 – Facing West Soledad Canyon Road at Bouquet Canyon Road

Mobil Station

SOURCE: PSOMAS – February 2004

Photo 26 – Facing West Soledad Canyon Road, East of Bouquet Canyon Road, on South Side of Soledad Canyon Road

Mobil Station and Del Taco

SOURCE: PSOMAS - February 2004

Photo 27 - Facing South Bouquet Canyon Road, South of Soledad Canyon Road/Valencia Boulevard Intersection, along East Side of Bouquet Canyon Road

Mobil Station

SOURCE: PSOMAS - February 2004

Photo 28 – Facing North Bouquet Canyon Road at Soledad Canyon Road, along East Side of Bouquet Canyon Road

112-16-02/04

Del Taco Drive-Thru

SOURCE: PSOMAS – February 2004

Photo 29 – Facing South Bouquet Canyon Road, South of Soledad Canyon Road/Valencia Boulevard, Along East Side of Bouquet Canyon Road

Del Taco Drive-Thru and Commercial Mini-Mall

SOURCE: PSOMAS – February 2004

Photo 30 – Facing South Bouquet Canyon Road, South of Soledad Canyon Road/Valencia Boulevard, Along East Side of Bouquet Canyon Road

Commercial Mini-Mall

SOURCE: PSOMAS – February 2004

Photo 31 – Facing South Bouquet Canyon Road, South of Soledad Canyon Road/Valencia Boulevard, Along East Side of Bouquet Canyon Road

Mobil Gas Station

SOURCE: PSOMAS – February 2004

Photo 32 – Facing North Bouquet Canyon Road, South of Soledad Canyon Road Intersection, Along East Side of Bouquet Canyon Road

Commercial Mini-Mall

SOURCE: PSOMAS - February 2004

Photo 33 – Facing East Soledad Canyon Road, on North Side of Soledad Canyon Road and East of Bouquet Canyon Road

Chichi's Pizza and Burrito Factory Adjacent

SOURCE: PSOMAS – February 2004

Photo 34 – Facing West Soledad Canyon Road, on North Side of Soledad Canyon Road and East of Bouquet Canyon Road

Chichi's Pizza

SOURCE: PSOMAS – February 2004

Photo 35 – Facing West Soledad Canyon Road, on North Side of Soledad Canyon Road and East of Bouquet Canyon Road

76 Service Station

SOURCE: PSOMAS – February 2004

Photo 36 – Facing West Soledad Canyon Road at Bouquet Canyon Road, North Side of Soledad Canyon Road

112-19-02/04

76 Service Station

SOURCE: PSOMAS – February 2004

Photo 37 – Facing South Bouquet Canyon Road and Soledad Canyon Road, east Side of Bouquet Canyon Road

76 Service Station and Commercial Uses

SOURCE: PSOMAS – February 2004

Photo 38 – Facing North Bouquet Canyon Road, East Side of Bouquet Canyon

Ultramar Gas Station

SOURCE: PSOMAS – February 2004

Photo 39 – Facing South along Soledad Canyon Road, East of Bouquet Canyon Road, on the North Side of Soledad Canyon Road

City of Santa Clarita – Trail

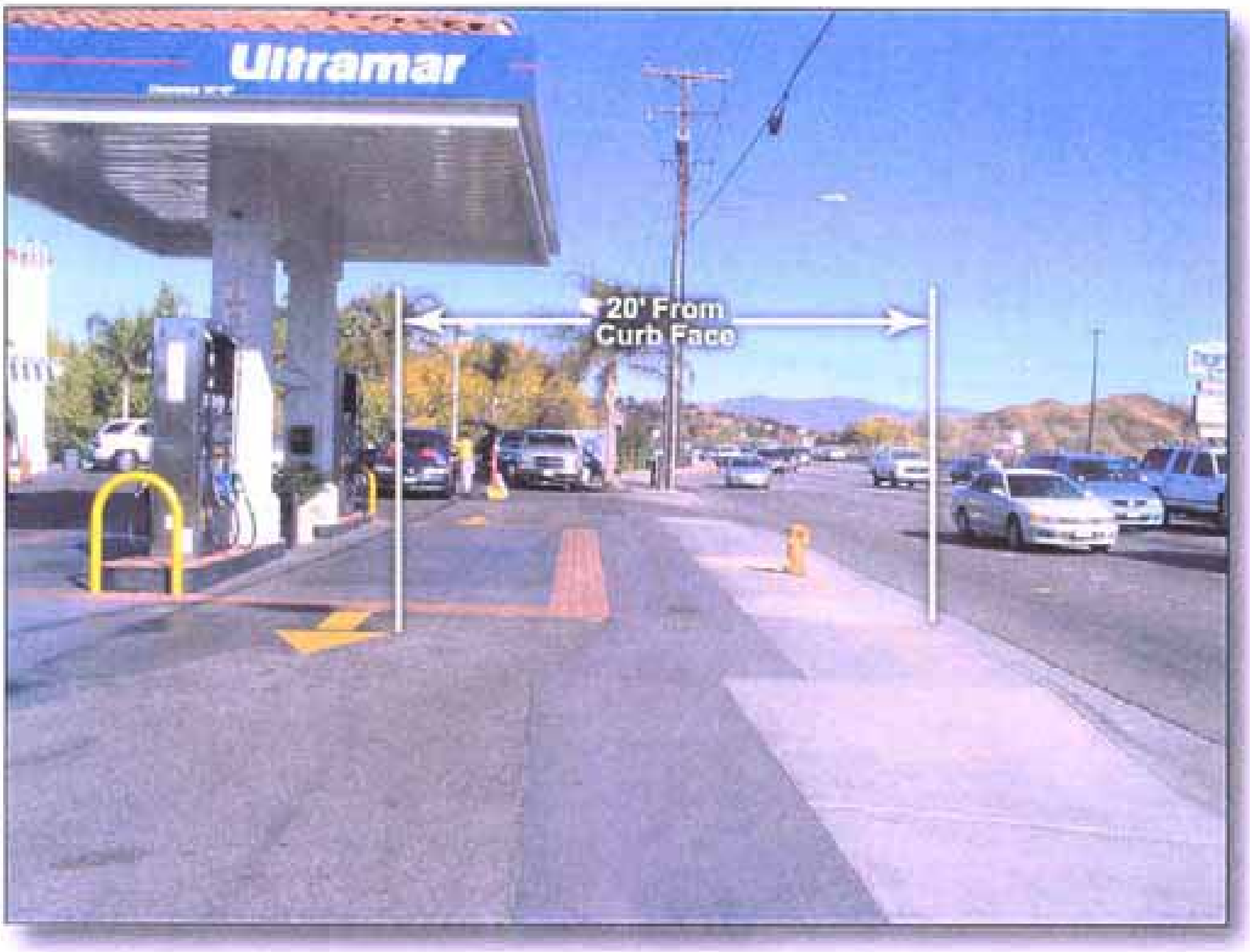
SOURCE: PSOMAS – February 2004

Photo 40 – Facing West Soledad Canyon Road/Valencia Canyon Road, along North Side of Valencia Boulevard, West of Bouquet Canyon Road

Ultramar Gas Station

SOURCE: PSOMAS – February 2004

Photo 41 – Facing East Soledad Canyon Road at Bouquet Canyon Road, on North Side of Soledad Canyon Road



Ultramar Gas Station

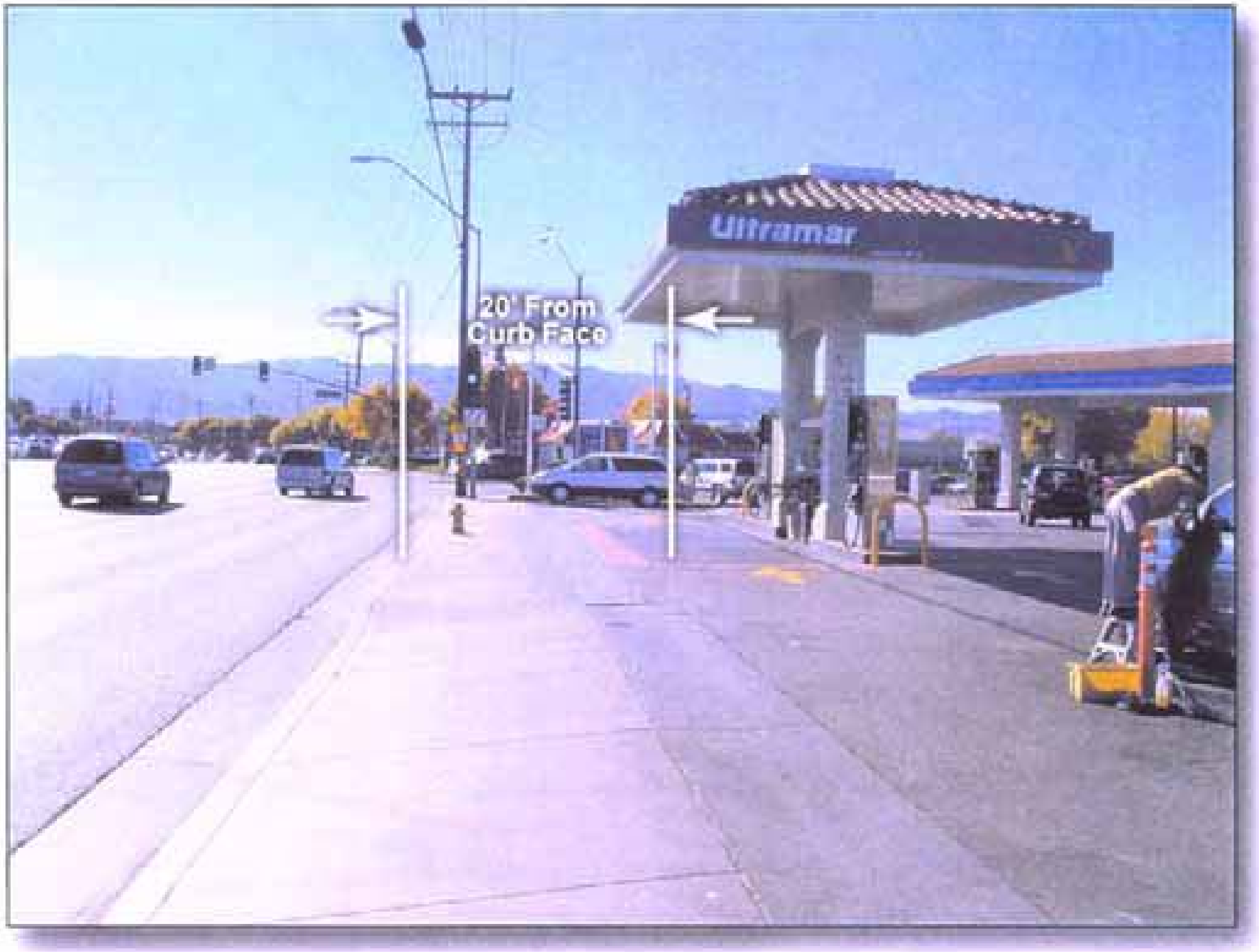
SOURCE: PSOMAS – February 2004

Photo 42 – Facing North Bouquet Canyon Road, West Side of Bouquet Canyon Road

Ultramar Gas Station

SOURCE: PSOMAS – February 2004

Photo 43 – Facing North Bouquet Canyon Road, West Side of Bouquet Canyon Road



Ultramar Gas Station

SOURCE: PSOMAS – February 2004

Photo 44 – Facing South Bouquet Canyon Road, West Side of Bouquet Canyon Road

APPENDIX 4.4

Air Quality Data

EXISTING CALINE4 EMISSIONS

BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS

Project Title:	River Park
Intersection:	Valencia Boulevard/Magic Mountain Parkway
Analysis Condition:	Existing Traffic Volumes
Nearest Air Monitoring Station measuring CO:	SRA13
Background 1-hour CO Concentration (ppm):	6.0
Background 8-hour CO Concentration (ppm):	3.1
Persistence Factor:	0.7
Analysis Year:	2002

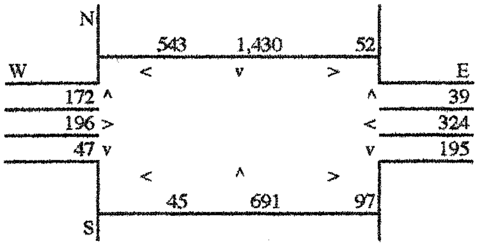
			No. of	Average Cruise Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Valencia Boulevard	At Grade	6	30	30
East-West Roadway:	Magic Mountain Parkway	At Grade	4	30	30

EMFAC7G COMPOSITE EMISSION FACTORS FOR CO

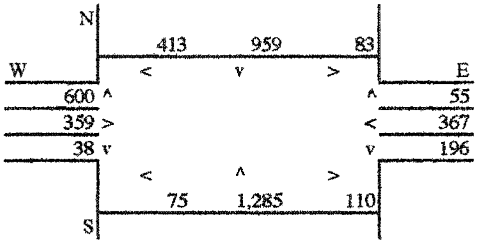
	Average Speed (miles per hour)									
Year	10	15	20	25	30	35	40	45	50	55
1998	24.84	16.74	12.71	10.30	8.67	7.50	6.65	6.07	5.78	5.88
1999	22.93	15.46	11.73	9.50	8.00	6.93	6.14	5.61	5.35	5.46
2000	21.02	14.17	10.75	8.70	7.33	6.35	5.63	5.15	4.92	5.03
2001	19.63	13.24	10.04	8.13	6.85	5.93	5.27	4.82	4.62	4.73
2002	18.24	12.31	9.33	7.55	6.36	5.52	4.90	4.50	4.32	4.43
2003	16.86	11.37	8.63	6.98	5.88	5.10	4.54	4.17	4.01	4.14
2004	15.47	10.44	7.92	6.40	5.39	4.69	4.17	3.85	3.71	3.84
2005	14.08	9.51	7.21	5.83	4.91	4.27	3.81	3.52	3.41	3.54
2010	10.78	7.30	5.52	4.46	3.77	3.28	2.95	2.75	2.69	2.83

PEAK HOUR TURNING VOLUMES

A.M. Peak



P.M. Peak



Representative Traffic Volumes (Vehicles per Hour)

N-S Road	2,927	N-S Road	3,395
E-W Road	1,327	E-W Road	1,852

ROADWAY CO CONTRIBUTIONS

	Reference CO Concentrations				Traffic		Emission		
Roadway	50 Feet	100 Feet	300 Feet		Volume		Factor		
A.M. Peak Hour									
N-S Road	4.9	3.5	1.6	*	2,927	*	6.36	÷	100,000
E-W Road	2.2	1.7	1.1	*	1,327	*	6.36	÷	100,000
P.M. Peak Hour									
N-S Road	4.9	3.5	1.6	*	3,395	*	6.36	÷	100,000
E-W Road	2.2	1.7	1.1	*	1,852	*	6.36	÷	100,000

TOTAL CO CONCENTRATIONS (ppm)

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
50 Feet from Roadway Edge	7.1	7.3	4.1
100 Feet from Roadway Edge	6.8	7.0	3.8
300 Feet from Roadway Edge	6.4	6.5	3.5

BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS

Project Title: River Park
Intersection: Bouquet Canyon Road/Seco Canyon Road
Analysis Condition: Existing Year Traffic Volumes
Nearest Air Monitoring Station measuring CO: SRA13
Background 1-hour CO Concentration (ppm): 6.0
Background 8-hour CO Concentration (ppm): 3.1
Persistence Factor: 0.7
Analysis Year: 2002

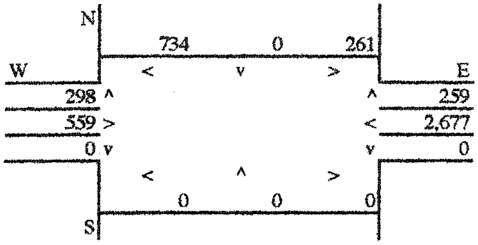
		Roadway Type	No. of Lanes	Average Cruise Speed A.M.	Average Cruise Speed P.M.
North-South Roadway:	Bouquet Canyon Road	At Grade	2	20	20
East-West Roadway:	Seco Canyon Road	At Grade	4	20	20

EMFAC7G COMPOSITE EMISSION FACTORS FOR CO

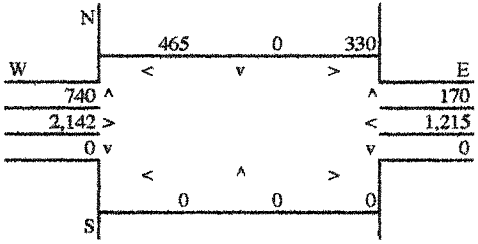
Year	Average Speed (miles per hour) 10	15	20	25	30	35	40	45	50	55
1998	24.84	16.74	12.71	10.30	8.67	7.50	6.65	6.07	5.78	5.88
1999	22.93	15.46	11.73	9.50	8.00	6.93	6.14	5.61	5.35	5.46
2000	21.02	14.17	10.75	8.70	7.33	6.35	5.63	5.15	4.92	5.03
2001	19.63	13.24	10.04	8.13	6.85	5.93	5.27	4.82	4.62	4.73
2002	18.24	12.31	9.33	7.55	6.36	5.52	4.90	4.50	4.32	4.43
2003	16.86	11.37	8.63	6.98	5.88	5.10	4.54	4.17	4.01	4.14
2004	15.47	10.44	7.92	6.40	5.39	4.69	4.17	3.85	3.71	3.84
2005	14.08	9.51	7.21	5.83	4.91	4.27	3.81	3.52	3.41	3.54
2010	10.78	7.30	5.52	4.46	3.77	3.28	2.95	2.75	2.69	2.83

PEAK HOUR TURNING VOLUMES

A.M. Peak



P.M. Peak



Representative Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road	1,552	N-S Road	1,705
E-W Road	4,268	E-W Road	4,562

ROADWAY CO CONTRIBUTIONS

Roadway	Reference CO Concentrations 50 Feet	100 Feet	300 Feet		Traffic Volume		Emission Factor		
A.M. Peak Hour									
N-S Road	2.2	1.7	1.0	*	1,552	*	9.33	÷	100,000
E-W Road	5.4	3.8	1.6	*	4,268	*	9.33	÷	100,000
P.M. Peak Hour									
N-S Road	2.2	1.7	1.0	*	1,705	*	9.33	÷	100,000
E-W Road	5.4	3.8	1.6	*	4,562	*	9.33	÷	100,000

TOTAL CO CONCENTRATIONS (ppm)

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
50 Feet from Roadway Edge	8.5	8.6	5.0
100 Feet from Roadway Edge	7.8	7.9	4.5
300 Feet from Roadway Edge	6.8	6.8	3.7

BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS

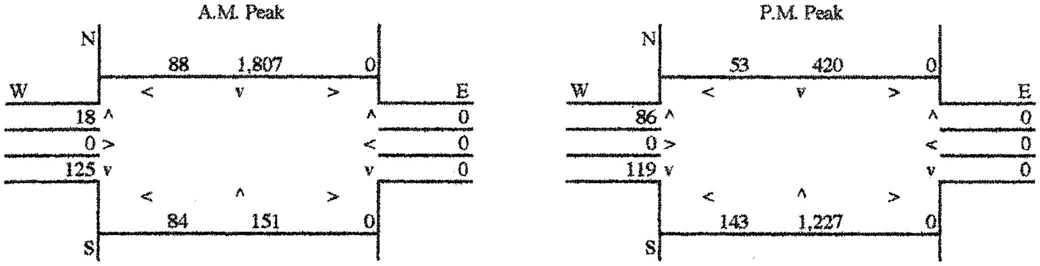
Project Title:	River Park
Intersection:	Sierra Highway/Golden Valley Road
Analysis Condition:	Existing Year Traffic Volumes
Nearest Air Monitoring Station measuring CO:	SRA13
Background 1-hour CO Concentration (ppm):	6.0
Background 8-hour CO Concentration (ppm):	3.1
Persistence Factor:	0.7
Analysis Year:	2002

			No. of	Average Cruise Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Sierra Highway	At Grade	4	30	30
East-West Roadway:	Golden Valley Road	At Grade	6	35	35

EMFAC7G COMPOSITE EMISSION FACTORS FOR CO

	Average Speed (miles per hour)									
Year	10	15	20	25	30	35	40	45	50	55
1998	24.84	16.74	12.71	10.30	8.67	7.50	6.65	6.07	5.78	5.88
1999	22.93	15.46	11.73	9.50	8.00	6.93	6.14	5.61	5.35	5.46
2000	21.02	14.17	10.75	8.70	7.33	6.35	5.63	5.15	4.92	5.03
2001	19.63	13.24	10.04	8.13	6.85	5.93	5.27	4.82	4.62	4.73
2002	18.24	12.31	9.33	7.55	6.36	5.52	4.90	4.50	4.32	4.43
2003	16.86	11.37	8.63	6.98	5.88	5.10	4.54	4.17	4.01	4.14
2004	15.47	10.44	7.92	6.40	5.39	4.69	4.17	3.85	3.71	3.84
2005	14.08	9.51	7.21	5.83	4.91	4.27	3.81	3.52	3.41	3.54
2010	10.78	7.30	5.52	4.46	3.77	3.28	2.95	2.75	2.69	2.83

PEAK HOUR TURNING VOLUMES



Representative Traffic Volumes (Vehicles per Hour)

N-S Road	2,167	N-S Road	1,909
E-W Road	315	E-W Road	401

ROADWAY CO CONTRIBUTIONS

	Reference CO Concentrations				Traffic		Emission		
Roadway	50 Feet	100 Feet	300 Feet		Volume		Factor		
A.M. Peak Hour									
N-S Road	5.4	3.8	1.6	*	2,167	*	6.36	÷	100,000
E-W Road	2.0	1.7	1.1	*	315	*	5.52	÷	100,000
P.M. Peak Hour									
N-S Road	5.4	3.8	1.6	*	1,909	*	6.36	÷	100,000
E-W Road	2.0	1.7	1.1	*	401	*	5.52	÷	100,000

TOTAL CO CONCENTRATIONS (ppm)

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
50 Feet from Roadway Edge	6.8	6.7	3.7
100 Feet from Roadway Edge	6.6	6.5	3.5
300 Feet from Roadway Edge	6.2	6.2	3.3

BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS

Project Title:	River Park
Intersection:	Rainbow Glen/Soledad Canyon Road
Analysis Condition:	Existing Year Traffic Volumes
Nearest Air Monitoring Station measuring CO:	SRA13
Background 1-hour CO Concentration (ppm):	6.0
Background 8-hour CO Concentration (ppm):	3.1
Persistence Factor:	0.7
Analysis Year:	2002

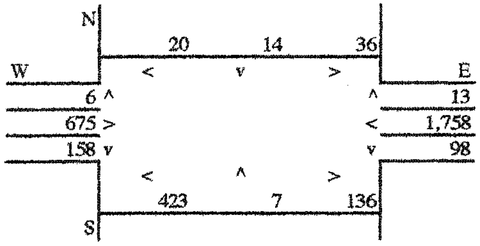
			No. of	Average Cruise Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Rainbow Glen	At Grade	2	20	20
East-West Roadway:	Soledad Canyon Road	At Grade	6	20	20

EMFAC7G COMPOSITE EMISSION FACTORS FOR CO

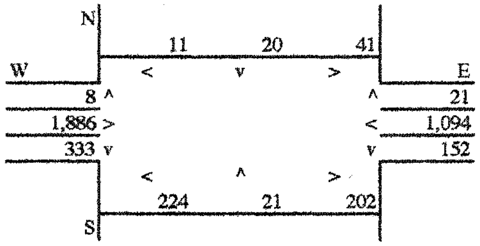
	Average Speed (miles per hour)									
Year	10	15	20	25	30	35	40	45	50	55
1998	24.84	16.74	12.71	10.30	8.67	7.50	6.65	6.07	5.78	5.88
1999	22.93	15.46	11.73	9.50	8.00	6.93	6.14	5.61	5.35	5.46
2000	21.02	14.17	10.75	8.70	7.33	6.35	5.63	5.15	4.92	5.03
2001	19.63	13.24	10.04	8.13	6.85	5.93	5.27	4.82	4.62	4.73
2002	18.24	12.31	9.33	7.55	6.36	5.52	4.90	4.50	4.32	4.43
2003	16.86	11.37	8.63	6.98	5.88	5.10	4.54	4.17	4.01	4.14
2004	15.47	10.44	7.92	6.40	5.39	4.69	4.17	3.85	3.71	3.84
2005	14.08	9.51	7.21	5.83	4.91	4.27	3.81	3.52	3.41	3.54
2010	10.78	7.30	5.52	4.46	3.77	3.28	2.95	2.75	2.69	2.83

PEAK HOUR TURNING VOLUMES

A.M. Peak



P.M. Peak



Representative Traffic Volumes (Vehicles per Hour)

N-S Road	836	N-S Road	952
E-W Road	3,040	E-W Road	3,556

ROADWAY CO CONTRIBUTIONS

	Reference CO Concentrations				Traffic		Emission		
Roadway	50 Feet	100 Feet	300 Feet		Volume		Factor		
A.M. Peak Hour									
N-S Road	2.2	1.7	1.0	*	836	*	9.33	÷	100,000
E-W Road	4.9	3.5	1.6	*	3,040	*	9.33	÷	100,000
P.M. Peak Hour									
N-S Road	2.2	1.7	1.0	*	952	*	9.33	÷	100,000
E-W Road	4.9	3.5	1.6	*	3,556	*	9.33	÷	100,000

TOTAL CO CONCENTRATIONS (ppm)

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
50 Feet from Roadway Edge	7.6	7.8	4.4
100 Feet from Roadway Edge	7.1	7.3	4.1
300 Feet from Roadway Edge	6.5	6.6	3.6

BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS

Project Title:	River Park
Intersection:	Whites Canyon/Soledad Canyon Road
Analysis Condition:	Existing Year Traffic Volumes
Nearest Air Monitoring Station measuring CO:	SRA13
Background 1-hour CO Concentration (ppm):	6.0
Background 8-hour CO Concentration (ppm):	3.1
Persistence Factor:	0.7
Analysis Year:	2002

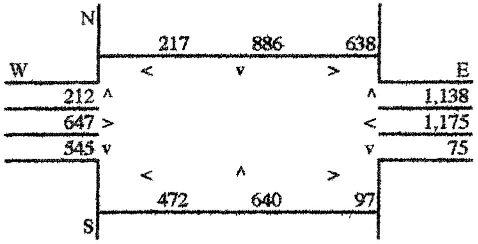
			No. of	Average Cruise Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Whites Canyon	At Grade	4	35	35
East-West Roadway:	Soledad Canyon Road	At Grade	4	35	35

EMFAC7G COMPOSITE EMISSION FACTORS FOR CO

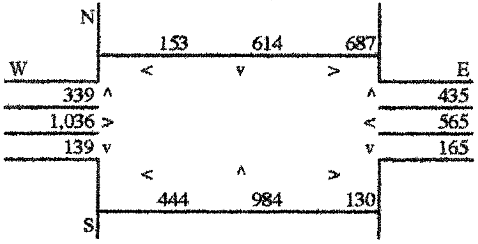
	Average Speed (miles per hour)									
Year	10	15	20	25	30	35	40	45	50	55
1998	24.84	16.74	12.71	10.30	8.67	7.50	6.65	6.07	5.78	5.88
1999	22.93	15.46	11.73	9.50	8.00	6.93	6.14	5.61	5.35	5.46
2000	21.02	14.17	10.75	8.70	7.33	6.35	5.63	5.15	4.92	5.03
2001	19.63	13.24	10.04	8.13	6.85	5.93	5.27	4.82	4.62	4.73
2002	18.24	12.31	9.33	7.55	6.36	5.52	4.90	4.50	4.32	4.43
2003	16.86	11.37	8.63	6.98	5.88	5.10	4.54	4.17	4.01	4.14
2004	15.47	10.44	7.92	6.40	5.39	4.69	4.17	3.85	3.71	3.84
2005	14.08	9.51	7.21	5.83	4.91	4.27	3.81	3.52	3.41	3.54
2010	10.78	7.30	5.52	4.46	3.77	3.28	2.95	2.75	2.69	2.83

PEAK HOUR TURNING VOLUMES

A.M. Peak



P.M. Peak



Representative Traffic Volumes (Vehicles per Hour)

N-S Road	3,731	N-S Road	3,212
E-W Road	3,770	E-W Road	3,018

ROADWAY CO CONTRIBUTIONS

	Reference CO Concentrations				Traffic		Emission		
Roadway	50 Feet	100 Feet	300 Feet		Volume		Factor		
A.M. Peak Hour									
N-S Road	2.2	1.7	1.1	*	3,731	*	5.52	÷	100,000
E-W Road	5.4	3.8	1.6	*	3,770	*	5.52	÷	100,000
P.M. Peak Hour									
N-S Road	5.4	3.8	1.6	*	3,212	*	5.52	÷	100,000
E-W Road	2.2	1.7	1.1	*	3,018	*	5.52	÷	100,000

TOTAL CO CONCENTRATIONS (ppm)

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
50 Feet from Roadway Edge	7.6	7.3	4.2
100 Feet from Roadway Edge	7.1	7.0	3.9
300 Feet from Roadway Edge	6.6	6.5	3.5

PROJECTED CALINE4 EMISSIONS

BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS

Project Title:	River Park
Intersection:	Valencia Boulevard/Magic Mountain Parkway
Analysis Condition:	Interim Year Traffic Volumes
Nearest Air Monitoring Station measuring CO:	SRA13
Background 1-hour CO Concentration (ppm):	6.0
Background 8-hour CO Concentration (ppm):	3.1
Persistence Factor:	0.7
Analysis Year:	2010

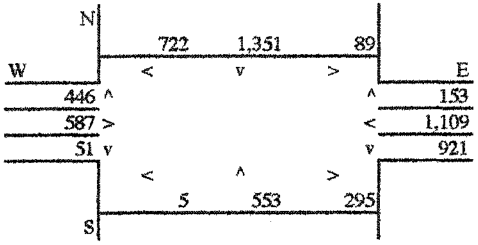
			No. of	Average Cruise Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Valencia Boulevard	At Grade	6	30	30
East-West Roadway:	Magic Mountain Parkway	At Grade	4	30	30

EMFAC7G COMPOSITE EMISSION FACTORS FOR CO

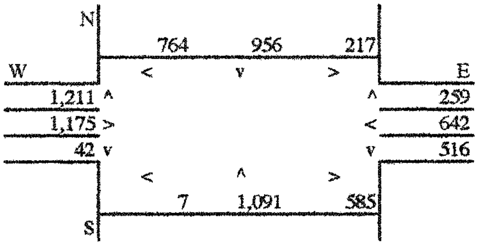
	Average Speed (miles per hour)									
Year	10	15	20	25	30	35	40	45	50	55
1998	24.84	16.74	12.71	10.30	8.67	7.50	6.65	6.07	5.78	5.88
1999	22.93	15.46	11.73	9.50	8.00	6.93	6.14	5.61	5.35	5.46
2000	21.02	14.17	10.75	8.70	7.33	6.35	5.63	5.15	4.92	5.03
2001	19.63	13.24	10.04	8.13	6.85	5.93	5.27	4.82	4.62	4.73
2002	18.24	12.31	9.33	7.55	6.36	5.52	4.90	4.50	4.32	4.43
2003	16.86	11.37	8.63	6.98	5.88	5.10	4.54	4.17	4.01	4.14
2004	15.47	10.44	7.92	6.40	5.39	4.69	4.17	3.85	3.71	3.84
2005	14.08	9.51	7.21	5.83	4.91	4.27	3.81	3.52	3.41	3.54
2010	10.78	7.30	5.52	4.46	3.77	3.28	2.95	2.75	2.69	2.83

PEAK HOUR TURNING VOLUMES

A.M. Peak



P.M. Peak



Representative Traffic Volumes (Vehicles per Hour)

N-S Road	3,314	N-S Road	4,498
E-W Road	3,154	E-W Road	3,841

ROADWAY CO CONTRIBUTIONS

	Reference CO Concentrations				Traffic		Emission		
Roadway	50 Feet	100 Feet	300 Feet		Volume		Factor		
A.M. Peak Hour									
N-S Road	4.9	3.5	1.6	*	3,314	*	3.77	÷	100,000
E-W Road	2.2	1.7	1.1	*	3,154	*	3.77	÷	100,000
P.M. Peak Hour									
N-S Road	4.9	3.5	1.6	*	4,498	*	3.77	÷	100,000
E-W Road	2.2	1.7	1.1	*	3,841	*	3.77	÷	100,000

TOTAL CO CONCENTRATIONS (ppm)

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
50 Feet from Roadway Edge	6.9	7.1	3.9
100 Feet from Roadway Edge	6.6	6.8	3.7
300 Feet from Roadway Edge	6.3	6.4	3.4

BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS

Project Title:	River Park
Intersection:	Bouquet Canyon Road/Seco Canyon Road
Analysis Condition:	Interim Year Traffic Volumes
Nearest Air Monitoring Station measuring CO:	SRA13
Background 1-hour CO Concentration (ppm):	6.0
Background 8-hour CO Concentration (ppm):	3.1
Persistence Factor:	0.7
Analysis Year:	2010

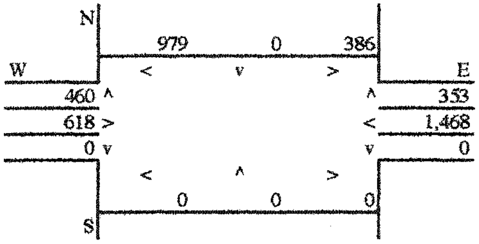
			No. of	Average Cruise Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Bouquet Canyon Road	At Grade	2	20	20
East-West Roadway:	Seco Canyon Road	At Grade	4	20	20

EMFAC7G COMPOSITE EMISSION FACTORS FOR CO

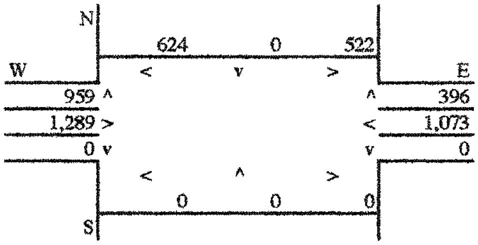
	Average Speed (miles per hour)									
Year	10	15	20	25	30	35	40	45	50	55
1998	24.84	16.74	12.71	10.30	8.67	7.50	6.65	6.07	5.78	5.88
1999	22.93	15.46	11.73	9.50	8.00	6.93	6.14	5.61	5.35	5.46
2000	21.02	14.17	10.75	8.70	7.33	6.35	5.63	5.15	4.92	5.03
2001	19.63	13.24	10.04	8.13	6.85	5.93	5.27	4.82	4.62	4.73
2002	18.24	12.31	9.33	7.55	6.36	5.52	4.90	4.50	4.32	4.43
2003	16.86	11.37	8.63	6.98	5.88	5.10	4.54	4.17	4.01	4.14
2004	15.47	10.44	7.92	6.40	5.39	4.69	4.17	3.85	3.71	3.84
2005	14.08	9.51	7.21	5.83	4.91	4.27	3.81	3.52	3.41	3.54
2010	10.78	7.30	5.52	4.46	3.77	3.28	2.95	2.75	2.69	2.83

PEAK HOUR TURNING VOLUMES

A.M. Peak



P.M. Peak



Representative Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road	2,178	N-S Road	2,501
E-W Road	3,525	E-W Road	3,945

ROADWAY CO CONTRIBUTIONS

	Reference CO Concentrations				Traffic		Emission		
Roadway	50 Feet	100 Feet	300 Feet		Volume		Factor		
A.M. Peak Hour									
N-S Road	2.2	1.7	1.0	*	2,178	*	5.52	÷	100,000
E-W Road	5.4	3.8	1.6	*	3,525	*	5.52	÷	100,000
P.M. Peak Hour									
N-S Road	2.2	1.7	1.0	*	2,501	*	5.52	÷	100,000
E-W Road	5.4	3.8	1.6	*	3,945	*	5.52	÷	100,000

TOTAL CO CONCENTRATIONS (ppm)

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
50 Feet from Roadway Edge	7.3	7.5	4.2
100 Feet from Roadway Edge	6.9	7.1	3.9
300 Feet from Roadway Edge	6.4	6.5	3.5

BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS

Project Title:	River Park
Intersection:	Santa Clarita Parkway/Bouquet Canyon Road
Analysis Condition:	Interim Year Traffic Volumes
Nearest Air Monitoring Station measuring CO:	SRA13
Background 1-hour CO Concentration (ppm):	6.0
Background 8-hour CO Concentration (ppm):	3.1
Persistence Factor:	0.7
Analysis Year:	2010

			No. of	Average Cruise Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Santa Clarita Parkway	At Grade	6	20	20
East-West Roadway:	Bouquet Canyon Road	At Grade	2	20	20

EMFAC7G COMPOSITE EMISSION FACTORS FOR CO

	Average Speed (miles per hour)									
Year	10	15	20	25	30	35	40	45	50	55
1998	24.84	16.74	12.71	10.30	8.67	7.50	6.65	6.07	5.78	5.88
1999	22.93	15.46	11.73	9.50	8.00	6.93	6.14	5.61	5.35	5.46
2000	21.02	14.17	10.75	8.70	7.33	6.35	5.63	5.15	4.92	5.03
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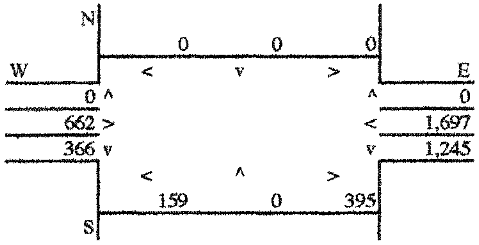
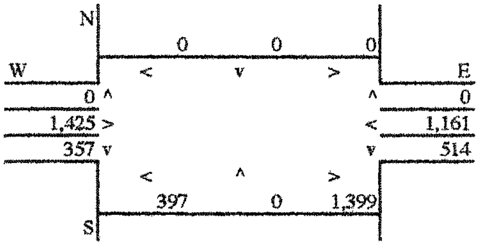
2002	18.24	12.31	9.33	7.55	6.36	5.52	4.90	4.50	4.32	4.43
2003	16.86	11.37	8.63	6.98	5.88	5.10	4.54	4.17	4.01	4.14
2004	15.47	10.44	7.92	6.40	5.39	4.69	4.17	3.85	3.71	3.84
2005	14.08	9.51	7.21	5.83	4.91	4.27	3.81	3.52	3.41	3.54
2010	10.78	7.30	5.52	4.46	3.77	3.28	2.95	2.75	2.69	2.83

PEAK HOUR TURNING VOLUMES

A.M. Peak



P.M. Peak



Representative Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road	2,165	N-S Road	2,667
E-W Road	3,999	E-W Road	4,499

ROADWAY CO CONTRIBUTIONS

	Reference CO Concentrations				Traffic		Emission		
Roadway	50 Feet	100 Feet	300 Feet		Volume		Factor		
A.M. Peak Hour									
N-S Road	2.0	1.7	1.1	*	2,165	*	5.52	÷	100,000
E-W Road	5.7	4.0	1.7	*	3,999	*	5.52	÷	100,000
P.M. Peak Hour									
N-S Road	2.0	1.7	1.1	*	2,667	*	5.52	÷	100,000
E-W Road	5.7	4.0	1.7	*	4,499	*	5.52	÷	100,000

TOTAL CO CONCENTRATIONS (ppm)

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
50 Feet from Roadway Edge	7.5	7.7	4.3
100 Feet from Roadway Edge	7.1	7.2	4.0
300 Feet from Roadway Edge	6.5	6.6	3.5

BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS

Project Title:	River Park
Intersection:	Sierra Highway/Golden Valley Road
Analysis Condition:	Interim Year Traffic Volumes
Nearest Air Monitoring Station measuring CO:	SRA13
Background 1-hour CO Concentration (ppm):	6.0
Background 8-hour CO Concentration (ppm):	3.1
Persistence Factor:	0.7
Analysis Year:	2010

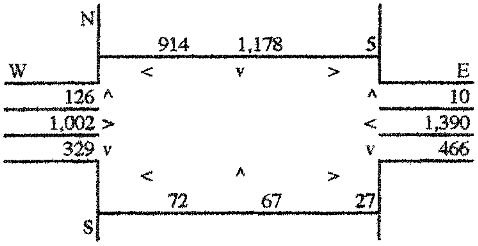
			No. of	Average Cruise Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Sierra Highway	At Grade	4	30	30
East-West Roadway:	Golden Valley Road	At Grade	6	35	35

EMFAC7G COMPOSITE EMISSION FACTORS FOR CO

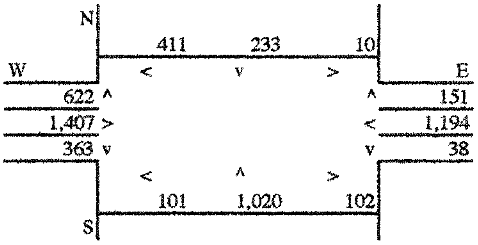
	Average Speed (miles per hour)									
Year	10	15	20	25	30	35	40	45	50	55
1998	24.84	16.74	12.71	10.30	8.67	7.50	6.65	6.07	5.78	5.88
1999	22.93	15.46	11.73	9.50	8.00	6.93	6.14	5.61	5.35	5.46
2000	21.02	14.17	10.75	8.70	7.33	6.35	5.63	5.15	4.92	5.03
2001	19.63	13.24	10.04	8.13	6.85	5.93	5.27	4.82	4.62	4.73
2002	18.24	12.31	9.33	7.55	6.36	5.52	4.90	4.50	4.32	4.43
2003	16.86	11.37	8.63	6.98	5.88	5.10	4.54	4.17	4.01	4.14
2004	15.47	10.44	7.92	6.40	5.39	4.69	4.17	3.85	3.71	3.84
2005	14.08	9.51	7.21	5.83	4.91	4.27	3.81	3.52	3.41	3.54
2010	10.78	7.30	5.52	4.46	3.77	3.28	2.95	2.75	2.69	2.83

PEAK HOUR TURNING VOLUMES

A.M. Peak



P.M. Peak



Representative Traffic Volumes (Vehicles per Hour)

N-S Road	2,300	N-S Road	2,447
E-W Road	3,833	E-W Road	4,098

ROADWAY CO CONTRIBUTIONS

	Reference CO Concentrations				Traffic		Emission		
Roadway	50 Feet	100 Feet	300 Feet		Volume		Factor		
A.M. Peak Hour									
N-S Road	2.2	1.7	1.1	*	2,300	*	3.77	÷	100,000
E-W Road	4.9	3.5	1.6	*	3,833	*	3.28	÷	100,000
P.M. Peak Hour									
N-S Road	2.2	1.7	1.1	*	2,447	*	3.77	÷	100,000
E-W Road	4.9	3.5	1.6	*	4,098	*	3.28	÷	100,000

TOTAL CO CONCENTRATIONS (ppm)

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
50 Feet from Roadway Edge	6.8	6.9	3.7
100 Feet from Roadway Edge	6.6	6.6	3.6
300 Feet from Roadway Edge	6.3	6.3	3.4

BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS

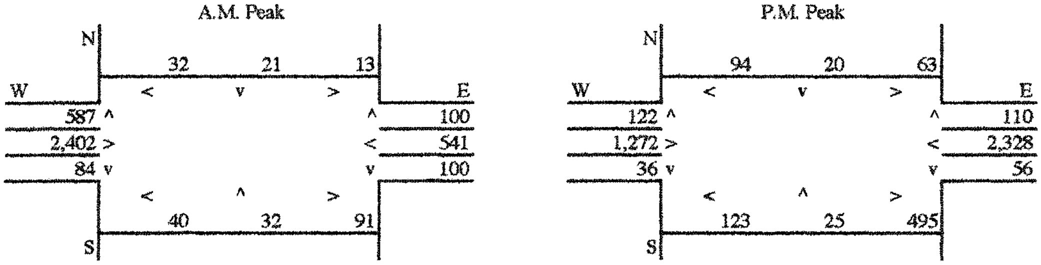
Project Title:	River Park
Intersection:	Rainbow Glen/Soledad Canyon Road
Analysis Condition:	Interim Year Traffic Volumes
Nearest Air Monitoring Station measuring CO:	SRA13
Background 1-hour CO Concentration (ppm):	6.0
Background 8-hour CO Concentration (ppm):	3.1
Persistence Factor:	0.7
Analysis Year:	2010

		Roadway Type	No. of Lanes	Average Cruise Speed A.M.	Average Cruise Speed P.M.
North-South Roadway:	Rainbow Glen	At Grade	2	20	20
East-West Roadway:	Soledad Canyon Road	At Grade	6	20	20

EMFAC7G COMPOSITE EMISSION FACTORS FOR CO

	Average Speed (miles per hour)									
Year	10	15	20	25	30	35	40	45	50	55
1998	24.84	16.74	12.71	10.30	8.67	7.50	6.65	6.07	5.78	5.88
1999	22.93	15.46	11.73	9.50	8.00	6.93	6.14	5.61	5.35	5.46
2000	21.02	14.17	10.75	8.70	7.33	6.35	5.63	5.15	4.92	5.03
2001	19.63	13.24	10.04	8.13	6.85	5.93	5.27	4.82	4.62	4.73
2002	18.24	12.31	9.33	7.55	6.36	5.52	4.90	4.50	4.32	4.43
2003	16.86	11.37	8.63	6.98	5.88	5.10	4.54	4.17	4.01	4.14
2004	15.47	10.44	7.92	6.40	5.39	4.69	4.17	3.85	3.71	3.84
2005	14.08	9.51	7.21	5.83	4.91	4.27	3.81	3.52	3.41	3.54
2010	10.78	7.30	5.52	4.46	3.77	3.28	2.95	2.75	2.69	2.83

PEAK HOUR TURNING VOLUMES



Representative Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road	785	N-S Road	755
E-W Road	3,686	E-W Road	4,324

ROADWAY CO CONTRIBUTIONS

Roadway	Reference CO Concentrations 50 Feet	100 Feet	300 Feet		Traffic Volume		Emission Factor		
A.M. Peak Hour									
N-S Road	2.2	1.7	1.0	*	785	*	5.52	÷	100,000
E-W Road	4.9	3.5	1.6	*	3,686	*	5.52	÷	100,000
P.M. Peak Hour									
N-S Road	2.2	1.7	1.0	*	755	*	5.52	÷	100,000
E-W Road	4.9	3.5	1.6	*	4,324	*	5.52	÷	100,000

TOTAL CO CONCENTRATIONS (ppm)

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
50 Feet from Roadway Edge	7.1	7.3	4.0
100 Feet from Roadway Edge	6.8	6.9	3.8
300 Feet from Roadway Edge	6.4	6.4	3.4

BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS

Project Title:	River Park
Intersection:	Whites Canyon/Soledad Canyon Road
Analysis Condition:	Interim Year Traffic Volumes
Nearest Air Monitoring Station measuring CO:	SRA13
Background 1-hour CO Concentration (ppm):	6.0
Background 8-hour CO Concentration (ppm):	3.1
Persistence Factor:	0.7
Analysis Year:	2010

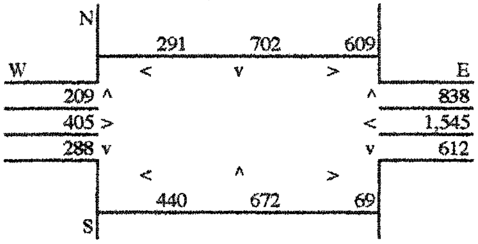
			No. of	Average Cruise Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Whites Canyon	At Grade	4	35	35
East-West Roadway:	Soledad Canyon Road	At Grade	4	35	35

EMFAC7G COMPOSITE EMISSION FACTORS FOR CO

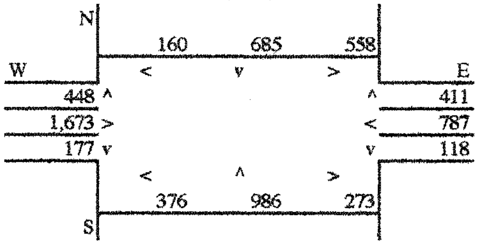
	Average Speed (miles per hour)									
Year	10	15	20	25	30	35	40	45	50	55
1998	24.84	16.74	12.71	10.30	8.67	7.50	6.65	6.07	5.78	5.88
1999	22.93	15.46	11.73	9.50	8.00	6.93	6.14	5.61	5.35	5.46
2000	21.02	14.17	10.75	8.70	7.33	6.35	5.63	5.15	4.92	5.03
2001	19.63	13.24	10.04	8.13	6.85	5.93	5.27	4.82	4.62	4.73
2002	18.24	12.31	9.33	7.55	6.36	5.52	4.90	4.50	4.32	4.43
2003	16.86	11.37	8.63	6.98	5.88	5.10	4.54	4.17	4.01	4.14
2004	15.47	10.44	7.92	6.40	5.39	4.69	4.17	3.85	3.71	3.84
2005	14.08	9.51	7.21	5.83	4.91	4.27	3.81	3.52	3.41	3.54
2010	10.78	7.30	5.52	4.46	3.77	3.28	2.95	2.75	2.69	2.83

PEAK HOUR TURNING VOLUMES

A.M. Peak



P.M. Peak



Representative Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road	3,321	N-S Road	3,248
E-W Road	4,078	E-W Road	3,820

ROADWAY CO CONTRIBUTIONS

	Reference CO Concentrations				Traffic		Emission		
Roadway	50 Feet	100 Feet	300 Feet		Volume		Factor		
A.M. Peak Hour									
N-S Road	2.2	1.7	1.1	*	3,321	*	3.28	÷	100,000
E-W Road	5.4	3.8	1.6	*	4,078	*	3.28	÷	100,000
P.M. Peak Hour									
N-S Road	2.2	1.7	1.1	*	3,248	*	3.28	÷	100,000
E-W Road	5.4	3.8	1.6	*	3,820	*	3.28	÷	100,000

TOTAL CO CONCENTRATIONS (ppm)

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
50 Feet from Roadway Edge	7.0	6.9	3.8
100 Feet from Roadway Edge	6.7	6.7	3.6
300 Feet from Roadway Edge	6.3	6.3	3.4

BAY AREA AQMD SIMPLIFIED CALINE4 ANALYSIS

Project Title:	River Park
Intersection:	Valley Center/Soledad Canyon Road
Analysis Condition:	Interim Year Traffic Volumes
Nearest Air Monitoring Station measuring CO:	SRA13
Background 1-hour CO Concentration (ppm):	6.0
Background 8-hour CO Concentration (ppm):	3.1
Persistence Factor:	0.7
Analysis Year:	2010

			No. of	Average Cruise Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Valley Center	At Grade	2	25	25
East-West Roadway:	Soledad Canyon Road	At Grade	6	35	35

EMFAC7G COMPOSITE EMISSION FACTORS FOR CO

	Average Speed (miles per hour)									
Year	10	15	20	25	30	35	40	45	50	55
1998	24.84	16.74	12.71	10.30	8.67	7.50	6.65	6.07	5.78	5.88
1999	22.93	15.46	11.73	9.50	8.00	6.93	6.14	5.61	5.35	5.46
2000	21.02	14.17	10.75	8.70	7.33	6.35	5.63	5.15	4.92	5.03
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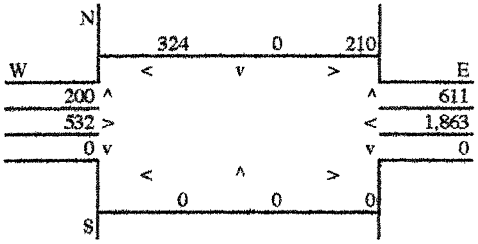
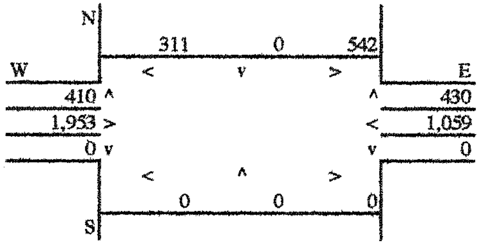
2004	15.47	10.44	7.92	6.40	5.39	4.69	4.17	3.85	3.71	3.84
2005	14.08	9.51	7.21	5.83	4.91	4.27	3.81	3.52	3.41	3.54
2010	10.78	7.30	5.52	4.46	3.77	3.28	2.95	2.75	2.69	2.83

PEAK HOUR TURNING VOLUMES

A.M. Peak



P.M. Peak



Representative Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road	1,345	N-S Road	1,693
E-W Road	3,216	E-W Road	3,984

ROADWAY CO CONTRIBUTIONS

	Reference CO Concentrations				Traffic		Emission		
Roadway	50 Feet	100 Feet	300 Feet		Volume		Factor		
A.M. Peak Hour									
N-S Road	2.2	1.7	1.0	*	1,345	*	4.46	÷	100,000
E-W Road	4.9	3.5	1.6	*	3,216	*	3.28	÷	100,000
P.M. Peak Hour									
N-S Road	2.2	1.7	1.0	*	1,693	*	4.46	÷	100,000
E-W Road	4.9	3.5	1.6	*	3,984	*	3.28	÷	100,000

TOTAL CO CONCENTRATIONS (ppm)

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
50 Feet from Roadway Edge	6.6	6.8	3.7
100 Feet from Roadway Edge	6.5	6.6	3.6
300 Feet from Roadway Edge	6.2	6.3	3.3

UNMITIGATED CONSTRUCTION EMISSIONS

Project Name **Riverpark** **Unmitigated Emissions**
Subphase **A, Weeks 1 thru 19**
Length of Subphase (weeks) **19.00**
Year **2004**

▨ Calculated Emissions
▨ Mitigated Emissions

	Emissions (Pounds per Day)					
Emissions Source/Subphase	CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	0.00	0.00	0.00	0.00	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	2,686.32	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	1,197.57	163.32	1,278.74	--	60.50	
Worker Commute Trips	14.14	1.54	2.57	0.02	0.08	
Mitigation/Reduction						
Fugitive Dust	--	--	--	--	1,343.16	Rule 403
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	No Pavement and Asphalt During This Subphase
Off-Road Diesel Exhaust Emissions	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Emissions	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						No Building Construction During This Subphase
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Architectural Painting						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	**1,211.71**	**164.86**	**1,281.31**	**0.02**	**1,403.74**	
SCAQMD Threshold:	**550.00**	**75.00**	**100.00**	**150.00**	**150.00**	
Exceeds Threshold?	**Yes**	**Yes**	**Yes**	**No**	**Yes**	

Project Name	**Riverpark**	**Unmitigated Emissions**	
Subphase	**B, Weeks 20 thru 25**		
Length of Subphase (weeks)		**6.00**	
Year	**2004**		

▨ Calculated Emissions
░ Mitigated Emissions

Emissions Source/Subphase	Emissions (Pounds per Day) CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	--	--	--	--	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	2,686.32	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	1,255.68	163.32	1,200.67	--	55.04	
Worker Commute Trips	12.94	1.41	2.38	0.02	0.08	
Mitigation/Reduction						
Fugitive Dust	--	--	--	--	1,343.16	Fugitive Dust Rule 403
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	--	0.37	--	--	--	
Off-Road Diesel Exhaust Emissions	261.64	34.03	249.59	--	11.33	
On-Road Diesel Exhaust Emissions	1.21	0.17	1.62	0.01	0.03	
Worker Commute Emissions	2.55	0.28	0.47	0.00	0.02	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	No Mitigation Employed
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No Building Construction During This Subphase
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Architectural Painting						
Off-Gas Emissions	--	0.00	--	--	--	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	1,534.02	199.59	1,454.73	0.03	1,409.66	
SCAQMD Threshold:	550.00	75.00	100.00	150.00	150.00	
Exceeds Threshold?	Yes	Yes	Yes	No	Yes	

Project Name **Riverpark** **Unmitigated Emissions**
Subphase **C, Weeks 26 thru 30**
Length of Subphase (weeks) **5.00**
Year **2005**

▨ Calculated Emissions
▨ Mitigated Emissions

	Emissions (Pounds per Day)					
Emissions Source/Subphase	CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	–	–	–	–	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	–	–	–	–	2,238.60	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	1,070.58	139.78	1,032.64	–	47.40	
Worker Commute Trips	11.03	1.21	2.03	0.01	0.07	
Mitigation/Reduction						
Fugitive Dust	–	–	–	–	1,119.30	Fugitive Dust Rule 403
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	–	0.37	–	–	–	
Off-Road Diesel Exhaust Emissions	261.64	34.03	249.59	–	11.33	
On-Road Diesel Exhaust Emissions	1.21	0.17	1.62	0.01	0.03	
Worker Commute Emissions	2.55	0.28	0.47	0.00	0.02	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	No Mitigation Employed
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No Building Construction During This Subphase
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Architectural Painting						
Off-Gas Emissions	–	0.00	–	–	–	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	1,347.01	175.84	1,286.35	0.03	1,178.15	
SCAQMD Threshold:	550.00	75.00	100.00	150.00	150.00	
Exceeds Threshold?	Yes	Yes	Yes	No	Yes	

Project Name **Riverpark** **Unmitigated Emissions**
Subphase D, Weeks 31 thru 44
Length of Subphase (weeks) 14.00
Year 2005

▨ Calculated Emissions
▨ Mitigated Emissions

	Emissions (Pounds per Day)					
Emissions Source/Subphase	CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	--	--	--	--	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	2,686.32	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	1,070.58	139.78	1,032.64	--	47.40	
Worker Commute Trips	11.03	1.21	2.03	0.01	0.07	
Mitigation/Reduction						
Fugitive Dust	--	--	--	--	1,343.16	Fugitive Dust Rule 403
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	--	0.13	--	--	--	
Off-Road Diesel Exhaust Emissions	409.36	51.42	359.90	--	16.10	
On-Road Diesel Exhaust Emissions	0.43	0.06	0.58	0.01	0.01	
Worker Commute Emissions	3.39	0.37	0.62	0.00	0.02	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	No Mitigation Employed
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No Building Construction During This Subphase
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Architectural Painting						
Off-Gas Emissions	--	0.00	--	--	--	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	1,494.80	192.97	1,395.77	0.02	1,406.76	
SCAQMD Threshold:	550.00	75.00	100.00	150.00	150.00	
Exceeds Threshold?	Yes	Yes	Yes	No	Yes	

Project Name	**Riverpark**	**Unmitigated Emissions**	▨	Calculated Emissions
Subphase	**E, Weeks 44 thru 50**		░	Mitigated Emissions
Length of Subphase (weeks)		**6.00**		
Year	**2005**			

Emissions Source/Subphase	Emissions (Pounds per Day) CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	–	–	–	–	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	–	–	–	–	1,151.28	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	1,070.58	139.78	1,032.64	–	47.40	
Worker Commute Trips	11.03	1.21	2.03	0.01	0.07	
Mitigation/Reduction						
Fugitive Dust	–	–	–	–	575.64	Fugitive Dust Rule 403
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	–	0.37	–	–	–	
Off-Road Diesel Exhaust Emissions	409.36	51.42	359.90	–	16.10	
On-Road Diesel Exhaust Emissions	1.21	0.17	1.62	0.01	0.03	
Worker Commute Emissions	3.39	0.37	0.62	0.00	0.02	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	No Mitigation Employed
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	6.79	0.74	1.99	0.01	0.04	
Architectural Painting						
Off-Gas Emissions	–	69.61	–	–	–	
Worker Commute Trips	6.79	0.74	1.25	0.01	0.04	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No Mitigation Employed
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	1,509.15	264.41	1,400.06	0.05	639.35	
SCAQMD Threshold:	550.00	75.00	100.00	150.00	150.00	
Exceeds Threshold?	Yes	Yes	Yes	No	Yes	

Project Name	**Riverpark**	**Unmitigated Emissions**	
Subphase	**F, Weeks 51 thru 89**		
Length of Subphase (weeks)		**39.00**	
Year	**2005**		

▨ Calculated Emissions
░ Mitigated Emissions

Emissions Source/Subphase	Emissions (Pounds per Day) CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	—	—	—	—	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	—	—	—	—	0.00	No Grading During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	—	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	—	0.37	—	—	—	
Off-Road Diesel Exhaust Emissions	261.64	34.03	249.59	—	11.33	
On-Road Diesel Exhaust Emissions	1.21	0.17	1.62	0.01	0.03	
Worker Commute Emissions	2.55	0.28	0.47	0.00	0.02	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	No Mitigation Employed
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	6.79	0.74	1.99	0.01	0.04	
Architectural Painting						
Off-Gas Emissions	—	69.61	—	—	—	
Worker Commute Trips	6.79	0.74	1.25	0.01	0.04	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No Mitigation Employed
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	**278.97**	**105.94**	**254.92**	**0.04**	**11.46**	
SCAQMD Threshold:	**550.00**	**75.00**	**100.00**	**150.00**	**150.00**	
Exceeds Threshold?	**No**	**Yes**	**Yes**	**No**	**No**	

Project Name **Riverpark** **Unmitigated Emissions**
Subphase G, Weeks 90 thru 94
Length of Subphase (weeks) **5.00**
Year **2006**

▨ Calculated Emissions
░ Mitigated Emissions

	Emissions (Pounds per Day)					
Emissions Source/Subphase	CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	--	--	--	--	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	0.00	No Grading During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	--	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	--	0.37	--	--	--	
Off-Road Diesel Exhaust Emissions	268.99	34.03	238.41	--	10.34	
On-Road Diesel Exhaust Emissions	1.10	0.16	1.54	0.01	0.03	
Worker Commute Emissions	2.34	0.26	0.44	0.00	0.02	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	No Mitigation Employed
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	9.35	1.09	2.77	0.01	0.06	
Architectural Painting						
Off-Gas Emissions	--	98.92	--	--	--	
Worker Commute Trips	9.35	1.03	1.74	0.01	0.06	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No Mitigation Employed
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	**291.12**	**135.86**	**244.89**	**0.04**	**10.51**	
SCAQMD Threshold:	**550.00**	**75.00**	**100.00**	**150.00**	**150.00**	
Exceeds Threshold?	**No**	**Yes**	**Yes**	**No**	**No**	

Project Name	**Riverpark**	**Unmitigated Emissions**
Subphase	**H, Weeks 95 thru 99**	
Length of Subphase (weeks)		**5.00**
Year	**2006**	

▨ Calculated Emissions
▨ Mitigated Emissions

Emissions Source/Subphase	Emissions (Pounds per Day) CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	--	--	--	--	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	0.00	No Grading During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	--	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	--	0.37	--	--	--	
Off-Road Diesel Exhaust Emissions	268.99	34.03	238.41	--	10.34	
On-Road Diesel Exhaust Emissions	1.10	0.16	1.54	0.01	0.03	
Worker Commute Emissions	2.34	0.26	0.44	0.00	0.02	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	No Mitigation Employed
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	12.46	1.37	3.69	0.02	0.09	
Architectural Painting						
Off-Gas Emissions	--	155.59	--	--	--	
Worker Commute Trips	12.46	1.37	2.32	0.02	0.09	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No Mitigation Employed
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	297.35	193.15	246.40	0.05	10.56	
SCAQMD Threshold:	550.00	75.00	100.00	150.00	150.00	
Exceeds Threshold?	No	Yes	Yes	No	No	

Project Name **Riverpark**
Subphase **I, Weeks 100 thru 105**
Length of Subphase (weeks) **6.00**
Year **2006**

Unmitigated Emissions

▨	Calculated Emissions
░	Mitigated Emissions

	Emissions (Pounds per Day)					
Emissions Source/Subphase	CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	--	--	--	--	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	0.00	No Grading During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	--	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	--	0.37	--	--	--	
Off-Road Diesel Exhaust Emissions	621.81	83.71	634.47	--	28.74	
On-Road Diesel Exhaust Emissions	1.10	0.16	1.54	0.01	0.03	
Worker Commute Emissions	11.29	1.24	2.10	0.02	0.08	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	No Mitigation Employed
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	15.58	1.71	4.61	0.02	0.11	
Architectural Painting						
Off-Gas Emissions	--	173.00	--	--	--	
Worker Commute Trips	15.58	1.71	2.91	0.02	0.11	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No Mitigation Employed
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	665.36	261.91	645.63	0.07	29.06	
SCAQMD Threshold:	550.00	75.00	100.00	150.00	150.00	
Exceeds Threshold?	Yes	Yes	Yes	No	No	

Project Name **Riverpark** **Unmitigated Emissions**
Subphase **J, Weeks 106 thru 107**
Length of Subphase (weeks) **2.00**
Year **2006**

▨ Calculated Emissions
░ Mitigated Emissions

Emissions Source/Subphase	Emissions (Pounds per Day) CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	--	--	--	--	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	0.00	No Grading During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	--	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	--	0.00	--	--	--	No Pavement or Asphalt During This Subphase
Off-Road Diesel Exhaust Emissions	0.00	0.00	0.00	--	0.00	
On-Road Diesel Exhaust Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Emissions	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	15.58	1.71	4.61	0.02	0.11	
Architectural Painting						
Off-Gas Emissions	--	173.00	--	--	--	
Worker Commute Trips	15.58	1.71	2.90	0.02	0.11	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No Mitigation Employed
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	31.16	176.42	7.51	0.04	0.22	
SCAQMD Threshold:	550.00	75.00	100.00	150.00	150.00	
Exceeds Threshold?	No	Yes	No	No	No	

Project Name **Riverpark** **Unmitigated Emissions**
Subphase **K, Weeks 108 thru 116**
Length of Subphase (weeks) **9.00**
Year **2006**

▨ Calculated Emissions
░ Mitigated Emissions

Emissions Source/Subphase	Emissions (Pounds per Day) CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	--	--	--	--	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	0.00	No Grading During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	--	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	--	0.12	--	--	--	
Off-Road Diesel Exhaust Emissions	268.99	34.03	238.41	--	10.34	
On-Road Diesel Exhaust Emissions	0.34	0.05	0.48	0.00	0.01	
Worker Commute Emissions	2.34	0.26	0.44	0.00	0.02	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	No Mitigation Employed
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	12.46	1.37	3.69	0.02	0.09	
Architectural Painting						
Off-Gas Emissions	--	129.33	--	--	--	
Worker Commute Trips	12.46	1.37	2.32	0.02	0.09	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No Mitigation Employed
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	296.59	166.52	245.34	0.04	10.54	
SCAQMD Threshold:	550.00	75.00	100.00	150.00	150.00	
Exceeds Threshold?	No	Yes	Yes	No	No	

Project Name Riverpark **Unmitigated Emissions**
Subphase L, Weeks 117 thru 157
Length of Subphase (weeks) 41.00
Year 2006

▨ Calculated Emissions
░ Mitigated Emissions

	Emissions (Pounds per Day)					
Emissions Source/Subphase	CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	--	--	--	--	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	0.00	No Grading During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	--	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	--	0.00	--	--	--	No Pavement and Asphalt in this Subphase
Off-Road Diesel Exhaust Emissions	0.00	0.00	0.00	--	0.00	
On-Road Diesel Exhaust Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Emissions	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	9.35	1.03	2.77	0.01	0.06	
Architectural Painting						
Off-Gas Emissions	--	111.92	--	--	--	
Worker Commute Trips	9.35	1.03	1.74	0.01	0.06	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No Mitigation Employed
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	18.69	113.97	4.51	0.03	0.13	
SCAQMD Threshold:	550.00	75.00	100.00	150.00	150.00	
Exceeds Threshold?	No	Yes	No	No	No	

Project Name	**Riverpark**	**Unmitigated Emissions**	
Subphase	**M, Weeks 158 thru 200**		
Length of Subphase (weeks)		**43.00**	
Year	**2007**		

▨ Calculated Emissions
░ Mitigated Emissions

	Emissions (Pounds per Day)					
Emissions Source/Subphase	CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	–	–	–	–	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	–	–	–	–	0.00	No Grading During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	–	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	–	0.00	–	–	–	No Pavement and Asphalt in this Subphase
Off-Road Diesel Exhaust Emissions	0.00	0.00	0.00	–	0.00	
On-Road Diesel Exhaust Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Emissions	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	5.73	0.63	1.70	0.00	0.04	
Architectural Painting						
Off-Gas Emissions	–	55.31	–	–	–	
Worker Commute Trips	5.73	0.63	1.07	0.00	0.04	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No Mitigation Employed
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	11.47	56.58	2.78	0.01	0.08	
SCAQMD Threshold:	550.00	75.00	100.00	150.00	150.00	
Exceeds Threshold?	No	No	No	No	No	

Project Name	**Riverpark**	**Unmitigated Emissions**
Subphase	**N, Weeks 201 thru 219**	
Length of Subphase (weeks)		**20.00**
Year	**2008**	

▨ Calculated Emissions
▨ Mitigated Emissions

Emissions Source/Subphase	Emissions (Pounds per Day) CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	--	--	--	--	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	0.00	No Grading During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	--	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	--	0.00	--	--	--	No Pavement and Asphalt in this Subphase
Off-Road Diesel Exhaust Emissions	0.00	0.00	0.00	--	0.00	
On-Road Diesel Exhaust Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Emissions	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	2.47	0.27	0.74	0.00	0.02	
Architectural Painting						
Off-Gas Emissions	--	29.38	--	--	--	
Worker Commute Trips	2.47	0.27	0.46	0.00	0.02	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No Mitigation Employed
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	4.94	29.92	1.20	0.00	0.04	
SCAQMD Threshold:	550.00	75.00	100.00	150.00	150.00	
Exceeds Threshold?	No	No	No	No	No	

MITIGATED CONSTRUCTION EMISSIONS

Project Name **Riverpark** **Mitigated Emissions**
Subphase **A, Weeks 1 thru 19**
Length of Subphase (weeks) **19.00**
Year **2004**

▨ Calculated Emissions
░ Mitigated Emissions

Emissions Source/Subphase	Emissions (Pounds per Day) CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	0.00	0.00	0.00	0.00	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	2,686.32	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	1,197.57	163.32	1,278.74	--	60.50	
Worker Commute Trips	14.14	1.54	2.57	0.02	0.08	
Mitigation/Reduction						
Fugitive Dust	--	--	--	--	1,343.16	Fugitive Dust Rule 403
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No On-Road Trucks During Grading
Off-Road Diesel Exhaust	1,077.81	146.99	511.50	n/a	51.43	Cooled Exhaust Gas Recirculation for Off-Road Diesel Exhaust
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	No Pavement and Asphalt During This Subphase
Off-Road Diesel Exhaust Emissions	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Emissions	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						No Building Construction During This Subphase
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Architectural Painting						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	**133.89**	**17.87**	**769.81**	**0.02**	**1,352.32**	
SCAQMD Threshold:	**550.00**	**75.00**	**100.00**	**150.00**	**150.00**	
Exceeds Threshold?	**No**	**No**	**Yes**	**No**	**Yes**	

Project Name **Riverpark** **Mitigated Emissions**
Subphase **B, Weeks 20 thru 25**
Length of Subphase (weeks) **6.00**
Year **2004**

▨	Calculated Emissions
░	Mitigated Emissions

	Emissions (Pounds per Day)					
Emissions Source/Subphase	CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	--	--	--	--	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	--	--	--	--	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	2,686.32	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	1,255.68	163.32	1,209.67	--	55.04	
Worker Commute Trips	12.94	1.41	2.38	0.02	0.08	
Mitigation/Reduction						
Fugitive Dust	--	--	--	--	1,343.16	Water Exposed Surfaces Three Times Daily
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No On-Road Trucks During Grading
Off-Road Diesel Exhaust	1,130.11	146.99	480.27	n/a	46.78	Cooled Exhaust Gas Recirculation for Off-Road Diesel Exhaust
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	--	0.37	--	--	--	
Off-Road Diesel Exhaust Emissions	261.64	34.03	249.59	--	11.33	
On-Road Diesel Exhaust Emissions	1.21	0.17	1.62	0.01	0.03	
Worker Commute Emissions	2.55	0.28	0.47	0.00	0.02	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	None Available
On-Road Diesel Exhaust	1.09	0.15	0.65	0.01	0.02	Cooled Exhaust Gas Recirculation for Off-Road Diesel Exhaust
Off-Road Diesel Exhaust	235.48	30.63	134.78	n/a	16.77	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No Building Construction During This Subphase
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Architectural Painting						
Off-Gas Emissions	--	0.00	--	--	--	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	
Off-Gas Emissions	--	n/a	--	--	--	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	**167.34**	**21.82**	**839.04**	**0.02**	**1,346.08**	
SCAQMD Threshold:	**550.00**	**75.00**	**100.00**	**150.00**	**150.00**	
Exceeds Threshold?	**No**	**No**	**Yes**	**No**	**Yes**	

Project Name	**Riverpark**	**Mitigated Emissions**	
Subphase	**C, Weeks 26 thru 30**		
Length of Subphase (weeks)		**5.00**	
Year	**2005**		

▨	Calculated Emissions
░	Mitigated Emissions

Emissions Source/Subphase	Emissions (Pounds per Day) CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	--	--	--	--	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	--	--	--	--	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	2,238.60	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	1,070.58	139.78	1,032.64	--	47.40	
Worker Commute Trips	11.03	1.21	2.03	0.01	0.07	
Mitigation/Reduction						
Fugitive Dust	--	--	--	--	1,119.30	Water Exposed Surfaces Three Times Daily
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No On-Road Trucks During Grading
Off-Road Diesel Exhaust	963.52	125.80	557.63	n/a	70.15	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	--	0.37	--	--	--	
Off-Road Diesel Exhaust Emissions	261.64	34.03	249.59	--	11.33	
On-Road Diesel Exhaust Emissions	1.21	0.17	1.62	0.01	0.03	
Worker Commute Emissions	2.55	0.26	0.47	0.00	0.02	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	No additional mitigation available for Off-Gas Emissions
On-Road Diesel Exhaust	1.09	0.15	0.88	0.01	0.02	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Off-Road Diesel Exhaust	235.48	30.63	134.78	n/a	16.77	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No Building Construction During This Subphase
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Architectural Painting						
Off-Gas Emissions	--	0.00	--	--	--	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	
Off-Gas Emissions	--	n/a	--	--	--	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	**146.92**	**19.26**	**593.07**	**0.02**	**1,091.20**	
SCAQMD Threshold:	**550.00**	**75.00**	**100.00**	**150.00**	**150.00**	
Exceeds Threshold?	**No**	**No**	**Yes**	**No**	**Yes**	

Project Name **Riverpark** **Mitigated Emissions**
Subphase **D, Weeks 31 thru 44**
Length of Subphase (weeks) **14.00**
Year **2005**

▨	Calculated Emissions
░	Mitigated Emissions

	Emissions (Pounds per Day)					
Emissions Source/Subphase	CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	--	--	--	--	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	--	--	--	--	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	2,686.32	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	1,070.58	139.78	1,032.64	--	47.40	
Worker Commute Trips	11.03	1.21	2.03	0.01	0.07	
Mitigation/Reduction						
Fugitive Dust	--	--	--	--	1,343.16	Water Exposed Surfaces Three Times Daily
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No On-Road Trucks During Grading
Off-Road Diesel Exhaust	963.52	125.80	557.63	n/a	70.15	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	--	0.13	--	--	--	
Off-Road Diesel Exhaust Emissions	402.36	51.42	359.90	--	16.10	
On-Road Diesel Exhaust Emissions	0.43	0.06	0.58	0.01	0.01	
Worker Commute Emissions	3.39	0.37	0.62	0.00	0.02	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	None Available
On-Road Diesel Exhaust	0.39	0.05	0.31	0.01	0.01	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Off-Road Diesel Exhaust	368.42	46.28	194.35	n/a	23.83	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No Building Construction During This Subphase
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Architectural Painting						
Off-Gas Emissions	--	0.00	--	--	--	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	
Off-Gas Emissions	--	n/a	--	--	--	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	**162.46**	**20.84**	**643.49**	**0.02**	**1,312.77**	
SCAQMD Threshold:	**550.00**	**75.00**	**100.00**	**150.00**	**150.00**	
Exceeds Threshold?	**No**	**No**	**Yes**	**No**	**Yes**	

Project Name **Riverpark** **Mitigated Emissions**
Subphase **E, Weeks 44 thru 50**
Length of Subphase (weeks) **6.00**
Year **2005**

▨ Calculated Emissions
▨ Mitigated Emissions

Emissions Source/Subphase	Emissions (Pounds per Day) CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	--	--	--	--	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	--	--	--	--	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	1,151.28	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	1,070.58	139.78	1,092.64	--	47.40	
Worker Commute Trips	11.03	1.21	2.03	0.01	0.07	
Mitigation/Reduction						
Fugitive Dust	--	--	--	--	575.64	Water Exposed Surfaces Three Times Daily
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	No On-Road Trucks During Grading
Off-Road Diesel Exhaust	963.52	125.80	557.63	n/a	70.15	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	--	0.37	--	--	--	
Off-Road Diesel Exhaust Emissions	409.36	51.42	359.90	--	16.10	
On-Road Diesel Exhaust Emissions	1.21	0.17	1.62	0.01	0.03	
Worker Commute Emissions	3.39	0.37	0.62	0.00	0.02	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	No additional mitigation available for Off-Gas Emissions
On-Road Diesel Exhaust	1.09	0.15	0.88	0.01	0.02	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Off-Road Diesel Exhaust	368.42	46.28	194.35	n/a	23.83	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	6.79	0.74	1.99	0.01	0.04	
Architectural Painting						
Off-Gas Emissions	--	69.61	--	--	--	
Worker Commute Trips	6.79	0.74	1.25	0.01	0.04	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Off-Gas Emissions	--	0.00	--	--	--	No additional mitigation available for Off-Gas Emissions
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	**176.12**	**92.18**	**647.21**	**0.04**	**545.34**	
SCAQMD Threshold:	**550.00**	**75.00**	**100.00**	**150.00**	**150.00**	
Exceeds Threshold?	No	Yes	Yes	No	Yes	

Project Name **Riverpark** **Mitigated Emissions**
Subphase **F, Weeks 51 thru 89**
Length of Subphase (weeks) **39.00**
Year **2005**

▨ Calculated Emissions
░ Mitigated Emissions

Emissions Source/Subphase	Emissions (Pounds per Day) CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	--	--	--	--	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	--	--	--	--	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	0.00	No Grading During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	--	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Dust	--	--	--	--	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.06	n/a	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	--	0.37	--	--	--	
Off-Road Diesel Exhaust Emissions	261.64	34.03	249.50	--	11.33	
On-Road Diesel Exhaust Emissions	1.21	0.17	1.62	0.01	0.03	
Worker Commute Emissions	2.55	0.28	0.47	0.00	0.02	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	No additional mitigation available for Off-Gas Emissions
On-Road Diesel Exhaust	1.09	0.15	0.88	0.01	0.02	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Off-Road Diesel Exhaust	235.48	30.63	134.78	n/a	16.77	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	6.79	0.74	1.99	0.01	0.04	
Architectural Painting						
Off-Gas Emissions	--	69.61	--	--	--	
Worker Commute Trips	6.79	0.74	1.25	0.01	0.04	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Off-Gas Emissions	--	0.00	--	--	--	No additional mitigation available for Off-Gas Emissions
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	**42.41**	**75.16**	**119.27**	**0.02**	**-5.33**	
SCAQMD Threshold:	**550.00**	**75.00**	**100.00**	**150.00**	**150.00**	
Exceeds Threshold?	**No**	**Yes**	**Yes**	**No**	**No**	

Project Name **Riverpark** **Mitigated Emissions**
Subphase **G, Weeks 90 thru 94**
Length of Subphase (weeks) **5.00**
Year **2006**

▓ Calculated Emissions
░ Mitigated Emissions

Emissions Source/Subphase	Emissions (Pounds per Day) CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	--	--	--	--	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	--	--	--	--	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	0.00	No Grading During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	--	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Dust	--	--	--	--	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	--	0.37	--	--	--	
Off-Road Diesel Exhaust Emissions	268.99	34.03	238.41	--	10.34	
On-Road Diesel Exhaust Emissions	1.10	0.16	1.54	0.01	0.03	
Worker Commute Emissions	2.34	0.26	0.44	0.00	0.02	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	No additional mitigation available for Off-Gas Emissions
On-Road Diesel Exhaust	0.99	0.14	0.83	0.01	0.02	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Off-Road Diesel Exhaust	242.09	30.63	128.74	n/a	15.30	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	9.35	1.03	2.77	0.01	0.06	
Architectural Painting						
Off-Gas Emissions	--	98.98	--	--	--	
Worker Commute Trips	9.35	1.03	1.74	0.01	0.06	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Off-Gas Emissions	--	0.00	--	--	--	No additional mitigation available for Off-Gas Emissions
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	**48.04**	**105.08**	**115.32**	**0.03**	**-4.81**	
SCAQMD Threshold:	**550.00**	**75.00**	**100.00**	**150.00**	**150.00**	
Exceeds Threshold?	**No**	**Yes**	**Yes**	**No**	**No**	

Project Name **Riverpark** **Mitigated Emissions**
Subphase **H, Weeks 95 thru 99**
Length of Subphase (weeks) **5.00**
Year **2006**

▨ Calculated Emissions
░ Mitigated Emissions

	Emissions (Pounds per Day)					
Emissions Source/Subphase	CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	–	–	–	–	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	–	–	–	–	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	–	–	–	–	0.00	No Grading During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	–	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Dust	–	–	–	–	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	–	0.37	–	–	–	
Off-Road Diesel Exhaust Emissions	268.99	34.03	238.41	–	10.34	
On-Road Diesel Exhaust Emissions	1.10	0.16	1.54	0.01	0.03	
Worker Commute Emissions	2.34	0.26	0.44	0.00	0.02	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	No additional mitigation available for Off-Gas Emissions
On-Road Diesel Exhaust	0.99	0.14	0.83	0.01	0.02	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Off-Road Diesel Exhaust	242.09	30.63	128.74	n/a	15.30	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	12.46	1.37	3.69	0.02	0.09	
Architectural Painting						
Off-Gas Emissions	–	155.59	–	–	–	
Worker Commute Trips	12.46	1.37	2.32	0.02	0.09	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Off-Gas Emissions	–	0.00	–	–	–	No additional mitigation available for Off-Gas Emissions
Worker Commute Trips	0.12	0.02	0.03	0.00	0.00	
Net Emission Totals:	**54.15**	**162.36**	**116.79**	**0.04**	**-4.77**	
SCAQMD Threshold:	**550.00**	**75.00**	**100.00**	**150.00**	**150.00**	
Exceeds Threshold?	**No**	**Yes**	**Yes**	**No**	**No**	

Project Name	**Riverpark**	**Mitigated Emissions**
Subphase	**I, Weeks 100 thru 105**	
Length of Subphase (weeks)		**6.00**
Year	**2006**	

▨ Calculated Emissions
▨ Mitigated Emissions

	Emissions (Pounds per Day)					
Emissions Source/Subphase	CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	--	--	--	--	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	--	--	--	--	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	0.00	No Grading During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	--	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Dust	--	--	--	--	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	--	0.37	--	--	--	
Off-Road Diesel Exhaust Emissions	621.81	83.71	634.47	--	28.74	
On-Road Diesel Exhaust Emissions	1.10	0.16	1.54	0.01	0.03	
Worker Commute Emissions	11.29	1.24	2.10	0.02	0.08	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	No additional mitigation available for Off-Gas Emissions
On-Road Diesel Exhaust	0.99	0.14	0.83	0.01	0.02	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Off-Road Diesel Exhaust	559.63	75.34	342.61	n/a	42.54	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	0
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	15.58	1.71	4.61	0.02	0.11	
Architectural Painting						
Off-Gas Emissions	--	173.00	--	--	--	
Worker Commute Trips	15.58	1.71	2.90	0.02	0.11	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Off-Gas Emissions	--	0.00	--	--	--	No additional mitigation available for Off-Gas Emissions
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	0
Net Emission Totals:	**104.74**	**186.43**	**302.18**	**0.06**	**-13.49**	
SCAQMD Threshold:	**550.00**	**75.00**	**100.00**	**150.00**	**150.00**	
Exceeds Threshold?	**No**	**Yes**	**Yes**	**No**	**No**	

Project Name **Riverpark** **Mitigated Emissions**
Subphase **J, Weeks 106 thru 107**
Length of Subphase (weeks) **2.00**
Year **2006**

▨ Calculated Emissions
░ Mitigated Emissions

	Emissions (Pounds per Day)					
Emissions Source/Subphase	CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	--	--	--	--	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	--	--	--	--	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	0.00	No Grading During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	--	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Dust	--	--	--	--	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	--	0.00	--	--	--	No Pavement or Asphalt During This Subphase
Off-Road Diesel Exhaust Emissions	0.00	0.00	0.00	--	0.00	
On-Road Diesel Exhaust Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Emissions	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	15.58	1.71	4.61	0.02	0.11	
Architectural Painting						
Off-Gas Emissions	--	173.00	--	--	--	
Worker Commute Trips	15.58	1.71	2.90	0.02	0.11	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Off-Gas Emissions	--	0.00	--	--	--	No additional mitigation available for Off-Gas Emissions
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	**31.16**	**176.42**	**7.51**	**0.04**	**0.22**	
SCAQMD Threshold:	**550.00**	**75.00**	**100.00**	**150.00**	**150.00**	
Exceeds Threshold?	**No**	**Yes**	**No**	**No**	**No**	

Project Name **Riverpark** **Mitigated Emissions**
Subphase **K, Weeks 108 thru 116**
Length of Subphase (weeks) **9.00**
Year **2006**

▨ Calculated Emissions
░ Mitigated Emissions

Emissions Source/Subphase	Emissions (Pounds per Day) CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	–	–	–	–	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	–	–	–	–	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	–	–	–	–	0.00	No Grading During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	–	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Dust	–	–	–	–	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	–	0.12	–	–	–	
Off-Road Diesel Exhaust Emissions	268.99	34.07	238.41	–	10.34	
On-Road Diesel Exhaust Emissions	0.34	0.05	0.48	0.00	0.01	
Worker Commute Emissions	2.34	0.26	0.44	0.00	0.02	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	No additional mitigation available for Off-Gas Emissions
On-Road Diesel Exhaust	0.31	0.04	0.26	0.00	0.01	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Off-Road Diesel Exhaust	242.09	30.63	128.74	n/a	15.30	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	12.46	1.37	3.69	0.02	0.09	
Architectural Painting						
Off-Gas Emissions	–	129.33	–	–	–	
Worker Commute Trips	12.46	1.37	2.32	0.02	0.09	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Off-Gas Emissions	–	0.00	–	–	–	No additional mitigation available for Off-Gas Emissions
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	**54.19**	**135.85**	**116.34**	**0.04**	**-4.77**	
SCAQMD Threshold:	**550.00**	**75.00**	**100.00**	**150.00**	**150.00**	
Exceeds Threshold?	**No**	**Yes**	**Yes**	**No**	**No**	

Project Name **Riverpark** **Mitigated Emissions**
Subphase **L, Weeks 117 thru 157**
Length of Subphase (weeks) **41.00**
Year **2006**

▨ Calculated Emissions
░ Mitigated Emissions

	Emissions (Pounds per Day)					
Emissions Source/Subphase	CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	-	-	-	-	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	-	-	-	-	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	-	-	-	-	0.00	No Grading During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	-	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Dust	-	-	-	-	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	-	0.00	-	-	-	No Pavement and Asphalt in this Subphase
Off-Road Diesel Exhaust Emissions	0.00	0.00	0.00	-	0.00	
On-Road Diesel Exhaust Emissions	0.00	0.00	0.06	0.00	0.00	
Worker Commute Emissions	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	9.35	1.03	2.77	0.01	0.06	
Architectural Painting						
Off-Gas Emissions	-	111.92	-	-	-	
Worker Commute Trips	9.35	1.03	1.74	0.01	0.06	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Off-Gas Emissions	-	0.00	-	-	-	No additional mitigation available for Off-Gas Emissions
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	**18.69**	**113.97**	**4.51**	**0.03**	**0.13**	
SCAQMD Threshold:	**550.00**	**75.00**	**100.00**	**150.00**	**150.00**	
Exceeds Threshold?	**No**	**Yes**	**No**	**No**	**No**	

Project Name	**Riverpark**	**Mitigated Emissions**
Subphase	**M, Weeks 158 thru 200**	
Length of Subphase (weeks)		**43.00**
Year	**2007**	

▨ Calculated Emissions

░ Mitigated Emissions

Emissions Source/Subphase	Emissions (Pounds per Day) CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	--	--	--	--	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	--	--	--	--	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	0.00	No Grading During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	--	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Dust	--	--	--	--	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	--	0.00	--	--	--	No Pavement and Asphalt in this Subphase
Off-Road Diesel Exhaust Emissions	0.00	0.00	0.00	--	0.00	
On-Road Diesel Exhaust Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Emissions	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	5.73	0.63	1.70	0.00	0.04	
Architectural Painting						
Off-Gas Emissions	--	55.31	--	--	--	
Worker Commute Trips	5.73	0.63	1.07	0.00	0.04	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Off-Gas Emissions	--	0.00	--	--	--	No additional mitigation available for Off-Gas Emissions
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	0
Net Emission Totals:	**11.47**	**56.58**	**2.78**	**0.01**	**0.08**	
SCAQMD Threshold:	**550.00**	**75.00**	**100.00**	**150.00**	**150.00**	
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	

Project Name **Riverpark** **Mitigated Emissions**
Subphase **N, Weeks 201 thru 219**
Length of Subphase (weeks) **20.00**
Year **2008**

▨ Calculated Emissions
░ Mitigated Emissions

Emissions Source/Subphase	Emissions (Pounds per Day) CO	ROG	NOx	SOx	PM10	Mitigation
Demolition Subphase						
Fugitive Demolition Dust	--	--	--	--	0.00	No Demolition During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Demolition Dust	--	--	--	--	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Grading Subphase						
FugitiveDust	--	--	--	--	0.00	No Grading During This Subphase
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	--	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Fugitive Dust	--	--	--	--	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Pavement and Asphalt Subphase						
Paving Off-Gas Emissions	--	0.00	--	--	--	No Pavement and Asphalt in this Subphase
Off-Road Diesel Exhaust Emissions	0.00	0.00	0.00	--	0.00	
On-Road Diesel Exhaust Emissions	0.00	0.00	0.00	0.00	0.00	
Worker Commute Emissions	0.00	0.00	0.00	0.00	0.00	
Mitigation/Reduction						
Off-Gas Emissions	0.00	0.00	0.00	0.00	0.00	
On-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Building Construction and Architectural Coatings Subphase						
Building Construction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	0.00	0.00	
Worker Commute Trips	2.47	0.27	0.74	0.00	0.02	
Architectural Painting						
Off-Gas Emissions	--	29.38	--	--	--	
Worker Commute Trips	2.47	0.27	0.46	0.00	0.02	
Mitigation/Reduction						
Off-Road Diesel Exhaust	0.00	0.00	0.00	n/a	0.00	Aqueous Fuel/Cooled Exhaust Gas Recirculation
Off-Gas Emissions	--	0.00	--	--	--	No additional mitigation available for Off-Gas Emissions
Worker Commute Trips	0.00	0.00	0.00	0.00	0.00	
Net Emission Totals:	**4.94**	**29.92**	**1.20**	**0.00**	**0.04**	
SCAQMD Threshold:	**550.00**	**75.00**	**100.00**	**150.00**	**150.00**	
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	

URBEMIS2002
UNMITIGATED OPERATIONAL EMISSIONS
SUMMERTIME

```
               URBEMIS 2002 For Windows   7.4.2

File Name:                      C:\Program Files\URBEMIS 2002 For Windows\Riverpark August 2003.urb
Project Name:                   Riverpark August 2003
Project Location:               South Coast Air Basin (Los Angeles area)
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                       SUMMARY REPORT
                    (Pounds/Day - Summer)




AREA SOURCE EMISSION ESTIMATES
                                    ROG       NOx        CO       SO2      PM10
 TOTALS (lbs/day,unmitigated)     65.17     19.41     14.98      0.17      0.05

OPERATIONAL (VEHICLE) EMISSION ESTIMATES
                                    ROG       NOx        CO       SO2      PM10
 TOTALS (lbs/day,unmitigated)    129.99    132.53  1,479.54      1.29    111.86

SUM OF AREA AND OPERATIONAL EMISSION ESTIMATES
                                    ROG       NOx        CO       SO2      PM10
 TOTALS (lbs/day,unmitigated)    195.15    151.94  1,494.52      1.46    111.91
```

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

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	1.49	19.32	8.21	-	0.04
Wood Stoves - No summer emissions					
Fireplaces - No summer emissions					
Landscaping	0.81	0.09	6.77	0.17	0.01
Consumer Prdcts	62.87	-	-	-	-
TOTALS(lbs/day,unmitigated)	65.17	19.41	14.98	0.17	0.05

```
                 UNMITIGATED OPERATIONAL EMISSIONS

                              ROG        NOx        CO        SO2       PM10
Single family housing       52.63      54.50    612.24      0.53      46.10
Apartments low rise         63.86      61.57    691.67      0.60      52.08
City park                    0.18       0.12      1.31      0.00       0.10
Strip mall                  13.31      16.34    174.32      0.16      13.57

TOTAL EMISSIONS (lbs/day)   129.99     132.53  1,479.54      1.29     111.86

Does not include correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2004  Temperature (F): 90   Season: Summer

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type                      Trip Rate                    Size    Total Trips

Single family housing       9.90 trips / dwelling units    459.00     4,544.10
Apartments low rise         6.90 trips / dwelling units    744.00     5,133.60
City park                   2.60 trips / acres               4.50        11.70
Strip mall                 40.00 trips / 1000 sq. ft.       40.00     1,600.00

Vehicle Assumptions:

Fleet Mix:

Vehicle Type              Percent Type    Non-Catalyst      Catalyst        Diesel
Light Auto                    93.00           2.70           96.80           0.50
Light Truck < 3,750    lbs     0.00           4.60           92.70           2.70
Light Truck  3,751- 5,750      0.00           2.60           96.20           1.20
Med Truck     5,751- 8,500     2.00           2.90           94.20           2.90
Lite-Heavy   8,501-10,000      0.00           0.00           80.00          20.00
Lite-Heavy  10,001-14,000      0.00           0.00           66.70          33.30
Med-Heavy   14,001-33,000      0.00          10.00           20.00          70.00
Heavy-Heavy 33,001-60,000      2.00           0.00           12.50          87.50
Line Haul > 60,000     lbs     0.00           0.00            0.00         100.00
Urban Bus                      0.10           0.00            0.00         100.00
Motorcycle                     1.60          87.50           12.50           0.00
School Bus                     0.00           0.00            0.00         100.00
Motor Home                     1.30          15.40           76.90           7.70

Travel Conditions
                                   Residential                Commercial
                          Home-     Home-      Home-
                          Work      Shop       Other    Commute  Non-Work Customer
Urban Trip Length (miles) 11.5       4.9        6.0      10.3       5.5       5.5
Rural Trip Length (miles) 11.5       4.9        6.0      10.3       5.5       5.5
Trip Speeds (mph)         35.0      40.0       40.0      40.0      40.0      40.0
% of Trips - Residential  20.0      37.0       43.0

% of Trips - Commercial (by land use)
City park                                                 5.0       2.5      92.5
Strip mall                                                2.0       1.0      97.0
```

```
Changes made to the default values for Land Use Trip Percentages
```

```
Changes made to the default values for Area

The natural gas residential percentage changed from 60 to 100.
The consumer product persons per residential unit changed from 2.861 to 3.056.

Changes made to the default values for Operations

The light auto percentage changed from 56.1 to 93.
The light truck < 3750 lbs percentage changed from 15.1 to 0.
The light truck 3751-5750 percentage changed from 15.6 to 0.
The med truck 5751-8500 percentage changed from 6.9 to 2.
The lite-heavy truck 8501-10000 percentage changed from 1.0 to 0.
The lite-heavy truck 10001-14000 percentage changed from 0.3 to 0.
The med-heavy truck 14001-33000 percentage changed from 1.0 to 0.
The heavy-heavy truck 33001-60000 percentage changed from 0.8 to 2.
The school bus percentage changed from 0.2 to 0.
The double counting internal work trip limit changed from  to 32.585.
The double counting shopping trip limit changed from  to 16.2925.
The double counting other trip limit changed from  to 1562.8225.
Mitigation measure Provide Sidewalks and/or Pedestrian Paths:1
     has been changed from off to on.
Mitigation measure Provide Direct Pedestrian Connections:1
     has been changed from off to on.
Mitigation measure Provide Pedestrian Safety:0.5
     has been changed from off to on.
Mitigation measure Provide Street Lighting:0.5
     has been changed from off to on.
Mitigation measure Provide Pedestrian Signalization and Signage:0.5
     has been changed from off to on.
Mitigation measure Floor Area Ratio 0.75 or Greater:1
     has been changed from off to on.
Mitigation measure Provide Street Lighting:0.5
     has been changed from off to on.
Mitigation measure Project Provides Shade Trees to Shade Sidewalks:0.5
     has been changed from off to on.
Mitigation measure Provide Pedestrian Safety Designs/Infrastructure at Crossings:0.5
     has been changed from off to on.
Mitigation measure Articulated Storefront(s) Display Windows with Visual Interest:0.25
     has been changed from off to on.
Mitigation measure No Long Uninterrupted Walls Along Pedestrian Walkways:0.25
     has been changed from off to on.
Mitigation measure Provide Bike Lanes/Paths Connecting to Bikeway System:2
     has been changed from off to on.
```

URBEMIS2002
UNMITIGATED OPERATIONAL EMISSIONS
WINTERTIME

```
               URBEMIS 2002 For Windows   7.4.2

File Name:                    C:\Program Files\URBEMIS 2002 For Windows\Riverpark August 2003.urb
Project Name:                 Riverpark August 2003
Project Location:             South Coast Air Basin (Los Angeles area)
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                         SUMMARY REPORT
                      (Pounds/Day - Winter)










AREA SOURCE EMISSION ESTIMATES
                                    ROG       NOx        CO       SO2      PM10
 TOTALS (lbs/day,unmitigated)  1,726.58     84.00  4,016.68     10.58    615.07


OPERATIONAL (VEHICLE) EMISSION ESTIMATES
                                    ROG       NOx        CO       SO2      PM10
 TOTALS (lbs/day,unmitigated)    119.88    191.06  1,393.67      1.14    111.86

SUM OF AREA AND OPERATIONAL EMISSION ESTIMATES
                                    ROG       NOx        CO       SO2      PM10
 TOTALS (lbs/day,unmitigated)  1,846.46    275.05  5,410.35     11.72    726.93
```

```
AREA SOURCE EMISSION ESTIMATES (Winter Pounds per Day, Unmitigated)
    Source                          ROG       NOx        CO       SO2      PM10
 Natural Gas                       1.49     19.32      8.21        -       0.04
 Wood Stoves                     314.75     49.37  2,522.13      8.23    411.44
 Fireplaces                    1,347.47     15.30  1,486.33      2.35    203.59
 Landscaping - No winter emissions
 Consumer Prdcts                  62.87        -         -         -         -
 TOTALS(lbs/day,unmitigated)  1,726.58     84.00  4,016.68     10.58    615.07
```

```
                UNMITIGATED OPERATIONAL EMISSIONS

                                ROG       NOx        CO       SO2      PM10
Single family housing          49.46     78.59    574.77      0.47     46.10
Apartments low rise            56.00     88.79    649.34      0.53     52.08
City park                       0.11      0.18      1.26      0.00      0.10
Strip mall                     14.32     23.51    168.31      0.14     13.57

TOTAL EMISSIONS (lbs/day)     119.88    191.06  1,393.67      1.14    111.86

Does not include correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2004  Temperature (F): 50   Season: Winter

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type                       Trip Rate                  Size   Total Trips

Single family housing        9.90 trips / dwelling units    459.00      4,544.10
Apartments low rise          6.90 trips / dwelling units    744.00      5,133.60
City park                    2.60 trips / acres               4.50         11.70
Strip mall                  40.00 trips / 1000 sq. ft.       40.00      1,600.00

Vehicle Assumptions:

Fleet Mix:

Vehicle Type             Percent Type    Non-Catalyst      Catalyst         Diesel
Light Auto                   93.00           2.70            96.80            0.50
Light Truck < 3,750   lbs     0.00           4.60            92.70            2.70
Light Truck  3,751- 5,750     0.00           2.60            96.20            1.20
Med Truck    5,751- 8,500     2.00           2.90            94.20            2.90
Lite-Heavy   8,501-10,000     0.00           0.00            80.00           20.00
Lite-Heavy  10,001-14,000     0.00           0.00            66.70           33.30
Med-Heavy   14,001-33,000     0.00          10.00            20.00           70.00
Heavy-Heavy 33,001-60,000     2.00           0.00            12.50           87.50
Line Haul > 60,000    lbs     0.00           0.00             0.00          100.00
Urban Bus                     0.10           0.00             0.00          100.00
Motorcycle                    1.60          87.50            12.50            0.00
School Bus                    0.00           0.00             0.00          100.00
Motor Home                    1.30          15.40            76.90            7.70

Travel Conditions
                                      Residential                Commercial
                           Home-      Home-      Home-
                           Work       Shop       Other    Commute  Non-Work Customer
Urban Trip Length (miles)  11.5        4.9        6.0      10.3       5.5       5.5
Rural Trip Length (miles)  11.5        4.9        6.0      10.3       5.5       5.5
Trip Speeds (mph)          35.0       40.0       40.0      40.0      40.0      40.0
% of Trips - Residential   20.0       37.0       43.0

% of Trips - Commercial (by land use)
City park                                                   5.0       2.5      92.5
Strip mall                                                  2.0       1.0      97.0
```

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Area

```
The natural gas residential percentage changed from 60 to 100.
The consumer product persons per residential unit changed from 2.861 to 3.056.
```

Changes made to the default values for Operations

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The light auto percentage changed from 56.1 to 93.
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The lite-heavy truck 10001-14000 percentage changed from 0.3 to 0.
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Mitigation measure Provide Sidewalks and/or Pedestrian Paths:1
     has been changed from off to on.
Mitigation measure Provide Direct Pedestrian Connections:1
     has been changed from off to on.
Mitigation measure Provide Pedestrian Safety:0.5
     has been changed from off to on.
Mitigation measure Provide Street Lighting:0.5
     has been changed from off to on.
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Mitigation measure Provide Pedestrian Safety Designs/Infrastructure at Crossings:0.5
     has been changed from off to on.
Mitigation measure Articulated Storefront(s) Display Windows with Visual Interest:0.25
     has been changed from off to on.
Mitigation measure No Long Uninterrupted Walls Along Pedestrian Walkways:0.25
     has been changed from off to on.
Mitigation measure Provide Bike Lanes/Paths Connecting to Bikeway System:2
     has been changed from off to on.
```

SUMMERTIME EMISSIONS REDUCTIONS

ESTIMATED EMISSIONS REDUCTIONS EFFICIENCIES
River Park Recommended Mitigation - Summertime Emissions

▨ Input Fields

LAND USE		Mitigated Emissions in Pounds per Day CO	VOC	NO_x	PM_{10}
Single Family Residential Uses	Vehicular Sources	622.2	52.6	54.9	48.1
	Area Sources	5.0	21.7	6.5	0.0
Multi-Family Residential Uses	Vehicular Sources	691.9	63.9	61.6	52.1
	Area Sources	5.0	21.7	6.5	0.0
Commercial/Office Uses	Vehicular Sources	164.3	13.3	16.3	11.6
	Area Sources	5.0	21.7	6.5	0.0
Industrial Uses	Vehicular Sources				
	Area Sources				
Total Emissions	Vehicular Sources	1,478.4	129.8	132.4	111.8
	Area Sources	15.0	65.2	19.4	0.1
	Total Non-Reduced Emissions	1,493.4	195.0	151.8	111.8

Recommended (Measures already incorporated into Project are marked "No." Yes	No	MEASURES, EFFICIENCIES, AND REDUCTIONS	Emission Reduction Efficiency CO	VOC	NO_x	PM_{10}	Reduced Emissions in Pounds per Day CO	VOC	NO_x	PM_{10}	REASONS FOR REJECTING MITIGATION MEASURES
Stationary Sources											
All Residential Uses											
X		Use solar or low emission water heaters	10.0%	11.0%	9.5%	4.5%	1.0	4.8	1.2	0.0	
X		Use built-in energy-efficient appliances	3.0%	2.5%	3.0%	6.5%	0.3	1.1	0.4	0.0	
	X	Provide shade trees to reduce heating/cooling needs	0.0%	0.0%	0.0%	0.5%	0.0	0.0	0.0	0.0	This measure is already incorporated into the project.
X		Use energy-efficient and automated controls for air conditioners	0.0%	0.0%	0.0%	0.5%	0.0	0.0	0.0	0.0	
X		Use double-glass paned windows	4.5%	4.5%	4.0%	2.5%	0.4	2.0	0.5	0.0	
	X	Provide ventilation systems for enclosed parking facilities	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Measure does not reduce emissions.
X		Use lighting controls and energy efficient lighting	0.0%	0.0%	0.0%	0.5%	0.0	0.0	0.0	0.0	
	X	Use fuel cells in residential subdivisions to produce heat and elec.	1.0%	0.0%	1.5%	7.0%	0.0	0.0	0.0	0.0	Measure not feasible.
X		Orient buildings to the north	13.5%	14.0%	13.0%	10.5%	1.3	6.1	1.7	0.0	
X		Use light-colored roof materials to reflect heat	1.5%	1.5%	1.5%	1.5%	0.1	0.7	0.2	0.0	
X		Comply with Title 24	13.0%	14.0%	13.0%	7.5%	1.3	6.1	1.7	0.0	
Multi-Family Residential Uses											
X		Use central water heating systems	8.5%	9.0%	8.0%	4.0%	0.4	2.0	0.5	0.0	
Commercial and Office Uses											
X		Use solar or low emission water heaters	0.5%	0.5%	0.5%	0.5%	0.0	0.1	0.0	0.0	
		Use central water heating systems	0.5%	0.5%	0.5%	0.5%	FALSE	FALSE	FALSE	FALSE	
	X	Provide shade trees to reduce heating/cooling needs	0.5%	0.5%	0.5%	1.0%	0.0	0.0	0.0	0.0	Measure already incorporated into project
X		Use energy-efficient and automated controls for air conditioners	1.0%	1.0%	1.0%	1.5%	0.0	0.2	0.1	0.0	
X		Use double-glass paned windows	3.0%	3.5%	3.0%	2.5%	0.1	0.8	0.2	0.0	
	X	Use energy-efficient low-sodium parking lights	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Measure does not reduce emissions.
	X	Provide ventilation systems for enclosed parking facilities	0.0%	0.0%	0.0%	0.5%	0.0	0.0	0.0	0.0	No parking garage is proposed on site.
X		Use lighting controls and energy efficient lighting	7.0%	3.0%	8.5%	19.5%	0.3	0.7	0.5	0.0	
X		Use light-colored roof materials to reflect heat	1.0%	1.0%	1.0%	0.5%	0.0	0.2	0.1	0.0	
X		Comply with Title 24	9.5%	10.0%	9.0%	7.0%	0.5	2.2	0.6	0.0	
X		Orient buildings to the north	12.5%	11.0%	13.5%	17.5%	0.6	2.4	0.9	0.0	
Industrial Uses											
	X	Provide shade trees to reduce heating/cooling needs	0.0%	0.0%	0.0%	0.5%	0.0	0.0	0.0	0.0	No industrial uses are proposed within the project.
	X	Use energy-efficient and automated controls for air conditioners	0.0%	0.0%	0.0%	1.0%	0.0	0.0	0.0	0.0	
	X	Use double-glass paned windows	0.0%	0.0%	0.5%	1.0%	0.0	0.0	0.0	0.0	
	X	Use energy-efficient low-sodium parking lights	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Provide ventilation systems for enclosed parking facilities	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Use lighting controls and energy efficient lighting	0.5%	0.0%	1.0%	2.5%	0.0	0.0	0.0	0.0	
	X	Use light-colored roof materials to reflect heat	0.0%	0.0%	0.0%	0.5%	0.0	0.0	0.0	0.0	
	X	Orient buildings to the north	2.5%	2.0%	3.0%	5.5%	0.0	0.0	0.0	0.0	
	X	Comply with Title 24	0.5%	0.0%	1.0%	3.0%	0.0	0.0	0.0	0.0	
	X	Improved storage and handling of source materials	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Materials substitution (e.g., use water-based paints, life cycle analysis)	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Utilize efficient manufacturing processes	1.5%	0.5%	2.0%	6.0%	0.0	0.0	0.0	0.0	
	X	Resource recovery systems	3.0%	3.5%	3.0%	1.5%	0.0	0.0	0.0	0.0	

ESTIMATED EMISSIONS REDUCTIONS EFFICIENCIES
River Park Recommended Mitigation - Summertime Emissions

Recommended (Measures already incorporated into Project are marked "No."			Emission Reduction Efficiency				Reduced Emissions in Pounds per Day				
Yes	No	MEASURES, EFFICIENCIES, AND REDUCTIONS	CO	VOC	NO_x	PM_{10}	CO	VOC	NO_x	PM_{10}	REASONS FOR REJECTING MITIGATION MEASURES
Mobile Sources											
Residential Uses											
	X	Allow satellite telecommunications centers in residential subdivisions	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	Satellite telecommunications centers are superseded by other technology.
	X	Shuttle service from res. subdivisions to commercial core areas	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	Bus transit and Metrolink already serve the area.
X		Construct bus passenger benches and shelters	0.2%	0.2%	0.2%	0.2%	2.6	0.2	0.2	0.2	
	X	Construct pedestrian facility improvements	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	This measure is already incorporated into the project.
	X	Retail services within or adjacent to residential subdivisions	1.3%	1.0%	1.3%	1.3%	0.0	0.0	0.0	0.0	This measure is already incorporated into the project.
	X	Shuttles to major rail transit centers or multi-modal stations	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	Bus transit and Metrolink already serve the area.
X		Contribute to regional transit systems	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
X		Synchronize traffic lights on streets impacted by development	4.0%	4.0%	4.0%	4.0%	52.2	4.7	4.6	3.9	
	X	Construct bicycle trails	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	This measure is already incorporated into the project.
Commercial Uses											
	X	Preferential parking spaces for carpools and vanpools	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	Retail commercial is not suited for carpools and vanpools.
	X	Implement on-site circulation plan in parking lots	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Measure does not reduce emissions.
	X	Provide separate windows for fast-food restaurants	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Measure does not reduce emissions.
	X	Provide video-conference facilities	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	No office requiring video conferencing is proposed on the site.
	X	Set up resident worker training programs to improve job/housing balance	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Measure does not reduce emissions.
	X	Implement home dispatching system for employees	0.1%	0.0%	0.1%	0.1%	0.0	0.0	0.0	0.0	This measure is not suitable for retail uses.
	X	Minimize use of fleet vehicles during smog alerts	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Retail use does not employ fleet vehicles.
	X	Use low emission fleet vehicles	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Retail use does not employ fleet vehicles.
	X	Reduce employee parking spaces for those business not under Rule 2202	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	Staggered retail employee hours not suited for carpooling or vanpooling
	X	Lunch shuttle service from a worksite to food establishments	0.5%	0.4%	0.5%	0.5%	0.0	0.0	0.0	0.0	Adequate restaurant uses exist in project area within walking distance.
	X	Implement compressed work-week schedules	1.0%	0.8%	1.0%	1.0%	0.0	0.0	0.0	0.0	Compressed work weeks not suitable for retail uses.
	X	Trip reduction plan to achieve 1.5 AVR for businesses	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	Staggered retail employee hours not suited for carpooling or vanpooling
	X	Utilize satellite offices rather than regular worksite to reduce VMT	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	Office uses not proposed on the commercial site.
	X	Establish a home-based telecommuting program	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	Telecommuting not suitable for retail uses.
	X	Provide or contribute to child care and after school facilities	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	There is no clear connection between providing this service and reducing air emissions.
	X	Offer travel incentives such as discounts on purchases for transit riders	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Measure does not reduce emissions.
	X	Provide on-site employee services such as cafeteria, banks, etc.	0.3%	0.2%	0.3%	0.3%	0.0	0.0	0.0	0.0	Food establishments and services already exist in the project area.
	X	Shuttle service from residential core area to the worksite	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	There is no residential core that would generate all or most of the employees for this project.
X		Construct bus passenger benches and shelters	0.1%	0.1%	0.1%	0.1%	0.2	0.0	0.0	0.0	
	X	Pricing structure for single-occupancy employee parking	2.0%	1.5%	2.0%	2.0%	0.0	0.0	0.0	0.0	Employee scheduling of retail uses do not facilitate carpooling, so single occupancy vehicles are the norm.
	X	Residential units within or adjacent to commercial developments	4.0%	3.1%	4.0%	4.0%	0.0	0.0	0.0	0.0	Measure already incorporated into project
	X	Utilize excess parking as park-n-ride or contribute to park-n-ride	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	No excess parking is proposed at the project.
	X	Construct bicycle facility improvements	0.3%	0.2%	0.3%	0.3%	0.0	0.0	0.0	0.0	Measure already incorporated into project
	X	Construct pedestrian facility improvements	0.2%	0.2%	0.2%	0.2%	0.0	0.0	0.0	0.0	Measure already incorporated into project
	X	Shuttles to major rail transit centers or multi-modal stations	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	Bus service already serves the area.
X		Contribute to regional transit systems	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Charge visitors to park	2.0%	1.5%	2.0%	2.0%	0.0	0.0	0.0	0.0	Retail uses do not typically charge patrons to park.
X		Synchronize traffic lights on streets impacted by development	4.0%	4.0%	4.0%	4.0%	7.0	0.5	0.7	0.5	
	X	Reschedule truck deliveries and pickups for off-peak hours	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Measure does not reduce emissions.
	X	Paid parking at walkup kiosks	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Retail uses do not typically charge patrons to park.
	X	On-site truck loading zones	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Measure does not reduce emissions.
	X	Implement or contribute to public outreach programs	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Measure does not reduce emissions.
X		Provide commuter information areas	0.1%	0.1%	0.1%	0.1%	0.2	0.0	0.0	0.0	

ESTIMATED EMISSIONS REDUCTIONS EFFICIENCIES
River Park Recommended Mitigation - Summertime Emissions

Recommended (Measures already incorporated into Project are marked "No."			Emission Reduction Efficiency				Reduced Emissions in Pounds per Day				
Yes	No	MEASURES, EFFICIENCIES, AND REDUCTIONS	CO	VOC	NO_x	PM_{10}	CO	VOC	NO_x	PM_{10}	REASONS FOR REJECTING MITIGATION MEASURES
Industrial Uses											
	X	Preferential parking spaces for carpools and vanpools	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	No industrial uses are proposed within the project.
	X	Implement on-site circulation plan in parking lots	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Set up resident worker training programs to improve job/housing balance	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Implement home dispatching system for employees	0.1%	0.0%	0.1%	0.1%	0.0	0.0	0.0	0.0	
	X	Minimize use of fleet vehicles during smog alerts	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Use low emission fleet vehicles	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Provide commuter information areas	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Reduce employee parking spaces for those business not under Rule 2202	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	
	X	Implement compressed work-week schedules	1.0%	0.8%	1.0%	1.0%	0.0	0.0	0.0	0.0	
	X	Offer loans or other incentives to employees who move locally	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Trip reduction plan to achieve 1.5 AVR for businesses	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	
	X	Provide or contribute to child care and after school facilities	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	
	X	Provide on-site employee services such as cafetaria, banks, etc.	0.3%	0.2%	0.3%	0.3%	0.0	0.0	0.0	0.0	
	X	Shuttle service from residential core area to the worksite	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	
	X	Construct bus passenger benches and shelters	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	
	X	Pricing structure for single-occupancy employee parking	2.0%	1.5%	2.0%	2.0%	0.0	0.0	0.0	0.0	
	X	Utilize excess parking as park-n-ride or contribute to park-n-ride	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	
	X	Construct bicycle facility improvements	0.3%	0.2%	0.3%	0.3%	0.0	0.0	0.0	0.0	
	X	Construct pedestrian facility improvements	0.2%	0.2%	0.2%	0.2%	0.0	0.0	0.0	0.0	
	X	Shuttles to major rail transit centers or multi-modal stations	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	
	X	Contribute to regional transit systems	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Synchronize traffic lights on streets impacted by development	4.0%	4.0%	4.0%	4.0%	0.0	0.0	0.0	0.0	
	X	Reschedule truck deliveries and pickups for off-peak hours	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Lunch shuttle system from worksite to food establishments	0.5%	0.4%	0.5%	0.5%	0.0	0.0	0.0	0.0	
	X	On-site truck loading zones	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Install aerodynamic add-on devices to heavy-duty trucks	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Implement or contribute to public outreach programs	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Reduce ship cruising speeds in the inner harbor	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Use low-emission fuels or electrify airport ground service vehicles	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Engine tuning for marine vessels	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Reduce number of aircraft engines used during idling	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Install monitoring system to control airport shuttles	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Use centralized ground power systems for airport service vehicles	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
		Net Reduction in Stationary Sources Emissions (Pounds per day)					6.7	29.1	8.6	0.0	
		Net Reduction in Mobile Sources Emissions (Pounds per day)					62.1	5.5	5.6	4.7	
		Total Net Reduction in Emissions (Pounds per day)					68.8	34.6	14.1	4.7	
		No Wood Burning Fire Places or Stoves in Residential Units									
		Percentage Reduced					4.6%	17.7%	9.3%	4.2%	
		Total Reduced Stationary Source Emissions					8.3	36.1	10.8	0.0	
		Total Reduced Mobile Source Emissions					1416.3	124.3	126.8	107.1	
		TOTAL REDUCED EMISSIONS					1,424.6	160.4	137.7	107.1	
		SCAQMD Thresholds					550.0	55.0	55.0	150.0	
		ProjectAir Quality Impacts Significant?					YES	YES	YES	NO	

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Prepared by R. Mamaghani
11/14/03

Based on SCAQMD
CEQA Air Quality Handbook
Table 11-6

WINTERTIME EMISSIONS REDUCTIONS

ESTIMATED EMISSIONS REDUCTIONS EFFICIENCIES
River Park Recommended Mitigation - Wintertime Emissions Without Wood Burning Stoves or Fire Places

▨ Input Fields

LAND USE		Unmitigated Emissions in Pounds per Day			
		CO	VOC	NO_x	PM_{10}
Single Family Residential Uses	Vehicular Sources	574.8	49.5	78.6	48.1
	Area Sources	2.7	21.5	6.4	0.0
Multi-Family Residential Uses	Vehicular Sources	649.3	56.0	88.8	52.0
	Area Sources	2.7	21.5	6.4	0.0
Commercial/Office Uses	Vehicular Sources	168.3	14.3	23.5	11.6
	Area Sources	2.7	21.5	6.4	0.0
Industrial Uses	Vehicular Sources				
	Area Sources				
Total Emissions	Vehicular Sources	1,392.4	119.8	190.9	111.7
	Area Sources	8.2	64.4	19.3	0.0
	Total Non-Reduced Emissions	1,400.6	184.1	210.2	111.8

Recommended (Measures already incorporated into Project are marked "No."			Emission Reduction Efficiency				Reduced Emissions in Pounds per Day				
Yes	No	MEASURES, EFFICIENCIES, AND REDUCTIONS	CO	VOC	NO_x	PM_{10}	CO	VOC	NO_x	PM_{10}	REASONS FOR REJECTING MITIGATION MEASURES
Stationary Sources											
All Residential Uses											
X		Use solar or low emission water heaters	10.0%	11.0%	9.5%	4.5%	0.5	4.7	1.2	0.0	
X		Use built-in energy-efficient appliances	3.0%	2.5%	3.0%	6.5%	0.2	1.1	0.4	0.0	
	X	Provide shade trees to reduce heating/cooling needs	0.0%	0.0%	0.0%	0.5%	0.0	0.0	0.0	0.0	This measure is already incorporated into the project.
X		Use energy-efficient and automated controls for air conditioners	0.0%	0.0%	0.0%	0.5%	0.0	0.0	0.0	0.0	
X		Use double-glass paned windows	4.5%	4.5%	4.0%	2.5%	0.2	1.9	0.5	0.0	
	X	Provide ventilation systems for enclosed parking facilities	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Measure does not reduce emissions.
X		Use lighting controls and energy efficient lighting	0.0%	0.0%	0.0%	0.5%	0.0	0.0	0.0	0.0	
	X	Use fuel cells in residential subdivisions to produce heat and elec.	1.0%	0.0%	1.5%	7.0%	0.0	0.0	0.0	0.0	Measure not feasible.
X		Orient buildings to the north	13.5%	14.0%	13.0%	10.5%	0.7	6.0	1.7	0.0	
X		Use light-colored roof materials to reflect heat	1.5%	1.5%	1.5%	1.5%	0.1	0.6	0.2	0.0	
X		Comply with Title 24	13.0%	14.0%	13.0%	7.5%	0.7	6.0	1.7	0.0	
Multi-Family Residential Uses											
X		Use central water heating systems	8.5%	9.0%	8.0%	4.0%	0.2	1.9	0.5	0.0	
Commercial and Office Uses											
X		Use solar or low emission water heaters	0.5%	0.5%	0.5%	0.5%	0.0	0.1	0.0	0.0	
		Use central water heating systems	0.5%	0.5%	0.5%	0.5%	FALSE	FALSE	FALSE	FALSE	
	X	Provide shade trees to reduce heating/cooling needs	0.5%	0.5%	0.5%	1.0%	0.0	0.0	0.0	0.0	Measure already incorporated into project
X		Use energy-efficient and automated controls for air conditioners	1.0%	1.0%	1.0%	1.5%	0.0	0.2	0.1	0.0	
X		Use double-glass paned windows	3.0%	3.5%	3.0%	2.5%	0.1	0.8	0.2	0.0	
	X	Use energy-efficient low-sodium parking lights	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Measure does not reduce emissions.
	X	Provide ventilation systems for enclosed parking facilities	0.0%	0.0%	0.0%	0.5%	0.0	0.0	0.0	0.0	No parking garage is proposed on site.
X		Use lighting controls and energy efficient lighting	7.0%	3.0%	8.5%	19.5%	0.2	0.6	0.5	0.0	
X		Use light-colored roof materials to reflect heat	1.0%	1.0%	1.0%	0.5%	0.0	0.2	0.1	0.0	
X		Comply with Title 24	9.5%	10.0%	9.0%	7.0%	0.3	2.1	0.6	0.0	
X		Orient buildings to the north	12.5%	11.0%	13.5%	17.5%	0.3	2.4	0.9	0.0	
Industrial Uses											
	X	Provide shade trees to reduce heating/cooling needs	0.0%	0.0%	0.0%	0.5%	0.0	0.0	0.0	0.0	No industrial uses are proposed within the project.
	X	Use energy-efficient and automated controls for air conditioners	0.0%	0.0%	0.0%	1.0%	0.0	0.0	0.0	0.0	
	X	Use double-glass paned windows	0.0%	0.0%	0.5%	1.0%	0.0	0.0	0.0	0.0	
	X	Use energy-efficient low-sodium parking lights	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Provide ventilation systems for enclosed parking facilities	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Use lighting controls and energy efficient lighting	0.5%	0.0%	1.0%	2.5%	0.0	0.0	0.0	0.0	
	X	Use light-colored roof materials to reflect heat	0.0%	0.0%	0.0%	0.5%	0.0	0.0	0.0	0.0	
	X	Orient buildings to the north	2.5%	2.0%	3.0%	5.5%	0.0	0.0	0.0	0.0	
	X	Comply with Title 24	0.5%	0.0%	1.0%	3.0%	0.0	0.0	0.0	0.0	
	X	Improved storage and handling of source materials	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Materials substitution (e.g., use water-based paints, life cycle analysis)	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Utilize efficient manufacturing processes	1.5%	0.5%	2.0%	6.0%	0.0	0.0	0.0	0.0	
	X	Resource recovery systems	3.0%	3.5%	3.0%	1.5%	0.0	0.0	0.0	0.0	

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11/14/08

Based on SCAQMD
CEQA Air Quality Handbook
Table 11-6

ESTIMATED EMISSIONS REDUCTIONS EFFICIENCIES
River Park Recommended Mitigation - Wintertime Emissions Without Wood Burning Stoves or Fire Places

Recommended (Measures already incorporated into Project are marked "No."			Emission Reduction Efficiency				Reduced Emissions in Pounds per Day				
Yes	No	MEASURES, EFFICIENCIES, AND REDUCTIONS	CO	VOC	NO_x	PM_{10}	CO	VOC	NO_x	PM_{10}	REASONS FOR REJECTING MITIGATION MEASURES
Mobile Sources											
Residential Uses											
	X	Allow satellite telecommunications centers in residential subdivisions	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	Satellite telecommunications centers are superseded by other technology.
	X	Shuttle service from res. subdivisions to commercial core areas	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	Bus transit and Metrolink already serve the area.
X		Construct bus passenger benches and shelters	0.2%	0.2%	0.2%	0.2%	2.4	0.2	0.3	0.2	
	X	Construct pedestrian facility improvements	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	This measure is already incorporated into the project.
	X	Retail services within or adjacent to residential subdivisions	1.3%	1.0%	1.3%	1.3%	0.0	0.0	0.0	0.0	This measure is already incorporated into the project.
	X	Shuttles to major rail transit centers or multi-modal stations	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	Bus transit and Metrolink already serve the area.
X		Contribute to regional transit systems	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
X		Synchronize traffic lights on streets impacted by development	4.0%	4.0%	4.0%	4.0%	49.0	4.2	6.7	3.9	
	X	Construct bicycle trails	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	This measure is already incorporated into the project.
Commercial Uses											
	X	Preferential parking spaces for carpools and vanpools	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	Retail commercial is not suited for carpools and vanpools.
	X	Implement on-site circulation plan in parking lots	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Measure does not reduce emissions.
	X	Provide separate windows for fast-food restaurants	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Measure does not reduce emissions.
	X	Provide video-conference facilities	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	No office requiring video conferencing is proposed on the site.
	X	Set up resident worker training programs to improve job/housing balance	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Measure does not reduce emissions.
	X	Implement home dispatching system for employees	0.1%	0.0%	0.1%	0.1%	0.0	0.0	0.0	0.0	This measure is not suitable for retail uses.
	X	Minimize use of fleet vehicles during smog alerts	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Retail use does not employ fleet vehicles.
	X	Use low emission fleet vehicles	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Retail use does not employ fleet vehicles.
	X	Reduce employee parking spaces for those business not under Rule 2202	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	Staggered retail employee hours not suited for carpooling or vanpooling.
	X	Lunch shuttle service from a worksite to food establishments	0.5%	0.4%	0.5%	0.5%	0.0	0.0	0.0	0.0	Adequate restaurant uses exist in project area within walking distance.
	X	Implement compressed work-week schedules	1.0%	0.8%	1.0%	1.0%	0.0	0.0	0.0	0.0	Compressed work weeks not suitable for retail uses.
	X	Trip reduction plan to achieve 1.5 AVR for businesses	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	Staggered retail employee hours not suited for carpooling or vanpooling.
	X	Utilize satellite offices rather than regular worksite to reduce VMT	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	Office uses not proposed on the commercial site.
	X	Establish a home-based telecommuting program	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	Telecommuting not suitable for retail uses.
	X	Provide or contribute to child care and after school facilities	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	There is no clear connection between providing this service and reducing air emissions.
	X	Offer travel incentives such as discounts on purchases for transit riders	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Measure does not reduce emissions.
	X	Provide on-site employee services such as cafeteria, banks, etc.	0.3%	0.2%	0.3%	0.3%	0.0	0.0	0.0	0.0	Food establishments and services already exist in the project area.
	X	Shuttle service from residential core area to the worksite	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	There is no residential core that would generate all or most of the employees for this project.
X		Construct bus passenger benches and shelters	0.1%	0.1%	0.1%	0.1%	0.2	0.0	0.0	0.0	
	X	Pricing structure for single-occupancy employee parking	2.0%	1.5%	2.0%	2.0%	0.0	0.0	0.0	0.0	Employee scheduling of retail uses do not facilitate carpooling, so single occupancy vehicles are the norm.
	X	Residential units within or adjacent to commercial developments	4.0%	3.1%	4.0%	4.0%	0.0	0.0	0.0	0.0	Measure already incorporated into project
	X	Utilize excess parking as park-n-ride or contribute to park-n-ride	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	No excess parking is proposed at the project.
	X	Construct bicycle facility improvements	0.3%	0.2%	0.3%	0.3%	0.0	0.0	0.0	0.0	Measure already incorporated into project
	X	Construct pedestrian facility improvements	0.2%	0.2%	0.2%	0.2%	0.0	0.0	0.0	0.0	Measure already incorporated into project
	X	Shuttles to major rail transit centers or multi-modal stations	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	Bus service already serves the area.
X		Contribute to regional transit systems	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Charge visitors to park	2.0%	1.5%	2.0%	2.0%	0.0	0.0	0.0	0.0	Retail uses do not typically charge patrons to park.
X		Synchronize traffic lights on streets impacted by development	4.0%	4.0%	4.0%	4.0%	6.7	0.6	0.9	0.5	
	X	Reschedule truck deliveries and pickups for off-peak hours	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Measure does not reduce emissions.
	X	Paid parking at walkup kiosks	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Retail uses do not typically charge patrons to park.
	X	On-site truck loading zones	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Measure does not reduce emissions.
	X	Implement or contribute to public outreach programs	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	Measure does not reduce emissions.
X		Provide commuter information areas	0.1%	0.1%	0.1%	0.1%	0.2	0.0	0.0	0.0	

ESTIMATED EMISSIONS REDUCTIONS EFFICIENCIES
River Park Recommended Mitigation - Wintertime Emissions Without Wood Burning Stoves or Fire Places

Recommended (Measures already incorporated into Project are marked "No."			Emission Reduction Efficiency				Reduced Emissions in Pounds per Day				
Yes	No	MEASURES, EFFICIENCIES, AND REDUCTIONS	CO	VOC	NO_x	PM_{10}	CO	VOC	NO_x	PM_{10}	REASONS FOR REJECTING MITIGATION MEASURES
Industrial Uses											
	X	Preferential parking spaces for carpools and vanpools	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	No industrial uses are proposed within the project.
	X	Implement on-site circulation plan in parking lots	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Set up resident worker training programs to improve job/housing balance	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Implement home dispatching system for employees	0.1%	0.0%	0.1%	0.1%	0.0	0.0	0.0	0.0	
	X	Minimize use of fleet vehicles during smog alerts	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Use low emission fleet vehicles	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Provide commuter information areas	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Reduce employee parking spaces for those business not under Rule 2202	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	
	X	Implement compressed work-week schedules	1.0%	0.8%	1.0%	1.0%	0.0	0.0	0.0	0.0	
	X	Offer loans or other incentives to employees who move locally	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Trip reduction plan to achieve 1.5 AVR for businesses	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	
	X	Provide or contribute to child care and after school facilities	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	
	X	Provide on-site employee services such as cafeteria, banks, etc.	0.3%	0.2%	0.3%	0.3%	0.0	0.0	0.0	0.0	
	X	Shuttle service from residential core area to the worksite	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	
	X	Construct bus passenger benches and shelters	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	
	X	Pricing structure for single-occupancy employee parking	2.0%	1.5%	2.0%	2.0%	0.0	0.0	0.0	0.0	
	X	Utilize excess parking as park-n-ride or contribute to park-n-ride	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	
	X	Construct bicycle facility improvements	0.3%	0.2%	0.3%	0.3%	0.0	0.0	0.0	0.0	
	X	Construct pedestrian facility improvements	0.2%	0.2%	0.2%	0.2%	0.0	0.0	0.0	0.0	
	X	Shuttles to major rail transit centers or multi-modal stations	0.1%	0.1%	0.1%	0.1%	0.0	0.0	0.0	0.0	
	X	Contribute to regional transit systems	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Synchronize traffic lights on streets impacted by development	4.0%	4.0%	4.0%	4.0%	0.0	0.0	0.0	0.0	
	X	Reschedule truck deliveries and pickups for off-peak hours	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Lunch shuttle system from worksite to food establishments	0.5%	0.4%	0.5%	0.5%	0.0	0.0	0.0	0.0	
	X	On-site truck loading zones	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Install aerodynamic add-on devices to heavy-duty trucks	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Implement or contribute to public outreach programs	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Reduce ship cruising speeds in the inner harbor	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Use low-emission fuels or electrify airport ground service vehicles	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Engine tuning for marine vessels	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Reduce number of aircraft engines used during idling	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Install monitoring system to control airport shuttles	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
	X	Use centralized ground power systems for airport service vehicles	0.0%	0.0%	0.0%	0.0%	0.0	0.0	0.0	0.0	
		Net Reduction in Stationary Sources Emissions (Pounds per day)					3.7	28.7	8.5	0.0	
		Net Reduction in Mobile Sources Emissions (Pounds per day)					58.5	5.0	8.0	4.7	
		Total Net Reduction in Emissions (Pounds per day)					62.1	33.8	16.6	4.7	
		No Wood Burning Fire Places or Stoves in Residential Units					4,008.5	1,662.2	64.7	615.0	
		Percentage Reduced					75.3%	91.9%	29.5%	85.3%	
		Total Reduced Stationary Source Emissions					4.5	35.6	10.8	0.0	
		Total Reduced Mobile Source Emissions					1333.9	114.7	182.9	107.0	
		TOTAL REDUCED EMISSIONS					1,338.5	150.4	193.7	107.0	
		SCAQMD Thresholds					550.0	55.0	55.0	150.0	
		ProjectAir Quality Impacts Significant?					YES	YES	YES	NO	

Impact Sciences, Inc.
Prepared by R. Mamaghani
11/14/08

Based on SCAQMD
CEQA Air Quality Handbook
Table 11-6

APPENDIX 4.5

Noise Data

```
 SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

 TITLE:
 RIVER PARK AREA A-1, LOTS AND WALLS AS PROPOSED AND AT CONVENTION
AL SPEEDS


1
          BARRIER DATA
          ************

 BAR              BARRIER HEIGHTS               BAR
 ELE    0    1    2    3    4    5    6    7    ID        LENGTH
 -------------------------------------------------------------------
-------------
  1     -   0.*                                30 FEET    327.6

  2     -   0.*                                30 FEET    402.2

  3     -   0.*                                8 FEET     662.9

  4     -   0.*                                10 FEET    305.3

  5     -   0.*                                10 FEET    120.8
  6     -   0.*                                B5 P2      269.3
  7     -   0.*                                B5 P3      353.6

  8     -   0.*                                6 FEET      36.4
  9     -   0.*                                B6 P2      378.6
 10     -   0.*                                B6 P3       60.2
 11     -   0.*                                B6 P4      141.4
 12     -   0.*                                B6 P5       50.0
 13     -   0.*                                B6 P6       44.7

 14     -   0.*                                6 FEET      31.6
 15     -   0.*                                B7 P2      294.6

 16     -   0.*                                6 FEET      50.2
 17     -   0.*                                B8 P2      335.0
 18     -   0.*                                B8 P3       50.0
 19     -   0.*                                B8 P4       90.0

 20     -   0.*                                10 FEET     45.0
 21     -   0.*                                B9 P2       83.3
 22     -   0.*                                B9 P3      274.0
 23     -   0.*                                B9 P4      242.2
 24     -   0.*                                B9 P5      201.2
 25     -   0.*                                B9 P6      190.4
```

```
26      -    0.*                                             B9 P7       100.5

27      -    0.*                                             10 FEET      90.1
28      -    0.*                                             B10 P2     1005.6
29      -    0.*                                             B10 P3        4.0
30      -    0.*                                             6 FEET      201.2

31      -    0.*                                             10 FEET      70.9
32      -    0.*                                             B11 P2      130.4
33      -    0.*                                             B11 P3      226.1
34      -    0.*                                             B11 P4      256.8
35      -    0.*                                             B11 P5       78.1
36      -    0.*                                             B11 P6      247.6
37      -    0.*                                             B11 P7      149.0

38      -    0.*                                             6 FEET       41.2
39      -    0.*                                             B12 P2       46.1
40      -    0.*                                             B12 P3       30.4
41      -    0.*                                             B12 P4      290.9
42      -    0.*                                             B12 P5       24.9
43      -    0.*                                             B12 P6      328.8
44      -    0.*                                             B12 P7       53.4
45      -    0.*                                             B12 P8      308.7

46      -    0.*                                             6 FEET      178.0
47      -    0.*                                             B13 P2      193.3
48      -    0.*                                             B13 P3       23.7
49      -    0.*                                             B13 P4      426.2
50      -    0.*                                             B13 P5       60.2

51      -    0.*                                             6 FEET       67.1
52      -    0.*                                             B14 P2       36.4
53      -    0.*                                             B14 P3        4.0
54      -    0.*                                             10 FEET     241.7
55      -    0.*                                             B14 P5      289.5
56      -    0.*                                             B14 P6      104.5
57      -    0.*                                             B14 P7      318.0
58      -    0.*                                             B14 P8       32.2
59      -    0.*                                             B14 P9       35.1

60      -    0.*                                             6 FEET      143.2
61      -    0.*                                             B15 P2        4.0
62      -    0.*                                             10 FEET     332.5
63      -    0.*                                             B15 P4      133.4
64      -    0.*                                             B15 P5      204.6
65      -    0.*                                             B15 P6     1467.5

66      -    0.*                                             6 FEET      478.1
```

```
 67     -   0.*                                        B16 P2     170.3
 68     -   0.*                                        B16 P3      92.2

 69     -   0.*                                        6 FEET      90.6
 70     -   0.*                                        B17 P2     310.6
 71     -   0.*                                        B17 P3      90.6
 72     -   0.*                                        B17 P4     130.4
 73     -   0.*                                        B17 P5      63.2
 74     -   0.*                                        B17 P6     400.0
 75     -   0.*                                        B17 P7     100.5
 76     -   0.*                                        B17 P8      63.4
 77     -   0.*                                        B17 P9     261.7
 78     -   0.*                                        B17 P10     64.0
 -----------------------------------------------------------------
-------------
       0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 --------------------------------
  1  LOT 1      67.     500.    65.9
  2  LOT 2      67.     500.    63.3
  3  LOT 3      67.     500.    64.3
  4  LOT 7      67.     500.    62.5
  5  LOT 8      67.     500.    61.4
  6  LOT 56     67.     500.    66.6
  7  LOT 55     67.     500.    64.1
  8  LOT 57     67.     500.    58.4
  9  LOT 58     67.     500.    57.9
 10  LOT 60     67.     500.    58.6
 11  LOT 61     67.     500.    58.6
 12  LOT 62     67.     500.    57.7
 13  LOT 64     67.     500.    56.9
 14  LOT 66     67.     500.    56.3
 15  LOT 69     67.     500.    58.6
 16  LOT 70     67.     500.    57.7
 17  LOT 176    67.     500.    59.4
 18  LOT 170    67.     500.    59.8
 19  LOT 162    67.     500.    54.6
 20  LOT 165    67.     500.    59.5
 21  LOT 161    67.     500.    58.3
 22  LOT 158    67.     500.    67.0
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
```

```
   1  1  1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0.
```

```
 SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

 TITLE:
 RIVER PARK AREA A-1, RIVER LOTS AS PROPOSED AND AT CONVENTIONAL S
PEEDS


1
          BARRIER DATA
          ************

 BAR                BARRIER HEIGHTS                    BAR
 ELE    0    1    2    3    4    5    6    7     ID          LENGTH
 ------------------------------------------------------------------
-------------
  1     -   0.*                                  30 FEET    327.6

  2     -   0.*                                  30 FEET    402.2

  3     -   0.*                                  8 FEET     662.9

  4     -   0.*                                  10 FEET    305.3

  5     -   0.*                                  10 FEET    120.8
  6     -   0.*                                  B5 P2      269.3
  7     -   0.*                                  B5 P3      353.6

  8     -   0.*                                  6 FEET      36.4
  9     -   0.*                                  B6 P2      378.6
 10     -   0.*                                  B6 P3       60.2
 11     -   0.*                                  B6 P4      141.4
 12     -   0.*                                  B6 P5       50.0
 13     -   0.*                                  B6 P6       44.7

 14     -   0.*                                  6 FEET      31.6
 15     -   0.*                                  B7 P2      294.6

 16     -   0.*                                  6 FEET      50.2
 17     -   0.*                                  B8 P2      335.0
 18     -   0.*                                  B8 P3       50.0
 19     -   0.*                                  B8 P4       90.0

 20     -   0.*                                  10 FEET     45.0
 21     -   0.*                                  B9 P2       83.3
 22     -   0.*                                  B9 P3      274.0
 23     -   0.*                                  B9 P4      242.2
 24     -   0.*                                  B9 P5      201.2
 25     -   0.*                                  B9 P6      190.4
```

```
26    -   0.*                                    B9 P7       100.5

27    -   0.*                                    10 FEET      90.1
28    -   0.*                                    B10 P2     1005.6
29    -   0.*                                    B10 P3        4.0
30    -   0.*                                    6 FEET      201.2

31    -   0.*                                    10 FEET      70.9
32    -   0.*                                    B11 P2      130.4
33    -   0.*                                    B11 P3      226.1
34    -   0.*                                    B11 P4      256.8
35    -   0.*                                    B11 P5       78.1
36    -   0.*                                    B11 P6      247.6
37    -   0.*                                    B11 P7      149.0

38    -   0.*                                    6 FEET       41.2
39    -   0.*                                    B12 P2       46.1
40    -   0.*                                    B12 P3       30.4
41    -   0.*                                    B12 P4      290.9
42    -   0.*                                    B12 P5       24.9
43    -   0.*                                    B12 P6      328.8
44    -   0.*                                    B12 P7       53.4
45    -   0.*                                    B12 P8      308.7

46    -   0.*                                    6 FEET      178.0
47    -   0.*                                    B13 P2      193.3
48    -   0.*                                    B13 P3       23.7
49    -   0.*                                    B13 P4      426.2
50    -   0.*                                    B13 P5       60.2

51    -   0.*                                    6 FEET       67.1
52    -   0.*                                    B14 P2       36.4
53    -   0.*                                    B14 P3        4.0
54    -   0.*                                    10 FEET     241.7
55    -   0.*                                    B14 P5      289.5
56    -   0.*                                    B14 P6      104.5
57    -   0.*                                    B14 P7      318.0
58    -   0.*                                    B14 P8       32.2
59    -   0.*                                    B14 P9       35.1

60    -   0.*                                    6 FEET      143.2
61    -   0.*                                    B15 P2        4.0
62    -   0.*                                    10 FEET     332.5
63    -   0.*                                    B15 P4      133.4
64    -   0.*                                    B15 P5      204.6
65    -   0.*                                    B15 P6     1467.5

66    -   0.*                                    6 FEET      478.1
```

```
 67      -    0.*                                        B16 P2     170.3
 68      -    0.*                                        B16 P3      92.2

 69      -    0.*                                        6 FEET      90.6
 70      -    0.*                                        B17 P2     310.6
 71      -    0.*                                        B17 P3      90.6
 72      -    0.*                                        B17 P4     130.4
 73      -    0.*                                        B17 P5      63.2
 74      -    0.*                                        B17 P6     400.0
 75      -    0.*                                        B17 P7     100.5
 76      -    0.*                                        B17 P8      63.4
 77      -    0.*                                        B17 P9     261.7
 78      -    0.*                                        B17 P10     64.0
 ------------------------------------------------------------------
-------------
        0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 --------------------------------
  1  LOT 3      67.     500.    64.5
  2  LOT 4      67.     500.    63.9
  3  LOT 8      67.     500.    62.1
  4  LOT 12     67.     500.    61.3
  5  LOT 13     67.     500.    61.1
  6  LOT 17     67.     500.    60.5
  7  LOT 29     67.     500.    59.7
  8  LOT 203    67.     500.    59.5
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0.
```

```
SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

TITLE:
RIVER PARK AREA A-2, LOTS AS PROPOSED & AT CONVENTIONAL SPEEDS



1
         BARRIER DATA
         ************

 BAR                BARRIER HEIGHTS                BAR
 ELE    0    1    2    3    4    5    6    7     ID          LENGTH
 ------------------------------------------------------------------
-------------
  1     -   0.*                                 30 FEET      327.6

  2     -   0.*                                 30 FEET      402.2

  3     -   0.*                                 8 FEET       662.9

  4     -   0.*                                 10 FEET      305.3

  5     -   0.*                                 10 FEET      120.8
  6     -   0.*                                 B5 P2        269.3
  7     -   0.*                                 B5 P3        353.6

  8     -   0.*                                 6 FEET        36.4
  9     -   0.*                                 B6 P2        378.6
 10     -   0.*                                 B6 P3         60.2
 11     -   0.*                                 B6 P4        141.4
 12     -   0.*                                 B6 P5         50.0
 13     -   0.*                                 B6 P6         44.7

 14     -   0.*                                 6 FEET        31.6
 15     -   0.*                                 B7 P2        294.6

 16     -   0.*                                 6 FEET        50.2
 17     -   0.*                                 B8 P2        335.0
 18     -   0.*                                 B8 P3         50.0
 19     -   0.*                                 B8 P4         90.0

 20     -   0.*                                 10 FEET       45.0
 21     -   0.*                                 B9 P2         83.3
 22     -   0.*                                 B9 P3        274.0
 23     -   0.*                                 B9 P4        242.2
 24     -   0.*                                 B9 P5        201.2
 25     -   0.*                                 B9 P6        190.4
```

```
26      -   0.*                                  B9 P7       100.5

27      -   0.*                                  10 FEET      90.1
28      -   0.*                                  B10 P2     1005.6
29      -   0.*                                  B10 P3        4.0
30      -   0.*                                  6 FEET      201.2

31      -   0.*                                  10 FEET      70.9
32      -   0.*                                  B11 P2      130.4
33      -   0.*                                  B11 P3      226.1
34      -   0.*                                  B11 P4      256.8
35      -   0.*                                  B11 P5       78.1
36      -   0.*                                  B11 P6      247.6
37      -   0.*                                  B11 P7      149.0

38      -   0.*                                  6 FEET       41.2
39      -   0.*                                  B12 P2       46.1
40      -   0.*                                  B12 P3       30.4
41      -   0.*                                  B12 P4      290.9
42      -   0.*                                  B12 P5       24.9
43      -   0.*                                  B12 P6      328.8
44      -   0.*                                  B12 P7       53.4
45      -   0.*                                  B12 P8      308.7

46      -   0.*                                  6 FEET      178.0
47      -   0.*                                  B13 P2      193.3
48      -   0.*                                  B13 P3       23.7
49      -   0.*                                  B13 P4      426.2
50      -   0.*                                  B13 P5       60.2

51      -   0.*                                  6 FEET       67.1
52      -   0.*                                  B14 P2       36.4
53      -   0.*                                  B14 P3        4.0
54      -   0.*                                  10 FEET     241.7
55      -   0.*                                  B14 P5      289.5
56      -   0.*                                  B14 P6      104.5
57      -   0.*                                  B14 P7      318.0
58      -   0.*                                  B14 P8       32.2
59      -   0.*                                  B14 P9       35.1

60      -   0.*                                  6 FEET      143.2
61      -   0.*                                  B15 P2        4.0
62      -   0.*                                  10 FEET     332.5
63      -   0.*                                  B15 P4      133.4
64      -   0.*                                  B15 P5      204.6
65      -   0.*                                  B15 P6     1467.5

66      -   0.*                                  6 FEET      478.1
```

```
 67      -    0.*                                         B16 P2      170.3
 68      -    0.*                                         B16 P3       92.2

 69      -    0.*                                         6 FEET       90.6
 70      -    0.*                                         B17 P2      310.6
 71      -    0.*                                         B17 P3       90.6
 72      -    0.*                                         B17 P4      130.4
 73      -    0.*                                         B17 P5       63.2
 74      -    0.*                                         B17 P6      400.0
 75      -    0.*                                         B17 P7      100.5
 76      -    0.*                                         B17 P8       63.4
 77      -    0.*                                         B17 P9      261.7
 78      -    0.*                                         B17 P10      64.0
 ----------------------------------------------------------------
-------------
       0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 --------------------------------
  1  LOT 270   67.    500.   59.9
  2  LOT 269   67.    500.   59.7
  3  LOT 264   67.    500.   60.8
  4  LOT 262   67.    500.   61.9
  5  LOT 261   67.    500.   62.7
  6  LOT 260   67.    500.   63.8
  7  LOT 259   67.    500.   60.3
  8  LOT 255   67.    500.   58.8
  9  LOT 252   67.    500.   59.0
 10  LOT 251   67.    500.   57.8
 11  LOT 292   67.    500.   63.9
 12  LOT 294   67.    500.   61.1
 13  LOT 295   67.    500.   65.1
 14  LOT 313   67.    500.   56.8
 15  LOT 314   67.    500.   70.9
 16  LOT 337   67.    500.   71.5
 17  LOT 338   67.    500.   72.1
 18  LOT 378   67.    500.   66.3
 19  LOT 377   67.    500.   63.7
 20  LOT 376   67.    500.   62.9
 21  LOT 368   67.    500.   65.5
 22  LOT 385   67.    500.   59.2
 23  LOT 458   67.    500.   61.5
 24  LOT 456   67.    500.   58.0
 25  LOT 449   67.    500.   57.5
 26  LOT 448   67.    500.   55.6
 27  LOT 442   67.    500.   68.7
 28  LOT 434   67.    500.   62.0
 29  LOT 429   67.    500.   63.2
```

```
 30  LOT 427   67.     500.   61.9
 31  LOT 424   67.     500.   59.3
 32  LOT 422   67.     500.   59.4
 33  LOT 420   67.     500.   59.7
 34  LOT 475   67.     500.   59.9
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
    1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
1  1  1  1
    1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
1  1  1  1
    1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
1  1  1  1
    1   1   1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0
.  0.  0.  0.
   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0
.  0.  0.  0.
   0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0
.  0.  0.  0.
   0.  0.  0.
```

```
 SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

 TITLE:
 RIVER PARK AREA A-2,B, RIVER LOTS AS PROPOSED AND WITH CONVENTION
AL SPEEDS


1
          BARRIER DATA
          ************

 BAR                BARRIER HEIGHTS                       BAR
 ELE     0    1    2    3    4    5    6    7     ID         LENGTH
 ----------------------------------------------------------------------
-------------
  1      -    0.*                                 30 FEET    327.6

  2      -    0.*                                 30 FEET    402.2

  3      -    0.*                                 8 FEET     662.9

  4      -    0.*                                 10 FEET    305.3

  5      -    0.*                                 10 FEET    120.8
  6      -    0.*                                 B5 P2      269.3
  7      -    0.*                                 B5 P3      353.6

  8      -    0.*                                 6 FEET      36.4
  9      -    0.*                                 B6 P2      378.6
 10      -    0.*                                 B6 P3       60.2
 11      -    0.*                                 B6 P4      141.4
 12      -    0.*                                 B6 P5       50.0
 13      -    0.*                                 B6 P6       44.7

 14      -    0.*                                 6 FEET      31.6
 15      -    0.*                                 B7 P2      294.6

 16      -    0.*                                 6 FEET      50.2
 17      -    0.*                                 B8 P2      335.0
 18      -    0.*                                 B8 P3       50.0
 19      -    0.*                                 B8 P4       90.0

 20      -    0.*                                 10 FEET     45.0
 21      -    0.*                                 B9 P2       83.3
 22      -    0.*                                 B9 P3      274.0
 23      -    0.*                                 B9 P4      242.2
 24      -    0.*                                 B9 P5      201.2
 25      -    0.*                                 B9 P6      190.4
```

```
26     -   0.*                                   B9 P7       100.5

27     -   0.*                                   10 FEET      90.1
28     -   0.*                                   B10 P2     1005.6
29     -   0.*                                   B10 P3        4.0
30     -   0.*                                   6 FEET      201.2

31     -   0.*                                   10 FEET      70.9
32     -   0.*                                   B11 P2      130.4
33     -   0.*                                   B11 P3      226.1
34     -   0.*                                   B11 P4      256.8
35     -   0.*                                   B11 P5       78.1
36     -   0.*                                   B11 P6      247.6
37     -   0.*                                   B11 P7      149.0

38     -   0.*                                   6 FEET       41.2
39     -   0.*                                   B12 P2       46.1
40     -   0.*                                   B12 P3       30.4
41     -   0.*                                   B12 P4      290.9
42     -   0.*                                   B12 P5       24.9
43     -   0.*                                   B12 P6      328.8
44     -   0.*                                   B12 P7       53.4
45     -   0.*                                   B12 P8      308.7

46     -   0.*                                   6 FEET      178.0
47     -   0.*                                   B13 P2      193.3
48     -   0.*                                   B13 P3       23.7
49     -   0.*                                   B13 P4      426.2
50     -   0.*                                   B13 P5       60.2

51     -   0.*                                   6 FEET       67.1
52     -   0.*                                   B14 P2       36.4
53     -   0.*                                   B14 P3        4.0
54     -   0.*                                   10 FEET     241.7
55     -   0.*                                   B14 P5      289.5
56     -   0.*                                   B14 P6      104.5
57     -   0.*                                   B14 P7      318.0
58     -   0.*                                   B14 P8       32.2
59     -   0.*                                   B14 P9       35.1

60     -   0.*                                   6 FEET      143.2
61     -   0.*                                   B15 P2        4.0
62     -   0.*                                   10 FEET     332.5
63     -   0.*                                   B15 P4      133.4
64     -   0.*                                   B15 P5      204.6
65     -   0.*                                   B15 P6     1467.5

66     -   0.*                                   6 FEET      478.1
```

```
 67      -    0.*                                         B16 P2     170.3
 68      -    0.*                                         B16 P3      92.2

 69      -    0.*                                         6 FEET      90.6
 70      -    0.*                                         B17 P2     310.6
 71      -    0.*                                         B17 P3      90.6
 72      -    0.*                                         B17 P4     130.4
 73      -    0.*                                         B17 P5      63.2
 74      -    0.*                                         B17 P6     400.0
 75      -    0.*                                         B17 P7     100.5
 76      -    0.*                                         B17 P8      63.4
 77      -    0.*                                         B17 P9     261.7
 78      -    0.*                                         B17 P10     64.0
 -----------------------------------------------------------------
-------------
        0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 --------------------------------
  1  LOT 288   67.     500.   60.0
  2  LOT 352   67.     500.   60.5
  3  LOT 350   67.     500.   59.9
  4  LOT 348   67.     500.   61.4
  5  LOT 346   67.     500.   62.3
  6  LOT 344   67.     500.   63.5
  7  LOT 341   67.     500.   66.4
  8  LOT 338   67.     500.   72.2
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0.
```

```
SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

TITLE:
RIVER PARK AREA C, LOTS AS PROPOSED & AT CONVENTIONAL SPEEDS



1
         BARRIER DATA
         ************

BAR                BARRIER HEIGHTS                    BAR
ELE    0     1     2     3     4     5     6     7    ID          LENGTH
-------------------------------------------------------------------
-------------
  1    -    0.*                                      30 FEET     327.6

  2    -    0.*                                      30 FEET     402.2

  3    -    0.*                                      8 FEET      662.9

  4    -    0.*                                      10 FEET     305.3

  5    -    0.*                                      10 FEET     120.8
  6    -    0.*                                      B5 P2       269.3
  7    -    0.*                                      B5 P3       353.6

  8    -    0.*                                      6 FEET       36.4
  9    -    0.*                                      B6 P2       378.6
 10    -    0.*                                      B6 P3        60.2
 11    -    0.*                                      B6 P4       141.4
 12    -    0.*                                      B6 P5        50.0
 13    -    0.*                                      B6 P6        44.7

 14    -    0.*                                      6 FEET       31.6
 15    -    0.*                                      B7 P2       294.6

 16    -    0.*                                      6 FEET       50.2
 17    -    0.*                                      B8 P2       335.0
 18    -    0.*                                      B8 P3        50.0
 19    -    0.*                                      B8 P4        90.0

 20    -    0.*                                      10 FEET      45.0
 21    -    0.*                                      B9 P2        83.3
 22    -    0.*                                      B9 P3       274.0
 23    -    0.*                                      B9 P4       242.2
 24    -    0.*                                      B9 P5       201.2
 25    -    0.*                                      B9 P6       190.4
```

```
26      -   0.*                                  B9 P7       100.5

27      -   0.*                                  10 FEET      90.1
28      -   0.*                                  B10 P2     1005.6
29      -   0.*                                  B10 P3        4.0
30      -   0.*                                  6 FEET      201.2

31      -   0.*                                  10 FEET      70.9
32      -   0.*                                  B11 P2      130.4
33      -   0.*                                  B11 P3      226.1
34      -   0.*                                  B11 P4      256.8
35      -   0.*                                  B11 P5       78.1
36      -   0.*                                  B11 P6      247.6
37      -   0.*                                  B11 P7      149.0

38      -   0.*                                  6 FEET       41.2
39      -   0.*                                  B12 P2       46.1
40      -   0.*                                  B12 P3       30.4
41      -   0.*                                  B12 P4      290.9
42      -   0.*                                  B12 P5       24.9
43      -   0.*                                  B12 P6      328.8
44      -   0.*                                  B12 P7       53.4
45      -   0.*                                  B12 P8      308.7

46      -   0.*                                  6 FEET      178.0
47      -   0.*                                  B13 P2      193.3
48      -   0.*                                  B13 P3       23.7
49      -   0.*                                  B13 P4      426.2
50      -   0.*                                  B13 P5       60.2

51      -   0.*                                  6 FEET       67.1
52      -   0.*                                  B14 P2       36.4
53      -   0.*                                  B14 P3        4.0
54      -   0.*                                  10 FEET     241.7
55      -   0.*                                  B14 P5      289.5
56      -   0.*                                  B14 P6      104.5
57      -   0.*                                  B14 P7      318.0
58      -   0.*                                  B14 P8       32.2
59      -   0.*                                  B14 P9       35.1

60      -   0.*                                  6 FEET      143.2
61      -   0.*                                  B15 P2        4.0
62      -   0.*                                  10 FEET     332.5
63      -   0.*                                  B15 P4      133.4
64      -   0.*                                  B15 P5      204.6
65      -   0.*                                  B15 P6     1467.5

66      -   0.*                                  6 FEET      478.1
```

```
 67     -   0.*                                  B16 P2     170.3
 68     -   0.*                                  B16 P3      92.2

 69     -   0.*                                  6 FEET      90.6
 70     -   0.*                                  B17 P2     310.6
 71     -   0.*                                  B17 P3      90.6
 72     -   0.*                                  B17 P4     130.4
 73     -   0.*                                  B17 P5      63.2
 74     -   0.*                                  B17 P6     400.0
 75     -   0.*                                  B17 P7     100.5
 76     -   0.*                                  B17 P8      63.4
 77     -   0.*                                  B17 P9     261.7
 78     -   0.*                                  B17 P10     64.0
 -----------------------------------------------------------------
-------------
        0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 --------------------------------
  1  LOT 521A  67.    500.   71.4
  2  LOT 521B  67.    500.   66.4
  3  LOT 519A  67.    500.   60.0
  4  LOT 519B  67.    500.   57.5
  5  LOT 519C  67.    500.   59.6
  6  LOT 519D  67.    500.   56.4
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0.
```

```
SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

TITLE:
RIVER PARK AREA D, LOTS AS PROPOSED & AT CONVENTIONAL SPEEDS


1
          BARRIER DATA
          ************

BAR                 BARRIER HEIGHTS                  BAR
ELE    0    1    2    3    4    5    6    7         ID          LENGTH
-----------------------------------------------------------------
-------------
 1     -    0.*                                     30 FEET     327.6

 2     -    0.*                                     30 FEET     402.2

 3     -    0.*                                     8 FEET      662.9

 4     -    0.*                                     10 FEET     305.3

 5     -    0.*                                     10 FEET     120.8
 6     -    0.*                                     B5 P2       269.3
 7     -    0.*                                     B5 P3       353.6

 8     -    0.*                                     6 FEET       36.4
 9     -    0.*                                     B6 P2       378.6
10     -    0.*                                     B6 P3        60.2
11     -    0.*                                     B6 P4       141.4
12     -    0.*                                     B6 P5        50.0
13     -    0.*                                     B6 P6        44.7

14     -    0.*                                     6 FEET       31.6
15     -    0.*                                     B7 P2       294.6

16     -    0.*                                     6 FEET       50.2
17     -    0.*                                     B8 P2       335.0
18     -    0.*                                     B8 P3        50.0
19     -    0.*                                     B8 P4        90.0

20     -    0.*                                     10 FEET      45.0
21     -    0.*                                     B9 P2        83.3
22     -    0.*                                     B9 P3       274.0
23     -    0.*                                     B9 P4       242.2
24     -    0.*                                     B9 P5       201.2
25     -    0.*                                     B9 P6       190.4
```

26	-	0.*	B9 P7	100.5
27	-	0.*	10 FEET	90.1
28	-	0.*	B10 P2	1005.6
29	-	0.*	B10 P3	4.0
30	-	0.*	6 FEET	201.2
31	-	0.*	10 FEET	70.9
32	-	0.*	B11 P2	130.4
33	-	0.*	B11 P3	226.1
34	-	0.*	B11 P4	256.8
35	-	0.*	B11 P5	78.1
36	-	0.*	B11 P6	247.6
37	-	0.*	B11 P7	149.0
38	-	0.*	6 FEET	41.2
39	-	0.*	B12 P2	46.1
40	-	0.*	B12 P3	30.4
41	-	0.*	B12 P4	290.9
42	-	0.*	B12 P5	24.9
43	-	0.*	B12 P6	328.8
44	-	0.*	B12 P7	53.4
45	-	0.*	B12 P8	308.7
46	-	0.*	6 FEET	178.0
47	-	0.*	B13 P2	193.3
48	-	0.*	B13 P3	23.7
49	-	0.*	B13 P4	426.2
50	-	0.*	B13 P5	60.2
51	-	0.*	6 FEET	67.1
52	-	0.*	B14 P2	36.4
53	-	0.*	B14 P3	4.0
54	-	0.*	10 FEET	241.7
55	-	0.*	B14 P5	289.5
56	-	0.*	B14 P6	104.5
57	-	0.*	B14 P7	318.0
58	-	0.*	B14 P8	32.2
59	-	0.*	B14 P9	35.1
60	-	0.*	6 FEET	143.2
61	-	0.*	B15 P2	4.0
62	-	0.*	10 FEET	332.5
63	-	0.*	B15 P4	133.4
64	-	0.*	B15 P5	204.6
65	-	0.*	B15 P6	1467.5
66	-	0.*	6 FEET	478.1

```
 67      -   0.*                                          B16 P2      170.3
 68      -   0.*                                          B16 P3       92.2

 69      -   0.*                                          6 FEET       90.6
 70      -   0.*                                          B17 P2      310.6
 71      -   0.*                                          B17 P3       90.6
 72      -   0.*                                          B17 P4      130.4
 73      -   0.*                                          B17 P5       63.2
 74      -   0.*                                          B17 P6      400.0
 75      -   0.*                                          B17 P7      100.5
 76      -   0.*                                          B17 P8       63.4
 77      -   0.*                                          B17 P9      261.7
 78      -   0.*                                          B17 P10      64.0
 -----------------------------------------------------------------
-------------
        0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 ---------------------------------
  1  525A      67.     500.    59.6
  2  525B      67.     500.    62.6
  3  525C      67.     500.    64.0
  4  525D      67.     500.    64.0
  5  525E      67.     500.    63.4
  6  525F      67.     500.    63.3
  7  525A      67.     500.    64.8
  8  525B      67.     500.    65.2
  9  525C      67.     500.    72.5
 10  525D      67.     500.    70.2
 11  228       67.     500.    58.6
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0.
```

```
 SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

 TITLE:
 RIVER PARK AREA A-1, LOTS AS PROPOSED AND WITH REALISTIC SPEEDS



1
          BARRIER DATA
          ************

 BAR                BARRIER HEIGHTS                    BAR
 ELE    0    1    2    3    4    5    6    7         ID          LENGTH
 -------------------------------------------------------------------
-------------
   1    -   0.*                                     30 FEET     327.6

   2    -   0.*                                     30 FEET     402.2

   3    -   0.*                                     8 FEET      662.9

   4    -   0.*                                     10 FEET     305.3

   5    -   0.*                                     10 FEET     120.8
   6    -   0.*                                     B5 P2       269.3
   7    -   0.*                                     B5 P3       353.6

   8    -   0.*                                     6 FEET       36.4
   9    -   0.*                                     B6 P2       378.6
  10    -   0.*                                     B6 P3        60.2
  11    -   0.*                                     B6 P4       141.4
  12    -   0.*                                     B6 P5        50.0
  13    -   0.*                                     B6 P6        44.7

  14    -   0.*                                     6 FEET       31.6
  15    -   0.*                                     B7 P2       294.6

  16    -   0.*                                     6 FEET       50.2
  17    -   0.*                                     B8 P2       335.0
  18    -   0.*                                     B8 P3        50.0
  19    -   0.*                                     B8 P4        90.0

  20    -   0.*                                     10 FEET      45.0
  21    -   0.*                                     B9 P2        83.3
  22    -   0.*                                     B9 P3       274.0
  23    -   0.*                                     B9 P4       242.2
  24    -   0.*                                     B9 P5       201.2
  25    -   0.*                                     B9 P6       190.4
```

```
26      -    0.*                                B9 P7       100.5

27      -    0.*                                10 FEET      90.1
28      -    0.*                                B10 P2     1005.6
29      -    0.*                                B10 P3        4.0
30      -    0.*                                6 FEET      201.2

31      -    0.*                                10 FEET      70.9
32      -    0.*                                B11 P2      130.4
33      -    0.*                                B11 P3      226.1
34      -    0.*                                B11 P4      256.8
35      -    0.*                                B11 P5       78.1
36      -    0.*                                B11 P6      247.6
37      -    0.*                                B11 P7      149.0

38      -    0.*                                6 FEET       41.2
39      -    0.*                                B12 P2       46.1
40      -    0.*                                B12 P3       30.4
41      -    0.*                                B12 P4      290.9
42      -    0.*                                B12 P5       24.9
43      -    0.*                                B12 P6      328.8
44      -    0.*                                B12 P7       53.4
45      -    0.*                                B12 P8      308.7

46      -    0.*                                6 FEET      178.0
47      -    0.*                                B13 P2      193.3
48      -    0.*                                B13 P3       23.7
49      -    0.*                                B13 P4      426.2
50      -    0.*                                B13 P5       60.2

51      -    0.*                                6 FEET       67.1
52      -    0.*                                B14 P2       36.4
53      -    0.*                                B14 P3        4.0
54      -    0.*                                10 FEET     241.7
55      -    0.*                                B14 P5      289.5
56      -    0.*                                B14 P6      104.5
57      -    0.*                                B14 P7      318.0
58      -    0.*                                B14 P8       32.2
59      -    0.*                                B14 P9       35.1

60      -    0.*                                6 FEET      143.2
61      -    0.*                                B15 P2        4.0
62      -    0.*                                10 FEET     332.5
63      -    0.*                                B15 P4      133.4
64      -    0.*                                B15 P5      204.6
65      -    0.*                                B15 P6     1467.5

66      -    0.*                                6 FEET      478.1
```

```
 67      -    0.*                                              B16 P2      170.3
 68      -    0.*                                              B16 P3       92.2

 69      -    0.*                                              6 FEET       90.6
 70      -    0.*                                              B17 P2      310.6
 71      -    0.*                                              B17 P3       90.6
 72      -    0.*                                              B17 P4      130.4
 73      -    0.*                                              B17 P5       63.2
 74      -    0.*                                              B17 P6      400.0
 75      -    0.*                                              B17 P7      100.5
 76      -    0.*                                              B17 P8       63.4
 77      -    0.*                                              B17 P9      261.7
 78      -    0.*                                              B17 P10      64.0
 -----------------------------------------------------------------
-------------
       0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 --------------------------------
  1  LOT 1     67.     500.   64.3
  2  LOT 2     67.     500.   61.7
  3  LOT 3     67.     500.   62.6
  4  LOT 7     67.     500.   60.9
  5  LOT 8     67.     500.   59.8
  6  LOT 56    67.     500.   65.2
  7  LOT 55    67.     500.   62.6
  8  LOT 57    67.     500.   57.0
  9  LOT 58    67.     500.   56.6
 10  LOT 60    67.     500.   57.2
 11  LOT 61    67.     500.   57.2
 12  LOT 62    67.     500.   56.2
 13  LOT 64    67.     500.   55.5
 14  LOT 66    67.     500.   54.9
 15  LOT 69    67.     500.   57.1
 16  LOT 70    67.     500.   56.1
 17  LOT 176   67.     500.   58.0
 18  LOT 170   67.     500.   58.5
 19  LOT 162   67.     500.   53.1
 20  LOT 165   67.     500.   58.1
 21  LOT 161   67.     500.   57.0
 22  LOT 158   67.     500.   65.6
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
```

```
   1  1  1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0.
```

```
 SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

 TITLE:
 RIVER PARK AREA A-1, STA CLARA RIVER RESIDENCES AT REALISTIC SPEE
D LIMITS


1
          BARRIER DATA
          ************

 BAR                BARRIER HEIGHTS                     BAR
 ELE    0    1    2    3    4    5    6    7    ID          LENGTH
 -----------------------------------------------------------------
-------------
  1     -    0.*                                30 FEET    327.6

  2     -    0.*                                30 FEET    402.2

  3     -    0.*                                8 FEET     662.9

  4     -    0.*                                10 FEET    305.3

  5     -    0.*                                10 FEET    120.8
  6     -    0.*                                B5 P2      269.3
  7     -    0.*                                B5 P3      353.6

  8     -    0.*                                6 FEET      36.4
  9     -    0.*                                B6 P2      378.6
 10     -    0.*                                B6 P3       60.2
 11     -    0.*                                B6 P4      141.4
 12     -    0.*                                B6 P5       50.0
 13     -    0.*                                B6 P6       44.7

 14     -    0.*                                6 FEET      31.6
 15     -    0.*                                B7 P2      294.6

 16     -    0.*                                6 FEET      50.2
 17     -    0.*                                B8 P2      335.0
 18     -    0.*                                B8 P3       50.0
 19     -    0.*                                B8 P4       90.0

 20     -    0.*                                10 FEET     45.0
 21     -    0.*                                B9 P2       83.3
 22     -    0.*                                B9 P3      274.0
 23     -    0.*                                B9 P4      242.2
 24     -    0.*                                B9 P5      201.2
 25     -    0.*                                B9 P6      190.4
```

```
26      -    0.*                                         B9 P7       100.5

27      -    0.*                                         10 FEET      90.1
28      -    0.*                                         B10 P2     1005.6
29      -    0.*                                         B10 P3        4.0
30      -    0.*                                         6 FEET      201.2

31      -    0.*                                         10 FEET      70.9
32      -    0.*                                         B11 P2      130.4
33      -    0.*                                         B11 P3      226.1
34      -    0.*                                         B11 P4      256.8
35      -    0.*                                         B11 P5       78.1
36      -    0.*                                         B11 P6      247.6
37      -    0.*                                         B11 P7      149.0

38      -    0.*                                         6 FEET       41.2
39      -    0.*                                         B12 P2       46.1
40      -    0.*                                         B12 P3       30.4
41      -    0.*                                         B12 P4      290.9
42      -    0.*                                         B12 P5       24.9
43      -    0.*                                         B12 P6      328.8
44      -    0.*                                         B12 P7       53.4
45      -    0.*                                         B12 P8      308.7

46      -    0.*                                         6 FEET      178.0
47      -    0.*                                         B13 P2      193.3
48      -    0.*                                         B13 P3       23.7
49      -    0.*                                         B13 P4      426.2
50      -    0.*                                         B13 P5       60.2

51      -    0.*                                         6 FEET       67.1
52      -    0.*                                         B14 P2       36.4
53      -    0.*                                         B14 P3        4.0
54      -    0.*                                         10 FEET     241.7
55      -    0.*                                         B14 P5      289.5
56      -    0.*                                         B14 P6      104.5
57      -    0.*                                         B14 P7      318.0
58      -    0.*                                         B14 P8       32.2
59      -    0.*                                         B14 P9       35.1

60      -    0.*                                         6 FEET      143.2
61      -    0.*                                         B15 P2        4.0
62      -    0.*                                         10 FEET     332.5
63      -    0.*                                         B15 P4      133.4
64      -    0.*                                         B15 P5      204.6
65      -    0.*                                         B15 P6     1467.5

66      -    0.*                                         6 FEET      478.1
```

```
 67      -   0.*                                  B16 P2     170.3
 68      -   0.*                                  B16 P3      92.2

 69      -   0.*                                  6 FEET      90.6
 70      -   0.*                                  B17 P2     310.6
 71      -   0.*                                  B17 P3      90.6
 72      -   0.*                                  B17 P4     130.4
 73      -   0.*                                  B17 P5      63.2
 74      -   0.*                                  B17 P6     400.0
 75      -   0.*                                  B17 P7     100.5
 76      -   0.*                                  B17 P8      63.4
 77      -   0.*                                  B17 P9     261.7
 78      -   0.*                                  B17 P10     64.0
 -----------------------------------------------------------------
-------------
        0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 -------------------------------
  1  LOT 3      67.     500.   62.8
  2  LOT 4      67.     500.   62.3
  3  LOT 8      67.     500.   60.5
  4  LOT 12     67.     500.   59.8
  5  LOT 13     67.     500.   59.5
  6  LOT 17     67.     500.   58.9
  7  LOT 29     67.     500.   58.3
  8  LOT 203    67.     500.   58.2
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0.
```

```
 SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

 TITLE:
 RIVER PARK AREA A-2, LOTS AS PROPOSED & AT REALISTIC SPEEDS


1
           BARRIER DATA
           ************

 BAR                BARRIER HEIGHTS                  BAR
 ELE    0    1    2    3    4    5    6    7    ID        LENGTH
 -----------------------------------------------------------------
-------------
  1     -   0.*                                 30 FEET    327.6

  2     -   0.*                                 30 FEET    402.2

  3     -   0.*                                 8 FEET     662.9

  4     -   0.*                                 10 FEET    305.3

  5     -   0.*                                 10 FEET    120.8
  6     -   0.*                                 B5 P2      269.3
  7     -   0.*                                 B5 P3      353.6

  8     -   0.*                                 6 FEET      36.4
  9     -   0.*                                 B6 P2      378.6
 10     -   0.*                                 B6 P3       60.2
 11     -   0.*                                 B6 P4      141.4
 12     -   0.*                                 B6 P5       50.0
 13     -   0.*                                 B6 P6       44.7

 14     -   0.*                                 6 FEET      31.6
 15     -   0.*                                 B7 P2      294.6

 16     -   0.*                                 6 FEET      50.2
 17     -   0.*                                 B8 P2      335.0
 18     -   0.*                                 B8 P3       50.0
 19     -   0.*                                 B8 P4       90.0

 20     -   0.*                                 10 FEET     45.0
 21     -   0.*                                 B9 P2       83.3
 22     -   0.*                                 B9 P3      274.0
 23     -   0.*                                 B9 P4      242.2
 24     -   0.*                                 B9 P5      201.2
 25     -   0.*                                 B9 P6      190.4
```

```
26     -   0.*                              B9 P7        100.5

27     -   0.*                              10 FEET       90.1
28     -   0.*                              B10 P2      1005.6
29     -   0.*                              B10 P3         4.0
30     -   0.*                              6 FEET       201.2

31     -   0.*                              10 FEET       70.9
32     -   0.*                              B11 P2       130.4
33     -   0.*                              B11 P3       226.1
34     -   0.*                              B11 P4       256.8
35     -   0.*                              B11 P5        78.1
36     -   0.*                              B11 P6       247.6
37     -   0.*                              B11 P7       149.0

38     -   0.*                              6 FEET        41.2
39     -   0.*                              B12 P2        46.1
40     -   0.*                              B12 P3        30.4
41     -   0.*                              B12 P4       290.9
42     -   0.*                              B12 P5        24.9
43     -   0.*                              B12 P6       328.8
44     -   0.*                              B12 P7        53.4
45     -   0.*                              B12 P8       308.7

46     -   0.*                              6 FEET       178.0
47     -   0.*                              B13 P2       193.3
48     -   0.*                              B13 P3        23.7
49     -   0.*                              B13 P4       426.2
50     -   0.*                              B13 P5        60.2

51     -   0.*                              6 FEET        67.1
52     -   0.*                              B14 P2        36.4
53     -   0.*                              B14 P3         4.0
54     -   0.*                              10 FEET      241.7
55     -   0.*                              B14 P5       289.5
56     -   0.*                              B14 P6       104.5
57     -   0.*                              B14 P7       318.0
58     -   0.*                              B14 P8        32.2
59     -   0.*                              B14 P9        35.1

60     -   0.*                              6 FEET       143.2
61     -   0.*                              B15 P2         4.0
62     -   0.*                              10 FEET      332.5
63     -   0.*                              B15 P4       133.4
64     -   0.*                              B15 P5       204.6
65     -   0.*                              B15 P6      1467.5

66     -   0.*                              6 FEET       478.1
```

```
 67      -   0.*                                      B16 P2     170.3
 68      -   0.*                                      B16 P3      92.2

 69      -   0.*                                      6 FEET      90.6
 70      -   0.*                                      B17 P2     310.6
 71      -   0.*                                      B17 P3      90.6
 72      -   0.*                                      B17 P4     130.4
 73      -   0.*                                      B17 P5      63.2
 74      -   0.*                                      B17 P6     400.0
 75      -   0.*                                      B17 P7     100.5
 76      -   0.*                                      B17 P8      63.4
 77      -   0.*                                      B17 P9     261.7
 78      -   0.*                                      B17 P10     64.0
 -----------------------------------------------------------------
-------------
       0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 --------------------------------
  1  LOT 270   67.    500.   58.7
  2  LOT 269   67.    500.   58.5
  3  LOT 264   67.    500.   59.5
  4  LOT 262   67.    500.   60.5
  5  LOT 261   67.    500.   61.4
  6  LOT 260   67.    500.   62.5
  7  LOT 259   67.    500.   59.0
  8  LOT 255   67.    500.   57.6
  9  LOT 252   67.    500.   57.9
 10  LOT 251   67.    500.   56.6
 11  LOT 292   67.    500.   63.1
 12  LOT 294   67.    500.   60.3
 13  LOT 295   67.    500.   64.3
 14  LOT 313   67.    500.   55.8
 15  LOT 314   67.    500.   70.0
 16  LOT 337   67.    500.   70.6
 17  LOT 338   67.    500.   71.2
 18  LOT 378   67.    500.   65.4
 19  LOT 377   67.    500.   62.8
 20  LOT 376   67.    500.   62.0
 21  LOT 368   67.    500.   64.6
 22  LOT 385   67.    500.   58.3
 23  LOT 458   67.    500.   60.6
 24  LOT 456   67.    500.   57.0
 25  LOT 449   67.    500.   56.4
 26  LOT 448   67.    500.   54.4
 27  LOT 442   67.    500.   67.7
 28  LOT 434   67.    500.   61.0
 29  LOT 429   67.    500.   61.8
```

```
 30  LOT 427   67.     500.   60.7
 31  LOT 424   67.     500.   58.1
 32  LOT 422   67.     500.   58.3
 33  LOT 420   67.     500.   58.2
 34  LOT 475   67.     500.   58.2
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0.
```

```
 SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

 TITLE:
 RIVER PARK AREA A-2, RIVER LOTS AS PROPOSED & WITH REALISTIC SPEE
DS


1
          BARRIER DATA
          ************

 BAR               BARRIER HEIGHTS                     BAR
 ELE    0    1    2    3    4    5    6    7    ID          LENGTH
 -----------------------------------------------------------------
-------------
  1     -   0.*                                  30 FEET    327.6

  2     -   0.*                                  30 FEET    402.2

  3     -   0.*                                  8 FEET     662.9

  4     -   0.*                                  10 FEET    305.3

  5     -   0.*                                  10 FEET    120.8
  6     -   0.*                                  B5 P2      269.3
  7     -   0.*                                  B5 P3      353.6

  8     -   0.*                                  6 FEET      36.4
  9     -   0.*                                  B6 P2      378.6
 10     -   0.*                                  B6 P3       60.2
 11     -   0.*                                  B6 P4      141.4
 12     -   0.*                                  B6 P5       50.0
 13     -   0.*                                  B6 P6       44.7

 14     -   0.*                                  6 FEET      31.6
 15     -   0.*                                  B7 P2      294.6

 16     -   0.*                                  6 FEET      50.2
 17     -   0.*                                  B8 P2      335.0
 18     -   0.*                                  B8 P3       50.0
 19     -   0.*                                  B8 P4       90.0

 20     -   0.*                                  10 FEET     45.0
 21     -   0.*                                  B9 P2       83.3
 22     -   0.*                                  B9 P3      274.0
 23     -   0.*                                  B9 P4      242.2
 24     -   0.*                                  B9 P5      201.2
 25     -   0.*                                  B9 P6      190.4
```

```
26      -    0.*                              B9 P7        100.5

27      -    0.*                              10 FEET       90.1
28      -    0.*                              B10 P2      1005.6
29      -    0.*                              B10 P3         4.0
30      -    0.*                              6 FEET       201.2

31      -    0.*                              10 FEET       70.9
32      -    0.*                              B11 P2       130.4
33      -    0.*                              B11 P3       226.1
34      -    0.*                              B11 P4       256.8
35      -    0.*                              B11 P5        78.1
36      -    0.*                              B11 P6       247.6
37      -    0.*                              B11 P7       149.0

38      -    0.*                              6 FEET        41.2
39      -    0.*                              B12 P2        46.1
40      -    0.*                              B12 P3        30.4
41      -    0.*                              B12 P4       290.9
42      -    0.*                              B12 P5        24.9
43      -    0.*                              B12 P6       328.8
44      -    0.*                              B12 P7        53.4
45      -    0.*                              B12 P8       308.7

46      -    0.*                              6 FEET       178.0
47      -    0.*                              B13 P2       193.3
48      -    0.*                              B13 P3        23.7
49      -    0.*                              B13 P4       426.2
50      -    0.*                              B13 P5        60.2

51      -    0.*                              6 FEET        67.1
52      -    0.*                              B14 P2        36.4
53      -    0.*                              B14 P3         4.0
54      -    0.*                              10 FEET      241.7
55      -    0.*                              B14 P5       289.5
56      -    0.*                              B14 P6       104.5
57      -    0.*                              B14 P7       318.0
58      -    0.*                              B14 P8        32.2
59      -    0.*                              B14 P9        35.1

60      -    0.*                              6 FEET       143.2
61      -    0.*                              B15 P2         4.0
62      -    0.*                              10 FEET      332.5
63      -    0.*                              B15 P4       133.4
64      -    0.*                              B15 P5       204.6
65      -    0.*                              B15 P6      1467.5

66      -    0.*                              6 FEET       478.1
```

```
 67      -   0.*                                        B16 P2     170.3
 68      -   0.*                                        B16 P3      92.2

 69      -   0.*                                        6 FEET      90.6
 70      -   0.*                                        B17 P2     310.6
 71      -   0.*                                        B17 P3      90.6
 72      -   0.*                                        B17 P4     130.4
 73      -   0.*                                        B17 P5      63.2
 74      -   0.*                                        B17 P6     400.0
 75      -   0.*                                        B17 P7     100.5
 76      -   0.*                                        B17 P8      63.4
 77      -   0.*                                        B17 P9     261.7
 78      -   0.*                                        B17 P10     64.0
 ----------------------------------------------------------------
-------------
        0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 --------------------------------
  1  LOT 288   67.     500.   58.8
  2  LOT 352   67.     500.   59.3
  3  LOT 350   67.     500.   58.2
  4  LOT 348   67.     500.   60.3
  5  LOT 346   67.     500.   61.2
  6  LOT 344   67.     500.   62.4
  7  LOT 341   67.     500.   65.5
  8  LOT 338   67.     500.   71.2
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0.
```

```
 SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

 TITLE:
 RIVER PARK AREA C, LOTS AS PROPOSED & AT REALISTIC SPEEDS



1
          BARRIER DATA
          ************

 BAR              BARRIER HEIGHTS                BAR
 ELE     0    1    2    3    4    5    6    7    ID        LENGTH
 ------------------------------------------------------------------
-------------
  1      -  0.*                                 30 FEET    327.6

  2      -  0.*                                 30 FEET    402.2

  3      -  0.*                                 8 FEET     662.9

  4      -  0.*                                 10 FEET    305.3

  5      -  0.*                                 10 FEET    120.8
  6      -  0.*                                 B5 P2      269.3
  7      -  0.*                                 B5 P3      353.6

  8      -  0.*                                 6 FEET      36.4
  9      -  0.*                                 B6 P2      378.6
 10      -  0.*                                 B6 P3       60.2
 11      -  0.*                                 B6 P4      141.4
 12      -  0.*                                 B6 P5       50.0
 13      -  0.*                                 B6 P6       44.7

 14      -  0.*                                 6 FEET      31.6
 15      -  0.*                                 B7 P2      294.6

 16      -  0.*                                 6 FEET      50.2
 17      -  0.*                                 B8 P2      335.0
 18      -  0.*                                 B8 P3       50.0
 19      -  0.*                                 B8 P4       90.0

 20      -  0.*                                 10 FEET     45.0
 21      -  0.*                                 B9 P2       83.3
 22      -  0.*                                 B9 P3      274.0
 23      -  0.*                                 B9 P4      242.2
 24      -  0.*                                 B9 P5      201.2
 25      -  0.*                                 B9 P6      190.4
```

26	-	0.*	B9 P7	100.5
27	-	0.*	10 FEET	90.1
28	-	0.*	B10 P2	1005.6
29	-	0.*	B10 P3	4.0
30	-	0.*	6 FEET	201.2
31	-	0.*	10 FEET	70.9
32	-	0.*	B11 P2	130.4
33	-	0.*	B11 P3	226.1
34	-	0.*	B11 P4	256.8
35	-	0.*	B11 P5	78.1
36	-	0.*	B11 P6	247.6
37	-	0.*	B11 P7	149.0
38	-	0.*	6 FEET	41.2
39	-	0.*	B12 P2	46.1
40	-	0.*	B12 P3	30.4
41	-	0.*	B12 P4	290.9
42	-	0.*	B12 P5	24.9
43	-	0.*	B12 P6	328.8
44	-	0.*	B12 P7	53.4
45	-	0.*	B12 P8	308.7
46	-	0.*	6 FEET	178.0
47	-	0.*	B13 P2	193.3
48	-	0.*	B13 P3	23.7
49	-	0.*	B13 P4	426.2
50	-	0.*	B13 P5	60.2
51	-	0.*	6 FEET	67.1
52	-	0.*	B14 P2	36.4
53	-	0.*	B14 P3	4.0
54	-	0.*	10 FEET	241.7
55	-	0.*	B14 P5	289.5
56	-	0.*	B14 P6	104.5
57	-	0.*	B14 P7	318.0
58	-	0.*	B14 P8	32.2
59	-	0.*	B14 P9	35.1
60	-	0.*	6 FEET	143.2
61	-	0.*	B15 P2	4.0
62	-	0.*	10 FEET	332.5
63	-	0.*	B15 P4	133.4
64	-	0.*	B15 P5	204.6
65	-	0.*	B15 P6	1467.5
66	-	0.*	6 FEET	478.1

```
 67      -    0.*                                          B16 P2     170.3
 68      -    0.*                                          B16 P3      92.2

 69      -    0.*                                          6 FEET      90.6
 70      -    0.*                                          B17 P2     310.6
 71      -    0.*                                          B17 P3      90.6
 72      -    0.*                                          B17 P4     130.4
 73      -    0.*                                          B17 P5      63.2
 74      -    0.*                                          B17 P6     400.0
 75      -    0.*                                          B17 P7     100.5
 76      -    0.*                                          B17 P8      63.4
 77      -    0.*                                          B17 P9     261.7
 78      -    0.*                                          B17 P10     64.0
 ------------------------------------------------------------------
-------------
        0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 --------------------------------
  1  LOT 521A  67.    500.   70.4
  2  LOT 521B  67.    500.   64.9
  3  LOT 519A  67.    500.   58.4
  4  LOT 519B  67.    500.   55.7
  5  LOT 519C  67.    500.   57.9
  6  LOT 519D  67.    500.   54.8
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0.
```

```
SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

TITLE:
RIVER PARK AREA D, LOTS AS PROPOSED & AT REALISTIC SPEEDS


1
          BARRIER DATA
          ************

BAR                BARRIER HEIGHTS                    BAR
ELE    0     1     2     3     4     5     6     7    ID         LENGTH
-----------------------------------------------------------------
-------------
 1     -    0.*                                      30 FEET    327.6

 2     -    0.*                                      30 FEET    402.2

 3     -    0.*                                      8 FEET     662.9

 4     -    0.*                                      10 FEET    305.3

 5     -    0.*                                      10 FEET    120.8
 6     -    0.*                                      B5 P2      269.3
 7     -    0.*                                      B5 P3      353.6

 8     -    0.*                                      6 FEET      36.4
 9     -    0.*                                      B6 P2      378.6
10     -    0.*                                      B6 P3       60.2
11     -    0.*                                      B6 P4      141.4
12     -    0.*                                      B6 P5       50.0
13     -    0.*                                      B6 P6       44.7

14     -    0.*                                      6 FEET      31.6
15     -    0.*                                      B7 P2      294.6

16     -    0.*                                      6 FEET      50.2
17     -    0.*                                      B8 P2      335.0
18     -    0.*                                      B8 P3       50.0
19     -    0.*                                      B8 P4       90.0

20     -    0.*                                      10 FEET     45.0
21     -    0.*                                      B9 P2       83.3
22     -    0.*                                      B9 P3      274.0
23     -    0.*                                      B9 P4      242.2
24     -    0.*                                      B9 P5      201.2
25     -    0.*                                      B9 P6      190.4
```

```
26     -    0.*                          B9 P7       100.5

27     -    0.*                          10 FEET      90.1
28     -    0.*                          B10 P2     1005.6
29     -    0.*                          B10 P3        4.0
30     -    0.*                          6 FEET      201.2

31     -    0.*                          10 FEET      70.9
32     -    0.*                          B11 P2      130.4
33     -    0.*                          B11 P3      226.1
34     -    0.*                          B11 P4      256.8
35     -    0.*                          B11 P5       78.1
36     -    0.*                          B11 P6      247.6
37     -    0.*                          B11 P7      149.0

38     -    0.*                          6 FEET       41.2
39     -    0.*                          B12 P2       46.1
40     -    0.*                          B12 P3       30.4
41     -    0.*                          B12 P4      290.9
42     -    0.*                          B12 P5       24.9
43     -    0.*                          B12 P6      328.8
44     -    0.*                          B12 P7       53.4
45     -    0.*                          B12 P8      308.7

46     -    0.*                          6 FEET      178.0
47     -    0.*                          B13 P2      193.3
48     -    0.*                          B13 P3       23.7
49     -    0.*                          B13 P4      426.2
50     -    0.*                          B13 P5       60.2

51     -    0.*                          6 FEET       67.1
52     -    0.*                          B14 P2       36.4
53     -    0.*                          B14 P3        4.0
54     -    0.*                          10 FEET     241.7
55     -    0.*                          B14 P5      289.5
56     -    0.*                          B14 P6      104.5
57     -    0.*                          B14 P7      318.0
58     -    0.*                          B14 P8       32.2
59     -    0.*                          B14 P9       35.1

60     -    0.*                          6 FEET      143.2
61     -    0.*                          B15 P2        4.0
62     -    0.*                          10 FEET     332.5
63     -    0.*                          B15 P4      133.4
64     -    0.*                          B15 P5      204.6
65     -    0.*                          B15 P6     1467.5

66     -    0.*                          6 FEET      478.1
```

```
 67      -    0.*                                          B16 P2     170.3
 68      -    0.*                                          B16 P3      92.2

 69      -    0.*                                          6 FEET      90.6
 70      -    0.*                                          B17 P2     310.6
 71      -    0.*                                          B17 P3      90.6
 72      -    0.*                                          B17 P4     130.4
 73      -    0.*                                          B17 P5      63.2
 74      -    0.*                                          B17 P6     400.0
 75      -    0.*                                          B17 P7     100.5
 76      -    0.*                                          B17 P8      63.4
 77      -    0.*                                          B17 P9     261.7
 78      -    0.*                                          B17 P10     64.0
 -----------------------------------------------------------------
-------------
       0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 --------------------------------
  1  525A      67.    500.   57.9
  2  525B      67.    500.   61.0
  3  525C      67.    500.   62.4
  4  525D      67.    500.   62.4
  5  525E      67.    500.   61.8
  6  525F      67.    500.   61.9
  7  525A      67.    500.   63.3
  8  525B      67.    500.   63.7
  9  525C      67.    500.   70.8
 10  525D      67.    500.   69.0
 11  228       67.    500.   56.9
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0.
```

```
SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

TITLE:
RIVER PARK AREA A-1, LOTS WITH SETBACKS & AT CONVENTIONAL SPEEDS



1
         BARRIER DATA
         ************

 BAR               BARRIER HEIGHTS                         BAR
 ELE     0    1    2    3    4    5    6    7    ID         LENGTH
 -----------------------------------------------------------------
-------------
  1      -    0.*                                 30 FEET    327.6

  2      -    0.*                                 30 FEET    402.2

  3      -    0.*                                 8 FEET     662.9

  4      -    0.*                                 10 FEET    305.3

  5      -    0.*                                 10 FEET    120.8
  6      -    0.*                                 B5 P2      269.3
  7      -    0.*                                 B5 P3      353.6

  8      -    0.*                                 6 FEET      36.4
  9      -    0.*                                 B6 P2      378.6
 10      -    0.*                                 B6 P3       60.2
 11      -    0.*                                 B6 P4      141.4
 12      -    0.*                                 B6 P5       50.0
 13      -    0.*                                 B6 P6       44.7

 14      -    0.*                                 6 FEET      31.6
 15      -    0.*                                 B7 P2      294.6

 16      -    0.*                                 6 FEET      50.2
 17      -    0.*                                 B8 P2      335.0
 18      -    0.*                                 B8 P3       50.0
 19      -    0.*                                 B8 P4       90.0

 20      -    0.*                                 10 FEET     45.0
 21      -    0.*                                 B9 P2       83.3
 22      -    0.*                                 B9 P3      274.0
 23      -    0.*                                 B9 P4      242.2
 24      -    0.*                                 B9 P5      201.2
 25      -    0.*                                 B9 P6      190.4
```

```
26     -    0.*                             B9 P7       100.5

27     -    0.*                             10 FEET      90.1
28     -    0.*                             B10 P2     1005.6
29     -    0.*                             B10 P3        4.0
30     -    0.*                             6 FEET      201.2

31     -    0.*                             10 FEET      70.9
32     -    0.*                             B11 P2      130.4
33     -    0.*                             B11 P3      226.1
34     -    0.*                             B11 P4      256.8
35     -    0.*                             B11 P5       78.1
36     -    0.*                             B11 P6      247.6
37     -    0.*                             B11 P7      149.0

38     -    0.*                             6 FEET       41.2
39     -    0.*                             B12 P2       46.1
40     -    0.*                             B12 P3       30.4
41     -    0.*                             B12 P4      290.9
42     -    0.*                             B12 P5       24.9
43     -    0.*                             B12 P6      328.8
44     -    0.*                             B12 P7       53.4
45     -    0.*                             B12 P8      308.7

46     -    0.*                             6 FEET      178.0
47     -    0.*                             B13 P2      193.3
48     -    0.*                             B13 P3       23.7
49     -    0.*                             B13 P4      426.2
50     -    0.*                             B13 P5       60.2

51     -    0.*                             6 FEET       67.1
52     -    0.*                             B14 P2       36.4
53     -    0.*                             B14 P3        4.0
54     -    0.*                             10 FEET     241.7
55     -    0.*                             B14 P5      289.5
56     -    0.*                             B14 P6      104.5
57     -    0.*                             B14 P7      318.0
58     -    0.*                             B14 P8       32.2
59     -    0.*                             B14 P9       35.1

60     -    0.*                             6 FEET      143.2
61     -    0.*                             B15 P2        4.0
62     -    0.*                             10 FEET     332.5
63     -    0.*                             B15 P4      133.4
64     -    0.*                             B15 P5      204.6
65     -    0.*                             B15 P6     1467.5

66     -    0.*                             6 FEET      478.1
```

```
 67     -   0.*                                B16 P2     170.3
 68     -   0.*                                B16 P3      92.2

 69     -   0.*                                6 FEET      90.6
 70     -   0.*                                B17 P2     310.6
 71     -   0.*                                B17 P3      90.6
 72     -   0.*                                B17 P4     130.4
 73     -   0.*                                B17 P5      63.2
 74     -   0.*                                B17 P6     400.0
 75     -   0.*                                B17 P7     100.5
 76     -   0.*                                B17 P8      63.4
 77     -   0.*                                B17 P9     261.7
 78     -   0.*                                B17 P10     64.0

 79     -   0.*                                B18 P1      98.5
 80     -   0.*                                B18 P2     125.5
 -----------------------------------------------------------------
-------------
        0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 --------------------------------
  1  LOT 1      67.    500.   62.4
  2  LOT 2      67.    500.   63.8
  3  LOT 3      67.    500.   64.3
  4  LOT 7      67.    500.   62.5
  5  LOT 8      67.    500.   61.4
  6  LOT 56     67.    500.   62.7
  7  LOT 55     67.    500.   64.1
  8  LOT 57     67.    500.   58.7
  9  LOT 58     67.    500.   57.7
 10  LOT 60     67.    500.   58.5
 11  LOT 61     67.    500.   58.7
 12  LOT 62     67.    500.   58.2
 13  LOT 64     67.    500.   56.5
 14  LOT 66     67.    500.   56.0
 15  LOT 69     67.    500.   58.5
 16  LOT 70     67.    500.   59.3
 17  LOT 176    67.    500.   59.8
 18  LOT 170    67.    500.   60.1
 19  LOT 162    67.    500.   54.6
 20  LOT 165    67.    500.   60.9
 21  LOT 161    67.    500.   61.3
 22  LOT 158    67.    500.   65.4
 23  LOT 72     67.    500.   61.4
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
```

```
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0.
```

```
  SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

  TITLE:
  RIVER PARK AREA A-2, B WITH SETBACKS & AT CONSERVATIVE SPEEDS



1
           BARRIER DATA
           ************

  BAR               BARRIER HEIGHTS                      BAR
  ELE    0    1    2    3    4    5    6    7    ID         LENGTH
 -----------------------------------------------------------------
-------------
   1     -   0.*                                 30 FEET    327.6

   2     -   0.*                                 30 FEET    402.2

   3     -   0.*                                 8 FEET     662.9

   4     -   0.*                                 10 FEET    305.3

   5     -   0.*                                 10 FEET    120.8
   6     -   0.*                                 B5 P2      269.3
   7     -   0.*                                 B5 P3      353.6

   8     -   0.*                                 6 FEET      36.4
   9     -   0.*                                 B6 P2      378.6
  10     -   0.*                                 B6 P3       60.2
  11     -   0.*                                 B6 P4      141.4
  12     -   0.*                                 B6 P5       50.0
  13     -   0.*                                 B6 P6       44.7

  14     -   0.*                                 6 FEET      31.6
  15     -   0.*                                 B7 P2      294.6

  16     -   0.*                                 6 FEET      50.2
  17     -   0.*                                 B8 P2      335.0
  18     -   0.*                                 B8 P3       50.0
  19     -   0.*                                 B8 P4       90.0

  20     -   0.*                                 10 FEET     45.0
  21     -   0.*                                 B9 P2       83.3
  22     -   0.*                                 B9 P3      274.0
  23     -   0.*                                 B9 P4      242.2
  24     -   0.*                                 B9 P5      201.2
  25     -   0.*                                 B9 P6      190.4
```

26	-	0.*	B9 P7	100.5
27	-	0.*	10 FEET	90.1
28	-	0.*	B10 P2	1005.6
29	-	0.*	B10 P3	4.0
30	-	0.*	6 FEET	201.2
31	-	0.*	10 FEET	70.9
32	-	0.*	B11 P2	130.4
33	-	0.*	B11 P3	226.1
34	-	0.*	B11 P4	256.8
35	-	0.*	B11 P5	78.1
36	-	0.*	B11 P6	247.6
37	-	0.*	B11 P7	149.0
38	-	0.*	6 FEET	41.2
39	-	0.*	B12 P2	46.1
40	-	0.*	B12 P3	30.4
41	-	0.*	B12 P4	290.9
42	-	0.*	B12 P5	24.9
43	-	0.*	B12 P6	328.8
44	-	0.*	B12 P7	53.4
45	-	0.*	B12 P8	308.7
46	-	0.*	6 FEET	178.0
47	-	0.*	B13 P2	193.3
48	-	0.*	B13 P3	23.7
49	-	0.*	B13 P4	426.2
50	-	0.*	B13 P5	60.2
51	-	0.*	6 FEET	67.1
52	-	0.*	B14 P2	36.4
53	-	0.*	B14 P3	4.0
54	-	0.*	10 FEET	241.7
55	-	0.*	B14 P5	289.5
56	-	0.*	B14 P6	104.5
57	-	0.*	B14 P7	318.0
58	-	0.*	B14 P8	32.2
59	-	0.*	B14 P9	35.1
60	-	0.*	6 FEET	143.2
61	-	0.*	B15 P2	4.0
62	-	0.*	10 FEET	332.5
63	-	0.*	B15 P4	133.4
64	-	0.*	B15 P5	204.6
65	-	0.*	B15 P6	1467.5
66	-	0.*	6 FEET	478.1

```
 67      -   0.*                                          B16 P2     170.3
 68      -   0.*                                          B16 P3      92.2

 69      -   0.*                                          6 FEET      90.6
 70      -   0.*                                          B17 P2     310.6
 71      -   0.*                                          B17 P3      90.6
 72      -   0.*                                          B17 P4     130.4
 73      -   0.*                                          B17 P5      63.2
 74      -   0.*                                          B17 P6     400.0
 75      -   0.*                                          B17 P7     100.5
 76      -   0.*                                          B17 P8      63.4
 77      -   0.*                                          B17 P9     261.7
 78      -   0.*                                          B17 P10     64.0
 -----------------------------------------------------------------
-------------
        0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 --------------------------------
  1  LOT 263   67.     500.   61.8
  2  LOT 265   67.     500.   60.4
  3  LOT 266   67.     500.   60.0
  4  LOT 267   67.     500.   59.6
  5  LOT 274   67.     500.   61.7
  6  LOT 290   67.     500.   62.6
  7  LOT 299   67.     500.   63.0
  8  LOT 309   67.     500.   56.5
  9  LOT 318   67.     500.   57.7
 10  LOT 342   67.     500.   64.1
 11  LOT 381   67.     500.   61.1
 12  LOT 385   67.     500.   61.2
 13  LOT 372   67.     500.   60.2
 14  LOT 507   67.     500.   60.8
 15  LOT 452   67.     500.   58.0
 16  LOT 445   67.     500.   56.4
 17  S STREET  67.     500.   59.9
 18  LOT 435   67.     500.   60.0
 19  LOT 437   67.     500.   60.3
 20  LOT 426   67.     500.   61.1
 21  LOT 422   67.     500.   59.8
 22  LOT 438   67.     500.   60.8
 23  LOT 411   67.     500.   59.6
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
```

```
1   1   1   1
    1   1   1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
   0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
   0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
   0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
   0. 0. 0.
```

```
SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

TITLE:
RIVER PARK AREA C, LOTS WITH SETBACKS & AT CONVENTIONAL SPEEDS


1
         BARRIER DATA
         ************

BAR                 BARRIER HEIGHTS                  BAR
ELE    0    1    2    3    4    5    6    7     ID         LENGTH
-----------------------------------------------------------------
-------------
 1     -   0.*                                 30 FEET    327.6

 2     -   0.*                                 30 FEET    402.2

 3     -   0.*                                 8 FEET     662.9

 4     -   0.*                                 10 FEET    305.3

 5     -   0.*                                 10 FEET    120.8
 6     -   0.*                                 B5 P2      269.3
 7     -   0.*                                 B5 P3      353.6

 8     -   0.*                                 6 FEET      36.4
 9     -   0.*                                 B6 P2      378.6
10     -   0.*                                 B6 P3       60.2
11     -   0.*                                 B6 P4      141.4
12     -   0.*                                 B6 P5       50.0
13     -   0.*                                 B6 P6       44.7

14     -   0.*                                 6 FEET      31.6
15     -   0.*                                 B7 P2      294.6

16     -   0.*                                 6 FEET      50.2
17     -   0.*                                 B8 P2      335.0
18     -   0.*                                 B8 P3       50.0
19     -   0.*                                 B8 P4       90.0

20     -   0.*                                 10 FEET     45.0
21     -   0.*                                 B9 P2       83.3
22     -   0.*                                 B9 P3      274.0
23     -   0.*                                 B9 P4      242.2
24     -   0.*                                 B9 P5      201.2
25     -   0.*                                 B9 P6      190.4
```

26	-	0.*	B9 P7	100.5
27	-	0.*	10 FEET	90.1
28	-	0.*	B10 P2	1005.6
29	-	0.*	B10 P3	4.0
30	-	0.*	6 FEET	201.2
31	-	0.*	10 FEET	70.9
32	-	0.*	B11 P2	130.4
33	-	0.*	B11 P3	226.1
34	-	0.*	B11 P4	256.8
35	-	0.*	B11 P5	78.1
36	-	0.*	B11 P6	247.6
37	-	0.*	B11 P7	149.0
38	-	0.*	6 FEET	41.2
39	-	0.*	B12 P2	46.1
40	-	0.*	B12 P3	30.4
41	-	0.*	B12 P4	290.9
42	-	0.*	B12 P5	24.9
43	-	0.*	B12 P6	328.8
44	-	0.*	B12 P7	53.4
45	-	0.*	B12 P8	308.7
46	-	0.*	6 FEET	178.0
47	-	0.*	B13 P2	193.3
48	-	0.*	B13 P3	23.7
49	-	0.*	B13 P4	426.2
50	-	0.*	B13 P5	60.2
51	-	0.*	6 FEET	67.1
52	-	0.*	B14 P2	36.4
53	-	0.*	B14 P3	4.0
54	-	0.*	10 FEET	241.7
55	-	0.*	B14 P5	289.5
56	-	0.*	B14 P6	104.5
57	-	0.*	B14 P7	318.0
58	-	0.*	B14 P8	32.2
59	-	0.*	B14 P9	35.1
60	-	0.*	6 FEET	143.2
61	-	0.*	B15 P2	4.0
62	-	0.*	10 FEET	332.5
63	-	0.*	B15 P4	133.4
64	-	0.*	B15 P5	204.6
65	-	0.*	B15 P6	1467.5
66	-	0.*	10 FEET	85.4

```
 67      -    0.*                                         B16 P2     478.1
 68      -    0.*                                         B16 P3     170.3
 69      -    0.*                                         B16 P4      92.2

 70      -    0.*                                         6 FEET      90.6
 71      -    0.*                                         B17 P2     310.6
 72      -    0.*                                         B17 P3      90.6
 73      -    0.*                                         B17 P4     130.4
 74      -    0.*                                         B17 P5      63.2
 75      -    0.*                                         B17 P6     400.0
 76      -    0.*                                         B17 P7     100.5
 77      -    0.*                                         B17 P8      63.4
 78      -    0.*                                         B17 P9     261.7
 79      -    0.*                                         B17 P10     64.0
 -----------------------------------------------------------------
------------
        0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 --------------------------------
  1  LOT 521A  67.    500.   66.6
  2  LOT 521B  67.    500.   61.8
  3  LOT 519A  67.    500.   60.0
  4  LOT 519B  67.    500.   57.5
  5  LOT 519C  67.    500.   59.6
  6  LOT 519D  67.    500.   56.4
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0.
```

```
 SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

 TITLE:
 RIVER PARK AREA D, LOTS WITH SETBACKS & AT CONVENTIONAL SPEEDS



1
          BARRIER DATA
          ************

 BAR              BARRIER HEIGHTS                         BAR
 ELE     0    1    2    3    4    5    6    7    ID          LENGTH
 -----------------------------------------------------------------
-------------
  1      -   0.*                                 30 FEET     327.6

  2      -   0.*                                 30 FEET     402.2

  3      -   0.*                                 8 FEET      662.9

  4      -   0.*                                 10 FEET     305.3

  5      -   0.*                                 10 FEET     120.8
  6      -   0.*                                 B5 P2       269.3
  7      -   0.*                                 B5 P3       353.6

  8      -   0.*                                 6 FEET       36.4
  9      -   0.*                                 B6 P2       378.6
 10      -   0.*                                 B6 P3        60.2
 11      -   0.*                                 B6 P4       141.4
 12      -   0.*                                 B6 P5        50.0
 13      -   0.*                                 B6 P6        44.7

 14      -   0.*                                 6 FEET       31.6
 15      -   0.*                                 B7 P2       294.6

 16      -   0.*                                 6 FEET       50.2
 17      -   0.*                                 B8 P2       335.0
 18      -   0.*                                 B8 P3        50.0
 19      -   0.*                                 B8 P4        90.0

 20      -   0.*                                 10 FEET      45.0
 21      -   0.*                                 B9 P2        83.3
 22      -   0.*                                 B9 P3       274.0
 23      -   0.*                                 B9 P4       242.2
 24      -   0.*                                 B9 P5       201.2
 25      -   0.*                                 B9 P6       190.4
```

```
26      -    0.*                                          B9 P7       100.5

27      -    0.*                                          10 FEET      90.1
28      -    0.*                                          B10 P2     1005.6
29      -    0.*                                          B10 P3        4.0
30      -    0.*                                          6 FEET      201.2

31      -    0.*                                          10 FEET      70.9
32      -    0.*                                          B11 P2      130.4
33      -    0.*                                          B11 P3      226.1
34      -    0.*                                          B11 P4      256.8
35      -    0.*                                          B11 P5       78.1
36      -    0.*                                          B11 P6      247.6
37      -    0.*                                          B11 P7      149.0

38      -    0.*                                          6 FEET       41.2
39      -    0.*                                          B12 P2       46.1
40      -    0.*                                          B12 P3       30.4
41      -    0.*                                          B12 P4      290.9
42      -    0.*                                          B12 P5       24.9
43      -    0.*                                          B12 P6      328.8
44      -    0.*                                          B12 P7       53.4
45      -    0.*                                          B12 P8      308.7

46      -    0.*                                          6 FEET      178.0
47      -    0.*                                          B13 P2      193.3
48      -    0.*                                          B13 P3       23.7
49      -    0.*                                          B13 P4      426.2
50      -    0.*                                          B13 P5       60.2

51      -    0.*                                          6 FEET       67.1
52      -    0.*                                          B14 P2       36.4
53      -    0.*                                          B14 P3        4.0
54      -    0.*                                          10 FEET     241.7
55      -    0.*                                          B14 P5      289.5
56      -    0.*                                          B14 P6      104.5
57      -    0.*                                          B14 P7      318.0
58      -    0.*                                          B14 P8       32.2
59      -    0.*                                          B14 P9       35.1

60      -    0.*                                          6 FEET      143.2
61      -    0.*                                          B15 P2        4.0
62      -    0.*                                          10 FEET     332.5
63      -    0.*                                          B15 P4      133.4
64      -    0.*                                          B15 P5      204.6
65      -    0.*                                          B15 P6     1467.5

66      -    0.*                                          6 FEET      478.1
```

```
 67      -    0.*                                  B16 P2     170.3
 68      -    0.*                                  B16 P3      92.2

 69      -    0.*                                  6 FEET      90.6
 70      -    0.*                                  B17 P2     310.6
 71      -    0.*                                  B17 P3      90.6
 72      -    0.*                                  B17 P4     130.4
 73      -    0.*                                  B17 P5      63.2
 74      -    0.*                                  B17 P6     400.0
 75      -    0.*                                  B17 P7     100.5
 76      -    0.*                                  B17 P8      63.4
 77      -    0.*                                  B17 P9     261.7
 78      -    0.*                                  B17 P10     64.0
 ------------------------------------------------------------------
-------------
        0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 ---------------------------------
  1  525A       67.    500.   59.6
  2  525B       67.    500.   62.6
  3  525C       67.    500.   64.0
  4  525D       67.    500.   64.0
  5  525E       67.    500.   63.4
  6  525F       67.    500.   63.3
  7  525G       67.    500.   64.8
  8  524B       67.    500.   65.2
  9  524C       67.    500.   65.3
 10  525D       67.    500.   68.5
 11  228        67.    500.   58.6
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0.
```

```
SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

TITLE:
RIVER PARK AREA A-1, RES. ALONG NRR W/RECOMMENTATIONS & REALISTIC
SPEEDS


1
          BARRIER DATA
          ************

BAR                 BARRIER HEIGHTS                      BAR
ELE    0    1    2    3    4    5    6    7    ID         LENGTH
-------------------------------------------------------------------
-------------
  1    -    0.*                                 30 FEET    327.6

  2    -    0.*                                 30 FEET    402.2

  3    -    0.*                                 8 FEET     662.9

  4    -    0.*                                 10 FEET    305.3

  5    -    0.*                                 10 FEET    120.8
  6    -    0.*                                 B5 P2      269.3
  7    -    0.*                                 B5 P3      353.6

  8    -    0.*                                 6 FEET      36.4
  9    -    0.*                                 B6 P2      378.6
 10    -    0.*                                 B6 P3       60.2
 11    -    0.*                                 B6 P4      141.4
 12    -    0.*                                 B6 P5       50.0
 13    -    0.*                                 B6 P6       44.7

 14    -    0.*                                 6 FEET      31.6
 15    -    0.*                                 B7 P2      294.6

 16    -    0.*                                 6 FEET      50.2
 17    -    0.*                                 B8 P2      335.0
 18    -    0.*                                 B8 P3       50.0
 19    -    0.*                                 B8 P4       90.0

 20    -    0.*                                 10 FEET     45.0
 21    -    0.*                                 B9 P2       83.3
 22    -    0.*                                 B9 P3      274.0
 23    -    0.*                                 B9 P4      242.2
 24    -    0.*                                 B9 P5      201.2
 25    -    0.*                                 B9 P6      190.4
```

```
26    -   0.*                              B9 P7      100.5

27    -   0.*                              10 FEET     90.1
28    -   0.*                              B10 P2    1005.6
29    -   0.*                              B10 P3       4.0
30    -   0.*                              6 FEET     201.2

31    -   0.*                              10 FEET     70.9
32    -   0.*                              B11 P2     130.4
33    -   0.*                              B11 P3     226.1
34    -   0.*                              B11 P4     256.8
35    -   0.*                              B11 P5      78.1
36    -   0.*                              B11 P6     247.6
37    -   0.*                              B11 P7     149.0

38    -   0.*                              6 FEET      41.2
39    -   0.*                              B12 P2      46.1
40    -   0.*                              B12 P3      30.4
41    -   0.*                              B12 P4     290.9
42    -   0.*                              B12 P5      24.9
43    -   0.*                              B12 P6     328.8
44    -   0.*                              B12 P7      53.4
45    -   0.*                              B12 P8     308.7

46    -   0.*                              6 FEET     178.0
47    -   0.*                              B13 P2     193.3
48    -   0.*                              B13 P3      23.7
49    -   0.*                              B13 P4     426.2
50    -   0.*                              B13 P5      60.2

51    -   0.*                              6 FEET      67.1
52    -   0.*                              B14 P2      36.4
53    -   0.*                              B14 P3       4.0
54    -   0.*                              10 FEET    241.7
55    -   0.*                              B14 P5     289.5
56    -   0.*                              B14 P6     104.5
57    -   0.*                              B14 P7     318.0
58    -   0.*                              B14 P8      32.2
59    -   0.*                              B14 P9      35.1

60    -   0.*                              6 FEET     143.2
61    -   0.*                              B15 P2       4.0
62    -   0.*                              10 FEET    332.5
63    -   0.*                              B15 P4     133.4
64    -   0.*                              B15 P5     204.6
65    -   0.*                              B15 P6    1467.5

66    -   0.*                              6 FEET     478.1
```

```
  67      -    0.*                                         B16 P2      170.3
  68      -    0.*                                         B16 P3       92.2

  69      -    0.*                                         6 FEET       90.6
  70      -    0.*                                         B17 P2      310.6
  71      -    0.*                                         B17 P3       90.6
  72      -    0.*                                         B17 P4      130.4
  73      -    0.*                                         B17 P5       63.2
  74      -    0.*                                         B17 P6      400.0
  75      -    0.*                                         B17 P7      100.5
  76      -    0.*                                         B17 P8       63.4
  77      -    0.*                                         B17 P9      261.7
  78      -    0.*                                         B17 P10      64.0

  79      -    0.*                                         B18 P1       98.5
  80      -    0.*                                         B18 P2      125.5
 -----------------------------------------------------------------
-------------
        0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 --------------------------------
  1  LOT 1      67.     500.   60.8
  2  LOT 2      67.     500.   62.1
  3  LOT 3      67.     500.   62.6
  4  LOT 7      67.     500.   60.9
  5  LOT 8      67.     500.   59.8
  6  LOT 56     67.     500.   61.4
  7  LOT 55     67.     500.   62.6
  8  LOT 57     67.     500.   57.4
  9  LOT 58     67.     500.   56.4
 10  LOT 60     67.     500.   57.1
 11  LOT 61     67.     500.   57.3
 12  LOT 62     67.     500.   56.8
 13  LOT 64     67.     500.   55.1
 14  LOT 66     67.     500.   54.6
 15  LOT 69     67.     500.   57.0
 16  LOT 70     67.     500.   57.7
 17  LOT 176    67.     500.   58.5
 18  LOT 170    67.     500.   58.8
 19  LOT 162    67.     500.   53.1
 20  LOT 165    67.     500.   59.5
 21  LOT 161    67.     500.   59.8
 22  LOT 158    67.     500.   63.9
 23  LOT 72     67.     500.   59.7
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
```

```
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0.
```

```
 SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

 TITLE:
 RIVER PARK AREA A-1, RIVER LOTS WITH SETBACKS & AT REALISTIC SPEE
DS


1
          BARRIER DATA
          ************

 BAR              BARRIER HEIGHTS                        BAR
 ELE    0    1    2    3    4    5    6    7    ID         LENGTH
 -----------------------------------------------------------------
-------------
  1     -    0.*                                 30 FEET    327.6

  2     -    0.*                                 30 FEET    402.2

  3     -    0.*                                 8 FEET     662.9

  4     -    0.*                                 10 FEET    305.3

  5     -    0.*                                 10 FEET    120.8
  6     -    0.*                                 B5 P2      269.3
  7     -    0.*                                 B5 P3      353.6

  8     -    0.*                                 6 FEET      36.4
  9     -    0.*                                 B6 P2      378.6
 10     -    0.*                                 B6 P3       60.2
 11     -    0.*                                 B6 P4      141.4
 12     -    0.*                                 B6 P5       50.0
 13     -    0.*                                 B6 P6       44.7

 14     -    0.*                                 6 FEET      31.6
 15     -    0.*                                 B7 P2      294.6

 16     -    0.*                                 6 FEET      50.2
 17     -    0.*                                 B8 P2      335.0
 18     -    0.*                                 B8 P3       50.0
 19     -    0.*                                 B8 P4       90.0

 20     -    0.*                                 10 FEET     45.0
 21     -    0.*                                 B9 P2       83.3
 22     -    0.*                                 B9 P3      274.0
 23     -    0.*                                 B9 P4      242.2
 24     -    0.*                                 B9 P5      201.2
 25     -    0.*                                 B9 P6      190.4
```

```
26      -    0.*                                      B9 P7       100.5

27      -    0.*                                      10 FEET      90.1
28      -    0.*                                      B10 P2     1005.6
29      -    0.*                                      B10 P3        4.0
30      -    0.*                                      6 FEET      201.2

31      -    0.*                                      10 FEET      70.9
32      -    0.*                                      B11 P2      130.4
33      -    0.*                                      B11 P3      226.1
34      -    0.*                                      B11 P4      256.8
35      -    0.*                                      B11 P5       78.1
36      -    0.*                                      B11 P6      247.6
37      -    0.*                                      B11 P7      149.0

38      -    0.*                                      6 FEET       41.2
39      -    0.*                                      B12 P2       46.1
40      -    0.*                                      B12 P3       30.4
41      -    0.*                                      B12 P4      290.9
42      -    0.*                                      B12 P5       24.9
43      -    0.*                                      B12 P6      328.8
44      -    0.*                                      B12 P7       53.4
45      -    0.*                                      B12 P8      308.7

46      -    0.*                                      6 FEET      178.0
47      -    0.*                                      B13 P2      193.3
48      -    0.*                                      B13 P3       23.7
49      -    0.*                                      B13 P4      426.2
50      -    0.*                                      B13 P5       60.2

51      -    0.*                                      6 FEET       67.1
52      -    0.*                                      B14 P2       36.4
53      -    0.*                                      B14 P3        4.0
54      -    0.*                                      10 FEET     241.7
55      -    0.*                                      B14 P5      289.5
56      -    0.*                                      B14 P6      104.5
57      -    0.*                                      B14 P7      318.0
58      -    0.*                                      B14 P8       32.2
59      -    0.*                                      B14 P9       35.1

60      -    0.*                                      6 FEET      143.2
61      -    0.*                                      B15 P2        4.0
62      -    0.*                                      10 FEET     332.5
63      -    0.*                                      B15 P4      133.4
64      -    0.*                                      B15 P5      204.6
65      -    0.*                                      B15 P6     1467.5

66      -    0.*                                      6 FEET      478.1
```

```
 67      -   0.*                                         B16 P2     170.3
 68      -   0.*                                         B16 P3      92.2

 69      -   0.*                                         6 FEET      90.6
 70      -   0.*                                         B17 P2     310.6
 71      -   0.*                                         B17 P3      90.6
 72      -   0.*                                         B17 P4     130.4
 73      -   0.*                                         B17 P5      63.2
 74      -   0.*                                         B17 P6     400.0
 75      -   0.*                                         B17 P7     100.5
 76      -   0.*                                         B17 P8      63.4
 77      -   0.*                                         B17 P9     261.7
 78      -   0.*                                         B17 P10     64.0
 -----------------------------------------------------------------
-------------
        0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 --------------------------------
  1  LOT 3      67.     500.   62.8
  2  LOT 4      67.     500.   62.3
  3  LOT 8      67.     500.   60.5
  4  LOT 12     67.     500.   59.8
  5  LOT 13     67.     500.   59.5
  6  LOT 17     67.     500.   58.9
  7  LOT 29     67.     500.   58.3
  8  LOT 203    67.     500.   58.2
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0.
```

```
SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

TITLE:
RIVER PARK AREA A-2, B WITH SETBACKS AND REALISTIC SPEEDS



1
          BARRIER DATA
          ************

BAR                BARRIER HEIGHTS                          BAR
ELE     0     1     2     3     4     5     6     7      ID          LENGTH
---------------------------------------------------------------------------
--------------
 1      -    0.*                                        30 FEET     327.6

 2      -    0.*                                        30 FEET     402.2

 3      -    0.*                                        8 FEET      662.9

 4      -    0.*                                        10 FEET     305.3

 5      -    0.*                                        10 FEET     120.8
 6      -    0.*                                        B5 P2       269.3
 7      -    0.*                                        B5 P3       353.6

 8      -    0.*                                        6 FEET       36.4
 9      -    0.*                                        B6 P2       378.6
10      -    0.*                                        B6 P3        60.2
11      -    0.*                                        B6 P4       141.4
12      -    0.*                                        B6 P5        50.0
13      -    0.*                                        B6 P6        44.7

14      -    0.*                                        6 FEET       31.6
15      -    0.*                                        B7 P2       294.6

16      -    0.*                                        6 FEET       50.2
17      -    0.*                                        B8 P2       335.0
18      -    0.*                                        B8 P3        50.0
19      -    0.*                                        B8 P4        90.0

20      -    0.*                                        10 FEET      45.0
21      -    0.*                                        B9 P2        83.3
22      -    0.*                                        B9 P3       274.0
23      -    0.*                                        B9 P4       242.2
24      -    0.*                                        B9 P5       201.2
25      -    0.*                                        B9 P6       190.4
```

26	-	0.*	B9 P7	100.5
27	-	0.*	10 FEET	90.1
28	-	0.*	B10 P2	1005.6
29	-	0.*	B10 P3	4.0
30	-	0.*	6 FEET	201.2
31	-	0.*	10 FEET	70.9
32	-	0.*	B11 P2	130.4
33	-	0.*	B11 P3	226.1
34	-	0.*	B11 P4	256.8
35	-	0.*	B11 P5	78.1
36	-	0.*	B11 P6	247.6
37	-	0.*	B11 P7	149.0
38	-	0.*	6 FEET	41.2
39	-	0.*	B12 P2	46.1
40	-	0.*	B12 P3	30.4
41	-	0.*	B12 P4	290.9
42	-	0.*	B12 P5	24.9
43	-	0.*	B12 P6	328.8
44	-	0.*	B12 P7	53.4
45	-	0.*	B12 P8	308.7
46	-	0.*	6 FEET	178.0
47	-	0.*	B13 P2	193.3
48	-	0.*	B13 P3	23.7
49	-	0.*	B13 P4	426.2
50	-	0.*	B13 P5	60.2
51	-	0.*	6 FEET	67.1
52	-	0.*	B14 P2	36.4
53	-	0.*	B14 P3	4.0
54	-	0.*	10 FEET	241.7
55	-	0.*	B14 P5	289.5
56	-	0.*	B14 P6	104.5
57	-	0.*	B14 P7	318.0
58	-	0.*	B14 P8	32.2
59	-	0.*	B14 P9	35.1
60	-	0.*	6 FEET	143.2
61	-	0.*	B15 P2	4.0
62	-	0.*	10 FEET	332.5
63	-	0.*	B15 P4	133.4
64	-	0.*	B15 P5	204.6
65	-	0.*	B15 P6	1467.5
66	-	0.*	6 FEET	478.1

```
 67      -   0.*                                         B16 P2     170.3
 68      -   0.*                                         B16 P3      92.2

 69      -   0.*                                         6 FEET      90.6
 70      -   0.*                                         B17 P2     310.6
 71      -   0.*                                         B17 P3      90.6
 72      -   0.*                                         B17 P4     130.4
 73      -   0.*                                         B17 P5      63.2
 74      -   0.*                                         B17 P6     400.0
 75      -   0.*                                         B17 P7     100.5
 76      -   0.*                                         B17 P8      63.4
 77      -   0.*                                         B17 P9     261.7
 78      -   0.*                                         B17 P10     64.0
 -----------------------------------------------------------------
-------------
        0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 --------------------------------
  1  LOT 263   67.     500.    60.5
  2  LOT 265   67.     500.    59.2
  3  LOT 266   67.     500.    58.8
  4  LOT 267   67.     500.    58.4
  5  LOT 274   67.     500.    60.7
  6  LOT 290   67.     500.    61.7
  7  LOT 299   67.     500.    62.1
  8  LOT 309   67.     500.    55.4
  9  LOT 318   67.     500.    56.6
 10  LOT 342   67.     500.    63.2
 11  LOT 381   67.     500.    60.2
 12  LOT 385   67.     500.    60.3
 13  LOT 372   67.     500.    59.3
 14  LOT 507   67.     500.    59.9
 15  LOT 452   67.     500.    57.0
 16  LOT 445   67.     500.    55.3
 17  S STREET  67.     500.    58.8
 18  LOT 435   67.     500.    58.9
 19  LOT 437   67.     500.    59.1
 20  LOT 426   67.     500.    59.9
 21  LOT 422   67.     500.    58.7
 22  LOT 438   67.     500.    59.6
 23  LOT 411   67.     500.    58.5
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
```

```
1  1  1  1
   1  1  1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0.
```

```
 SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

 TITLE:
 RIVER PARK AREA C LOTS WITH SETBACKS & AT REALISTIC SPEEDS


1
          BARRIER DATA
          ************

 BAR              BARRIER HEIGHTS              BAR
 ELE    0    1    2    3    4    5    6    7    ID         LENGTH
 -----------------------------------------------------------------
-------------
  1     -   0.*                                 30 FEET    327.6

  2     -   0.*                                 30 FEET    402.2

  3     -   0.*                                 8 FEET     662.9

  4     -   0.*                                 10 FEET    305.3

  5     -   0.*                                 10 FEET    120.8
  6     -   0.*                                 B5 P2      269.3
  7     -   0.*                                 B5 P3      353.6

  8     -   0.*                                 6 FEET      36.4
  9     -   0.*                                 B6 P2      378.6
 10     -   0.*                                 B6 P3       60.2
 11     -   0.*                                 B6 P4      141.4
 12     -   0.*                                 B6 P5       50.0
 13     -   0.*                                 B6 P6       44.7

 14     -   0.*                                 6 FEET      31.6
 15     -   0.*                                 B7 P2      294.6

 16     -   0.*                                 6 FEET      50.2
 17     -   0.*                                 B8 P2      335.0
 18     -   0.*                                 B8 P3       50.0
 19     -   0.*                                 B8 P4       90.0

 20     -   0.*                                 10 FEET     45.0
 21     -   0.*                                 B9 P2       83.3
 22     -   0.*                                 B9 P3      274.0
 23     -   0.*                                 B9 P4      242.2
 24     -   0.*                                 B9 P5      201.2
 25     -   0.*                                 B9 P6      190.4
```

```
26      -    0.*                                            B9 P7       100.5

27      -    0.*                                            10 FEET      90.1
28      -    0.*                                            B10 P2     1005.6
29      -    0.*                                            B10 P3        4.0
30      -    0.*                                            6 FEET      201.2

31      -    0.*                                            10 FEET      70.9
32      -    0.*                                            B11 P2      130.4
33      -    0.*                                            B11 P3      226.1
34      -    0.*                                            B11 P4      256.8
35      -    0.*                                            B11 P5       78.1
36      -    0.*                                            B11 P6      247.6
37      -    0.*                                            B11 P7      149.0

38      -    0.*                                            6 FEET       41.2
39      -    0.*                                            B12 P2       46.1
40      -    0.*                                            B12 P3       30.4
41      -    0.*                                            B12 P4      290.9
42      -    0.*                                            B12 P5       24.9
43      -    0.*                                            B12 P6      328.8
44      -    0.*                                            B12 P7       53.4
45      -    0.*                                            B12 P8      308.7

46      -    0.*                                            6 FEET      178.0
47      -    0.*                                            B13 P2      193.3
48      -    0.*                                            B13 P3       23.7
49      -    0.*                                            B13 P4      426.2
50      -    0.*                                            B13 P5       60.2

51      -    0.*                                            6 FEET       67.1
52      -    0.*                                            B14 P2       36.4
53      -    0.*                                            B14 P3        4.0
54      -    0.*                                            10 FEET     241.7
55      -    0.*                                            B14 P5      289.5
56      -    0.*                                            B14 P6      104.5
57      -    0.*                                            B14 P7      318.0
58      -    0.*                                            B14 P8       32.2
59      -    0.*                                            B14 P9       35.1

60      -    0.*                                            6 FEET      143.2
61      -    0.*                                            B15 P2        4.0
62      -    0.*                                            10 FEET     332.5
63      -    0.*                                            B15 P4      133.4
64      -    0.*                                            B15 P5      204.6
65      -    0.*                                            B15 P6     1467.5

66      -    0.*                                            10 FEET      85.4
```

```
 67      -   0.*                                   B16 P2     478.1
 68      -   0.*                                   B16 P3     170.3
 69      -   0.*                                   B16 P4      92.2

 70      -   0.*                                   6 FEET      90.6
 71      -   0.*                                   B17 P2     310.6
 72      -   0.*                                   B17 P3      90.6
 73      -   0.*                                   B17 P4     130.4
 74      -   0.*                                   B17 P5      63.2
 75      -   0.*                                   B17 P6     400.0
 76      -   0.*                                   B17 P7     100.5
 77      -   0.*                                   B17 P8      63.4
 78      -   0.*                                   B17 P9     261.7
 79      -   0.*                                   B17 P10     64.0
 -----------------------------------------------------------------
-------------
        0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 --------------------------------
  1  LOT 521A  67.    500.   65.0
  2  LOT 521B  67.    500.   59.9
  3  LOT 519A  67.    500.   58.2
  4  LOT 519B  67.    500.   55.5
  5  LOT 519C  67.    500.   57.7
  6  LOT 519D  67.    500.   54.5
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0.
```

```
SOUND32 - RELEASE 07/30/91, MODIFIED 04/22/00

TITLE:
RIVER PARK AREA D, LOTS WITH SETBACKS & AT REALISTIC SPEEDS


1
          BARRIER DATA
          ************

BAR                BARRIER HEIGHTS                  BAR
ELE     0    1    2    3    4    5    6    7     ID          LENGTH
-----------------------------------------------------------------
-------------
 1      -   0.*                                 30 FEET     327.6

 2      -   0.*                                 30 FEET     402.2

 3      -   0.*                                 8 FEET      662.9

 4      -   0.*                                 10 FEET     305.3

 5      -   0.*                                 10 FEET     120.8
 6      -   0.*                                 B5 P2       269.3
 7      -   0.*                                 B5 P3       353.6

 8      -   0.*                                 6 FEET       36.4
 9      -   0.*                                 B6 P2       378.6
10      -   0.*                                 B6 P3        60.2
11      -   0.*                                 B6 P4       141.4
12      -   0.*                                 B6 P5        50.0
13      -   0.*                                 B6 P6        44.7

14      -   0.*                                 6 FEET       31.6
15      -   0.*                                 B7 P2       294.6

16      -   0.*                                 6 FEET       50.2
17      -   0.*                                 B8 P2       335.0
18      -   0.*                                 B8 P3        50.0
19      -   0.*                                 B8 P4        90.0

20      -   0.*                                 10 FEET      45.0
21      -   0.*                                 B9 P2        83.3
22      -   0.*                                 B9 P3       274.0
23      -   0.*                                 B9 P4       242.2
24      -   0.*                                 B9 P5       201.2
25      -   0.*                                 B9 P6       190.4
```

```
26    -   0.*                              B9 P7       100.5

27    -   0.*                              10 FEET      90.1
28    -   0.*                              B10 P2     1005.6
29    -   0.*                              B10 P3        4.0
30    -   0.*                              6 FEET      201.2

31    -   0.*                              10 FEET      70.9
32    -   0.*                              B11 P2      130.4
33    -   0.*                              B11 P3      226.1
34    -   0.*                              B11 P4      256.8
35    -   0.*                              B11 P5       78.1
36    -   0.*                              B11 P6      247.6
37    -   0.*                              B11 P7      149.0

38    -   0.*                              6 FEET       41.2
39    -   0.*                              B12 P2       46.1
40    -   0.*                              B12 P3       30.4
41    -   0.*                              B12 P4      290.9
42    -   0.*                              B12 P5       24.9
43    -   0.*                              B12 P6      328.8
44    -   0.*                              B12 P7       53.4
45    -   0.*                              B12 P8      308.7

46    -   0.*                              6 FEET      178.0
47    -   0.*                              B13 P2      193.3
48    -   0.*                              B13 P3       23.7
49    -   0.*                              B13 P4      426.2
50    -   0.*                              B13 P5       60.2

51    -   0.*                              6 FEET       67.1
52    -   0.*                              B14 P2       36.4
53    -   0.*                              B14 P3        4.0
54    -   0.*                              10 FEET     241.7
55    -   0.*                              B14 P5      289.5
56    -   0.*                              B14 P6      104.5
57    -   0.*                              B14 P7      318.0
58    -   0.*                              B14 P8       32.2
59    -   0.*                              B14 P9       35.1

60    -   0.*                              6 FEET      143.2
61    -   0.*                              B15 P2        4.0
62    -   0.*                              10 FEET     332.5
63    -   0.*                              B15 P4      133.4
64    -   0.*                              B15 P5      204.6
65    -   0.*                              B15 P6     1467.5

66    -   0.*                              6 FEET      478.1
```

```
 67      -   0.*                                         B16 P2     170.3
 68      -   0.*                                         B16 P3      92.2

 69      -   0.*                                         6 FEET      90.6
 70      -   0.*                                         B17 P2     310.6
 71      -   0.*                                         B17 P3      90.6
 72      -   0.*                                         B17 P4     130.4
 73      -   0.*                                         B17 P5      63.2
 74      -   0.*                                         B17 P6     400.0
 75      -   0.*                                         B17 P7     100.5
 76      -   0.*                                         B17 P8      63.4
 77      -   0.*                                         B17 P9     261.7
 78      -   0.*                                         B17 P10     64.0
 ------------------------------------------------------------------
-------------
       0    1    2    3    4    5    6    7
1
 REC REC ID  LEQ(CAL)
 ---------------------------------
  1  525A       67.     500.   57.9
  2  525B       67.     500.   61.0
  3  525C       67.     500.   62.4
  4  525D       67.     500.   62.4
  5  525E       67.     500.   61.8
  6  525F       67.     500.   61.9
  7  525G       67.     500.   63.3
  8  524B       67.     500.   63.7
  9  524C       67.     500.   63.9
 10  525D       67.     500.   66.9
 11  228        67.     500.   56.9
 BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1
1  1  1  1
   1  1  1
 CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
. 0. 0. 0.
  0. 0. 0.
```