TECHNICAL APPENDICES
DRAFT
ENVIRONMENTAL IMPACT REPORT

Ascension Heights Subdivision Project

Prepared for:
County of San Mateo
Planning and Building Department
455 County Center, 2nd Floor
Redwood City, CA 94063

Prepared by:
CHRISTOPHER A. JOSEPH & ASSOCIATES
Environmental Planning and Research

PLN2002-00517
SCH No. 2003102061
June 2009

TECHNICAL APPENDICES

ASCENSION HEIGHTS SUBDIVISON PROJECT
DRAFT
ENVIRONMENTAL IMPACT REPORT

Prepared for:

County of San Mateo
Planning and Building Department
455 County Center, 2nd Floor
Redwood City, CA 94063

Prepared by:

Christopher A. Joseph & Associates
Environmental Planning and Research
179 H Street
Petaluma, CA 94952

June 2009

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TECHNICAL APPENDICES

Ascension Heights Subdivision Project
Draft
Environmental Impact Report

APPENDIX A:	NOTICE OF PREPARATION (NOP) AND INITIAL STUDY
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APPENDIX A

NOTICE OF PREPARATION (NOP) AND INITIAL STUDY

NOTICE OF PREPARATION
OF A
DRAFT ENVIRONMENTAL IMPACT REPORT
THOMAS SUBDIVISION
OCTOBER 10, 2003

Project Title:	Thomas Subdivision
Project Applicant:	San Mateo Real Estate, Inc.
Project Location:	Eastern corner of Bel Aire Road and Ascension Drive, San Mateo County
Project Description:	See attached materials
Lead Agency:	County of San Mateo Planning & Building Division 455 County Center, 2nd Floor Redwood City, CA 94063 Gabrielle Rowan, Project Planner (650) 363-1829

The County of San Mateo will be the Lead Agency and will prepare the environmental impact report (EIR) for the proposed project. The Lead Agency needs to know the views of your agency as to the scope and content of the EIR which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects of the proposed project are contained in the attached Initial Study.

Please send your response within 30 days of receipt of this notice to **Gabrielle Rowan** at the address provided above.

ALL INTERESTED PARTIES ARE INVITED TO ATTEND A PUBLIC SCOPING MEETING TO ASSIST IN IDENTIFYING ISSUES TO BE ADDRESSED IN THE EIR. ATTENDEES WILL HAVE AN OPPORTUNITY TO PROVIDE INPUT TO THE CONSULTANTS PREPARING THE EIR.

The public scoping meeting for the EIR will be held on:

Monday, October 27, 2003 at 7:30 p.m.
at South Cafeteria, Building 5
College of San Mateo
1700 West Hillsdale Boulevard
San Mateo, California 94402
****Parking available at Campus Parking Lot #3****

County of San Mateo
Planning and Building Division

INITIAL STUDY
ENVIRONMENTAL EVALUATION CHECKLIST
(To Be Completed By Planning Division)

I. BACKGROUND

Project Title: Thomas Subdivision

File No.: PLN 2002-00517

Project Location: Eastern corner of Bel Aire Road and Ascension Drive, San Mateo County (See Figures 1 and 2)

Assessor's Parcel No.: 041-111-020, 041-111-130, 041-111-160, 041-111-270, 041-111-280, 041-111-320, 041-111-360

Applicant/Owner: Applicant: San Mateo Real Estate, Inc. Owner: John O'Rourke

Date Environmental Information Form Submitted: August 28, 2002

PROJECT DESCRIPTION

See Attachment A for a detailed description of the proposed project.

II. ENVIRONMENTAL ANALYSIS

Any controversial answers or answers needing clarification are explained on an attached sheet. For source, refer to pages 10 and 11.

	IMPACT					SOURCE
	NO	YES				
		Not Significant	Significant Unless Mitigated	Significant	Cumulative	
1. **LAND SUITABILITY AND GEOLOGY**						
Will (or could) this project:						
a. Involve a unique landform or biological area, such as beaches, sand dunes, marshes, tidelands, or San Francisco Bay?	X					B, E
b. Involve construction on slope of 15% or greater?			X			E
c. Be located in area of soil instability (subsidence, landslide or severe erosion)?			X			A, B
d. Be located on, or adjacent to a known earthquake fault?			X			B
e. Involve Class I or Class II Agriculture Soils and Class III Soils rated good or very good for artichokes or Brussels sprouts?	X					B
f. Cause erosion or siltation?			X			A, E
g. Result in damage to soil capability or loss of agricultural land?	X					B
h. Be located within a flood hazard area?	X					G
i. Be located in an area where a high water table may adversely affect land use?			X			B
j. Affect a natural drainage channel or streambed, or watercourse?	X					E
2. **VEGETATION AND WILDLIFE**						
Will (or could) this project:						
a. Affect federal or state listed rare or endangered species of plant life in the project area?	X					B

	IMPACT					
	NO	YES				
		Not Significant	Significant Unless Mitigated	Significant	Cumulative	SOURCE
b. Involve cutting of heritage or significant trees as defined in the County Heritage Tree and Significant Tree Ordinance?			X			E
c. Be adjacent to or include a habitat food source, water source, nesting place or breeding place for a federal or state listed rare or endangered wildlife species?			X			E
d. Significantly affect fish, wildlife, reptiles, or plant life?			X			E
e. Be located inside or within 200 feet of a marine or wildlife reserve?	X					B
f. Infringe on any sensitive habitats?			X			B
g. Involve clearing land that is 5,000 sq. ft. or greater (1,000 sq. ft. within a County Scenic Corridor), that has slopes greater than 20% or that is in a sensitive habitat or buffer zone?			X			B, E
3. **PHYSICAL RESOURCES**						
Will (or could) this project:						
a. Result in the removal of a natural resource for commercial purposes (including rock, sand, gravel, oil, trees, minerals or top soil)?	X					B
b. Involve grading in excess of 150 cubic yards?			X			E
c. Involve lands currently protected under the Williamson Act (agricultural preserve) or an Open Space Easement?	X					E, F
d. Affect any existing or potential agricultural uses?	X					A, E, F

	IMPACT					
	NO	YES				
		Not Significant	Significant Unless Mitigated	Significant	Cumulative	SOURCE
4. **AIR QUALITY, WATER QUALITY, SONIC**						
Will (or could) this project:						
a. Generate pollutants (hydrocarbon, thermal odor, dust or smoke particulates, radiation, etc.) that will violate existing standards of air quality on site or in the surrounding area?			X			E
b. Involve the burning of any material, including brush, trees and construction materials?	X					E
c. Be expected to result in the generation of noise levels in excess of those currently existing in the area, after construction?		X				E
d. Involve the application, use or disposal of potentially hazardous materials, including pesticides, herbicides, other toxic substances, or radioactive material?	X					E
e. Be subject to noise levels in excess of levels determined appropriate according to the County Noise Ordinance or other standard?	X					B
f. Generate noise levels in excess of levels determined appropriate according to the County Noise Ordinance standard?			X			E
g. Generate polluted or increased surface water runoff or affect groundwater resources?			X			E
h. Require installation of a septic tank/leachfield sewage disposal system or require hookup to an existing collection system which is at or over capacity?			X			E

	IMPACT					
	NO	YES				
		Not Significant	Significant Unless Mitigated	Significant	Cumulative	SOURCE
5. **TRANSPORTATION**						
Will (or could) this project:						
a. Affect access to commercial establishments, schools, parks, etc.?	X					E
b. Cause noticeable increase in pedestrian traffic or a change in pedestrian patterns?	X					E
c. Result in noticeable changes in vehicular traffic patterns or volumes (including bicycles)?		X				E
d. Involve the use of off-road vehicles of any kind (such as trail bikes)?	X					E
e. Result in or increase traffic hazards?			X			E
f. Provide for alternative transportation amenities such as bike racks?	X					E
g. Generate traffic which will adversely affect the traffic carrying capacity of any roadway?			X			E
6. **LAND USE AND GENERAL PLANS**						
Will (or could) this project:						
a. Result in the congregating of more than 50 people on a regular basis?	X					E
b. Result in the introduction of activities not currently found within the community?	X					E
c. Employ equipment which could interfere with existing communication and/or defense systems?	X					E

	IMPACT					
	NO	YES				
		Not Significant	Significant Unless Mitigated	Significant	Cumulative	SOURCE
d. Result in any changes in land use, either on or off the project site?	X					E
e. Serve to encourage off-site development of presently undeveloped areas or increase development intensity of already developed areas (examples include the introduction of new or expanded public utilities, new industry, commercial facilities or recreation activities)?	X					E
f. Adversely affect the capacity of any public facilities (streets, highways, freeways, public transit, schools, parks, police, fire, hospitals), public utilities (electrical, water and gas supply lines, sewage and storm drain discharge lines, sanitary landfills) or public works serving the site?			X			E
g. Generate any demands that will cause a public facility or utility to reach or exceed its capacity?			X			E
h. Be adjacent to or within 500 feet of an existing or planned public facility?		X				E
i. Create significant amounts of solid waste or litter?			X			E
j. Substantially increase fossil fuel consumption (electricity, oil, natural gas, coal, etc.)?			X			E
k. Require an amendment to or exception from adopted general plans, specific plans, or community policies or goals?	X					E
l. Involve a change of zoning?	X					E
m. Require the relocation of people or businesses?	X					E
n. Reduce the supply of low-income housing?	X					E

	IMPACT					
	NO	YES				
		Not Significant	Significant Unless Mitigated	Significant	Cumulative	SOURCE
o. Result in possible interference with an emergency response plan or emergency evacuation plan?	X					E
p. Result in creation of or exposure to a potential health hazard?	X					E
7. **AESTHETIC, CULTURAL AND HISTORIC**						
Will (or could) this project:						
a. Be adjacent to a designated Scenic Highway or within a State or County Scenic Corridor?			X			B, E
b. Obstruct scenic views from existing residential areas, public lands, public water body, or roads?			X			B, E
c. Involve the construction of buildings or structures in excess of three stories or 36 feet in height?	X					E
d. Directly or indirectly affect historical or archaeological resources on or near the site?	X					B, E
e. Visually intrude into an area having natural scenic qualities?		X				A, E

III. RESPONSIBLE AGENCIES. Check what agency has permit authority or other approval for the project.

AGENCY	YES	NO	TYPE OF APPROVAL
U.S. Army Corps of Engineers (CE)		X	
State Water Resources Control Board		X	
Regional Water Quality Control Board	X		Storm Water Pollution Prevention Plan (SWPPP)
State Department of Public Health		X	
San Francisco Bay Conservation and Development Commission (BCDC)		X	

AGENCY	YES	NO	TYPE OF APPROVAL
U.S. Environmental Protection Agency (EPA)		X	
County Airport Land Use Commission (ALUC)		X	
CalTrans		X	
Bay Area Air Quality Management District		X	
U.S. Fish & Wildlife Service		X	
Coastal Commission		X	
City		X	
Sewer/Water District:		X	
Other:		X	

IV. MITIGATION MEASURES

	Yes	No
Mitigation measures have been proposed in project application.	X	
Other mitigation measures are needed.	X	

The following measures are included in the project plans or proposals pursuant to Section 15070(b)(1) of the State CEQA Guidelines:

- Grading and construction activities must adhere to standards contained in the County's Noise Ordinance.
- Best management practices (BMPs) to be used during grading and construction (e.g. grading in the dry season, protecting storm drain inlets, etc.)
- Trees removed would be replaced with new native trees at a 3:1 ratio.
- Thirty-two percent (approximately two acres) of the project site would be designated as a conservation easement.

V. MANDATORY FINDINGS OF SIGNIFICANCE

	Yes	No
1. 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, or eliminate important examples of the major periods of California history or prehistory?	X	
2. Does the project have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals?		X
3. Does the project have possible environmental effects which are individually limited, but cumulatively considerable?	X	
4. Would the project cause substantial adverse effects on human beings, either directly or indirectly?		X

On the basis of this initial evaluation:

______ I find the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared by the Planning Division.

______ 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 of the mitigation measures in the discussion have been included as part of the proposed project. A NEGATIVE DECLARATION will be prepared.

__X__ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

(Sign) [signature]

(Title) Regional Manager

9/25/03
Date

VI. SOURCE LIST

A. Field Inspection

B. County General Plan 1986

C. County Subdivision Regulations

D. County Zoning Regulations

E. Vesting Tract Map or EIF

F. Williamson Act Maps

G. FEMA Flood Hazard Map, ESRI/FEMA Project Impact Hazard Information and Awareness Site

CPD FORM A-ENV-30
FRM00018.DOC (8/4/1999)

ATTACHMENT A
County of San Mateo
Environmental Services Agency
Planning and Building Division

Initial Study Pursuant to CEQA
Project Narrative to Questions for the Initial Study
File Number: PLN 2002-00517
Thomas Subdivision

Introduction

The proposed project consists of a major subdivision and a grading permit to divide six legal parcels, totaling 13.3 acres, into 25 single-family lots.

Environmental Setting

The project site is located on the eastern corner of Bel Aire Road and Ascension Drive, within the unincorporated San Mateo Highlands area of San Mateo County (see Figures 1 and 2). The project site is undeveloped and is located southwest of the City of San Mateo. On-site vegetation includes grassland, small brush, and approximately 78 trees (e.g. oak trees, pine trees and eucalyptus trees). The general plan designation for the project site is Medium Low Density Residential (2.4 – 6.0 dwelling units/acre). The project site is zoned R-1/S-8 (single-family residential/7,500 square foot minimum lot size). This zoning requires 40% yard coverage, and setbacks of 20 feet (front and back yards) and five feet (side yards). The maximum height limit for the project site is three stories or 36 feet.

The project site is surrounded by single-family homes. A water tank (owned by the California Water Service Company) and a cell site are enclosed by the project site and are served by a small access road that connects to Bel Aire Road, which also serves as the only access point to the site. This piece of property is not a part of the proposed project.

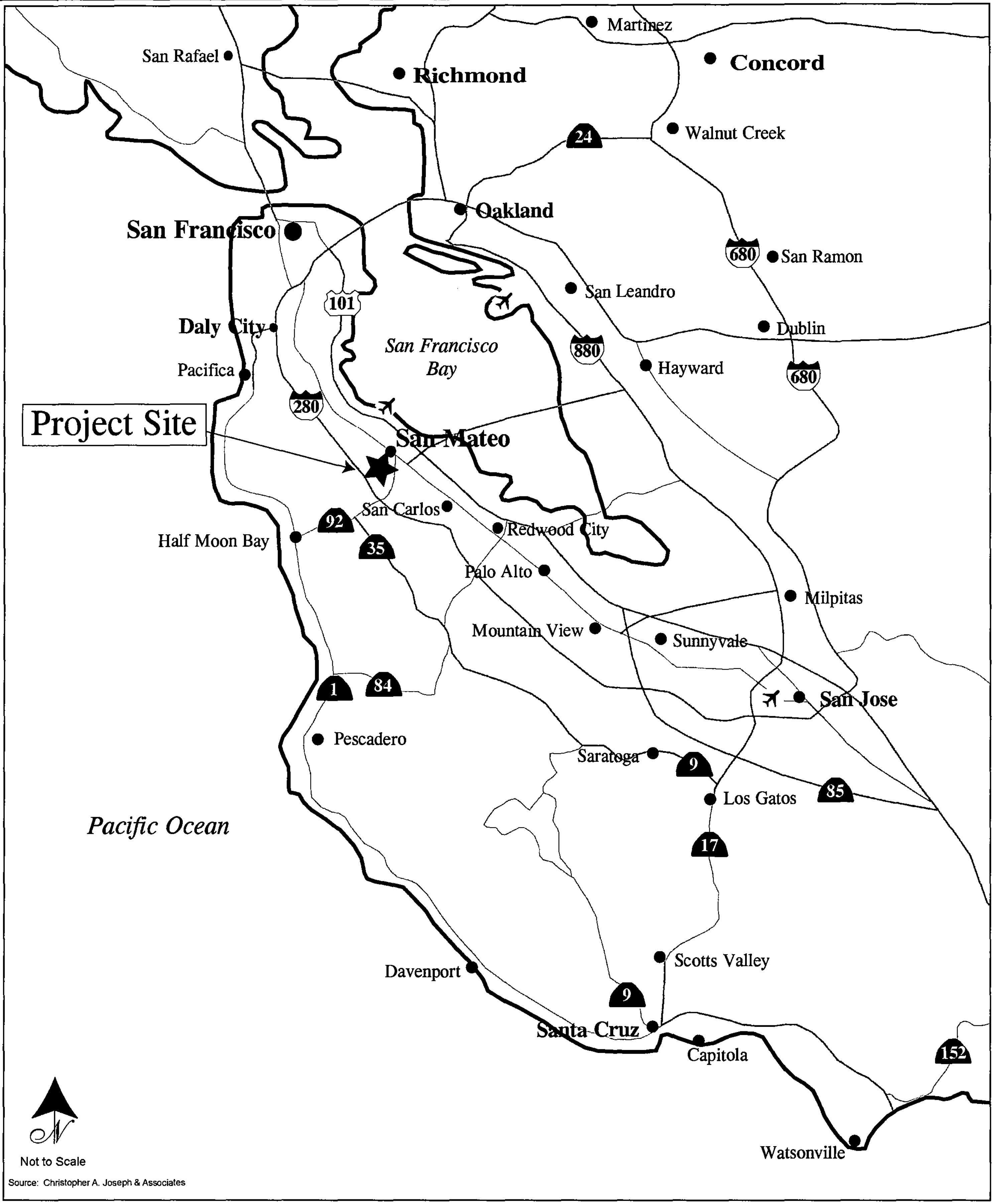
Project Description

The proposed project consists of a 25-lot single-family residential subdivision on a public street, with lot sizes ranging from 10,120 square feet to 17,590 square feet (see Figure 3). Lots are proposed to be located on both sides of a new public street, which would be 32 feet wide. Approximately 100,200 cubic yards (cy) of earth material would be graded for the proposed project on a slope averaging 40 percent. Specifically, the grading phase of the proposed project would require approximately 93,100 cy of cut material and 7,100 cy of fill material.

New utility lines would need to be installed to accommodate the proposed project. California Water Service would provide water services to the project site. Water lines would be connected to the site from two points: (1) the intersection of Bel Aire Road and the new public street built by the project site, and (2) an extension at the northeastern edge of the project site from the north where there are other single family homes receiving water service. Storm drain inlets would be provided near the project site entrance, the northeastern portion of the project site, and three points along the southern portion of the project site. Sanitary sewer lines would exit the project site at two points near the entrance and at the southwestern and northeastern portions of the project site. Sewer service would be provided by Crystal Springs Sanitary District.

The proposed project would provide recreational trails, a tot lot, and a conservation easement consisting of 32 percent (approximately two acres) of the total project site acreage. The conservation easement would be landscaped with native vegetation.

The individual homes of the proposed project would require building permits. The project applicant is requesting approval of the Tentative Subdivision Map and the Grading Plan.

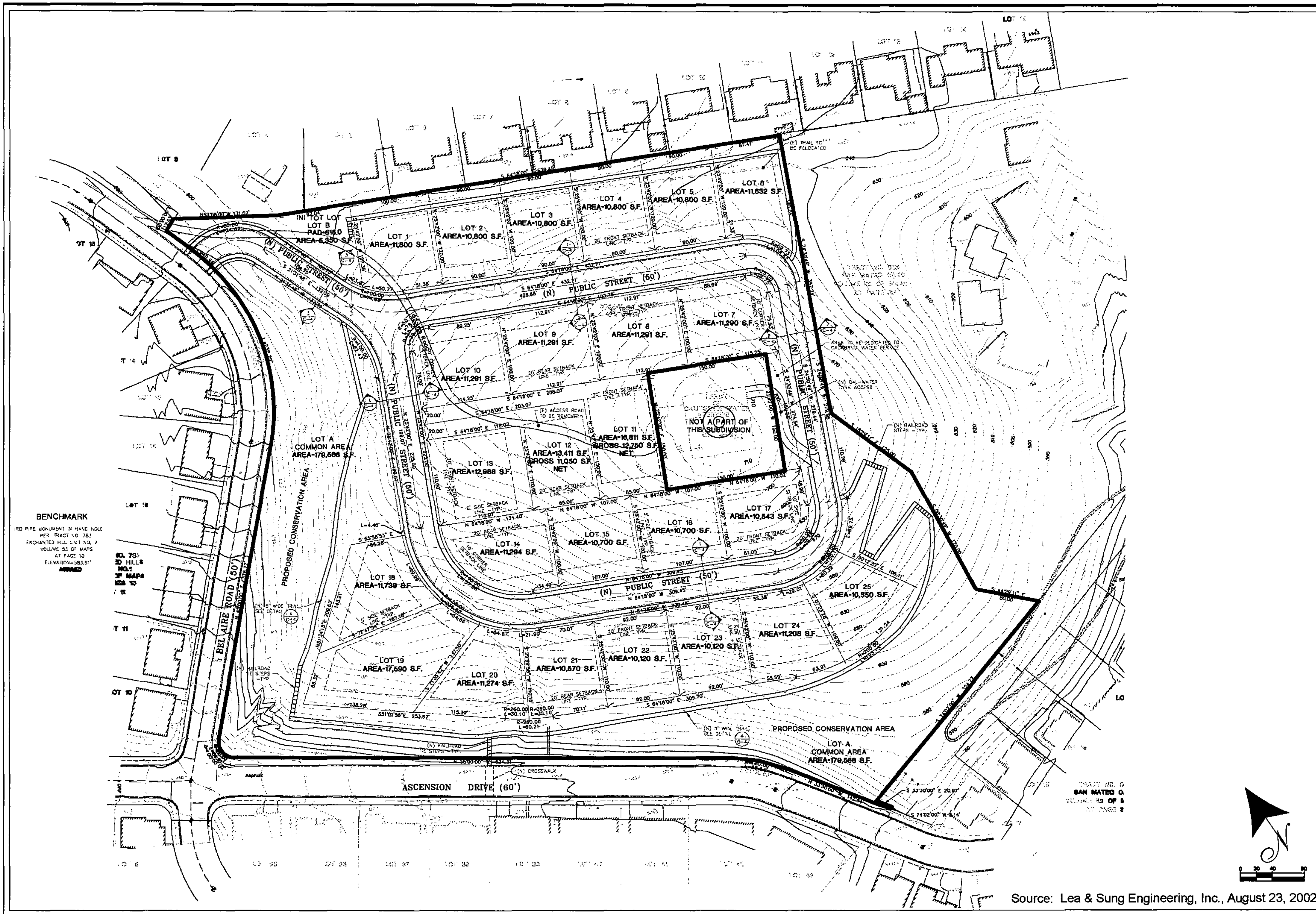


CHRISTOPHER A. JOSEPH & ASSOCIATES
Environmental Planning and Research

Figure 1
Regional Map

CHRISTOPHER A. JOSEPH & ASSOCIATES
Environmental Planning and Research

Figure 2
Aerial Photograph of the Project Site



Source: Lea & Sung Engineering, Inc., August 23, 2002.

CHRISTOPHER A. JOSEPH & ASSOCIATES
Environmental Planning and Research

Figure 3
Tentative Tract Map

ANSWERS TO INITIAL STUDY QUESTIONS

1. LAND SUITABILITY AND GEOLOGY

b. Involve construction on slope of 15% or greater?

The residential subdivision would require grading of approximately 100,200 cubic yards of earth on an average slope of 40 percent. Such grading is proposed in order to create suitable building pads and access roads. Additional analysis of these issues is required, including the project's relationship to applicable hillside grading codes and standards, and any required mitigation measures.

c. Be located in area of soil instability (subsidence, landslide or severe erosion)?

Historical landslide activity in the subdivision adjacent to the site indicates that the slopes may be highly susceptible to landslides. For example, a landslide occurred in 1983 between Rainbow Drive and Starlite Drive, approximately 800 feet northwest of the site. The north boundary (headscarp) of the 1983 landslide extended into the back yards of several Starlite Drive properties and threatened several homes. Another landslide occurred in 1997 between Polhemus Road and Rainbow Drive, approximately 1,200 feet northwest of the site. Additionally, surficial erosion is visible on-site. If not properly designed, the project could exacerbate soil erosion during runoff conditions. Therefore, additional analysis of these issues is required.

d. Be located on, or adjacent to a known earthquake fault?

The project site is located less than one mile east of the San Andreas Fault and the Alquist-Priolo Special Studies Zone. The project site will experience strong seismic ground shaking in the event of an earthquake along the San Andreas Fault. If not properly designed, significant damage could occur to proposed on-site buildings and roadways. Additional analysis is required.

f. Cause erosion or siltation?

The project site is subject to natural erosion and siltation during periods of high runoff. Surficial erosion is visible on-site. Soils would be exposed during grading and construction. If not properly designed, the project could result in slope erosion and siltation during runoff conditions. Additional analysis of these issues is required which documents anticipated increases in siltation.

i. Be located in an area where a high water table may adversely affect land use?

The project site is located within the Pulgas Watershed and within a groundwater basin. It is unknown at this time at what depth the water table is on-site. Because water table depths vary from place to place, additional analysis of this issue is required which documents the approximate water table depth and if it could affect the proposed project.

2. VEGETATION AND WILDLIFE

b. Involve cutting of heritage or significant trees as defined in the County Heritage Tree and Significant Tree Ordinance?

The proposed project would remove 37 of the 78 trees located on-site. Three of the 37 trees proposed to be removed are significant trees, which are 12-inches or more in diameter. It is unknown at this time if any of the 37 trees proposed to be removed are heritage trees. All of the large pine trees on the site will remain and the existing trees removed would be replanted with new native trees at a 3:1 ratio. Additional analysis of this issue is required, including a review of the Heritage Tree ordinances, a tree survey and, if necessary, the identification of any required mitigation measures.

c. Be adjacent to or include a habitat food source, water source, nesting place or breeding place for a federal or state listed rare or endangered wildlife species?

While the project site does not contain a natural water source, there are a variety of native and non-native trees on-site that may provide a habitat food source, nesting place or breeding place for a federal or state listed rare or endangered wildlife species. Existing trees proposed to be removed would be replanted with new native trees at a 3:1 ratio. The proposed project would also provide a conservation easement consisting of 32 percent (approximately two acres) of the total project site acreage. The conservation easement would be landscaped with native vegetation. Additional analysis of these issues is required, including the identification of required mitigation measures.

d. Significantly affect fish, wildlife, reptiles, or plant life?

The project site is undeveloped land that is characterized by both native and non-native vegetation. The project site would be graded to provide suitable building pads and an access road that would result in the removal of natural habitat. Additional analysis of this issue is required, including an inventory of existing flora and fauna, a determination of the project's potential impact to biological resources, and identification of existing standards and regulations relative to habitat protection and preservation, as well as any required mitigation measures.

f. Infringe on any sensitive habitats?

The project site is undeveloped land that is characterized by both native and non-native vegetation. The project site would be graded to provide suitable building pads and an access road that would result in the removal of natural habitat. Additional analysis of this issue is required, including an inventory of existing flora and fauna, a determination of the project's potential impact to biological resources and sensitive habitats, and identification of existing standards and regulations relative to habitat protection and preservation, as well as any required mitigation measures.

g. Involve clearing land that is 5,000 sq. ft. or greater (1,000 sq. ft. within a County Scenic Corridor), that has slopes greater than 20% or that is in a sensitive habitat or buffer zone?

The project site is not located within a County Scenic Corridor or a sensitive habitat or buffer zone. However, the proposed project would require the clearing of more than 5,000 square feet of land. The residential subdivision would require grading of approximately 100,200 cubic yards of earth on an average slope of 40 percent. Additional analysis of these issues is required, including the project's relationship to applicable hillside grading codes and standards, and any required mitigation measures.

3. <u>PHYSICAL RESOURCES</u>

b. Involve grading in excess of 150 cubic yards?

Grading of the project site is required in order to create suitable building pads and access roads. The project would require grading of approximately 100,200 cubic yards of earth. Additional analysis of these issues is required, including the project's relationship to applicable hillside grading codes and standards, and any required mitigation measures.

4. <u>AIR QUALITY, WATER QUALITY, SONIC</u>

a. Generate pollutants (hydrocarbon, thermal odor, dust or smoke particulates, radiation, etc.) that will violate existing standards of air quality on site or in the surrounding area?

Grading and construction of the project site would result in the creation of a variety of air pollutant emissions, such as fugitive dust, carbon monoxide, nitrogen dioxide, and sulfur dioxide. Such emissions may exceed the air quality standards established by the Bay Area Air Quality Management District (BAAQMD). During operation of the project, regional emissions would be generated by mobile sources, and to a lesser extent, stationary sources. Mobile emissions (e.g. carbon monoxide) would occur as a result of project-related motor vehicles traveling to and from the project site. Stationary source emissions would occur indirectly as a result of space and water heating systems, and various appliances. While operational emissions are not anticipated to exceed BAAQMD standards, additional analysis of air quality impacts from the project is required, including the identification of applicable regulations and any required mitigation measures.

c. Be expected to result in the generation of noise levels in excess of those currently existing in the area, after construction?

Long-term operation of the proposed project would increase the noise levels on the project site and at adjacent properties due to the increased residential population as well as the associated increase in vehicle trips. Additional analysis is required which documents adjacent noise-sensitive receptors, existing ambient noise levels, project-related construction and operational noise levels, noise impacts upon adjacent uses, applicable noise standards and regulations, and any required mitigation measures.

f. Generate noise levels in excess of levels determined appropriate according to the County Noise Ordinance standard?

Implementation of the proposed project may result in an increase in ambient noise levels during both the construction phase and the operational phase. During the construction phase, heavy equipment and machinery would be used to grade the site, to install various infrastructure, and to construct the access roads and single-family residences. These activities may increase the existing noise levels at adjacent residential properties in excess of levels determined appropriate. All grading and construction activities are required to adhere to standards contained in the County's Noise Ordinance (e.g. hours of construction). Long-term operation of the proposed project would increase the noise levels on the project site and at adjacent properties due to the increased residential population and as well as the associated increase in vehicle trips. Additional analysis is required which documents adjacent noise-sensitive receptors, existing ambient noise levels, project-related construction and operational noise levels, noise impacts upon adjacent uses, applicable noise standards and regulations, and any required mitigation measures.

g. Generate polluted or increased surface water runoff or affect groundwater resources?

Without proper mitigation, the proposed project could contribute to the degradation of existing surface water quality conditions, primarily due to: 1) potential erosion and sedimentation during the grading phase; 2) automobile/street-generated pollutants (e.g., oil and grease, tire wear, etc.); 3) fertilizers associated with landscaping; and 4) particulate matter from dirt and dust generated on the project site.

The project site contains an access road used for the water tank and cell sites. The remainder of the project site consists of undeveloped land. Construction of the project would result in an increase in impermeable surfaces, which would increase existing storm water runoff levels.

Additional analysis is required which documents the project's potential to degrade water quality during the grading/construction and operational phases, as well as the increased runoff associated with the project. The additional analysis shall also document the adequacy of the applicant's proposed best management practices (BMPs) as well as existing water quality regulations and standards and any required mitigation measures.

h. Require installation of a septic tank/leachfield sewage disposal system or require hookup to an existing collection system which is at or over capacity?

The project applicant proposes a sanitary sewer system for wastewater disposal instead of septic systems. The Crystal Springs County Sanitation District serves the project area. Additional analysis is required which documents the existing and projected available wastewater treatment capacity, future sewage generation by the proposed project, capacities of sewer lines that would serve the project site, and any required mitigation measures.

5. TRANSPORTATION

c. Result in noticeable changes in vehicular traffic patterns or volumes (including bicycles)?

The proposed project would bring additional traffic to a site that previously only was visited by maintenance vehicles for the water tank and cell sites. A traffic study for the proposed project is required which documents existing traffic levels in the area, traffic operating levels of service, future traffic levels, potential traffic impacts from the proposed project, and any required mitigation measures.

e. Result in or increase traffic hazards?

Several of the roads that access the project area are relatively steep (e.g. portions of Bel Aire Road and Ascension Drive). Also, the access road to the project site is located on a curve on Bel Aire Road. This curve may represent potential traffic hazards for vehicles entering and exiting the project site. Conversely, the increased vehicular traffic entering and exiting the project site may create traffic hazards for motorists traveling on Bel Aire Road. The grading phase of the proposed project also requires the use of heavy trucks to export approximately 86,000 cy of soil from the site to an off-site location. These circumstances warrant additional analysis and mitigation, as necessary.

g. Generate traffic which will adversely affect the traffic carrying capacity of any roadway?

The addition of 25 single-family homes would add traffic to the roadways surrounding the project site. A traffic study for the proposed project is required which documents existing traffic levels in the area, traffic operating levels of service, future traffic levels, traffic impacts from the proposed project, and any required mitigation measures.

6. LAND USE AND GENERAL PLANS

f. Adversely affect the capacity of any public facilities (streets, highways, freeways, public transit, schools, parks, police, fire, hospitals), public utilities (electrical, water and gas supply lines, sewage and storm drain discharge lines, sanitary landfills) or public works serving the site?

A traffic study for the project is required which documents existing traffic levels in the area, traffic operating levels of service, future traffic levels, traffic impacts from the proposed project, and any required mitigation measures.

Implementation of the proposed project would result in an increase in residential population at the project site, resulting in increased demands for various public facilities (e.g. schools, parks, sheriff and fire) and public utilities (e.g. electricity, water, natural gas, sewage, storm drains, and sanitary landfills). Such increased demands may affect the capacity of public facilities and utilities. Additional analysis is required, including: 1) identification of the locations and capacities of each public service and utility; 2) the project's demand for public services and utilities; 3) impacts to the various public facilities and utilities; 4) applicable County and/or state regulations (e.g. water conservation measures, recycling requirements, school impact fees, etc.); and any required mitigation measures.

g. Generate any demands that will cause a public facility or utility to reach or exceed its capacity?

Implementation of the proposed project would result in an increase in residential population at the project site, resulting in increased demands for various public facilities (e.g. schools, parks, sheriff and fire) and public utilities (e.g. electricity, water, natural gas, sewage, storm drains, and sanitary landfills). Such increased demands may cause a public facility or utility to reach or exceed its capacity. Additional analysis is required, including: 1) identification of the locations and capacities of each public service and utility; 2) the project's demand for public services and utilities; 3) impacts to the various public facilities and utilities; 4) applicable County and/or state regulations (e.g. water and energy conservation measures, recycling requirements, school impact fees, etc.); and any required mitigation measures.

h. Be adjacent to or within 500 feet of an existing or planned public facility?

The project site encloses a piece of property (which is not part of the proposed project) housing a water tank owned by the California Water Service Company. The College of San Mateo is located approximately 350 feet northeast of the project site. Two rows of housing and Parrot Drive separate the project site from the College. No significant impact is anticipated.

i. Create significant amounts of solid waste or litter?

Implementation of the proposed project would result in an increase in solid waste generated at the site on a daily basis. This issue requires additional analysis, including: the identification of landfills that accept solid waste from the project area; the existing and planned future capacities of each landfill; the daily amount of solid waste to be generated by the proposed project; existing recycling regulations; and any required mitigation measures.

j. Substantially increase fossil fuel consumption (electricity, oil, natural gas, coal, etc.)?

Implementation of the proposed project would result in an increase in residential population at the project site, resulting in increased demands for electricity and natural gas. Additional analysis is required which documents the utility service providers, the daily amount of electricity and natural gas to be consumed by the project, an assessment as to whether the utilities can adequately serve the project site, energy conservation measures, and any required mitigation measures.

7. AESTHETIC, CULTURAL AND HISTORIC

a. Be adjacent to a designated Scenic Highway or within a State or County Scenic Corridor?

The project site is not located within a scenic corridor. However, the project site is located outside of the I-280 State Scenic Corridor which is an important viewpoint. Development of the project may result in the obstruction of scenic views from existing public viewing locations. Additional analysis is required which documents the existence of scenic views in the area, as well as the identification of applicable County aesthetic standards, and any required mitigation measures.

b. Obstruct scenic views from existing residential areas, public lands, public water body, or roads?

The project site is not located within the I-280 State Scenic Corridor but is located within the Polhemus County Scenic Corridor. Development of the project may result in the obstruction of scenic views from existing public viewing locations. Additional analysis is required which documents the existence of scenic views in the area, as well as the identification of applicable County aesthetic standards, and any required mitigation measures.

e. Visually intrude into an area having natural scenic qualities?

The project site is undeveloped land characterized by natural scenic qualities. Construction of the project would eliminate areas that contain natural scenic qualities. Existing trees removed would be replanted with new native trees at a 3:1 ratio. The proposed project would provide a conservation easement consisting of 32 percent (approximately two acres) of the total project site acreage. The conservation easement would be landscaped with native vegetation. The project site is also surrounded by existing residential uses. However, additional analysis of the project's impact on natural scenic qualities is required, including an assessment of proposed on-site landscaping, and any other required mitigation measures.

APPENDIX B

RESPONSES TO NOP & COMMENTS FROM EIR SCOPING MEETING

THOMAS SUBDIVISION

PLEASE SIGN IN Meeting 12/4/03

#	NAME	ADDRESS
1	GERALD McCLELLAN	1899 PARROTT DR S.M. 94402
2	Jean Kidera	1432 Bel Aire Rd. S M 94402
3	Ron & Arlene Johnson	1348 Parrott
4	Gilma P. Walker	155 STARLITE DRIVE, S.M 94402-3638
5	David J. O'Connor	1348 Enchanted Way, SM 94402
6	Pauline Yoshida	164 Starlite Dr. San Mateo 94402
7	JACK + MERI BEEMAN	1526 PARROTT DR. 94402
8	[illegible] N Chas Reed	1283 Parrott 94402
9	Don & Else Welch	1550 PARROTT Dr. 94402
10	NEVAIR MURRAY	1563 PARROTT Dr. 94402
11	CAROL McGRAW	1944 PARROTT D 94402
12	[illegible] Weller	1450 PARROTT DR. 94402
13	HAYA & URSULA WONG	1582 Ascension Dr 94402
14	FRANK Stissler	1583 Ascension Dr 94402
15	[illegible] Schaffer	1596 Ascension
16	Linda Ozanne	1434 Enchanted Way 94402
17	Jerry Ozanne	" " " "
18	Carl M. Pileri	1725 Los Altos Drive S.M 94402
19	Harris Dubrow	1705 Los Altos Dr
20	TED GLASGOW	1597 ASCENSION DR S.M 94402
21	Marie O'Rourke	124 CSM Dr. 94402
22	Eamonn O'Brien-Strain	107 Starlite Dr, San Mateo 94402
23	Peggy "	"
24	Lloyd & J. Graham	140 CSM Dr. San Mateo 94402
25	Pat McGuire	1610 Ascension Drive San Mateo 94402

PLEASE SIGN IN Meeting 12/4/03

#	NAME	ADDRESS
26	GENE CIRANNI Gene Ciranni	1606 Ascension
27	JIM HART	1474 ASCENSION Dr.
28	Pat O'Neil	2108 Los Altos Dr
29	KEVIN ROSE	OFFICE OF SUPERVISOR CHURCH 400 COUNTY CENTER RWC 94063
30	Marian Sosnick	1605 Ascension Dr. S.M. CA 94402
31	Tony DeZego/Brian Brown	1911 Los Altos Dr. SM CA 94402
32	PAUL HOCKETT	32 VALLEY VIEW CT SM, CA 94402
33	ART GRINSTEAD	1527 PARROTT DRIVE, SM CA 94402
34	Chiachu Hsu	180 Kristin Ct S/M CA 94402
35	ALI GIVECHI	1512 ASCENSION
36	Marc & Ines Malardino	28 Valley View Ct
37	Lee B & Maggie Bussey	1561 Ascension Dr., SM CA 94402
38	Jack Prost	30 Mt. View Pl. SM " "
39	Marge Prost	" " " " " " " "
40	Heinz Moser	1566 Ascension Drive SM, 94402
41	Kathy EVERITT	#5 PARROTT CT SM 94402
42	Scott Miller	1635 Ascension Dr. SM 94402
43	Helen Hann	1383 Enchanted Way SM 94402
44	Peter Laurence	1542 Ascension Dr.
45	Donald Nagle	1538 Parrott Drive, San Mateo 94402
46	Cliff Donley	30 Shelburne Place, San Mateo 94402
47	Pam + Gordy Stroud	1486 Parrott Dr SM 94402
48	Giffin Oliver	1601 Ascension Dr SM 94402
49	Mark Williams	1414 BEL AIRE ROAD, SM 94402
50	Robert Bergeron	1654 Ascension Drive

THOMAS SUBDIVISION

PLEASE SIGN IN Meeting 12/4/03

#	NAME	ADDRESS
51	Barbara Mikulic	132 CSM Drive
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(1)

Speaker's Request Form

Date: 12-4-03

Your Name (Please Print): ______

Your Mailing Address: Organized Presentation

Phone No. ______ Fax No. (optional) ______

E-mail address (optional): ______

Your Organization or Affiliation (if any): ______

Please provide a brief summary of your position:

☐ Support ☐ Oppose ☐ Oral Communication

Comments:

(1) Peggy O'Brien Sprain

(2) Gerald McClellan

(3) Jerry Ozanne

Thank you!

4

County of San Mateo • Planning and [illegible]lding Division

Speaker's Request Form

Date: 4 Dec 2003

Your Name (Please Print): Jean Kidera

Your Mailing Address: 1432 Bel Aire Road
San Mateo CA 94402-3518

Phone No. (650) 341-0487 Fax No. (optional) ______

E-mail address (optional): ______

Your Organization or Affiliation (if any): —

Please provide a brief summary of your position:

☐ Support ☒ Oppose ☐ Oral Communication

Comments: A number of houses on Bel Aire Road have had problems due to the instability of the land. In 1989 our house was stabilized with pilings down to bed rock. Since that time there has been a drop of 4+ inches of a brick patio at the back of the house.* Cracks have continued to appear in the garage and basement areas.

There also is the problem of water in these hills, which would also be →

Thank you!

* I invite anyone who wishes to inspect this to contact me.

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a problem as far as stability is concerned.

Although there are numerous trees on the property, we planted bushes and ivy to help control erosion.

5

County of San Mateo • Planning an[d Bu]ilding Division

Speaker's Request Form

Date: December 4, 200

Your Name (Please Print): Donald Nagle

Your Mailing Address: 1538 Parrott Drive
San Mateo, CA 94402

Phone No. 377-0207 Fax No. (optional)

E-mail address (optional)

Your Organization or Affiliation (if any):

Please provide a brief summary of your position:

☐ Support ☒ Oppose ☐ Oral Communication

Comments:

- I have Health concerns from the lengthy exposure to dust & particulates
- Concerned about cutting down heritage trees on the site
- Concerned about the close proximity of the site to properties on Parrott that have heritage trees.
- Where are the construction workers going to park?
- Concern about wildlife impacts

Thank you!

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6

County of San Mateo • Planning an[d Bu]ilding Division

Speaker's Request Form

Date: 12/4/22

Your Name (Please Print): TED GLASGOW

Your Mailing Address: 1597 ASHBURTON DR
S,M 94402

Phone No. 574-2321 Fax No. (optional)

E-mail address (optional)

Your Organization or Affiliation (if any):

Please provide a brief summary of your position:

☐ Support ☒ Oppose ☐ Oral Communication

Comments:
SIZE OF PROJECT IS
TO LARGE

FIRE CONCERNS

Thank you!

1

County of San Mateo • Planning an[d B]uilding Division

Speaker's Request Form

Date: ____________________

Your Name (Please Print): Harris Dubrow

Your Mailing Address: 1705 Los Altos Dr

Phone No. ____________ Fax No. (optional) ____________

E-mail address (optional) ____________________

Your Organization or Affiliation (if any): ____________________

Please provide a brief summary of your position:

☐ Support ☐ Oppose ☑ Oral Communication

Comments: ____________________

Thank you!

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8

County of San Mateo • Planning an[ ]ilding Division

Speaker's Request Form

Date: 12/5/03

Your Name (Please Print): Pat McGuire

Your Mailing Address: 1610 Ascension Drive
San Mateo, CA 94402

Phone No. 341-5275 Fax No. (optional)

E-mail address (optional)

Your Organization or Affiliation (if any): homeowner
San Mateo Oaks

Please provide a brief summary of your position:

☐ Support ☒ Oppose ☒ Oral Communication

Comments: Impact of
A. Slides (1) Pohlemus Road
(2) Los Altos Drive
B. Traffic - Ascension/Bel Aire/Laurie/Parrott
C. CSM Housing Project

Thank you!

vpdata\admin\spkrsfrm.vp pg5 2-25-03 ds

9

County of San Mateo • Planning and Building Division

Speaker's Request Form

Date: 12/4/03

Your Name (Please Print): GENE CIRANNI

Your Mailing Address: 1606 ASCENSION DRIVE

Phone No. 349-6738 Fax No. (optional)

E-mail address (optional)

Your Organization or Affiliation (if any): S.M. OAKS HOMEOWNERS ASS'N

Please provide a brief summary of your position:

☐ Support ☑ Oppose ☐ Oral Communication

Comments: AS PART OF EIR PROCESS CAN WE GET A GUARANTY, IN PERPETUITY, FROM THE COUNTY THAT IT WILL FINANCE AND ~~CONSTRUCT~~ REPAIR ANY FUTURE DAMAGE FROM LANDSLIDES WATER (UNDERGROUND) MOVEMENTS, ETC.?

Thank you!

10

County of San Mateo • Planning an[d Bu]ilding Division

Speaker's Request Form

Date: 12/03/03

Your Name (Please Print): PETER LAWRENCE

Your Mailing Address: 1542 Ascension

Phone No. 574-1277 Fax No. (optional)

E-mail address (optional)

Your Organization or Affiliation (if any):
Resident

Please provide a brief summary of your position:

☑ Support ☐ Oppose ☐ Oral Communication

Comments: A quality development is possible in this area. The tot park, walking trail, and revegetation are all positive aspects. While open space is wonderful, a park is not possible. There are property rights involved, and mine are diminished if those of the developer are abused.

Thank you!

\\(

County of San Mateo • Planning and lding Division

Speaker's Request Form

Date: ______________

Your Name (Please Print): Frank Shissler

Your Mailing Address: 1583 Ascension Dr.

____

Phone No. 345 6462   Fax No. (optional) ______________

E-mail address (optional): ______________

Your Organization or Affiliation (if any): ______________

____

Please provide a brief summary of your position:

☐ Support   ☑ Oppose   ☐ Oral Communication

Comments: ______________

Thank you!

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(12)

County of San Mateo • Planning and Building Division

Speaker's Request Form

Date: 12/4/03

Your Name (Please Print): Barbara Mikulic

Your Mailing Address: 132 CSM Drive
San Mateo, CA 94402

Phone No. 574 1923 Fax No. (optional)

E-mail address (optional)

Your Organization or Affiliation (if any): San Mateo Oaks homeowners

Please provide a brief summary of your position:

☐ Support ☒ Oppose ☐ Oral Communication

Comments: Environmental report
— 1 c, d, F, i, 2 b, c, D, f, g
3 b, 4 a, f, g, h, 5 E, G
7 a, b
V 1 + 3
need I say more!

Thank you!

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* Earthquake
* Erosion
* Landslides

surrounding properties affecting their slope.

Polhemus side —
twice

(13)

County of San Mateo • Planning and Building Division

Speaker's Request Form

Date: 12/4/03

Your Name (Please Print): Giffin Oliver

Your Mailing Address: 1601 Ascension Dr.
San Mateo CA 94402

Phone No. ______ Fax No. (optional) ______

E-mail address (optional) giffinoliver@hotmail.com

Your Organization or Affiliation (if any): ______

Please provide a brief summary of your position:

☐ Support ☐ Oppose ☑ ~~Oral Communication~~ Questions/Concerns

Comments:

- Where will wildlife go, such as deer, coyotes, rodents? What impact will their displacement have on local homes?
- I'm concerned about the removal of so many trees, especially heritage trees. I look up at the hillside from my bedroom ~~kitchen~~, family room & back garden - ~~and~~ it is a beautiful view, and one of the reasons we bought our home.
- I have a small child & am concerned about air pollution & traffic.

Thank you!

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- I'm concerned about negative impact the construction process will have on property values. a messy construction project will deter new buyers and/or lower market prices, at least temporarily. If we have to sell before project is completed, we'll have to sell at a loss.
- we live across the street from the proposed project. I'm concerned about what impact all the regrading will have on our property. ~~If we need to sell we have for some reason~~

Major Themes For
Thomas Subdivision Draft EIR

December 4, 2003

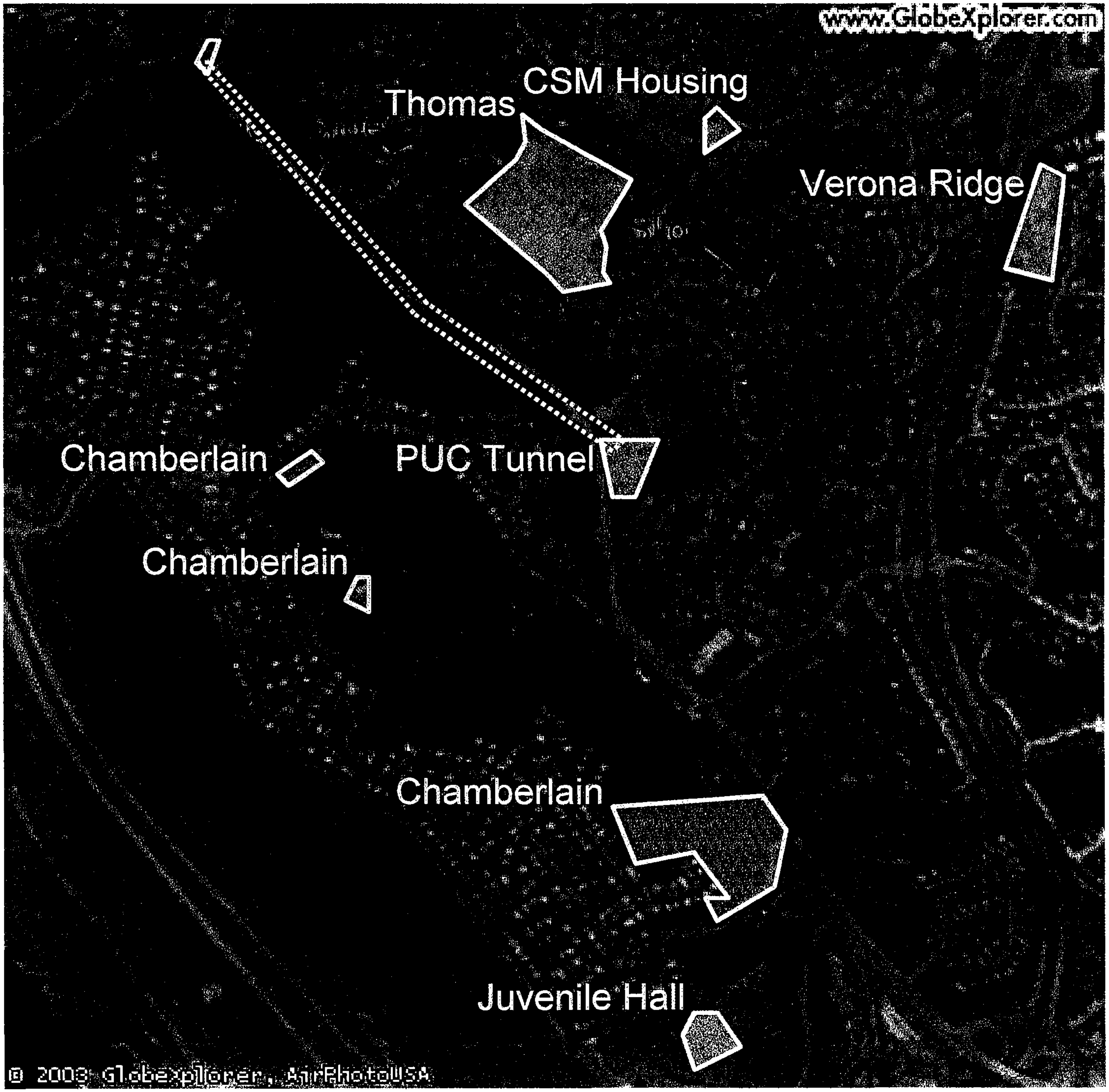
Baywood Park Homeowners' Association

Peggy O'Brien-Strain, President
Gerard Ozanne, Vice President
Gerald McClellan, Director

Major Interrelated Issues

For each dimension of EIR, consider:

- Cumulative impacts
- Magnitude of the project
- Health and safety concerns


www.GlobeXplorer.com
Thomas
CSM Housing
Verona Ridge
Chamberlain
PUC Tunnel
Chamberlain
Chamberlain
Juvenile Hall
© 2003 GlobeXplorer, AirPhotoUSA

Magnitude: Over 43,000 trips?

- Grading: **100,200** cubic yards (cy) of earth
- 86,000 cy moved offsite and returned
- Move off 8 cy per truck: 10,750 truckloads
- Move back 8 cy per truck: 10,750 truckloads
- 2 passes per truckload =

43,000 truck trips for soil alone

43,000 truck trips = 100 truckloads per day for 10 months

Example questions for the EIR:

- Which homes will these trucks pass?
- What is the wear and tear on our streets?
- How will slow trucks on steep hills impact traffic?
- How will heavy trucks on sharp curves impact safety?

Health and Safety

Gerard Ozanne, MD
University of California, San Francisco

Health and Safety: Airborne Contaminants

- Inhabitants surround project / access streets
- Wind: speed, prevailing direction, inversions
- Particle size: PM10, PM2.5 (airborne for weeks)
- Soil Dust
  - Allergens, pollens, mold spores (Aspergillus fumigatus), silica particles, asbestos
  - Particle size: PM10, PM2.5
  - Quantity and duration of exposures by location

Airborne Contaminants

- Diesel Exhaust
  - •Oxides of nitrogen, particulate matter (carbon spheres 0.1 micron), carbon monoxide, and hydrocarbons (100's)
  - •Quantity and duration of exposures by locations
- Brake Lining Debris
  - •Particle Size: 2-6 micron (50% airborne)
  - •Non-asbestos materials untested for safety

Consequences from Airborne Pollution

- Increased mortality, chronic bronchitis, respiratory infections, ischemic heart disease, stroke, cancer and asthma (Epidemiological, lab studies)
- Highest risks to elderly, young, compromised immune system
- Adjacent neighbors with life-threatening pulmonary disease (down wind)

Consequences from Airborne Pollution

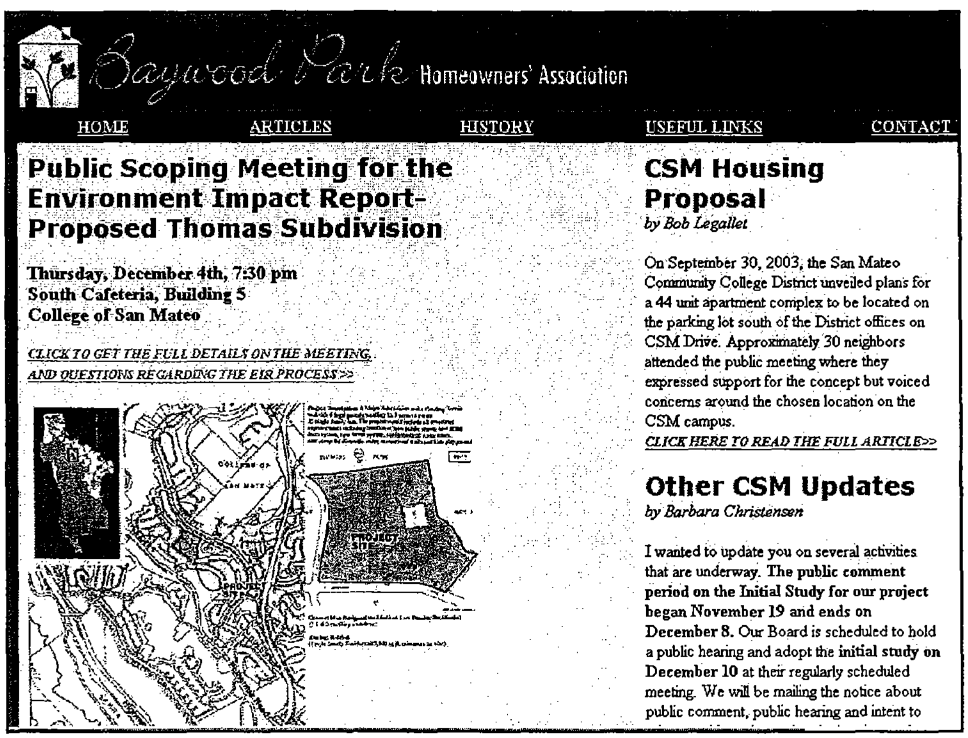
"Expert opinion is that there is no threshold concentration below which particulates have no effect on health."

Health and Safety: Other Concerns

- Noise Pollution
  - 9-12 months, trucks every 3-4 minutes
  - Construction
- Rodent disruptions
- Traffic Safety
  - Limited Access
  - 10,000's truck trips (brake, steering failure)
  - Accidents

Keep Neighborhood Involved

- BPHA is happy to facilitate communication between neighbors and project members.
- HOAs other than BPHA are also concerned about potential impacts.
- Website offers setting to share documents: www.baywood.org.



Baywood Park Homeowners' Association

HOME ARTICLES HISTORY USEFUL LINKS CONTACT

Public Scoping Meeting for the Environment Impact Report- Proposed Thomas Subdivision

Thursday, December 4th, 7:30 pm
South Cafeteria, Building 5
College of San Mateo

CLICK TO GET THE FULL DETAILS ON THE MEETING AND QUESTIONS REGARDING THE EIR PROCESS>>

CSM Housing Proposal
by Bob Legallet

On September 30, 2003, the San Mateo Community College District unveiled plans for a 44 unit apartment complex to be located on the parking lot south of the District offices on CSM Drive. Approximately 30 neighbors attended the public meeting where they expressed support for the concept but voiced concerns around the chosen location on the CSM campus.
CLICK HERE TO READ THE FULL ARTICLE>>

Other CSM Updates
by Barbara Christensen

I wanted to update you on several activities that are underway. The public comment period on the Initial Study for our project began November 19 and ends on December 8. Our Board is scheduled to hold a public hearing and adopt the initial study on December 10 at their regularly scheduled meeting. We will be mailing the notice about public comment, public hearing and intent to

Baywood Park Homeowners' Association

Results of the Public Scoping Meeting for the Environment Impact Report Proposed Thomas Subdivision

Thursday December 4th at 7:30 pm
South Cafeteria, Building 5
College of San Mateo

Here were some overall comments that were made by some of the meeting attendees:

1. Several people expressed concern over the issue of earth movement and landslides. One resident spoke of the fact that since her home was stabilized in 1989, her patio had dropped by 4". Another resident indicated that San Mateo Oaks spent over $750,000 fixing their own slide.

2. Many traffic issues were cited. The concerns about limited points of access to the proposed area were brought to light. Additionally, one member questions where all of these construction workers plan on parking. Another resident spoke of recurring car crashes into her wall that have happened due to current road conditions, and believes it will only worsen when the development traffic begins. Also, another resident indicated that the intersection at Parrott and Laurie is very treacherous, and will also get worse.

3. The cutting of heritage trees was also addressed. One homeowner spoke of the fact that several large limbs on his trees were encroaching on the project area, and how he has no intention of having those limbs disturbed.

4. Several health issues were cited. One resident spoke of his family's chronic allergies, and worries about the change in air quality after the project begins. Many concerns were raised over the health and safety of the seniors in the neighborhood as well.

5. One resident cited the concern over the upgrading of local utilities (electricity, phone, gas), and what changes would be implemented that would directly impact current homeowners.

6. Another consideration by many was the different projects that can all be happening concurrently (Chamberlain, Thomas, Juvenile Facility, Tunnel, etc.) and the dramatic impact they will have on traffic and general neighborhood disruption.

Can you think of anything you'd like to contribute? If you were unable to attend the meeting, it's not too late to get your issues considered in the EIR. There's still time to send your comments to us, so we can forward them on to the county. All comments are due no later than December 18th to the county, so submit them to us ASAP via:

ENVIRONMENTAL SERVICES AGENCY

Agricultural Commissioner/ Sealer of Weights & Measures

Animal Control

Cooperative Extension

Fire Protection

LAFCo

Library

Parks & Recreation

Planning & Building

November 25, 2003

Baywood Park Homeowners' Association
Attn: Gerald McClellan
1899 Parrott Drive
San Mateo, CA 94402

Baywood Park HOA
Attn: Peggy O'Brien-Strain
107 Starlite Drive
San Mateo, CA 94402

Dear Baywood Park Homeowners' Association:

SUBJECT: **Thomas Subdivision Public Scoping Meeting (PLN2002-00517)**

This letter is in response to your fax dated November 23, 2003 in relation to the Public Scoping meeting on December 4, 2003 and a number of questions you have raised. I hope this letter clarifies the purpose of the scoping session for your association.

The scoping session allows an opportunity for the community and other interested parties to attend and express their comments or concerns on the project and the Initial Study in order to help to define the scope of the EIR. This is an information-gathering meeting for the EIR consultants hired by the County (Christopher Joseph & Associates) to focus their research and analysis for the preparation of the Draft EIR. If a person is not able to attend the scheduled scoping meeting, they also have the ability to submit their comments in writing in response to the NOP.

The California Environmental Quality Act (CEQA) and the CEQA Guidelines guide the process for the preparation of EIR documents. The NOP is the initial step which notifies all interested parties and initiates a 30-day response period. This notice was mailed out on October 10, 2003. Therefore the noticing period through to December 18, 2003 already provides an extended period for comments to be received (more than 60 days or two times the State requirement). However, comments received outside of that period may still be accepted by the County and may be considered by the EIR consultants in the preparation of the Draft EIR. Also, please be aware that there will be other opportunities for your association to comment on the various stages of the EIR.

In your letter, you list two areas that you feel were deficient in the Initial Study Checklist. These are the health and safety impacts of the construction phase and

PLANNING AND BUILDING
455 County Center, 2nd Floor • Redwood City, CA 94063 • Phone (650) 363-4161 • FAX (650) 363-4849

the cumulative impacts of other pending development projects in the area. The Public Scoping Meeting provides you with an opportunity to raise these concerns and to request that these issues are investigated and discussed in greater detail in the Draft EIR. The Draft EIR will discuss potential air quality health impacts during the grading, construction and operational phases of the project. The Draft EIR will also analyze the potential cumulative impacts associated with implementation of the proposed project and other pending projects in the area.

You listed specific questions in relation to the Initial Study and the Public Scoping meeting at the end of your letter. I respond to each one of these below:

Initial Study

1. *Who completes this document?*

   This was completed by the EIR consultants hired by the County to undertake the EIR, Christopher Joseph & Associates. The Initial Study was also reviewed by the County of San Mateo Department of Planning & Building.

2. *Who decides the significance of any particular impact? On whose expertise is that impact decided? Which, if any experts are consulted?*

   Christopher Joseph & Associates completed the Initial Study with input from the County and from other sub-consultants including Hexagon Transportation Consultants, Gilpin Geosciences, Inc and Schaaf & Wheeler Civil Engineers. The Initial Study is a preliminary document and during the review process of the EIR, certain impacts may change in significance and others may be introduced. The purpose of the Initial Study and the Scoping Meeting is to highlight areas of concern which will be investigated and researched during the preparation of the Draft EIR. Based on the Initial Study, virtually all environmental issues on the checklist will be analyzed in detail in the Draft EIR, with the exception of a few issues which were found to be less than significant such as the loss of agricultural resources and mineral resources. The Draft EIR will have "Thresholds of Significance" for each environmental issue area which determines when a significant impact is generated by the proposed project.

3. *What criteria are used to decide the impact of any particular category? Who provides the data used to make that decision?*

   The Initial Study is a preliminary document used to highlight areas of concern as determined by the EIR consultants, their sub-consultants and the County. Comments received during the 30-day public review period and during the Public Scoping meeting may introduce additional areas of concern or may change the level of significance of certain impacts. The Draft EIR will have "Thresholds of Significance" for each environmental issue area which determines when a significant impact is generated by the proposed project.

4. *Can the degree of impacts listed in this checklist be changed?*

   Yes, the degree of impacts can be redefined as part of the Draft EIR.

Public Scoping Meeting

1. *What are the ground rules for this meeting? What is the protocol for presentation of questions and data? Is there a time limit?*

   The meeting will consist of a brief introduction to the purpose of the meeting and the background of the project by County Staff and representatives from Christopher Joseph and Associates and their sub-consultants. Then attendees will be invited to present their comments and concerns. The meeting will be tape-recorded to ensure that all comments are accurately received. There will be a sign-in sheet for all attendees to complete and if people wish to speak, there will be speaker slips to be completed, again to ensure there is a correct record of who attended and who spoke. If you wish to submit your comments in writing at the meeting, please hand them directly to myself or else these can be mailed after the meeting to the above address. There is no specific time limit for each speaker. The room is available for two hours which should allow adequate time for all speakers to present their comments.

2. *Will the developer or the County provide answers to our questions?*

   The purpose of this meeting is not to provide definite answers to questions. The EIR consultants will listen to all the concerns and this will help to develop a more defined scope for the Draft EIR. Concerns raised at this stage will be addressed in the Draft EIR.

3. *What will be the time frame for providing those answers?*

   The next step in the process is to receive and review comments from this public review period and then to prepare a Draft EIR. The timeframe for this will depend on the number of comments received. The Draft EIR will be available for public review in a couple of months.

4. *What is the protocol for presentation of written data?*

   Written data can be submitted directly to myself at the meeting or can be mailed afterwards. If a speaker wishes to read the data at the meeting, that would acceptable also, time permitting.

5. *How will public comments and data provided through this process be considered for inclusion as a study item in the EIR. Who makes that decision and on what basis?*

   All comments received will be considered and included in the preparation of the Draft EIR. There will be a 45-day public review period for the Draft EIR as well as a public hearing on the Draft EIR. Additional comments on the adequacy of the Draft EIR can also be received at that time.

I hope the above information is useful to yourselves. If you have any questions, prior to the meeting, please contact me at 650/363-1829.

Sincerely,

G. Rowan

Gabrielle Rowan
Project Planner

c.c. Supervisor Mark Church
Marcia Raines, Environmental Services Director
Terry Burnes, Planning Administrator
[redacted]

GERALD McCLELLAN
1899 PARROTT DR., SAN MATEO, CA. 94402

January 12. 2004

Terry Burnes, Planning Administrator
Planning and Building Division
455 County Center, 2nd Floor
Redwood City, CA 94063

RE: Thomas Subdivision #PLN 2002-00517

Regarding the above project, our Association is formally requesting a copy of the proposed Scope of Work document which will be presented to the Board of Supervisors for approval, in addition to the approved Contract for the Environmental Impact Report.

We would appreciate receiving this proposed Scope of Work document in a timely manner prior to it's being presented to the Board, so that we may review and comment appropriately.

By way of this letter, we are also advising that we will be submitting a specific Mitigated Alternative, with supporting documents, for study by the EIR Consultants, in the near future.

Sincerely,

G McClellan

Gerald McClellan
Land Use Committee
Baywood Park Homeowner's Association

(650) 345-9930

cc: Gabrielle Rowan, Planner

GERALD McCLELLAN
1899 PARROTT DR., SAN MATEO, CA. 94402
BAYWOOD PARK HOMEOWNER'S ASSOCIATION

January 21, 2004 BY: FAX & Mail

Terry Burnes, Planning Administrator
Planning and Building Division
455 County Center, 2nd Floor
Redwood City, Ca 94063

RE: Thomas Subdivision #PLN 2002-00517 "Mitigated Alternative"

Dear Mr. Burnes:

In accordance with agreement between communities in this area and the County at the pre-application workshops, we are submitting in this document alternatives for inclusion in the Scope Of Work for study and analysis in the EIR on the proposed project.

The proposed development has provoked considerable concerns which were brought to County attention in such areas as short and long term cumulative impacts, health hazards, geotechnical safety, design standards, fire safety, efficient police patrols, community character, traffic, visual impacts, and so as previously recorded.

Our Association has received further technical data following review by our Geotechnical Expert, and is prepared to propose a reasonable alternative and feasible alternative for specific study to the proposed project.

The information suggests that a good deal of the site consists of existing very steep cut slopes (approximately 1.5:1, horizontal:vertical) approaching 100 feet or more in height above Ascension Dr. and Bel Aire Road. Native slopes are generally moderately steep, (20 - 40% inclination). The existing slope demonstrates extensive erosion in several areas, and several areas of instability are noted nearby.

Basic concerns include the proposed grading and drainage design, which do not appear consistent with currently accepted 1997 National Uniform Building Code (UBC) requirements, in that:

> Lots 14-17 would appear to be uniformly re-graded to exceed an inclination of 2:1, approximately 70 feet in height. UBC typically requires slope terraces and drainage interceptor ditches at maximum 30 foot vertical intervals.
>
> Lots 14-17 would require substantial additional grading, with cut slopes on the order of

20 feet in depth below the currently proposed grades to allow construction on these sites.

Lots 19-24 would appear to be re-graded to inclinations of close to 1.5:1. These very steep slopes may not be consistent with suitable building pads found in the general Bay Area.

The very steep existing slopes in the vicinity of Lots 19-25 may also require similar additional grading to notch any structures into the slopes. The resulting structures and necessary cripple walls developed down the steep slopes, would present a significant visual mass. The connecting driveways would cross inclinations of 1.5:1 slopes.

The UBC grading requirements have evolved over time, resulting in progressively more conservative design practices. Because of generally poor performance of cuts completed at such steep inclinations, UBC grading requirements have been revised to generally limit new cut slopes to a maximum inclination of 2:1. Additionally, building setbacks g have been adopted from the top and toes of graded 2:1 slopes, and included specific minimum terracing and drainage improvement requirements.

The current proposal does not give considerations for the following:

New slopes, intended for residential construction, should not be created which are steeper than inclinations of 2:1.

Establishing minimum building setbacks from the tops of grades exceeding 2:1, consistent with UBC requirements, and construction should not be allowed across such slopes.

Coordination of necessary and effective slope drainage control measures between properties if individual lots are sold and developed by separate owners.

While the developer's Geotechnical study, as far as it went, was conducted in a manner consistent with prevailing standards, the potential for topographic amplification of seismic ground shaking, with mitigation measures appears to be an area of consideration. Construction across such steep slopes is likely to result in increased damage levels to future residences under seismic ground shaking conditions. As slopes become steeper, the foundations and shear resistant design elements that anchor buildings to slopes become more severely tested under ground shaking conditions.

In view of the significant environmental issues, the communities have determined a need to have two alternatives studied in the EIR. Both alternatives mitigate the impacts from the project proposal. The first alternative for study for five single family houses would be consistent with currently accepted UBC requirements and potentially answer serious questions for the following reasons:

1. The identified steep slopes would not be utilized for building, substantially reducing the required grading costs, and resultant health and safety issues which the developer proposes to be born by this older established neighborhood..

2. Significantly less truck and construction traffic.

3. Safe building setbacks could be maintained, and would be Geothechnically preferred, reducing slope maintenance and liability.

4. There would be significantly less drainage issues if the developer were responsible for effective drainage control measures co-ordinated between individual lots.

5. This alternative incurs minimal long term liability for all affected parties, especially to the County and the taxpayers.

6. There would be significantly less engineering costs.

7. The roads could be appropriately and properly widened allowing for parking, which is prohibited in this proposal, and reducing the conflict with fire safety equipment (as occurred on the narrow streets during the recent Oakland fire), and allow for safety equipment to turn around.

8. Building design could be consistent with the existing neighborhood, and the architecture could provide for a neutral visual effect, maintaining the aesthetics of this hillside area which defines the community character.

9. Economically, the developer could still realize a reasonable profit from their investment.

Area communities also want a second alternative studies: land donation, with financial benefit to the owners. This alternative clearly mitigates all liabilities of the proposed project. Both short and long term tax benefits accrue to the owners for donation of the property. We would be happy to facilitate acquisition of information for EIR study of this alternative.

Please let me know if you need any further information to facilitate inclusion in the EIR of these alternatives to the current proposal.

Page 4
Terry Burnes

January 21, 2004

Sincerely

Gerald McClellan
Land Use Committee
Baywood Park Homeowner's Association

cc: Gabrielle Rowan, Planner
cc: Cotton, Shires and Associates, Inc.

GM:gm

COTTON, SHIRES & ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

January 21, 2004
G0193

TO: Gerald McClellan
BAYWOOD PARK HOMEOWNERS' ASSOCIATION
1899 Parrott Drive
San Mateo, California 94402

SUBJECT: **Geotechnical Review of "Mitigated Alternative" (Letter)**
RE: Ascension Heights/Thomas Subdivision Proposal
PLN 2002-00517
San Mateo County, California

Dear Mr. McClellan:

We have reviewed geotechnical aspects of the proposed Thomas Subdivision Tentative Map, a Geotechnical Investigation (report) by Michelucci & Associates, and a Mitigated Alternative (letter dated January 21, 2004) prepared by the Baywood Park Homeowner's Association.

We make no assertion regarding the geotechnical necessity of any specific number of future residential lots at the subject property. This issue has not been evaluated by our office. However, we do concur with the basic project geotechnical constraints outlined in the letter noted above. We recommend that these issues be satisfactorily addressed during the development design review process.

Our services consist of professional opinions and recommendations made in accordance with generally accepted engineering geology and geotechnical engineering principles and practices. No warranty, expressed or implied, or merchantability of fitness, is made or intended in connection with our work, by the proposal for consulting or other services, or the furnishing of oral or written reports.

Sincerely,

COTTON, SHIRES AND ASSOCIATES, INC.

Ted Sayre
Supervising Engineering Geologist
CEG 1795

David T. Schrier
Senior Geotechnical Engineer
GE 2334

DTS:TS:st

ENVIRONMENTAL SERVICES AGENCY

Agricultural Commissioner/ Sealer of Weights & Measures

Animal Control

Cooperative Extension

Fire Protection

LAFCo

Library

Parks & Recreation

Planning & Building

January 21, 2004

Gerald McClellan
Baywood Park Homeowners Association
1899 Parrott Drive
San Mateo, CA 94404

Dear Mr. McClellan:

SUBJECT: Thomas Subdivision - County File No: PLN2002-00517

Thank you for your letter dated January 12, 2004 in relation to the above project. In your letter you request a copy of the proposed Scope of Work document prior to it being presented to the Board of Supervisors.

Please let me explain the order of events in the EIR process in order to clarify matters for your Association. The contract with the EIR consultants was approved in June 2003 in order to enable the consultants to commence and proceed with their work. The Board of Supervisors did not need to approve this contract as it was under a certain dollar amount threshold.

The purpose of the EIR scoping session held in December 2003 was to better define the scope of the EIR and elements to be included in the Draft EIR rather than to form a specific contract for the EIR consultants. The next step is for the Draft EIR to be published to address those issues raised at the scoping session and the NOP responses. Interested parties will have an opportunity to comment on the adequacy and scope of the Draft EIR at that stage. There will be a 45-day comment period for the Draft EIR as set by CEQA and a public hearing will be held during that time. This will take place within the next few months.

If you have any further questions please do not hesitate to call me at 650/363-1829.

Sincerely

G. Rowan

Gabrielle Rowan
Project Planner

c.c. Marcia Raines, Director of Environmental Services
Terry Burnes, Planning Administrator
Geoff Reilly, CAJA

Homeowners' Association

February 9, 2004

RECEIVED
IN THE OFFICE OF
FEB 17 2004
MA[illegible]
1ST DISTRICT
COUNTY SUPERVISOR

Mark Church, Supervisor
County of San Mateo
400 Government Center
Redwood City, CA 94063

RE: Planning Department Misrepresentations

Dear Mr. Church:

Please find attached our letter delineating the Planning Department's failure to meet commitments for active community involvement in the Scope of Work for the EIR to be done for the Thomas Subdivision, PLN 2002 – 00517.

Our community is very disappointed that, despite promises made by the Planning Department to the community from the very first pre-application meeting in May 2002, this EIR process has proceeded with only perfunctory attention paid to community interests. This subdivision is an enormous project in this established neighborhood, with multiple significant health issues which were clearly identified to the Planning Department. Neither the Planning Department nor the EIR consultant has provided documentation to clarify whether these issues and others raised by the community were incorporated in the Scope of Work for the EIR. The community has been excluded from an opportunity to review or otherwise actively participate in the finalization of the Scope of Work. Given their previous commitment to include the community, the Planning Department's lack of cooperation is unacceptable.

In bringing this to your attention, we request that you intercede with the Planning Department to ensure they diligently provide the six specific items listed on page 3 of the attached February 9th letter. We view fulfillment of these requests as a minimal obligation in light of promises made to the community. We also invite you to meet directly with members of our community regarding this issue. We would propose an evening meeting the week of February 23rd. Peggy O'Brien-Strain can coordinate with your office to set the details.

Sincerely,

G. McClellan

Gerald McClellan
Land Use Committee Chairperson
(650) 345-9930

February 9, 2004

Peggy O'Brien-Strain

Peggy O"Brien-Strain
President, Baywood Park Homeowners' Association
(650) 525-1139

G. Ozanne

Jerry Ozanne
Vice President, Baywood Park Homeowners' Association
(650) 572-1652

Attachment: February 9th letter to Gabrielle Rowan

Homeowners' Association

February 9, 2004

Gabrielle Rowan, Project Planner
Planning Department
455 County Center, 2nd Floor
Redwood City, CA 94063

RE: Thomas Subdivision - No: PLN2002-00517

Dear Ms. Rowan:

Thank you for your letter of January 21, 2004 explaining the EIR process again. However, it seems to explain that the primary issues of the EIR had already been identified and work commenced June 2003, well before the time of the subsequent public scoping meeting held December 4, 2003, which the community understood was to allow for community input of specific concerns and important elements for study in the Environmental Impact Report (EIR).

Since the preparation for the earliest pre-application meetings, beginning March 7, 2002, it has always been agreed to and committed by the Planning Department staff that this community would have an opportunity for meaningful input into the Scope of Work preparation, including participation in the development and review of the final Scope of Work document. To date we have not received either a draft or an outline for the Scope of Work, which was to have been a product of the public Scoping workshop meeting held December 4, 2003. Our previous correspondence, including a letter to your Department on December 2, 2002, clearly described our understanding of community involvement in this process, and our expectations that we would assist in organizing and scheduling scoping meetings for such public input.

A January 14, 2004 response from Mr. Burnes clearly reports "Once a consultant is hired then a scoping sessions conducted for which notification goes out to the community members within 500 feet and to all other interested parties and organizations." He further indicated, "It is only after the consultant is hired that a scoping session will be conducted." Your letter defines the public scoping meeting, held December 4, 2003, as only "to better define the scope of the EIR and elements to be included in the Draft EIR..." However it appears that the EIR has been well under way for six months, and you indicate the only opportunity for further public input will be after the Draft EIR is published, which then allows only 45 days for public response. This is outside your Departments' commitments from the beginning of this process, and unacceptable to this community. Your letter of January 21, 2004 appears to abrogate the prior commitments made by the Planning Department to this community with regard to review and active participation by the community in the finalization of the Scope of Work Document.

As you know, our Association has provided, in writing, specific and well documented information requesting study of important Health and Safety and Geotechnical elements including:

- Respiratory Health issues, which may fall outside the Bay Area Air Quality Management District guidelines. These Health issues proposed to be studied are supported by expert medical evaluation and comment.

- Multiple Health and Safety issues which stem from a projection of what would be considered to be inordinate volumes of truck traffic through steep and difficult residential roadways.

- Health and Safety issues which stem from the inordinate effects from cumulative other projects.

- Geotechnical concerns supported by expert evaluation and comment. Also please find a letter from our Geotechnical Experts supporting and confirming the geotechnical concerns and issues described in my letter of January 21, 2004.

- Adverse impacts to our schools and infrastructure.

- Specific reduced alternatives and "Mitigated Alternatives," with supporting documentation.

We are concerned that much of the project data that we, and our expert consultants, had to work with was only provided with the Initial Study Document and Answers to Initial Study Questions, documents which were issued September 25, 2003, some three months after the contract with the EIR consultants was approved, "...in order to enable the consultants to commence and proceed with their work."

Since we have not been allowed to participate in the review, writing, or finalization of the scoping document, our association is very concerned that the serious Health and Safety issues mentioned above will not be fully or adequately addressed in either the Scope of Work, or the EIR. It is essential that these critical elements submitted be included in the Scope of Work and be fully evaluated in the EIR to provide the Board of Supervisors with the best information possible for their decision on this proposal. This was the process promised to the community by the Planning Staff since the first Pre-Application meeting of March 3, 2002. We have dealt in good faith based on those representations, and we expect the Planning staff to meet those representations.

By way of this letter, we are formally requesting:

1. The initial Scope of Work and the Contract which was issued to Christopher Joseph & Associates in June 2003.

February 9, 2004

2. The current working draft version of the Scope of Work document which your staff indicated would be created and which would include those issues brought forth by the public, at and following the December 4, 2003 public scoping meeting.

3. Full and active participation by the community, through BPHA representatives, on all continuing and future development of the Scope of Work document.

4. A public meeting held in the neighborhood, in evening hours, to review and finalize the Scope of Work for the intended EIR project.

5. A minimum of 90 days for public response to the Draft EIR.

6. Planning Commission Hearings on the Draft EIR to be held in this Community, in evening hours.

Kindly advise when these documents will be provided. Following receipt and review of these documents, we will actively participate in the planning of the necessary public meeting. Gerald McClellan will serve as BPHA's contact person on this project. Please coordinate with him by phone at (650) 345-9930 or by mail at 1899 Parrott Drive, San Mateo CA 94402. Thank you very much for your cooperation.

Sincerely,

Gerald McClellan
Land Use Committee Chairperson
(650) 345-9930

Peggy O'Brien-Strain

Peggy O"Brien-Strain
President, Baywood Park Homeowners' Association
(650) 525-1139

Jerry Ozanne
Vice President, Baywood Park Homeowners' Association
(650) 572-1652

Attachment: letter - Cotton Shires and Assoc.

cc: Marcia Raines, Director
Terry Burnes Administrator
Mark Church, Supervisor

ENVIRONMENTAL SERVICES AGENCY

Agricultural Commissioner/ Sealer of Weights & Measures

Animal Control

Cooperative Extension

Fire Protection

LAFCo

Library

Parks & Recreation

Planning & Building

February 19, 2004

Gerald McClellan
Baywood Park Homeowners' Association
1899 Parrott Drive
San Mateo, CA 94404

Dear Mr. McClellan:

SUBJECT: Thomas Subdivision - County File No: PLN2002-00517

Thank you for your letter dated February 9, 2004 in relation to the above project.

The issues raised by your association are in relation to our commitment to public involvement in this process particularly in relation to the scope of the EIR. I have discussed your concerns with senior department management and County Counsel.

We feel that there has been significant community involvement during the early stages of the process including two pre-application workshops held prior to the submittal of the planning application and an extended public review period for the Notice of Preparation (NOP) document which included a public scoping session. We continue to be committed to encouraging public involvement throughout the next stages of the EIR as required by the CEQA process.

Your letter includes six requests. Our response to each of these follows:

1. Please find attached the approved contract with Christopher Joseph & Associates dated June 2003 as requested. This includes their scope of work.

2. The scope of the EIR is continually developed between the EIR consultants and the County throughout this process. The EIR consultants have a significant level of technical expertise in the preparation of environmental documents and the EIR process. The County relies on the professional judgment of the consultants to provide an initial scope for the EIR. In order to help define this scope, the NOP public review period provided an opportunity for individuals to provide written

comments and the scoping session, held on December 4, 2003, allowed interested parties to directly address the County and the EIR consultants. We feel that this meeting was very productive and all comments were received and duly recorded both by the County and the EIR consultants. As with the initial scope of work, we rely on the professional judgment of the consultant to incorporate the input received from the public into the scope of work as he prepares what, in his professional judgment is a "complete, correct and adequate EIR". The consultants are now working towards a Draft EIR to address all comments received during the public review period. The next opportunity for public comment will be the circulation of the Draft EIR.

3. As explained in point two above, the opportunity to comment on the scope of the EIR took place during the NOP review period and the public scoping session.

4. The process calls for the next public meeting to be to review the Draft EIR. However, your association could arrange community meetings to discuss this project. This may be an effective way to co-ordinate community comments and to raise community awareness of the project and the EIR process.

5. We will take this request for a 90-day public response period for the Draft EIR under advisement and delay setting a review time until the Draft EIR is complete. When we get closer to the release of the Draft EIR, we will have a better understanding of the length of review time appropriate for this document. Please be aware, however, that we are also required to follow the time requirements as set by CEQA in order to ensure that this process continues to move forward in a timely manner.

6. At the time the Draft EIR is released for public comment, we will forward your request to the Planning Commission for a local evening meeting to review the Draft EIR. They will decide closer to that time if they can accommodate your request.

We appreciate that your association has serious concerns about this development and are therefore eager to ensure comprehensive community involvement during every stage of the process. The County is committed to continuing to involve your association and members of the community during all the public review stages of the project and welcomes your constructive comments.

If you have any further questions regarding the project or the EIR process, please do not hesitate to call me at 650/363-1829.

Sincerely

G. Rowan

Gabrielle Rowan
Project Planner

Enc. EIR Contract

c.c. Supervisor Mark Church
Marcia Raines, Director of Environmental Services (no enclosure)
Terry Burnes, Planning Administrator (no enclosure)
Michael Murphy, County Counsel (no enclosure)
Geoff Reilly, CAJA (no enclosure)
Dennis Thomas, San Mateo Real Estate, Inc (no enclosure)

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse

Gray Davis
Governor

Tal Finney
Interim Director

Notice of Preparation

October 15, 2003

To: Reviewing Agencies

Re: Thomas Subdivision
SCH# 2003102061

Attached for your review and comment is the Notice of Preparation (NOP) for the Thomas Subdivision 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:

Gabrielle Rowan
San Mateo County Planning and Building Division
455 County Center, 2nd Floor
Redwood City, CA 94063

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

Document Details Report
State Clearinghouse Data Base

SCH#	2003102061
Project Title	Thomas Subdivision
Lead Agency	San Mateo County

Type **NOP** Notice of Preparation

Description The project consists of a 25-lot residential subdivision on a public street, with lot sizes ranging from 10,120 square feet to 17,590 square feet. Approximately 100,200 cubic yards (cy) of soil would be graded on a slope averaging 40 percent. New utility and roadway infrastructure would be provided as well as recreational trails, a tot lot and a conservation easement.

Lead Agency Contact

Name	Gabrielle Rowan		
Agency	San Mateo County Planning and Building Division		
Phone	650 363-1829	*Fax*	
email			
Address	455 County Center, 2nd Floor		
City	Redwood City	*State* CA	*Zip* 94063

Project Location

County	San Mateo		
City	San Mateo		
Region			
Cross Streets	Bel Aire Road/Ascension Drive		
Parcel No.	041-111-020,130,160,270		
Township	*Range*	*Section*	*Base*

Proximity to:

Highways	92, I-280
Airports	
Railways	
Waterways	Polhemus Creek, San Mateo Creek
Schools	College of San Mateo, Aragon High
Land Use	R-1/S-8 (single-family residential/7,500 s.f. min. lot size)/Medium Low Density Residential

Project Issues Aesthetic/Visual; Air Quality; Drainage/Absorption; Geologic/Seismic; Noise; Population/Housing Balance; Public Services; Recreation/Parks; Schools/Universities; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wildlife; Growth Inducing; Landuse; Cumulative Effects

Reviewing Agencies Resources Agency; Department of Forestry and Fire Protection; Department of Parks and Recreation; Department of Fish and Game, Region 3; Native American Heritage Commission; Department of Housing and Community Development; Caltrans, District 4; State Water Resources Control Board, Division of Water Quality; Regional Water Quality Control Board, Region 2

Date Received 10/14/2003 *Start of Review* 10/14/2003 *End of Review* 11/12/2003

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

Resources Agency

- [x] **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
- [x] **Dept. of Forestry & Fire Protection**
  Allen Robertson
- [ ] **Office of Historic Preservation**
  Hans Kreutzberg
- [x] **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

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
- [x] **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

____

- [x] **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
- [x] **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
- [x] **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
- [x] **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)
- [x] **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** ______________________

SAN MATEO
LAFCO
LOCAL AGENCY FORMATION COMMISSION
455 COUNTY CENTER, 2ND FLOOR • REDWOOD CITY, CA 94063-1663 • PHONE (650) 363-4224 • FAX (650) 363-4849

October 15, 2003

Ms. Gabrielle Rowan, Project Planner
County of San Mateo
Environmental Service Agency
Planning & Building Division
455 County Center, 2nd Floor
Redwood City, CA 94063

Subject: Thomas Subdivision

Dear Ms. Rowan;

Thank you for the opportunity to comment on the Draft EIR for the Thomas Subdivision in unincorporated Highlands. As you know, the Highlands Community receives enhanced police and fire protection through County Service Area No. 1 which includes a special tax. In reviewing the proposed project, I find that because the original boundaries of CSA No. 1 were drawn to encompass the original Highlands Subdivision, a small portion of the proposed Thomas Subdivision are not within the CSA boundaries (highlighted on the attached map). While it is a small area, it would appear that if all homes to be constructed are to receive the same level of police and fire protection, the highlighted territory should be annexed to County Service Area No. 1 so that CSA 1 has both the jurisdiction and the funding to provide such service. Annexation would require application to the Local Agency Formation Commission.

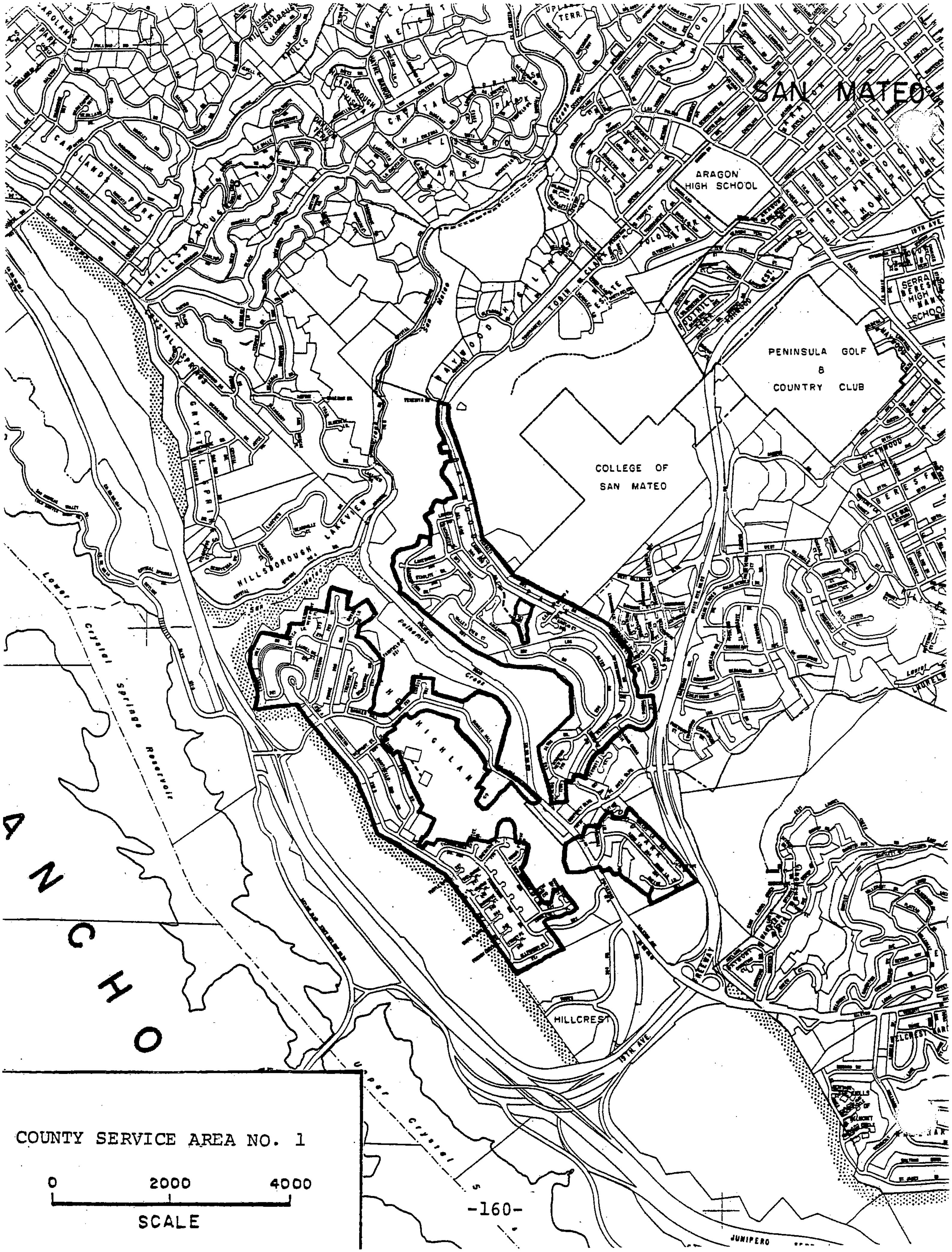
Thank you for this opportunity to comment.

Sincerely,

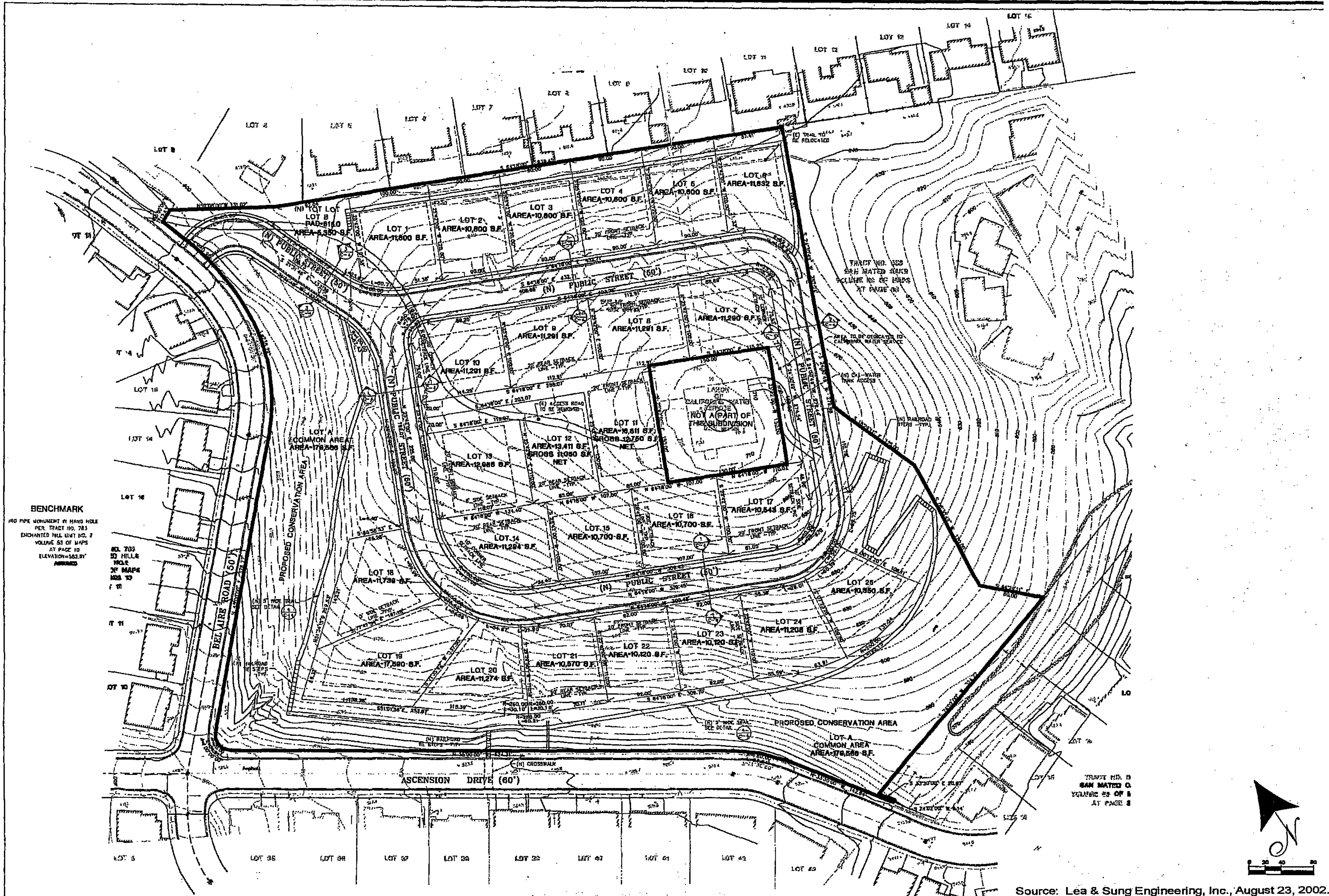
Martha Poyatos

Martha Poyatos
Executive Officer

CC: Marcia Raines, Director, Environmental Services Agency
Donna Spillane, Administrative Services Manager, Environmental Services Agency
John Sims, Operations Chief, California Department of Forestry
Greg Munks, Undersheriff



SAN MATEO
ARAGON HIGH SCHOOL
SERRA HIGH SCHOOL
PENINSULA GOLF & COUNTRY CLUB
COLLEGE OF SAN MATEO
HIGHLANDS
HILLCREST
19TH AVE.
FREEWAY
JUNIPERO SERRA
Lower Crystal Springs Reservoir
Upper Crystal Springs
Polhemus Creek
San Mateo
HILLSBOROUGH
RANCHO
COUNTY SERVICE AREA NO. 1
0
2000
4000
SCALE



Source: Lea & Sung Engineering, Inc., August 23, 2002.

CHRISTOPHER A. JOSEPH & ASSOCIATES
Environmental Planning and Research

Figure 3
Tentative Tract Ma

DEPARTMENT OF TRANSPORTATION
P. O. BOX 23660
OAKLAND, CA 94623-0660
(510) 286-4444
(510) 286-4454 TDD

Flex your power!
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November 6, 2003

SM-092-R9.38
SM092127
SCH 2003102061

Ms. Gabrielle Rowan
San Mateo County Planning and Building Division
455 County Center, 2nd Floor
Redwood City, CA 94063

Dear Ms. Rowan:

Thomas Subdivision - Notice of Preparation (NOP) for the Draft Environmental Impact Report (DEIR)

Thank you for including the California Department of Transportation in the environmental review process for the proposed plan. We have reviewed the NOP and have the following comments to offer:

Our primary concern with the project is the potentially significant impact it may have to traffic volume and congestion. In order to adequately address our concerns regarding the proposed development of the Thomas Subdivision, we recommend a traffic impact analysis be prepared. The traffic impact analysis should include, but not be limited to the following:

1. Information on the master plan's traffic impacts in terms of trip generation, distribution, and assignment. The assumptions and methodologies used in compiling this information should be addressed.

2. Current Average Daily Traffic (ADT) and AM and PM peak hour volumes on all significantly affected streets, highway segments, intersections and ramps.

3. Schematic illustration of the traffic conditions for: 1) existing, 2) existing plus master plan, and 3) cumulative for the intersections in the master plan area.

4. Calculation of cumulative traffic volumes should consider all traffic-generating developments, both existing and future, that would affect the State Highway facilities being evaluated.

5. Mitigation measures should consider highway and non-highway improvements and services. Special attention should be given to the development of alternate solutions to circulation problems that do not rely on increased highway construction.

6. All mitigation measures proposed should be fully discussed, including financing, scheduling, implementation responsibilities, and lead agency monitoring.

We recommend you utilize Caltrans' *"Guide for the Preparation of Traffic Impact Studies"* which can be accessed from the following webpage: http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf

We look forward to reviewing the traffic impact analysis and DEIR for this project. We do expect to receive a copy from the State Clearinghouse, but in order to expedite our review you may send two copies in advance to:

José L. Olveda
Office of Transit and Community Planning
Department of Transportation, District 4
P.O. Box 23660
Oakland, CA 94623-0660

Should you require further information or have any questions regarding this letter, please call José L. Olveda of my staff at (510) 286-5535.

Sincerely,

Peter Li for

TIMOTHY C. SABLE
District Branch Chief
IGR/CEQA

c: Scott Morgan (State Clearinghouse)

COUNTY OF SAN MATEO

Inter-Departmental Correspondence

Date: November 19, 2003

TO: Gabrielle Rowan, Project Planner, Planning & Building Division

FROM: Neil R. Cullen, Director of Public Works

SUBJECT: Notice of Preparation of a DEIR for the Thomas Subdivision - Polhemus Road Area

We received the notice of preparation of a draft environmental impact report for the proposed Thomas Subdivision and offer the following initial comments:

1. The Crystal Springs County Sanitation District, a Board of Supervisors governed district that provides sewer service in the area, will not approve of sewer mains in easements due to the difficulties in maintaining sanitary sewers located out of street areas. All proposed sewer mains will need to be constructed in street areas. Properties that are located on the slope lower than the street grade will need to be served via an ejector pump owned and maintained by the property owner that can discharge house sewage into a sewer main in the street.

2. The developer will have to demonstrate compliance with the National Pollutant Discharge Elimination System (NPDES) requirements of no net increase in storm runoff from the site and a reduction in pollutants being discharged from the subdivision. There is currently no maintenance district formed over the area to finance the maintenance of storm drains or other drainage facilities located in easements or private property and the provisions of the State Constitution (Proposition 218) effectively precludes the formation of a district. Therefore, the Subdivision conditions will have to provide for the maintenance of any storm drain facilities or retention basins that are constructed as part of the subdivision.

3. The proposed subdivision indicates that a path will be built. Who will be responsible for maintenance and upkeep of this path?

4. The grade of some of the proposed roads appear to exceed the maximum grade of public roads as allowed by the Subdivision Ordinance. The developers will need to address this issue as this may affect the proposed grading of the site.

Neil R. Cullen
Director of Public Works

NRC:BCL:sdd
F:\USERS\ADMIN\P&S\SEWERS\2003\Comments on Notice of Preparation EIR Oct 30.doc

cc: Brian C. Lee, P.E., Deputy Director of Public Works, Engineering & Resource Protection
Ann M. Stillman, P.E., Principal Civil Engineer, Flood Control & Utility Services

November 24, 2003

Gabrielle Rowan, Thomas Subdivision Planner
Planning & Building Division
455 County Center, 2nd Floor
Redwood City, CA 94063

My comments as to the Scope & Content of the EIR Checklist are below.

Refer to page 7, line II. 6. p., and page 9, line V. 4.

Exposure to dust and engine exhaust from moving 100,200 cy of earth material is a threat to life with my severe Chronic Obstructive Pulmonary Disease, and will be injurious to my wife's Asthma.

Professional confirmation is available from Dr. Richard Morgan, Pulmonary Physician, and from Gina Thomas, Respiratory Rehabilitation Therapist at Sequoia Hospital.

Jack Beeman

Jack Beeman
1526 Parrott Drive
San Mateo, CA 94402

Phone: (650) 345-7725

cc: Peggy O'Brien-Strain, President
Baywood Park Homerowners' Assoc.

December 11, 2003
1542 Ascension Dr.
San Mateo, CA 94402-3613

Gabrielle Rowan, Project Planner
Planning & Building Division
455 County Center,
Redwood City, CA 94063

Subject: EIR Hearing, Thomas Subdivision, December 4, 2003
Reference: Public input

Gabrielle,

As a speaker at the hearing on the 4th of the month [CSM Cafeteria], I tried to affirm property rights, process, and responsible building. I also raised questions about the changed proposal which puts houses and lots closer to the affected streets and increased the number of lots from 22 to 25. I have since heard from Mr. Thomas that this reduced the amount of earth removal from the project.

While many of the issues raised at the meeting were articulately delivered and of appropriate concern, there is an additional aspect of the plan I would like to see addressed, especially with lot lines coming farther down the hills:

> Could there be consideration of adding sidewalks to the Ascension Drive and Belaire Road sides of the development? 3' retaining walls similar to those found on a portion of Los Altos Drive may also be needed for erosion control.
>
> There will be added parking at times on these two streets for access to the walking trail and tot park. Sidewalks would ease access, alleviate problems for existing homes, and reduce hazards of people crossing the street by encouraging parking on the development side of the street.
>
> Sidewalks would also eliminate the need for a painted crosswalk at 1524 Ascension.

Thank you for your attention to this matter and for adding these remarks to the public input regarding the development.

Sincerely,

Peter C. Lawrence

Peter C. Lawrence

MEMORANDUM

TO: GABRIELLE ROWAN, COUNTY OF SAN MATEO
FROM: MARK WILLIAMS, 1414 BEL AIRE ROAD
RE: THOMAS SUBDIVISION
DATE: DEC. 15, 2003

Having spoken with most of the residents of Bel Aire Road adjacent to the proposed project (1400-1500 blocks), I can list our major concerns as follows:

1) Geological stability of the building site.
Several homes beneath the proposed site have already experienced various forms of slippage, settlement and so on, including a major slide at 1456 Bel Aire. The entire area has experienced similar problems, including a major landslide on Rainbow Dr. Additional earth moving and construction would be highly ill-advised. The potential liability for builders and the county, in the event of future property damage, is enormous.

2) Traffic.
The problem is multi-fold, during the earth-moving and construction phase (several months to two years) and the long-term impact of adding 50-65 vehicles to an area with existing traffic problems. The issues are as follows:

A) There is a serious traffic bottleneck at Laurie Lane (between Bel Aire Road and Parrott Dr.) because it is virtually the only access to Parrott for all local streets.

B) This condition is exacerbated because Bel Aire is a main access route for students to the College of San Mateo (from Polhemus, along Ascension Dr., Bel Aire Road, Laurie Lane, Parrott Dr. and CSM Dr.). On school days several hundred cars use this route, often at breakneck speeds, in addition to local residents.

C) In the proposed plan, the only access road to/from the project is situated at a very dangerous spot. A sudden change in elevation along Bel Aire (just north of the access road) creates a blind spot for both vehicles traveling south and drivers turning left from the proposed access road onto Bel Aire. Moreover, vehicles traveling north on Bel Aire, when encountering slow-moving trucks, would have a tendency to pass to the left and move directly into the blind spot and oncoming traffic. This situation will be especially dangerous during any earth-moving and construction phase, when CSM students, hurrying to arrive at class on time, will be tempted to pass trucks and heavy equipment.

D) It will be very difficult for fire-fighting equipment and other emergency vehicles to access the development via the proposed road because of the angle at which it enters Bel Aire.

3) Public Nuisance
The noise, dust, a pollution during the extended earth-moving and construction phases will be horrific. The costs for homeowners to repair, repaint etc. could be substantial.
PLEASE CONSIDER THESE ISSUES SERIOUSLY BEFORE GRANTING APPROVAL.

Mark N Williams

Baywood Plaza Community Association

December 18, 2003

*Via facsimile 650-363-4849 original will **not** follow*
Page 1 of 2

Gabrielle Rowan, Project Planner
County of San Mateo
Department of Planning and Building
455 County Center, 2nd Floor
Redwood City, CA 94063

Re: Thomas Subdivision – comments on EIR scoping

Dear Ms. Rowan:

Please ignore the letter I faxed to you earlier today. That letter was an earlier version of this letter and I sent it inadvertently. Thank you very much.

We believe the scope of the EIR should include the following.

Visual Impacts: Please analyze visual impacts from all neighborhoods, including parks and open space in those neighborhoods, which have homes that can see the project site. For example, the project site can be seen from the Timberlane Open Space, an open space preserve owned by the City of San Mateo on Fairmont Drive in San Mateo. Development of the project site may result in significant degradation of views from the open space. In addition, the hill can be seen from homes on Kings Lane, Queens Lane, Timberlane Way, and Fairmont Drive. Because the project site appears as an undeveloped hilltop, please consider this issue.

Noise: Please analyze noise impacts beyond the immediate neighborhood of the project site. Because of the ridge that makes up The Highlands, noise from the project may be heard in the Baywood Plaza neighborhood. Because the project is on an exposed hill, noise from the project site may travel significant distances and impact residents and businesses at the Crystal Springs Shopping Center and in the Baywood Plaza neighborhood. Please also keep in mind that a significant percentage of the residents in the Baywood Plaza neighborhood are home during the weekday.

Traffic: Please analyze traffic impacts beyond the immediate neighborhood of the project site. Traffic from the project may impact the Baywood Plaza neighborhood, if, for example, construction vehicles use De Anza or Polhemus. Please also keep in mind that a significant percentage of the residents in the Baywood Plaza neighborhood are home during the weekday.

Hydrogeology: Please analyze the impact of the project on local hydrology. Given the nature of the hydrogeology in the neighborhood, it seems that development in one area causes water to emerge from the ground in another area. Given the significant number of homes that are downhill from the project site, this is a significant issue.

Air Quality/Public Health: Please analyze public health impacts due to degraded air quality beyond the immediate neighborhood of the project site. Because much of the neighborhood is a "bowl," air quality in the neighborhood may be impacted for a longer period of time than would occur if the neighborhood was not in a bowl, thus impacting residents and businesses at the Crystal Springs Shopping Center and in the

Baywood Plaza neighborhood. Please also keep in mind that a significant percentage of the residents in the Baywood Plaza neighborhood are home during the weekday.

Regards,

Alan Palter
2035 Queens Lane
San Mateo, CA 94402
650.424.5885 (work)

Baywood Plaza Community Association

December 18, 2003

Via facsimile 650-363-4849 original will not follow
Page 1 of 1

Gabrielle Rowan, Project Planner
County of San Mateo
Department of Planning and Building
455 County Center, 2nd Floor
Redwood City, CA 94063

Re: Thomas Subdivision – comments on EIR scoping

Dear Ms. Rowan:

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Regards,

Alan Palter
2035 Queens Lane
San Mateo, CA 94402
650.424.5885 (work)

From: "Peggy O'Brien-Strain" <pobrain@pacbell.net>
To: "'Gabrielle Rowan'" <GRowan@co.sanmateo.ca.us>
Date: 12/22/2003 12:50:47 AM
Subject: RE: Initial Study for Thomas Subdivision

Gabrielle and Geoff,

Thank you for accepting these documents today. I have attached two documents: the first is an overview set of comments from BPHA, the second is more specific comments from Gerald McClellan. You should receive each of these in hard copy by mail or hand in the next few days. We also anticipate additional comments in the next day or so based on a geotechnical review. I recognize that you will not be in the office after Monday, but we will forward these to you and to the EIR consultant directly.

Please let me know if you have any difficulty reading these documents, or if you would like the underlying pictures, etc. in another format. Also please let me know if you have any questions.

Finally, we would greatly appreciate a copy of the attendee list from the December 4th meeting. (In general, any documents that are available electronically would be helpful.)

Thanks!

Peggy

Peggy O'Brien-Strain
President, Baywood Park Homeowners Association

-----Original Message-----
From: Gabrielle Rowan [mailto:GRowan@co.sanmateo.ca.us]
Sent: Thursday, December 18, 2003 9:44 AM
To: mstrain@sphereinstitute.org
Subject: RE: Initial Study for Thomas Subdivision

Peggy

Please try and get the comments to me as early as possible on Monday - this is my last day in the office before Christmas and I would like to get all the comments received and forwarded to the EIR consultants by then.

Thanks and Happy Holidays

Gabrielle

CC: <geoff@cajaeir.com>

Baywood Park Homeowners' Association

To: Gabrielle Rowan, Planner, County of San Mateo

From: Peggy O'Brien-Strain, President, Baywood Park Homeowners' Association

CC: Geoffrey Reilly, Christopher A. Joseph & Associates

Date: December 22, 2003

Re: Comments on Scope of Work for Thomas Subdivision EIR

This document provides additional information in support of the presentation titled "Major Themes for the Thomas Subdivision Draft EIR" provided to you at the December 4th public scoping meeting, as well as forwarding additional specific comments we received from residents.

1. **Please consider the cumulative impact of a number of projects that are likely to affect the neighborhoods surrounding the proposed subdivision.**

At the December 4th meeting, you received a map showing many of the proposed and/or approved projects that will impact this area (included as attachment 1 to this document). In particular, the Thomas Subdivision project is surrounded by:

Project	Status	Jurisdiction
CSM Faculty Housing	To Planning Commission Jan-Feb 2004	City
Juvenile Campus	Ground broken	County
Ward-Chamberlain	In mediation, probable EIR scoping this spring	County
New Crystal Springs Bypass Tunnel	Environmental review process underway	San Francisco PUC

Please address how the proposed Thomas project will contribute to the cumulative effects of these projects on:

- Traffic, especially on Polhemus Road, Ascension Drive, Bel Aire and Parrot Drive. For traffic, please distinguish the impacts during the construction period and afterwards.

  At the December 4th meeting, the traffic expert indicated that the expected additional load was not sufficient to require study of specific intersections. This may be true of each of these projects individually, yet the cumulative effects on intersections such as Polhemus-Ascension and Bel Aire-Parrot may be substantial.

  In addition, the PUC tunnel construction is expected to last three years, involving significant construction vehicle traffic on Polhemus.

- Land stability and hydrology, including the potential impact of the Thomas project on efforts "down the hill" especially the bypass tunnel.

The PUC has provided a schematic diagram showing a "typical slope cross-section" of the underlying geology in the area. (Included as attachment 2) Their initial studies suggest that there is a shallow sandstone layer running through the hills in the area of the Thomas Subdivision, with significantly less stable material underneath. They indicated that the tunnel needed to be 100 feet deep to ensure seismic stability. Although we recognize that the seismic requirements for the two projects are quite different, their analysis does not appear consistent with the initial geotechnical report filed for the Thomas Subdivision.

The map also shows some of the landslide problems both immediately adjacent and in the general neighborhood of the Thomas project. As the comments on December 4th indicated, the neighbors have substantial concerns about the land stability.

- Public and private services, including fire and sheriff coverage, as well as parking and related access issues at Crystal Springs Shopping Center.

- Noise, including both construction and traffic noise both during and after construction.

  The hills and valleys around the Thomas Subdivision project create an acoustic effect that carries noise over long distances. This is particularly true for heavy vehicles climbing Ascension Drive.

- Visual impacts, including on the Polhemus Road scenic corridor, addressed in greater detail below.

2. Please provide additional study of the health effects of the proposed construction, particularly given the magnitude of the grading required by the project.

To allow stakeholders to effectively assess the health effects of a major grading project in an established neighborhood, this analysis should, at a minimum:

- Conduct pre-construction analyses of dust particle components and quantities by size (<PM10 and >PM10) in site. [PM10 <= 10 micron diameter]

- Develop quantitative distributions in neighborhood lots and houses of each PM10 component (amounts and durations of exposures) as distributed by construction processes (soil dust and diesel exhaust), dust mitigations methods, prevailing winds, street contamination with airborne spread by traffic and cleaning process.

  Note that the prevailing winds are an unusual, but important aspect, to this project. This neighborhood is subject to relatively strong winds through the "92 gap."

- Provide expert assessments of risk of causing or exacerbating diseases due to airborne particles.

- Include under mitigation approaches:

  - Methods for continuous monitoring of dust in homes/yards and rules for halting of construction activities with excessive dust.

- Financial coverage for all required patient testing, necessary therapies and loss of income.

- Cleaning of all affected properties as required for health reasons—independent of aesthetic requirements.

Attachment 3 provides an overview of the health issues as identified by Dr. Gerard Ozanne, Clinical Professor, University of California San Francisco

3. Please provide graphical depictions of the visual impact of the grading on the affected hill, from multiple perspectives.

The location of the proposed Thomas Subdivision is extremely prominent, visible over a long distance and to homeowners not included in the public noticing. Attachment 4 provides photographs of the hill from the Baywood Park neighborhood (Enchanted Way), the San Mateo Highlands (Bennington Court, Bunker Hill Road and Oriskany Drive) and Polhemus Road. Although not included in these photographs, the hill is also prominently visible from the Baywood Plaza neighborhood (Timberlane Road and Kings Lane).

4. Please evaluate reasonable alternatives that significantly reduce the amount of grading required.


www.GlobeXplorer.com
CSM Housing
Thomas
Verona Ridge
Chamberlain
PUC Tunnel
Chamberlain
Chamberlain
Juvenile Hall

Typical Slope Cross Section

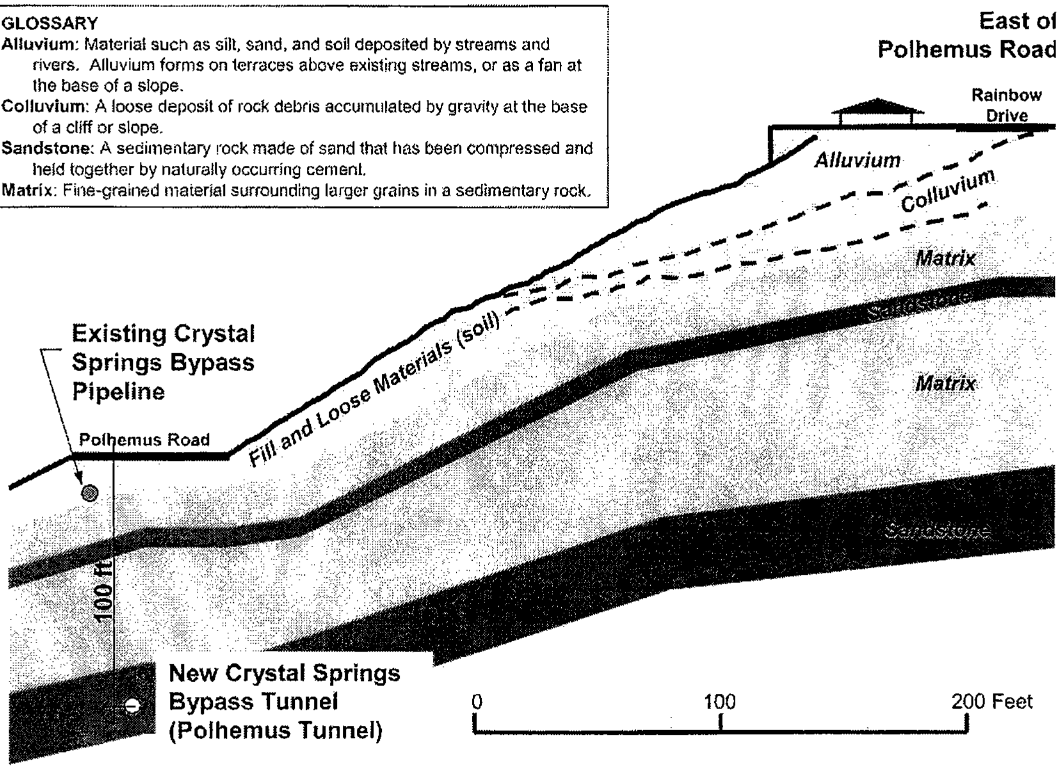
GLOSSARY

Alluvium: Material such as silt, sand, and soil deposited by streams and rivers. Alluvium forms on terraces above existing streams, or as a fan at the base of a slope.

Colluvium: A loose deposit of rock debris accumulated by gravity at the base of a cliff or slope.

Sandstone: A sedimentary rock made of sand that has been compressed and held together by naturally occurring cement.

Matrix: Fine-grained material surrounding larger grains in a sedimentary rock.



Date: December 1, 2003

To: Whomever Concerned

Re: Public Health Risks Caused by Thomas Subdivision Project

Creation of dust and diesel exhaust during construction is well known to create health hazards for nearby individuals. Scientific data strongly support that the risks of contracting airborne diseases and exacerbating existing pulmonary diseases are directly related to both the quality, quantity and duration of dust and diesel exhaust exposures.

The Thomas Subdivision project proposes to remove and re-compact more than 100,000 cubic yards of soil on the 13 acre parcel of land. At least several earth moving operations will be required—initial removal, temporary storage and eventual replacement, grading and compacting of the soil. The total amount of soil disturbed during these operations will be in excess of a quarter of a million cubic yards. The enormous volume of disturbed soil and substantial time required to complete the project will create significant dust and exhaust hazards for the hundreds of individuals in the neighborhood.

Rural and natural habitat soil contains many dangerous and disease-causing substances including allergens, mold spores, silica particles, and asbestos. Many soil dust particles are less than 10 microns in diameter which are small enough to be inhaled deeply into the lungs and can result in acute asthmatic attacks, exacerbation of chronic pulmonary diseases, pulmonary infections and, with enough particles, cancer. Individuals with specific, pre-existing diseases or conditions will be at especially high risk, e.g., asthma, chronic obstructive pulmonary disease (COPD), and compromised immune systems (cancer therapies, HIV, steroid treatments).

Although mandatory dust mitigation procedures are required for all construction sites, the size and duration of this project, strong prevailing winds and immediate, circumferential location of existing homes essentially preclude complete containment of either dust or exhaust. Some neighbors immediately adjacent to the Thomas property currently have pulmonary conditions, including extreme life-threatening pulmonary disease, and may be unable to tolerate even minimal amounts of dust.

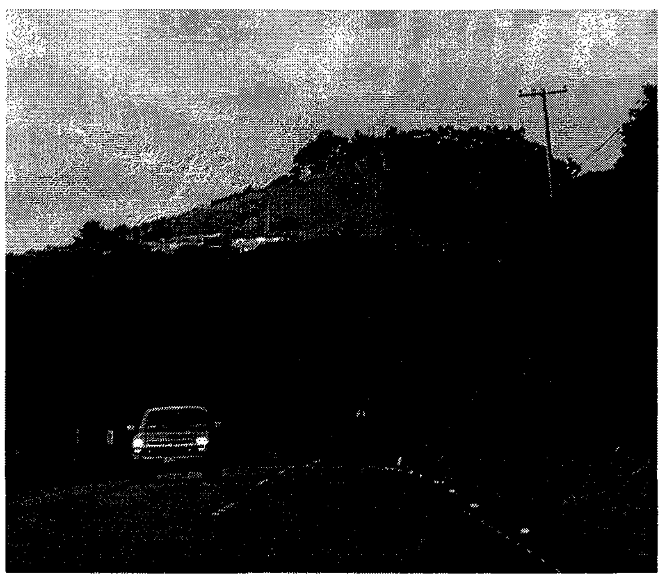
In the consideration of any project at this location, a) individual health risks need to be assessed before project approval, including quantitative assessments of soil contents and dust particle sizes, b) airborne pollutants should be monitored continuously at neighborhood homes during construction, c) dust-creating construction activities should be halted immediately with effective remedies employed and d) all individual health costs incurred should be compensated.

Gerard M. Ozanne, MD
Clinical Professor
Department of Anesthesia and Perioperative Care
University of California, San Francisco

Cc: Baywood Park Homeowners Association

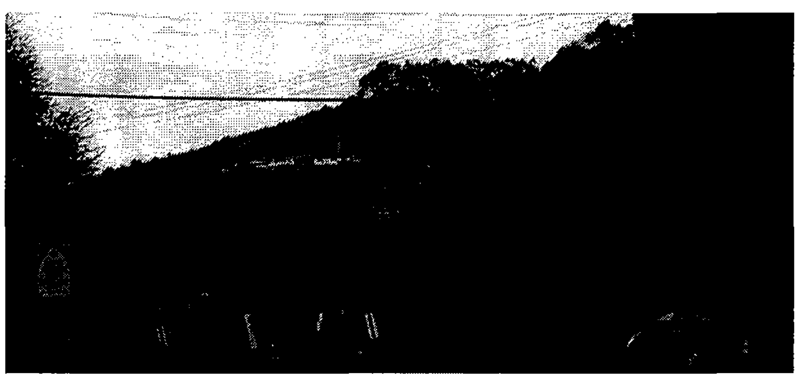
Thomas Subdivision location as visible from:

1. Polhemus Road (scenic corridor)



2. From Baywood Park – Enchanted Way and Starlite Drive

3. From San Mateo Highlands – Bennington Ct, Oriskany Dr. and Bunker Hill Road



Attachment 5

We live at 1480 Bel Aire Road which is right across the street from the proposed project. Our main concerns are as follows:

1. Stability of the hillside -- in looking at it after the weekend we realize that there could be severe slide problems with that hillside. We do not understand why these people continue to say that with new technology the hillside can be stabilized and that it can support the number of homes they are proposing. The trickle down theory is it may not affect that particular area but what about all of the surrounding areas when the digging begins -- it could start something that could be disastrous to us all. We are not against development we just want to make sure that the all of the proper steps have been taken to analyze the soil -- there is a combination shale, rock, clay, underground springs etc. in this area -- What happens if they start and there are severe problems -- do they have the money to pay for any and all damages that may occur? The project was abandoned once before -- what will we look at if they have to abandon it again -- what will happen to our property values if this is a total eyesore of will they plant trees and shrubs and enhance the property before they leave it?

2. How is this project going to impact our sewer systems, water supplies and water run-off?

3. Dirt, traffic and rodents --
Dirt - are they going to wash our houses, driveways etc -- when all of this dirt starts flying around?

4. Traffic -- this is a real concern because people don't stop at the stop signs now -- are we going to have speed bumps/traffic control?

5. Rodents -- I am sure that everyone has had a mouse or two or maybe even a roof rat or two and we have been able to deal with the problem --wait until they start the construction -- we will all be plagued with them. What happens to the deer and other nice wildlife that inhabit the area -- I guess that does not matter.

We feel that this whole project had not been well thought out -- the impact on every homeowner in our area is going to be much more than just increasing our property values -- we are going to be dealing with other problems that were not anticipated.

I know that this is rambling but there are some major concerns here -- we don't understand why they have to develop an area that is already overdeveloped. Like I said earlier we are not against development -- but developers should stop thinking with their pocket books and look at the impact overdevelopment causes. This could be a huge success - and if that is true we will all benefit and we will all be happy but if it is not a success we will all be left with very little recourse.

Thank you.

Regards,

Bob and Rosemarie Thomas
1480 Bel Aire Road

GERALD McCLELLAN
1899 PARROTT DR.
SAN MATEO, CA 94402
(650) 345-9930

INITIAL STUDY/DRAFT ENVIRONMENTAL IMPACT REPORT

THOMAS SUBDIVISION/PLN 2002-00517

Written public views as to the scope and content of the EIR

WELL ESTABLISHED RESIDENTIAL AREA:

The first consideration should be to understand and recognize that this is a well established residential area with over a half century of residential history. Many of the homes were constructed during 1950 - 1953, and many residents are original owners, making them 70-90 years old. Also, many of the homes have "rolled over" to new families with very young children.

A common example would be that within ½ block of my home on Parrott Dr. I have one original owner, and three new families with children one year or less. Obtaining specifics of this demographic data would gives us important information relative to health and safety issues to be discussed under additional headings.

It is incumbent that our homeowner's association advocate for these very susceptible age groups, the elderly and very young, as they are too often overlooked by standard thresholds and average conditions. This project's impacts are neither average nor standard..

WILDLIFE:

Long established undeveloped, or open areas, have created "wildlife buffer zones", in which an unknown, but significant amount of wildlife has learned to co-exist with, and depend on existing elements in their food chains, such as food plants in the form of watered gardens and landscaping. Disturbing these "buffer zones" will have an unknown effect on wildlife, especially raptores who are frequently seen hunting the open area proposed for this development.

History has shown that significant construction in wildlife areas causes the existing wildlife, especially in the form of ground dwelling rodents, to be displaced and seek new environments nearby. Rats, gophers, field mice, among others, will be running rapidly for their lives to adjacent and surrounding residential areas creating unknown health and safety issues. Destroying 13 acres of wildlife habitat will cause a significant displacement, and should at least have some modicum of study.

This long established and large wildlife buffer has also generated it's own form of ground and subsurface bacteria based on the food habits and elimination processes of the critters, including birds. The presence of Aspergillus fumigatus spores, etc, should be studied, as these will be included in the initial air born contaminates rising from the intended grading, and cannot be ignored, or studied only by engineers as has been credited in the county letter of November 25, 2003. These are very important health and safety issues for which only health care professionals should be consulted to best consider the health and safety impacts to our very young and very old residents in the projected dust plume and transportation corridor.

SITE DEVELOPMENT CONSTRUCTION:

The intended movement of 100,200 cubic yards (cy) of materials over very steep approaches on older established residential streets is, in it's self, a matter of delicate consideration and should be analyzed as to total impacts. Destruction of the colossal and very steep hillside above Ascension is a challenging engineering feat. The Initial Study only refers to an average slope of 40%. As some of the site is almost level, then this downhill side exceeds 50%, but is not specifically identified. The level portions would require significantly less grading and lend themselves to a reasonablely reduced alternative which should be seriously studied in detail.

Disturbing a slope of this magnitude does not come without serious complications. The residents immediately at the bottom of this steep hillside, on Ascension, are more than concerned about the short, and long term affects of any grading above them, as well as the stability of the hillside in it's existing configuration. Residents on Ascension Dr. (See Map-Attachment #1), identified as:

Bussey Family	1561 Ascension
Velarde Family	1575 Ascension
Isaac Family	1581 Ascension
Shissler Family	1583 Ascension
Uyeda Family	1587 Ascension

each report troubling earth movements, over the years, in their back yards at the bottom of this huge hillside. This is in addition to the previous large slide and repair site around the corner on Los Altos Dr., which was inexplicitly not recognized or reported in the Initial Study documents. These residents are powerless to respond to changes to hydrology or earth slippage due to any massive slope destruction and reconstruction on the steep hillside above their homes.

To that end, our association has solicited the services of a highly respected Consulting Engineer and Geologist for an independent professional peer review and evaluation of the existing geotechnical study for the proposed development. Unfortunately, the additional data included in the Initial Study, available to the developer and County for some time, was not made available to the public until the scoping meeting notice of October 10, 2003. An initial report from our consultant is due this week, just before Christmas, 2003, with a final report to be provided shortly thereafter. It is reasonably anticipated that this professional data will contribute important information for the scope of the EIR, and hopefully will not be ignored for not meeting an arbitrary time frame.

It was only in the Initial Study that we were advised of the fact that 86,000cy of material would be moved from this site to an unknown off-site location. The movement of this amount of material, given the very steep approaches and sharp turns necessary to approach the site would most reasonably be limited to dump trucks with a capacity of 10cy, and then most reasonably not be completely filled because of the steep grades. The initial application speaks to moving 100,200cy of material.

It would take approximately 12,500 such dump trucks to move this material. If a dump truck approached the site empty, and left full, then returned full at some later interval and left empty, it would have passed any one spot, on the yet to be proposed residential route, a total of over 43,000 times. If 50 such dump truck loads were removed each work day, it would take 430 days, or 86 weeks to complete just this facet of construction. This is a significant amount of traffic for an older established residential neighborhood.

HEALTH AND SAFETY:

Health and Safety considerations come in several forms given the gross ramifications of this very ambitious project.

TRAFFIC HEALTH AND SAFETY

Given the construction trips of delivering building materials such as lumber, concrete, paving, and heavy construction equipment, and including the materials movement previously described, this project could be reasonably expected to generate several tens of thousands of work related trips, mostly involving large equipment. This equipment, negotiating steep slopes, and competing with the cyclic but heavy traffic generated by the College of San Mateo, would contribute to a severe degradation of the quality of life in this older residential neighborhood. The numeric odds of one of these truck trips conflicting with a child, playing in front of their house or traversing the same county streets which have no requirement for sidewalks, is a significant issue. How many trips before a heavy truck loses it's brakes on the steep residential approaches and has a "significant impact"?

The amount of traffic this project will generate will affect the wear and tear of our community streets, and possibly have an affect on the traffic patterns in adjacent communities, depending on specified routes. There is no indication that adjacent communities are scheduled to be contacted in any manner. It is unknown whether the optimum route chosen will include traversing Parrott Dr., (through the Town of Hillsborough) to Rt. 92, or over Parrott Dr. to CSM Dr., and Hillsdale Blvd (a San Mateo City Street) to Rt. 92. It would be reasonably anticipated that the identified amount of heavy truck traffic would have a significant impact to the condition local roads, and of Polhemus Rd., in spite of Ms. Hunt's declared decisions as to there being no impact on County roadway segments.

The health considerations of the asbestos brake lining thrown off from the brakes of these heavily
laden trucks passing residential areas for weeks on end must be considered, given the gross amount of trips necessary.

The noise generated by the heavy equipment traversing the steep approaches will be a significant factor, for an extended period of time, and needs adequate study and reasonable projections before mitigation.

The dust plume from this massive and extended project will, by it's self, become a significant factor. However, when combined with the amount of diesel exhaust fumes reasonably anticipated, will become an even more significant factor. The initial dust plume will also carry with it a significant amount of wildlife animal bacteria as previously discussed. The weather conditions, over an extended and anticipated time of construction should be studied, as periodic temperature inversions and shifting winds will affect a wide area. The area affected should also consider the residential corridor chosen to access this site. The cumulative impact requires study by health care specialists, and not just engineers.

INDIVIDUAL HEALTH CONSIDERATIONS

Given that many of the at risk residents are very young or very old, they are especially susceptible to respiratory problems from the previously identified air born pollutants. One elderly resident, immediately adjacent to this project, has already identified himself to the County as suffering from COPD. This health issue is detailed in a companion report from a medical expert, who indicates that any normal threshold, as recommended by the Bay Area Air Quality Control District, may be insufficient to meet the individual health considerations of certain residents suffering from identifiable and chronic respiratory diseases.

The content of the materials to be excavated and removed should also be analyzed to content as to hazardous materials such as asbestos, etc., which could adversely effect these fragile residents. Additionally, if those spoils removed are not the same ones returned from a common site, the new materials should be similarly analyzed .

As previously indicated, this association must advocate for the health and safety of our community. If this issue is not specifically addressed by health care specialists, and the project allowed to continue without adequate mitigation of specific and individual health and safety issues, legal recourse would be anticipated. To that end, it should be noted that California Appellate Law has carefully defined an individual right to privacy concerning their personal health issues. (Wood v. Superior Court, supra 166 Cal. App 3rd at 1147 / Division of Medical Quality v. Gherardini, supra 93 Cal. App. 3rd at 680 / Brovelli v. Superior Court (1961) 56 Cal.2nd 524, 529 / Younger v. Jensen (1980) 26 Cal.3rd 397, 404-405.) It is not within this association's legal responsibility or jurisdiction to identify to the developer, or the County, the health status of individual residents. It is sufficient to recognize that severe and chronic individual health issues should be anticipated in an older established residential community of this nature. It is known that such health issues do exist, and should be identified and addressed by some form of reasonable mitigation which includes recommendations of health care specialists.

SILTING AND SOILS RUNOFF

Downstream from this project is the City of San Mateo, which lays alongside the Bay of San Francisco . Recently, the Federal Emergency Management Agency, under the direction of the U.S. Congress, has re-assessed the low lying areas as to vulnerability to flooding. San Mateo has been such an identified area. Flood insurance, at great individual and community expense, for federally funded loans is required in these newly defined low lying areas. The City of San Mateo is attempting to mitigate this issue by increasing the height of their levees , and undertaking other expensive projects. Silting from large earth moving projects, if not adequately mitigated, will defeat the City's efforts to address their flood and insurance issues. It is noted that the City of San Mateo is not listed as an agency that may be affected, or require approval of certain aspects of this project.

CALIFORNIA WATER SERVICE WATER SUPPLY TANK

There has been no indication of any contact with the California Water Service Company as to maintaining the integrity of this important water supply when over 100,000cy of material will be removed from around the base of a large water tank which is surrounded by this project.

CUMULATIVE IMPACTS

At this time, there are numerous other projects in the immediate vicinity, which will contribute, in a significant cumulative manner, to the impacts to be suffered by this hillside community. The cumulative effects require study in each and every case. Those projects include:

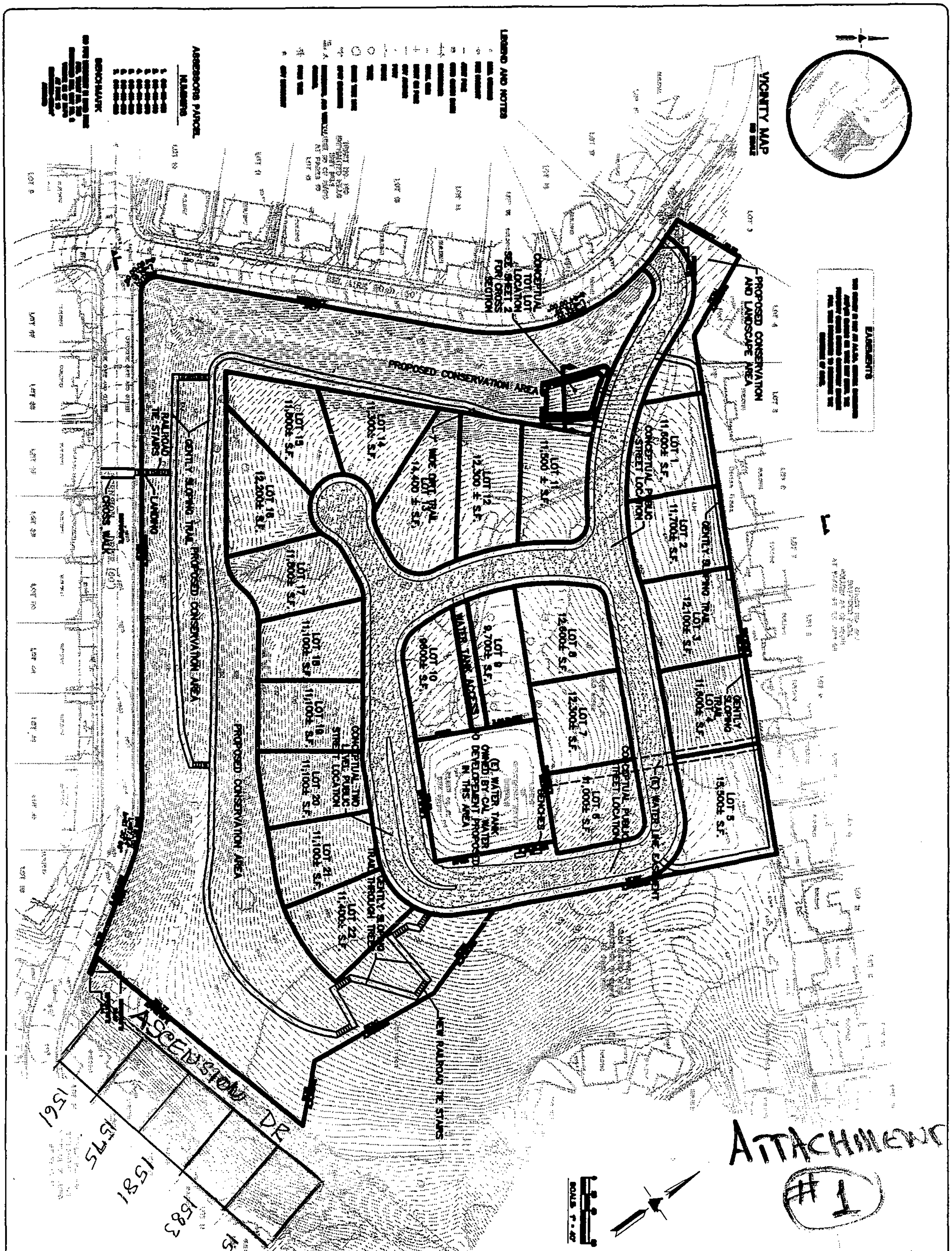
Thomas Subdivision	- this 25 unit residential project.
Chamberlain Project	- a 63 home residential project which will use many of the same traffic corridors, and move about the same amount of materials along Polhemus Rd. to Rt. 92.
CSM Residential	- a 44 unit project just around the coroner from this project, on CSM Dr. at Parrott Dr., and use the same traffic corridors.
County Juvenile Hall	- a federally funded project creating a new juvenile detention and rehabilitation facility, and court system utilizing the same traffic corridors, and moving a large amount of materials along Polhemus

	R., the same traffic corridor
San Francisco Public Utilities Commission -	an ambitious project to excavate a new tunnel, at two locations under Polhemus Rd., and will utilize the same traffic corridors
Verona Ridge	- a 36 unit residential project which will access Rt. 92 at Hillsdale, the same traffic corridor.
Odessy School	- a reconfiguration of an existing building just North of this project, on Polhemus Rd., will used the same traffic corridors.

The cumulative traffic and air pollution from all of these projects, with similar start times must be studied as to community and individual impacts.

REASONABLE ALTERNATIVE

An alternative project which incorporates a significant reduction in material moved would be a reasonable alternative to be studied and included in the EIR and study.



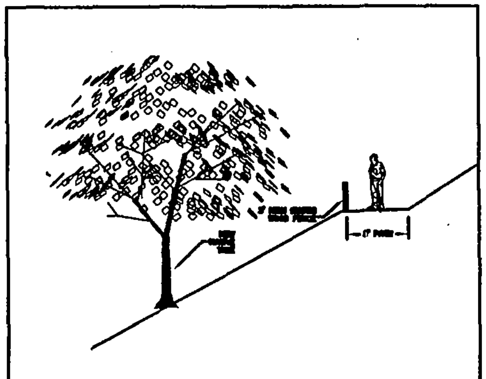
ATTACHMENT #1

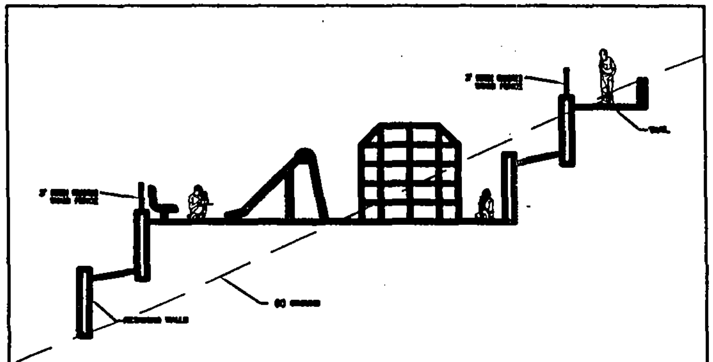
PRELIMINARY CONCEPT PLAN

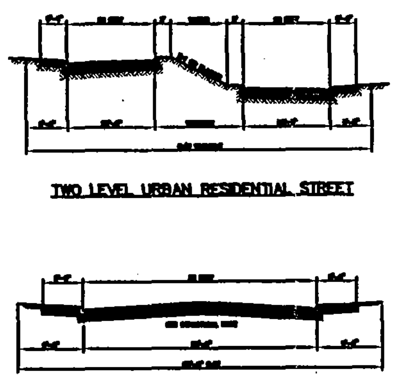
ACENSION DR & BELL AIRE SAN MATEO, CA

LEA & SUNG ENGINEERING, INC.

C-1







PROJECT DATA

DEVELOPER:
SAN MATEO REAL ESTATE AND CONSTRUCTION
DENNIS THOMAS
1777 BOREL PLACE, SUITE 300
SAN MATEO, CA 94402
(650) 578-0330

ENGINEER:
LEA & SUNG ENGINEERING INC.
JIM TOBY
2495 INDUSTRIAL PARKWAY WEST
HAYWARD, CA 94545
(510) 887-4086

ZONING: R-1

PROPOSED LOTS: 22

LOT COVERAGE:	ACRERAGE	% OF TOTAL
INDIVIDUAL LOTS TOTAL:	6.0	46%
PUBLIC STREETS PROPOSED	2.3	17%
CONSERVATION/TRAIL/TOT LOT AREA	5.1	37%
TOTAL	13.4	100%

LEA & SUNG ENGINEERING, INC.

ACENSION DR &
BELL AIRE
SAN MATEO, CA

CONCEPTUAL
DETAILS

C-2

APPENDIX C

LETTERS FROM PUBLIC SERVICE AND UTILITY AGENCIES

July 25, 2008

San Mateo County Library
Anne-Marie Despain, Interim Director of Library Services
125 Lessingia Court
San Mateo, CA 94402

Re: Proposed Ascension Heights Subdivision Environmental Impact Report (EIR)

Dear Ms Despain,

Christopher A. Joseph & Associates (CAJA) is preparing an Environmental Impact Report (EIR) for the proposed Ascension Heights Subdivision Project. The project site is located on the eastern corner of Bel Aire Road and Ascension Drive, within the unincorporated San Mateo Highlands area of San Mateo County, southwest of the City of San Mateo (see Figure 1, Regional and Vicinity Map). As proposed, the project would subdivide six legal parcels (APN: 041-111-130, -160, -270, -280, -320, and -360) into 25 single-family residential lots (see Site Plan). Each lot would be developed with one single-family home and lots would range in size from 10,120 to 17,590 square feet. The proposed project would dedicate acreage of land to an open space conservation area, as well as a "Tot Lot" public play area. The California Water Service Company will provide water for the project and fire protection. The Cal Water terminal storage for the area is located at the highest point of the proposed project site (not part of the proposed project development; refer to Figure 2, Vesting Tentative Map). Based on Census 2000 data for San Mateo County, it is estimated the proposed project will add approximately 70 new residents to the area.

The purpose of the EIR is to assess the project's potential impacts to various environmental issues areas and public service agencies. We hope you can help us identify potentially significant impacts to the San Mateo County Library that may be created by the proposed residential project. If it is determined that significant impacts will be created by the project, the study will provide mitigation measures to reduce potentially significant impacts to "less than significant" levels. Any assistance that you can provide with the following questions would be greatly appreciated.

1. The San Mateo and Hillsdale branch libraries are closest to the proposed project. Are there other libraries or branches likely to provide service to the residents of the proposed project?

2. Are the existing library facilities in San Mateo County adequate to meet the existing needs of County residents?

3. Are San Mateo County libraries adequately staffed to meet the existing needs of County residents?

4. Will serving the residents of the proposed project have a significant impact on the San Mateo County library system?

5. Does the County have any plans to develop new libraries or expand existing libraries in the proposed project area?

6. In addition to addressing project-specific impacts to library services, the EIR will also address cumulative impacts to library services. We are in the process of compiling a list of reasonably-foreseeable development in the County. Table 1, Related Projects List includes a list of some of the other major, reasonably-foreseeable approved development in the County in proximity to the proposed project's location (refer to Figure 3, Location of Related Projects). However, additional projects will likely be added to the list as our research continues. Can the Library accommodate the demand for library services associated with the development of these projects in conjunction with the proposed project?

   6a. How does the Library address the growing demand for library services?

   6b. Do you have any projections for future demand based on projected growth in the region?

   6c. What would be needed to meet the cumulative demand for library services?

7. Do you have any recommendations that might help reduce any potentially significant impacts to the San Mateo County Library generated by the proposed project?

Thank you for your assistance with the questions outlined above. Any response that you can provide will help us ensure that our analysis of project-specific and cumulative impacts on library services is accurate and complete. In order to attain a timely completion of our analysis, please provide your response (via mail, email, or fax) no later than **August 8, 2008**. Should you have any questions or need additional information on any aspect of this project, please feel free to contact me by phone at (707) 676-1909 or by e-mail at byron.easton@cajaeir.com.

Sincerely,

Byron Easton
Associate Environmental Planner
Christopher A. Joseph & Associates

Enclosed:

Figure 1: Regional and Vicinity Map
Figure 2: Site Plan
Table 1: Related Projects
Figure 3: Location of the Related Projects

From: Despain, Anne-Marie [despain@smcl.org]
Sent: Friday, August 01, 2008 9:04 PM
To: Byron Easton
Subject: RE: Proposed Ascension Heights Subdivision Environmental Impact Report (EIR)
San Mateo County Library responses to questions:

1. San Mateo and Hillsdale libraries are "city libraries" (not county) if you may want to contact them. The closest County Library would be the Belmont Library.
2. Yes.
3. Yes.
4. No.
5. No.
6. Yes.
   6a. Currently we are able to keep up with demand by employing innovative service strategies and utilizes additional technology.
   6b. No.
   6c. The impact would be very insignificant so no remedies are necessary.

7. The impact would be very insignificant so no remedies are necessary.

Anne-Marie Despain
Interim Director of Library Services
San Mateo County Library
125 Lessingia Court, San Mateo, CA 94402
T 650-312-5245 **F** 650-312-5382 **E** despain@smcl.org **W** smcl.org

CHRISTOPHER A. JOSEPH & ASSOCIATES
Environmental Planning and Research

July 25, 2008

San Mateo County Parks Department
David Holland, Director
455 County Center, 4th Floor
Redwood City, CA 94063-1646

Re: Proposed Ascension Heights Subdivision Environmental Impact Report (EIR)

Dear Mr. Holland,

Christopher A. Joseph & Associates (CAJA) is preparing an Environmental Impact Report (EIR) for the proposed Ascension Heights Subdivision Project. The project site is located on the eastern corner of Bel Aire Road and Ascension Drive, within the unincorporated San Mateo Highlands area of San Mateo County, southwest of the City of San Mateo (see Figure 1, Regional and Vicinity Map). As proposed, the project would subdivide six legal parcels (APN: 041-111-130, -160, -270, -280, -320, and -360) into 25 single-family residential lots (see Site Plan). Each lot would be developed with one single-family home and lots would range in size from 10,120 to 17,590 square feet. The proposed project would dedicate acreage of land to an open space conservation area, as well as a “Tot Lot” public play area. The California Water Service Company will provide water for the project and fire protection. The Cal Water terminal storage for the area is located at the highest point of the proposed project site (not part of the proposed project development; refer to Figure 2, Vesting Tentative Map). Based on Census 2000 data for San Mateo County, it is estimated the proposed project will add approximately 70 new residents to the area.

The purpose of the EIR is to assess the project’s potential impacts to various environmental issues areas and public service agencies. We hope you can help us identify potentially significant impacts to parks and recreation facilities that may be created by the proposed residential project. If it is determined that significant impacts will be created by the project, the study will provide mitigation measures to reduce potentially significant impacts to “less than significant” levels. Any assistance that you can provide with the following questions would be greatly appreciated.

1. Does the San Mateo County Parks Department have any plans to develop new parks or expand existing parks in the project area?

2. Would the project significantly affect existing park facilities?

   2a. If yes, please identify which facilities might be affected, and any anticipated impacts.

3. The Quimby Act (Gov’t Code §66477 *et seq*) allows for exactions in the form of fees or land dedications at the time of subdivision. Under the Act, exactions are limited to 3 acres per 1000 residents or in-lieu fees. It is expected that the dedication of common areas/conservation areas and the “Tot Lot” improvements will offset any fees or exactions that will be required by Article 6 of the San Mateo County Subdivision Regulations. Will this dedication and related improvements adequately mitigate any potentially significant impacts to parks and recreation facilities in the County created by the proposed project?

3a. If not, what measures would you suggest to mitigate the potential impacts?

4. In addition to addressing project-specific impacts to parks and recreational services, the EIR will also address cumulative impacts to parks and recreational services. We are in the process of compiling a list of reasonably-foreseeable development in the County. Table 1, Related Projects List includes a list of some of the other major, reasonably-foreseeable approved development in the County in proximity to the proposed project's location (refer to Figure 3, Location of Related Projects). However, additional projects will likely be added to the list as our research continues. Can the District accommodate the demand for parks and recreational services associated with the development of these projects in conjunction with the proposed project?

   4a. How does your agency address the growing demand for parks and recreational services?

   4b. Do you have any projections for future demand based on projected growth in the region?

   4c. What would be needed to meet the cumulative demand for parks and recreational services?

5. Please provide any recommendations that might help eliminate or reduce any potential impacts the proposed project would have on parks and recreational services provided by the Department.

Thank you for your assistance with the questions outlined above. Any response that you can provide will help us ensure that our analysis of project-specific and cumulative impacts on parks and recreation facilities is accurate and complete. In order to attain a timely completion of our analysis, please provide your response (via mail, email, or fax) no later than **August 8, 2008**. Should you have any questions or need additional information on any aspect of this project, please feel free to contact me by phone at (707) 676-1909 or by e-mail at byron.easton@cajaeir.com.

Sincerely,

Byron Easton
Associate Environmental Planner
Christopher A. Joseph & Associates

Enclosed:

Figure 1: Regional and Vicinity Map
Figure 2: Site Plan
Table 1: Related Projects
Figure 3: Location of the Related Projects

HRD
Highlands Recreation District
Est. 1957

Highlands Recreation District
1851 Lexington Avenue • San Mateo, CA 94402
(650) 341-4251 • Fax (650) 349-9627
www.highlandsrec.com

August 6, 2008

Christopher A. Joseph & Associates
Environmental Planning and Research
179 H Street
Petaluma, CA 94952

Re: Proposed Ascension Heights Subdivision Environmental Impact Report

To Whom It May Concern:

The Highlands Recreation District will be responding to the questions posed regarding the potentially significant impacts to parks and recreation facilities due to the proposed residential project.

1. The District does not have any plans to develop new parks or expand existing parks in the near future.
2. The current project would not significantly affect existing park facilities.
3. This question does not pertain to us as a District.
4. Yes. The District can accommodate the demand for parks and recreational services associated with this development as well as the possible others.
    A. The District is open to residents and non-residents for use and the demand for usage varies depending on the time of year. The few increases in certain program areas have not caused undue stress upon the facility or the programs so we have not needed to address this matter in the past.
    B. No.
    C. Unknown at this time.
5. The District does not have any recommendations at the present time.

Please contact me if you have any questions about the responses the District has provided.

Sincerely,

Margaret Glomstad
General Manager

SAN MATEO
FOSTER CITY
SCHOOL DISTRICT

51 West 41st Avenue
P.O. Box K
San Mateo, CA 94402
(650) 312-7700
FAX (650) 312-7779

August 29, 2003

Attn. Gary Helfrich
Christopher A. Joseph & Associates
101 H Street, Suite Q
Petaluma, CA 94952

Dear Mr. Helfrich:

In response to your recent letter of inquiry to Superintendent Clark requesting information pertinent to an EIR for the proposed Thomas Subdivision Project in San Mateo County, the following are replies to your questions about the impact on our schools.

1) A) **Highlands Elementary School** (K-5) - current enrollment **400**
B) The school currently has one classroom not being used as a general education classroom. It could accommodate 20 primary grade or 28 upper grade students.
2) **Yes**, the existing school capacity within the District is adequate to meet current student population.
3) A) **School Developer Fees for residential** development are $1.28 for San Mateo-Foster City SD and $.86 for San Mateo Union HSD for a **total** of **$2.14 per square foot.**
B) **Parcel tax - Measure B 1991** - current rate **$77.54** per parcel
Parcel tax - Measure B 2003 for seven years at **$75 per parcel**
4) **No**, there are not any improvements or additions planned for District schools that serve the project area.
5) Bussing and overcrowding - Most district schools currently have portable/relocatable buildings on their campuses. The District busing program is for purposes of integration rather than to accommodate overcrowding.

If you need additional information, please feel free to contact my office.

Sincerely,

Susan Silver

Susan Silver, Ed.D.
Associate Superintendent
Administrative Services

SS/sc

cc: Pendery Clark, Ed.D.

Mr. Byron Easton
Christopher A. Joseph & Associates 1
79 H Street
Petaluma, Ca. 94952
FAX: 707-283-4041

August 1, 2008

Dear Mr. Easton:

Here is my response, on behalf of the San Mateo County Sheriff's Office, to your **Proposed Ascension Heights Subdivision Environmental Impact Report.**

1. What Sheriff's Department station(s) serves(s) the project area?
Headquarters Patrol, Hall of Justice, Redwood City. Please note that the Highlands Patrol Area provides office space for report taking.

2. What are the existing staff levels (both sworn and civilian) of the station(s) in Question 1?
One deputy each 12 hour shift rendering 24/7 coverage, per contract.

2a. Are the existing staff levels at the station(s) adequate to meet the current demands for the protection services in the project area?
Yes.

3. What is the existing equipment inventory at each police station included in your response to Question 1?
Vehicle and all ancillary supplies.

3a) Are the equipment levels adequate to meet the project area's current demand for police services?
Yes

4. Is there a target response time for incidents in the proposed project area? Will the proposed project have a significant impact on achieving or maintaining this response time?
The target response time will remain within current response times.
The proposed area is within the current beat assignment of the 'Highlands', there will be no significant impact, once the staff is familiar with the project.
Currently we are participating in a State Audit (via POST) to determine best practice staffing levels.

5. Does the Sheriff's Department have a preferred deputy-to-population ratio?
Currently we are participating in a State Audit (via POST) to determine best practice staffing levels.

5a) What is the current ratio?
We currently determine staffing levels per assignment rather than population ratios. This is due, in part, to other staff assignments such as bailiff, Corrections, Transit and investigations.

6. Is the current staffing level adequate to meet the current demands for police services in the proposed area?
Yes

7. Included in this letter is the proposed site plan. Does the proposed design conform to the Sheriff's Department" requirements for emergency access?
Yes, as long as the proposed "Fire Access Road" (Southeast) remains in the project plan.

8. In what Reporting District is the proposed plan?
40 Beat

8a) Please provide recent statistics for this Reporting Districts?
Please see attached, DOC #1. This "Yearly Comparison" from 2000 - June of 2008 addresses reports of major criminal activity.

8b) How does the crime rate near the proposed project compare to the overall crime rate for other unincorporated areas of San Mateo County?
Lower

9. Would the Sheriff's Department need to construct new police facilities or expand existing facilities in order to accommodate the project's demand for police services.
No.

9a) Would the project require the Sheriff's Department to hire more deputies or staff?
Doubtful

9b) Would the project require the Sheriff's Department to purchase more equipment?
Doubtful

10. The Emergency Management Unit provides rescue and hazmat response to San Mateo County and its cities, Will the proposed project have a significant impact on services provided by the Emergency Management Unit.

Possible, during construction. Upon completion of the project, highly unlikely.

11. In addition to addressing project-profile impacts to police services, the EIR will also address the cumulative impacts to police services. We are in the process of compiling a list of reasonably foreseeable development in the County. Table 1, related projects List includes a list of some of the other major, reasonable-foreseeable approved development in the County in proximity of the proposed projects location (refer to Figure 3, Location Related Projects). However, additional projects will likely be added to the list as our research continues. Can the Sheriff's Department accommodate the demand for police services associated with the development of these projects in conjunction with the proposed project?

Yes, with the current list. The only possible exception is unanticipated impact of YSC.

11a) How does your agency address the growing demand for police services?

Community input and contract negotiations for certain locations, the Highlands being one.

11b) Do you have any projections for the future demand based on projected growth in the region?

Not at this time, awaiting POST Audit.

11c) What would be needed to met the cumulative demand for police services?

Sudden and sustained increase in crime.

12. Please provide recommendations that could reduce the demand for police services created by the proposed project and cumulative development?

Good street lighting, signage, and address numbering.

As stated, we are in the process of a State of California, Peace Officers Standards and Training audit for patrol staffing. When this is complete, I would be happy to share the information with you.

Sincerely,

Mark S. Hanlon, Captain
San Mateo County Sheriff's Office
400 County Center, Redwood City, Ca. 94404
Ph: 650.363.4390
Email: mhanlon@co.sanmateo.ca.us

Document #1

Four pages to follow

Response to "Proposed Ascension Heights Subdivision Environmental Impact Report".

Statistics submitted by Captain Mark S. Hanlon

San Mateo County Sheriff's Office

Crime Activities

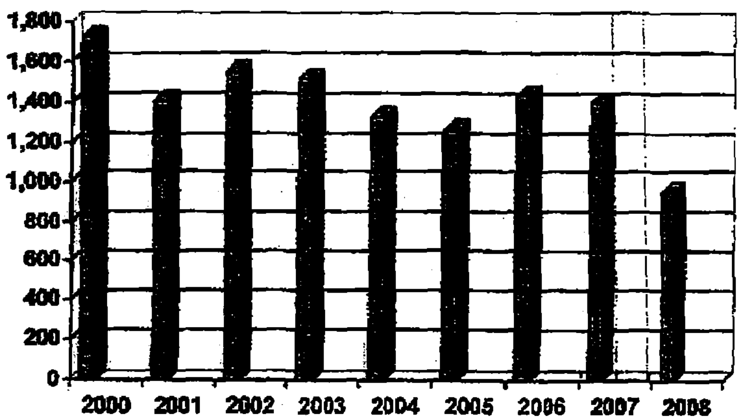
Eichler Highlands
Beat 40

Yearly Comparisons

Total reported and self-initiated CAD activities:

	2000	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*
Activities	1,733	1,407	1,554	1,521	1,331	1,263	1,439	1,397	958

Activities per Year



San Mateo County Sheriff's Office

Crime Activities

Eichler Highlands
Beat 40

Yearly Comparisons

Crime related - reported and self-initiated CAD activities:

Type	2000	2001	2002	2003	2004	2005	2006	2007	2008
Homicide	0	0	0	0	0	0	0	0	0
Rape	1	1	0	0	0	0	0	0	0
Robbery	0	0	0	0	0	0	0	0	0
Assault	2	1	4	4	0	0	3	1	0
Burglary - Other*	9	7	8	8	9	6	10	9	5
Burglary - Auto	9	15	10	7	11	9	11	17	6
Theft	32	34	27	17	8	11	8	6	1
Auto Theft	2	5	6	4	0	0	1	1	0
Arson	0	0	0	0	0	0	0	0	0
Kidnap	0	0	0	0	0	0	0	0	0
Missing Person or Runaway	4	14	5	5	9	7	4	6	0
Firearm Discharge	2	0	7	3	3	0	2	0	1
Suspicious Circumstance**	74	119	172	168	126	105	114	99	56
Disturbances (F/N)***	43	61	55	47	32	23	36	28	21
Drug Activities	0	0	0	2	0	2	0	3	2
Vandalism	13	19	25	37	0	0	0	1	1
Intoxicated Person	0	1	0	1	1	0	2	3	3
Alarm Commercial	3	1	2	0	0	1	2	2	4
Alarm Other	176	178	146	156	119	109	120	96	71
Emergency Medical	8	12	11	5	3	4	9	8	4
Domestic Violence	5	7	9	7	0	2	0	1	0

* Commercial / Residential
** Includes suspicious persons and vehicles
*** (F) Family / (N) Neighbor

San Mateo County Sheriff's Office

Crime Activities

Eichler Highlands
Beat 40

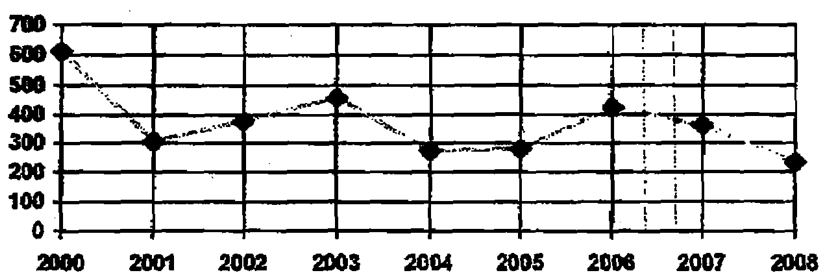
Yearly Comparisons

Traffic related - reported and self-initiated CAD activities:

Type	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*
Enforcement Stops	475	190	158	308	187	199	286	178	119
Drunk Driving	2	1	0	1	0	1	1	0	1
Abandoned Vehicles	19	19	28	13	9	9	5	9	3
Vehicles Towed	7	2	9	7	4	5	5	2	2
Traffic Investigation*	94	80	161	112	70	61	115	169	101
Accidents - Total	15	18	18	20	8	7	14	3	6
Property	7	16	15	18	7	6	11	3	4
Injury	8	2	3	2	1	1	3	0	2
Total Traffic Activities	612	310	374	461	278	282	426	361	235

* Includes investigation of speeding vehicles, reckless drivers, parking violations, traffic hazards, traffic controls, etc.

Traffic Related Activities



San Mateo County Sheriff's Office

Crime Activities

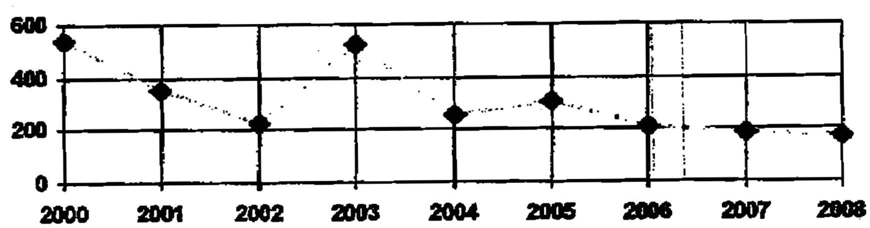
Eichler Highlands
Beat 40

Yearly Comparisons for 2006

Citations Issued:

Citations Issued - Moving	433	222	154	341	173	182	182	139	138
Citations Issued - Other	105	134	70	186	80	128	26	47	31
Total Citations Issued	538	356	224	527	253	310	208	186	169

Citations Issued



Arrests:

Type	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*
Arrests - Felony	5	3	2	5	N/A	N/A	4	5	N/A
Arrests - Misdemeanor	8	19	18	19	N/A	N/A	6	13	N/A
Total Arrests	13	22	20	24	N/A	N/A	10	18	N/A

CHRISTOPHER A. JOSEPH & ASSOCIATES
Environmental Planning and Research

July 25, 2008

San Mateo Fire Department
Chief Daniel T. Belville
1900 O'Farrell Street, Suite 140
San Mateo, CA 94403

Re: Proposed Ascension Heights Subdivision Environmental Impact Report (EIR)

Dear Chief Belville,

Christopher A. Joseph & Associates (CAJA) is preparing an Environmental Impact Report (EIR) for the proposed Ascension Heights Subdivision Project. The project site is located on the eastern corner of Bel Aire Road and Ascension Drive, within the unincorporated San Mateo Highlands area of San Mateo County, southwest of the City of San Mateo (see Figure 1, Regional and Vicinity Map). As proposed, the project would subdivide six legal parcels (APN: 041-111-130, -160, -270, -280, -320, and -360) into 25 single-family residential lots (see Site Plan). Each lot would be developed with one single-family home and lots would range in size from 10,120 to 17,590 square feet. The proposed project would dedicate acreage of land to an open space conservation area, as well as a "Tot Lot" public play area. The California Water Service Company will provide water for the project and fire protection. The Cal Water terminal storage for the area is located at the highest point of the proposed project site (not part of the proposed project development; refer to Figure 2, Vesting Tentative Map). Based on Census 2000 data for San Mateo County, it is estimated the proposed project will add approximately 70 new residents to the area.

The purpose of the EIR is to assess the project's potential impacts to various environmental issue areas and public service and utility agencies, including the California Department of Forestry and Fire Protection (CAL FIRE). We hope you can help us identify potential impacts to **fire protection and emergency medical response** in the project area. If applicable, the study will also provide recommendations that may be necessary to reduce such potential significant impacts to "less than significant" levels. Any assistance that you can provide with the following four questions would be greatly appreciated.

1. Which fire station will provide initial response to the proposed project?
2. What are the existing staffing levels and equipment inventories (i.e., Engine, Truck, Rescue ambulance, etc.) for these stations?

   2a. Are these levels adequate to meet existing needs for fire protection and emergency response?

   2b. Would additional staffing or equipment be needed to mitigate potential impacts of this project on services provided by your Department? Does the Department have a preferred ratio of fire fighters per population?

   2c. What is the current ratio?

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Summary of Comments on Microsoft Word - Fire_2 Letter.doc

Page: 1

Sequence number: 1
Author: mdong
Subject: Note
Date: 7/31/2008 11:20:59 AM
Station 27

Sequence number: 2
Author: mdong
Subject: Note
Date: 7/31/2008 1:47:52 PM
Captain & fire fighter, firefighter/medic. One Engine.

Sequence number: 3
Author: mdong
Subject: Note
Date: 7/31/2008 11:21:34 AM
yes

Sequence number: 4
Author: mdong
Subject: Note
Date: 7/31/2008 11:22:23 AM
No. No

Sequence number: 5
Author: mdong
Subject: Note
Date: 7/31/2008 1:50:51 PM
23 firefighters to 95,000 population.

---

3. What other agencies provide mutual aid to the project site and surrounding area?

4. What is the average response distance and time for the stations responding to the project area? Do these statistics meet the desired performance standards of the Department?

5. The proposed project is designed with a 250-foot long access road connecting to Bel Aire Road, as well as an Emergency Vehicle Access (EVA) road connecting to Ascension Drive. A loop road provides access to residences within the proposed project. Will these road designs have a significant impact on response time within the project? If so, can you recommend changes to the road design that would mitigate or avoid these impacts?

6. Does the Department have plans to develop any new fire stations or make improvements to the staff/equipment levels of stations in the area of the proposed project?

   6a. If so, please describe the specifics of these planned improvements.

7. Does the Department have a preferred response time to calls for emergency service?

   7a. What is the Department's record in meeting this preferred response time?

   7b. What is the distance to the nearest hospital emergency room?

   7c. Is the hospital capable of meeting emergency demand?

8. Two fire stations provide primary response in the area of the project site. CDF Station 17 (20 Tower Road in Belmont) houses Medic Engines 17 and 217, as well as Engine 1771 and Dozer 1741 during wildland fire season. San Mateo City Station 27 (545 Beresford in San Mateo) houses Medic Engine 27 and Truck 21. Minimum staffing at both stations is maintained at three firefighters per apparatus. Both stations have response times of less than five minutes to the project site. The area is not located in fire risk or hazard zones as identified by CAL FIRE and the State Fire Marshal.

   Please verify this information is correct.

9. Is the project site susceptible to wildland fires?

10. Would implementation of the proposed project require the Department to construct new facilities or expand existing facilities to accommodate the increased demand for fire protection services created by the proposed project?

11. In addition to addressing project-specific impacts to fire protection services, the EIR will also address cumulative impacts to fire protection services. We are in the process of compiling a list of reasonably-foreseeable development in the County. Table 1, Related Projects List includes a list of some of the other major, reasonably-foreseeable approved development in the County in proximity to the proposed project's location (refer to Figure 3, Location of Related Projects). However, additional projects will likely be added to the list as our research continues. Can the Department accommodate the demand for fire protection services associated with the development of these projects in conjunction with the proposed project?

12. How does your agency address the growing demand for fire protection services?

    12a. Do you have any projections for future demand based on projected growth in the region?

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Page: 2

Sequence number: 1
Author: mdong
Subject: Note
Date: 7/31/2008 11:24:04 AM
Woodside Fire Protection District, Central County Fire, Belmont/San Carlos, Half Moon Bay Fire District

---

Sequence number: 2
Author: mdong
Subject: Note
Date: 7/31/2008 1:54:05 PM
About 1.25 mile or 5 minutes for San Mateo Fire. Yes.

Sequence number: 3
Author: mdong
Subject: Note
Date: 7/31/2008 2:21:32 PM
Yes, lot 11 and 12 are impacted for access, road grade poses problems. Recommend all homes to have fire sprinkler system and hydrants with 41/2"x2x21/2" outlets spaced at 300 ft. Provide turn-around but better to provide through access. Need minimum 26' wide roads. Radii turns may not meet city standards.

Sequence number: 4
Author: mdong
Subject: Note
Date: 7/31/2008 11:55:01 AM
No

Sequence number: 5
Author: mdong
Subject: Note
Date: 7/31/2008 1:55:06 PM
<7 minutes

Sequence number: 6
Author: mdong
Subject: Note
Date: 7/31/2008 11:55:37 AM
95%

Sequence number: 7
Author: mdong
Subject: Note
Date: 7/31/2008 1:56:40 PM
5 miles

Sequence number: 8
Author: mdong
Subject: Note
Date: 7/31/2008 1:56:54 PM
Unknown

Sequence number: 9
Author: mdong
Subject: Note
Date: 7/31/2008 1:58:05 PM
Truck 21 is not located in this station. Cal Fire known status.

Sequence number: 10
Author: mdong
Subject: Note
Date: 7/31/2008 11:57:36 AM
yes

Sequence number: 11
Author: mdong

Comments from page 2 continued on next page

3. What other agencies provide mutual aid to the project site and surrounding area?

4. What is the average response distance and time for the stations responding to the project area? Do these statistics meet the desired performance standards of the Department?

5. The proposed project is designed with a 250-foot long access road connecting to Bel Aire Road, as well as an Emergency Vehicle Access (EVA) road connecting to Ascension Drive. A loop road provides access to residences within the proposed project. Will these road designs have a significant impact on response time within the project? If so, can you recommend changes to the road design that would mitigate or avoid these impacts?

6. Does the Department have plans to develop any new fire stations or make improvements to the staff/equipment levels of stations in the area of the proposed project?

   6a. If so, please describe the specifics of these planned improvements.

7. Does the Department have a preferred response time to calls for emergency service?

   7a. What is the Department's record in meeting this preferred response time?

   7b. What is the distance to the nearest hospital emergency room?

   7c. Is the hospital capable of meeting emergency demand?

8. Two fire stations provide primary response in the area of the project site. CDF Station 17 (20 Tower Road in Belmont) houses Medic Engines 17 and 217, as well as Engine 1771 and Dozer 1741 during wildland fire season. San Mateo City Station 27 (545 Beresford in San Mateo) houses Medic Engine 27 and Truck 21. Minimum staffing at both stations is maintained at three firefighters per apparatus. Both stations have response times of less than five minutes to the project site. The area is not located in fire risk or hazard zones as identified by CAL FIRE and the State Fire Marshal.

   Please verify this information is correct.

9. Is the project site susceptible to wildland fires?

10. Would implementation of the proposed project require the Department to construct new facilities or expand existing facilities to accommodate the increased demand for fire protection services created by the proposed project?

11. In addition to addressing project-specific impacts to fire protection services, the EIR will also address cumulative impacts to fire protection services. We are in the process of compiling a list of reasonably-foreseeable development in the County. Table 1, Related Projects List includes a list of some of the other major, reasonably-foreseeable approved development in the County in proximity to the proposed project's location (refer to Figure 3, Location of Related Projects). However, additional projects will likely be added to the list as our research continues. Can the Department accommodate the demand for fire protection services associated with the development of these projects in conjunction with the proposed project?

12. How does your agency address the growing demand for fire protection services?

    12a. Do you have any projections for future demand based on projected growth in the region?

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Subject: Note
Date: 7/31/2008 12:38:27 PM
no

Sequence number: 12
Author: mdong
Subject: Note
Date: 7/31/2008 12:39:04 PM
yes

Sequence number: 13
Author: mdong
Subject: Note
Date: 7/31/2008 12:42:06 PM
Being pro-active in fire prevention, require built-in fire protection and make evaluations. Joint powers agreement.

Sequence number: 14
Author: mdong
Subject: Note
Date: 7/31/2008 12:41:27 PM
no

12b. What would be needed to meet the cumulative demand for fire protection services?

13. Please provide recommendations that could reduce the demand for fire protection services created by the proposed project and cumulative development.

Thank you for your assistance with the questions outlined above. Any response that you can provide will help us ensure that our analysis of project-specific and cumulative impacts on fire protection services is accurate and complete. In order to attain a timely completion of our analysis, please provide your response (via mail, email, or fax) no later than **August 8, 2008**. Should you have any questions or need additional information on any aspect of this project, please feel free to contact me by phone at (707) 676-1909 or by e-mail at byron.easton@cajaeir.com.

Sincerely,

Byron Easton
Associate Environmental Planner
Christopher A. Joseph & Associates

Enclosed:

Figure 1: Regional and Vicinity Map

Figure 2: Site Plan

Table 1: Related Projects

Figure 3: Location of the Related Projects

Page: 3

Sequence number: 1
Author: mdong
Subject: Note
Date: 7/31/2008 12:43:16 PM
built-in fire extinguishing systems and fire warning systems.

Sequence number: 2
Author: mdong
Subject: Note
Date: 7/31/2008 2:03:01 PM
Fire sprinkler systems, property maintenance, vegetation management, building construction using non-combustible materials and in accordance with the Wildland Urban Interface Building Standards.

San Mateo Union High School District

David Miller, Ph.D., Superintendent
Elizabeth McManus, Deputy Supt. Business Services
Matthew Biggar, Associate Supt. Instructional Services
Kirk Black, Associate Supt. Human Resources & Admin. Services

650 North Delaware Street
San Mateo, CA 94401-1795
(650) 558-2299
(650) 762-0249 FAX

August 8, 2008

Mr. Bryon Easton via fax 707-283-4041
Christopher A. Joseph & Associates
179 H. Street
Petaluma, CA 94952

Re: Proposed Thomas Subdivision EIR

Dear Mr. Easton:

Per your letter dated July 25, 2008, requesting information on potential impacts of the above stated proposed project on the San Mateo Union High School District, below are answers and comments to your questions and concerns:

1. The San Mateo Union High School District has six comprehensive high schools, one continuation high school and one adult school that serve the cities of Burlingame, Foster City, Hillsborough, Millbrae, San Bruno and San Mateo.

2. Aragon High School, 900 Alameda de las Pulgas, San Mateo, CA 94402 would serve the proposed Thomas Subdivision

   a. Aragon enrollment for the 2007/2008 school year was 1,603. Maximum capacity for Aragon is 1,500.

3. Existing school capacity within the District is adequate to meet current student population.

4. The current San Mateo Union High School District developer fee for residential development is \$1.05/sq ft., which is 40% of the total rate of \$2.63. This fee is for the High School District only. The Elementary School District charges an additional fee (the remaining 60%). At its January 30, 2008, meeting, the State Allocation Board (SAB) approved the biennial increase in the Level 1 developer fees. The new total residential rate is \$2.97/sq ft. Sometime within the next six months the District intends on raising their residential development fee rate to \$1.19, which is our 40% of the maximum allowable rate as approved by the SAB January 2008.

   The San Mateo Union High School District has two Bond Measures that have been passed. Measure D was passed in 2000 and Measure M was passed in 2006. The 2007-08 tax rate for the Measure D Bonds was \$15 per \$100,000 of assessed value. The Measure M bonds did not have a 2007-08 tax rate as the bonds had not yet been issued when the 2007-08 rates were set. We are estimating the

San Mateo Union High School District

David Miller, Ph.D., Superintendent
Elizabeth McManus, Deputy Supt. Business Services
Matthew Biggar, Associate Supt. Instructional Services
Kirk Black, Associate Supt. Human Resources & Admin. Services

650 North Delaware Street
San Mateo, CA 94401-1795
(650) 558-2299
(650) 762-0249 FAX

Measure M Bonds to have a rate of $15.20 per $100,000 for 2008-09.

5. The District is not utilizing any bussing programs or portable classrooms to accommodate overcrowding.

6. The District is in the process of implementing modernization projects at all six comprehensive high schools. The list of projects is available on our website at www.smuhsd.org.

7. The student generation rate used for single-family residential projects is one student per household.

8. Yes, the District can accommodate the demand for school services associated with the development of projects listed in Table 1, attached to your letter dated July 25, 2008. In general, the District's enrollment projections are decreasing, and its overall enrollment is below District capacity. The District has room for the anticipated projected growth in our area.

9. The San Mateo Union High School District has no other comments or concerns regarding this potential project at this time.

Sincerely,

Elizabeth McManus (by PC)

Elizabeth McManus
Deputy Superintendent Business Services

Department of Public Works

COUNTY OF SAN MATEO

555 COUNTY CENTER, 5TH FLOOR • REDWOOD CITY • CALIFORNIA 94063-1665 • PHONE (650) 363-4100 • FAX (650) 361-8220

JAMES C. PORTER
DIRECTOR

September 17, 2008

Mr. Byron Easton
Associate Environmental Planner
Christopher A. Joseph & Associates
179 H Street
Petaluma, CA 94952

Dear Mr. Easton:

Re: Proposed Ascension Heights Subdivision Environmental Impact Report (EIR) Solid Waste & Sewer Service

We are in receipt of your letter dated July 25, 2008, regarding the above project. We have listed below your questions (Q) and our responses (R) to your questions.

SOLID WASTE SERVICES

Q1. Solid waste services for the proposed project area are provided by Allied Waste Industries, Inc. The primary disposal site is the Ox Mountain Sanitary Landfill. This site had an original capacity of 12 million cubic yards, and has a remaining capacity of 33.5 million cubic yards, due to various expansion projects. Ox Mountain receives an average of 3,250 tons of waste per day with a maximum of 3,598 yards per day. Can you please verify this data is accurate?
R1. According to Ox Mountain's Solid Waste Facility Permit, the design capacity for disposal is 37.9 million cubic yards. The amount of permitted tons per Operating day is 3,598 tons/day. The average tonnage Ox Mountain receives per day varies, depending upon when the average was taken. For 2008, Ox Mountain averages well below 3,250 tons of waste per day.

Q2. Would waste go to a transfer station before going to the landfill?
R2. Franchised waste will be brought to the transfer station. Self-haul from garages and yard cleanups can be brought to the landfill or a Transfer Station.

Q3. Would the transfer station/landfill have enough capacity to accommodate the project's generation of solid waste?
R3. The impact will be minimal. We cannot determine disposal impacts until we can calculate how many households and how many persons per household.

Q3a. If not, what would be needed to accommodate the project's generation of solid waste?
R3a. Ensuring there will be adequate space on each parcel for recycling.

Q4. What recycling programs are available for the residents of the proposed project?

R4. Curbside recycling; Cans, Bottles, Paper, Cardboard and Yard Waste.

Q4a. How much diversion of solid waste does the recycling program average?
R4a. The County is required per AB939 to divert at least 50% of its waste from going to the landfill. The County Unincorporated diversion rate is approximately 64% as submitted for 2006. This diversion has not yet been approved by the California Integrated Waste Management Board.

Q4b. What is the percentage of reduction from the landfill that is created by the recycling program?
R4b. We do not measure the percentage of reduction from recycling, we measure diversion from the landfill. Recycling is not the only method to divert waste; there are other methods such as BackYard Composting, Green Building, Reuse, Source Reduction.

Q5. A diversion plan will be implemented for all construction debris generated by the proposed project. The plan will follow technical guidelines provided by your Waste Management Section. Are there any suggestions for mitigation of potential construction related impacts to solid waste services?
R5. Encourage Source Separation of materials onsite into various categories to ensure construction debris gets recycled. The County has a Construction and Demolition Guide that lists the various providers of C & D recycling such as cardboard, wire, metal, wood, all inerts etc. The project should also require all the jobsite subcontractors to recycle.

Q6. Has San Mateo County implemented single stream recycling? If not, is there any plan in the reasonably foreseeable future to do so?
R6. No, but it is planned to be implemented in certain area of the County by January 1, 2011.

Q7. "Per CIWMB facility/site details for Ox Mountain Landfill remaining capacity is listed at 44,646,148 cubic yards with a maximum permitted capacity of **xx**. Furthermore, no violations or areas of concern have been noted during site inspections. Maximum permitted disposal at the landfill is 3,598 tons per day (tpd); therefore, an additional 0.03 tons per day would represent a minimal incremental increase in solid waste generation."
R7. Per CIWMB facility/site details for Ox Mountain Landfill remaining capacity is listed at 44,646,148 cubic yards with a maximum permitted capacity of 37,900,000.

Q8. AB 939 (California Public Resources Code Section 40000 *et seq*) requires at least 50% of the solid waste stream to be diverted from landfills by the year 2000. Are there additional measures that can be taken to minimize potentially significant impacts to solid waste services that may be generated by the proposed project?
R8. The project can implement aggressive programs to divert most if not all of the waste generated from the landfill from construction activities.

Q9. What steps or programs does San Mateo County implement with respect to California Integrated Waste Management Act of 1989 (AB 939) that may involve the project?
R9. We have staff available to provide technical assistance and a website at http://www.RecycleWorks.org to provide additional resources.

Q10. In addition to addressing project-specific impacts to solid waste service, the EIR will also address cumulative impacts to solid waste service. We are in the process of compiling a list of reasonably foreseeable development in the County. Table 1, Related Projects List includes a list of some of the other major, reasonably foreseeable approved development in the County in proximity to the proposed project's location (refer to Figure 3, Location of Related Projects). However, additional projects will likely be added to the list as our research continues. Can the landfill accommodate the demand for landfill capacity associated with these projects in conjunction with the proposed project?
R10. See R3.

Q10a. How does your agency address the growing demand for landfill capacity?
R10a. Encouraging new programs and policies to divert waste from the landfill.

Q10b. Do you have any projections for future demand based on projected growth in the region?
R10b. RecycleWorks does not track this data. This item is most likely addressed in the County General Plan. The County produced both a Siting Element and the San Mateo County Integrated Waste Management Plan. Every five years the County works with City County Association of Governments (C/CAG) to update the documents. These documents include some discussion on future planning.

Q10c. What would be needed to meet the cumulative demand for landfill capacity?
R10c. Siting or expanding landfill capacity, encouraging zero waste and many other diversion programs.

Q11. Please provide any recommendations that could reduce the demand for landfill capacity created by the proposed project and cumulative development.
R11. Comply with the County Waste Management Plan. Design garbage and recycling enclosures/locations for adequate space and access in mind. Incorporate the Build It Green checklist into the design to encourage the use of recyclable and sustainable materials. Encourage the homeowners association to encourage reuse by holding annual garage sales. Contact the local hauler to make sure the width and turns of the designed road is adequate for turning, maneuvering and the weight of the trucks to ensure serviceability.

SEWER SERVICES

Q1. Please describe the sizes and capacities of existing sewer lines that would serve the project site and the surrounding area. If possible, please include a map illustrating your description.
R1. The size of the existing sewer lines in the project site area is 6" in diameter. Downstream sewer lines have larger diameters. Attached is a map indicating the Crystal Springs County Sanitation District (District) service area and the existing sewer lines surrounding the project site. The District relies on the Town of Hillsborough and the City of San Mateo (City) for the transport of sewage emanating from the District, and on the City's wastewater treatment plant for treatment of the sewage.

Q2. Where is the wastewater treatment plant located that will serve the proposed project?
R2. The wastewater treatment plant, which is owned and operated by the City, is located at 2050 Detroit Drive in San Mateo.

Q3. Where does this plant discharge?
R3. The plant discharges into the San Francisco Bay. Specific information regarding the wastewater treatment plant and discharge should be directed to the City.

Q4. What is the NPDES permit number that regulates discharge from this plant?
R4. As stated in R2, the City owns and operates the treatment plant and should be contacted to obtain the NPDES permit number. The City's phone number is (650) 522-7300.

Q5. What is the design capacity for the wastewater treatment plant serving the proposed project?
R5. The City should be contacted for this information.

Q6. Are there any existing sewer service problems/deficiencies in the project area?
R6. There are no known sewer service problems or deficiencies in the immediate project area; however, the District has identified through a Master Sewer Plan approximately $2.3 Million in capital improvement projects within the District.

There are capacity issues in the sewer lines downstream of the project area within the Town of Hillsborough and the City of San Mateo during wet weather events. Both downstream jurisdictions are evaluating projects to reduce wet weather sewer overflows. Based on the District's agreement with both downstream agencies, a portion of the costs associated with future projects will be paid by the District. The District currently has a $1 Million loan from the County General Fund for a past capital improvement project completed by the Town of Hillsborough. The District also owes the City for their proportionate share of the current wastewater treatment plant project estimated at $1.3 Million.

Q6a. If sewer service problems/deficiencies exist, how would they affect the project?
R6a. The additional flows from the subdivision will exacerbate the downstream capacity problems unless the wet weather issues are resolved.

Q6b. What measures could the project incorporate to minimize the affect these sewer service problems/deficiencies on the project and surrounding uses?
R6b. The project could minimize its impact on the downstream systems by completing capital improvement projects within the District that would reduce inflow and infiltration in an amount equal to the projected sewage discharge amount to the District from the project. This type of mitigation would mitigate the project's affect on downstream pipes by reducing or eliminating wet weather inflow and infiltration from the District to downstream of the project.

Q7. "Currently, the SMWTP discharges an average daily flow of 13.8 mgd and has capacity to treat 15.7 mgd. This translates into a remaining capacity of 1.9 mgd at average daily flows that can be treated at the SMWTP." ***Please verify this information is correct.***
R7. The City should be contacted to verify this information.

Q8. "The San Mateo Wastewater Treatment Plant has sufficient capacity to accommodate sewage generated by the proposed project." ***Please verify this information is correct.***
R8. The City should be contacted to verify this information.

Q9. Will connection of the proposed project create any temporary interruption of service to existing customers? If the project will disrupt service, can you give us an estimate of how long the interruption would last?
R9. The District will not allow interruption of service to existing customers. Sewer lines affected by the project may require by-pass pumping during construction.

Q10. Is recycled water within the project area, or that could serve the project site?
R10. There is no recycled water within the project area.

Q11. What sewage generation rates does the Department of Public Works use?
R11. The San Mateo County Department of Public Works in its capacity of administering the Crystal Springs County Sanitation District uses the sewage generation rate of 220 gallons per day per equivalent residential unit.

Q12. In addition to addressing project-specific impacts to sewer service, the EIR will also address cumulative impacts to sewer service. We are in the process of compiling a list of reasonably foreseeable development in the County. Table 1, Related Projects List includes a list of some of the other major, reasonably foreseeable approved development in the County in proximity to the proposed project's location (refer to Figure 3, Location of Related Projects). However, additional projects will likely be added to the list as our research continues. Can the District accommodate the demand for sewer services associated with these projects in conjunction with the project?
R12. There are two (2) other projects listed in Table 1 that are within the District boundary. Project No. 1 is a San Francisco Public Utilities Commission water pipeline improvement project, which does not affect sewer service demand. All other projects, except for Project No. 4, are located in the City and do not affect the District's sewer service demand. Project No. 4 will receive similar comments related to capacity and downstream sewer impacts as the project being contemplated.

Q12a. How does your agency address the growing demand for sewer services?
R12a. The District is predominantly built-out and does not experience a growing demand for sewer service.

The District has a Sewer Master Plan prepared by Brown and Caldwell in 1999,which evaluated the District's sewer system using hydraulic modeling. The District upgraded a portion of the Polhemus Road trunk line in 2003 as it was identified in the master plan as being hydraulically deficient to meet peak wet weather flow conditions. The project replaced the existing

10" vitrified clay pipes with 12" to 15" plastic pipes. A copy of the master plan can be obtained on our website at www.co.sanmateo.ca.us/sewers

As mentioned above in R6 there are additional projects that the District has proposed, which are based on the Master Plan. The remaining projects were identified based on structural deficiencies and maintenance efforts.

Q12b. Do you have any projections for future demand based on projected growth in the region?
R12b. We do not have any projections for future demand based on projected growth in the District.

Q12c. What would be needed to meet the cumulative demand for sewer services capacity?
R12c. The developer of the proposed subdivision must demonstrate that the District sewer mains utilized to transport sewage from the subdivision has the peak wet weather capacity for conveying the additional flow to be generated by the 25 residences. If it's determined that the lines are insufficient to convey additional flow, the developer may need to upgrade the sewer lines to accommodate this subdivision. This study and work will not, however, resolve the downstream capacity issues. As mentioned in R6b, a project to reduce inflow and infiltration in the District could offset any increase in sewage produced by the proposed subdivision.

Q13. Do you have any recommendations that would avoid or mitigate significant impacts on the existing system?
R13. See R6b and R12c.

If you have any other questions, please contact Lillian Clark at (650) 599-1447 regarding solid waste services, and Ann Stillman at (650) 599-1417 regarding sewer services.

Very truly yours,

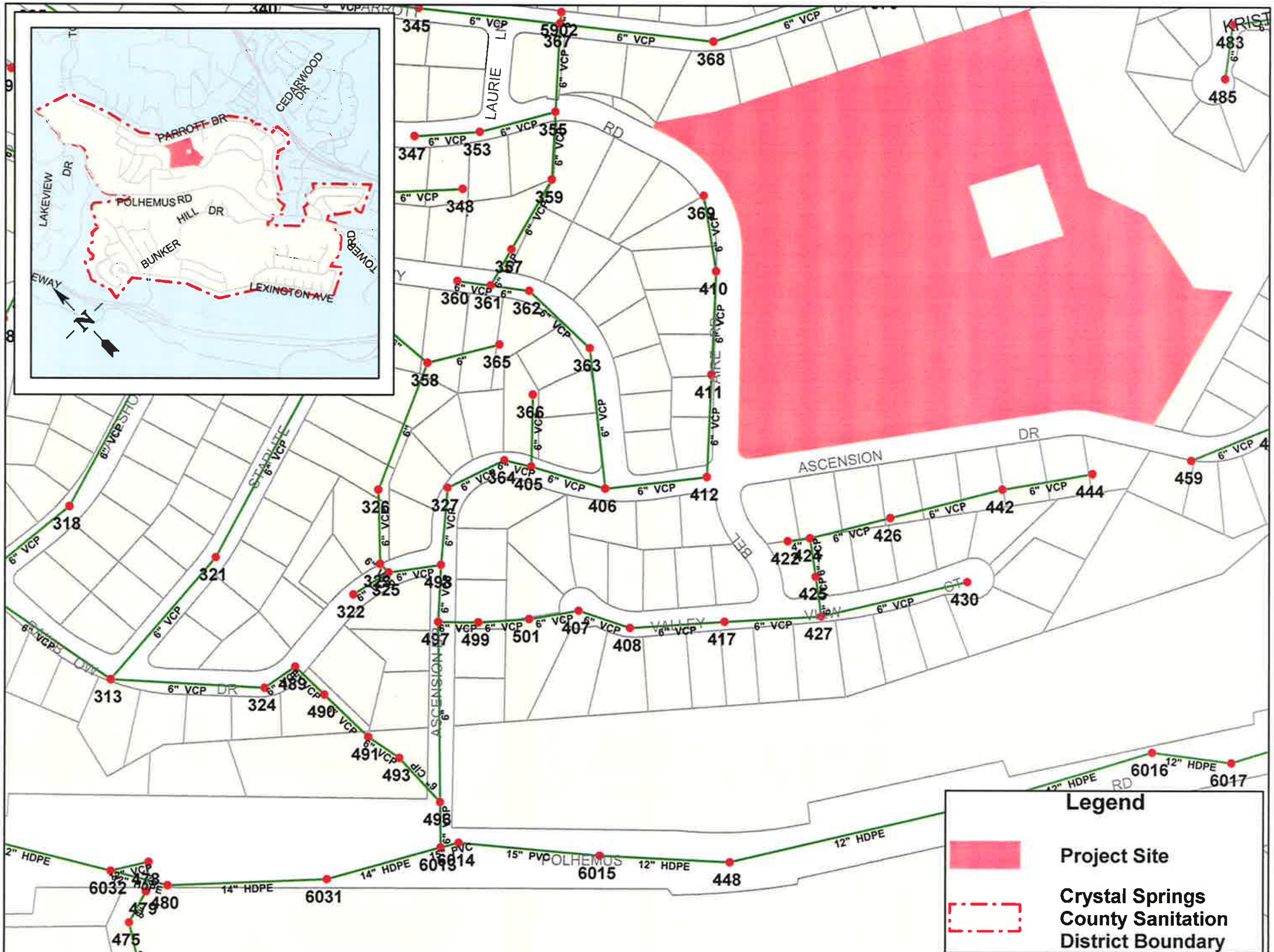
James C. Porter
Director of Public Works

JCP:AMS:JY:sdd
F:\users\admin\P&S\CSCSD\2008\Response Letter to CAJA AMS.doc
G:\USERS\UTILITY\Sewers\Districts\Crystal Springs CSD\Property Information\Ascension Heights Subdivision\EIR\Response Letter to CAJA.doc
F-351 (26C)

Encl: Exhibit A – Map of Crystal Springs County Sanitation District Service Area and Project Site Surrounding Area

cc: Ann M. Stillman, Principal Civil Engineer, Utilities-Flood Control-Watershed Protection
Lillian Clark, RecycleWorks Program Manager, Waste and Environmental Services
Julie Young, Senior Civil Engineer, Utilities-Flood Control-Watershed Protection

Exhibit A



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CALIFORNIA WATER SERVICE COMPANY
1720 NORTH FIRST STREET • SAN JOSE, CA 95112-4598
(408) 367-8200

September 15, 2008

Byron Easton
Associate Environmental Planner
Christopher A. Joseph & Associates
179 H Street
Petaluma, CA 94952

Re: Proposed Ascension Heights Subdivision Environmental Impact Report (EIR)

Dear Mr. Easton:

I would like to thank you for the opportunity to provide our comments to the proposed Ascension Heights EIR. I apologize for the late reply due to not receiving your letter prior to your deadline. I hope our answers to your questions below will still be useful to your EIR preparation for the above mentioned project.

1. What is the size and capacity of existing water mains near the project? If possible, please include a map illustrating your discussion.

   Please see below map for location and size of existing water mains near the proposed project.

CALIFORNIA WATER SERVICE COMPANY
1720 NORTH FIRST STREET • SAN JOSE, CA 95112-4598
(408) 367-8200

2. Are there any existing water service problems or deficiencies in the area immediately adjacent to the project?

   There is no existing water service problem in the area immediately adjacent to the project.

3. Can the existing water distribution system near the project site accommodate the increased water demand from the project site? If not, what improvements to the system would need to be made?

   The existing water distribution system near the project site can accommodate the water demand from the project site. However, the existing system can not provide the adequate pressure to the project site. The developer needs to pay for booster facilities to be built at the tank site in order to serve the project with adequate pressure.

4. Does Cal Water offer recycled water within the project area, or that could serve the project site?

   No, Cal Water currently does not offer recycled water.

DISTRICT OFFICES: ANTELOPE VALLEY • BAKERSFIELD • BAYSHORE • BEAR GULCH • CHICO • DIXON • EAST LOS ANGELES • KERN RIVER VALLEY • KING CITY • LIVERMORE • LOS ALTOS • MARYSVILLE • OROVILLE • RANCHO DOMINGUEZ • REDWOOD VALLEY • SALINAS • SELMA • STOCKTON • VISALIA • WESTLAKE • WILLOWS

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1720 NORTH FIRST STREET • SAN JOSE, CA 95112-4598
(408) 367-8200

5. What is the current and remaining treatment capacity of the Mid-Peninsula Water District?

   Please see Cal Water's 2007 Urban Water Management Plan.

6. Does San Mateo County have its own methods or water generation rate?

   Please see Cal Water's 2007 Urban Water Management Plan.

7. What water treatment plant would serve treated water to the proposed project?

   Please see Cal Water's 2007 Urban Water Management Plan.

8. In order to meet California Department of Forestry and Fire Protection (CAL FIRE) standards, all hydrants in the proposed project must deliver 1,000 gpm with a residual pressure of 20psi. Is the water supply to the site adequate to meet this standard?

   The existing water system will have not adequate pressure to serve the project. Please see answer to question 3 above for improvements needed to serve the project.

9. Will connection of the proposed project to your system create any temporary interruption of service to existing customers? If the project will disrupt service, can you give us an estimate of how long the interruption would last?

   Temporary interruption of service to existing customers may happen during tie-ins of new and/or relocated pipelines to the existing water system or tank inlet/outlet.

10. California Water Service Company has a terminal storage tank that will be bounded on all sites by the proposed project. A new access road will be constructed to the tank as part of the proposed project. Are there any additional issues as to access and maintenance of this tank that need to be addressed by the proposed project?

    Cal Water would like to review geotechnical report for the project to ensure any construction (cut or fill) of the slope will not negatively impact Cal Water's tank site located at the top of the hill. We would also need to review the design of the access road (i.e. width, turning radius, slope) to ensure big heavy vehicles can access the tank site to maintain the tank and other equipment at the site.

11. In addition to addressing project-specific impacts to water service, the EIR will also address cumulative impacts to water service. We are in the process of compiling a list of reasonably-foreseeable development in the County. Table 1, Related project list includes a list of some of the other major, reasonably-foreseeable approved development in the County in proximity to the proposed project's location (refer to Figure 3, Location of Related Projects). However, additional projects will likely be added to the list as our research continues. Can the District accommodate the demand

CALIFORNIA WATER SERVICE COMPANY
1720 NORTH FIRST STREET • SAN JOSE, CA 95112-4598
(408) 367-8200

for water services associated with these projects in conjunction with the proposed project?

Please see Cal Water's 2007 Urban Water Management Plan.

12. What process does the District use for conducting water supply assessments for proposed developments?

    When a development is big enough that meets SB 610 requirements, a water supply assessment report will be prepared upon request of the lead agency on the EIR. Cal Water's Urban Water Management Plan will also analyze growth and supply projection of our water system. Enclosed is a CD of 2007 Urban Water Management Plan for Cal Water's Mid-Peninsula District.

13. Do you have any recommendations that would avoid or mitigate significant impacts on the existing system?

    Recommendations have been made in answers to above questions.

Please feel free to contact me via phone at (408) 367-8323 or via email at the@calwater.com for further questions.

Thank you.

Sincerely,

Ting He, P.E.
Manager of Distribution, Engineering

Enclosed:
2007 Urban Water Management Plan for Cal Water's Mid-Peninsula District in CD

FIRE MARSHAL'S OFFICE

FIRE CHIEF
JOHN FERREIRA

FIRE MARSHAL
PETE MUÑOA

DEPUTY FIRE MARSHALS
MARC COLBERT
MIKE JARSKE

COUNTY OF SAN MATEO
CAL FIRE

320 Paul Scannell Drive, San Mateo, California 94402 (650) 573-3846 * Fax (650) 573-3850

September 20, 2008

Christopher A. Joseph and Associates
Byron Easton
Associate Environmental Planner
179 H Street
Petaluma, CA 94952

Re: Proposed Ascension Heights Subdivision Environmental Impact Report (EIR)

Byron,

This letter is in response to your questions for the proposed Ascension Heights Subdivision located in San Mateo County.

1) The jurisdictional responsibility for fire and emergency response lies with the County of San Mateo Fire Department / CAL FIRE. In San Mateo County, a Joint Powers Agreement (JPA) has been established throughout the County. Jurisdictional boundaries for the purpose of emergency response have been dropped and in its place is "closest available resource dispatching." Depending on what type of emergency was called in, the proposed location of the Ascension Heights Subdivision would primarily be serviced by the San Mateo City Fire Department's Station 27. If the emergency escalated or warranted further personnel and equipment, the San Mateo County Fire Department's Station 17 would also respond.

2) The apparatus staffed at San Mateo City Fire Dept. Station 27 is one Type I fire engine. The engine staffing consists of three (3) firefighters. The apparatus stationed and staffed at the San Mateo County Fire Dept. Station 17 consists of two (2) Type I fire engines, one (1) Type III fire engine, one (1) Transport and Bull Dozer and a Battalion Chief. All the fire engines are staffed with a minimum of three (3) firefighters per apparatus.

   The question pertaining to adequacy levels for emergency response cannot be answered without providing additional details on what would is considered a base line level.

3) If additional personnel and equipment were needed to mitigate an emergency in that area, units from the Central County Fire Dept., Belmont - San Carlos Fire Dept., as well as other identified "closest resources" would respond.

4) The average response time to the proposed site from San Mateo City Fire Dept.'s Station 27 is approximately 3 minutes. The average response time from the San Mateo County Fire Dept.'s Station 17 is approximately 3 – 4 minutes. These response times meet the desired performance standards set by the JPA.

5) The 250 foot access road that would connect Bel Aire Road to Ascension Drive as proposed is graded too steep. A road grade of not greater than 15% is required by the San Mateo County Fire Code and enforced by the Fire Marshal's Office.

6) The requirements set forth by CAL FIRE for secondary emergency access is correct.

7) Currently, there are no future plans to augment fire stations, equipment or staffing.

8) The nearest hospital to the proposed site is approximately 5 miles away.

   The question pertaining to the hospital emergency capability cannot be answered with additional detailed information.

9) The location of the proposed subdivision has potential to be susceptible to an urban wildland fire event.

10) The proposed subdivision may require additional or the expansion of fire department facilities to properly serve the citizens of the area.

11) The additional demand for fire protection services brought forward by the construction of the proposed subdivision would need to be reviewed in depth by consultants. If the need was to be identified by the review, in my opinion, it would be the developer's responsibility to facilitate and/or provide fiscally for the increase in fire protection.

If I can be of further assistance please feel free to contact me at (650) 573-3847.

Sincerely,

Pete Muñoa
San Mateo Co. Fire Marshal

cc: file

FIRE MARSHAL'S OFFICE

FIRE CHIEF
JOHN FERREIRA

FIRE MARSHAL
CLAYTON JOLLEY

DEPUTY FIRE MARSHALS
MARC COLBERT
MIKE JARSKE

COUNTY OF SAN MATEO
CAL FIRE

320 Paul Scannell Drive, San Mateo, California 94402 (650) 573-3846 * Fax (650) 573-3850

May 15, 2009

James Casteneda
455 County Center
Redwood City, CA 94063

Subject: Response to request for comments for Ascension Height Subdivision.

This memo is in response to a query regarding the secondary access road by Jim Eggemeyer.

Our review of the vesting tentative subdivision map provided was focused on the secondary access road to the subdivision from Ascension Drive to the Private Street within the proposed subdivision.
Specifically addressed was the 20% grade delineated on the vesting tentative subdivision map prior to and subsequent to the 5% grade at the turnout.

I am willing to allow this grade at this time based on the documentation in our files and the roads status as a secondary emergency access. This length of 20% grade (unbroken grade greater than 150’) is not acceptable for primary access roads. The San Mateo County Fire Department will require a plan and profile of the all roads within the project including the primary and secondary access roads and all roads, dead end driveways and Fire turnarounds within the subdivision.

At building permit submittal, County Fire will require a report of findings justifying the greater than 15% slope throughout the project as specified by County Ordinance and a request for exemption.

Road widths and parking restrictions shown on the plan are non-compliant with County Fire requirements as required in prior correspondence and are not approved as shown.

Clayton Jolley
Battalion Chief/Fire Marshal
San Mateo County Fire/CAL FIRE

Cc: FMO
John Sims, Division Chief

ENVIRONMENTAL SERVICES AGENCY

Agricultural Commissioner/ Sealer of Weights & Measures

Animal Control

Cooperative Extension

Fire Protection

AFCO

Library

Parks & Recreation

Planning & Building

September 16, 2003

Gary Helfrich
Christopher A. Joseph & Associates
101 H Street, Suite Q
Petaluma, CA 94952

Gary Helfrich:

SUBJECT: Proposed Ascension Heights Subdivision
PLN2002-00517

This letter is a response to the fire protection questions you sent to our department regarding the Ascension Heights Subdivision. This information should help identify some of the major fire service needs related to this project.

Dispatching for San Mateo County involves one dispatch center, "County Communications Center" for all areas of the county, including the area of the proposed subdivision. All the various fire jurisdictions, as well as other emergency services, are dispatched through the County Communication Center. Additionally, all fire jurisdictional boundaries have been dropped for emergency response. The purpose of this boundary drop is to have the closest available equipment respond, and provide immediate emergency services. The type and severity of the emergency will dictate the actual number and type of emergency equipment that is dispatched to respond.

The two closest fire stations in the area of this proposed project are San Mateo City fire station #27 and CDF/San Mateo County fire station #17. Station #27 houses medic engine 27 and sometimes truck 21. Station #17 houses medic engines 17, 217, and the Central County breathing support unit. During the wildland fire season station 17 also staffs engine 1771 and dozer 1741. The minimum staffing for each of the above fire engines is three. Both fire stations have response times of less than five minutes into the proposed subdivision area. The impact of the Ascension Heights subdivision, by itself, should not require additional fire equipment or increased staffing levels.

A secondary road access shall be required for this project. The roadway as shown on the plans is a dead end, cul-de-sac roadway configuration that is over 1,000 feet.

Lots 11 and 12 will be required to have minimum 20 feet wide access road. Lot 11 will require a fire engine turnaround. Lot 12 may also require an engine turnaround if the structure is located more than 150 from the access road. A recorded shared hammerhead turnaround would be acceptable to County Fire.

As shown on the plans, a 32' road width only allows for parking on one side of the roadway. Road widths and parking in this subdivision shall be as follows:

1. 30-foot road width: parking allowed on only one side of the roadway.
2. 40-foot road width: parking is not restricted.
3. Turnaround bulbs shall have minimum drivable diameter of 80 feet without parking, or a 100 feet diameter with parking.

Where parking is not permitted, the curbs shall be painted red and no parking signs shall be posted on streets.

Fire hydrants shall be spaced a maximum of 500 feet apart. (Note: your letter in error states a 250-foot hydrant spacing is required). An additional hydrant may be required for lots 11 and 12 depending on how the actual spacing works out on the plan.

FIRE PROTECTION
20 Tower Road - San Mateo, CA 94402 - Phone (650) 345-1612 - FAX (650) 573-3850

Should you have any further questions or concerns on this issue please contact our office at (650) 573-3846.

Sincerely,

Jim Rust
Fire Marshal
San Mateo County Fire

Cc: Protection & Planning
John Sims

SAN MATEO
LOCAL AGENCY FORMATION COMMISSION
455 COUNTY CENTER, 2ND FLOOR • REDWOOD CITY, CA 94063-1663 • PHONE (650) 363-4224 • FAX (650) 363-4849

January 5, 2004

Mr. Gary Helfrich
Christopher A. Joseph & Assoc.
101 H Street, Suite Q
Petaluma, CA 94952

Subject: Proposed Thomas Subdivision and County Service Area (CSA) 1 Boundaries

Dear Mr. Helfrich;

In response to your letter of December 22, 2003, the parcels of the above noted project that are not within the boundaries of CSA 1 are 041-111-280 and 041-111-320. I am attaching a printout from the County's GIS system and a map of the CSA boundaries. While the map is not of the best quality, it does illustrate that County Service Area 1 has very irregular boundaries and consists of two non-contiguous areas. In the area closest to College of San Mateo on the map, you will note that there is an "island" of territory that was not included in the original boundaries of CSA 1. The configuration of the parcels is more clearly shown on the GIS map and the parcel owned by California Water Service Company (Calwater) and the two parcels identified above correspond to the "island" on the CSA boundary map.

As stated in my comment letter on the Draft EIR, these properties should be annexed to County Service Area 1 if they are to be developed so that they can receive the same level of police and fire protection as surrounding residential development in the Highlands neighborhood. Also, in reviewing the surrounding territory, it is recommended that the Calwater property also be annexed to create more logical boundaries and efficient delivery of police and fire projection in the area.

Feel free to contact me if you have any questions.

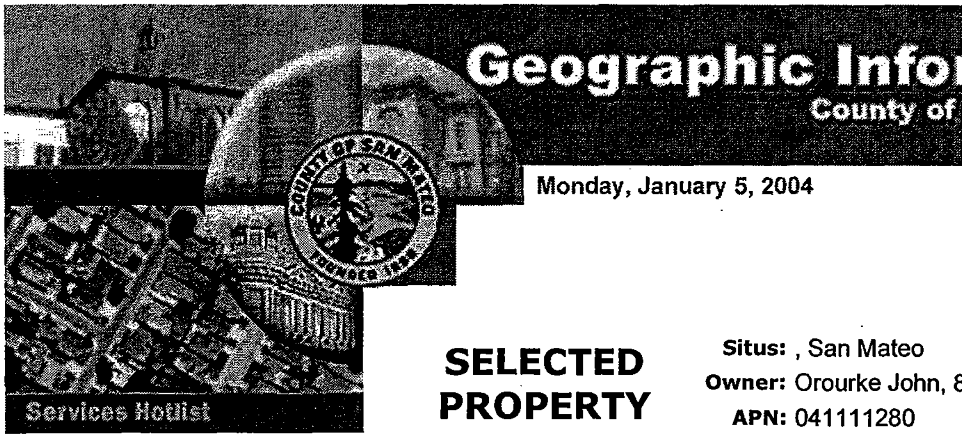
Sincerely,

Martha Poyatos

Martha Poyatos
Executive Officer

Enclosures

CC: Gabrielle Rowan, Project Planner
Marcia Raines, Director, San Mateo County Environmental Services Agency
Donna Spillane, Administrative Services Manager, San Mateo County Environmental Services Agency

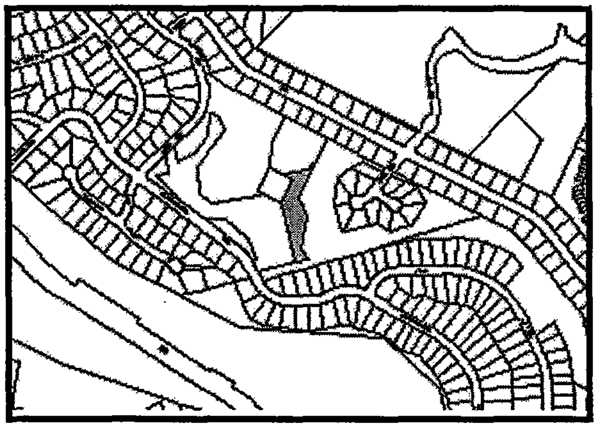


Monday, January 5, 2004

SELECTED PROPERTY

Situs: , San Mateo
Owner: Orourke John, 850 E Brunswick St, San Francisco,
APN: 041111280

- Applications
  - **Property Review**
  - Notification
  - Raster Maps
- Metadata
- Resources
- Standards
- Related Links
- Procedures
- Communications
- FAQ
- Help



Property Owne

APN:	041111
Parcel ID:	21890
Situs:	, San M
Owner:	Orourke
Owner Address:	850 E B Francisc

Create Notification Map

Related Documents

Assessor Map:

04111.tif

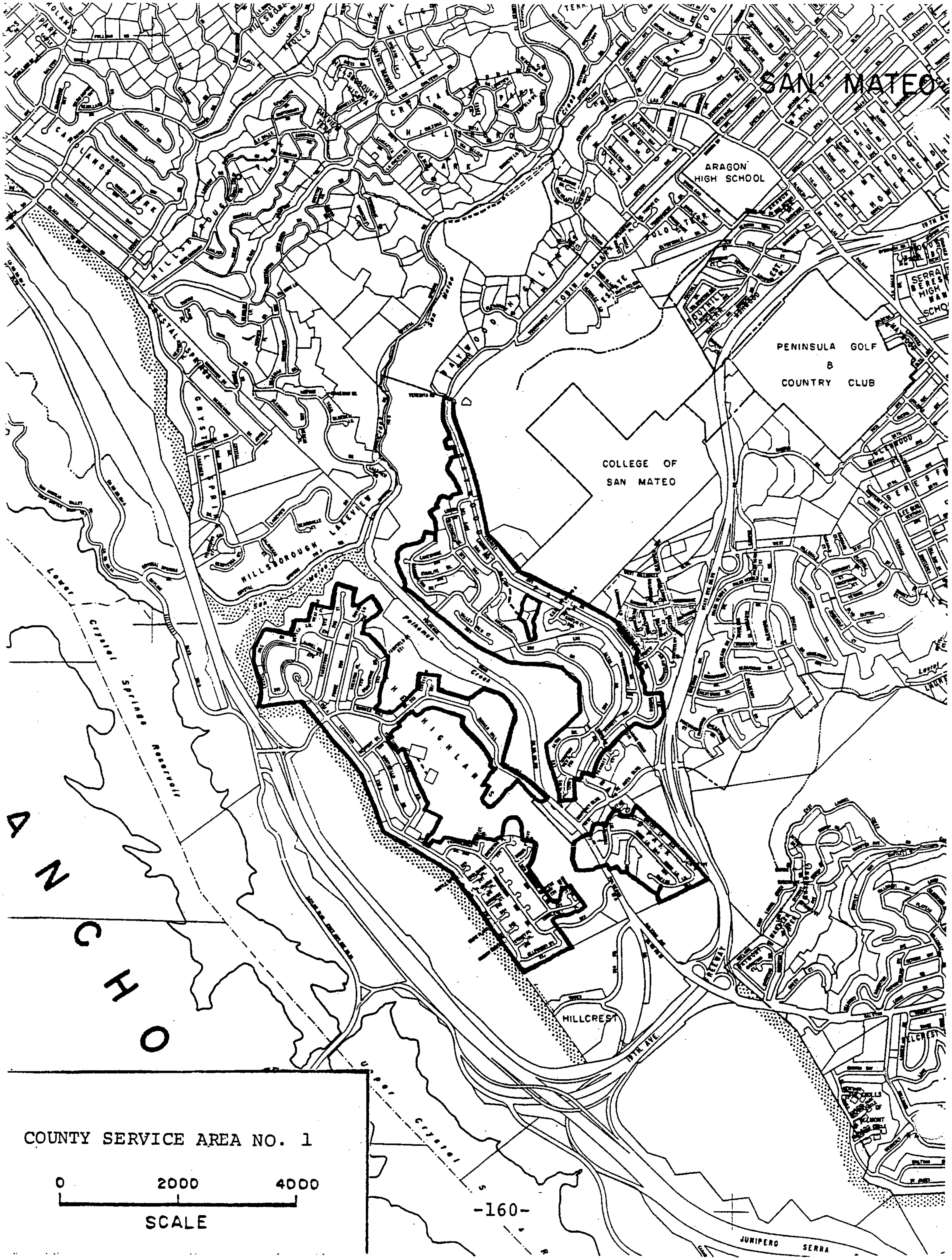
Recorded Maps: Access Documents

Jurisdic

Supervisorial:	
Congressional:	
Assembly:	
Senatorial:	
Election Precinct:	
City Name:	l
Zip Code:	
Mitigation Fee Area:	

Tax Rate Area# 078004

GENERAL TAX RATE	GENERAL COUNTY
COUNTY DEBT SERVICES	FREE LIBRARY
COUNTY FIRE PROTECTION STRUCT	SAN MATEO CITY ELEM GENL PUR
S M FOSTER CTY ELM BD SER 91A	S M FOSTER CTY ELM BD SER 91E
S M FOSTER CTY ELM BD SER 91C	S M FOSTER CTY ELM BD SER 91I
S M FOSTER CTY ELM BD SER 97A	S M FOSTER CTY ELM BD SER 97E
S M FOSTER CTY ELM BD SER 97C	SM FOSTER CITY EL BD SER 2001
SM FC EL BD SER 2001 B	SAN MATEO HIGH GENRL PURPOS
SAN MATEO HIGH BD SER 2000 A	SAN MATEO HIGH BD SER 2002 E
SM JR COLLEGE GEN PUR INSIDE	SM JR COLLEGE BOND SER 2002
CRYSTAL SPRINGS SANI DIST	BAY AREA AIR QUALITY MGMT


SAN MATEO
ARAGON HIGH SCHOOL
SERRA HIGH SCHOOL
PENINSULA GOLF & COUNTRY CLUB
COLLEGE OF SAN MATEO
HILLSBOROUGH
HIGHLANDS
HILLCREST
RANCHO
Lower Crystal Springs Reservoir
Upper Crystal Springs
JUNIPERO SERRA
FREEWAY
19TH AVE.
COUNTY SERVICE AREA NO. 1
0 2000 4000
SCALE

CHRISTOPHER A. JOSEPH & ASSOCIATES
Environmental Planning and Research

DEC 17 2008
CITY OF SAN MATEO
PUBLIC WORKS DEPARTMENT

December 16, 2008

Mr. Larry Patterson, Director
City of San Mateo Public Works
330 West 20th Avenue
San Mateo, CA 94403

Re: Memorandum Regarding Crystal Springs County Sanitation District (CSCSD) Hook-ups

Dear Mr. Patterson:

I am helping to prepare the EIR for the Ascension Heights Subdivision Project located in the County of San Mateo. I have been in contact with Kathy Zammit to try to obtain a copy of a moratorium memo related to the CSCSD hook-ups for new development that was distributed to the County of San Mateo. She was unable to locate this memo and suggested I contact you to request a copy.

If possible, please email or fax a copy of the memo to me. If you have any questions, please contact me at jessica.viramontes@cajaeir.com or at 510.550.3723.

Sincerely,

Jessica Viramontes
Environmental Planner

610 16th Street • Suite 514 • Oakland • CA 94612
Phone 510 452-5200 • Fax 510 452-5202 • E-mail info@cajaeir.com • Web www.cajaeir.com
Los Angeles • Santa Clarita • Agoura Hills • Petaluma • Oakland • Mammoth Lakes

DEPARTMENT OF PUBLIC WORKS
Larry A. Patterson, P. E., Director

CITY OF SAN MATEO
INCORPORATED 1894
CALIFORNIA

330 West 20th Avenue
San Mateo, California 94403-1388
Telephone (650) 522-7300
FAX: (650) 522-7301
www.cityofsanmateo.org

March 13, 2007

Ms. Lisa Grote
Director of Planning and Building
County of San Mateo
455 County Center, 2nd Floor
Redwood City, CA 94063

Re: ***Ability to Serve New Subdivision***

Dear Ms. Grote:

At the January 11, 2007 meeting of the agencies of the Sanitary Sewer Agreement, Crystal Springs County Sanitation District (CSCSD) informed us that two subdivisions are being planned in the area served by CSCSD.

The District is in arrears in its payments in an amount of $1,274,000 to the City of San Mateo for operating and capital costs due under the Sanitary Sewer Agreement. Therefore, we are obligated to inform you that we cannot approve the additional flow that would result from these new subdivisions.

The City of San Mateo would consider granting approval for the additional flow provided that:

1. The District pays the amount due and
2. The District presents an acceptable plan that assures sufficient revenues necessary to meet the current costs and the future additional costs as defined in the Agreement.

If you have any questions or wish to discuss this matter further, please contact Darla Reams (650-522-7304) or me (650-522-7303).

Sincerely,

Larry A. Patterson
Director of Public Works

c: Doug Koenig, San Mateo County Acting Director of Public Works
Arne Croce, City Manager
Darla Reams, Deputy Director for Operations and Maintenance
Susanna Chan, Deputy Director/City Engineer
Chron/File

San Mateo-
Foster City
School District

1170 Chess Drive
Foster City, CA 94404
(650) 312-7700
FAX (650) 312-7779
www.smfc.k12.ca.us

December 2008

To Whom It May Concern:

Re. **Ascension Heights Subdivision Project – Service Information**

The San Mateo-Foster City School District appreciates that Christopher A. Joseph & Associates, Environmental Planning and Research is preparing an Environmental Impact Report for the proposed Ascension Heights Subdivision located on the eastern corner of Bel Aire Road and Ascension Drive, within the unincorporated San Mateo Highlands area of San Mateo County, in the southwest area of the City of San Mateo.

All building construction, especially residential units, in the City of San Mateo does have significant physical impact on school services in the District.

The following information is in response to inquiries in your letter to Pendery A. Clark, Superintendent.

1. It is accurate that San Mateo-Foster City School District has sixteen (16) elementary and four (4) middle schools.

2. The schools of assignment for the described project are:
   Highlands Elementary, current enrollment 451; Highlands is at capacity.
   Borel Middle School, current enrollment 937; Borel is at capacity.

3. Existing school capacity within the District has reached maximum capacity at some grade levels in most schools.

4. The District does not have a specific bussing program to accommodate students placed at another school within the District due to reaching capacity; portable classrooms have been added to many campuses to accommodate increased enrollment this year.

5. The student generation rate for single-family residential development is: .18

6. San Mateo school developer fees are $2.97 per square foot.

7. There are no current plans for additions to the District schools that serve the Ascension Heights Project area described in your inquiry.

8. 8a; b; c; Enrollment projections and capacity needs are completed annually. In some cases, students in highly impacted areas are administratively placed in other schools within our District. Some additional capacity will be added to impacted schools through the Measure C facilities bond.

9. We have no recommendations at this time that would help reduce any potential impacts to the SM-FCSD generated by this proposed project are.

Respectfully submitted,

Joan Rosas, Ed.D.
Assistant Superintendent

Table 1
Ascension Heights Subdivision Related Projects List

Project No.	Project Name	Project Type	Address	Size	Status
San Mateo County[1]					
1	NA	Water Supply Pipeline Improvement	East of Polhemus Road Alignment	NA	Proposed
2	NA	Youth Services Center Remodel & Expansion	Tower Road (near Polhemus Rd/SR 92 intersection)	Approx. 300,000 sf	Under Construction
3	NA	Facilities Master Plan	College of San Mateo	Campus-Wide	Approved
4	NA	Residential Development	San Mateo Highlands (Ticonderoga Drive, Bunker Hill Drive, Cobblehill Place, and Cowpens Way)	99 acres 11 du	Proposed
City of San Mateo[2]					
5	Verona Ridge	Residential Subdivision	Near SR 92, Campus Drive, and the Peninsula Golf and Country Club	34 du 5.5 acres	Under Construction
6	Bay Meadows II - SPAR I	*Mixed Use* Residential Development Office Development Commercial Development	2600 South Delaware Street	392 du 750,000 sf 93,000 sf	Approved
	Bay Meadows II - SPAR II	Townhouse and Condominium Development	2600 South Delaware Street	330 du	Proposed
	Bay Meadows II - SPAR III	Residential Development	2600 South Delaware Street	344 du	Proposed
7	Chesapeake Point Apartments	Apartment Additions	1633 Marina Court	30 du 6.78 acres	Approved
8	Hacienda Mateo	Townhouse Development	613 & 701 2nd Street	8 du	Approved
9	Villa Hotel	Senior Housing Facility	4000 South El Camino Real	135 du	Approved
10	Station Park Green	*Mixed Use* Residential Development Commercial Development	1700 South Delaware Street	12 acres	Proposed
11	Mariner's Island Condominiums	Condominium Development	400 Mariner's Island Blvd.	76 du	Approved
12	Norfolk Townhomes	Townhouse Development	2868 South Norfolk Street	10 du	Approved
13	San Mateo Police Station	Police Station	200 Franklin Parkway	45,000 sf	Under Construction
14	San Mateo Drive Condominiums	Condominium Development	117 - 121 North San Mateo Drive	34 du	Proposed
15	Clock Tower Building	*Mixed Use* Office Development Commercial Development	221 South El Camino Real	23,462 sf 11,426 sf	Approved
16	Peninsula Station Affordable	*Mixed Use* Residential Development	2901 - 2905 South El Camino Real	68 du	Approved

Table 1
Ascension Heights Subdivision Related Projects List

Project No.	Project Name	Project Type	Address	Size	Status
	Housing	(Affordable Housing) Commercial Development		2,917 sf	
17	Sadigh Mixed Use	*Mixed Use* Condominium Development Commercial Development	4300 South El Camino Real	10 du 4,000 sf	Approved
18	One Eagle Road	Townhouse Development	1 Eagle Road (at El Camino Real)	6 du	Approved
19	San Mateo Executive Park	Office Building Renovations	3001 & 3155 Clearview Way	22 acres	Under Construction

Notes: *du: dwelling unit*
sf: square feet
NA = Not Available
[1] *County of San Mateo Planning and Building Division, June 2008.*
[2] *City of San Mateo Planning Department, June 2008.*

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NORTH

0 500 1,000 1,500 2,000
Feet

Figure 1
Regional and Vicinity Map

Source: Lea & Braze Engineering, January 17, 2007.

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Environmental Planning and Research

Figure 2
Vesting Tentative Map

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Environmental Planning and Research

NORTH

0 1,000 2,000 3,000 4,000
Feet

Figure 3
Location of the
Related Projects

APPENDIX D

AIR QUALITY DATA

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: Y:\AQ\Projects\Ascension\URBEMIS\ASCENSION.urb924

Project Name: Ascension

Project Location: Bay Area Air District

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

Off-Road Vehicle Emissions Based on: OFFROAD2007

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Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2007 TOTALS (lbs/day unmitigated)	18.41	176.71	90.80	0.06	706.91	8.64	715.55	147.66	7.95	155.61	15,409.50
2007 TOTALS (lbs/day mitigated)	18.41	142.31	90.80	0.06	47.88	5.36	53.24	10.03	4.93	14.96	15,409.50
2008 TOTALS (lbs/day unmitigated)	17.41	167.50	85.77	0.06	706.91	8.13	715.03	147.66	7.47	155.13	15,409.51
2008 TOTALS (lbs/day mitigated)	17.41	134.81	85.77	0.06	47.88	5.01	52.90	10.03	4.61	14.64	15,409.51
2009 TOTALS (lbs/day unmitigated)	3.13	18.35	11.39	0.00	0.01	1.60	1.60	0.00	1.47	1.47	1,461.57
2009 TOTALS (lbs/day mitigated)	3.13	13.31	11.39	0.00	0.01	0.80	0.81	0.00	0.74	0.74	1,461.57

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	1.80	0.32	1.25	0.00	0.00	0.00	401.69

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	2.53	2.89	30.46	0.02	3.74	0.72	2,118.75

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	4.33	3.21	31.71	0.02	3.74	0.72	2,520.44

Construction Unmitigated Detail Report:

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CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 12/28/2007-12/31/2007 Active Days: 2	18.41	**176.71**	**90.80**	0.06	706.91	**8.64**	715.55	147.66	**7.95**	155.61	15,409.50
Mass Grading 12/28/2007-02/22/2008	18.41	176.71	90.80	0.06	706.91	8.64	715.55	147.66	7.95	155.61	15,409.50
Mass Grading Dust	0.00	0.00	0.00	0.00	706.68	0.00	706.68	147.58	0.00	147.58	0.00
Mass Grading Off Road Diesel	15.12	123.95	68.62	0.00	0.00	6.57	6.57	0.00	6.04	6.04	9,084.94
Mass Grading On Road Diesel	3.10	52.44	16.78	0.06	0.21	2.06	2.27	0.07	1.90	1.97	5,942.78
Mass Grading Worker Trips	0.19	0.32	5.40	0.00	0.02	0.01	0.03	0.01	0.01	0.01	381.78
Time Slice 1/1/2008-2/22/2008 Active Days: 39	17.41	167.50	85.77	0.06	706.91	8.13	715.03	147.66	7.47	155.13	**15,409.51**
Mass Grading 12/28/2007-02/22/2008	17.41	167.50	85.77	0.06	706.91	8.13	715.03	147.66	7.47	155.13	15,409.51
Mass Grading Dust	0.00	0.00	0.00	0.00	706.68	0.00	706.68	147.58	0.00	147.58	0.00
Mass Grading Off Road Diesel	14.30	117.80	65.01	0.00	0.00	6.23	6.23	0.00	5.73	5.73	9,084.94
Mass Grading On Road Diesel	2.94	49.41	15.70	0.06	0.21	1.89	2.10	0.07	1.74	1.81	5,942.78
Mass Grading Worker Trips	0.17	0.29	5.06	0.00	0.02	0.01	0.03	0.01	0.01	0.01	381.79

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Time Slice 2/25/2008-8/25/2008 Active Days: 131	5.90	41.40	23.28	0.00	66.41	2.76	69.17	13.87	2.54	16.41	3,298.49
Asphalt 02/25/2008-08/25/2009	3.33	19.35	11.65	0.00	0.01	1.68	1.69	0.00	1.55	1.55	1,461.52
Paving Off-Gas	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	3.24	19.16	9.94	0.00	0.00	1.67	1.67	0.00	1.54	1.54	1,324.15
Paving On Road Diesel	0.01	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.11
Paving Worker Trips	0.06	0.10	1.69	0.00	0.01	0.00	0.01	0.00	0.00	0.00	127.26
Fine Grading 02/25/2008-08/25/2008	2.58	22.05	11.63	0.00	66.40	1.08	67.48	13.87	0.99	14.86	1,836.97
Fine Grading Dust	0.00	0.00	0.00	0.00	66.40	0.00	66.40	13.87	0.00	13.87	0.00
Fine Grading Off Road Diesel	2.54	22.00	10.61	0.00	0.00	1.08	1.08	0.00	0.99	0.99	1,760.61
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.06	1.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	76.36
Time Slice 8/26/2008-12/31/2008 Active Days: 92	3.33	19.35	11.65	0.00	0.01	1.68	1.69	0.00	1.55	1.55	1,461.52
Asphalt 02/25/2008-08/25/2009	3.33	19.35	11.65	0.00	0.01	1.68	1.69	0.00	1.55	1.55	1,461.52
Paving Off-Gas	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	3.24	19.16	9.94	0.00	0.00	1.67	1.67	0.00	1.54	1.54	1,324.15
Paving On Road Diesel	0.01	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.11
Paving Worker Trips	0.06	0.10	1.69	0.00	0.01	0.00	0.01	0.00	0.00	0.00	127.26
Time Slice 1/1/2009-8/25/2009 Active Days: 169	3.13	18.35	11.39	0.00	0.01	1.60	1.60	0.00	1.47	1.47	1,461.57
Asphalt 02/25/2008-08/25/2009	3.13	18.35	11.39	0.00	0.01	1.60	1.60	0.00	1.47	1.47	1,461.57
Paving Off-Gas	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	3.05	18.18	9.80	0.00	0.00	1.59	1.59	0.00	1.46	1.46	1,324.15
Paving On Road Diesel	0.00	0.08	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.11
Paving Worker Trips	0.05	0.09	1.56	0.00	0.01	0.00	0.01	0.00	0.00	0.00	127.32

Phase Assumptions

Phase: Fine Grading 2/25/2008 - 8/25/2008 - Building Construction

Total Acres Disturbed: 13.3

Maximum Daily Acreage Disturbed: 3.32

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

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

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

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

Phase: Mass Grading 12/28/2007 - 2/22/2008 - Site Grading

Total Acres Disturbed: 13.3

Maximum Daily Acreage Disturbed: 3.32

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 2400 cubic yards/day; Offsite Cut/Fill: 887 cubic yards/day

On Road Truck Travel (VMT): 1476.1

Off-Road Equipment:

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

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

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

Phase: Paving 2/25/2008 - 8/25/2009 - Road Paving

Acres to be Paved: 3.32

Off-Road Equipment:

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

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

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

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

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 12/28/2007-12/31/2007 Active Days: 2	18.41	142.31	**90.80**	0.06	47.88	5.36	53.24	10.03	4.93	14.96	15,409.50
Mass Grading 12/28/2007-02/22/2008	18.41	142.31	90.80	0.06	47.88	5.36	53.24	10.03	4.93	14.96	15,409.50
Mass Grading Dust	0.00	0.00	0.00	0.00	47.66	0.00	47.66	9.95	0.00	9.95	0.00
Mass Grading Off Road Diesel	15.12	89.55	68.62	0.00	0.00	3.28	3.28	0.00	3.02	3.02	9,084.94
Mass Grading On Road Diesel	3.10	52.44	16.78	0.06	0.21	2.06	2.27	0.07	1.90	1.97	5,942.78
Mass Grading Worker Trips	0.19	0.32	5.40	0.00	0.02	0.01	0.03	0.01	0.01	0.01	381.78
Time Slice 1/1/2008-2/22/2008 Active Days: 39	17.41	134.81	85.77	0.06	47.88	5.01	52.90	10.03	4.61	14.64	**15,409.51**
Mass Grading 12/28/2007-02/22/2008	17.41	134.81	85.77	0.06	47.88	5.01	52.90	10.03	4.61	14.64	15,409.51
Mass Grading Dust	0.00	0.00	0.00	0.00	47.66	0.00	47.66	9.95	0.00	9.95	0.00
Mass Grading Off Road Diesel	14.30	85.11	65.01	0.00	0.00	3.11	3.11	0.00	2.86	2.86	9,084.94
Mass Grading On Road Diesel	2.94	49.41	15.70	0.06	0.21	1.89	2.10	0.07	1.74	1.81	5,942.78
Mass Grading Worker Trips	0.17	0.29	5.06	0.00	0.02	0.01	0.03	0.01	0.01	0.01	381.79

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Time Slice 2/25/2008-8/25/2008 Active Days: 131	5.90	29.98	23.28	0.00	4.64	1.38	6.02	0.97	1.27	2.24	3,298.49
Asphalt 02/25/2008-08/25/2009	3.33	14.03	11.65	0.00	0.01	0.84	0.85	0.00	0.78	0.78	1,461.52
Paving Off-Gas	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	3.24	13.85	9.94	0.00	0.00	0.84	0.84	0.00	0.77	0.77	1,324.15
Paving On Road Diesel	0.01	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.11
Paving Worker Trips	0.06	0.10	1.69	0.00	0.01	0.00	0.01	0.00	0.00	0.00	127.26
Fine Grading 02/25/2008-08/25/2008	2.58	15.95	11.63	0.00	4.63	0.54	5.17	0.97	0.50	1.46	1,836.97
Fine Grading Dust	0.00	0.00	0.00	0.00	4.63	0.00	4.63	0.97	0.00	0.97	0.00
Fine Grading Off Road Diesel	2.54	15.89	10.61	0.00	0.00	0.54	0.54	0.00	0.49	0.49	1,760.61
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.06	1.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	76.36
Time Slice 8/26/2008-12/31/2008 Active Days: 92	3.33	14.03	11.65	0.00	0.01	0.84	0.85	0.00	0.78	0.78	1,461.52
Asphalt 02/25/2008-08/25/2009	3.33	14.03	11.65	0.00	0.01	0.84	0.85	0.00	0.78	0.78	1,461.52
Paving Off-Gas	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	3.24	13.85	9.94	0.00	0.00	0.84	0.84	0.00	0.77	0.77	1,324.15
Paving On Road Diesel	0.01	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.11
Paving Worker Trips	0.06	0.10	1.69	0.00	0.01	0.00	0.01	0.00	0.00	0.00	127.26
Time Slice 1/1/2009-8/25/2009 Active Days: 169	3.13	13.31	11.39	0.00	0.01	0.80	0.81	0.00	0.74	0.74	1,461.57
Asphalt 02/25/2008-08/25/2009	3.13	13.31	11.39	0.00	0.01	0.80	0.81	0.00	0.74	0.74	1,461.57
Paving Off-Gas	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	3.05	13.14	9.80	0.00	0.00	0.80	0.80	0.00	0.73	0.73	1,324.15
Paving On Road Diesel	0.00	0.08	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.11
Paving Worker Trips	0.05	0.09	1.56	0.00	0.01	0.00	0.01	0.00	0.00	0.00	127.32

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 2/25/2008 - 8/25/2008 - Building Construction

For Soil Stablizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

For Soil Stablizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:

PM10: 5% PM25: 5%

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:

PM10: 69% PM25: 69%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Rubber Tired Dozers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Rubber Tired Dozers, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Tractors/Loaders/Backhoes, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Water Trucks, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Water Trucks, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

The following mitigation measures apply to Phase: Mass Grading 12/28/2007 - 2/22/2008 - Site Grading

For Soil Stablizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

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For Soil Stablizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:

PM10: 5% PM25: 5%

For Soil Stablizing Measures, the Water exposed surfaces 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:

PM10: 69% PM25: 69%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Rubber Tired Dozers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Rubber Tired Dozers, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Tractors/Loaders/Backhoes, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Water Trucks, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Water Trucks, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

The following mitigation measures apply to Phase: Paving 2/25/2008 - 8/25/2009 - Road Paving

For Pavers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Pavers, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Paving Equipment, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Paving Equipment, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

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NOX: 15%

For Rollers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Rollers, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Tractors/Loaders/Backhoes, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.02	0.31	0.13	0.00	0.00	0.00	399.90
Hearth - No Summer Emissions							
Landscape	0.20	0.01	1.12	0.00	0.00	0.00	1.79
Consumer Products	1.22						
Architectural Coatings	0.36						
TOTALS (lbs/day, unmitigated)	1.80	0.32	1.25	0.00	0.00	0.00	401.69

Area Source Changes to Defaults

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Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Single family housing	2.53	2.89	30.46	0.02	3.74	0.72	2,118.75
TOTALS (lbs/day, unmitigated)	2.53	2.89	30.46	0.02	3.74	0.72	2,118.75

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2008 Temperature (F): 85 Season: Summer

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	13.30	10.17	dwelling units	25.00	254.25	2,173.76
					254.25	2,173.76

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	53.9	2.0	97.6	0.4
Light Truck < 3750 lbs	12.9	3.1	93.0	3.9
Light Truck 3751-5750 lbs	19.7	1.0	98.5	0.5
Med Truck 5751-8500 lbs	6.5	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.9	0.0	77.8	22.2
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Med-Heavy Truck 14,001-33,000 lbs	1.0	0.0	20.0	80.0
Heavy-Heavy Truck 33,001-60,000 lbs	0.4	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	3.2	78.1	21.9	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	0.6	0.0	83.3	16.7

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						

Operational Changes to Defaults

9/26/2008 11:28:49 AM

Urbemis 2007 Version 9.2.4

Combined Winter Emissions Reports (Pounds/Day)

File Name: Y:\AQ\Projects\Ascension\URBEMIS\ASCENSION.urb924

Project Name: Ascension

Project Location: Bay Area Air District

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

Off-Road Vehicle Emissions Based on: OFFROAD2007

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Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2007 TOTALS (lbs/day unmitigated)	18.41	176.71	90.80	0.06	706.91	8.64	715.55	147.66	7.95	155.61	15,409.50
2007 TOTALS (lbs/day mitigated)	18.41	142.31	90.80	0.06	47.88	5.36	53.24	10.03	4.93	14.96	15,409.50
2008 TOTALS (lbs/day unmitigated)	17.41	167.50	85.77	0.06	706.91	8.13	715.03	147.66	7.47	155.13	15,409.51
2008 TOTALS (lbs/day mitigated)	17.41	134.81	85.77	0.06	47.88	5.01	52.90	10.03	4.61	14.64	15,409.51
2009 TOTALS (lbs/day unmitigated)	3.13	18.35	11.39	0.00	0.01	1.60	1.60	0.00	1.47	1.47	1,461.57
2009 TOTALS (lbs/day mitigated)	3.13	13.31	11.39	0.00	0.01	0.80	0.81	0.00	0.74	0.74	1,461.57

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	5.14	0.65	13.12	0.04	2.05	1.97	866.53

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	2.82	4.34	32.81	0.02	3.74	0.72	1,840.47

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	7.96	4.99	45.93	0.06	5.79	2.69	2,707.00

Construction Unmitigated Detail Report:

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CONSTRUCTION EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 12/28/2007-12/31/2007 Active Days: 2	18.41	**176.71**	**90.80**	0.06	706.91	**8.64**	715.55	147.66	**7.95**	155.61	15,409.50
Mass Grading 12/28/2007-02/22/2008	18.41	176.71	90.80	0.06	706.91	8.64	715.55	147.66	7.95	155.61	15,409.50
Mass Grading Dust	0.00	0.00	0.00	0.00	706.68	0.00	706.68	147.58	0.00	147.58	0.00
Mass Grading Off Road Diesel	15.12	123.95	68.62	0.00	0.00	6.57	6.57	0.00	6.04	6.04	9,084.94
Mass Grading On Road Diesel	3.10	52.44	16.78	0.06	0.21	2.06	2.27	0.07	1.90	1.97	5,942.78
Mass Grading Worker Trips	0.19	0.32	5.40	0.00	0.02	0.01	0.03	0.01	0.01	0.01	381.78
Time Slice 1/1/2008-2/22/2008 Active Days: 39	17.41	167.50	85.77	0.06	706.91	8.13	715.03	147.66	7.47	155.13	**15,409.51**
Mass Grading 12/28/2007-02/22/2008	17.41	167.50	85.77	0.06	706.91	8.13	715.03	147.66	7.47	155.13	15,409.51
Mass Grading Dust	0.00	0.00	0.00	0.00	706.68	0.00	706.68	147.58	0.00	147.58	0.00
Mass Grading Off Road Diesel	14.30	117.80	65.01	0.00	0.00	6.23	6.23	0.00	5.73	5.73	9,084.94
Mass Grading On Road Diesel	2.94	49.41	15.70	0.06	0.21	1.89	2.10	0.07	1.74	1.81	5,942.78
Mass Grading Worker Trips	0.17	0.29	5.06	0.00	0.02	0.01	0.03	0.01	0.01	0.01	381.79

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Time Slice 2/25/2008-8/25/2008 Active Days: 131	5.90	41.40	23.28	0.00	66.41	2.76	69.17	13.87	2.54	16.41	3,298.49
Asphalt 02/25/2008-08/25/2009	3.33	19.35	11.65	0.00	0.01	1.68	1.69	0.00	1.55	1.55	1,461.52
Paving Off-Gas	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	3.24	19.16	9.94	0.00	0.00	1.67	1.67	0.00	1.54	1.54	1,324.15
Paving On Road Diesel	0.01	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.11
Paving Worker Trips	0.06	0.10	1.69	0.00	0.01	0.00	0.01	0.00	0.00	0.00	127.26
Fine Grading 02/25/2008- 08/25/2008	2.58	22.05	11.63	0.00	66.40	1.08	67.48	13.87	0.99	14.86	1,836.97
Fine Grading Dust	0.00	0.00	0.00	0.00	66.40	0.00	66.40	13.87	0.00	13.87	0.00
Fine Grading Off Road Diesel	2.54	22.00	10.61	0.00	0.00	1.08	1.08	0.00	0.99	0.99	1,760.61
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.06	1.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	76.36
Time Slice 8/26/2008-12/31/2008 Active Days: 92	3.33	19.35	11.65	0.00	0.01	1.68	1.69	0.00	1.55	1.55	1,461.52
Asphalt 02/25/2008-08/25/2009	3.33	19.35	11.65	0.00	0.01	1.68	1.69	0.00	1.55	1.55	1,461.52
Paving Off-Gas	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	3.24	19.16	9.94	0.00	0.00	1.67	1.67	0.00	1.54	1.54	1,324.15
Paving On Road Diesel	0.01	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.11
Paving Worker Trips	0.06	0.10	1.69	0.00	0.01	0.00	0.01	0.00	0.00	0.00	127.26
Time Slice 1/1/2009-8/25/2009 Active Days: 169	3.13	18.35	11.39	0.00	0.01	1.60	1.60	0.00	1.47	1.47	1,461.57
Asphalt 02/25/2008-08/25/2009	3.13	18.35	11.39	0.00	0.01	1.60	1.60	0.00	1.47	1.47	1,461.57
Paving Off-Gas	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	3.05	18.18	9.80	0.00	0.00	1.59	1.59	0.00	1.46	1.46	1,324.15
Paving On Road Diesel	0.00	0.08	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.11
Paving Worker Trips	0.05	0.09	1.56	0.00	0.01	0.00	0.01	0.00	0.00	0.00	127.32

Phase Assumptions

Phase: Fine Grading 2/25/2008 - 8/25/2008 - Building Construction

Total Acres Disturbed: 13.3

Maximum Daily Acreage Disturbed: 3.32

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

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

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

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

Phase: Mass Grading 12/28/2007 - 2/22/2008 - Site Grading

Total Acres Disturbed: 13.3

Maximum Daily Acreage Disturbed: 3.32

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 2400 cubic yards/day; Offsite Cut/Fill: 887 cubic yards/day

On Road Truck Travel (VMT): 1476.1

Off-Road Equipment:

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

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

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

Phase: Paving 2/25/2008 - 8/25/2009 - Road Paving

Acres to be Paved: 3.32

Off-Road Equipment:

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

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

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

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

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Winter Pounds Per Day, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 12/28/2007-12/31/2007 Active Days: 2	18.41	142.31	**90.80**	0.06	47.88	5.36	53.24	10.03	4.93	14.96	15,409.50
Mass Grading 12/28/2007-02/22/2008	18.41	142.31	90.80	0.06	47.88	5.36	53.24	10.03	4.93	14.96	15,409.50
Mass Grading Dust	0.00	0.00	0.00	0.00	47.66	0.00	47.66	9.95	0.00	9.95	0.00
Mass Grading Off Road Diesel	15.12	89.55	68.62	0.00	0.00	3.28	3.28	0.00	3.02	3.02	9,084.94
Mass Grading On Road Diesel	3.10	52.44	16.78	0.06	0.21	2.06	2.27	0.07	1.90	1.97	5,942.78
Mass Grading Worker Trips	0.19	0.32	5.40	0.00	0.02	0.01	0.03	0.01	0.01	0.01	381.78
Time Slice 1/1/2008-2/22/2008 Active Days: 39	17.41	134.81	85.77	0.06	47.88	5.01	52.90	10.03	4.61	14.64	**15,409.51**
Mass Grading 12/28/2007-02/22/2008	17.41	134.81	85.77	0.06	47.88	5.01	52.90	10.03	4.61	14.64	15,409.51
Mass Grading Dust	0.00	0.00	0.00	0.00	47.66	0.00	47.66	9.95	0.00	9.95	0.00
Mass Grading Off Road Diesel	14.30	85.11	65.01	0.00	0.00	3.11	3.11	0.00	2.86	2.86	9,084.94
Mass Grading On Road Diesel	2.94	49.41	15.70	0.06	0.21	1.89	2.10	0.07	1.74	1.81	5,942.78
Mass Grading Worker Trips	0.17	0.29	5.06	0.00	0.02	0.01	0.03	0.01	0.01	0.01	381.79

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Time Slice 2/25/2008-8/25/2008 Active Days: 131	5.90	29.98	23.28	0.00	4.64	1.38	6.02	0.97	1.27	2.24	3,298.49
Asphalt 02/25/2008-08/25/2009	3.33	14.03	11.65	0.00	0.01	0.84	0.85	0.00	0.78	0.78	1,461.52
Paving Off-Gas	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	3.24	13.85	9.94	0.00	0.00	0.84	0.84	0.00	0.77	0.77	1,324.15
Paving On Road Diesel	0.01	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.11
Paving Worker Trips	0.06	0.10	1.69	0.00	0.01	0.00	0.01	0.00	0.00	0.00	127.26
Fine Grading 02/25/2008-08/25/2008	2.58	15.95	11.63	0.00	4.63	0.54	5.17	0.97	0.50	1.46	1,836.97
Fine Grading Dust	0.00	0.00	0.00	0.00	4.63	0.00	4.63	0.97	0.00	0.97	0.00
Fine Grading Off Road Diesel	2.54	15.89	10.61	0.00	0.00	0.54	0.54	0.00	0.49	0.49	1,760.61
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.06	1.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	76.36
Time Slice 8/26/2008-12/31/2008 Active Days: 92	3.33	14.03	11.65	0.00	0.01	0.84	0.85	0.00	0.78	0.78	1,461.52
Asphalt 02/25/2008-08/25/2009	3.33	14.03	11.65	0.00	0.01	0.84	0.85	0.00	0.78	0.78	1,461.52
Paving Off-Gas	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	3.24	13.85	9.94	0.00	0.00	0.84	0.84	0.00	0.77	0.77	1,324.15
Paving On Road Diesel	0.01	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.11
Paving Worker Trips	0.06	0.10	1.69	0.00	0.01	0.00	0.01	0.00	0.00	0.00	127.26
Time Slice 1/1/2009-8/25/2009 Active Days: 169	3.13	13.31	11.39	0.00	0.01	0.80	0.81	0.00	0.74	0.74	1,461.57
Asphalt 02/25/2008-08/25/2009	3.13	13.31	11.39	0.00	0.01	0.80	0.81	0.00	0.74	0.74	1,461.57
Paving Off-Gas	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	3.05	13.14	9.80	0.00	0.00	0.80	0.80	0.00	0.73	0.73	1,324.15
Paving On Road Diesel	0.00	0.08	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.11
Paving Worker Trips	0.05	0.09	1.56	0.00	0.01	0.00	0.01	0.00	0.00	0.00	127.32

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 2/25/2008 - 8/25/2008 - Building Construction

For Soil Stablizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

For Soil Stablizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:

PM10: 5% PM25: 5%

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:

PM10: 69% PM25: 69%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Rubber Tired Dozers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Rubber Tired Dozers, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Tractors/Loaders/Backhoes, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Water Trucks, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Water Trucks, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

The following mitigation measures apply to Phase: Mass Grading 12/28/2007 - 2/22/2008 - Site Grading

For Soil Stablizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

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For Soil Stablizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:

PM10: 5% PM25: 5%

For Soil Stablizing Measures, the Water exposed surfaces 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:

PM10: 69% PM25: 69%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Rubber Tired Dozers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Rubber Tired Dozers, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Tractors/Loaders/Backhoes, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Water Trucks, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Water Trucks, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

The following mitigation measures apply to Phase: Paving 2/25/2008 - 8/25/2009 - Road Paving

For Pavers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Pavers, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Paving Equipment, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Paving Equipment, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Rollers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Rollers, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Tractors/Loaders/Backhoes, the Diesel Oxidation Catalyst 15% mitigation reduces emissions by:

NOX: 15%

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.02	0.31	0.13	0.00	0.00	0.00	399.90
Hearth	3.54	0.34	12.99	0.04	2.05	1.97	466.63
Landscaping - No Winter Emissions							
Consumer Products	1.22						
Architectural Coatings	0.36						
TOTALS (lbs/day, unmitigated)	5.14	0.65	13.12	0.04	2.05	1.97	866.53

Area Source Changes to Defaults

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Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Single family housing	2.82	4.34	32.81	0.02	3.74	0.72	1,840.47
TOTALS (lbs/day, unmitigated)	2.82	4.34	32.81	0.02	3.74	0.72	1,840.47

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2008 Temperature (F): 40 Season: Winter

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	13.30	10.17	dwelling units	25.00	254.25	2,173.76
					254.25	2,173.76

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	53.9	2.0	97.6	0.4
Light Truck < 3750 lbs	12.9	3.1	93.0	3.9
Light Truck 3751-5750 lbs	19.7	1.0	98.5	0.5
Med Truck 5751-8500 lbs	6.5	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.9	0.0	77.8	22.2
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Med-Heavy Truck 14,001-33,000 lbs	1.0	0.0	20.0	80.0
Heavy-Heavy Truck 33,001-60,000 lbs	0.4	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	3.2	78.1	21.9	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	0.6	0.0	83.3	16.7

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						

Operational Changes to Defaults

Highest 4 Daily Maximum 8-Hour Carbon Monoxide Averages

Redwood City

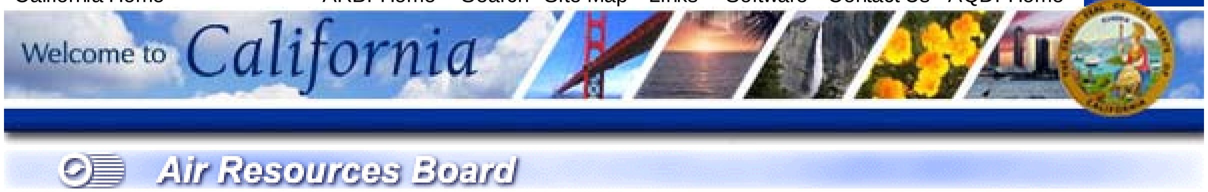
Year:	2005		2006		2007	
	Date	Measurement	Date	Measurement	Date	Measurement
National:						
First High:	Nov 23	2.26	Dec 25	2.44	Jan 10	2.33
Second High:	Nov 22	2.21	Dec 20	2.24	Jan 19	2.14
Third High:	Nov 22	2.18	Jan 9	2.13	Jan 16	2.07
Fourth High:	Nov 21	2.17	Dec 26	2.09	Jan 24	2.04
California:						
First High:	Nov 23	2.26	Dec 24	2.44	Jan 10	2.33
Second High:	Nov 22	2.21	Dec 20	2.24	Jan 19	2.14
Third High:	Nov 21	2.17	Jan 9	2.13	Jan 16	2.07
Fourth High:	Jan 17	2.14	Dec 25	2.09	Jan 24	2.04
# Days Above Nat'l Standard:		0		0		0
# Days Above State Standard:		0		0		0
Year Coverage:		97		98		97

Go Backward One Year | New Top 4 Summary | Go Forward One Year

Notes: All averages are expressed in parts per million.
State exceedances are shown in yellow . National exceedances are shown in **orange** .
An exceedance is not necessarily a violation.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period.
* There was insufficient (or no) data available to determine the value.

Switch: Hourly Ozone | 8-Hour Ozone | PM10 | PM2.5 | Nitrogen Dioxide | Sulfur Dioxide | Hydrogen Sulfide

Go to: Data Statistics Home Page | Top 4 Summaries Start Page



iADAM

Highest 4 Daily Maximum 8-Hour Ozone Averages

Redwood City

FAQs

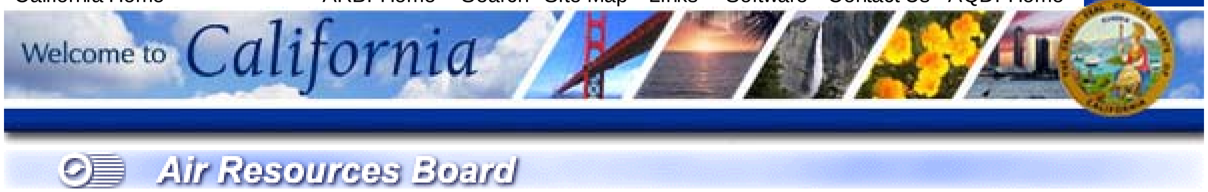
Year:	2005		2006		2007	
	Date	8-Hr Average	Date	8-Hr Average	Date	8-Hr Average
National:						
First High:	Jul 23	0.061	Aug 9	0.063	May 7	0.069
Second High:	Sep 25	0.052	May 14	0.061	May 6	0.056
Third High:	Mar 13	0.051	Jun 21	0.052	Sep 26	0.055
Fourth High:	Apr 22	0.050	Jun 22	0.051	Apr 14	0.052
California:						
First High:	Jul 23	0.062	Aug 9	0.063	May 7	0.070
Second High:	Sep 25	0.052	May 14	0.062	May 6	0.056
Third High:	Mar 13	0.051	Jun 21	0.052	Sep 26	0.055
Fourth High:	Apr 22	0.051	Jun 22	0.052	Apr 14	0.053
National:						
# Days Above Nat'l 1997 Std.:		0		0		0
Nat'l 1997 Std. Design Value:		0.057		0.053		0.051
National Year Coverage:		99		98		98
California:						
# Days Above State Standard:		0		0		0
California Designation Value:		0.066		0.058		0.056
Expected Peak Day Conc.:		0.065		0.058		0.057
California Year Coverage:		99		98		97

Go Backward One Year | New Top 4 Summary | Go Forward One Year

Notes: All averages are expressed in parts per million.
National exceedances are shown in **orange** . State exceedances are shown in yellow .
An exceedance is not necessarily a violation.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period.
* There was insufficient (or no) data available to determine the value.

Switch: Hourly Ozone | PM10 | PM2.5 | Carbon Monoxide | Nitrogen Dioxide | Sulfur Dioxide | Hydrogen Sulfide

Go to: Data Statistics Home Page | Top 4 Summaries Start Page



Highest 4 Daily Maximum Hourly Nitrogen Dioxide Measurements

Redwood City

FAQs

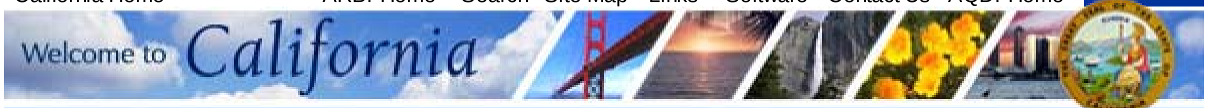
Year:	2005		2006		2007	
	Date	Measurement	Date	Measurement	Date	Measurement
First High:	Oct 13	0.062	Oct 27	0.069	Oct 23	0.057
Second High:	Nov 21	0.061	Oct 28	0.063	Oct 24	0.054
Third High:	Nov 22	0.060	Dec 5	0.056	Jan 24	0.053
Fourth High:	Nov 16	0.056	Dec 6	0.056	Jan 11	0.050
# Days Above State Standard:		0		0		0
Annual Average:		0.015		0.014		0.013
Year Coverage:		99		98		98

Go Backward One Year | New Top 4 Summary | Go Forward One Year

Notes: All concentrations are expressed in parts per million.
State exceedances are shown in yellow . National exceedances are shown in **orange** .
An exceedance is not necessarily a violation.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.
* There was insufficient (or no) data available to determine the value.

Switch: Hourly Ozone | 8-Hour Ozone | PM10 | PM2.5 | Carbon Monoxide | Sulfur Dioxide | Hydrogen Sulfide

Go to: Data Statistics Home Page | Top 4 Summaries Start Page



Air Resources Board

iADAM

Highest 4 Daily Maximum Hourly Ozone Measurements

Redwood City

FAQs

Year:	2005		2006		2007	
	Date	Measurement	Date	Measurement	Date	Measurement
First High:	Jul 23	0.084	Aug 9	0.085	May 7	0.077
Second High:	Sep 30	0.064	May 14	0.081	Sep 26	0.069
Third High:	Aug 30	0.063	Jun 21	0.072	Sep 5	0.068
Fourth High:	Sep 25	0.060	Jul 23	0.068	Mar 12	0.061
# Days Above State Standard:		0		0		0
California Designation Value:		0.08		0.07		0.07
Expected Peak Day Conc.:		0.079		0.074		0.068
# Days Above Nat'l Standard:		*0*		*0*		*0*
National Design Value:		*0.090*		*0.084*		*0.077*
Year Coverage:		99		98		97

Go Backward One Year | New Top 4 Summary | Go Forward One Year

Notes: All concentrations are expressed in parts per million.
The national 1-hour ozone standard was revoked in June 2005 and is no longer in effect. Statistics related to the revoked standard are shown in *italics* or *italics* .
State exceedances are shown in yellow . Exceedances of the revoked national 1-hour standard are shown in *orange* .
An exceedance is not necessarily a violation.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period.
* There was insufficient (or no) data available to determine the value.

Switch: 8-Hour Ozone | PM10 | PM2.5 | Carbon Monoxide | Nitrogen Dioxide | Sulfur Dioxide | Hydrogen Sulfide

Go to: Data Statistics Home Page | Top 4 Summaries Start Page

Welcome to California

Air Resources Board

iADAM

Highest 4 Daily PM10 Measurements

Redwood City

FAQs

Year:	2005		2006		2007	
	Date	Measurement	Date	Measurement	Date	Measurement
National:						
First High:	Nov 22	78.1	Dec 25	66.2	Jan 24	52.2
Second High:	Nov 18	69.5	Dec 7	53.0	Nov 26	45.9
Third High:	Dec 6	43.4	May 11	39.0	Dec 14	39.0
Fourth High:	Dec 14	39.3	Dec 1	37.4	Feb 5	37.5
California:						
First High:	Nov 22	80.8	Dec 25	69.9	Jan 24	55.8
Second High:	Nov 18	71.9	Dec 7	55.8	Nov 26	48.6
Third High:	Dec 6	46.1	May 11	40.0	Dec 14	41.9
Fourth High:	Dec 14	41.5	Dec 1	39.6	Feb 5	39.4
Measured:						
# Days Above Nat'l Standard:		0		0		0
# Days Above State Standard:		2		2		1
Estimated:						
3-Yr Avg # Days Above Nat'l Std:		0.0		0.0		0.0
# Days Above Nat'l Standard:		0.0		0.0		0.0
# Days Above State Standard:		10.2		10.2		6.0
State 3-Yr Maximum Average:		21		21		21
State Annual Average:		20.9		19.8		19.6
National 3-Year Average:		*20*		*19*		*19*
National Annual Average:		*19.5*		*19.2*		*19.1*
Year Coverage:		97		100		100

Go Backward One Year | New Top 4 Summary | Go Forward One Year

Notes: All concentrations are expressed in micrograms per cubic meter.
The national annual average PM10 standard was revoked in December 2006 and is no longer in effect.
Statistics related to the revoked standard are shown in *italics* or *italics* .
State exceedances are shown in yellow . National exceedances are shown in **orange** .
An exceedance is not necessarily a violation.
Statistics may include data that are related to an exceptional event.
State and national statistics may differ for the following reasons:
State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods.

State and national statistics may therefore be based on different samplers.

State statistics for 1998 and later are based on *local* conditions (except for sites in the South Coast Air Basin, where State statistics for 2002 and later are based on *local* conditions). National statistics are based on *standard* conditions.

State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

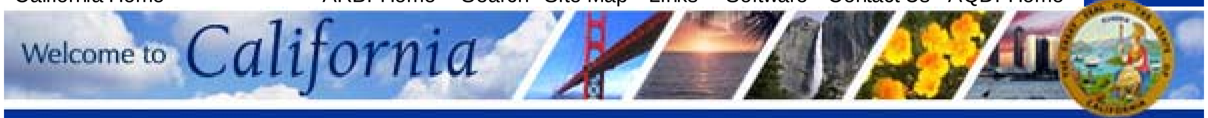
Measurements are usually collected every six days. Measured days counts the days that a measurement was greater than the level of the standard; Estimated days mathematically estimates how many days concentrations would have been greater than the level of the standard had each day been monitored.

3-Year statistics represent the listed year and the 2 years before the listed year.

Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.

* There was insufficient (or no) data available to determine the value.

Switch:	**Hourly Ozone**	**8-Hour Ozone**	**PM2.5**	**Carbon Monoxide**	**Nitrogen Dioxide**	**Sulfur Dioxide**	**Hydrogen Sulfide**
Go to:	**Data Statistics Home Page**			**Top 4 Summaries Start Page**			



Air Resources Board

iADAM

Highest 4 Daily PM2.5 Measurements

Redwood City

FAQs

Year:	2005		2006		2007	
	Date	Measurement	Date	Measurement	Date	Measurement
National:						
First High:	Nov 21	30.9	Dec 25	75.3	Jan 24	45.4
Second High:	Jan 22	29.4	Dec 7	34.8	Feb 5	33.0
Third High:	Dec 15	29.4	Nov 19	30.9	Jan 27	32.8
Fourth High:	Jan 16	28.3	Dec 4	28.8	Nov 26	30.8
California:						
First High:	Dec 8	48.4	Dec 25	75.3	Jan 25	45.6
Second High:	Jan 25	43.9	Dec 24	44.2	Jan 24	45.4
Third High:	Dec 17	42.5	Dec 3	35.2	Jan 26	44.4
Fourth High:	Dec 16	40.0	Dec 7	34.8	Feb 4	39.2
Est Days > Nat'l '97 24-Hr Std:		0.0		*		0.0
Measured Days > Nat'l '97 24-Hr Std:		0		1		0
Nat'l '97 24-Hour Std Design Value:		28		*		*
Nat'l '97 24-Hr Std 98th Percentile:		29.4		*		32.8
National Annual Std Design Value:		9.0		*		*
National Annual Average:		8.8		*		8.3
State Ann'l Std Designation Value:		9		10		10
State Annual Average:		8.8		9.5		8.3
Year Coverage:		100		98		96

Go Backward One Year | New Top 4 Summary | Go Forward One Year

Notes: All concentrations are expressed in micrograms per cubic meter.
State exceedances are shown in yellow . National exceedances are shown in **orange** .
An exceedance is not necessarily a violation.
State and national statistics may differ for the following reasons:
State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods.
State and national statistics may therefore be based on different samplers.
State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was

sufficient data for annual statistics to be considered valid.
* There was insufficient data available throughout the year to determine the value.

Switch:	Hourly Ozone	8-Hour Ozone	PM10	Carbon Monoxide	Nitrogen Dioxide	Sulfur Dioxide	Hydrogen Sulfide
Go to:	Data Statistics Home Page			Top 4 Summaries Start Page			

APPENDIX E

BIOLOGICAL RESOURCES DATA

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ASCENSION HEIGHTS SUBDIVISION BIOLOGY REPORT

I. Introduction

This report is prepared as part of an Environmental Impact Report (EIR) on the proposed Ascension Heights Subdivision development project within unincorporated San Mateo County, California. The information in this report is organized as follows;

- Section II presents the Existing Conditions/Setting in which the biotic resources (vegetation, wildlife habitats and sensitive species) currently existing on the properties are described.
- Section III describes the Impacts (short-term, long-term, cumulative and unavoidable) of the proposed projects upon the existing biotic resources. A definition of impact threshold levels is presented as well.
- Section IV presents potential Mitigation Measures that would reduce the identified impacts to insignificant levels.
- Section V lists the References used in preparing this report.

The data and information presented in this report is based upon the citations noted in the text as well as a field survey conducted by the author on May 18, 2003. The field survey was conducted on foot with the aid of topographic maps (approximately 1”=80’). The biological field survey was conducted at a time of the year when most of the potential sensitive plant species would be in bloom and identifiable.

II. Existing Conditions/Setting.

II.A. Topography/Aspect. The proposed Ascension Heights Subdivision development site consists of approximately 13.25 acres. The proposed project site is located in an unincorporated area of San Mateo County just east of Interstate Highway 280, and just north of State Highway 92. The proposed project site is square in shape with Ascension Drive delineating the southwestern border and Bel Aire Road delineating the northwestern border. The property boundary to the northeast is essentially defined by the backyards of an existing and adjacent housing development. There is an open space area on a south facing slope that borders the southeast boundary of the project site. The site is centered upon a small peak or knob that sits along the ridge that separates Polhemus Creek from those creeks and drainages that drain towards the San Francisco Bay. The vast majority of the property drains towards Polhemus Creek to the west. A small portion of the eastern most side of the property drains to the east. The site is too steep to support any year round water courses. At the time the field survey was conducted, the only surface water found was located in tire ruts along a dirt road below a small seep at the east end of the site.

The topographic elevations on the proposed development site range from a high point of approximately 710 feet above mean sea level (msl) to the lowest elevation of 505 feet above msl at the northwest corner near the intersection of Ascension Drive and Bel Aire Road. In general, the slopes on the site are very steep ranging from near 95% along the northern boundary above Bel Aire Road to 25% at the eastern most corner of the site to near 0% at the top of the peak.

There is one existing paved roadway on the property running from the north corner off Bel Aire Road up to an existing water tank owned by California Water Service at the top of the peak. There is a narrow path of dirt road along the eastern boundary of the site. Additional land disturbances to the site include cut slopes and shelves along the lower slopes immediately above Ascension Drive and Bel Aire Road. These man made alteration encompass approximately ¼ of the site area. .

II.B Vegetation. As noted above, approximately 1/4 of the site has been significantly disturbed or altered. The existing plant communities on the site consist of scattered thickets of Coast Live Oak series within a matrix of California Annual Grassland series (Sawyer and Keeler-Wolf, 1995). There are scatterings of ornamental shrubs and trees throughout the site with the largest and most concentrated groupings occurring along the southern site boundary where there is a grove of blue gum *(Eucalyptus sp.)* trees, and at the peak around the water tank where Monterey Pine trees *(Pinus radiate)* have been planted as a visual screen.

The plant species identified during the field survey are listed in Table 1. The vegetation structure outside of the groves of eucalyptus and Monterey pines varies from thickets of coast live oaks *(Quercus agrifolia)* with coyote brush *(Baccharis pilularis),* and escaped ornamentals such as firethorn *(Pyrocantha angustifolia),* acacias *(Acacia sp.),* juniper trees *(Juniperus sp.)* and Monterey pines predominately on the north and east facing slopes to open grasslands with scattered bushes and trees on the south and west facing slopes. Other indicative native plant species of the Coast Live Oak series found on the site include blackberry *(Rubus sp.)*, common snowberry *(Symporicarpus albus)*, poison oak *(Toxicodendron diversilobum)*, and toyon *(Heteromeles arbutifolia).* The site supports 78 native and non-native trees (Lea and Sung Engineering, Inc. August 23, 2002).

Beneath the tree canopies the ground cover vegetation varies from scattered brush species like blackberries in the wetter sites and poison oak on the drier sites to herbaceous annual grasses and forbs. Much of the groundcover on this site is dominated by annual grassland species, most of which are non-native but have become naturalized in California. Mixed within the matrix of non-native grasses is a native bunch grass (Purple needlegrass, *Nassella pulchra*). This native bunch grass may have at one time been the dominate plant in the groundcover but is now being overcrowded by the more aggressive non-native annual grasses. Some of the more common non-native grasses and forbs in the grasslands include brome *(Bromus sp.)*, European hairgrass *(Airea caroyophyllea),* filaree *(Erodium sp.),* mustards *(Brassica sp.),* oats *(Avena sp.),* fescue *(Vulpia sp.),* and ryegrass *(Lolium sp.).*

Those portions of the site that have been heavily disturbed also support some invasive weedy species including rose clover *(Trifolium hirtum),* hop clover *(T. campestre),* winter vetch *(Vinca villosa)* and various thistles (*Cirsium* sp.).

II.C. Wildlife Species/Habitat. California coast live oak woodlands provide habitat for a variety of wildlife species (USDA, 1988). At least 60 species of mammals and 110 species of birds use oak woodlands (Barrett, 1980; Verner, 1980). Quail, turkey, squirrels and deer utilize the oak acorns as a major food item in their diets. During the brief field survey for this report, a male mule deer *(Odocoileus hemionus)* was observed resting under an oak tree. Various birds were observed flying over the site and in the trees and brush including white bushtits (*Psaltiparus minimus*), chickadees (*Parus* spp.), Western bluebirds (*sialia mexicana*). Western fence lizards (*Scaeloporus occidentalis*) were observed on rock outcrops and on fallen trees.

II.D. Sensitive Species. The sensitive species that are known to occur in the general area are identified in Tables 2 and 3. Of the 24 sensitive wildlife species listed in Table 2 known to occur in the San Mateo County region, only two are known to occur in habitats similar to those found on the site; the Mission Blue butterfly and roosting sites for the Monarch butterfly. The Mission blue butterfly is listed as Endangered by the U.S. Fish and Wildlife Service. A small population (15-20 plants) of one of the larvae host plants *(Lupinus formosus)* for the endangered Mission blue butterfly was found in one location on the steep west facing slope above Ascension Drive. In addition, one of the food plants *(Dichelostemma pulchellum)* for the adult Mission blue butterfly was found throughout the site. The nearest known population of this butterfly to this site is on San Bruno Mountain located approximately 15 miles to the north. The site survey was conducted at a time of the year the adult Mission blue butterflies would be out but none were observed during the site survey.

Monarch butterflies are known to mass or roost in groves of trees during their migration in the fall. These butterflies will return to the same trees year after year. One of the most famous massing or roosting sites in on the Monterey peninsula in the town of Pacific Grove. The nearest reported sighting of Monarch butterflies is at Coyote Point near the museum located more than five miles east of the site. Although the site supports a grove of eucalyptus trees, it does not support other habitat requirements for the butterfly including a water source and the food plant (milkweed) for the species. There have been no reported sightings of this butterfly on the site in the past and thus it is highly unlikely that the Monarch butterfly masses at this site.

As listed in Table 3, there are thirty five (35) sensitive plant species known to occur in this region of San Mateo County. Many of these sensitive species are typically associated with serpentine soils and are known to occur within a mile or so of the proposed project site. Prior to conducting the site survey, the biologist surveyed known locations of these plants to verify that they were blooming at this time of the year. One of these plants, the Crystal Springs Lessingia, does not typically bloom till July and thus it would not have been possible to identify this plant at the time the survey was conducted. However, the site does not support any serpentine soils and none of the sensitive plants typically associated with this soil were found on the site, and thus it is very unlikely that the Crystal Springs Lessingia occurs on the site. The site does support suitable habitat for six of the sensitive plant species known to occur in the region including the White-rayed Pentachaeta (open dry rocky areas in grasslands), the San Mateo Woolly Sunflower (openings in woodlands, often on roadcuts), the Diablo helianthella, San Francisco campion and San Francisco gumplant (foothill grasslands), and the bent-flowered fiddleneck (foothill grasslands). None of these sensitive plants were found on the site.

The field survey was conducted in mid May when most of the sensitive plant species typically bloom. Of those sensitive plant species that typically bloom at another time of the year six are perennial species that are identifiable when not in flower (four species of Manzanita, the San Francisco gum plant, and Western Leatherwood). Based upon these findings and due to the heavily disturbed nature on portions of the site, it is highly unlikely that the site supports any sensitive plant species.

II.D. Sensitive Habitats. There are three habitat types of limited extent and rarity that have been reported in the project area; serpentine bunchgrass, southern coastal salt marsh and valley oak woodland. Southern coastal salt marsh occurs along the borders of the San Francisco Bay and thus is not associated with the project site. Valley oak woodlands occur in the deep alluvial soils of inland valleys. The site is located atop a hill and thus does not support any valley oak woodlands. The nearest and most probably sensitive habitat that could have occurred on the site was serpentine grasslands. Serpentine grasslands are located along the major ridgelines in the project area; Buri Buri Ridge, Pulgas Ridge, Jasper Ridge, and in Edgewood Park. Serpentine soils support unique and rare plant communities. Serpentine soils are typically thin and high in certain minerals that many non-native, invasive plant species cannot tolerate. Unique communities of native plants adapted to these soils are typically found in areas that contain serpentine soils. One such community is dominated by native perennial bunchgrasses such as *Nassella pulchra* (found on the site), *Poa scabrella, Sitanion hystrix, and Calamogrostis ophitidis* as well as a number of rare herbaceous plants. Although the site supports a remnant population of *Nassella pulchra,* it does not support any of the other indicator species and the soils are not serpentine and thus this sensitive habitat does not occur on the site.

III. Impacts

III.A. Significance Criteria.

The following thresholds of significance were used in determining when an identified impact was considered significant (S) or insignificant (IS).

- Reduce the numbers or range of a rare, threatened, or endangered species.
- Adversely affect the habitats of rare, threatened, or endangered species.

- Substantially reduce the wildlife habitat values of a site.
- Threaten to eliminate a plant community or animal population in a region.
- Adversely affect wetlands under jurisdiction of Section 404 of the Clean Water Act.
- Interfere with the movement of native resident or migratory wildlife species.
- Conflict with San Mateo County policies or ordinances protecting biological resources.
- Conflict with an adopted Habitat Conservation Plan or other type of approved biological habitat management plan.

In addition to determining if an impact is significant or not, the following discussion identifies the type or nature of the identified impact as either short-term/temporary, long-term/permanent, and/or cumulative.

The proposed project is not expected to reduce the numbers or adversely affect the habitats of any rare, threatened, endangered species, species of concern, or eliminate a rare plant community or animal population from the project area. Although the proposed retention wall immediately southwest of lots 22 and 23 would eliminate about half of the Silver lupine population, this would not constitute a significant impact since the Mission blur butterfly was not found nor is expected to occur on the site.

The proposed project would reduce the habitat values for deer, but would not substantially reduce the wildlife habitat values for other wildlife species. The proposed project site is surrounded by urban development, and the proposed project would convert approximately 68% of the existing open space into public streets and single family dwelling lots. With this level of conversion the deer and larger raptor species that now use the site will have to move to other open spaces off site most likely to the west. The remaining open space area (approximately 32%) will support many of the existing wildlife species now using the site. This would be a long-term/permanent and cumulative impact but would not be significant. Deer populations in the area are healthy and there are abundant open spaces in the project area for raptors to hunt and feed.

The proposed project site does not support any wetland habitats and thus would not require a Section 404 permit.

The only wildlife species that may move through the area are the deer and some limited bird life in migration. The habitats on the site do not represent important or rare habitats typically used by migratory bird species.

TABLE 2
SENSITIVE ANIMAL SPECIES
KNOW TO OCCUR IN PROJECT AREA[1]
(ASCENSION HEIGHTS SUBDIVISION)

Scientific Name	Common Name	Status[2]		Breeding Season Habitat Requirements	Notes (Occurrence Potential)
		Fed	State		
Euphydryas editha bayensis	Bay Checkerspot Butterfly	Threatened	None	Restricted to native grasslands on outcrops of serpentine soil. The nearest population is located along Pulgas Ridge approximately half a mile west of the site.	**Not Present:** None of the host plants (*Plantago erecta May-Aug, Orthocarpus densiflorus March-May, and O. purpurscens March-May*) were found on the site
Danaus Plexippus	Monarch Butterfly	None	Species of Special Concern	Winter roosts in groves of trees.	**Potential in Eucalyptus Trees:** It was not possible to determine conclusively that these butterflies do not roost in the eucalyptus trees, but there has never been a reported sighting at this location
Speyeria zerene myrtleae	Myrtle's Silverspot	Endangered	None	Believed to have been extirpated from San Mateo County. Breeds on coastal dune habitats with *Viola adunca (March-July).*	**Not Present:** The site does not support suitable habitats nor the host plant.
Icaricia icariodes missionensis	Mission Blue Butterfly	Endangered	None	Known to occur in grasslands with *Lupinus albifrons (March-June), L. varicolor (April-July), and/or L. formosus (April-October).* Nearest populations are know to occur on San Bruno Mountain to the north.	**Potential but Not Found:** Although a small population of one of the larval host plants *(Lupinus formosus)* and abundant adult food plant (*Dichelostemma pulchellum)* occurs on the site, no adults were observed in flight during the site survey.
Incisalia mosii bayensis	San Bruno Elfin Butterfly	Endangered	None	Occupies coastal hills and mountains with grassy covered steep slopes and *Sedum spathifolium (May-July).*	**Not Present:** The site does not support the host plant.
Speyeria callippe callippe	Callippe Silverspot Butterfly	Endangered	None	North Coastal scrub, associated with *Viola peduculata (Feb-April)*	**Not Present:** The site does not support the host plant.
Rana aurora dratonii	California Red-legged Frog	Threatened	Species of Special Concern	Winter season in bodies of quiet water, larval development in spring. Adults use adjacent uplands as estivation sites. Nearest known population is located 4.5 miles to the southwest in the Pilarcitos Creek watershed.	**Not Present:** Site does not have suitable breeding or larval habitat.

TABLE 2
SENSITIVE ANIMAL SPECIES
KNOW TO OCCUR IN PROJECT AREA[1]
(ASCENSION HEIGHTS SUBDIVISION)

Scientific Name	Common Name	Status[2]		Breeding Season Habitat Requirements	Notes (Occurrence Potential)
		Fed	State		
Thamnophis sirtalis tetrataenia	San Francisco Garter Snake	Endangered	Endangered	Ponds and water drainages with populations of California red-legged and/or tree frogs. Uses adjacent uplands as estivation sites. Nearest known population is located two miles to the west at Lower Crystal Springs Reservoir.	**Not Present:** Site does not have suitable breeding habitat.
Hydrochara rickseckeri	Ricksecker's Water Scavenger Beetle	None	None	Requires aquatic habitat. The nearest known population is located 5 miles to the south at the Pulgas Water Temple.	**Not Present:** Suitable aquatic habitat for this beetle does not occur on the site.
Calicina minor	Edgewood Blind Harvestman	None	None	Open grasslands with serpentine outcrops near permanent springs. Nearest population is located at Lower Crystal Springs Reservoir.	**Not Present:** Suitable habitat for this insect does not occur on the site.
Rallus longirostrus obsoletus	California Clapper Rail	Endangered	Endangered	Breeds in salt marshes on the edges of the San Francisco Bay	**Not Present:** Site does not have suitable breeding habitat.
Geothlypis trichas sinuosa	Saltmarsh Common Yellowthroat	Species of Concern	None	Nests in fresh and salt water marshes in the San Francisco Bay region.	**Not Present:** Site does not have suitable breeding habitat.
Oncorhynchus mykiss irideus	Central California Coast Steelhead	Threatened	None	Breeds in perennial creeks from the Russian River to Soquel Creek.	**Not Present:** Site does not have suitable breeding habitat.
Lichnanthe ursina	Bumblebee Scarab Beetle	Species of Concern	None	Occurs in coastal sand dunes	**Not Present:** Site does not have suitable breeding habitat.
Phalacrocorax auritus	Double-crested Comorant	None	Species of Special Concern	Establishes rookeries on coastal cliffs	**Not Present:** Site does not have suitable breeding habitat.
Laterallus jamaicensis coturniculus	Western Snowy Plover	Threatened	None	Needs sandy friable soils for nesting, typically found on sandy beaches.	**Not Present:** Site does not have suitable breeding habitat.
Reithrodontomys raviventris	Salt-marsh Harvest Mouse	Endangered	Endangered	Saltmash habitats	**Not Present:** Site does not have suitable breeding habitat.

TABLE 2
SENSITIVE ANIMAL SPECIES
KNOW TO OCCUR IN PROJECT AREA[1]
(ASCENSION HEIGHTS SUBDIVISION)

Riparia riparia	Bank Swallow	Species of Concern	Threatened	Colonial nester in riparian habitats.	**Not Present:** Site does not have suitable breeding habitat.
Scientific Name	**Common Name**	**Status[2]**		**Breeding Season Habitat Requirements**	**Notes (Occurrence Potential)**
		Fed	**State**		
Eucyclogobius newberryi	Tidewater goby	Endangered	None	Brackish water habitats	**Not Present:** Site does not have suitable breeding habitat.
Clymmys marmorata	Western Pond Trutle	None	Species of Special Concern	Permanent bodies of fresh water.	**Not Present:** Site does not have suitable breeding habitat.
Caecidotea tomalensis	Tomales Isopod	None	Species of Special Concern	Permanent bodies of fresh water.	**Not Present:** Site does not have suitable breeding habitat.
Ambystoma californiense	California Tiger Salamander	Endangered	Species of Special Concern	Breeds in freshwater ponds.	**Not Present:** Site does not have suitable breeding habitat.
Sterna antillarum browni	California Least Tern	Endangered	Endangered	Nests on bare or sparsely vegetated, flat areas.	**Not Present:** Site does not have suitable breeding habitat.
Sorex vagrans halicoetes	Salt –marsh Wandering Shrew	None	Species of Special Concern	Salt marshes	**Not Present:** Site does not have suitable breeding habitat.

TABLE 2
SENSITIVE ANIMAL SPECIES
KNOW TO OCCUR IN PROJECT AREA[1]
(ASCENSION HEIGHTS SUBDIVISION)

[1] Project Area: California Natural Diversity Data Base (CNDDB) search of the following U.S.G.S 7.5 minute quad maps (April, 2001).

- San Mateo
- Palo Alto
- Woodside

[2] Status:

Federal; Endangered Species Act of 1973 (as amended)

Endangered = Any species, including subspecies, in danger of extinction through all or a significant portion of its range.

Threatened = Any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Species of Concern = an informal term that refers to those species that the U.S. Fish and Wildlife Service believe might be declining or be in need of concentrated conservation actions to prevent decline**.**

State; California Endangered Species Act of 1984 (as amended)

Endangered = Any native species who's survival and reproduction are in immediate jeopardy from one or more causes.

Threatened = Any native species, although not presently threatened with extinction, is likely to become an endangered species within the foreseeable future in the absence of special protection and management efforts of the state.

Rare = Any native species, although not presently threatened with extinction, is in such small numbers throughout its range that it may become endangered if its present environment worsens.

Candidate = Any taxon that has been officially noticed by the California Fish and Game Commission as being under review for addition to the rare, threatened, or endangered species list.

Species of Special Concern" (SSC) status applies to animals not listed under the federal Endangered Species Act or the California Endangered Species Act, but which nonetheless 1) are declining at a rate that could result in listing, or 2) historically occurred in low numbers and known threats to their persistence currently exist. SSC share one or more of the following criteria:

1. occur in small, isolated populations or in fragmented habitat, and are threatened by further isolation and population reduction;

2. show marked population declines. Population estimates are unavailable for the vast majority of taxa. Species that show a marked population decline, yet are still abundant, do not meet the Special Concern definition, whereas marked population decline in uncommon or rare species is an inclusion criterion;

3. depend on a habitat that has shown substantial historical or recent declines in size. This criterion infers the population viability of a species based on trends in the habitats upon which it specializes. Coastal wetlands, particularly in the urbanized San Francisco Bay and south-coastal areas, alluvial fan sage scrub and coastal sage scrub in the southern coastal basins, and arid scrub in the San Joaquin Valley, are examples of California habitats that have seen dramatic reductions in size in recent history. Species that specialize in these habitats generally meet the criteria for Threatened or Endangered status or Special Concern status;

4. occur only in or adjacent to an area where habitat is being converted to land uses incompatible with the animal's survival;

5. have few California records, or which historically occurred here but for which there are no recent records; and

6. occur largely on public lands, but where current management practices are inconsistent with the animal's persistence.

Table 1
Plant List
(ASCENSION HEIGHTS SUBDIVISION)

Scientific Name	Common Name
*Acacia baileyana**	Bailey's acacia
*Acacia melanoxylon**	Black acacia
Achillea millefolium	Common yarrow
Achyrachaena mollis	Blow Wives
Antennaria sp	Pussy-toes
*Avena barbata**	Slender Oat
Avena fatua	Wild Oat
Baccharis pilularis	Coyote Brush
*Brassica nigra**	Black Mustard
*Briza minor**	Little Quaking grass
*Bromus mollis**	Soft chess
*Cardus pycnocephalus**	Italian thistle
Chlorogalum pomeridianum	Wavy-leaf Soap Plant
Cirsium vulgare	Bull Thistle
*Convolvulus arvensis**	Field Bindweed
*Cortaderia selloana**	Pampas grass
*Cynodon dactylon**	Bermuda Grass
*Cyperus eragrostis **	Nutsedge
*Cytisus scoparius**	Scotch broom
Dentaria claifornica	Milk maids
Dichelostemma pulchellum	Blue dicks
*Dipsacus fullonum**	Fuller's Teasel
*Erodium botrys**	Long-beaked storksbill
*Erodium cicutarium**	Redstem storksbill
Eriogonum sp.	Buckwheat
Eschscholzia californica	California Poppy
*Eucalyptus citirodora**	Spotted Gum Tree
*Eucalyptus Globulus **	Blue Gum Tree
*Foeniculum vulgare**	Sweet fennel
Galium aparine	Bed Straw
Heteromeles arbutifolia	Toyon
Hordeum sp	Barley
*Juniperus sp**	Upright Juniper
*Lolium multiflorum**	Italian ryegrass
Lupinus bicolor	Miniture lupine
Lupinus formosus	Silver lupine
Lupinus subvexus	Valley lupine
Lotus scoparius	Deerweed
*Medicago arabica**	Spotted clover
*Medicago polymorpha**	Bur Clover
Montia perfoliata	Miner's lettuce
Mullia maritime	Common mullia
Marah fabaceous	California manroot
Nassella pulchra	Purple Needlegrass

Table 1
Plant List
(Ascension Heights Subdivision)

Scientific Name	Common Name
*Plantago lanceolata**	English plantain
*Pichris echoides**	Ox tongue
*Pinus radiata**	Monterey Pine
*Pyracantha angustifolia**	Firethorn
Quercus agrifolia	California Live Oak
Ranunculus californica	California Buttercup
Rosa sp.	Wild rose
Rubus ursinus	Wild Blackberry
*Rumex acetosella**	Sheep sorrel
*Rumex crispus**	Curly dock
Sanicula crassicaulis	Pacific sanicula
Sidelcea malvaeflora	Checker bloom
Sidalcea oregana	Oregon sidalcea
*Silene gallica**	Common Catchfly
*Silybum marianum**	Milk Thistle
Sisyrinchium bellum	Blue-eyed grass
*Sonchus oleraceus**	Common sow thistle
*Sonchus asper**	Prickly sow thistle
Stachys ajugoides var rigida	Rigid Hedge Nettle
Stellaria media	Common chickweed
Symphocarphus albus	Common snowberry
Toxicodendron diversilobum	Poison Oak
Trifolium campestre	Hop clover
Trifolium hirtum	Rose clover
*Vicia villosa ssp. varia **	Winter vetch
*Vicia sativa**	Spring vetch
*Vinca major**	Periwinkle
Wyethia angustifolia	Narrowleaf mule ears

* Non-native

Abrams, Leroy. Illustrated Flora of the Pacific States, 1984.

Bailey, L.H. Manual of Cultivated Plants, 1949

Hickman, James C. editor, The Jepson Manual Higher Plants of California, 1994.

Munz, Philip A. and David D. Keck. A California Flora, 1970.

TABLE 3
SENSITIVE PLANT SPECIES
KNOW TO OCCUR IN PROJECT AREA[1]
(ASCENSION HEIGHTS SUBDIVISION)

Scientific Name	Common Name	Status[2]			Blooming Season Habitat Requirements	Notes (Occurrence Potential)
		Fed	State	CNPS		
Cirsium fontinale var *fontinale*	Fountain Thistle	Endangered	Endangered	List 1B 3-3-3	Wet seeps in serpentine grasslands. Known to occur along Pulgas Ridge immediately west of project site Blooms June - October	**Not present:** Suitable habitat for this plant does not occur on the site.
Pentachaeta bellidiflora	White-rayed Pentachaeta	Endangered	Endangered	List 1B 3-3-3	Open dry rocky areas in grasslands. Blooms March - May	**Not Present:** Limited suitable habitat but not found on site.
Silene verecunda ssp *vericunda*	San Francisco Campion	None	None	List 1B 3-2-3	Coastal scrub, valley grasslands and in serpentine grasslands. Blooms March - June	**Not Present:** Suitable habitat but not found on site.
Arctostaphylos andersonii	Santa Cruz Manzanita	None	None	List 1B 2-2-3	Broadleaved or North Coast coniferous forest. Blooms Nov. - April	**Not present:** Suitable habitat for this plant does not occur on the site.
Acanthomintha duttonii	San Mateo Thorn-mint	Endangered	Endangered	List 1B 3-3-3	Valley grasslands and chaparral on serpentine soils. Known to occur along Pulgas Ridge immediately west of the project site Blooms April - June	**Not Present:** Site does not support serpentine soils.
Hesperolinon congestum	Marin Western Flax	Threatened	Threatened	List 1B 3-3-3	Valley grasslands and chaparral on serpentine soils. Known to occur at Upper Crystal Springs Reservoir approximately one mile west of project site Blooms May - July	**Not Present:** Site does not support serpentine soils.

TABLE 3
SENSITIVE PLANT SPECIES
KNOW TO OCCUR IN PROJECT AREA[1]
(ASCENSION HEIGHTS SUBDIVISION)

Scientific Name	Common Name	Status[2]			Blooming Season Habitat Requirements	Notes (Occurrence Potential)
		Fed	State	CNPS		
Chorizanthe cuspidata var *cuspidata*	San Francisco Bay Spineflower	None	None	List 1B 2-2-3	Sandy soils of coastal terraces and slopes in coastal scrub, dunes or prairie Blooms April - July	**Not Present:** Suitable sandy soils and vegetation communities do not occur on the site.
Dirca occidentalis	Western Leatherwood	None	None	List 1B 2-2-3	Mixed evergreen and woodland communities on mesic sites. Blooms Jan. - April	**Not Present:** Site does not support suitable habitats.
Allium peninsulare var *francisanum*	Franciscan Onion	None	None	List 1B 2-2-3	Clay serpentine soils and known to occur at San Mateo Creek, north of the project site Blooms March - June	**Not Present:** Site does not support serpentine soils. Nearby reference site was searched and plant was found in bloom.
Fritillaria liliacea	Fragrant Fritillary	None	None	List 1B 2-2-3	Clay serpentine soils and known to occur along Pulgas Ridge immediately west of the project site. Blooms Feb. - April	**Not Present:** Site does not support serpentine soils. Nearby reference site was searched and plant was not found in bloom.
Eriophyllum latilobum	San Mateo Woolly Sunflower	Endangered	Endangered	List 1B 3-3-3	Openings in woodlands, often in roadcuts. Nearest known population is located approximately one mile to the north. Blooms May - June	**Not Present:** Suitable habitat but not found on site. Nearby reference sites were searched and the plant was found in bloom.
Fritillaria biflora var *ineziana*	Hillsborough Chocolate Lily	None	None	List 1B 3-3-3	Woodlands and grasslands on serpentine soils. The nearest know population is located at Upper Crystal Springs Reservoir to the west. Blooms March - April	**Not Present:** Site does not support serpentine soils. Nearby reference site was searched and plant was not found in bloom.
Lessingia arachnoidea	Crystal Springs Lessingia	None	None	List 1b 3-2-3	Woodlands, scrub, and grasslands on serpentine soils. The nearest know population is located at Lower Crystal Springs Reservoir to the north. Blooms July – Oct.	**Not Present:** Site does not support serpentine soils.

Table 3
Sensitive Plant Species Know to Occur in Project Area[1] (Ascension Heights Subdivision)

Scientific Name	Common Name	Status[2]			Blooming Season Habitat Requirements	Notes (Occurrence Potential)
		Fed	State	CNPS		
Triphysaria floribunda	San Francisco owls clover	Species of Concern	None	List 1B 2-2-3	Coastal Prairie, Valley and foothill grasslands usually serpentine soils Blooms April-June	**Not Present:** Site does not support serpentine soils and not found on site.
Cordylanthus maritimus ssp. palustris	Pt. Reyes Bird's beak			List 1B 2-2-2	Coastal marshes and swamps Blooms June-October	**Not Present:** Suitable habitat for this plant does not occur on the site.
Sanicula maritima	Adobe sanicle	Species of Concern	None	List 1B 3-3-3	Clay soils of seeps and wet meadows. Blooms February-May	**Not Present:** Suitable habitat for this plant does not occur on the site.
Linanthus rosaceus	Rose linanthus	Species of Concern	None	List 1B 3-3-3	Coastal bluff scrub Blooms April-June	**Not Present:** Suitable habitat for this plant does not occur on the site.
Cirsium occidentalis var. compactum	Compact Cobwebby Thistle	Species of Concern	None	List 1B 2-2-3	Coastal dunes, scrub, and prairie, chaparral and on clay soils Blooms April-June	**Not Present:** Site does not support suitable habitats and soils.
Potentilla hickmanii	Hickman's cinquefoil	Endangered	Endangered	List 1B 3-3-3	Freshwater marshes, coastal bluff scrub, seasonally wet seeps and meadows Blooms April-August	**Not Present:** Suitable habitat for this plant does not occur on the site.
Cirsium praeteriens	Lost Thistle	None	None	List 1A	Extinct	**Not Present:** Not found on site.
Centromadia parryi ssp. congdonii	Congdon's tarplant	None	None	List 1B 3-3-3	Alkaline soils in Valley and foothill grasslands Bloom June-November	**Not Present:** Suitable habitat for this plant does not occur on the site.
Potomogeton filiformis	Slender leaved pondweed	None	None	List 1B 3-2-1	Freshwater marshes Blooms May-July	**Not Present:** Suitable habitat for this plant does not occur on the site.
Grindelia hirsutula var. maritima	San Francisco gumplant	Species of Concern	None	List 1B 2-2-3	Coastal Sea bluffs, scrub, valley and foothill grasslands sandy or serpentine soils Blooms August-September	**Not Present:** Some limited habitat but not found on the site.
Arctostaphylos maontaransis	Montara manzanita	Species of Concern	None	List 1B 3-2-3	Chaparral and coastal scrub Blooms January-March	**Not Present:** Suitable habitat for this plant does not occur on the site.

TABLE 3
SENSITIVE PLANT SPECIES
KNOW TO OCCUR IN PROJECT AREA[1]
(ASCENSION HEIGHTS SUBDIVISION)

Scientific Name	Common Name	Status[2]			Blooming Season Habitat Requirements	Notes (Occurrence Potential)
		Fed	State	CNPS		
Linnanthus cruceus	Coast Yellow linanthus	None	None	List 1B 3-3-3	Coastal bluffs, prairie Blooms May	**Not Present:** Suitable habitat for this plant does not occur on the site.
Helianthella castanea	Diablo helianthella	Species of Concern	None	List 1B 2-2-3	Chaparral, oak woodland, foothill grasslands Bloom April-June	**Not Present:** Suitable habitat but was not found on site.
Layia carnosa	Beach layia	Endangered	Endangered	List 1B 3-3-3	Coastal sand dunes and scrub Bloom March-July	**Not Present:** Suitable habitat for this plant does not occur on the site.
Lessingia germanorum	San Francisco lessingia	Endangered	Endangered	List 1B 3-3-3	Costal scrub and remnant dunes Bloom June-November	**Not Present:** Suitable habitat for this plant does not occur on the site.
Amsinckia lunaris	Bent-flowered fiddleneck	Species of Concern	None	List 1B 2-2-3	Valley and foothill grasslands Bloom March-June	**Not Present:** Suitable habitat but was not found on site.
Arctostaphylos hookeri ssp. ravenii	Presidio manzanita	Endangered	Endangered	List 1B 3-3-3	Rocky serpentine slopes Bloom February-March	**Not Present:** Suitable habitat for this plant does not occur on the site.
Arctostaphylos hookeri ssp. franciscana	Franciscan manzanita	Species of Concern	None	List 1A	Coastal Scrub Bloom February-April	**Not Present:** Extinct, only in cultivation no native populations.
Arctostaphylos imbricata	San Bruno Mountain manzanita	Species of Concern	Endangered	List 1B 3-3-3	Sandstone outcrops in chaparral and coastal scrub. Bloom February-May	**Not Present:** Suitable habitat for this plant does not occur on the site.
Astragalus tener var. tener	Alkali milk-vetch	Species of Concern	None	List 1B 3-2-3	Vernal pools and playas in valley and foothill grasslands Bloom March-June	**Not Present:** Suitable habitat for this plant does not occur on the site.
Chorizanthe robusta var. robusta	Robust spine-flower	Endangered	None	List 1B 3-3-3	Coastal sandy terraces and bluffs Bloom April-September	**Not Present:** Suitable habitat for this plant does not occur on the site.
Horkelia cuneata ssp. sericea	Kellogg's horkelia	Species of Concern	None	List 1B 3-3-3	Openings in coastal scrub, chaparral, and closed cone coniferous forest, Bloom April-September	**Not Present:** Suitable habitat for this plant does not occur on the site.

TABLE 3
SENSITIVE PLANT SPECIES
KNOW TO OCCUR IN PROJECT AREA[1]
(ASCENSION HEIGHTS SUBDIVISION)

[1] Project Area: California Natural Diversity Data Base (CNDDB) search of the following U.S.G.S 7.5 minute quad maps (April, 2001).

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- Woodside

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Species of Concern = an informal term that refers to those species that the U.S. Fish and Wildlife Service believe might be declining or be in need of concentrated conservation actions to prevent decline**.**

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Rare = Any native species, although not presently threatened with extinction, is in such small numbers throughout its range that it may become endangered if its present environment worsens.
Candidate = Any taxon that has been officially noticed by the California Fish and Game Commission as being under review for addition to the rare, threatened, or endangered species list.

CNPS (California Native Plant Society); Inventory of Rare and Endangered Vascular Plants of California, Special Publication No. 1/ Fifth Edition / February 1994.

List 1A = Plants believed to be extinct in California
List 1B = Plants Rare, Threatened, or Endangered in California and Elsewhere.
R-E-D Code = Raiety-Endangerment-Distrabution

Rariety: 1= Rare, but found in sufficient numbers and distributed widely enough that the potential for extinction is low at this time.
2= Distributed in limited numbers of occurrences, occasionally more if each occurrence is small.
3= Distributed in one to several highly restricted occurrences, or present in such small numbers that it is seldom reported.

Endangerment: 1= Not Endangered.
2= Endangered in a portion of its range.
3= Endangered throughout its range.

Distribution: 1= More or less widespred outside California.
2= Rare outside of California.
3= Endemic to California.

REPORT ON
THOMAS SUBDIVISION (ASCENSION HEIGHTS)
1542 BEL AIRE, SAN MATEO, CALIFORNIA

Prepared For
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August 18, 2003

Mayne Tree Expert Company, Inc.

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RICHARD L. HUNTINGTON
PRESIDENT

KEVIN R. KIELTY
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August 18, 2003

Attn: Geoff Reilly
Christopher A. Joseph & Associates
Environmental Planning and Research
35640 Fremont Blvd., Ste 185
Fremont, CA 94536

Re: Thomas Subdivision (Ascension Hts.) 1542 Bel Aire, San Mateo, CA

Dear Mr. Reilly:

On August 8 through 14, 2003, I made visits to the above 13.3 acre site for the purpose of inspecting and commenting on the trees. All trees 6 inches in diameter at 4.5 feet above ground level were included in this report.

Method:

The trees over 6 inches in diameter were located on a map provided by you. Each tree was given an identification number which was inscribed on a metal foil tag and nailed to the tree at eye level where possible. Then the trees were measured for diameter at 4.5 feet above ground level. Where it was not possible to nail up a tag, a yellow ribbon was placed and the trunks were measured at 4.5 feet. If this was not possible, the diameters were estimated. The trees were then given a condition rating for form and vitality based on the following system.

0-29 ...Very poor

30-49 ... Poor

50-69 ... Fair

70-89 ...Good

90-100 .. Excellent

TABLE OF CONTENTS

Each tree was then given a height measurement which was estimated and is not considered exact.

1 = 1-10	6 = 61-70
2 = 21-30	7 = 71-80
3 = 31-40	8 = 81-90
4 = 41-50	9 = 91-100
5 = 51-60	10 = 100 +

Lastly, a "Comments" section is provided for each tree.

Note: Heavy poison oak on site and thick foliage to the ground made tagging and exact measurement of every tree impossible. Approximately 16 percent of the trees have an estimated DBH.

CHRISTOPHER JOSEPH TREE SURVEY (Thomas Subdivision)

Tree No.	Species	DBH (Inches)	Condition (Percent)	Height (Feet)	Comments
1	Monterey pine	23.4	65	4	Tree has fair vigor. Abundance of deadwood.
2	Monterey pine	23.2	65	4	Tree has fair vigor. Abundance of deadwood.
3	Monterey pine	24. Est.	65	4	**Caution.** Yellow jacket nest at base.
4	Monterey pine	22.2	65	4	Good vigor. Abundance of deadwood.
5	Monterey pine	28 Est.	60	4	No access due to fencing.
6	Monterey pine	28 Est.	65	4	No access due to fencing.
7	Monterey pine	30 Est.	60	4	No access due to fencing. Abundance of deadwood.
8	Coast live oak	10-11 Est. @ 2'	60	4	V-shaped crotch at base. Abundance of lower deadwood.
9	Monterey pine	28.9	45	6	Abundance of deadwood. Tree has poor vigor: appears to be water deprived.
10	Coast live oak	15.9 @ 1'	65	3	V-shaped crotches with oozing from trunks.
11	Monterey pine	28.9, 20.6	60	5	Abundance of deadwood. Poor crotch at base.
12	Monterey pine	13.4	40	2	Scar at 8'. Grown in shade of No. 11.
13	Monterey pine	12.2-10.3	55	3	V-shaped crotches at base. Abundance of deadwood.
14	Stone pine	19.9 – 9.4	50	2	V-shaped crotch at base. Abundance of deadwood.
15	Coast live oak	10.1	80	2	Good form and vigor.
16	Coast live oak	6.1	70	2	Leans southwest.
17	Coast live oak	6.9 @ 3'	55	1	V-shaped crotch at 4'. Bleeding canker at that point.
18	Coast live oak	6.3 @ 3'	80	2	Good crotch formation. Good vigor.
19	Coast live oak	18.0 @ Base Est.	45	3	V-shaped crotches at base. Abundance of lower deadwood.

CHRISTOPHER JOSEPH TREE SURVEY (Thomas Subdivision)

Tree No.	Species	DBH (Inches)	Condition (Percent)	Height (Feet)	Comments
20	Coast live oak	18.0 @ Base Est.	70	3	Abundance of poison oak at base. No tag.
21	Coast live oak	12.0 Est.	65	3	Abundance of poison oak at base. No tag.
22	Coast live oak	14 @ 3' Est.	65	2	Abundance of poison oak at base. No tag.
23	Coast live oak	16 @ 2' Est.	60	2	Abundance of poison oak at base. No tag.
24	Coast live oak	7.5	70	2	Good crotch formation.
25	Coast live oak	7.2	65	2	Lower foliage removed.
26	Coast live oak	7.7 @ 3'	60	2	V-shaped crotch at 3'.
27	Coast live oak	9.8 @ 1'	65	2	Abundance of deadwood. Lower.
28	Coast live oak	7.2	65	2	V-shaped crotch at 5'.
29	Coast live oak	7.2 @ 3'	70	2	Abundance of lower deadwood.
30	Bishop pine	8.0 Est.	65	2	Abundance of deadwood. Lower.
31	Bishop pine	6.5	65	2	Abundance of deadwood.
32	Coast live oak	8.8 @ base	55	1	V-shaped crotch @ 1'.
33	Coast live oak	6.2	60	2	Broken limb by dirt road.
34	Coast live oak	6.0 Est.	65	2	No tag. Poison oak.
35	Coast live oak	6.3	50	1	Broken limb by dirt road. Crown rot at base.
36	Coast live oak	11.0 Est.	60	3	V-shaped crotches. No tag. Poison oak at base.
37	Coast live oak	8.0 Est.	65	3	No tag. Poison oak at base.
38	Coast live oak	7.8 @ 3'	50	2	V-shaped crotches (poor).
39	Plum	12.0 Est.	65	2	None.
40	Coast live oak	6.0, 8.2	40	2	V-shaped crotch. Foliage thin. Ivy on trunk.
41	Coast live oak	6.4	55	1	Stunted growth. Tree is short for DBH.

CHRISTOPHER JOSEPH TREE SURVEY (Thomas Subdivision)

Tree No.	Species	DBH (Inches)	Condition (Percent)	Height (Feet)	Comments
42	Coast live oak	20.0 Est.	75	3	Good crotch formation. No tag. Poison oak.
43	Coast live oak	20.0 Est.	70	2	No tag, poison oak at base.
44	Plum	7.0 @ 3'	65	3	Western gall rust disease on low limbs.
45	Coast live oak	9.2 @ 7'	60	2	Bleeding canker.
46	Monterey pine	7.4	60	2	Leans southwest. In shade of No. 42.
47	Monterey pine	8.1	60	2	Grown in shade of No. 48.
48	Coast live oak	4.0 @ 25' Est.	55	2	Multiple V-shaped crotches at 3'.
49	Coast live oak	11.4	65	3	Abundance of lower deadwood.
50	Coast live oak	6.0, 8.0, 6.0 Est.	60	2	Abundance of lower deadwood.
51	Coast live oak	12.6	70	2	Abundance of lower deadwood.
52	Coast live oak	10.8	70	3	Abundance of lower deadwood.
53	Coast live oak	5.4, 5.8	60	3	V-shaped crotch at base.
54	Coast live oak	21.0 Est.	65	2	Poison oak at base. No tag.
55	Coast live oak	14.0, 14.0 Est.	60	2	Poison oak at base. No tag.
56	Coast live oak	18.0, 12.0 Est.	55	2	Poison oak at base. No tag.
57	Coast live oak	5.9, 6.6	45	2	V-shaped crotch at base.
58	Monterey pine	12.1	65	3	Foliage to the ground.
59	Monterey pine	10.0 Est.	50	2	Infested with western gall rust.
60	Monterey pine	38.7	60	5	V-shaped crotch at 8'. Abundance of deadwood.
61	Monterey pine	24.7	65	5	Foliage on west side only. Red turpentine bark beetles present.
62	Monterey pine	30.3	65	4	All foliage on west side. Red turpentine bark beetles present.

CHRISTOPHER JOSEPH TREE SURVEY (Thomas Subdivision)

Tree No.	Species	DBH (Inches)	Condition (Percent)	Height (Feet)	Comments
63	Monterey pine	20.8	60	4	Trunk leans south, then straight.
64	Monterey pine	27.0	65	4	Slight lean to southeast. Abundance of deadwood.
65	Monterey pine	24.1	55	4	Foliage thin on top. Leans slightly east.
66	Monterey pine	28.2	50	4	Foliage thin. Abundance of deadwood.
67	Monterey pine	33.3	45	4	V-shaped crotch at 6'. Trunk damage from bark beetles on driveway side.
68	Monterey pine	21.4	50	4	Trunk damage on drive side. Root damage from vehicles entering water tank area.
69	Monterey pine	27.8	66	4	Abundance of deadwood. Girdling limb.
70	Monterey pine	28.4	50	3	Abundance of deadwood. Leans north.
71	Monterey pine	34.1	55	4	Abundance of deadwood. Foliage to east side.
72	Monterey pine	25.5, 17.3	50	4	Abundance of deadwood. V-shaped crotch.
73	Monterey pine	27.0	40	3	Red turpentine bark beetle present. Abundance of deadwood.
74	Monterey pine	18.7, 14.2	45	4	Foliage sparse, beetles present.
75	Monterey pine	22.5	55	4	Double trunk at 12'. The crotch is fine, but the trunks twist.
76	Monterey pine	57.9 @ Base	65	4	Multi-trunked at 2'. Abundance of deadwood.
77	Monterey pine	25.1	60	4	V-shaped crotch. Abundance of deadwood.
78	Monterey pine	25.0	65	4	Grown in shade of No. 77. Top leans southeast.
79	Monterey pine	26.2	65	4	Foliage predominates on southeast side.
80	Monterey pine	31.0	65	4	Abundance of deadwood.
81	Monterey pine	28.1 @ Base	55	4	Abundance of deadwood.

CHRISTOPHER JOSEPH TREE SURVEY (Thomas Subdivision)

Tree No.	Species	DBH (Inches)	Condition (Percent)	Height (Feet)	Comments
82	Monterey pine	24.2	50	4	Sweep in trunk at 18'.
83	Monterey pine	30.5 @ 2'	55	4	Beetle damage at base.
84	Monterey pine	26.8 @ 2'	55	4	Multi V-shaped crotch at 6'.
85	Monterey pine	20.3 @3'	40	3	Foliage thin. Red turpentine bark beetle present.

Note: Trees 78-85 have fire damage on the southeast trunks.

Tree No.	Species	DBH (Inches)	Condition (Percent)	Height (Feet)	Comments
86	Monterey pine	18.8	60	4	Sweep in trunk.
87	Monterey pine	26.2 @ 3'	65	4	Foliage is good.
88	Monterey pine	23.9	60	4	Tree leans east towards tank.
89	Blue gum eucalyptus	30.0	65	5	Grown in shade of No. 90. Heavy to west.
90	Blue gum eucalyptus	44.6	70	7	Heavy lateral limbs.
91	Blue gum eucalyptus	14.4, 21.1	55	5	Grown in shade of No. 90. Foliage sparse.
92	Blue gum eucalyptus	54.5	70	6	Good limb structure. Laterals long and heavy.
93	Blue gum eucalyptus	29.8, 18.3	55	7	Girdling trunk. Abundance of deadwood.
94	Blue gum eucalyptus	25.7	50	6	Abundance of deadwood.
95	Blue gum eucalyptus	26.0 Est.	45	3	Abundance of deadwood. Poison oak at base. No tag.
96	Blue gum eucalyptus	30.0, 28.0 Est.	55	6	Poison oak at base. No tag.
97	Blue gum eucalyptus	22.5	60	7	No foliage up until 40'.
98	Blue gum eucalyptus	33.0	65	7	Some deadwood. Good crotch spacing.
99	Blue gum eucalyptus	43.6	65	7	Large crotch at 15'. Heavy lateral limbs.
100	Blue gum eucalyptus	50.0 Est.	70	5	Poison oak at base. Heavy lateral limbs.
101	Blue gum eucalyptus	54.9	70	7	Good foliage and vigor. Heavy lateral limbs.

CHRISTOPHER JOSEPH TREE SURVEY (Thomas Subdivision)

Tree No.	Species	DBH (Inches)	Condition (Percent)	Height (Feet)	Comments
102	Blue gum eucalyptus	28.6 @ 2'	45	4	Pruned in past. Tight, V-shaped crotch.
103	Blue gum eucalyptus	22.0	45	5	Cavity at base (fire scar). Foliage thin.
104	Blue gum eucalyptus	25.8	45	6	Multiple trunks. Past topping has left watersprout type growth.
105	Blue gum eucalyptus	22.0	60	6	Foliage thin.
106	Blue gum eucalyptus	13.2	50	4	Foliage thin.
107	Blue gum eucalyptus	16.8, 19.5	35	7	Tree split years ago. Has fallen into No. 104.
108	Blue gum eucalyptus	31.2	10	8	No foliage until tree reaches 30'.
109	Blue gum eucalyptus	26 Est.	60	7	Foliage thin, deadwood. Abundant poison oak.
110	Blue gum eucalyptus	32 Est.	65	8	Poison oak up to 10'.
111	Blue gum eucalyptus	30 Est.	60	7	Poison oak up to 18'.
112	Blue gum eucalyptus	30 Est.	65	7	Dead stubs from broken limbs. Poison oak on trunk.
113	Blue gum eucalyptus	30.4	65	6	Foliage sparse up to 40'.
114	Blue gum eucalyptus	19.0	70	6	Foliage has good vigor. Some deadwood.
115	Blue gum eucalyptus	29.0 @ Base	60	5	Multi-trunk. V-shaped crotches.
116	Blue gum eucalyptus	27.4	50	5	V-shaped crotches. Foliage thin. Abundance of deadwood.
117	Blue gum eucalyptus	17.4, 16.3	55	6	V-shaped crotch at 3'. Some deadwood.
118	Blue gum eucalyptus	23.0	60	7	Tall for DBH.
119	Blue gum eucalyptus	44.6 @ 1'	55	7	Fire scarred bark. Multi-trunked.
120	Blue gum eucalyptus	42.0	50	7	V-shaped crotches.
121	Blue gum eucalyptus	29.0 Est.	50	7	Foliage thin up until 40'.

CHRISTOPHER JOSEPH TREE SURVEY (Thomas Subdivision)

Tree No.	Species	DBH (Inches)	Condition (Percent)	Height (Feet)	Comments
122	Blue gum eucalyptus	28, 23 @ 2'	50	6	Tree No. 123 has fallen into this tree.
123	Blue gum eucalyptus	16.3	30	5	Has fallen into No. 122.
124	Blue gum eucalyptus	13.1	50	5	Thin, V-shaped crotch at 50'.
125	Blue gum eucalyptus	13.0	50	6	Thin, V-shaped crotch at 30'.
126	Blue gum eucalyptus	36.0	55	6	Thin V-shaped crotch at 30'.
127	Blue gum eucalyptus	54.5 @ Base	65	6	Foliage has good vigor.
128	Blue gum eucalyptus	29.5	10	6	Nearly dead.
129	Blue gum eucalyptus	6.0, 11.8	35	3	Multi-trunked, half dead.
130	Blue gum eucalyptus	15.9, 16.6	55	6	V-shaped crotch at 1'.
131	Blue gum eucalyptus	14.4 @ 3'	50	5	V-shaped crotch at 4'. Thin foliage canopy.
132	Blue gum eucalyptus	11.0	45	5	Top dead, foliage is sparse.
133	Blue gum eucalyptus	13.4	40	4	Top dead, foliage is sparse.
134	Blue gum eucalyptus	46.9 @ 3'	70	7	Codominant leaders at 5' feet. Crotch formation is fair.
135	Blue gum eucalyptus	19.2, 16.8	50	4	Top dead, foliage is thin.
136	Blue gum eucalyptus	43.3 @ 2.5	60	6	Leans southeast. Heavy lateral limbs to southeast.
137	Blue gum eucalyptus	48.2	65	7	Some pruning done in past. Balance good.
138	Blue gum eucalyptus	35.1 @ Base	55	6	V-shaped crotch at 2'.
139	Blue gum eucalyptus	16.1	60	6	Tall for DBH.
140	Blue gum eucalyptus	14.8	60	6	Tall for DBH.
141	Blue gum eucalyptus	9.2	60	3	Grown in shade of No. 140.
142	Blue gum eucalyptus	16.0 Est.	55	6	Tall for DBH.

CHRISTOPHER JOSEPH TREE SURVEY (Thomas Subdivision)

Tree No.	Species	DBH (Inches)	Condition (Percent)	Height (Feet)	Comments
143	Blue gum eucalyptus	13.2	60	6	Foliage is sparse.
144	Blue gum eucalyptus	16.9	60	6	Foliage is sparse.
145	Blue gum eucalyptus	19.6	65	7	Crotch and limbs spacing is good.
146	Blue gum eucalyptus	40.2	65	6	Pruned in past. V-shaped crotch at 8'.
147	Blue gum eucalyptus	11.4	60	5	Topped in past.
148	Blue gum eucalyptus	12.0	65	5	Topped in past.
149	Blue gum eucalyptus	12.9	60	4	Tall for DBH.
150	Blue gum eucalyptus	11.0	60	4	Tall for DBH.
151	Monterey pine	11.8	40	3	Foliage is thin.
152	Monterey pine	11.7	45	3	Foliage is thin.
153	Monterey pine	11.1	50	3	Foliage is thin.
154	Arizona cypress	9.0	55	3	Leans southeast. Abundance of deadwood.
155	Monterey pine	11.2	50	3	Foliage is thin.
156	Monterey pine	13.8	50	3	Western gall rust disease present.
157	Monterey pine	13.8	55	3	Lower foliage is dead.
158	Monterey pine	11.5	50	3	Foliage is thin.
159	Monterey pine	14.6	65	3	Foliage has good color and goes to the ground.
160	Monterey pine	10.0	55	3	Foliage thin.
161	Monterey pine	12.7	60	3	Foliage color is good.
162	Monterey pine	9.0	45	3	Foliage is off-color.
163	Monterey pine	14.5	50	3	Foliage is off-color, sparse.
164	Monterey pine	15.6	60	3	Leans southwest slightly.

CHRISTOPHER JOSEPH TREE SURVEY (Thomas Subdivision)

Tree No.	Species	DBH (Inches)	Condition (Percent)	Height (Feet)	Comments
165	Monterey pine	15.2	55	3	Foliage is sparse.
166	Monterey pine	12.3	55	3	Foliage is sparse.
167	Coast live oak	2.0. 6.0, 4.0 Est.	60	2	V-shaped crotches at base.
168	Coast live oak	18.0, 6.0 Est.	65	2	V-shaped crotch at base.
169	Coast live oak	14.0 @ Base Est.	70	1	None.
170	Stone pine	18.0 @ Base Est.	65	2	Poison oak at base.
171	Coast live oak	20.0 @ Base Est.	60	2	V-shaped crotch at base. Poison oak at base.
172	Coast live oak	18.0 @ Base Est.	60	2	V-shaped crotch at base. Poison oak at base.
173	Coast live oak	20.0 @ Base Est.	60	2	3 codominant leaders at base, V-shaped crotch.
174	Coast live oak	7.5	55	1	Deadwood at base.
175	Lombardy Poplar	20.0 @ Base Est.	65	3	Multi-trunked from base.
176	Monterey pine	11.9	60	2	Foliage thin. Tree is water stressed.
177	Monterey pine	19.9	65	3	Long lateral limbs.
178	Monterey pine	28.0 @ Base Est.	45	2	Foliage is sparse.
179	Canary Island pine	7.2	45	2	Foliage is thin.
180	Canary Island pine	8.8	45	2	Foliage is thin.
181	Monterey pine	15.2	40	3	Bark beetles at base. Borers on trunk.
182	Red iron bark Eucalyptus	8.2	40	2	Leans east.

CHRISTOPHER JOSEPH TREE SURVEY (Thomas Subdivision)

Tree No.	Species	DBH (Inches)	Condition (Percent)	Height (Feet)	Comments
183	Red iron bark eucalyptus	10.0 @ Base Est.	45	2	Abundance of deadwood.
184	Red iron bark eucalyptus	10.0, 10.7	60	2	Kept trimmed by utility company.
185	Red iron bark eucalyptus	8.2	55	2	Leans east.
186	Red iron bark eucalyptus	12.1	60	2	Foliage color is good.
187	Red iron bark eucalyptus	8.8, 6.6	55	2	V-shaped crotch at base. Foliage has good color.
188	Red iron bark eucalyptus	9.4	45	2	Tree topped by line clearance.
189	Monterey pine	7.0	60	2	Pruned for line clearance.
190	Red iron bark eucalyptus	13.3	55	2	Pruned for line clearance.
191	Red iron bark eucalyptus	11.2	50	2	Pruned for line clearance.
192	Aleppo pine	33.9	55	4	V-shaped crotch at base. Trimmed by utility company.
193	Monterey pine	18.8	60	4	Foliage color is good.
194	Aleppo pine	13.3, 17.7	45	3	Topped for utilities.
195	Red iron bark eucalyptus	19.5	50	3	Topped for utilities.
196	Red iron bark eucalyptus	10.3	45	2	Poor form.
197	Red iron bark eucalyptus	12.0 Est.	60	2	Ivy up to 15'.
198	Red iron bark Eucalyptus	12.0 Est.	60	2	Ivy up to 15'.

CHRISTOPHER JOSEPH TREE SURVEY (Thomas Subdivision)

Tree No.	Species	DBH (Inches)	Condition (Percent)	Height (Feet)	Comments
199	Red iron bark eucalyptus	12.0 Est.	60	2	Ivy to 15'.
200	Coast live oak	10.0 Est.	60	2	Ivy to 15".
201	Monterey pine	10.8, 6.3	65	3	V-shaped crotches. Foliage is sparse.
202	Coast live oak	11.0 @ Base Est.	60	2	V-shaped crotches at base. Foliage to ground.
203	Monterey pine	12.0	55	3	Pine pitch canker present and western gall rust.
204	Toyon	13.0 @ Base Est.	65	2	Large for species, just large shrub. No tag.
205	Toyon	12.0 @ Base Est.	60	1	Large for species, just large shrub. No tag.
206	Toyon	10.0 @ Base Est.	60	1	Large for species, just large shrub. No tag.
207	Coast live oak	14.0 @ Base Est.	65	2	No tag. Poison oak at base.
208	Coast live oak	5.5	75	2	Good crotch formation.
209	Coast live oak	8.0	70	2	V-shaped crotch at 5'. Poison oak to top.
210	Coast live oak	9.0 Est.	70	2	V-shaped crotch at 5'. Poison oak to top.
211	Coast live oak	11.0 Est. @ 2'	60	2	Severe V-shaped crotch at 3'.
212	Monterey pine	11.0	60	3	Abundance of deadwood on lower trunk.
213	Monterey pine	8.9, 11.6	55	3	V-shaped crotch at base. Abundance of lower deadwood.
214	Monterey pine	8.9	50	3	Western gall rust on lower limbs.
215	Monterey pine	7.2	55	3	Red turpentine bark beetle at base.
216	Italian stone pine	14.2	60	3	V-shaped crotch at 6'.

CHRISTOPHER JOSEPH TREE SURVEY (Thomas Subdivision)

Tree No.	Species	DBH (Inches)	Condition (Percent)	Height (Feet)	Comments
217	Italian stone pine	11.3	75	2	Good crotch formation for species.
218	Coast live oak	21.1 @ 2'	55	2	Poor crotch at 3'. Abundance of deadwood. Cryptocline on lower leaves.
219	Coast live oak	14.0 Est.	60	1	Trimmed for road access. Poor crotches.
220	Coast live oak	10.0 @ Base Est.	60	1	Foliage to ground.
221	Coast live oak	12.0 @ Base Est.	60	2	Poor crotches. Poison oak to top.
222	Coast live oak	6.8	55	1	V-shaped crotch.
223	Toyon	8.0 @ Base	65	1	V-shaped crotches. Tree is just large shrub.
224	Monterey pine	6.2	65	2	Inner needles are browning.
225	Coast live oak	8.0 Est.	70	1	Stunted growth. Poison oak at base.

Summary:

The 13.3 acres known as The Ascension Heights Subdivision is a mix of native trees and shrubs and exotic trees which are not native to this location in San Mateo County. The trees on site, native and imported, suffer from poor soils, lack of irrigation (non-natives) and weather extremes (wind). Many of the trees are disfigured and many have limbs which are denuded. Some of the trees have foliage to the ground which results in a large shrub-type form. The site is overrun with poison oak and greasewood. The Monterey pines suffer from lack of irrigation and poor soils. The eucalyptus on site have below average vigor, but are surviving well. Natives include coast live oaks and toyons. The stone pines seem to exist well in the dry poor soil.

None of the trees on this site appear to be excellent specimens. Although there are many small diameter oaks on site, none of the trees seem worthy of the time and effort to transplant. In addition, according to the County of San Mateo Tree Ordinances, none of the trees on the site qualify as Heritage Trees.

The Monterey pines may be retained during construction as a property barrier. If this is the case, irrigation will be required to maintain the trees. The Monterey pines are not good specimens and suffer from bark beetles, pine pitch canker and western gall rust disease. If planting in the proposed construction areas is planned. I strongly suggest native materials be used, with coast live oaks being the dominant trees. These drought resistant trees require irrigation while they are immature. The blue gum eucalyptus grove will require constant maintenance to keep it in a safe, relatively hazard free form. Blue gum eucalyptus will always be a fire hazard. Replacement of these trees with native specimens is strongly suggested.

To sum up my remarks, the trees on this site cannot be considered impressive, although they do provide excellent animal habitat.

I believe this report is accurate and based on sound arboricultural principles and practices.

Sincerely,

Kevin R. Kielty
Certified Arborist WC #0476

KRK:dcr

Encls.

INTERNATIONAL SOCIETY OF ARBORICULTURE
KEVIN KIELTY
No. WC-0476
CERTIFIED ARBORIST

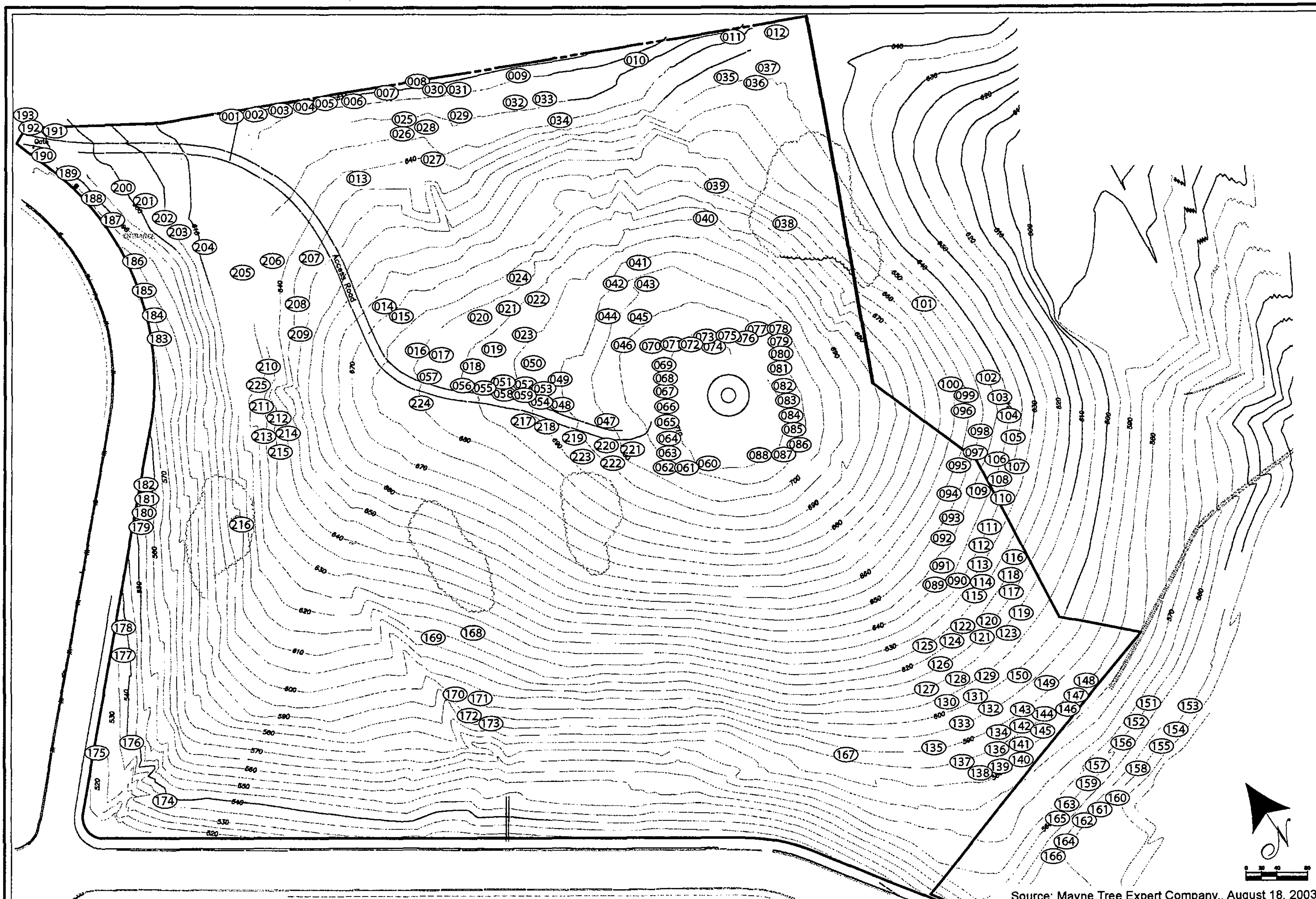
INSECTS AND DISEASES ON SITE
(Mentioned in Report)

Insect	Host
Red turpentine bark beetle	Pines
Bark borers	Oaks and pines

Disease	Description	Host
Cryptocline	Leaf fungus	Oaks
Pine pitch canker	Heavy sap flow, limb death	Pines
Western gall rust	Fungus causing galls on limbs and cankers on trunks.	Pines
Bleeding canker	Fungus or bacteria causing fluid to bleed through bark after killing tissues	Oaks and toyons
Crown rot	Decay at base of tree and in roots (root rot). Caused by fungus	Oaks

GLOSSARY

DBH	Diameter of tree trunk at 4.5 feet above ground.
Deadwood	Limbs or branches which have died.
Girdling	When material restricts growth of trunks, limbs or roots.
Oozing	When fluid bleeds through trunk or limbs.
Sweep in trunk	Bending or twisting of trunk or limbs.
Vigor	Healthy look to leaves (not wilted).
V-shaped crotch	When two or more leaders on a tree join at a sharp angle, causing a great chance of tree failure.
Water deprived	Trees which are stressed due to lack of water.



CHRISTOPHER A. JOSEPH & ASSOCIATES
Environmental Planning and Research

Figure IV.L-1
Tree Map

PLN2002-00517

San Mateo real estate inc.

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September 21, 2005

David Holbrook
San Mateo County Planning Dept.
455 County Center
2nd Floor
Redwood City, CA 94063

Dear David,

Enclosed is a copy of the Biologist's report for the Ascension Project. As you will read, he conducted a survey to determine the presence of a Mission Blue Butterfly on the property. He did not find any and submits the results of his field survey.

I look forward to seeing you next Wednesday the 28th.

Very Truly Yours,

Dennis Thomas

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www.TRAenviro.com

Dennis Thomas
San Mateo Real Estate
1777 Borel Place, Suite 330
San Mateo CA 94402

September 15, 2005
TRA Case: BBIO

Subject: *Results of Mission blue butterfly surveys at Ascension Heights Project Area, San Mateo, California.*

Dear Mr. Thomas:

Attached are the results of the Mission blue butterfly surveys I conducted on your property in spring 2005. Please feel free to contact me at the office if you have any questions.

Sincerely,

Patrick Kobernus
Senior Biologist

Summary

In the spring of 2005, I assessed the undeveloped property at the corner of Bel Aire Road and Ascension Drive in the town of Highlands, California, in unincorporated San Mateo County, for the federally endangered Mission blue butterfly (*Plebejus (Icaricia) icaroides missionensis*). A residential development, the Ascension Heights Project, is proposed for part of the site. Prior to conducting the surveys, I conducted research by consulting the California Natural Diversity Database for historical occurrences of Mission blue butterflies and communicated with local experts Stuart Weiss and Bob Langston, both of whom have conducted surveys for Mission blue and Pardalis blue butterflies (*Plebejus (Icaricia) icaroides pardalis*) in the San Mateo/ Crystal Springs area. The Pardalis blue butterfly is a relatively common butterfly that does not have protected status and is found in areas surrounding the known range of the Mission blue butterfly. The results of my field surveys and research indicate that the site is most likely occupied by a very small colony of Pardalis blue butterfly. This conclusion is based on the phenology of the host plants (*L. formosus*) present on site, the known geographic range of Mission blue and Pardalis blue butterflies, and the presence of significant barriers (residential development, freeways, and forests) between the nearest known location of Mission blue butterflies and the project site. No adult butterflies were observed on site during the course of my surveys.

Introduction

I assessed the property at the corner of Bel Aire Road and Ascension Drive in the town of Highlands for Mission blue butterflies between March 24 – and June 24, 2005. I also conducted research by consulting the California Natural Diversity Database for historical occurrences of Mission blue butterflies and communicated with local experts Stuart Weiss and Bob Langston, both of whom have conducted surveys for Mission blue and Pardalis blue butterflies in the San Mateo/ Crystal Springs area. I also made three (unreturned) phone calls to Chris Nagano with the US Fish and Wildlife Service over the course of these surveys.

As the Habitat Manager for the San Bruno Mountain Habitat Conservation Plan, I have conducted surveys for Mission blue butterfly annually during its flight season for the past 10 years (1995-2005). I have also conducted surveys for Mission blue in the Skyline, Gypsy Hill, and Sweeney Ridge areas. My qualifications are shown in Appendix A.

Setting

The project site is located at the corner of Bel Aire Road and Ascension Heights Drive in the town of Hillside, in unincorporated San Mateo County, California (Figure 1). The surrounding area is primarily residential development and Fish and Game open space lands (Crystal Springs). The project site is approximately 1.4 miles northwest of the junction between Highways 92 and 280.

Background

The Mission blue butterfly is a federally listed endangered species. Mission blue habitat consists of open grassland habitats that provide the appropriate larval host plants and adult nectar plants to support the species. Habitats where Mission blues are found include native and non-native grasslands and disturbed roadcuts. The species uses three larval host plants, all of which are perennial lupines: silver lupine (*Lupinus albifrons var. collinus*), summer lupine (*Lupinus formosus var. formosus*), and varied lupine (*Lupinus variicolor*). At least one of these lupine species needs to be present for Mission blues to reproduce and persist. A sizeable patch of lupines with approximately 50 – 100 plants, with other habitat patches within ¼ mile are needed for this species to persist in an area (San Mateo County, 1982; and personal observations). Mission blues may use a variety of nectar plants in any given area. Favored nectar plants include coastal buckwheat (*Eriogonum latifolium*), California Phacelia (*Phacelia californica*), golden aster (*Heterotheca bollanderi*), California horkelia (*Horkelia californica*), and a variety of native and non-native thistles.

The mission blue butterfly is one of several subspecies of the Boisduval's blue (*Plebejus (Icaricia) icaroides*). The Mission blue subspecies is limited in its distribution to the coastal fogbelt of Pacifica, San Francisco, and the Marin headlands. The species is currently found on San Bruno Mountain, Twin Peaks, Milagra Ridge, Montara Mountain and associated ridgelines, and in the Marin headlands. These areas are strongly influenced by summertime fog. The Pardalis blue (*Plebejus (Icaricia) icariodes pardalis*), is a similar looking subspecies that is much more widespread and does not have protected status, whose geographic range surrounds that of the Mission blue. Pardalis blues are found in grassland habitats immediately north and south of the Mission blue habitats, and it's distribution includes Santa Clara County to the south, Contra Costa and Alameda Counties to the east, and Marin and Sonoma Counties to the north (Howe, et al, 1975). The two subspecies appear to overlap in distribution in the Tennessee Valley area of Marin County on the north, and in the Crystal Springs area of San Mateo County on the south (personal communication Summer Lindzey, Bob Langston, and Stuart Weiss).

Pardalis blues use some of the same host plants as the Mission blue and are very similar in appearance. The two subspecies have been differentiated from one another by lepidopterists by the color of the females. Pardalis females are brown (mouse gray) in color, whereas Mission blue females often have blue, and this form is referred to as the "pheres" phenotype. Mission blue females can also be all brown, and this form is referred to as the "pardalis" phenotype (Personal communication Bob Langston). Pardalis and Mission blue males are identical in coloration. Timing of emergence, flight season, and diapause are also likely different for each subspecies due to the different climates in which they are found. The Pardalis blue utilizes over a dozen varieties of lupines over its wide range in California. At Point Richmond, Pardalis blues utilize a specific variety of *L. formosus* that is bigger and taller than the *L. formosus* found on San Bruno Mountain (personal communication Bob Langston).

Optimum weather for observing Mission blue butterflies is in temperatures above 20 C, and wind speeds below 5 mph. These butterflies can be observed in conditions outside of this range, such as on warm, windy days; or slightly cool days with low wind. Both Pardalis and Mission blues are typically observed on or hovering over their host plants, or within tens of feet of their host plants, sometimes nectaring or chasing one another or other butterflies.

Methods

The site was surveyed for vegetation types in February 2004, and a vegetation map was created for the site. At that time perennial lupines were identified (several *Lupinus formosus* plants and one *Lupinus albifrons var. albifrons* on site. These plants were found occurring only in an approximately 1 acre area located on previously graded slopes on the northwest corner of the property at the corner of Bel Aire Road and Ascension Drive (Figures 3 and 4). These cut slopes, created at some point in the 1950's, have sections that are severely eroded. Disturbed, eroded slopes are often colonized by lupines because they are an early successional species. No other areas of the property were found to contain perennial lupines.

The site was surveyed for Mission blue butterflies on five days during the spring of 2005 between March 24 and June 24, 2005. Weather was recorded and photos were taken on each survey date. The lupine areas were walked for approximately 30 – 45 minutes on each date. Air temperature, wind speed, and time of day were recorded on each survey date.

Results

No Mission blue or Pardalis blue butterflies were observed in the five visits made to the project site (Table 1). Two Lycaenid butterfly eggs were observed on one of the *L. formosus* plants on the June 23 site visit.

Table 1 shows the dates, weather and results of Mission blue/Pardalis blue surveys.

Date	Time	Weather	Surveyor	Results	Notes
3/24/05	9:30-10:15	Temp. 60's. Wind <5 mph Rain on day before.	PK	No Mission or Pardalis blues	*L. formosus* just leafing out.
4/18/05	2:30-3:30	Temp. 22.7 C Wind: 8.3 mph Weather warm, but windy.	PK	No Mission or Pardalis blues	*L. formosus* not blooming yet. Nectar plants in bloom.
6/16/05		Temp. Cool Wind: >5 mph Weather cool and windy.	PK	No Mission or Pardalis blues	*L. formosus* in bloom.
6/23/05	5:00 – 5:30	Temp. 30.1 C Ave. Wind 6.2 mph Weather windy and warm (fog in morning)	PK	No Mission or Pardalis blues *Observed 2 Lycaenid eggs	*L. formosus* in bloom, some going to seed.
6/24/05	10:15 – 10:45	Temp. 23 C Ave. Wind 3.0	PK	No Mission or Pardalis blues	*L. formosus* in bloom, some going to seed.

Discussion

No adult butterflies were observed on the project site, however two butterfly eggs were seen and based on their size and appearance, these could be from a variety of Lycaenidae butterflies that use lupines, including Mission blue and Pardalis blue. It is not possible to determine subspecies from eggs.

Though these results are inconclusive as to which subspecies, if either, is present on site, it is unlikely that Mission blues would be present on site based on the known distribution of Mission blue butterfly and Pardalis butterfly, the habit and phenology of the *L. formosus* plants found on site, and the existence of significant barriers between the closest recorded observation of Mission blue butterflies and the project site.

Figure 2 shows the known locations of Mission blue butterfly and Pardalis butterfly in proximity to the project site. The nearest recorded Mission blue observations (pheres phenotypes) near the project site is approximately 4 miles northwest between the Crystal Springs golf course and San Andreas Dam. These observations were made in the late 1980's or early 1990's by Stuart Weiss. The nearest recorded Pardalis blue observations were made southeast of the Highway

92/ 280 junction, approximately 1.5 miles southeast of the project site, also by Stuart Weiss (personal communication Stuart Weiss).

It is unknown if the Mission blue habitat near the San Andreas Dam area still supports Mission blues. However in-between this area and the project site is four miles of forest, highway, and residential development that is likely a significant barrier for Mission blue. Between the San Andreas Dam area and the project site there is very dense oak/bay woodland forest on the west side of Highway 280, Highway 280, and dense residential development within the cities of Millbrae, Burlingame, Burlingame Hills, Hillsborough, and the Highlands (Figure 2). It is highly unlikely that Mission blue butterflies, if still present at the Dam site, would have any potential for reaching the project area. Typically Mission blue butterflies can move up to approximately ¼ mile between habitat patches (San Mateo County, 1982).

The *Lupinus formosus* plants observed on site were different in habit and phenology of the *L. formosus var. formosus* that is utilized by the Mission blue butterfly on San Bruno Mountain and elsewhere. The plants identified on the project site were less tomentose (i.e. less hairy), more "leggy" and taller than the *L. formosus var. formosus* utilized by Mission blue on San Bruno Mountain (personal observations). It was also observed that the *L. formosus* on the project site bloomed and set seed approximately 2-4 weeks later in the season than the *L. formosus var. formosus* on San Bruno Mountain.

Mission blue butterflies that use *L. formosus var. formosus* on San Bruno Mountain are typically flying from late April to mid-June (San Mateo County, 1982-2004). In 2005, Mission blues were detected on San Bruno Mountain (within *L. formosus var. formosus* patches) on May 11, May 23, May 31, June 1, June 7, June 12, and June 13. Surveys at the project site were conducted in March, April and June. No adults were observed on the survey dates, however two Lycaenid eggs were observed on one *L. formosus* plant.

Though these results are inconclusive, it is thought that based on the phenology of the host plants on site, the known geographic distribution of Mission blue and Pardalis blue butterflies, and the existence of significant barriers between the closest recorded observation of Mission blue butterfly and the project site, that the project site is unlikely to support Mission blue butterflies. The site may support a small colony of Pardalis blue butterflies.

References

CNDDB, May 2005. California Natural Diversity Database, updated May 27, 2005. Records search for Mission blue butterfly occurrences.

Howe, W. H., and contributors, 1975. The Butterflies of North America. Doubleday and Company, Inc. Garden City, New York.

San Mateo County, 1982 – 2004. San Bruno Mountain Habitat Conservation Plan Activities Reports. Permit No. PRT-2-9818. Prepared for San Mateo County and the US Fish and Wildlife Service. Prepared by Thomas Reid Associates.

San Mateo County, 1982. Endangered Species Survey, San Bruno Mountain. Biological Study 1980 – 1981. Final Report to the San Mateo County Steering Committee for San Bruno Mountain. Prepared for San Mateo County by Thomas Reid Associates, May 1982.

Personal Communications

Bob Langston, several email communications, August and September 2005.

Stuart Weiss, several email communications, August 2005.

Summer Lindzey, SFSU Graduate student, personal communication, May 31 2005.

Figure 1. Location Map.

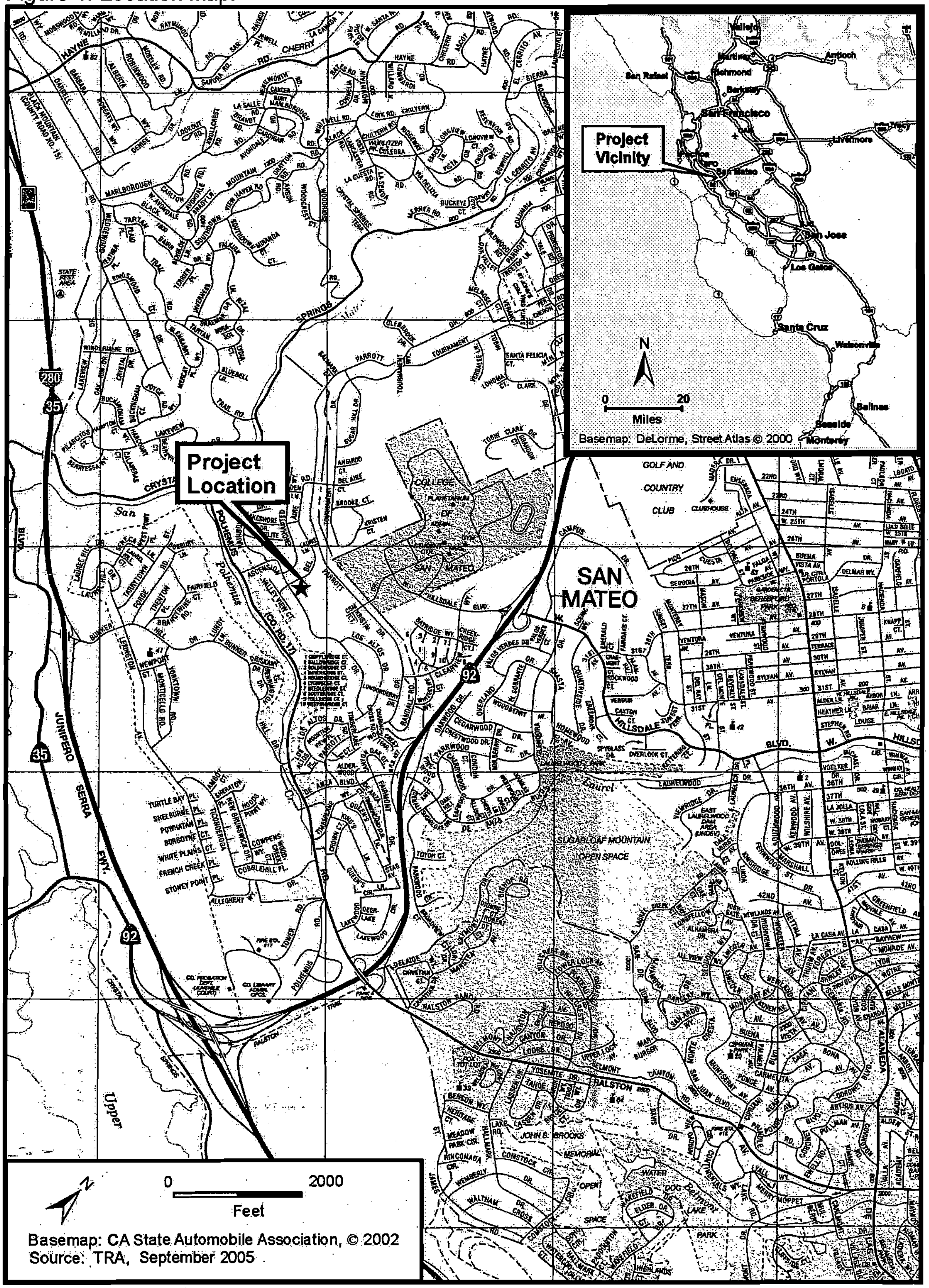
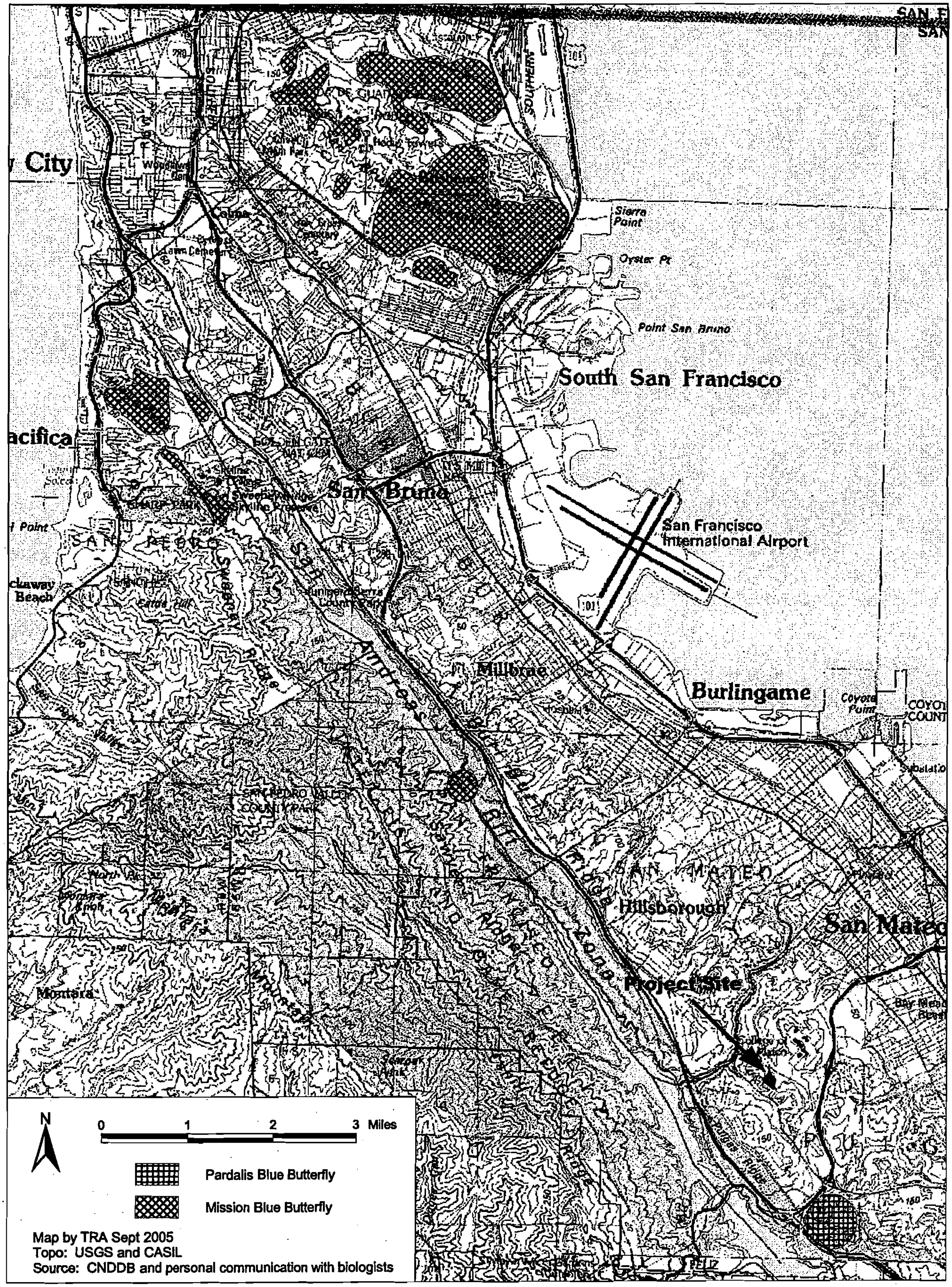


Figure 2. Mission Blue Recorded Observations Near the Ascension Heights Project Site



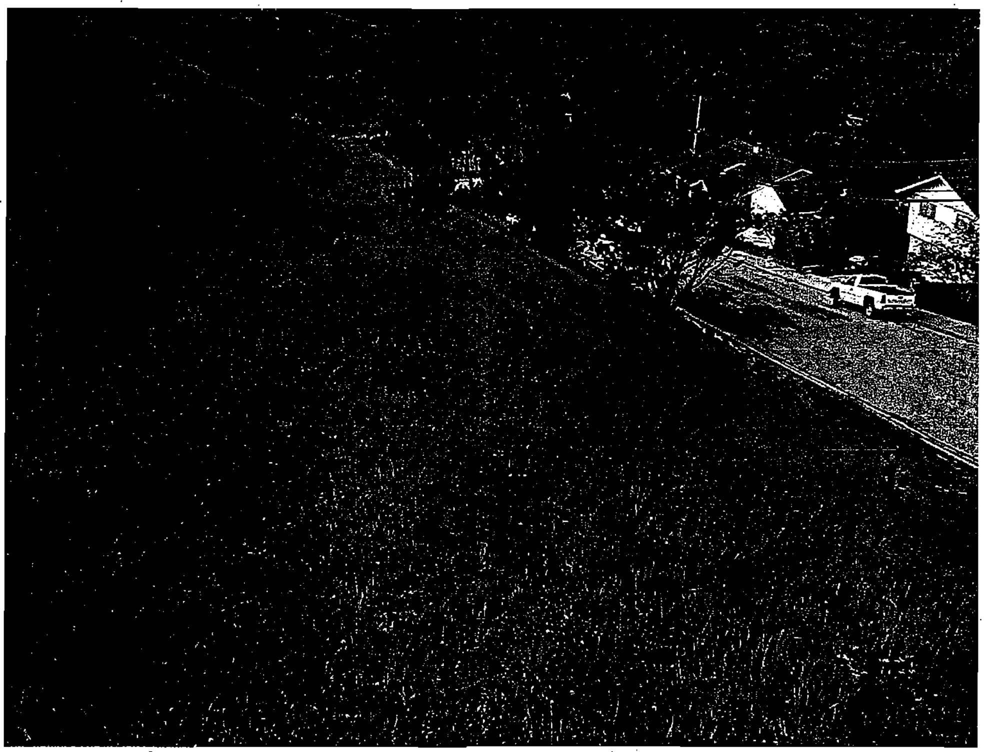


Figure 3. Cut slope along Bel Aire Road, looking west toward intersection with Ascension Drive. Approximately 100 *L. formosus* plants were found within an approximately one acre-size area on site (photo date: 3/24/05).

Figure 4. Corner of property at intersection of Bel Aire Road and Ascension Drive. Deep gullies have formed on the cut slopes, and *L. formosus* plants were found growing in the gullies (photo date: 6/24/05).

APPENDIX A: Qualifications

Patrick Kobernus (Senior Associate)

Mr. Kobernus has a Master's degree in Ecology, from California State University, Hayward, and has been an Associate with Thomas Reid Associates (TRA) since 1995. He is familiar with the status and range of many state and federally protected wildlife species, and with biological data sources such as the California Natural Diversity Database (CNDDB). Mr. Kobernus has conducted biological assessments and surveys for the Mission blue butterfly, Callippe silverspot butterfly, San Bruno elfin butterfly, Smith's blue butterfly, monarch butterfly, steelhead, southern seep salamander, California tiger salamander, California red-legged frog, burrowing owl, northern spotted owl and several rare plant species, including serpentine endemic species.

As a staff biologist for TRA, Mr. Kobernus has conducted over 100 endangered species surveys, biological impact assessments, and wetland delineations for clients in the San Francisco Bay Area. He has conducted biological surveys in San Mateo, Alameda, Contra Costa, Marin, Santa Cruz, Monterey, Santa Clara, and San Benito Counties. He has particular expertise in conducting biological assessments in streams and associated habitats in San Francisco Bay Area watersheds. He has conducted endangered species surveys and/or wetland delineations for Santa Clara Valley Water District, San Mateo County Parks and Recreation, Kaufman and Broad, Cal-Trans, and several other clients. Mr. Kobernus often works closely with developers, public utilities, government agencies, and individual homeowners in modifying projects to avoid or minimize biological impacts to sensitive species and the environment.

As a project manager for TRA, Mr. Kobernus has managed the implementation of the San Bruno Mountain Habitat Conservation Plan since 1995. He supervises field crews on the Mountain conducting monitoring for the endangered mission blue, callippe silverspot, and San Bruno elfin butterflies. He also oversees the rare plant mapping, exotics control, grazing, controlled burning, and replanting projects on the Mountain. He has conducted several presentations for local governments and academic groups on the technicalities of the San Bruno Mountain HCP, and the ongoing the management programs under his direction.

Mr. Kobernus is a trained wetland delineator in the US Army Corps of Engineers Wetland Delineation methodology (Wetland Training Institute, March, 2001). He has also received specialty training in Applied Hydric Soils (WTI, May 2003). He has assisted clients in preparing California Department of Fish and Game 1600 Streambed Alteration Agreements, and with permit applications for the US Army Corps of Engineers and for the California Regional Water Quality Control Board.

Mr. Kobernus has a diverse biological background with a focus in stream ecology. As a graduate student at Cal State University Hayward, he conducted his Master's research on assessing urbanization impacts to steelhead and other fishes in San Lorenzo Creek. He also assisted with a study on heavy metal accumulation within urban creeks (Vegetated Channels Study, 1992), and performed a study testing the toxicity of stormwater on macroinvertebrates and fish (DUST Marsh toxicity study, 1993) for Alameda County Water Resources Department. As a wildlife biologist for Gualala Redwoods in 1996 (Gualala, CA) he conducted surveys for northern spotted owls and conducted independent research on carnivores using riparian habitat. Mr. Kobernus developed and directed a program that provided hands-on experience to kids in stream ecology from 1996-1997 (San Lorenzo Creek Wildlife Hikes).

Educational Background

M.S. Ecology, California State University, Hayward, CA 1998
B.A. English, Sonoma State University, Rohnert Park, CA 1987

APPENDIX F

GEOTECHNICAL DATA

SOIL INVESTIGATION
on
PROPOSED SUBDIVISION
Northeast Corner of
Ascension Drive
and Bel Aire Road
San Mateo County, California

for

BARTHOLOMEW ASSOCIATES

By
TERRASEARCH, INC.
Project No. 4516-E
November 1979
(Revised - February 1980)

SOIL, FOUNDATION AND GEOLOGICAL ENGINEERS
TERRASEARCH INC.
1580 NORTH FOURTH STREET, SAN JOSE, CALIFORNIA 95112, ~~(408) 287-9460~~

Project No. 4516-E 12 November 1979 (Revised 15 February 1980)
Bartholomew Associates 760 Polhemus Road
San Mateo, CA 94402

SUBJECT: Proposed Subdivision Northeast Corner of Ascension Drive and Bet Aire Road
San Mateo County, California SOILS INVESTIGATION
Gentlemen:
In accordance with your authorization, TERRASEARCH INC., has conducted a soil investigation at the subject site in San Mateo County, California

The accompanying report presents our findings derived from the field investigation and laboratory testing program and our conclusions and recommendations based on these findings.

Our investigation indicates that the subsurface conditions are suitable for the proposed residential development provided the recommendations presented in this report are followed and incorporated into the project plans and specifications. Of special concern are those recommendations concerning protection and benching of slide hill slopes.

Should you have any questions or desire additional information, please contact our office at your convenience.

Very truly yours,
TERRASEARCH, INC.,

Reviewed by:
David McKee, P.E. Project Engineer

Hassan Amer, P.E. Principal Engineer

Richard Rowland, C.E.G. Senior Geologist

Copies: 4 to Bartholomew Associates

5702 MARSH DRIVE, SUITE J, PACHECO, CALIFORNIA 94553
Project No. 4516-E 12 November 1979 Revised/15 February 1980

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SOIL INVESTIGATION

Purpose and Scope

This report presents the results of our soils investigation for the proposed single-family and dual townhouse residential development. Based upon the results of our field investigation, recommendations are presented for remedial grading, pier and grade beam foundation systems, and slab on grade construction.

Site Location and Description

The subject site encompasses approximately 11 acres and is located on the north easterly corner of Ascension Drive and Bel Aire Road in San Mateo County,California.
The topography of the site is characterized by a *prominent* knoll in the middle-east portion with cut slopes descending to Bel Aire Road and Ascension Drive on west and south sides, respectively. Existing subdivisions bound the east and north sides. Maximum relief over the property is about 210 feet. Existing cut slope gradients along Ascension Drive and Bet Aire Road vary from about 1:5 to 1:8 (horizontal to vertical) and contain benches at about 20 foot intervals.
Existing structures on the property include a 40 foot diameter water tank situated upon the easterly knoll.

Vegetation observed at the time of drilling included weeds and brush throughout, and a relatively dense grove of eucalyptus trees located along the southeasterly boundary.

The site location and description contained herein are based on a site reconnaissance by the Soil Engineer and on a rough grading plan prepared by Donald A. Woolfe and Associates, dated 8 June 1978.

Subsurface Conditions

The soils encountered in the test borings consisted of dense, fine sandy SILTS and silty SANDS which were present from existing ground surface to depths of 1 to 2-1/2 feet. These materials are considered to be non-expansive when subjected to variations in water content.

Beneath the surficial soils, hard SANDSTONES with occasional claystone interbeds were encountered to depths of 15 to 20 feet, at the locations explored.

Free groundwater was not encountered in any of the test borings. However, moisture was noticed in Test Boring Number 7 at a depth of about 12 feet.

A more detailed description of the materials encountered is given on the "Logs of Test Borings," Figures 2 through 9, Appendix A.

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DISCUSSIONS, CONCLUSIONS AIM RECOMMENDATIONS

General

1. The site is suitable for residential development as proposed provided the recommendations contained within the body of this report are strictly adhered to and complied with during the grading and construction phases.

2. All grading and foundation plans should be reviewed by the Soil Engineer to ensure compliance with the recommendations of this report.

3. The Soil Engineer should be notified a minimum of two (2) working days prior to the commencement of any grading on the site in order to observe the stripping of contaminated material and to coordinate the work with the contractor in the field.

4. Prior to the commencement of grading on the site, the area should be thoroughly cleared of any brush or vegetation so that the unstable areas are clearly defined. Material generated from the clearing and grubbing operations should be disposed of away from the project area or stockpiled on a specified location to be shown on the grading plan for later use in landscaping.

Grading

5. Before any grading is performed, the surface of the site should be stripped to remove existing vegetation and other deleterious materials. The depth of stripping should be determined in the field at the time of grading. It is estimated that stripping depth of 2 to 4 inches may be necessary. Any existing undesirable items which do not meet the requirements of engineered fill (tree roots, old building foundations, septic and other buried tanks, leach fields, etc.) should be removed. Stripped material from the site may not be used as engineered fill. Organically contaminated soil may be placed in back yards and front yards or stockpiled and used for landscaping purposes.

6. Following site stripping, the top 8 inches of exposed subgrade soil in areas to be filled should be scarified and compacted to the requirement's of engineered fill.

7. After the native soil is properly prepared, material generated from excavations on the site, excluding deleterious material, may be used as engineered fill. The fill must be placed in thin lifts not exceeding 8 inches in uncompacted thickness. The fill should be moisture conditioned-as necessary and compacted to a minimum of 90% relative compaction, based on ASTM Test Procedure D1557-70.

8. When engineered fill is to be placed on slopes where the existing surface gradient is steeper than 5:1 (horizontal to vertical), any weak soils should be removed and bench areas should be cut horizontally into competent material prior to fill placement. It is recommended that the benches be no less than 10 feet wide and spaced at 10 foot vertical intervals. The toe key should be a minimum of 12 feet in width cut into firm- natural ground and sloped back into the hillside at a gradient of not less than 2%.

9. Subsurface drains should be provided where any potential seepage zones are disclosed during the grading operations. The subsurface drains will provide drainage for these areas and, consequently, will increase the stability of the fills. It is recommended that all subsurface drains be installed according to Section 9.1 of the "Recommended Grading Specifications".

10. The proposed fill slopes may be constructed at a gradient of 2:1 (horizontal to vertical) with engineered fill being compacted to at least 90% relative compaction. Slope protection for erosion control must be provided as discussed below.

11. Proposed cut slopes should not be steeper than 1.5:1 (horizontal to vertical).Existing slopes should be stable at their present configuration provided drainage provision and slope protection methods are implemented (discussed below).

The inclination of cut slopes is often governed by adverse bedding or by the inclination of weak zones within the bedrock rather than the general strength of the rock being cut. It is recommended that the Soil Engineer and/or Engineering Geologist evaluate the cut slopes during grading and provide recommendations, should adverse conditions occur. However, slopes should not be steeper than those recommended above.

12. Existing ruts should be removed during grading and backfilled with rip-rap material. Side slope drainage berms or benches should be provided at 30 foot vertical intervals and at points of changing slope gradient. Minimum 6-foot wide berms are recommended with a concrete or asphalt-lined ditch. The upper lip of the ditch should be properly backfilled to prevent infiltration of water beneath the ditch that may cause erosion and sloughing. 13. Due to the nature of the soil and rocks at the subject site, it is recommended that the grading operations be carried out during the summer months. Therefore, before work is stopped at the end of the summer, a positive gradient away from the slopes should be provided to carry the surface run-off water away from the slopes and to areas where erosion can be controlled. It is vital that no slope be left standing through a winter season without drainage and erosion control measures being provided.

14. It is our opinion that all of the proposed cut areas can be excavated using standard heavy duty construction equipment. Trenching in sandstone areas will probably require jack-hammering.

Slope Protection

15. Cut and fill slopes should be protected with a soil reinforcement matting such as Enkamat. This type of matting has been used to successfully stabilize granular slopes. After the eroded areas have been properly cleared and backfilled, the matting should be staked to the slope and covered with approximately 3/4 to 1 inch of existing topsoils. The slope can then be hydromulched, planted with the desired vegetation, or alternately covered with gravel, in accordance with the recommendations of the project landscape architect.

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Residential Construction

16. The proposed residential structures may be supported safely on lot pads which have been cut into native soil or rock, or constructed with engineered fill. It is anticipated that foundation materials will be undisturbed sandstone or non-expansive fill derived from sandstone cuts. Recommendations for endbearing pier and grade beam construction are presented in the following paragraphs.

17. For end-bearing pier and grade beam construction, the piers shall be founded a minimum of 24 inches into the undisturbed sandstone as determined by the Soil Engineer. The minimum diameter of all piers shall be 18 inches. The soil bearing capacity for all piers bedded into firm sandstone is 4,000 p.s.f. An additional 200 p.s.f. may be added for each additional foot of depth below the minimum 2 feet.

18. Grade beams should be reinforced with a minimum of two No. 4 bars, one on top and one on bottom. The exterior end-bearing piers should have reinforcement tied to the top reinforcement of the grade beam.

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Interior Slab-on-Grade Construction

19. Where slabs-on-grade are to be constructed and floor coverings are anticipated the following recommendations are made:

a. Four inches of free-draining gravel or clean crushed rock material should be placed between the subgrade (finished) and the floor slab to serve as a capillary break between the subsoil and the slab.

b. Measures should be provided to prevent condensation caused by temperature differentials from harming the floor covering. One way to protect floor covering is to use a waterproof membrane placed between the granular layer and the floor slab. Two inches of wetted sand should be placed over the membrane to facilitate curing of the concrete. Where sand is used, the thickness of the rock cushion may be reduced by the same thickness of sand.

c. Prior to placing the waterproof membrane, the subsoil should be wetted until the moisture equilibrium state is reached.

d. Slabs should be reinforced with a minimum of wire mesh.

20. For slabs without floor coverings, including driveway and concrete patios, the following recommendations and suggestions are made.

a. Slabs may be poured directly over native, non-expansive compacted subgrade and should be provided with deep tool joints or expansion joints.

b. Prior to pouring the slab, the subgrade soil should be wetted until a moisture equilibrium state is reached.

c. Slabs at door openings should be constructed with a curl or a thickened edge extending 6 inches into native ground or compacted fill or the foundations may be continued across the openings.

d. To further minimize cracking, items a) and b) of Section 20 may be utilized.

General Construction Requirements

21. All building pads should be provided with liberal drainage away from the foundations and to a properly controlled discharge system. It is vital that no drainage be allowed to flow from the pad over an unprotected slope.

22. All utility trenches should be properly backfilled with material processed to the recommended compaction requirements. Trenches extending under footings should be properly sealed so that water is prevented from seeping underneath the house.

23. Rain water collected in roof gutters should not be allowed to flow uncontrolled. Protective measures should be provided to carry the water away from the downspouts to a properly located discharge system.

24. All foundations and grading plans must be checked and approved by the Soil Engineer to ensure compliance with the recommendations provided in this report. Any work performed without the approval of the Soil Engineer will render the recommendations of this report invalid.

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LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. It should be noted, that it is the responsibility of the owner or his representative to notify Terrasearch Inc., in writing, a minimum of 48 hours before any demolition, stripping, grading or foundation excavations can commence at the site.

2. The recommendations of this report are based upon the assumption that the soil conditions do not deviate from those disclosed in the borings and from a reconnaissance of the site. Should any variations or undesirable conditions be encountered during the development of the site, Terrasearch, Inc., will provide supplemental recommendations as dictated by the field conditions.

3. This report is issued with the understanding that it is the responsibility of the owner, or his representative, to ensure that the information and recommendations contained herein are brought to the attention of the Architect and Engineer for the project and incorporated into the plans, and that the necessary steps are taken to see that the Contractor and Subcontractors carry out such recommendations in the field.

FIELD INVESTIGATION

The field investigation consisted of a reconnaissance of the site by the Soil Engineer and the drilling of 8 test borings at the approximate locations shown on Figure 1, "Site Plan." Drilling was performed with a truck-mounted rig using power-driven 6-inch diameter continuous flight augers. As the drilling proceeded, undisturbed core samples were obtained by means of a 2.5 inch O.D. modified split-tube sampler. The sampler was advanced into the in situ soils at various depths by dynamically driving the sampler with a 140-pound weight with a free fall of 30 inches. The test borings extended to depth of 15 to 20 feet below the existing ground surface.

The blow counts were adjusted to the equivalent standard penetration resistance for the dynamically advanced samples and is given as blows/foot on the "Logs of Test Borings."

The samples were sealed and returned to our laboratory for testing. The stratification of the soils, descriptions, location of undisturbed soil samples and standard penetration resistance values are shown on the "Logs of Test Borings."

APPENDIX B
Laboratory Investigation Summary of Laboratory Test Results
Compaction Test
Grain Size Curves.

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LABORATORY INVESTIGATION

The laboratory testing program was directed toward a qualitative and quantitative evaluation of the physical and engineering properties of the soils underlying the site.

In-place dry density and moisture content determinations were made to determine the consistency and moisture variation throughout the soil profile.

The strength parameters of the foundation soils were evaluated from direct shear tests on representative undisturbed and remolded soil samples. The results of the field penetration tests were also used to evaluate the in situ strength of the soil.

The results of the aforementioned laboratory testing program are presented on TABLE I of Appendix B, and on the respective "Logs of Test Borings," in Appendix A.

A compaction test was performed on a representative sample of the native soil to be used in fills. The test was run in accordance with the ASTM Test Procedure D1557-70. The results of the compaction tests are shown graphically on Figure 10. Two sieve analyses were performed on existing slope materials to determine the relative grain size. The results of these tests are shown on Figure Numbers 11 and 12.

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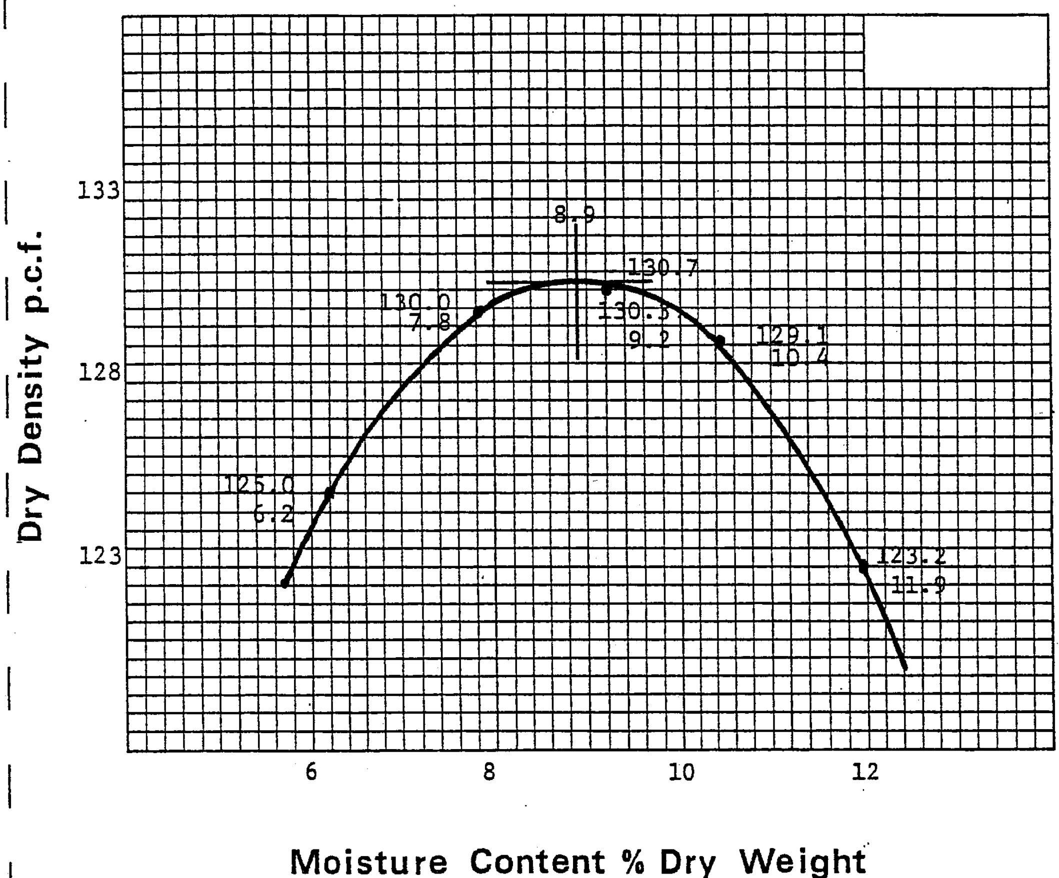
TABLE I

Summary of Laboratory Test Results

Hole No.	Depth (ft.)	Dry Density (p.c.f.)	Moisture Content (% Dry wt.)	Direct Shear	
				Cohesion (p.s.f.	Angle of Internal Friction
1-1	1.0	101	11		
2-1	1.5	94	5		
2-2	5.0	111	23	1,600	44°
2-3	10.0	104	19		
3-1	2.0	86	14		
3-2	7.0	119	20	0	59°
5-1	1.0	111	11		
6-1	1.0	124	6		
7-1	1.0	104	6		
7-2	6.0	117	12		
8-1	1.0	90	11		
8-2	4.0	112	7		
Bag#4: Remolded slope material compacted to 90% relative compaction:					
		117	16	450	35°

COMPACTION TEST



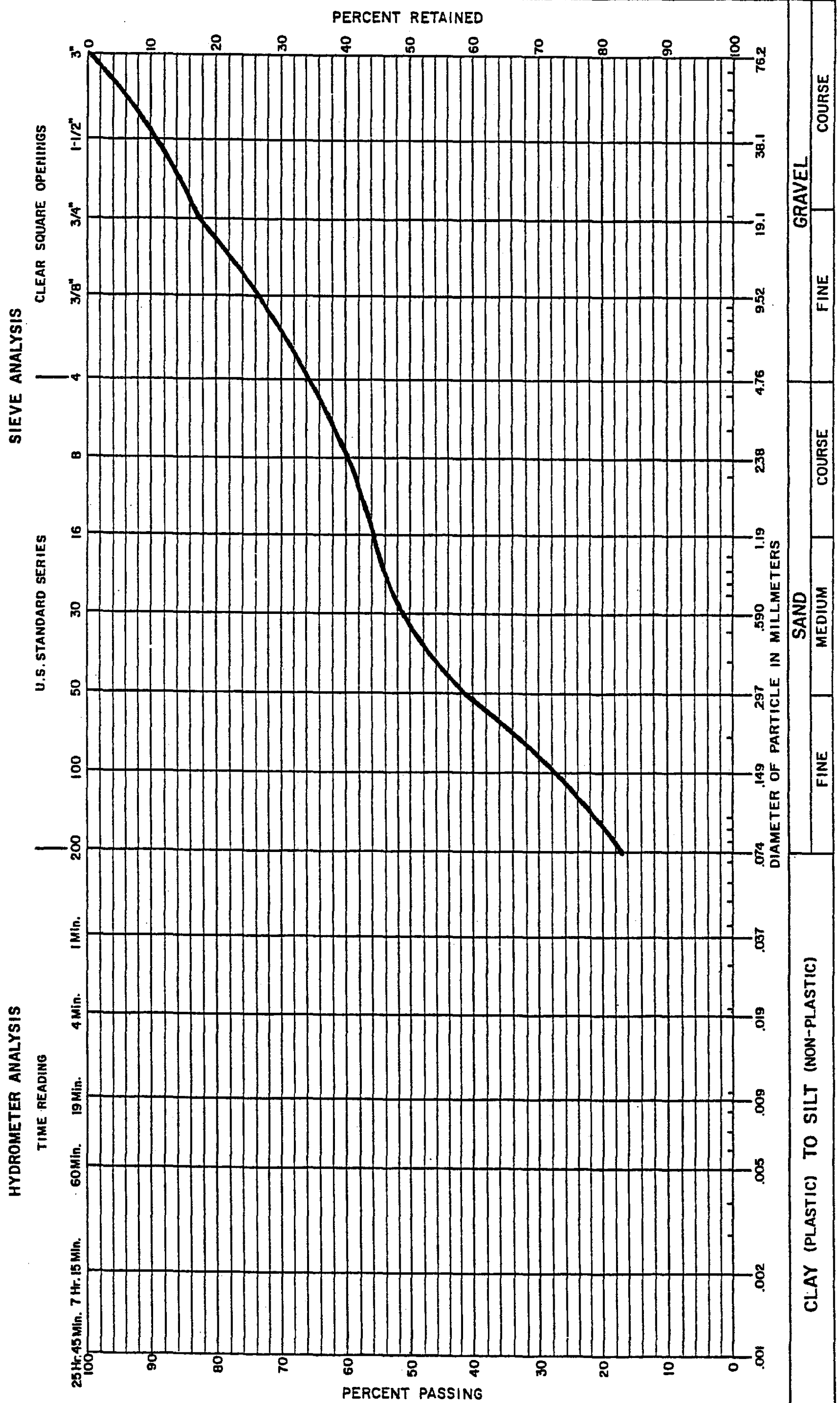
Sample No.	Bag #4
Sample Depth	
Sample Description	Light brown Silty fine Sands with some Gravels
Specific Gravity	
Test Designation	ASTM D1557-70
Maximum Dry Density (p.c.f.)	130.7
Optimum Moisture Content (%)	8.9

(Revised/15 February 1980) 12 November 1979

Tested by JC	Project Ascension & Bel Aire	Project No. 4516-E

LL.	
PL	
PI	
NAT. W/C	
CLASSIF. SYMB.	
SAMPLE NO.	Bag 4
DEPTH FT.	
BORING NO.	

Light brown Silty fine Sand



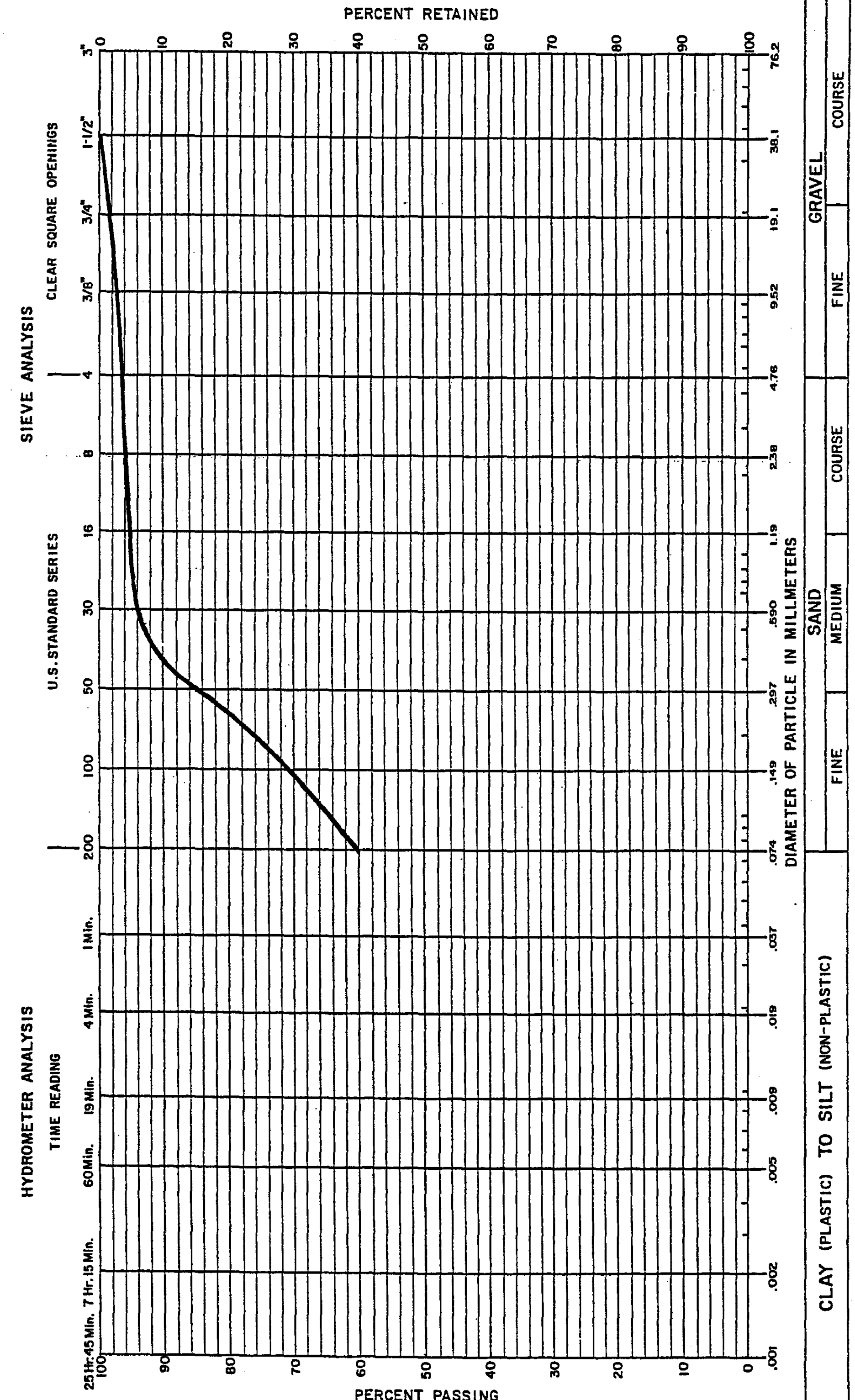
TERRASEARCH INC. FIGURE No. 11- GRADATION TEST RESULTS

12 November 1979
Revised/15 February 1980

Tested by JC	Project Ascension & Bel Aire	Project No. 4516-E

LL	PL	PI	NAT. W/C	CLASSIF. SYMB.	SAMPLE NO.	DEPTH FT.	BORING NO.
					Bag 2		

Light brown Sandy Silt



TERRASEARCH INC.

FIGURE No. 12- GRADATION TEST RESULTS

APPENDIX C
Recommended Grading Specifications
Guide Specifications For Rock Under Floor Slabs

Project No. 4516-E
12 November 1979
Revised/15 February 1980

RECOMMENDED GRADING SPECIFICATIONS
for
Proposed Subdivision Northeast Corner of Ascension Drive and Bel Aire Road
San Mateo County, California

1.1 General Description

1.11 These specifications have been prepared for the grading and site development of the proposed subdivision an Ascension Drive and Bel Aire Road, San Mateo County, California. TERRASEARCH, INC., hereinafter described as the Soil Engineer, should be consulted prior to any site work connected with site development to ensure compliance with these specifications.

1.12 The Soil Engineer should be notified at least two (2) working days prior to any site clearing or grading operations on the property in order to observe the stripping of surface contaminated materials and to coordinate the work with the Grading Contractor in the field.

1.13 This item shall consist of all clearing or grubbing, preparation of land to be filled, installation of subdrains, filling of the land, spreading, compaction and control of the filled areas to conform with the lines, grades and slopes as shown on the accepted plans. The Soil Engineer is not responsible for determining line, grade, elevations or slope gradients. The property owner, or his representative, shall designate the person or organizations that will be responsible for these items of work.

1.14 Contents of these specifications shall be integrated with the Soil Investigation Report of which they are a part; therefore, they shall not be used as a self-contained document.

2.1 Tests

2.11 The standard test used to define maximum densities of all compaction work shall be the ASTM Test Procedure D1557-70. All densities shall be expressed as a relative compaction in terms of the maximum dry density obtained in the laboratory by the foregoing standard procedure.

3.1 Clearing, Grubbing and Preparing Areas to Be Filled

3.11 All trees, roots, vegetative matter and organic topsoil shall be removed from all structural areas. The depth of organic topsoil to be removed will be determined in the field by the Soil Engineer, but in general, will vary from 2 to 4 inches.

3.12 All soil deemed soft or unsuitable by the Soil Engineer shall be removed. Any loose fills and surface soil sloughs shall also be excavated.

3.13 Any abandoned underground structures shall be removed from the site such as old foundations, abandoned pipe lines, septic tanks, and leach fields.

3.14 The final stripping and excavation shall be approved by the Soil Engineer during construction before further grading is started.

3.15 The original ground on which the fill is to be placed shall be plowed or scarified to at least-8 inches and until the surface is free from ruts, hummocks or uneven features which would tend to prevent uniform compaction by the equipment to be used. Where the slope ratio of the original ground is steeper than 5:1 (horizontal to vertical), the bank shall be stepped or benched. At the toe of the sideslope fills, the base key shall be at least 12 feet in width, cut into firm natural ground. and sloped back into the hillside at a gradient of no less than 2%. Subsequent keys should be placed at vertical heights of no more than 10 feet and shall have a width of no less than 10 feet.

3.16 The native subgrade soils to receive fill shall be moisture conditioned and compacted to the requirements of engineered fill.

4.1 Materials Used for Fills

4.11 All fill material shall be approved by the Soil Engineer. The material shall be a soil or soil-rock mixture which is free from organic matter or other deleterious substances. The fill material within 3 feet of finished grade shall not contain rocks or lumps over 6 inches in greatest dimension and not more than 15% larger than 2-1/2 inches. Materials from the site are suitable for use in fills. The Soil Engineer shall determine the suitability of materials for use as engineered fill. Rocks greater than six (6) inches shall be placed in deep fills so that they are not nested and so that compaction may be achieved around them.

4.12 Should import material be required, it must be approved by the Soil Engineer prior to transporting it to the project and must meet the following requirements:

1. Plasticity Index not to exceed 12;
2. R-Value not less than 25;
3. Should not contain rocks larger than 6 inches in maximum size;
4. Not more than 15% passing the No. 200 sieve.

Import material meeting the above requirements should be compacted to 90% of the maximum dry density obtained as determined by ASTM Test Procedure D1557-70.

5.1 Placing, Spreading and Compacting Fill Material

5.11 The fill materials shall be placed in uniform lifts of not more than 8 inches in uncompacted thickness. Each layer shall be spread evenly and shall be thoroughly blade mixed during the spreading to obtain uniformity of material in each layer. Before compaction begins, the fill shall be brought to a water content that will permit proper compaction by either (1) aerating the material if it is too wet; or (2) spraying the material with water if it is too dry.

5.12 After each layer has been placed, mixed and spread evenly, it shall be compacted to a relative compaction of 90% at moisture content slightly above the optimum as determined by ASTM Test Procedure D1557-70. Relative compaction is the ratio of the dry density of the constructed fill to the maximum determined by ASTM Test Procedure D1557-70.

5.13 Compaction shall be by sheepsfoot rollers, multiple pneumatic-,tired rollers or other types of acceptable compacting rollers. Rollers shall be of such design that they will be able to compact the fill to the specified density. Rolling shall be accomplished while the fill materials is within the specified moisture content-range. Rolling of each layer shall be contin-uous over its entire area and the roller shall make sufficient trips to ensure that the required density has been obtained. No ponding or jetting shall be permitted.

5.14 Fill slopes shall be compacted by means of sheepsfoot rollers or other suitable equipment. Compacting operations shall be continued until the slopes are stable. While no appreciable amount of loose soil will be permitted on the slopes, compaction shall not be so dense as to prohibit planting. Compacting of the slopes may be done progressively in increments of 3 to 5 feet in fill height or after the fill is brought to its total height.

5.15 Field density tests shall be made in each compacted layer by the Soil Engineer in accordance with ASTM Test Procedure D1556-64 or ASTM Test Procedure D2922-71. When sheepsfoot rollers are used for compaction, the density tests shall be taken in the compacted material below the surface disturbed by the roller. When these tests indicate that the density of any layer of fill, or portion thereof, is below the required density, it shall be reworked until the required compaction has been obtained.

5.16 No soil shall be placed or compacted during periods of rain nor on ground-which is not drained of all free water. Soil which has been soaked and wetted by rain or other cause, shall not be compacted until completely drained and until the moisture content is within the limits hereinbefore described by the Soil Engineer. Prior approval by the Soil Engineer shall be obtained before continuing the grading operations.

6.1 Trenches

6.11 The utility trenches extending under the perimeter foundations and concrete slabs-on-grade floors shall be backfilled with native soils and adequately compacted.

7.1 Subsurface Line Removal (if encountered in the field)

7.11 The methods of removal will be designated by the Soil Engineer in the field depending upon the depth and location of the line. One of the following methods will be used.

7.12 Remove the pipe and fill and compact the soil in the trench according to the applicable portions of Sections 5.1 and 6.1.

7.13 The pipe shall be crushed in the trench. The trench shall then be filled and compacted according to the applicable portions of Sections 5.1 and 6.1.

7.14 Cap the ends of the line with concrete to prevent entrance of water. The length of cap shall not be less than 5 feet. The concrete mix shall have a minimum shrinkage.

7.15 Any existing wells on the project site must be buried and capped in accordance with the requirements of the County of San Mateo, Department of Public Works. The strength of the cap shall be at least equal to that of the adjacent soil. The final elevation of the top of the wall casing must be a minimum of 36 inches below any adjacent-grade at the completion of any grading or filling operations. In no case should any house foundation be placed over the capped wells.

8.1 S1opes

8.11 Fill slopes shall-be graded at gradients no steeper than 2:1 (horizontal to vertical).

8.12 All fill materials on the slopes shall be compacted to the above specified completion requirements. Drainage facilities shall be constructed to prevent water from flowing directly over the top of all slopes, No slope shall be left to stand through a winter season without erosion control measures having been provided.

9.1 Subdrain Installation

9.11 Provide and install perforated-metal or plastic pipe, porous concrete, pipe, perforated asbestos cement, or bituminous
(last line is not available)

or as directed by the Engineer and as specified in Section 68 of the Standard Specifications, current edition, State of California, Department of Transportation, except as modified in the following paragraphs.

9.12 Clay drain tile, concrete drain tile and perforated clay pipe will not be permitted. Use no wyes, tees or other joints of these materials.

9.13 Porous concrete pipe, perforated asbestos-cement pipe, or bituminous fiber pipe will not be-permitted either where the subgrade soils are compressible or where the depth of overburden soils exceeds 20 feet. In any event, use of these materials will be permitted only on written authorization of the Engineer.

9.14 Use Type, B filter material, unless otherwise permitted by written authorization of the Soil Engineer. Delete requirements of State Specifications for quality testing using Los Angeles rattler or sand equivalent tests.

9.15 Unless directed otherwise, use pipes not less than 4-inches in diameter for laterals up to 50 feet in length. Use pipes of not less then 6-inches in diameter for laterals greater than 50 feet in length.

9.16 Excavate trench to width not less than one foot plus outside diameter of pipe, and to a gradient of not less then 2.0%. Bed the pipe on 6 inches of filter material and install at such depth that there is not less than 2 feet of filter material over the pipe or as directed by the Engineer.

10.1 Unusual Conditions

10.11 In the event that any unusual conditions, not covered by the special provisions, are encountered during the grading operations, the Soil Engineer shall be immediately notified for directions.

Project No. 4516-E 12
November 1979 Revised/15
February 1980

GUIDE SPECIFICATIONS FOR ROCK UNDER FLOOR SLABS

Definition

Graded gravel or crushed rock for use under slabs-on-grade shall consist of a minimum thickness of mineral aggregate placed in accordance with these specifications and in conformity with the dimensions shown on the plans. The minimum thickness is specified in the accompanying report.

Material

The mineral aggregate shall consist of broken stone, crushed, or uncrushed gravel, quarry waste or a combination thereof. The aggretate shall be free from adobe, vegetable matter, loam, volcanic tuff, and other deleterious substances. It shall be of such quality that the absorption o£ water in a saturated dry condition does not exceed 3% of the oven dry weight of the sample.

Grading

The mineral aggregate shall be of such size that the percentage composition by dry weight, as determined by laboratory sieves (U.S. Sieves), will conform to the following grading:

Sieve Size	Percentage Passing
¾	100
No. 4	10-35
No. 200	0-2

Placing

Subgrade, upon which gravel or crushed rock is to be placed, shall be prepared as outlined in the accompanying Soil Report.

Project No.
4516-E -3.2.°
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9 Revised/15
February 1980

FIELD IMTESTIGATION

The field investigation consisted of a reconnaissance of the site by the Soil Engineer and the drilling of 8 test borings at the approximate locations shown on Figure 1, "Site Plan." Drilling was performed with a truck-mounted rig using powerdriven 6-inch diameter continuous flight augers. As the drilling proceeded, undisturbed core samples were obtained by means of a 2.5 inch O.D. modified split-tube sampler. The sampler was advanced into the in situ soils at various depths by dynamically - driving the sampler with a 140-pound weight with a free fall of

30 inches. The test borings extended to depth of 15 to 20 feet below the existing ground surface.

The blow counts were adjusted to the equivalent standard penetration resistance for the dynamically advanced samples and is given as blows/foot on the "Logs of Test Borings."

The samples were sealed and returned to our laboratory for testing. The stratification of the soils, descriptions, location of undisturbed soil samples and standard penetration resistance values are shown on the "Logs of Test Borings."

_. APPENDIX B

' Laboratory Investigation Summary of Laboratory Test Results

Compaction Test
Grain Size Curves .

Project No. 4516-E
12_ November 1979 Revised/15 February 1980
LABORATORY INVESTIGATION

The laboratory testing program was directed toward a qualitative and quantitative evaluation of the physical and engineering properties of the soils underlying the site.

In-place dry density and moisture content determinations were made to determine the consistency and moisture variation throughout the soil profile.

The strength parameters of the foundation soils were evaluated from direct shear tests on representative undisturbed and remolded soil samples. The results of the field penetration tests were also used to.evaluate the in situ strength of the soil

The results of the aforementioned laboratory testing program are presented on TABLE I of Appendix B, and on the respective "Logs of Test Borings," in Appendix A.

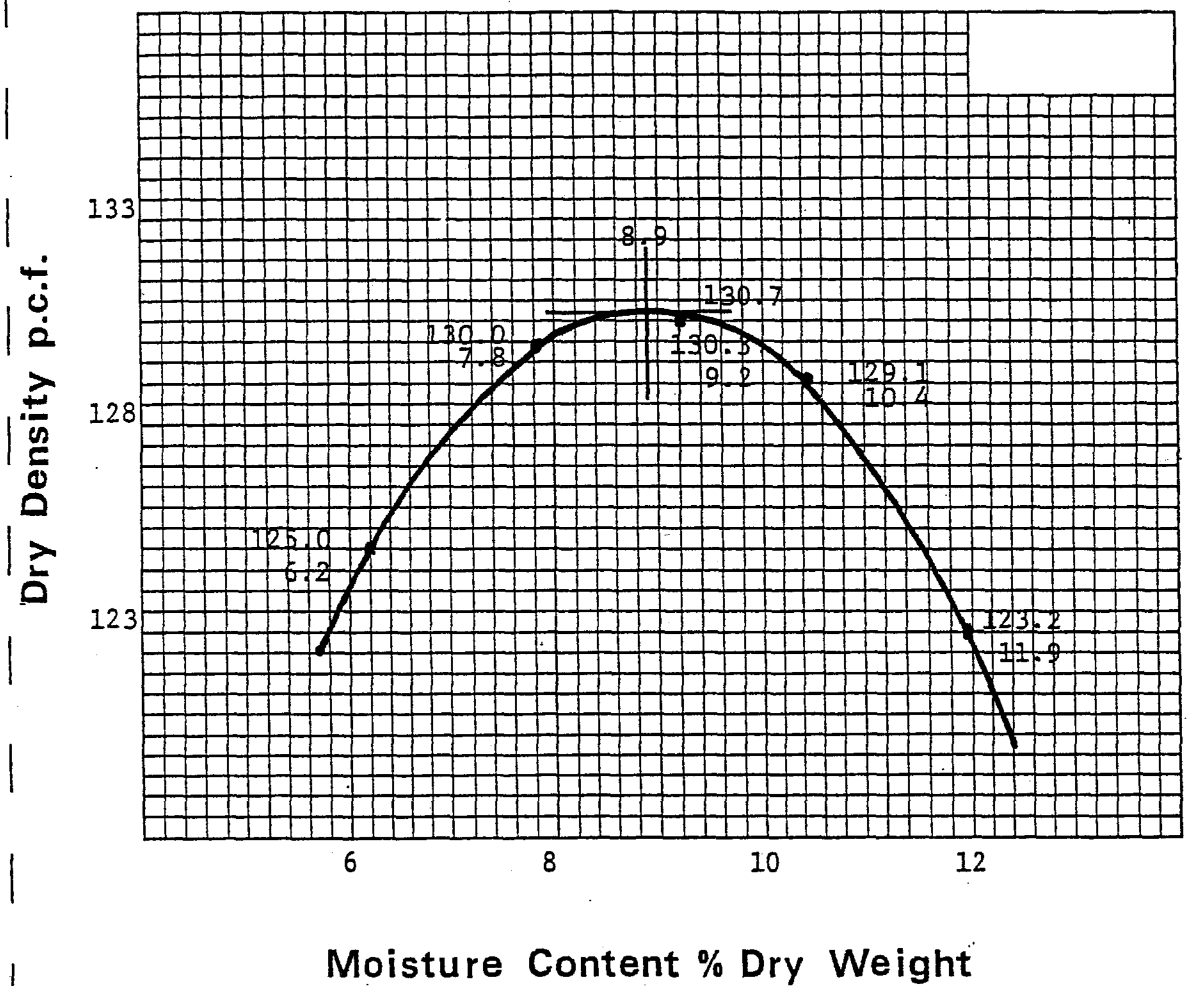
.A compaction test was performed on a representative sample of the native soil to be used in fills. The test was run in accordance with the ASTM Test Procedure D1557-70. The results of the compaction tests are shown graphically on Figure 10. Two sieve analyses were performed on existing slope materials to determine the relative grain size. The results of these tests are shown on Figure Numbers 11 and 12.

TABLE I

Summary of Laboratory Test Results

Hole No.	Depth (f t.)	Dry Density (p.c.f.	Moisture Content (% Dry wt.)	Atterber ~ Limits Liquid Limit	Plasticity Index (X)	Unconfined Compressive Strength	Direct Shear Cbhesion (p.s.f.)	Angle Interna Frictio de ree)
1-1	1.0	101	11					
2-1	1.5	94	5					
2-2	5.0	111	23				1,600	44^0
2-3	10.0	104	19					
3-1	2.0	86	14					
3-2	7.0	119	20				0	59^0
5-1	1.0	111	11					
6-1	1.0	124	6					
7-1	1.0	104	6					
7-2	6.0	117	12					
8-1	1.0	90	11					
8-2	4.0	112	7					
Bag #4: Remolded slope material compacted to 90% relative compaction:								
		117	16				450	35°

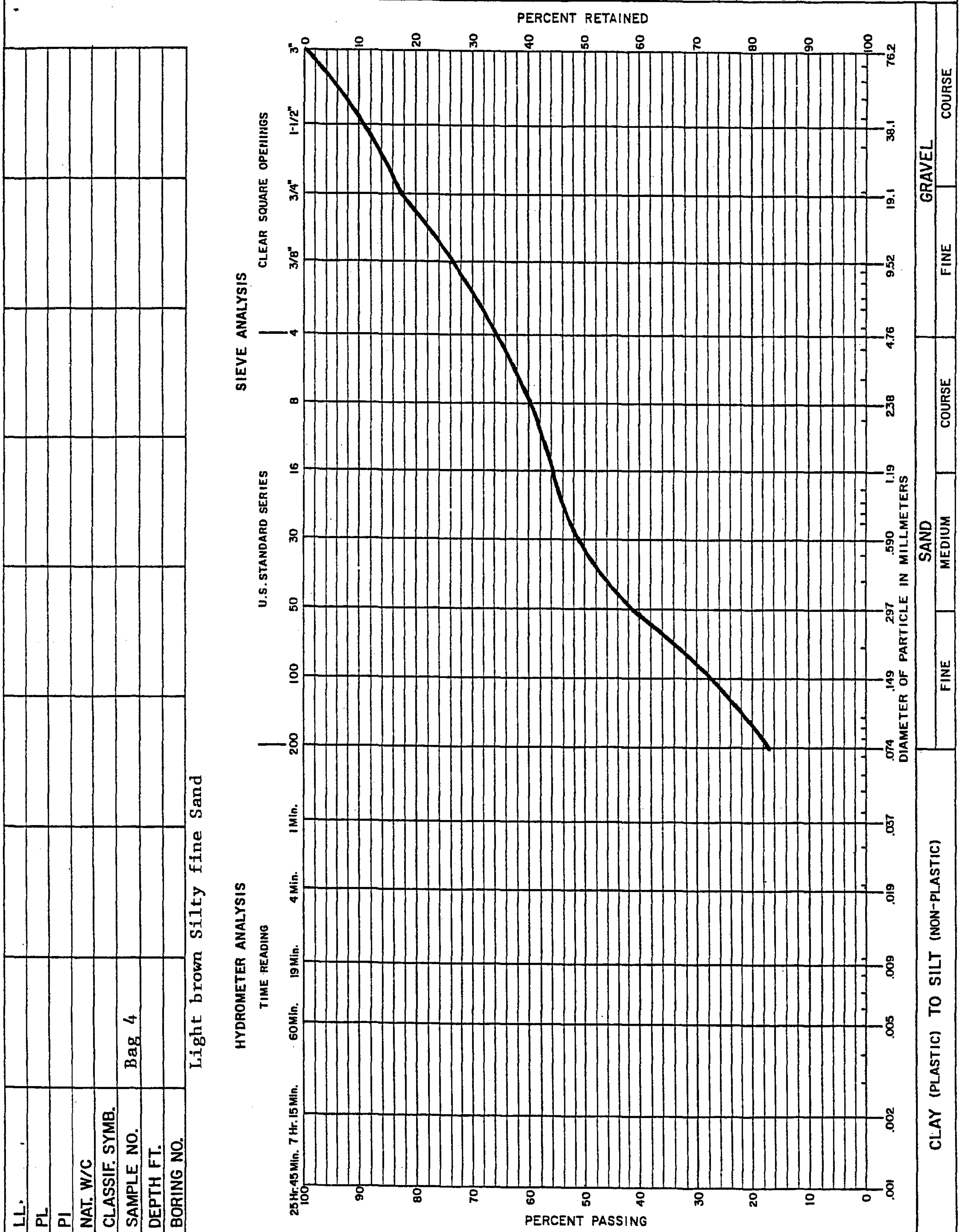
COMPACTION TEST



Sample No. Bag #4
Sample Depth
Sample Description Light brown Silty fine Sands with some Gravels
Specific Gravity
Test Designation ASTM D1557-70
Maximum Dry Density (p.c.f.) 130.7
Optimum Moisture Content (%) 8.9

(Revised/15 February 1980) 12 November 1979

Tested by JC | Project Ascension & Bel Aire | Project No. 4516-E



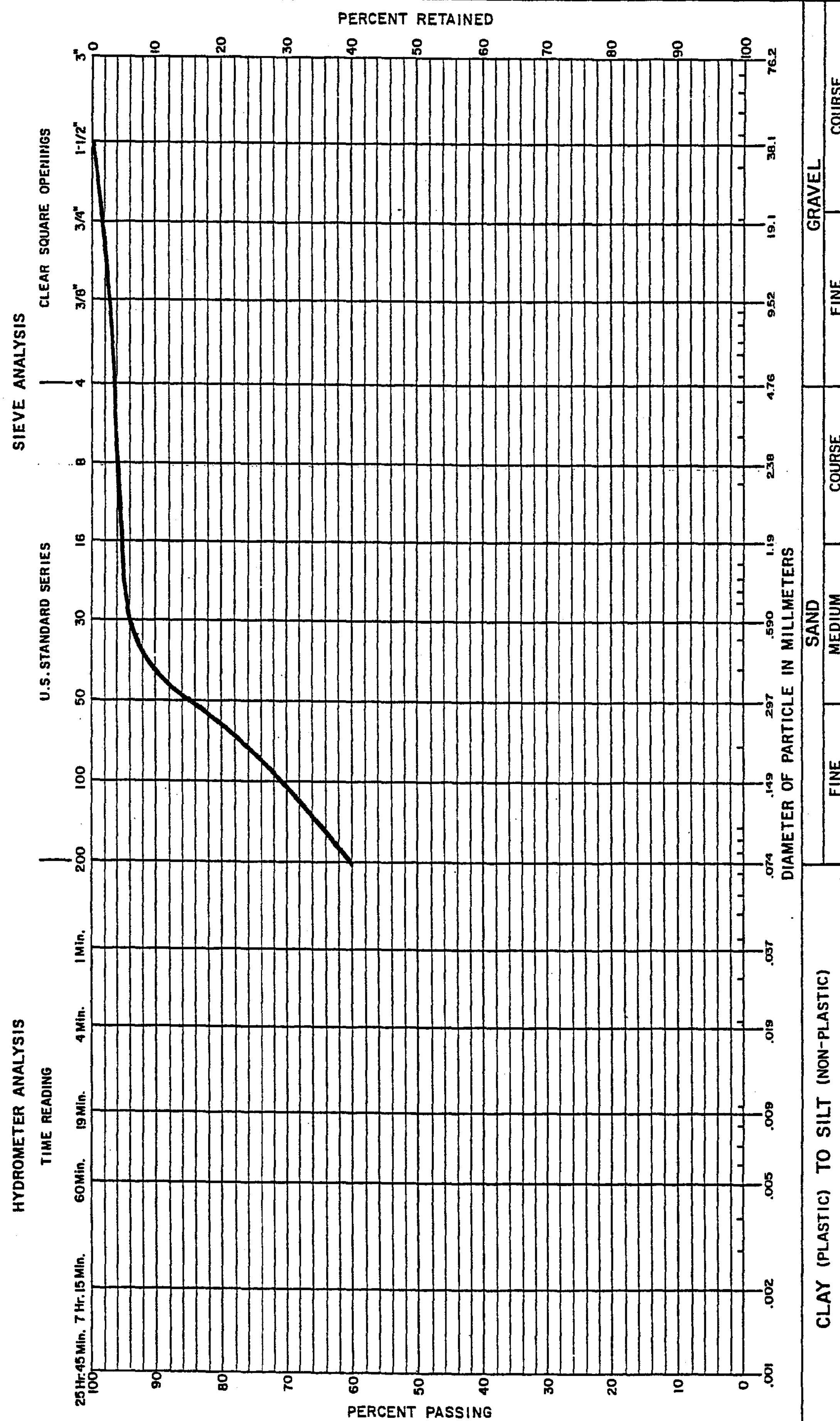
TERRASEARCH INC.

FIGURE No. 11- GRADATION TEST RESULTS

Tested by JC | Project Ascension & Bel Aire | Project No. 4516-E

LL	PL	PI	NAT. W/C	CLASSIF. SYMB.	SAMPLE NO.	DEPTH FT.	BORING NO.
					Bag 2		

Light brown Sandy Silt



TERRASEARCH INC.

FIGURE No. 12- GRADATION TEST RESULTS

APPENDIX C 'Recommended›

Grading 'Specifications

Guide Specifications' For Rock' Under Floor Slabs

Project No.
4516-E 12 November 1979 ReNiisedl15
February 1980 RECOMMENDED GRADING
SPECIFICATIONS
for
Proposed Subdivision
Northeast Corner of
Ascension Drive and Bel
Aire Road

San Mateo County,

California 1.1 General Description

1.11 These specifications have been prepared for the grading and site development of the proposed subdivision an Ascension Drive and Bel Aire Road, San Mateo County, California. TERRASEARCH, INC., hereinafter described as the Soil Engineer, should be consulted prior to any site work connected with site development to ensure compliance with these specifications. 1.12 The Soil Engineer should be notified at least two (2) working days prior to any site clearing or grading operations on the property in order to observe the stripping of surface contaminated materials and to coordinate the work with the Grading Contractor in the field.

1.13 This item shall consist of all clearing or grubbing, preparation of land to be filled, installation of subdrains, filling of the land, spreading, compaction and control of the filled areas to conform with the lines, grades and slopes as shown on the accepted plans. The Soil Engineer is not responsible for determining line, grade, elevations or slope gradients. The property owner, or his representative, shall designate the person or organizations that will be responsible for these items of work.

1.14 Contents of these specifications shall be integrated with the Soil Investigation Report of which they are a part; therefore, they shall not be used as a self-contained document. 2.1 Tests

2.11 The standard test used to define maximum densities of all compaction work shall be the ASTM Test Procedure D1557-70. All densities shall be expressed as a relative compaction in terms of the maximum dry density obtained in the laboratory by the foregoing standard procedure.

3.1 Clearing, Grubbing and Preparing Areas 'to Be Filled

3.11 All trees, roots, vegetative matter and organic topsoil shall be removed from all structural areas. The depth of organic topsoil to be removed will be determined in the field by the Soil Engineer, but in general, will vary from 2 to 4 inches. 3.12 All soil deemed soft or unsuitable by the Soil Engineer shall be removed. Any loose fills and surface soil sloughs shall also be excavated.

3.13 Any abandoned underground structures shall be removed from the site such as old foundations, abandoned pipe lines, septic tanks, and leach fields.

3.14 The final stripping and excavation shall be approved by the

o Soil Engineer during construction before further grading is

started. 32

3.15 The original ground on which the fill is to be placed **shall be plowed or scarified to at least-8 inches and** until **the surface is free from ruts, hummocks or uneven features** which **would tend to prevent uniform compaction by the equipment to be used. Where the slope ratio of the original ground is steeper than 5:1 (horizontal to vertical), the bank shall be stepped or benched. At the toe of the sideslope fills, the base key** shall be **at least 12 feet in width, cut into firm natural ground.** and **sloped back into the hillside at a**

gradient of no less than 2%. **Subsequent keys should be placed at vertical heights of no more than 10 feet and shall have a width of no less than 10 feet. 3.16 The native subgrade soils to** receive **fill shall be moisture conditioned and compacted** to the **requirements of engineered fill.**

4.1 <u>Materials Used for Fills</u>

4.11 All fill material shall be approved by the **Soil Engineer. The material shall** be a **soil or soil-rock mixture which is free from organic matter** or other **deleterious substances. The fill material within 3 feet of finished grade shall not contain rocks or lumps over 6 inches in greatest dimension and not more than 15% larger than 2-1/2 inches. Materials from the site are suitable for use in fills. The Soil Engineer shall determine the • suitability of materials for use as engineered** fill. **Rocks greater than six (6) inches shall be placed in deep fills so that they are not nested and so that compaction may be achieved around them.**

4.12 Should import material be required, it must be approved by the Soil Engineer prior to transporting it to the project and must meet the following requirements:

l. Plasticity Index not to exceed 12; 2. R-Value not less than 25;

3. Should not contain rocks larger than 6 inches in maximum size;
4. Not more than 15% passing the No. 200 sieve.

Import material meeting the above requirements should be compacted to 90% of the maximum dry density obtained as determined by ASTM Test Procedure D1557-70.

5.1 Placing, Spreadingand'Compacting Fill Material

5.11 The fill materials shall be placed in uniform lifts of not more than 8 inches in uncompacted thickness. Each layer shall be spread evenly and shall be thoroughly blade mixed during the spreading to obtain uniformity of material in each layer. Before compaction begins, the fill shall be brought to a water content that will permit proper compaction by either (1) aerating the material if it is too wet; or (2) spraying the material with water if it is too dry.

5.12 After each layer has been placed, mixed and spread evenly,

it shall.be compacted to a relative compaction of 90% at a moisture content slightly above the optimum as determined by ASTM Test Pro' cedure D1557-70. Relative compaction is the ratio of the dry density of the constructed fill to the maximum determined by ASTM Test Procedure D1557-70.

5.13 Compaction shall be by sheepsfoot rollers, multiple pneumatic-,tired rollers or other types of acceptable compacting rollers. Rollers shall be of such design that they will be able to compact the fill to the specified density. Rolling shall be accomplished while the fill materials is within the specified moisture content-range. Rolling of each layer shall be continuous over its entire area and the roller shall make sufficient trips to ensure that the required density has been obtained. No ponding or **jetting shall be permitted.**

5.14 Fill slopes shall be compacted by means of sheepsfoot rollers or other suitable equipment. Compacting operations shall be continued until the slopes are stable. While no appreciable amount of loose soil will be permitted on the slopes, compaction shall not be so dense as to prohibit planting. Compacting of the slopes may be done progressively in increments of 3 to 5 feet in fill height or after the fill is brought to its total height.

5.15 Field density tests shall be made'in each compacted layer by the Soil Engineer in accordance with ASTM Test Procedure D1556-64 or ASTM Test Procedure D2922-71. When **sheepsfoot** rollers **are used for compaction, the density tests shall be taken in the compacted material below the surface disturbed by the** roller. **When these tests indicate that the** density **of any layer** of fill, **or portion thereof, is below the required density, it** shall be **reworked until the required compaction has been obtained.**

5.16 No soil shall be placed or compacted during periods of rain nor on ground which is not drained of all free water. Soil which has been soaked and wetted by rain or other cause, shall not be compacted until completely drained and until the moisture content is within the limits hereinbefore described by the Soil Engineer. Prior approval by the Soil Engineer shall be obtained before continuing the grading operations.

6.1 Trenches

6.11 The utility trenches extending under the perimeter foundations and concrete slabs-on-grade floors shall be backfilled with native soils and adequately compacted.

7.1 Subsurface Line Removal (if encountered in the field)

7.11 The methods of removal will be designated by the Soil Engineer in the field depending upon the depth and location of the line. One of the following methods will be used.

7.12 Remove the pipe and fill and compact the soil in the trench according to the applicable portions of Sections 5.1 and 6.1. 7.13 The pipe shall be crushed in the trench. The trench shall then be filled and compacted according to the applicable portions of Sections 5.1 and 6.1.

7.14 Cap the ends of the line with concrete to prevent entrance of water.. The length of cap shall not be less than 5 feet. The concrete mix shall have a minimum shrinkage.

7.15 Any existing wells on the project site must be buried and capped in accordance with the requirements of the County of San Mateo, Department of Public Works. The strength of the cap shall be at least equal to that of the adjacent soil. The final elevation of the top of the wall casing must be a minimum of 36 inches below any adjacent-grade at the completion of any grading or filling operations.' In no case should any house foundation be placed over the capped wells.

8.1 S1_ opes

8.11 Fill slopes shall be graded at gradients no steeper than 2:1 (horizontal to vertical).

8.12 All fill materials on the slopes shall be compacted to the above specified completion requirements. Drainage facilities shall be constructed to prevent water from flowing directly over the top of all slopes, No slope shall be left to stand through a winter season.without erosion control measures having been provided.

' 9.1 Subdrain Installation

9.11 Provide and install perforated metal or plastic pipe, porous concrete. pipe, perforated asbestos cement, or bituminous

Project No. 4516-E

'   12 November 1979

Revised/15 February 1980 or as directed by the Engineer and as specified in Section 68 of the .Standard Specifications, current edition, State of California, Department of Transportation, except as modified in . the following paragraphs.

9.12 Clay drain tile, concrete drain tile and perforated clay pipe will not be permitted. Use no wyes, tees or other joints of these materials.

9.13 Porous concrete pipe, perforated asbestos-cement pipe, or bituminous fiber pipe will not be-permitted either where the subgrade soils are compressible or where the depth of overburden soils exceeds 20 feet. In any event, use of these materials will be permitted only on written authorization of the Engineer.

9.14 Use Type ,B filter material, unless otherwise permitted by written authorization of the Soil Engineer. Delete requirements of State Specifications for quality testing using Los Angeles rattler or sand equivalent tests.

9.15 Unless directed otherwise, use pipes not less than 4-inches in diameter for laterals up to 50 feet in length. Use pipes of not less then 6-inches in diameter for laterals greater than 50 feet in length.

9.16 Excavate trench to width not less than one foot plus outside diameter of pipe, and to a gradient of not less then 2.0%. Bed the pipe on 6 inches of filter material and install at such depth that

there is not less than 2 feet of filter material over the pipe or as directed by the Engineer.

10.1 Unusual 'Cariditions

10.11 In the event that any unusual conditions, not covered by the special provisions, are encountered during the grading operations, the Soil Engineer shall be immediately notified for directions.

Sieve Size	**Percentage Passing**
3/4	**100·**
No. 4	**..10 - 35**
No. 200	**0 - 2**

**Project No. 4516-E 12
November 1979
Revised/15 February
1980**

GUIDE **SPECIFICATIONS** FOR ROCK UNDER FLOOR

SLABS Definition

Graded gravel or crushed rock for use under slabs-on-grade shall consist of a minimum thickness of mineral aggregate placed in accordance with these specifications and in **con-formity with the dimensions shown on the plans.** The **minimum thickness is specified in the accompanying report.**

Material

The mineral aggregate shall consist of broken stone, **crushed,. or uncrushed gravel, quarry** waste **or a combination thereof. The aggretate shall be free from adobe, vegetable** matter, **loam, volcanic tuff, and other deleterious substances. It shall be of such quality that the absorption o£** water in **a saturated dry condition does not exceed 3% of the oven dry weight of the sample.**

Grading

The mineral aggregate shall be of such size that the percentage composition by dry weight, as determined by laboratory sieves (U.S. Sieves)*, will conform to the **following grading:**

Placing

Subgrade,upon which gravel or crushed rock is to be placed, shall be prepared as outlined in the accompanying Soil Report.

FEASIBILITY
GEOTECHNICAL INVESTIGATION

ASCENSION/BEL AIRE P.U.D.

SAN MATEO, CALIFORNIA

PREPARED FOR

WHITECLIFF HOMES

859 NORTH SAN MATEO DRIVE
SAN MATEO, CALIFORNIA 94401

PREPARED BY

CHARLES I. TRANTHAM
ENGINEERING GEOLOGIST
EG 700

RICHARD C. HARLAN
CIVIL ENGINEER 11598

R.C. HARLAN AND ASSOCIATES
geotechnical consultants
55 NEW MONTGOMERY STREET • MAILING ADDRESS P.O. BOX 7717 • SAN FRANCISCO, CALIFORNIA 94120 • (415) 434-3004

PROJECT NO. 114.52 JULY 8, 1981

R. C. HARLAN
AND
ASSOCIATES

CONTENTS

ILLUSTRATIONS

I. INTRODUCTION

This report presents the results of our feasibility level geotechnical investigation for the property of about 12 acres located on the northeast corner of Ascension Drive and Bel Aire Road in San Mateo, California. Location of the site is shown on Figure 1, "Location and Geologic Map". The site is proposed for a townhouse development consisting of two-story, wood-frame structures with related driveways, and an access street. The property has previously been graded. Essentially, the present grading plans are to flatten most of the existing cut slopes, remove eroded colluvial ("infilling") material and replace with large rock and filter cloth, and excavate for street and building pads.

The purpose of this investigation was to develop data to assist in determining the feasibility of the project, and to make recommendations for geotechnical exploration required for design and construction of the proposed project. Our scope consisted of site reconnaissances, study of aerial photographs, geologic mapping, and a review of published and unpublished data contained in our files and listed in the bibliography.

Subsurface exploration was not performed, however, previous exploration data was reviewed including that obtained by Leighton and Associates (October 27, 1977) and Terrasearch, Inc. (November, 1977).

We performed the investigation for Whitecliff Homes, San Mateo, California. The civil engineer is Brian-Kangas-Foulk & Associates of Redwood City, California.

II. SITE CONDITIONS

The project site is an irregular, generally square-shaped parcel of land. It is in a residential area of single family homes. Within the site boundary is a water tank on top of the hill, which is the only man-made structure on the site.

The site is situated in a hilly area. Surface elevation of the site ranges from approximately 410 to 610 feet above mean sea level. Existing natural slopes range from.nearly flat on top of the ridge to 1.5 to 1 (horizontal to vertical) on the flanks, most being between 2 to 1 and 3 to 1. Drainage is down the slopes in a southwesterly direction to Polhemus Creek. Vegetation is generally sparse, consisting of grasses, some brush, and a few trees. A small eucalyptus grove is on the southeast side of the site and pines have been planted around the water tank.

The site has previously been graded, assumedly about 20 years ago. Grading consisted of excavating into the side of the hill for construction of Ascension Drive and Bel Aire Road. The cut slopes were made at 1.5 to 1 with 8-foot wide benches spaced at 30-foot vertical intervals. These benches generally parallel the street. Surface runoff water from the benches has eroded deeply (locally 10 feet plus) into the unconsolidated colluvial materials exposed on the cut slopes and benches. Erosion into the underlying Franciscan Formation bedrock has been minor.

A small abandoned quarry is located in the outcrop of hard sandstone northeast of the water tank. It appears that only a few yards of material were removed several years ago.

of the planned structures. Borcherdt, et al, 1975, developed a map showing maximum earthquake intensity predicted on a regional scale which has five intensity grades (San Francisco Scale): A - very violent, B - violent, C - very strong, D - strong, and E - weak. The project site is within grade "C" on this map. During the 18 April 1906 earthquake, the site probably experienced an intensity of VIII on the Modified Mercalli Intensity Scale (Nason, 1980).

IV. SITE GEOLOGY

The property is underlain by bedrock consisting mainly of sandstone and some greenstone of the Franciscan Formation. 'typically the sandstone is fine-grained to medium-grained, brown, highly-to moderately weathered, moderately hard, and closely fractured. However, local areas of both slightly weathered, hard rock and completely weathered, soft rock are also present. The greenstone ranges from brown, highly weathered, slightly hard, extremely fractured rock to a. gray, slightly weathered, hard, moderately fractured rock.

Locally the bedrock is masked by unconsolidated deposits of colluvium and artificial-fill. The colluvium is unconsolidated material that has undergone some downslope movement. It is a brown sand, silt, and clay mixture containing scattered angular gravel fragments of sandstone and greenstone. Generally it has 1 to 2 feet of gray clayey topsoil developed on the surface. Depth of the colluvium is estimated to range from 1 to 15 feet, and averages about 5 feet.

Geologic structures observed at the site consist of two shear zones and fractures in the bedrock. Both shears contain gouge, slickensides, and highly polished rock fragments. Fractures and joints in the bedrock are typically closely spaced and at random orientation. Bedding is not well developed in most places, but where observed it generally dips northeast at a low angle into the hill.

Slope stability at the site is generally good, particularly as related to large landslides. The site is in an area in which natural soil and bedrock are designated as low and moderate in susceptibility to landsliding, according to Brabb, et al, 1972.. Minor landslides, slumps, and erosion have occurred at the site and are shown on Figure l. The small landslide along Bel Aire Road has occurred in colluvium cut at a slope of 1.5 to 1. East of the water tank is a small landslide in the colluvium started by gullying into which slumping has occurred. No landslides involving bedrock were observed, although the rock along the streets was cut at 1.5 to l slopes. Major rill erosion and gullying has occurred in the cuts made in the colluvium but has only penetrated a maximum of about 3 feet into the completely weathered,-soft sandstone bedrock. Essentially, no erosion has-occurred in the less weathered rock.

The depth to the groundwater table is not known, but it is expected to be relatively deep, reflect the surface topography, and to fluctuate with precipitation. Local seeps and springs were mapped at a few locations in the lower part- of the cut' slope. This seepage is believed to-be mainly perched water flowing from the colluvium at the contact with the less permeable bedrock, or from fractures

in the bedrock- a few feet below the contact. Another area of seepages --(seasonal?) occurs near. the center. of the north property line.. Significant quantities of groundwater are not expected to be encountered during the proposed excavation..

There are no known economic mineral deposits within the property (Bailey and Harden, 1975). A small amount (estimated 10-20 cubic yards) of rock was previously quarried.

Excavations up to 30-feet deep are proposed for the grading of the site. Leighton and Associates (October 2.7, 1977) discussed their seismic refraction survey and rippability characteristics of the bedrock. They concluded the sandstone is rippable to depths of 70± feet using a Caterpillar D8 or D9 with single shank ripper. We are in general agreement with these findings but local zones of hard, nearly massive bedrock may occur that could require the use of a pavement breaker or light blasting, particularly in utility trench excavations. One such zone of hard rock is the old quarry site.

V. DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

We conclude that, from a geotechnical engineering standpoint, the site is suitable for the proposed development provided the recommendations presented in this report are followed. The soilrelated aspects of the project and site are discussed below.

A. Geotechnical Hazards

Potential geotechnical hazards which might have an impact on the project site include: ground shaking, slope instability, erosion, and ground settlement. These potential hazards and mitigation measures are discussed below in decreasing order of probable effect on the site, based on our investigation.

1. Ground Shaking

Seismically-induced ground shaking at the site is predicted to be very strong in the event of a major earthquake, particularly on the San Andreas Fault. Accordingly, structures should be designed for very strong ground shaking.

2. Slope Instability

Slope instability in the form of shallow landslides. and slumping in the colluvial material has occurred at the site. No slides have developed in the bedrock although existing cut slopes are 1.5 to 1. Plans are to regrade the existing cut slope along Bel Aire Road, and the lower two benches along Ascension Drive, to 1.7 to 1 slope with 8-foot wide benches at 30-foot vertical intervals. This will essentially excavate all of the presently eroded colluvial material and increase the stability of the bedrock slope. The slope along Ascension Drive,. above the second bench, is presently stable at 1.5 to 1 except for locally eroded colluvial areas which should be excavated and rebuilt to the existing 1.5 to 1 slope using large rock placed on filter cloth. New cuts made in the completely and highly weathered bedrock should be at 2 to 1 slopes. Cuts should be stable at 1.5 to l slopes in the less weathered sandstone near the old quarry. Cuts in the colluvium should be no steeper than 2 to 1. 3. Erosion

Erosion of the colluvial material is a serious problem at the site. Careful attention to the surface water drainage by flattening the gradient of the benches and piping the water between benches should eliminate most of the problem. Water should not be allowed to flow uncontrolled over slopes. Slopes should be planted and maintained with drought-resistant vegetation.

4. Ground Settlement

Ground settlement is not considered a problem because all structural foundations should be placed on firm, natural materials or well-compacted soil.

B. Grading

Site grading, as presently planned, will consist primarily of excavation with relatively small areas of engineered fill.

Most of the excavation can be performed using heavy construction equipment such as a Caterpillar D8 or D9 with single shank ripper. Local zones of hard rock, particularly in utility trenches, may require use of a pavement breaker or light blasting. Cut slopes should be inclined as previously discussed under "Slope Instability".

Engineered fills of two types are presently planned. One type is the backfilling of gullies and eroded areas on existing slopes of 2 to 1 or flatter by using the stronger, on-site, excavated sandstone. A subdrain should be installed and the fill compacted to 95% relative compaction, ASTM D 1557-70. The other type is the backfilling of eroded areas on existing cut slopes of 1.5 to 1 using filter cloth and large rock. Both types of fills should be keyed into the side hill and all unsuitable material excavated.

C. Foundations

Spread footings or drilled, cast-in-place-concrete piers will provide satisfactory foundation support. On flat pads, spread footings bottomed at code depth will probably be more economical. On and near slopes, deepened spread footings with tie beams could be used, but piers would probably be more economical. In particular, piers will probably be more economical in the area of potentially compressible colluvium, in the northeast portion of the property as reported by Leighton and Associates, October 27, 1977.

D Retaining Walls

Retaining walls may be required locally to support cuts, minor fills, and landscaping. Walls should be backdrained to prevent. hydrostatic pressure buildup, and should be drained to a suitable discharge location.

E. Erosion Control

Drought resistant vegetation established by hydromulching, or controlled irrigated landscaping, will help in the control or-erosion of soil and weathered rock slopes. Less weathered, hard rock slopes should not experience significant erosion.

VI. RECOMMENDED DESIGN LEVEL INVESTIGATIONS

When the project planning reaches an appropriate stage, a design-level geotechnical investigation should be performed to-confirm the applicability of the above findings and to develop detail grading recommendations, foundation design criteria, and other geotechnical data.. The investigation should give consideration to the following items:

- Drilling and sampling of the materials at the site; both the colluvium and the sandstone. This will further establish depth and extent of colluvium, indicate physical properties and conditions of the materials, and provide samples for laboratory testing. At least two borings should be drilled in the sandstone adjacent to the high cut slopes. This drilling program may have to be expanded to determine that sufficient high quality rocky sandstone is present for backfilling eroded areas and gullies.

- Laboratory testing of selected samples to provide strength data for both slope analysis and foundation design. Performing detailed slope stability analysis for cuts and fills.

- Preparing geologic cross sections at various locations on the site.

- Mapping geologic fractures in detail for use in slope stability analysis.

VII. LIMITATIONS AND UNIFORMITY OF CONDITIONS

This feasibility investigation was performed in accordance with present geotechnical engineering standards applicable to this project. In our opinion, the scope of services adequately support the conclusions and recommendations herein. The findings are valid now, but should not be relied upon after two years without our review. Additional investigations are necessary before final design and construction.

The recommendations of this report are based upon the assumption that the subsurface conditions do not deviate from those interpreted from the surface and subsurface data of this investigation. The recommendations of this report are intended for the site described only and must not be extended to adjacent areas.

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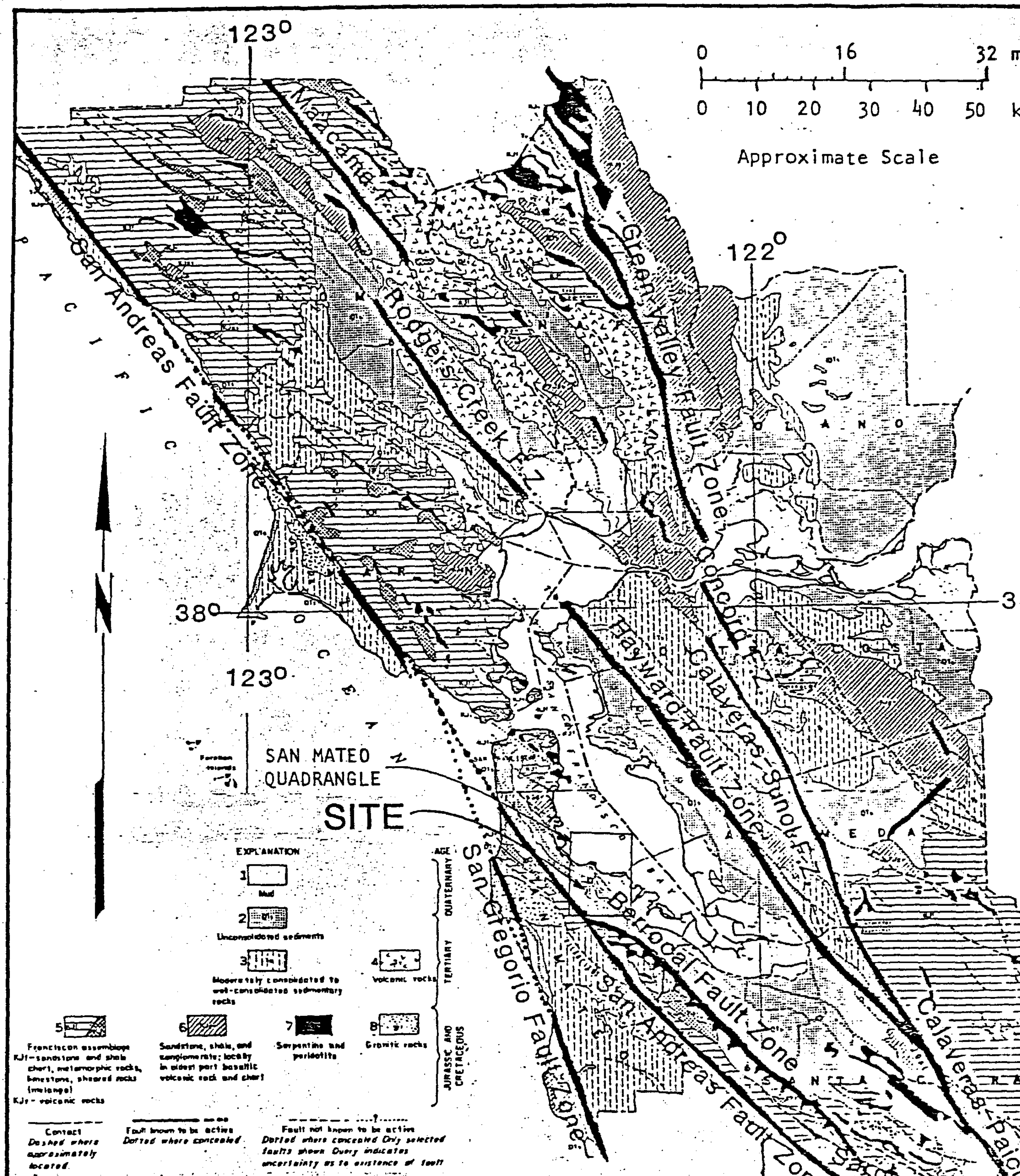

NOTES:

1. Generalized geologic map by J. Schlocker, 1970.

2. Principal recently active faults by Darrell G. Herd, 1979.

R. C. HARLAN AND ASSOCIATES 55 NEW MONTGOMERY STREET SAN FRANCISCO, CALIFORNIA 94105	REGIONAL GEOLOGIC MAP ASCENSION/BEL AIR P.U.D.	FIGU 2

GEOTECHNICAL AND ENGINEERING GEOLOGIC INVESTIGATION

Proposed Ascension Heights Subdivision
San Mateo County, California

Prepared for:
Mr. Dennis Thomas
December 16, 2002

Michelucci & Associates, Inc.
Geotechnical Consultants

Joseph Michelucci, G.E.
Daniel S. Caldwell, G.E.
Richard Quarry

December 16, 2002
Job No. 01-3186

Mr. Dennis Thomas

San Mateo Real Estate, Inc.
1777 Borel Place, Suite 330
San Mateo, California 94402

Re: Geotechnical and Engineering Geologic Investigation
Proposed Ascension Heights Subdivision
San Mateo County, California

Dear Mr. Thomas:

As authorized, we have completed a geotechnical and engineering geologic investigation of the site of a proposed residential development located along Ascension Drive and Bel Aire Road in unincorporated San Mateo County, California.

It is our basic conclusion that the sloping site, which is composed primarily of dense sandstone bedrock, is suitable for the proposed development, provided that the recommendations contained within this report are incorporated into the final plans and followed during construction.

We are pleased to have been of service to you on this project, and will be available to review our findings with you and your other consultants at the earliest convenience.

Very truly yours,

David Hoexter Certified Engineering
Geologist #1158
(ex res 11/30/03)

Joseph Michelucci
c Geotechnical Engineer #593
(expires 3/31/03)

cc: Lea & Sung Engineering

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GEOTECHNICAL AND ENGINEERING GEOLOGIC INVESTIGATION
PROPOSED ASCENSION HEIGHTS SUBDIVISION
SAN MATEO COUNTY, CALIFORNIA

INTRODUCTION .

This report covers our investigation of the soil and bedrock conditions that occur at the site of the proposed 14.5 acre residential development located adjacent to Ascension Drive and Bel Aire Road, near San Mateo, in unincorporated San Mateo County, California. The location of the site is shown on the Site Location Map, included as Figure 1 of this report. The regional geologic setting is illustrated on Figure 2. An overview of the planned development, including the location of test borings from a previous study and test borings and exploration pits associated with this study, is included on the attached Site Plan/Engineering Geology Map, Figure 3A. Ground surface profiles showing subsurface geologic features are shown on Figure 3B.

The purpose of our study was to evaluate the soil and bedrock conditions that occur at the site, and to provide recommendations and design criteria pertaining to building foundations, site grading, retaining walls, drainage, erosion, and other items that relate to the site soil and geologic conditions.

DESCRIPTION OF PROJECT

The hillside project site is located along the sides of a knoll and is s currently unimproved with the exception of a large cylindrical water tank, which is owned by the California Water Service and a paved road that services the tank. We understand' that future development plans will call for the construction of about 25 building lots that will eventually be improved with single-family dwellings. Access to the subdivision will be from Ascension Drive as shown on Figure 3A. The roadway leading to the water tank is to be abandoned, and access to the 0.52 acre Water Service property will be from a new driveway to the east of the tank as shown on Figure 3A.

Current plans call for excavating on the order of 93,000 cubic yards of soil and bedrock and the placement of about 7000 cubic yards o f engineered fill. Thus on the order of 86,000 cubic yards of material will be removed from the site. The project will also feature improvement of site drainage and the repair of previous erosional features along existing cut slopes associated with the original development of Ascension Drive and Bel Aire Road, between 1955 and 1961.

SCOPE OF SERVICES

Our study included:

1. Detailed site inspections by our geotechnical and engineering geologic personnel and mapping of site features;

2. A review of about a dozen files for other projects our firm has completed in the site vicinity, including nearby projects on Ascension Drive, Bel Aire Road and Valley View Court;

3. The review of a previous soil investigation on the subject property prepared by Terrasearch, Inc. in 1979. The report included the logs of 8 test borings which are appended to this report. We also reviewed a subsequent 1981 feasibility geotechnical investigation (no additional subsurface information) by R.C. Harlan and Associates;

4. The review of Tentative Subdivision Map Preliminary Grading and Drainage Plan, prepared by Lea & Sung Engineering, Inc., dated August 23, 2002;

5. Discussions with representatives of Lea & Sung Engineering, meeting with representatives of Lea & Sung, San Mateo County, and neighborhood groups;

6. A review of available published geologic maps and literature;
7. Stereoscopic examination of aerial photographs taken between 1946 and 2000;

8. The excavation of 19 exploratory test borings excavated with various types of drilling and sampling equipment;

9. The recovery of samples from the borings, and the performance of a variety of engineering tests upon the various soil and bedrock layers encountered;

10. The excavation of 16 test pits utilizing a track-mounted backhoe, and geologic logging of the materials exposed in the pits;

11. The performance of geotechnical engineering analysis utilizing the above items; and,

12. The preparation of this report.

FIELD INVESTIGATION AND LABORATORY TESTS

In order to evaluate the geotechnical engineering characteristics of the soil and bedrock layers which underlie the site, 19 borings were drilled at the approximate locations indicated on the attached Site Plan/Engineering Geology Map, Figure 3A. The borings were drilled under the supervision of our staff geologist and geotechnical engineer during November and December 2002, with track-mounted, portable "Minuteman", and hand augering equipment. Relatively undisturbed samples were recovered from the borings at selected intervals with free-falling, 70- to 140-pound hammers (with 30 inch drops) and a hydraulic hammer advancing modified California drive and standard penetration samplers 18 inches into the subsurface soil and rock layers.

As the borings were excavated, logs of the materials encountered were prepared based upon an inspection of the recovered samples and auger cuttings. The final boring logs, as presented on the attached Figures 4 through 22, are based upon the field logs with occasional modifications made upon further laboratory examinations of the recovered samples and laboratory test results.

Laboratory tests performed included the determinations of moisture content, dry density and unconfined compressive strength of selected samples. The results of these tests, along with the resistance to penetration of the sampler, are listed opposite the corresponding sample location on the final boring logs, Figures 4 through 22.

We also logged the excavation of 16 test pits that were made with a backhoe. Logs of the test pits are included on the attached Figures 23 through 38. The approximate locations of the test pits are included on Figure 3A.

In addition, we performed a plasticity index test upon a representative sample of the near surface soils. The results of this test, which is useful in evaluating the shrink-swell characteristics of the material tested, are included on the attached Figure 39.

SITE CONDITIONS

The hillside property is located along an elongated knoll; the primary axis of the knoll is in a southeast/northwest direction. A water tank is located at the top of the knoll and the lands around the tank are owned by California Water Service, and are not a part of the proposed subdivision. The topography in the areas to be developed slopes generally downward from the water tank pad at an average inclination that is on the order of 2 horizontal to 1 vertical. The upper portions of the site are more gently sloping than the downhill areas, especially along the existing benched cut slopes along Ascension Drive and Bel Aire Road, which slope at an average of 1.9 horizontal to 1 vertical above Ascension Drive and 1.6 horizontal to 1 vertical above Bel Aire Road. The maximum site elevation is approximately 714 feet, at the base of the water tank. The lowest elevation is approximately 502 feet, at the intersection of Ascension Drive and Bel Aire Road.

The property is covered with a growth of seasonal grass and bushes, along with scattered pines and a prominent grove of eucalyptus trees. An access road leading to the water tank from Bel Aire Road is paved, and a few unpaved roadways and trails exist along the uphill portion of the property. The water tank access road reportedly overlies one of two buried water lines feeding or leading from the tank. The other line is located along a utility easement on the northeast-facing slope of the knoll.

Extensive soil erosion has occurred on portions of the site. There are four primary areas where erosion has affected the existing cut/benched slopes above Ascension Drive and Bel Aire Road. These areas are shown on Figure 3A. These areas are almost entirely located within the areas of earlier excavated cuts, or originate along abandoned bulldozer tracks located at higher elevations. Areas of erosion occur broadly along the excavated slope cuts, and below or along surface drainage channels. One relatively small, additional, area of erosion is located along the southeastern slope, below the water tank. This area appears to be a natural slope. The erosion reportedly occurred following a sudden large volume release from the water tank in the 1960s. It is not apparent on the 1961 aerial photos, but appears fresh on 1969 photos (see discussion of air photos in subsequent section of this report).

A small abandoned rock quarry is located southeast of the water tank. A few yards of rock was removed from this location at some time in the past.

SOIL AND BEDROCK CONDITIONS

The surface soil conditions encountered at the site consisted generally of a thin layer of brown to tan brown sandy to silty clay (colluvium/residual soil). This material was commonly less than 3 feet thick, and tested very low in expansion potential (Figure 39). The surface soil was primarily underlain by dense to very dense tan to yellow brown sandstone bedrock. It should be noted that the sandstone encountered in our exploratory borings and pits generally became less weathered, and thus stronger and more cemented with depth. It should also be noted that none of the borings or test pits encountered shale or sheared rocks, which have been mapped elsewhere in the area. (As will be discussed in the "geology" section of this report, it is our opinion that the site is primarily underlain by Franciscan sandstone).

The sandstone was commonly fractured at shallow depth. - Fracture orientations were variable, with no prominent out of slope fracturing. The fractures were observed at the ground surface within the slope cuts, and within test pits, although decreasing is n number with depth. We did not observe indications of bedding within test pits or surficial rock exposures.

Groundwater was not encountered in any of the borings at the time of drilling. Groundwater levels, however, tend to fluctuate seasonally, and could rise to the depths explored in the future. Shallow, seasonal "perched" groundwater sometimes occurs in the topsoil layer when the soil is underlain by dense, less pervious, bedrock. We observed groundwater seepage from the base o f weathered rock and above the less pervious rock along Ascension Drive.

For a more complete description of the soil and bedrock layers encountered in the borings and test pits, refer to the Boring and Test Pit Logs, included as Figures 4 through 38.

REGIONAL GEOLOGIC SETTING

The site is located within the central region of the Coast Ranges Geomorphic Province, which extends from the Oregon border south t o the Transverse Ranges. The general topography is characterized by subparallel, northwest trending mountain ranges and intervening valleys. The region has undergone a complex geologic history o f sedimentation, volcanic activity, folding, faulting, uplift and erosion. The relatively flat-lying, alluviated San Francisco Bay Plain is situated to the east of the site; the uplifted Santa Cruz Mountains are located to the west of the site.

Based on Pampeyan (1981, 1994), the general site vicinity is mapped to be underlain by Cretaceous age Franciscan Complex Rocks (Figure 2, Regional Geology Map). These rocks in the site vicinity are primarily shale, chert, sandstone and greenstone. These rocks are commonly sheared and distorted by past tectonic activity. Based on the geologic references, the site is underlain by the Franciscan "Sheared Rock" unit (often referred to as Franciscan "Melange"), described as predominantly sheared shale, siltstone and graywacke

sandstone, containing various inclusions of other Franciscan rock types. The bedrock is overlain by younger unconsolidated residual and colluvial soil deposits. The unit commonly erodes to "badlands-type" topography.
Pampeyan does not identify definitive bedding, shears, faults or landslides in the immediate vicinity.

SITE GEOLOGY

The site has been mapped to be underlain by Franciscan Complex "Sheared Rocks", which on a regional basis primarily consists o f sheared shale, siltstone and sandstone. Based on our geologic mapping, the site is primarily underlain by generally dense to very dense sandstone.

There are no indications of extensive shearing, although two shear zones are noted by R.C. Harlan and Associates (1981). The locations are not identified within the Harlan report, although they are possibly shown on a site plan which is absent from the report copy supplied to our office.

There are no indications of deep-seated soil or bedrock landsliding at the site. Shallow soil slumps appear on pre-development air photos, but are of limited extent, and were largely removed by the late 1950s site grading. A relatively broad, shallow bowl-shaped area occurs on the southwest slope (see Figure 3A). We placed test pits and exploratory borings within this area, and observed shallow bedrock within a few feet of the ground surface, and no indications of landsliding.

There are no indications on the air photos or during our geologic mapping of debris flow scars or deposits.
The soil on the northeast facing slope is relatively richer in clay and silt than elsewhere on the property. This has resulted in a thicker soil horizon and increased water content within the soil.

As noted elsewhere in this report, extensive soil erosion and gullying has occurred above Ascension Drive and Bel Aire Road. Gullies approach 10 feet in depth, although most erosion is on the order of 2 to 3 feet deep. The erosion has occurred in residual soil and in highly weathered sandstone. The deepest gullies are primarily located within former bulldozer tracks and where benches and v-ditches discharge. Some areas of erosion, particularly along the eastern area of the southeast slope above Ascension Drive, appear to have developed in conjunction with shallow soil slumping on the order of one to two feet in depth.

There are no surface features that are indicative of active faulting at the site. The site does not lie within a State of California Earthquake Fault Zone (CDMG, 1974). The closest mapped active fault to the site is the San Andreas located approximately 1.1 miles (1.75 kilometers) to the southwest. The San Andreas, and numerous other active and potentially active Bay Area faults, are capable of producing moderate to major earthquakes that could cause severe ground shaking at the subject site in the future. This hazard is shared in some degree by all land and structures in the San Francisco Bay Area.

We conducted a portion of our field investigation shortly following a rainfall period of approximately 2 days with precipitation on the order to 2 to 3 inches. We observed active seepage of water from the toe of the cut slope adjacent to Ascension Drive and from the base of the weathered rock horizon (overlying less weathered rock) 1 to 2 feet below the ground surface. It appears that the erosion occurs primarily within this zone, and that groundwater, except possibly as relatively slow seepage, does not penetrate to greater depth.

AIR PHOTO INTERPRETATION

We interpreted 9 sets of air photo stereo pairs, taken from 1946 through 2000. The specific photo pairs are listed in the References section of this report, which includes specific dates and scales. The photos provided a clear indication of the pre- and post-grading conditions of the site.

1946

The 1946 images pre-date grading in the vicinity. Although few of the existing cultural features, including the water tank, are present, the site location is easily discerned. Polhemus Road is the only road in the site vicinity. Random cattle paths and jeep tracks are located across the site and surrounding area. The site is a prominent isolated hill with a steep slope to the southwest and northwest, and lesser slopes in the other directions.

The slope is relatively uniform from the top of the hill to the current Ascension Drive location. The lower half of this slope exhibits apparent shallow soil slumping. The overall appearance o f the site is of relatively shallow soil, with indications of near surface bedrock. There is a broad swale from near the crest of the hill down towards Ascension Drive (see Figure 3A). There are no indications of deep-seated landsliding or soil movement within this area or on other portions of the site. However, slopes below Ascension Drive (southwest of the site) are hummocky and have the appearance of landslides (landslides have occurred on these off-site slopes in recent years).

1955

The 1955 images pre-date the extensive subsequent grading in the site vicinity. Parrott Drive and adjacent residences have been constructed. There are erosion gullies on the slopes below Ascension Drive, off-site, but none on the site. This suggests a thicker soil profile downslope of the site.

1961

Ascension Drive and BelAire Road have been constructed,in conjunction with grading of the on-site slopes above the roads. Narrow benches have been constructed on the cuts, with v-ditches along the benches. Several ditches and equipment tracks are visible; these subsequently are the locations of soil erosion gullies.

1969

Extensive soil rill erosion is apparent on much of the cut faces. Current (2002), deep erosion gullies are located within or immediately below the dozer trails noted in the 1961 imagery. There is no significant erosion on natural (ungraded) slopes within the site, with the exception of one area southeast of the tank. This is the area of the reported earlier water release from the tank, although there is no apparent continuation of the erosion upslope to the tank in the 1969 images.

<u>1975-2000</u>

The site is effectively unchanged during this 25 year period. Vegetation matures over the years, but there are no indications o f landsliding or additional significant erosion areas. The previously noted erosion continues to be evident and on-going, with some areas remaining barren of vegetation.

CONCLUSIONS

Based upon our study, it is our opinion that the project can be developed as planned, provided that the recommendations contained within this report are followed. Our subsurface exploration program, coupled with our geologic mapping, laboratory testing, and research indicate that the site is typically composed of very dense sandstone bedrock. The site topography is in the shape of a resistant knoll which reflects the dense and resistant nature of the bedrock. Such material will support the proposed improvements with minimal settlement.

We did not observe any evidence of deep seated previous slope instability, and, in our opinion, the risk of future deep seated landsliding is low. In fact, the planned removal of material from the top of the site, along with a significant reduction in the amount o f water that will seep into the ground during rainfall (due to paved surfaces,roofs,and area drains that will collect water) will significantly increase the factor of safety of the hillside with respect to slope stability. A primary geotechnical consideration will involve repairing the existing erosional features, and improving site drainage in these areas. We have provided recommendations for such repair and drainage improvements in this report.

RECOMMENDATIONS

The following recommendations are contingent upon our firm being retained to review the development plans and to observe the geotechnical aspects of construction.

A. Grading

All grading should be performed under the observation of a representative from our firm and in accordance with the attached "Guide Specifications for Engineered Fill". Prior to the commencement of grading, the areas to be graded should be stripped to remove all grass, weeds, and other deleterious materials. In addition, brush and trees should be removed, along with their root systems. In areas to receive fill where trees are removed, it will be necessary to carefully backfill the stump excavations with engineered fill.

After the site has been stripped to our satisfaction, a key should be excavated at the toe of any planned fill slope. Actual key widths should be determined when grading commences, as it will slightly depending upon the width of the compaction equipment Generally, a 12 to 15 foot wide key will accommodate compaction equipment. Fill can then be brought into the key in thin lifts, moistened or aerated as required, mixed, and compacted. All fills should be compacted to a minimum degree of compaction of 95 percent based upon ASTM D1557, latest revision.

As the level of the fill rises, horizontal benches should be excavated into the hillside, so that a strong bond is maintained between the newly placed engineered fill and strong rock.

The downhill side of the key excavation should have a minimum depth of 18 inches into strong bedrock. This will probably require that the keyways have overall depths on the order of 2 to 3 feet measured at the downslope edge of the key. All horizontal benches should remove the surface soil and extend into strong residual soil or dense bedrock as approved by our representative. The maximum finished fill slope inclination should not exceed 2 horizontal to 1 vertical (with the exception of areas where geogrid slope reinforcing material is used. In these areas steeper slopes may be considered). All fill slopes should be somewhat overbuilt and then trimmed to expose strong compacted soil. Any cut slopes should also not exceed 1 1/2 horizontal to 1 vertical in bedrock, and the upper portion of cuts where any soil is exposed should be trimmed to 2 horizontal to 1 vertical in the upper 2 feet. All
be inspected by our engineering geologist. If bedding or joint planes are encountered in the additional recommendations may be necessary.

It may be necessary to place subdrainage beneath fills that have a thickness greater than 4 feet, or in areas where seepages are encountered. All subsurface drainage should be constructed in n accordance with the attached "Guide Specifications for Subsurface Drains".

The dense nature of the sandstone bedrock will require heavy grading equipment to successfully excavate. As noted, the density and cementation of the bedrock was found to increase with depth.

The above recommendations are illustrated in profile view on the attached Figure 40.

B. Repair of Erosional Features

As noted, several areas of erosion have occurred on the existing steep cut slopes above Bel Aire and Ascension Drive. There are a number of options that may be considered to stabilize these erosion features. The borings that we excavated in these areas encountered very strong, resistant sandstone bedrock at relatively shallow depths and this rock may be used as a "foundation" for various repair options.

One option would involve excavation and removal of the material affected by erosion (in areas where the topography allows a cut t o "daylight" at acceptable inclinations). This option could be considered in the prominent gully above the Bel Aire/Ascension intersection.

Another option would involve excavation of a "keyway" at the base of the slope in the erosion areas (or in some cases where resistant rock is exposed at the base of the erosion area). The slope could then be rebuilt with compacted and drained engineered fill with a geogrid to allow slope reconstruction at a steep inclination (The manufacturer's specifications could be used to design grid type and grid spacing for various finished slope inclinations). We have included a typical detail for slope reconstruction utilizing geogrid on the attached Figure 41.

A third option would involve construction of structural retaining walls or terrace walls in the erosion areas. Consideration could be given to constructing a wall at the top of the eroded area and then trimming the erosional features away from below the wall.

Whatever options are chosen, it is essential that the finished slopes be planted with erosion resistant vegetation (and lined with a jute type mesh). Improvement of surface drainage above the repair areas and subsurface drainage (if regrading takes place) is important.

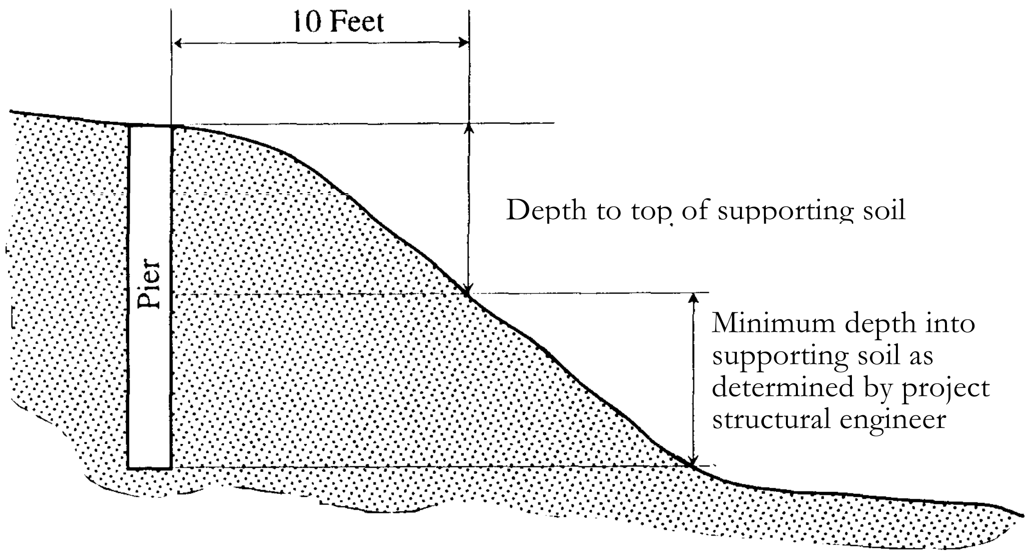
C. Foundations

In our opinion, the proposed residences may be constructed upon drilled, cast-in-place, reinforced concrete pier and grade beam foundations, or spread footings, whichever proves appropriate for the minimum depth criteria presented below. The chosen foundation system should anchor the proposed structures into strong bedrock. Based upon our current understanding of the project, we anticipate that spread footings may be best suited for the uphill lots with drilled piers on the downhill lots.

C1. Drilled Piers

The bedrock at the site is very dense and drilling equipment capable of drilling through hard rock should be used. Drilled piers should be designed on the basis of a skin friction value of 500 psf beginning at the top of supporting material. In this case, the top of supporting material should be assumed to begin at a depth of 2 feet, 1 foot below the top of bedrock, or as defined by the "Rule of Ten" criteria illustrated below, whichever is deeper. The depth may be modified by our representative during construction, especially if very dense bedrock areas are encountered.

DRILLED PIER FOUNDATIONS



Pier depths should be based upon actual design loads at each pier location. However, as a minimum, the piers should extend 6 feet below the top of supporting material. Therefore, it is anticipated that average pier depths will be on the order of 8 to 11 feet below existing grades.

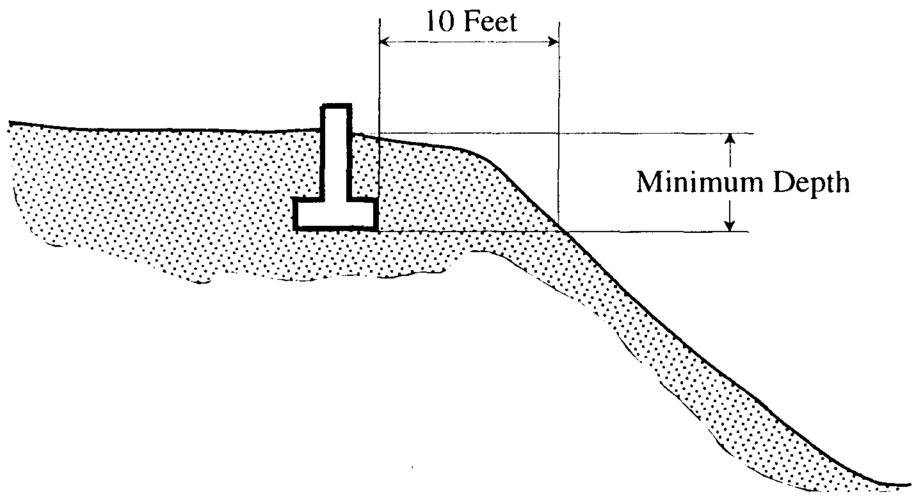
In addition to vertical loading, the piers should be designed to resist a horizontal "creep" load equal to a fluid weighing 50 pounds per cubic foot, which should be projected over 2 1/2 pier diameters. This lateral load should be designed to extend to a depth of 2 feet below finished grade. The piers can resist the lateral load through a passive resistance of 350 pounds per cubic foot, projected over 2 pier diameters. The passive value begins at the top of supporting material, as defined above. The creep load will not apply in areas that the upper few feet of soil has been excavated, or in areas that piers are to extend through engineered fill, as any weak surface soil will have been removed. It is suggested that the structural engineer contact us during the design phase, so that a specific lateral load criteria can be developed for each pier location.

Reinforcing for the piers should be determined by the structural engineer based upon anticipated loading.

C2. Spread Footings

Spread footings may be used if the footings extend to a minimum depth of 18 inches, 12 inches into strong bedrock, or as illustrated by the "Rule of Ten" criteria presented below, whichever is deeper. The "Rule of Ten" takes into account the reduction in bearing capacity that shallow foundations experience when located on o r near sloping terrain.

SPREAD FOOTING FOUNDATIONS



At the recommended minimum depth the footings can be designed for an allowable bearing pressure of 3000 psf for dead loads and 3250 for dead plus live loads. This value may be increased by 33 per cent to account for all loads, including wind and seismic.

D. Seismic Design Parameters

The State of California has adopted the 1997 Uniform Building Code (UBC) and 2001 California Building Code (CBC) with respect to seismic design considerations. Due to the very dense nature of the bedrock encountered during our study, it is our opinion that the site may be classified as "SB" (Rock Profile) for the purpose of structural engineering and as defined in Section 1636 of the 1997 UBC and 2001 CBC.
The site, as well as the entire Bay Area, is located within Seismic Zone 4. Thus, a Seismic Zone Factor, Z, of 0.40 applies to the site. From Tables 16-Q and 16-R of the 1997 UBC and 2001 CBC, Seismic Coefficients "Ca" and "Cv" of 0.40Na and 0.40Nv, respectively, can be used for a Seismic Zone Factor, Z, of 0.40 and a soil profile of "SB”.

The International Conference of Building Officials (ICBO) published a set of maps titled "Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada" that are to be used in conjunction with the above-referenced UBC. Based upon these maps, the San Andreas Fault, which is located about 1.75 kilometers to the southwest, is considered a Seismic Source Type A. Thus, Tables 1 6S and 16-T of the 1997 UBC and 2001 CBC can be used to determine Near-Source Factors "Na" and "Nv" based upon the above information. A Near-Source Factor "Na" of 1.5 and a Near Source Factor "Nv" of 2.0 can be used in the design.

E. Retaining Walls

Retaining walls should be constructed upon foundations designed in accordance with Section B above. All retaining walls should be designed to resist the active equivalent fluid pressures tabulated below.

WALL BACKSLOPE INCLINATION (H:V)	EQUIVALENT FLUID PRESSURE (pcf)
Level	35
4h:1v	40
3h:1v	45
2h:1v	50

When walls are to be rigidly restrained from rotation, a uniform surcharge pressure of 75 psf should be added to the design values. Interpolation can be used to determine pressures for intermediate inclinations.

Passive resistance can begin at the top of supporting material, as defined above, and can be taken as a value of 350 pcf. If drilled piers are used to support the wall, this value can be projected over 2 pier diameters. In areas where spread footings are appropriate, a friction factor of 0.35 can be incorporated into the design.

It is important that adequate subdrainage be constructed behind retaining walls. We have included a Typical Subdrain Detail on Figure 42. The subdrains should also be constructed in accordance with the attached "Guide Specifications for Subsurface Drains." In addition, moisture proofing should be provided in areas where moisture migration through retaining walls would be undesirable. Moisture proofing details are the responsibility of the project architect.

F. Slab-On-Grade Construction

It is anticipated that the only slab-on-grade construction will be for the garage floors of uphill lots. The slabs should be reinforced with steel bars and cast upon firm natural soil, rock, or engineered fill. It is recommended that some type of moisture prevention be provided beneath the slabs. We have included a minimum, but commonly used treatment on the attached Figure 43. We also recommend that a network of "finger drains" be constructed in areas to receive slabs to mitigate the potential of water affecting the slabs. Finger drains should be constructed in accordance with Figure 44.

G. Surface Drainage

We recommend that the site be fine-graded to direct surface water to flow away from the building foundations. As a general requirement, stormwater should not be allowed to pond or flow in concentrated streams or channels on the site. Such ponding or flows and the resulting saturation can weaken the soils and perhaps cause some minor site erosion.

It is further recommended that all roof downspouts be led into tightline disposal pipes that deposit water well away from building foundations and into a suitable disposal area. Rigid PVC pipe should be used. In no case should corrugated flex type pipe be used.

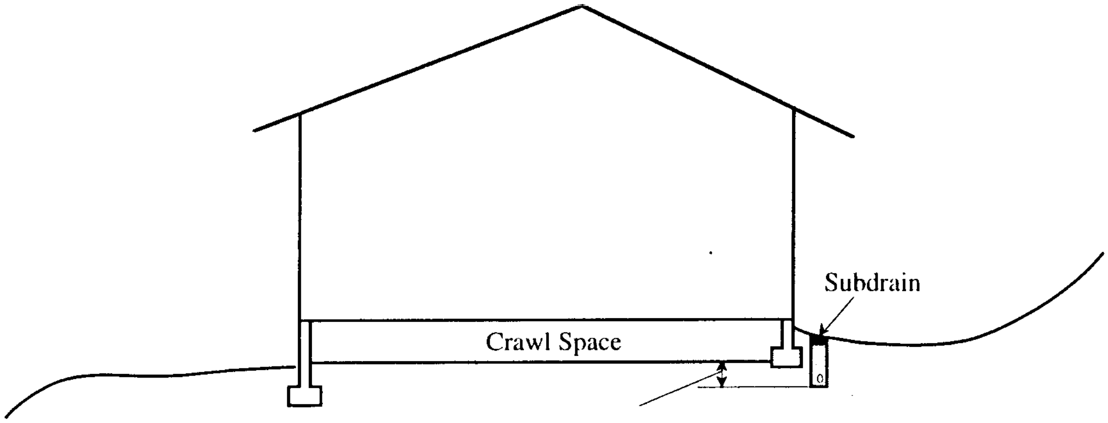
It will also be necessary to construct concrete "v" ditches at strategic locations to protect slopes. The civil engineer should locate such drains and provisions to maintain the drains will be important. Failure of "v" ditches is a common problem at similar sites. Therefore, due to the steep slopes and history of erosion, it i s recommended that the design be particularly 'conservative.

H. Subdrainage

All subdrainage should be constructed in accordance with the attached "Guide Specifications for Subsurface Drains". As noted, subdrainage should be constructed behind retaining walls as illustrated on Figure 42. Subdrains should also be placed beneath engineered fills that have depths greater than 4 feet and in areas where any seepage zones (or potential seepage zones) are encountered.

In order to reduce the potential for water to seep into the building "crawl areas", it is also important that a foundation drain be constructed along the uphill and sidehill sides of the structures as is illustrated below. If the uphill foundation wall is a retaining wall, the wall subdrain will serve this purpose.

FOUNDATION SUBDRAIN AT UPHILL SIDES OF STRUCTURE



Subdrain to extend at least 6 inches below elevation of adjacent crawl space.

The above subdrain should be constructed in accordance with the specifications for retaining wall subdrainage included on Figure 42. In our opinion, it would also be prudent to construct an "outlet" through the footing or grade beam at a low point within the crawl space. Such an outlet would allow any moisture that entered the subfloor area to be dissipated. The crawl space soil or rock surface should be graded to slope to the outlet, with no isolated low areas that could trap water.

I. Pavements

Final pavement design will be dependent upon the anticipated traffic and the materials exposed at the subgrade levels. For preliminary design purposes, a pavement section of 3 inches of asphaltic concrete underlain by 8 inches of Class 2 aggregate base material can be anticipated for the roadway. When traffic indexes (T.I.) become available, we will be able to provide additional input regarding pavements.

J. Review of Plans and Construction Observations

It is recommended that all of the plans related to our recommendations be submitted to our office for review. The purpose of our review will be to verify that our recommendations are understood and reflected on the plans, and to allow us to provide supplemental recommendations, if necessary.

It is important that we be retained to provide observation and testing services during construction. Our observations and tests will allow us to verify that the materials encountered are consistent with those found during our study, and will allow us t o provide supplemental, on-site recommendations, as necessary.

LIMITATIONS

The conclusions and opinions expressed in this report are based upon the exploratory borings and test pits that were excavated on the site, spaced as shown on the Site Plan/Engineering Geology Map, Figure 3A. While in our opinion these exploration borings and pits adequately disclose the soil and bedrock conditions across the site, the possibility exists that abnormalities or changes in the soil conditions, which were not discovered by this investigation, could occur between borings.

This study was not intended to disclose the locations of any existing utilities, hazardous wastes, or other buried structures. The contractor or other people should locate these items, if necessary.

The passage of time may result in significant changes in technology, economic conditions, or site variations that could render this report inaccurate.
This report was prepared to provide engineering opinions and recommendations only. It should not be construed to be any type o f guarantee or insurance.

REFERENCES

Aerial Photographs

Pacific Aerial Surveys (PAS) black and white stereo pairs:

Film I.D.	Scale	Date
PAS-AV-9-16-7/8/9	1:23,600	7/29/46"
PAS-AV-170-10-10/11	1:10,000	5/10/55*
PAS-AV-432-10-17/08	1:12,000	6/20/61 *
PAS-AV-933-10-06/07	1:12,000	6/30/69*
PAS-AV-1188-08-14/15	1:12,000	5/12/75
PAS-AV-2265-09-06/07	1:12,000	6/6/83
PAS-AV-2670-9-7/8	1:12,000	10/15/85
PAS-AV-4916-309-9/10	1:12,000	9/7/95
PAS-AV-6600-10-7/8	1:12,000	8/16/00*

* These photos were most-utilized in interpreting the site geologic conditions.

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Brabb, E.E, and Pampeyan, E.H, 1972, Preliminary Map of Landslide Deposits in San Mateo County, California: USGS Miscellaneous Field Studies Map MF-344, scale 1:62,500.

California Division of Mines and Geology, 1974, San Mateo 7.5' Quadrangle, Special Studies Zones, Official Map, July 1, 1974; Scale 1:24,000.

International Conference of Building Officials, April, 1997, 1997 Uniform Building Code, Volume 2 Structural Engineering Design Provisions.

International Conference of Building Officials, February, 1998, Maps of Known Active Fault Near- Source Zones in California and Adjacent Portions of Nevada. (To be used with 1997 Uniform Building Code)

Leighton and Associates, 1976, Geotechnical Hazard Synthesis Map of San Mateo County, California: geotechnical consultant's December maps to the County of San Mateo Planning Department, Sheet 2, scale 1:24,000.

Pampeyan, Earl H., 1981, "Geology and Former Shoreline Features o f the San Mateo 7.5-Minute Quadrangle, San Mateo County, California", USGS Open file Report 81-839, Scale 1: 12,000.

....., 1994, "Geologic Map of the Montara Mountain and San Mateo 7 - 1/2' Quadrangles, San Mateo County, California", USGS Miscellaneous Investigations Series Map I-2390, Scale 1:24,000.

Unpublished Maps and Reports

(R.C.) Harlan and Associates, 1981, "Feasibility Geotechnical Investigation, Ascension/Bel Aire P.U.D, San Mateo, California", report dated July 8, 1981.

Lea & Sung Engineering, Inc. 2002, "Tentative Subdivision Map, Preliminary Grading and Drainage Plan, Ascension Heights Subdivision, San Mateo, California (Unincorporated) San Mateo County", Sheet C-3, August 23, 2002, Scale 1 " = 40'.

Terrasearch, Inc, 1979, "Soil Investigation on Proposed Subdivision, Northeast Corner of Ascension Drive and Bel Aire Road, San Mateo County, California", report dated November 12, 1979 revised February 15, 1980.

A. GENERAL

1. Definition of Terms

FILL ... is all soil or soil/rock materials placed to raise the grade of the site or to backfill excavations.

ON-SITE MATERIAL ... is that which is obtained from the required excavations on the site.

IMPORT MATERIAL ... is that hauled in from off-site areas.

SELECT MATERIAL ... is a soil material meeting the requirements set forth in "C(2)" below.

ENGINEERED FILL ... is a fill upon which the Geotechnical Engineer has made sufficient tests and observations to enable him to issue a written statement that in his opinion the fill has been placed and compacted in accordance with the specification requirements.

AASHTO SPECIFICATIONS ... are the Standard Specifications of the American Association of State Highway Officials, latest revision.

ASTM SPECIFICATIONS ... are the Annual Book of ASTM Standards (Part 19), American Society for Testing and Materials, latest revision.

MAXIMUM LABORATORY DENSITY ... is the maximum density for a given fill material that can be produced in the laboratory by the Standard procedure ASTM D1557, "MoistureDensity Relations of Soils Using a 10-Pound (4.5 kg) Hammer and an 18-Inch (457 mm) Drop" (AASHTO Test T-180, "Moisture-Density Relations of Soils Using a 10 -Pound Hammer and an 18-Inch Drop").

OPTIMUM MOISTURE CONTENT ... is the moisture content at which the maximum laboratory density is achieved using the standard compaction procedure ASTM Test Designation D1557 (AASHTO Test T-180).

DEGREE OF COMPACTION... is the ratio, expressed as a percentage, of the dry density of the fill material as compacted in the field to the maximum laboratory dry density for the same material.

2. Responsibility of the Geotechnical Engineer

The Geotechnical Engineer shall be the Owner's representative to observe the grading operations, both during preparation of the site and compaction of any engineered fill. He shall make enough visits to the site to familiarize himself generally with the progress and quality of the work. He shall make a sufficient number of field observations and tests to enable him to form an opinion regarding the adequacy of the site preparation, the acceptability of the fill material, and the extent to which the degree of compaction meets the specification requirements. Any fill where the site preparation, type of material, or compaction is not approved by the Geotechnical Engineer shall be removed and/or recompacted until the requirements are satisfied.

3. Soil Conditions

A soil investigation has been performed for the site by Michelucci & Associates, and a report has been prepared. The Contractor shall familiarize himself with the soil conditions on the site, whether covered in the report or not, and shall thoroughly understand all recommendations associated with the grading.

B. SITE PREPARATION

1. Stripping

Prior to any cutting or filling, the site shall be stripped to a sufficient depth to remove all grass, weeds, roots, and other vegetation. The minimum stripping depth shall be 3 inches. The site shall be stripped to such greater depth as the Geotechnical Engineer i n the field may consider necessary to remove materials that in his opinion are unsatisfactory. The stripped material shall either be removed from the site or stockpiled for reuse later as topsoil, but none of this stripped material may be used for engineered fill.

2. Preparation for Filling

After stripping, the weak soils in areas to be filled shall be overexcavated to the minimum depth called for on the plans or that is required by the Soil Engineer in the field. The overexcavated soils that are clean and free from organic material can be used later as general engineered fill.

After stripping the surface vegetation and overexcavating the weak soils to the required depths, horizontal keyways and benches shall be excavated at least 24 inches below the ground surface or 18 inches into strong bedrock, whichever is deeper. When the required depth has been achieved, the exposed surface shall be scarified to a minimum depth of 6 inches, watered or aerated as necessary to bring the soil to a moisture content that will permit proper compaction, and recompacted to the requirement of engineered fill as specified in "D" below. Prior to placing fill, the Contractor shall obtain the Geotechnical Engineer's approval of the site preparation in the area to be filled. The requirements of this section may be omitted only when approved in writing by the Geotechnical Engineer.

C. MATERIAL USED FOR FILL

1. Requirements for General Engineered Fill

All fill material must be approved by the Geotechnical Engineer. The material shall be a soil or soil/rock mixture that is free from organic matter or other deleterious substances. The fill material shall not contain rocks or'lumps over 6 inches in greatest dimension, and not more that 15% by dry weight. Gravels or rock materials in the soil shall not be larger than 2 1/2 inches in greatest dimension. A portion of or all soils from the site, except the surface strippings, may be suitable for use as fill if they are broken down to size requirements.

2. Requirements for Select Fill Material

In addition to the requirements of "C(1)" above, select material, when called for on the plans and for use under floor slabs, must conform to the following minimum requirements:

Maximum Plasticity Index 10

In addition to the requirements of "C(1)" above, the select material shall be non-plastic and shall have an "R" value of at least 25. Select material shall be approved by the Geotechnical Engineer.

D. PLACING AND COMPACTING FILL MATERIAL

All fill material shall be compacted as specified below or by other methods, if approved by the Geotechnical Engineer, so as to produce a minimum degree of compaction of 95% (ASTM D1557). Fill material shall be spread in uniform lifts not exceeding 6 inches i n thickness. Before compaction begins, the fill shall be brought to a water content that will permit proper compaction by either aerating the material if it is too wet or spraying the material with water if it is too dry. Each lift shall be thoroughly mixed before compaction to ensure a uniform distribution of water content. If any cohesive soils are used within 3 feet of the finished ground surface, they shall be placed and compacted at a moisture content that is 1 % to 3% above optimum.

E. EXCAVATION

All excavations shall be carefully made true to the grades and elevations shown on the plans. The excavated surfaces shall be properly graded to provide good drainage during construction and to prevent ponding of water.

F. TREATMENT AFTER COMPLETION OF GRADING

After grading is completed and the Geotechnical Engineer has finished his observation of the work, no further excavation or filling shall be done except with the approval of and under the observation of the Geotechnical Engineer.

It shall be the responsibility of the Grading Contractor to prevent erosion of freshly - graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

A. DESCRIPTION

Subsurface drains are pipes installed beneath the ground surface and which collect and convey subsurface drainrock and water. Unless otherwise directed by the Soil Engineer in the field, the conduit shall be placed in a trench and the trench shall be backfilled with pervious material. The conduit and pervious material shall meet the requirements for the materials given in these specifications. The materials for the subsurface drain and the size of the trench shall be as shown on the plans or as determined by the Soil Engineer in the field.

B. MATERIALS

1 . Subdrain Pipe

Subdrain pipe shall be manufactured in accordance with the following requirements:

a. Perforated corrugated metal pipe shall conform to the specifications of AASHTO Designation M-36. Corrugated steel sheet used in the fabrication of the pipe shall have a protective coating of zinc (galvanizing), aluminum, o r aluminum-zinc alloy conforming to ASTM Designation A760.

b. Acrylontrile-Butadiene-Styrene (ABS) plastic pipe shall conform to the specifications for ABS plastic pipe given in ASTM Designation D2282 and ASTM Designation D2751. ABS pipe shall have a minimum pipe stiffness of 45 psi at 5% deflection when measured in accordance with ASTM Method D2412.

c. Polyvinyl chloride (PVC) pipe shall conform to AASHTO Designation M278. PVC pipe shall have a minimum pipe stiffness of 50 psi at 5% deflection when measured in accordance with ASTM Method D2412. Schedule 40 PVC pipe shall be suitable.

2. Pervious Backfill Material

Pervious materials for use in backfilling trenches shall conform to the requirements of Paragraph C1 of the specifications. Pervious material conforming to the requirements of Paragraph C2 may be used, provided that the backfill is wrapped in a suitable geotextile ("filter fabric") meeting the requirements given in Section D.

C. BACKFILL MATERIAL

1. Filter Material

Filter material for use in backfilling trenches around and over subdrains pipes and behind retaining walls shall consist of clean coarse sand and gravel or crushed stone

conforming to the following requirements:

Sieve Size	% PassinQ-Sieve
2"	100
3/4"	70-100
3/8 "	40-100
# 4	25-50
# 8	15-45
# 3 0	5-25
# 5 0	0-20
#200	0-3

Class 2 "permeable material" conforming to the State of California Department of Transportation Standard Specifications, latest edition, Section 68-1.025 shall be suitable.

2.

Gravel

Gravel for use in pervious blankets and in backfilling trenches or wrapped in filter fabric meeting the requirements of Section D of these specifications shall consist of clean fresh stone conforming to the following grading requirements:

Sieve Size	% Passing Sieve
1 "	100
1/2"	50-100
# 4	40-100
# 8	0-40
# 3 0	0-40
# 5 0	0-5
#200	0-3

Class 1 "permeable material" conforming to the State of California Department of Transportation Standard Specifications Section 68-1.025 shall be suitable.

D. GEOTEXTILE

Geotextiles for use in subdrains or as directed by the Soil Engineer shall be of non woven needle punched construction and consist of long chain polymeric fibers composed of polypropylene, polyethylene, or polyamide. The fibers shall be oriented into a m u l t i - directional stable network. The geotextile shall conform to the physical property

requirements listed below:

Physical Property	Test Method	Acceptable Typical Test Results
Tensile Strength, wet, lbs..	ASTM D-1682	90 (minimum)
Elongation, wet, %	ASTM D-1682	40 (minimum)
Coefficient of Water Permeability, cm/sec	Constant Head	0.10 (minimum)
Pore size--EOS, U.S. Corps of Engineers Standard Sieve	CW-02215	40 (maximum)

The geotextile shall be furnished in a protective wrapping which shall protect the fabric from ultraviolet radiation and from abrasion due to shipping and handling.

E. LAYING AND PLACEMENT

The drain pipe and filter material shall be placed as shown on the plans or as determined by the Soil Engineer in the field. Unless otherwise directed by the Soil Engineer, perforated pipe shall be laid with the perforations at the bottom. Corrugated metal pipe sections shall be joined with couplers.

Subsurface drains shall be placed to the depths, lines, and grades shown on the plans and as directed by the Soil Engineer in the field. Subsurface drains shall discharge to a suitable outlet as defined in the field by the Soil Engineer or as shown on the plans.

After excavating the subsurface drain trench but before placing the drainpipe, a minimum of 6 inches of filter material shall be placed on the trench bottom. The filter material shall be rounded to conform to the curvature of the pipe so that the pipe i s carefully bedded. The trench shall then be backfilled to the top of the pipe, and the backfill should be tamped or hand-wedged into place to provide firm support at the sides of the pipe. In general, the installation shall follow the guidelines of ASTM Designation D2774, except that compaction of the filter material in the trench shall not be required.

The contractor shall, at his expense, replace pipes damaged during the installation or subsurface drains not placed at the lines and grades called for on the plans or as determined by the Soil Engineer in the field.

The geotextile shall be placed in the manner and at the locations shown on the plans. The surface to receive the fabric and/or the trench into which the fabric is to be placed shall be prepared to a smooth condition free of obstructions and debris.

The geotextile shall be covered with a permeable material within two weeks of its placement. Should the fabric be damaged during the construction, the torn or punctured section shall be repaired by placing a piece of fabric that is large enough to cover the damaged area and to meet the overlap requirement. Adjacent borders of the geotextile shall be overlapped a minimum of twelve (12) inches or sewn. The preceding roll shall overlap the following roll in the direction the material is being placed.

F. CLEANOUTS

At the direction of the Soil Engineer, cleanouts shall be provided at the ends of pipes and at junctions and connections of pipelines. Junction angles should be no steeper than 4 5 degrees where cleanout pipes connect to the subdrain pipes. Cleanouts should be provided with caps.

20 November 2003
Project 3738.01

Mr. Geoffrey A. Reilly
Christopher A. Joseph & Associates
101 H Street, Suite Q
Petaluma, California 94952

Subject: Third Party Geotechnical/Geological Review
Thomas Subdivision
San Mateo, California

Dear Mr. Reilly:

This letter presents our third party geotechnical/geological review comments for the Thomas Subdivision project in San Mateo, California. The project site is east of the intersection of Bel Aire Road and Ascension Drive in San Mateo, as indicated on the vicinity map on Figure 1.

Our scope of services for this third party geotechnical/geological review included:

- reviewing available published and unpublished geologic and seismicity data, including previous geotechnical and geologic reports for the site.
- reviewing select historical aerial photography of the site to identify features that may be associated with areas of slope instability, areas of fill, or other geologic conditions of concern.
- performing a site reconnaissance to confirm features identified in the aerial photograph review and to observe the soil and site conditions for evidence of geologic hazards.

Our scope of services did not include subsurface exploration or laboratory testing.

SITE DESCRIPTION

The site consists of six parcels with a total area of 13.3 acres and is located on a knoll that is slightly elongated to the northwest. The top of the knoll is near the center of the site. Site elevations vary from approximately 714 feet at the top of the knoll to 502 feet at the corner of Bel Aire Road and Ascension Drive[1].

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1 Elevations based on Tentative Subdivision Map Lot Layout Plan, Ascension Heights Subdivision, San Mateo, California, prepared by Lea & Sung Engineering, Inc., dated 23 August 2002.

Natural slopes on the northeast and southeast sides of the knoll vary from approximately 4:1 (horizontal to vertical) to 2:1. The northeast-facing slope is truncated with a 3/4:1 to 1:1 cut along the northeast site boundary that is roughly 10 to 15 feet high. The slopes on the northwest and southwest sides of the knoll have been cut and benched, with an overall slope inclination of approximately 1.7:1. Slope faces between benches are inclined at approximately 1.4:1.

In general, the site is covered with grasses, bushes, and a few scattered trees. Also, there are a few unpaved roadways and trails at the uphill portion of the site. The site is generally unimproved with the exception of a large cylindrical water tank located at the top of the knoll and an asphalt-paved road that leads to the tank. The tank and lands around the tank are owned by the California Water Service (CWS), and are not part of the proposed subdivision. We understand there are two buried water lines that supply water to the CWS tank. The first line is located beneath the existing access road. The second line is located within a 15-foot-wide easement on the northeast-facing slope of the knoll.

PROJECT DESCRIPTION

The proposed project will consist of subdividing the site to create 25 building lots that will eventually be improved with single-family dwellings. A new street from Bel Aire Road will provide access to the subdivision, as shown on the Tentative Subdivision Map Lot Layout Plan, Ascension Heights Subdivision, San Mateo, California (Lea & Sung Engineering, 2002). The street will be about 32 feet wide and will have inclinations between 9 to 20 percent. We understand the existing asphalt-paved access road will be abandoned, and a new road will be constructed on the eastern side of the tank. Maximum cuts and fills on the order of 30 and 7 feet, respectively, are expected during site grading. The cuts and fills will result in excavation and placement of 93,000 and 7,000 cubic yards of soil, respectively.

Other associated site improvements will consist of installing new storm drain and sewer systems, installing a pump for domestic water, realigning the existing water main, and constructing recreational trails and a new playground area for children.

SITE HISTORY

Historical site conditions were observed by reviewing aerial photographs dating back to 1946. The aerial photographs reviewed are listed in Table 1. Standard aerial photograph review and photogeologic mapping techniques were employed to identify significant geologic features at the site such as tonal contrasts, vegetation patterns, and abrupt changes in topographic slope. The following sections provide a limited chronology of site development and slope conditions based on the photographs.

Table 1
List of Aerial Photographs Reviewed[2]
Thomas Subdivision, San Mateo County, California

Date	Photo Number	Scale	Type*
7-29-1946	AV 9-15-7,8,9	1:23,600	B&W
5-10-1955	AV 170-10-9,10	1:10,000	B&W
5-10-1955	AV 170-11-8,9	1:10,000	B&W
6-20-1961	AV 432-9-6,7	1:12,000	B&W
12-30-1969	AV 933-10-6,7	1:12,000	B&W
5-2-1972	AV 1045-10-8,9	1:12,000	B&W
6-20-1977	AV 1356-9-8,9	1:12,000	B&W
6-19-1981	AV 2020-9-7,8	1:12,000	B&W
6-6-1983	AV 2265-9-7,8	1:12,000	B&W
10-15-1985	AV 2670-9-7,8	1:12,000	B&W
5-30-1989	AV 3556-9-8,9	1:12,000	B&W
9-7-1995	AV 4916-10-6,7	1:12,000	B&W
8-16-2000	SMT AV 6600-10-7,8	1:12,000	B&W

*B&W = black and white

Development History

The earliest available aerial photographs, dated 1946, show the site and surrounding vicinity to be undeveloped. By 1955, Parrott Drive and the accompanying residences adjacent to the northeast site boundary were present. The top of the knoll at the site had been graded flat and the present-day water tank had been built. Two unpaved roads connecting the tank to the north corner of the site were visible in the 1955 photographs. Bel Aire Road and Ascension Drive first appear in the 1961 aerial photographs, along with adjacent cut slopes on the northwest and southwest slopes of the site. The cut slopes were benched. Remnants of construction roads were visible as hillside benches and notches near the cut slopes. Most of the residences along Bel Aire Road and Ascension Drive were present opposite the site cut slopes.

[2] Aerial photographs provided by Pacific Aerial Surveys in Oakland, California

By 1969, all residences along Bel Aire Road and Ascension Drive were present. Cul-de-sacs for Kristin Court and College of San Mateo Drive, near the southeast site border, had been cut and graded. Residences were present along the cul-de-sacs by 1972. No additional development at the site or adjacent properties was observed in the aerial photographs taken after 1972, with one exception. Minor grading was observed west of the Kristin Court residences in the 1989 photographs.

Historical Slope Conditions

The pre-development site conditions observed in the 1946 photographs show that the northwestern slope of the knoll is composed of a broad, gentle swale. The ground surface had a slight hummocky appearance indicative of surficial soil creep. Two relatively narrow, gentle swales were located on the southwestern slope of the knoll. Hummocky ground surfaces within each swale indicated the presence of shallow earth flows and/or creep zones in the swales. We observed a small, shallow scarp on the northeastern slope of the knoll that may have been a small excavation such as a test pit. This feature becomes less prominent over time.

The 1961 photographs show that most of the former creep area on the northwestern slope had been removed by the cut for Bel Aire Road. Likewise, the lower portions of the two shallow swales on the southwestern slope had been removed by the cut for Ascension Drive. Possible remnants of creeping soil in the upper portions of both swales may have remained after the Ascension Road cut.

By 1969, portions of the northwestern and southwestern cut slopes were extensively eroded with numerous gullies that disrupted the benches (see Figure 1). Two former construction roads, one located at the top of the northwestern cut slope and the other located between the northwestern and southwestern cut slopes, had eroded into drainage gullies. A localized area of gully erosion was observed on the southeast slope of the knoll, downslope of the water tank. That gullied area appears to have been created during a reported release from the tank described in Michelucci & Associates (M&A) (2002).

In 1972, the cut slopes were mostly re-vegetated with grass except at the heavily gullied areas, which showed increased gully erosion compared to the previous photographs. By 1977, the small scarp observed in the 1946 aerial photographs was no longer visible, and the gullied area downhill of the tank was less pronounced and mostly re-vegetated with grass.

Site conditions remained relatively unchanged through the 1980s and 1990s. During that time period, the aerial photographs showed the areas of gully erosion to become a little more extensive.

REGIONAL GEOLOGY

The site is within the Coast Ranges geomorphic province, which is characterized by northwest trending valleys and ridges. These are controlled by a series of folds and faults that resulted from the collision of the Farallon and North American plates and subsequent strike-slip faulting along the San Andreas Fault zone.

Bedrock in the site vicinity consists of melange (fsr) belonging to the Franciscan Complex (see Figure 2). The melange typically consists of relatively weak, highly sheared shale, siltstone and sandstone containing variably sized inclusions of sandstone, greenstone, chert, serpentinite and other rock types (Pampeyan, 1994). Bedrock is overlain by colluvium deposits that are reported in the U.S. Department of Agriculture's Soil Survey to vary from 40 to 60 inches thick in the site vicinity (USDA, 1991). These deposits include varying amounts of sand, silt, clay, and weathered rock fragments that are transported by gravity to the base of the slope.

SITE GEOLOGY

Terrasearch, Inc. performed a soil investigation for the site in 1979 (Terrasearch, 1979). Their site exploration included eight exploratory borings that extended to depths of 15 to 20 feet in the northeast half of the site. They encountered Franciscan Complex bedrock consisting of hard sandstone with occasional claystone interbeds. Fine sandy silts and silty sands that varied in thickness from 1 to 2.5 feet overlay the sandstone.

R.C. Harlan & Associates (H&A) performed a geotechnical feasibility study of the site in 1981 (Harlan, 1981). Based on geologic mapping, aerial photograph interpretation, and review of previous exploration by other consultants, they concluded the site was underlain by sandstone and minor greenstone of the Franciscan Complex. The sandstone was described as typically brown, moderately hard, highly to moderately weathered, fine to medium grained, and closely fractured, with local areas of "both slightly weathered, hard rock and completely weathered, soft rock." Bedding was not well developed but was generally inclined to the northeast at a low angle. The greenstone was described as ranging from brown, slightly hard, highly weathered and extremely fractured to gray, hard, slightly weathered and moderately fractured. Colluvium and artificial fill were observed overlying the bedrock, with the colluvium consisting of a brown sand, silt, and clay mixture containing scattered angular gravel fragments of sandstone and greenstone, with 1 to 2 feet of gray clayey topsoil present at the surface. H&A estimated the colluvium thickness to range from 1 to 15 feet, with 5 feet being the average thickness. The areas of relatively thick colluvium were not identified in the H&A report reviewed for this study.[3]

M&A explored the site in 2002 using 19 borings and 16 test pits (M&A, 2002). They describe the bedrock at the site as dense to very dense tan to yellow brown sandstone that generally becomes less weathered, stronger, and more cemented with depth. They observed bedrock to be overlain by a thin (less than three feet thick) layer of brown sandy to silty clay (colluvium/residual soil) that tested very low in expansion potential. Areas of thicker colluvium postulated by H&A were not encountered in M&A's nor Terrasearch's exploratory borings and test pits. M&A also pointed out that they encountered no shale or sheared rocks typical of Franciscan Complex melange in any of their test pits or borings. Bedrock structure data were limited to one test pit (TP-3) in the west-central portion of the site. The M&A report indicates that at TP-3, two fracture orientations were measured and M&A concluded the orientations were favorable from a slope stability standpoint.

Figure 1 shows areas we mapped having colluvium (Qc) that may be somewhat thicker than that observed by M&A and Terrasearch. We expect that the maximum thickness would be less than five feet. These colluvium deposits coincide with remnant swales, the lower portions of which were removed by the slope cut for Ascension Drive. The remaining areas of the site are interpreted to be underlain by Franciscan Complex bedrock with a veneer of colluvium generally less than three feet thick. Bedrock has been mapped on Figure 1 as sandstone (KJss), but was described in logs of previous test pits and borings as also containing minor amounts of siltstone. We interpret the mapped sandstone unit to be a large block of sandstone within the Franciscan Complex melange (regional map unit "fsr" shown on Figure 2). No areas of artificial fill were visible in the aerial photographs or during our site reconnaissance, except for minor "sliver" fills along remnant construction roads near the northwest and southwest site slopes.

We observed many erosional gullies on-site during our site reconnaissance and aerial photograph review. The gullies are found on the cut slopes on the northwest and southwest knoll faces adjacent to Bel Aire Road and Ascension Drive, respectively, and their locations are mapped on the Figure 1. We observed a much smaller, localized area of gully erosion on the southeast slope

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[3] The H&A report copy provided by the San Mateo County Planning and Building Division was not complete. Figure 1, which included site geology, was missing.

downhill of the water tank that we attribute to the reported release of water from the tank during the 1960's.

REGIONAL SEISMICITY

The site is within a region characterized by the seismically active San Andreas fault system, which is the principal tectonic element of the North American/Pacific plate boundary in California. Movements along this plate boundary in the Northern California region are primarily translational, resulting in mostly right-lateral strike-slip faulting along the San Andreas fault system. Seismic and aseismic slip on the San Andreas fault system is partitioned into subsidiary structures that distribute plate movements across the Coast Ranges province, between the offshore Continental Shelf areas to the west and the Sacramento Valley to the east (Figure 3).

The San Andreas fault zone is located approximately 1.6 kilometers southwest of the site. Other major active faults in the region include the San Gregorio, Hayward, and Calaveras faults. A list of major active faults in the region, including their distances from the site and maximum moment magnitudes[4] (M_W), is provided in Table 2.

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4 Moment Magnitude is an energy-based scale and provides a physically meaningful measure of the size of a faulting event. Moment magnitude is directly related to average slip and fault rupture area.

Table 2
Regional Active Faults and Seismicity
Thomas Subdivision
San Mateo County, California

Fault Name	Distance from Site (km)	Direction Site From	Maximum Moment Magnitude
San Andreas – 1906 Rupture	1.6	Southwest	7.9
San Andreas – Penninsula	1.6	Southwest	7.2
Monte Vista	13	Southeast	6.8
San Gregorio – North	14	West	7.3
Hayward – Southern	28	Northeast	6.9
Hayward – Total	28	Northeast	7.1
Hayward – Northern	32	Northeast	6.6
San Andreas – North Coast South	38	Northwest	7.5
Hayward – Southeast Extension	40	East	6.4
Calaveras – Northern	40	Northeast	7.0
Mount Diablo Thrust	46	Northeast	6.7
Calaveras – Central	48	East	6.6
San Andreas – Santa Cruz Mountains	49	Southeast	7.2
Concord	51	Northeast	6.5

Since 1800, four major earthquakes have been recorded on the San Andreas fault in the greater San Francisco Bay and Monterey Bay areas. In 1836, an earthquake with an estimated maximum intensity of VII on the Modified Mercalli (MM) scale occurred east of Monterey Bay on the San Andreas fault (Toppazada and Borchardt, 1998). Figure 4 summarizes the MM scale. The estimated moment magnitude for this earthquake is approximately 6.25. In 1838, an earthquake occurred with an estimated MM intensity of about VIII-IX, corresponding to a M_w of about 7.25. The San Francisco earthquake of 1906 caused the most significant damage in the history of the San Francisco Bay area in terms of loss of lives and property damage. This earthquake created a 400-kilometer surface rupture along the San Andreas fault from Shelter Cove to San Juan Bautista. It had a maximum MM intensity of XI, a M_w of about 7.9, and was felt 560 kilometers away in Oregon, Nevada and Los Angeles. The most recent large earthquake to affect the Bay Area was the Loma Prieta earthquake of 17 October 1989 with a M_w of 6.9.

The epicenter of this earthquake was in the Santa Cruz Mountains, approximately 68 kilometers southeast of the project site.

In 1868, an earthquake with an estimated maximum intensity of X on the MM scale occurred on the southern segment (between San Leandro and Fremont) of the Hayward Fault. The estimated M_w for the earthquake is about 7.0. In 1861, an earthquake of unknown magnitude (probably a M_w of about 6.5) was reported on the Calaveras Fault. The most recent significant earthquake on this fault was the 1984 Morgan Hill Earthquake (M_w = 6.2).

In 1999, the Working Group on California Earthquake Probabilities (WGCEP, 1999) at the U.S. Geologic Survey (USGS) predicted a 70 percent probability of a magnitude 6.7 or greater earthquake occurring in the San Francisco Bay Area by the year 2030. The WGCEP revised their estimate in 2003 to a 62 percent probability of a magnitude 6.7 or greater earthquake during the period of 2003 to 2032. More specific estimates of the probabilities for select faults in the Bay Area are presented in Table 3.

TABLE 3
WGCEP Estimates of 30-Year Probability of a Magnitude 6.7 or Greater Earthquake for Select Faults

Fault Segment	Probability (WGCEP, 1999) (percent)	Probability (WGCEP, 2003) (percent)
Hayward-Rodgers Creek	32	27
San Andreas	21	21
Calaveras	18	11
San Gregorio	10	10

GEOLOGIC AND SEISMIC HAZARDS

Potential geologic and seismic hazards to the project site include fault rupture, deep-seated landslide hazards, shallow landslide hazards, soil liquefaction, and surface erosion. In addition, the proposed development could increase the potential for geologic hazards to adjacent properties. These geologic and seismic hazards are discussed in the following sections.

Fault Rupture

M&A concludes there are no surface features that are indicative of active faulting at the site. M&A indicates the site does not lie within a State of California Earthquake Fault Zone and that the nearest mapped active fault to the site, the San Andreas Fault, is located approximately 1.1 miles (1.75 kilometers) to the southwest.

Based on our review of the site location, we concur with M&A that the site is not located within an Earthquake Fault Zone (CDMG, 1974). However, we conclude the nearest mapped active fault is San Andreas Fault, which lies 1.6 kilometers southwest of the project site. Also, we reviewed the "Natural Hazards" portion of the San Mateo County General Plan (1986) which states that with the exception of some right-lateral displacement on the trace of the San Andreas fault in 1906, surface rupture has not historically been a frequent occurrence in the county. We observed no evidence of active faulting at the site during our review of aerial photographs and ground reconnaissance. Based on the site's location outside of an Earthquake Fault Zone and the lack of evidence for active faulting at the site, we judge the fault rupture potential at the site is very low.

Landslides

A planning-level hazard map prepared by the U.S. Geological Survey in 1985 indicates the northeast slope of the knoll has a low susceptibility of failing during a major earthquake, while the remaining site slopes have a moderate to high susceptibility (Wieczorek et. al., 1985). Historical landslide activity in the subdivision adjacent to the site indicates Franciscan Complex melange in the site vicinity can be highly susceptible to landslides. For clarity, we have divided our discussion of landslide hazards into deep-seated landsliding, shallow landsliding, and temporary cut slope stability.

<u>Deep-Seated Landslide Hazards</u>

M&A concludes there are no indications of previous and existing deep-seated slope instability at the site and that the risk of deep-seated slope failures developing in the future is low.

Deep-seated landslides have occurred in the site vicinity. In 1983, a landslide occurred between Rainbow Drive and Starlite Drive, approximately 800 feet northwest of the site. The north boundary (headscarp) of the 1983 landslide extended into the back yards of several Starlite Drive properties and threatened several homes. Applied Earth Consultants (1983) concluded the 1983 landslide occurred as a result of oversteepening of the slope during mass grading for the subdivision in the 1950's/1960's, localized grading in 1979, and high rainfall during the two years preceding the landslide. Final repairs and reconstruction of the slope was completed using engineered fill in 1985. Subsequently, a portion of the repaired slope failed again in February 1998, and required the installation of a pier and grade beam wall at the northwestern portion of the original slide repair.

In 1997, a landslide occurred between Polhemus Road and Rainbow Drive, approximately 1,200 feet northwest of the site. The landslide threatened several residences and a large-diameter water supply pipeline, and destroyed a pier-and-grade-beam retaining wall installed behind the residences. Stabilization of the landslide consisted of a tie-back retaining wall and engineered fill. Prior to stabilization, interim measures for protecting the water pipeline included placing a temporary fill buttress in Polhemus Creek near Polhemus Road.

Despite the occurrence of deep-seated landslides in the site vicinity, the site shows no readily visible evidence of past deep-seated landsliding. This conclusion is supported by subsurface exploration completed by other consultants, and by our site reconnaissance and review of aerial photographs. We attribute the more stable condition of the site slopes relative to surrounding areas to the presence of a single large (or multiple abutting smaller) sandstone blocks within melange bedrock beneath the site. This bedrock condition contrasts with melange in the surrounding areas that has a substantial proportion of weak, sheared clayey matrix material that is more susceptible to slope failure.

Based on our experience with similar site conditions, we expect that small localized areas of weak rock or sheared matrix material within the melange may be present at the site. Where these weak zones extend beneath the sandstone, the site slopes may be subject to deep-seated failure if the slopes are not properly graded during site development. This concern is particularly relevant for the neighboring residences along the northeast site boundary, where the slope was cut steeply to create level back yards and proposed site grading includes placing fill in proximity to the cut slope. Therefore, as a precaution, the site developer should retain a qualified engineering geologist to observe all excavations for evidence of weak zones within bedrock. Weak zones can be identified by 1) adversely oriented bedding, joints or shears, or 2) the presence of sheared clayey material typical of the melange matrix. Any weak zones should be evaluated to determine whether they present a potential zone for future landsliding based on planned final site grades. Additionally, such zones should be protected from groundwater derived from infiltrating rainfall, irrigation, and leaking pipes by installing appropriate subdrains and sloping surface grades.

Shallow Landslide Hazards

M&A observed shallow, limited extent soil slumps on pre-development aerial photographs, which were largely removed by site grading during the late 1950s. A relatively broad, shallow, bowl-shaped area was observed on the southwest slope. Test pits and exploratory borings performed within the bowl-shaped area encountered bedrock within a few feet from ground surface, and indicated the area is not a deep-seated landslide. M&A concluded that a primary geotechnical consideration to increase the factor of safety with respect to shallow slope stability will involve the repair of existing erosional features and improvement of drainage in these areas.

Based on our study, areas of active soil creep were observed in the 1946 aerial photographs along the northwestern and southwestern slopes. Virtually all of the observed creeping soil areas were removed by subsequent slope cuts made during construction of Bel Aire Road and Ascension Drive. In addition, we anticipate that the proposed grading will remove most if not all of the remaining areas of active soil creep. While any remaining native soil is subject to future surficial creep, we expect the rate of creep to be minor and typical of similar slopes in the San Francisco Bay area.

Considering that relatively steep slope inclinations are planned for the new development, we judge that the site may be susceptible to debris-flow type failures. Evidence of such failures was not observed in the aerial photographs; however, changes in drainage from the proposed site development can result in concentrated storm water runoff onto the site slopes. The runoff has the potential to trigger debris-flow type landslides that would endanger neighboring streets and properties. Therefore, it is critical that site storm water be controlled to prevent discharge of concentrated runoff onto the site slopes. Additionally, the site storm water drainage system (including individual systems for each residence) should include redundancies to prevent discharge of uncontrolled runoff onto the site slopes in the event one or more components of the stormwater system becomes clogged or otherwise incapacitated.

Localized minor “sliver” fills associated with the remnant construction roads are also susceptible to creep and/or failure. This hazard can be mitigated by removing the fill during site grading.

Temporary Cut Slopes

M&A (2002) state that there are no adverse bedding and/or joint orientations in the bedrock underlying the site, but measured only two fracture attitudes from the many test pits that were excavated around the site. These attitudes were taken from the southwest slope of the knoll and are not adverse to the slope in that location. However, if the jointing were consistent across the site, the orientation would be adverse on the northeast slope of the knoll. Because the approximate center of the site occupies the top of a knoll, with slopes in every direction, it is conceivable that adverse bedding and/or joints will be encountered at one or more locations at the site. Any adverse bedding that exists will increase the potential for landsliding.

We consider the presence of adverse bedding and joints to be primarily a concern during construction, when steep temporary cuts into rock may expose unstable slabs or wedges of bedrock. We recommend the site developer retain a qualified engineering geologist to observe all excavations for evidence of adverse bedding and joints in bedrock. Where encountered, the potential hazard posed by these conditions should be evaluated from a standpoint of temporary and permanent slope stability.

Hazards to Adjacent Properties

It should be recognized that while the site bedrock conditions are favorable from a deep-seated landslide standpoint, bedrock conditions beneath the neighboring properties are unlikely to be as favorable. For that reason, the site development should take reasonable precautions to avoid contributing surface water and groundwater to the neighboring slopes. This is best achieved through rigorous control of surface water runoff from impervious surfaces (roofs, roads, patios, driveways, etc.) and through extensive use of subdrains in all fill keyways and benches, behind retaining walls and footings, and within utility trenches.[5]

[5] Utility trenches have a tendency to collect water and convey it to other areas. When such water is conveyed to a sloping area, the slope may become vulnerable to failure from chronic water seepage from the trench.

Liquefaction and Cyclic Densification

In addition to triggering landslides, strong ground shaking caused by large earthquakes can induce ground failures, such as liquefaction[6] and cyclic densification[7]. A site's susceptibility to these hazards relates to the site topography, soil conditions, and/or depth to groundwater.

The Geotechnical Hazard Synthesis Map for San Mateo County (1976) includes the site in a zone described as having "poor to good earthquake stability". The degree of stability presumably depends on the inherent strength of the bedrock materials, which consist of serpentinite and melange in the designated zone. We expect the earthquake stability of the proposed project site would be in the upper end of the specified range based on the presence of relatively strong sandstone bedrock. A compilation of ground failure occurrences induced by earthquakes in the region between 1800 and 1970 included no instances of historical earthquake-induced ground failure at the site (Youd and Hoose, 1978).

Subsurface exploration by others shows that moderately hard to hard sandstone is present at depths less than three feet below the existing ground surface. Based on the shallow bedrock depths and presence of clay in the near-surface soil, we judge the potential for liquefaction and cyclic densification at the site is low.

Expansive Soil

Expansive soils shrink or swell with changes in moisture content. Clay mineralogy, clay content, and porosity of the soil influence the change in volume. The shrinking and swelling caused by expansive clay-rich soil can result in damage to overlying structures. U.S. Department of Agriculture (USDA) Soil Survey (1991) describes soils in the site vicinity as loam, clay loam, and clay having a moderate to high shrink-swell potential. Site soils encountered in studies by Terrasearch and M&A contained more sand and silt than reported by the USDA. Furthermore, M&A reported a sample of colluvium collected from a depth of one foot below the ground surface had a very low plasticity index of 4 and a low liquid limit of 23. These data indicate a

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6 Liquefaction is a phenomenon in which saturated, cohesionless soil experiences a temporary loss of strength due to the buildup of excess pore water pressure, especially during cyclic loading such as that induced by earthquakes. Soil most susceptible to liquefaction is loose, clean, saturated, uniformly graded, fine-grained sand; however, low plasticity silts and clay can also liquefy.

7 Cyclic densification is a phenomenon in which non-saturated, cohesionless soil is densified by earthquake vibrations, causing ground surface settlement.

low shrink-swell potential for near-surface soils, which is consistent with our experience with colluvium derived from Franciscan sandstone bedrock.

Erosion

Our site reconnaissance and aerial photograph review show the on-site road cuts along Bel Aire Road and Ascension Drive to be heavily gullied. According to the USDA soil survey (USDA, 1991), the soil conditions at the site are likely to result in rapid to very rapid runoff with a high to very high potential for soil erosion. Considering the runoff conditions, soil conditions, and inclinations of on-site cut and natural slopes, we judge the erosion potential for the existing slopes to be high, especially at the steeper road cuts along Bel Aire Road and Ascension Drive. Controlling surface runoff and directing it away from site slopes and proposed improvements, and repairing and re-vegetating existing eroded slopes can reduce the potential for future erosion.

GEOTECHNICAL AND FOUNDATION ISSUES

The M&A report indicates the site can be developed as proposed, provided the recommendations presented in their report are incorporated into the project plans and specifications, and are implemented during construction. M&A concludes the site topography is in the shape of a resistant knoll consisting of dense and resistant bedrock that is capable of supporting the proposed improvements with minimal settlement. In addition, M&A concludes there is no evidence of previous deep-seated slope instability, and the risk of future deep-seated slope failures developing at the site is low. According to M&A, the primary geotechnical consideration is the repair of existing erosion features and improvement of drainage in these areas.

Our understanding of the primary conclusions and recommendations presented by M&A and our associated comments are presented in the following sections.

Foundations

The M&A report indicates that proposed residential structures may be supported on either spread footings or drilled pier and grade beams. M&A anticipates that spread footings will be most suitable for uphill lots and drilled piers for downhill lots.

M&A recommends that spread footings extend: 1) a minimum of 18 inches, 2) 12 inches into strong bedrock, or 3) maximum depth of slope ten horizontal feet from edges of footings, whichever is deepest. The spread footings may be designed for an allowable bearing pressure of 3,000 pounds per square feet (psf) for dead loads and 3,250 psf for dead plus live loads. The allowable bearing pressure for dead plus live loads may be increased by 33 percent to account for all loads, including wind and seismic.

M&A recommends that drilled, cast-in-place concrete piers be designed using a skin friction value of 500 psf beginning at the top of "supporting material". The top of supporting material, as defined in the M&A report, should be the deepest of the following conditions: 1) a depth of two feet, 2) one foot below the top of bedrock, or 3) maximum depth of slope within a 10 foot horizontal distance from the edge of the drilled pier. Drilled piers should extend a least six feet below the top of supporting material.

M&A also recommends that drilled piers be designed to resist a lateral pressure corresponding to an equivalent fluid weight of 50 pounds per cubic foot (pcf) for creep. The equivalent fluid weight should be projected over 2-1/2 pier diameters and a depth of two feet below finished grade. The creep load will not apply in areas where weak surface soil will be removed. Drilled piers can resist the lateral load through a passive resistance of 350 pcf, projected over two pier diameters. Passive value begins at the top of supporting material.

Treadwell & Rollo concurs that spread footings and drilled piers with grade beams can be used for support of the new residences. However, the M&A report does not describe how new residences will be supported on lots where new fill slopes will be added, such as those along the northeast and southwest edges of the site. In general, where new fill slopes are planned on residential lots, Treadwell & Rollo recommends that M&A perform settlement and slope stability analyses to evaluate the static and seismic performance of the proposed sloped fill. Subsequently, M&A should select a foundation system(s) that is compatible with the estimate movement of the fill slope (if any), and capable of safety supporting the new residences.

Site Grading

M&A recommends all grasses, weeds, root systems, and other deleterious materials to be stripped and removed within the area to be graded. In areas to receive fill where trees where removed, the stump excavations should be backfilled with engineered fill.

For fill slopes, M&A recommends a key be excavated at the toe of the slope. The downhill side of key excavation should have a minimum embedment of 18 inches into strong bedrock. The report indicates that fill should be placed in thin lifts, moisture-conditioned, and compacted to a minimum degree of compaction of 95 percent based upon ASTM D1557, latest revision. M&A recommends that horizontal benches be excavated into the hillside as the level fill rises. All horizontal benches should extend into strong residual soil or dense bedrock, as approved by their field representative. The maximum finished fill slope inclination should not exceed 2:1, unless geogrid slope reinforcing material is used. Fill slopes should be overbuilt and then trimmed to expose compacted soil. Also, the M&A report indicates that heavy grading equipment will be required to excavate the sandstone bedrock.

Based on our review of the M&A report, we found an apparent discrepancy between the minimum embedment recommendation of 18 inches into strong bedrock and the recommendation for a "minimum embedment of 36 inches into competent residual soil or 12 inches into bedrock, whichever is deeper" as indicated on Figure 40 of the M&A report. This discrepancy should be clarified. In addition, we typically recommend toe key embedment depths into competent soil and/or rock to be on the order of 15 to 20 percent of the fill slope height. Therefore, we recommend that M&A check whether their toe key embedment criteria is adequate for all proposed fill slopes at the site.

Also, proposed cuts are up to 32 feet deep, and a majority of the excavation is likely to be sandstone bedrock. Treadwell & Rollo recommend that the applicant carefully consider the feasibility of performing deep excavations into sandstone bedrock.

Lastly, recommendations for the abandonment and/or removal of water lines leading to the water tanks should be provided.

1997 Uniform Building Code Seismic Design Criteria

In accordance with the 1997 Uniform Building Code (UBC), M&A recommends using the following seismic design criteria:

- seismic zone factor of 0.4
- soil profile type of S_B
- seismic coefficient (C_a) of $0.40N_a$

- seismic coefficient (C_v) of $0.40N_v$
- near-source factor N_a of 1.5
- near-source factor N_v of 2.0
- seismic source type A.

Treadwell & Rollo concur with the recommended design criteria.

Slab-on-Grade Floors

M&A report indicates that slab-on-grade construction will be used for garage floors of uphill lots. M&A recommends the slabs be reinforced with steel bars and cast upon firm natural soil, rock, or engineered fill. M&A also recommends the slab be underlain by some type of moisture prevention treatment and a network of finger drains. Typical moisture prevention treatment and specifications for finger drains are attached as a figure within the M&A report. The moisture prevention treatment consists of a two-inch-thick layer of sand, over a moisture-proof membrane, over a layer of gravel. The thickness of the gravel layer is not defined. M&A recommends the finger drains consist of 4-inch-diameter perforated pipe sloped to drain at a minimum grade of one percent. The pipe should be placed in trenches that are at least 12 inches wide and at least 12 inches deep, and backfilled with either Caltrans Class 2 permeable material or clean, coarse gravel that is wrapped in an acceptable geotextile, such as Mirafi 140N.

Treadwell & Rollo take no exception to the proposed slab-on-grade and moisture prevention system design criteria.

Repair of Erosion Features

M&A recommends three options to repair and stabilize existing erosion features. Based on their field investigation, M&A concludes that areas of existing erosion features are underlain by very strong, resistant sandstone bedrock at relatively shallow depths. Whichever option is selected, M&A recommends that the finished slopes should be planted with erosion resistant vegetation and improvements be made to surface and subsurface drainage.

M&A's Option No. 1
Excavate and remove materials affected by erosion in areas where the topography allows a cut to daylight at acceptable inclinations.

M&A's Option No. 2
Excavate a key at the base of the slope or resistant rock in the erosion area. Rebuild the slope with compacted, drained, engineered fill over a geogrid to allow for slope reconstruction at a steep inclination.

M&A's Option No. 3
Construct structural retaining walls or terrace walls in the erosion areas. A wall can be constructed at the top of the eroded area and then trim the erosional features away from below the wall.

Treadwell & Rollo take no exception to the proposed erosion repair options.

Surface and Subsurface Drainage

The M&A report indicates the site should be fine-graded to direct surface water to flow away from the building foundations. Storm water should not be allowed to pond or flow in concentrated streams or channels on the site. M&A recommends roof downspouts be connected to tightlines consisting of rigid, PVC pipe that will convey water to suitable discharge areas. Concrete v-ditches should also be placed at strategic locations to protect slopes. M&A indicates the Civil Engineer of the project should locate drains and make provisions to maintain drains for the project.

M&A indicates that subsurface drains should be constructed behind retaining walls, beneath engineered fills greater than four feet in depth, where seepage is encountered, and along the uphill and side hill sides of proposed structures in accordance with the "Guide Specifications for Subsurface Drains" attached to the M&A report.

Treadwell & Rollo believe the design of surface and subsurface systems are important to the success of the proposed project. Of particular concern is the high susceptibility to erosion of site soils and the likely presence of weak Franciscan melange adjacent to the sandstone bedrock at or near the site perimeter (including neighboring properties). Therefore, Treadwell & Rollo believes that M&A (or other geologic consultant with experience in surface and groundwater controls) should provide technical input and review of the surface and subsurface drainage systems for the purpose of reducing the potential for adverse impacts, such as surface erosion and shallow and deep-seated landslides, on and adjacent to site. Common design issues that may required technical input from M&A include: 1) the location of surface and subsurface drainage alignments, especially within filled slopes, 2) selection of water discharge locations, 3) separation of surface and subsurface water collection pipes, 4) location of pipe cleanouts, and 5) recommendations for controlling groundwater flow through trench backfill.

Retaining Walls

M&A recommends that all retaining walls be designed to resist the active pressure corresponding to an equivalent fluid weight of 35, 40, 45, and 50 pcf for wall backslope inclinations of level, 4:1, 3:1, and 2:1 (horizontal to vertical), respectively. If walls are rigidly restrained from rotation, a uniform surcharge pressure of 75 psf should be added to the design values. M&A also recommends adequate subdrainage be constructed behind retaining walls.

A passive resistance of 350 pcf can be used below the supporting material (as defined above). If the wall is supported by drilled piers, the passive resistance value can be projected over two pier diameters. If the wall is supported by spread footings, a friction factor of 0.35 can be incorporated into the design.

Due to the relatively close proximity of the San Andreas Fault to the site and the potential for very strong ground shaking, Treadwell & Rollo recommends applying a uniform seismic increment to the design of new retaining walls at the site. Also, if retaining walls are constructed adjacent to roadways and/or buildings, appropriate surcharge loads from the adjacent improvements should be incorporated in the wall design. M&A should indicate whether seismic and surcharge loads will be incorporated into the design of new retaining walls.

CONCLUSIONS

We conclude the proposed project is feasible, but potentially constrained by: 1) very strong ground shaking, 2) slope instabilities associated with drainage systems, and new and existing cuts and fills, 3) localized settlement of compacted fill, and 4) potential difficulties associated with deep excavations into sandstone bedrock. Based on our review of the geotechnical/geological studies presented to us for this project, we judge the consultants have performed an adequate geotechnical/geological characterization of the site conditions and provided suitable geotechnical/geological recommendations for many of the site issues. However, we judge there are several issues that need further evaluation.

Based on our geological/geotechnical third party review, we have the following comments that should be addressed by the project applicant. These comments were previously discussed in this letter and are summarized as follows.

T&R Comment No. 1
The site developer should retain a qualified engineering geologist to observe all site grading activities for evidence of adverse bedding and joints in bedrock. Where encountered, the potential hazard posed by these conditions should be evaluated from a standpoint of temporary and permanent slope stability. Also, the engineering geologist should provide technical input and review surface and subsurface drainage plans and specifications for compliance with the geologist's recommendations.

T&R Comment No. 2
The site storm water drainage system (including individual systems for each residence) should include redundancies to prevent discharge of uncontrolled runoff onto the site slopes in the event one or more components of the stormwater system becomes clogged or otherwise incapacitated.

T&R Comment No. 3
M&A should perform settlement and slope stability analyses to evaluate the static and seismic performance of the proposed fill slopes within planned buildings areas. Subsequently, M&A should select a foundation system(s) that is compatible with the estimated movement of the fill slope (if any), and capable of safety supporting the new residences.

T&R Comment No. 4
The apparent discrepancy between the minimum embedment depths for fill slope toe keys should be clarified. Also, M&A should indicate whether the minimum embedment depth is sufficient for all proposed fill slopes at the site.

T&R Comment No. 5
The applicant should carefully consider the feasibility of performing deep excavations into sandstone bedrock. The approximate extent to which difficult excavation conditions (such as those requiring a hoe-ram) will be encountered should be described.

T&R Comment No. 6
M&A should provide recommendations for the abandonment and/or removal of water lines leading to the water tank.

T&R Comment No. 7
M&A should indicate whether seismic and surcharge loads will be incorporated into the design of new retaining walls.

In conclusion, we recommend the project applicant provide a response to the comments presented above. San Mateo County should be given an opportunity to review the responses, and comment on whether any outstanding issues still remain.

This review was prepared with the technical assistance from Mr. Charles Snell of Gilpin Geosciences (Geology Consultants). On behalf of Treadwell & Rollo and Gilpin Geosciences, we appreciate the opportunity to assist you with the evaluation of geological and geotechnical issues for this project. If you have any questions or require additional information, please call.

Sincerely yours,
TREADWELL & ROLLO, INC.

Dean H. Iwasa
Geotechnical Engineer

Attachment: References
Figures 1 through 4

cc: Mr. Charles Snell, Gilpin Geosciences

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Michelucci & Associates, Inc.
Geotechnical Consultants

Joseph Michelucci, G.E.
Daniel S. Caldwell, G.E.
Richard Quarry

Post-it® Fax Note 7671	Date 1/20/04 # of pages ▶ 2
To Jeffery Reilly	From Cristina
Co./Dept. Christopher Joseph & Assoc	Co. Michelucci & Assoc
Phone #	Phone # (415) 330-0170
Fax # (707) 283-4041	Fax # (415) 330-0370

January 15, 2004
Job No. 01-3186

San Mateo Real Estate
1777 Borel Place, Suite 330
San Mateo, CA 94402

Attention: Mr. Dennis Thomas

Re: Response to "Third Party Review"
Ascension Heights Subdivision
San Mateo County, California

Dear Mr. Thomas:

As requested, we have reviewed the comments prepared by Treadwell and Rollo in their "Third Party Geotechnical/Geologic Review" letter dated November 20, 2003. The review was in response to our geotechnical report for the project dated December 16, 2002.

The reviewer provided seven comments that relate to our geotechnical study and provided some recommendations for further input. We will respond to the comments in the order that they were presented.

T&R comment 1: We concur that the developer should retain a qualified engineering geologist to observe all site grading activities. In fact, this recommendation was included in our geotechnical report. We are available and anticipate that we will provide such services.

T&R comment 2: We concur with this comment and assume that the civil engineer will incorporate this aspect of the storm drainage system into the final plans.

T&R comment 3: Our recommendations for site grading include removing any existing topsoil and constructing horizontal keyways and benches into dense sandstone bedrock. In addition, all fill will be compacted to a minimum degree of 95 percent based upon ASTM D 1557, latest revision, and subdrainage will be provided in areas where fills are deep or where seepage is encountered. Our analysis suggests that the fill slopes will be stable under static and seismic conditions in the planned building areas. In our opinion, properly compacted fill should not be affected by significant settlement and the recommendations contained in our report included anchoring all foundations into bedrock.

T&R comment 4: The embedment depth recommended into bedrock should be in accordance with the text of the report. Figure 40 should be superceded by the text.

T&R comment 5: We concur that there may be some difficulty excavating into the bedrock due to the extreme density of the rock that was encountered in our borings and test pits.

T&R comment 6: Water lines are to be removed from the area leading from the water tank. The excavation should be backfilled with engineered fill based upon our recommendations. We should be provided with information regarding the intent of removal or relocation of water lines and we will then be able to provide additional supplemental recommendations, if needed.

T&R comment 7: We believe that the seismic and surcharge loading will be the responsibility of the civil engineer during the design of the related structures.

We trust that the above has provided answers to the reviewers questions.

We look forward to continue working with you on this project.

Please call if you have any questions or comments.

Very truly yours,
MICHELUCCI & ASSOCIATES, INC.

Joseph Michelucci /cg
Joseph Michelucci
Geotechnical Engineer #593
(Expires 3/31/07)

Cc: Lea & Sung Engineers
Attention: Jim Toby

County of San Mateo
Attention: Jay Mazzetta

22 January 2004
Project 3738.01

Mr. Geoffrey A. Reilly
Christopher A. Joseph & Associates
101 H Street, Suite Q
Petaluma, California 94952

Subject: Third Party Geotechnical/Geological Review
Thomas Subdivision
San Mateo, California

Dear Mr. Reilly:

This letter acknowledges our receipt of the letter titled *Response to Third Party Review, Ascension Heights Subdivision, San Mateo County, California*, prepared by Michelucci & Associates, Inc. (Michelucci), dated 15 January 2004. The responses provided by Michelucci either concur, clarify, or provide mitigation for geotechnical/geological comments and/or issues described in our third party review letter dated 20 November 2003. Therefore, we judge Michelucci's letter satisfactorily addresses our concerns and no further response is required. However, it should be noted that some of the proposed mitigation will require reviewing and approving the final plans and details, and providing geotechnical/geological consultation based on field observations during construction. To ensure the applicant's geologic and geotechnical consultants are provided the necessary opportunity to participate in the final design and construction phases of the project, we suggest the county require the owner's consultants (Registered Geotechnical Engineer and Registered Engineering Geologist) to review and approve the final grading, drainage, and foundation plans and specifications. Also, upon completion of construction activities, the owner's consultant should provide a final statement indicating whether the work was performed in accordance with project plans and specifications, and the consultant's recommendations.

If you have any questions or require additional information, please call.

Sincerely yours,
TREADWELL & ROLLO, INC.

Dean H. Iwasa
Geotechnical Engineer

cc: Mr. Charles Snell, Gilpin Geosciences

Treadwell&Rollo

12 December 2008
Project No. 3738.01

Ms. Jennie Anderson
Christopher A. Joseph & Associates
179 H Street
Petaluma, California 94952

Subject: Supplemental Geologic Information
Response to County Review Comments
Ascension Heights Subdivision
San Mateo, California

Dear Ms. Anderson:

This letter presents the results of our supplemental geologic review to update our previously submitted Third Party Geotechnical/Geological Review letter dated 20 November 2003. We understand that the County Geologist, Ms. Jean Demouthe has reviewed the project, and issued review comments related to the site geology in an email dated 27 October 2008. The objective of this letter is to respond to these comments and provide updated seismic design criteria based upon the current California Building Code (CBC). For clarity, each review comment is presented in italics followed by our response.

Response to Review Comments

a. They (Treadwell & Rollo, Inc.) need to define the physical relationship between the sandstone and the greenstone (i.e. who's on top? nature of the contact?)

The R.C. Harlan and Associates feasibility geotechnical investigation report dated 8 July 1981 stated *"The property is underlain by bedrock consisting mainly of sandstone and some greenstone of the Franciscan Formation".* None of the other investigation reports for the site by Terrasearch (revision date 15 February 1980), Michelucci & Associates (M&A) (dated 16 December, 2002) or our prior third party review letter described observations of greenstone on the site.

Our engineering geologist visited the site to conduct a geologic reconnaissance on 5 December 2008. During that reconnaissance, sandstone bedrock was observed in outcrops at various locations around the site, including a previous small quarry pit. Based on our review of the prior reports and our site observations, it is our opinion that there the site is underlain by sandstone, and no greenstone/sandstone contact is present.

b. There is colluvium reported to be up to 5 feet deep in old swales.

During our site visit, we did observe that there appears to be deep colluvium in swales on the southwest and northeast sides of the site. If the colluvium remains onsite, it may be susceptible to soil creep and small scale debris flows. During our site visit, we observed small scale debris-flow deposits in an area previously identified as "medium erosion gully" (see attached Site Geologic Map).

c. Regarding the cross-sections....where is the greenstone? And they should show bedding orientation in the sandstone (diagrammatically at least) on the sections.

As discussed above, we do not believe there to be greenstone at the site. During our site visit, our geologist observed and measured bedding attitudes at three locations on the site. The attached three geologic cross-sections have been updated to graphically show the apparent bedding, adjusted for the direction of the sections. The attached updated site geologic map shows the locations of the three bedding attitudes recorded.

d. Serious gully erosion present. Drainage is going to be a serious problem, during and after grading and construction. Erosion hazard, too. But the report skims over these problems. The project has huge amount of grading, and will result in very steep slopes. Potential for lots of erosion.

As noted in our prior study, severe gully erosion is present on the site, primarily on the cut slopes above Bel Aire Road and Ascension Drive. Our prior study recommended mitigating further erosion by controlling surface runoff and directing it away from these slopes along with repairing and re-vegetating the eroded areas.

The report by M&A provided three options for repairing the existing erosional features (page 19). We agree that the three options presented are feasible methods for mitigating erosion, and one or more of these methods should be incorporated into the final site grading plan.

These measures plus additional mitigations that include re-establishing the vegetation on finished slopes and controlling surface runoff should reduce the potential for long term erosion in areas that have been graded. As previously recommended in our prior study, we recommend that the project geotechnical consultant be involved in reviewing the final grading and drainage plans, as well as perform construction observation services during grading to ensure that erosion control mitigation measures are performed.

e. The bedding is described as having a shallow dip to the NE, which makes the north and northeast slopes dip slopes, with the potential for slope stability problems. It is odd that they say (page 7: landslides) that this slope has the lowest susceptibility for failure. The text says there is little hazard from deep-seated landslides, but the hazard analysis (page 18) says there are weak zones below (?) the sandstone that could result in deep failure.

The reference on page 7 refers to a map by the USGS that indicates the northeast slope of the knoll has a low susceptibility of failure during an earthquake (Wieczorek et.al, 1985). As previously described, we indicated that small localized areas of weak rock or shared matrix material or areas with adversely oriented bedding, joints, or shears may exist within the sandstone bedrock. These areas may experience shallow landsliding if not addressed.

We previously recommended that the site developer retain a qualified engineering geologist to observe all site excavations for evidence of such weak zones. If such zones are observed, they should be evaluated to determine if there is a potential for future landsliding based upon final site grading configurations, and mitigation recommendations should be provided if appropriate.

f. With all the grading planned, it is hard to imagine that there will still be a potential for debris flow failures, unless areas of colluvium, deep soils, or unengineered fill will remain on the site.

As discussed above, we judge the site may be susceptible to debris flows similar to the small flow deposits in the northeast portion of the site if deep soil, fill, or colluvium will remain on site. In our opinion, the risk of these debris flow deposits can be successfully mitigated through the control of surface runoff by not allowing concentrated runoff to flow over graded slopes or over areas of thick soil, colluvium or fill.

g. I agree that landslide hazards on this site are significant, but their justification for saying so seems to be at odds with information in the early part of the report. This whole hazard analysis section reads like it was written by a different person (who didn't read the first part of the report).

The discrepancy appears to be related to the discussion of "weak zones" and their influence on deep-seated landsliding. We judge the site may contain localized "weak zones" within the sandstone bedrock. Should a qualified geologist be retained during construction as recommended, the lack or presence of such zones can be determined, and appropriate recommendations for mitigation can be developed.

h. Why does the EIR contain engineering recommendations (page 19)? This reads like it was culled right out of the Michelucchi report.

We understand that the revised EIR will not contain specific engineering recommendations, but rather general guideline recommendations for site development.

2007 CALIFORNIA BUILDING CODE MAPPED VALUES

For seismic design in accordance with the provisions of 2007 California Building Code (CBC), we recommend the following:

- Maximum Considered Earthquake (MCE) S_s and S_1 of 2.18g and 1.23g, respectively.
- Site Class B
- Site Coefficients F_A and F_V of 1.0 and 1.0
- Maximum Considered Earthquake (MCE) spectral response acceleration parameters at short periods, S_{MS}, and at one-second period, S_{M1}, of 2.18g and 1.23g, respectively.
- Design Earthquake (DE) spectral response acceleration parameters at short period, S_{DS}, and at one-second period, S_{D1}, of 1.45g and 0.82g, respectively.

We trust this provides you with the information you require at this time.

Sincerely yours,
TREADWELL & ROLLO, INC.

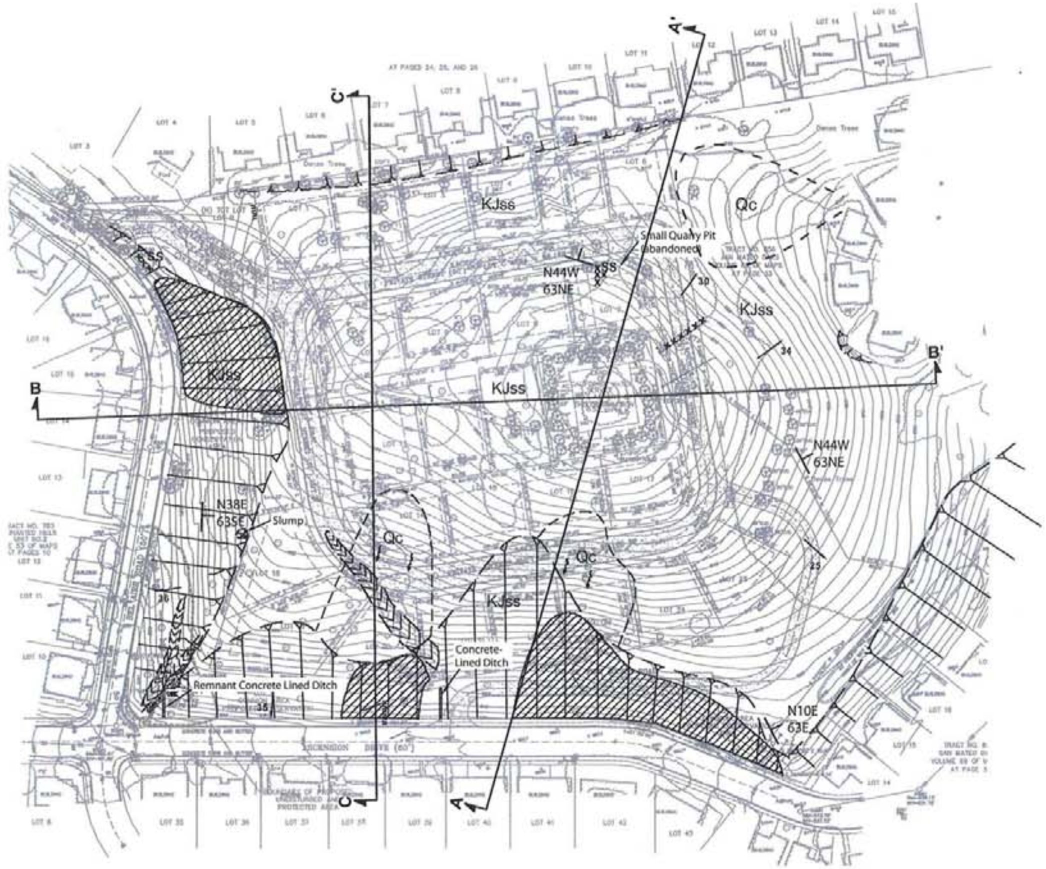
Christopher R. Hundemer, C.E.G.
Senior Project Geologist

Dean H. Iwasa
Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
DEAN H. IWASA
GE 2285
Exp. 3/31/10
GEOTECHNICAL
STATE OF CALIFORNIA

37380102.CRH

Attachments: Figure 1 – Updated Site Geologic Map
Figure 2 – Updated Geologic Cross-Section A-A'
Figure 3 – Updated Geologic Cross-Section B-B'
Figure 4 – Updated Geologic Cross-Section C-C'



EXPLANATION

- Cut slope
- Area of severe erosion and small gullies
- Medium erosion gully
- Large erosion gully
- Sandstone outcrop
- 34 Slope inclination (degrees)
- Areas of shallow soil creep
- Geologic contacts, approximately located
- Qc Colluvium
- KJss Franciscan Complex sandstone (Sandstone block within sheared rock "fsr")
- N44W 63NE Strike and dip of bedding
- xxxxxx Area of shallow debris flow deposits
- A A' Idealized subsurface profile location

Notes:
1. Base map from Lea & Sung Engineering, Inc.
2. Geologic interpretation based on review of aerial photographs, review of subsurface data by others, and a site reconnaissance on 15 September 2003. Site conditions may have changed since the reconnaissance was completed.
3. Refer to report text for a discussion of conditions shown on this map.

ASCENSION HEIGHTS SUBDIVISION
San Mateo, California

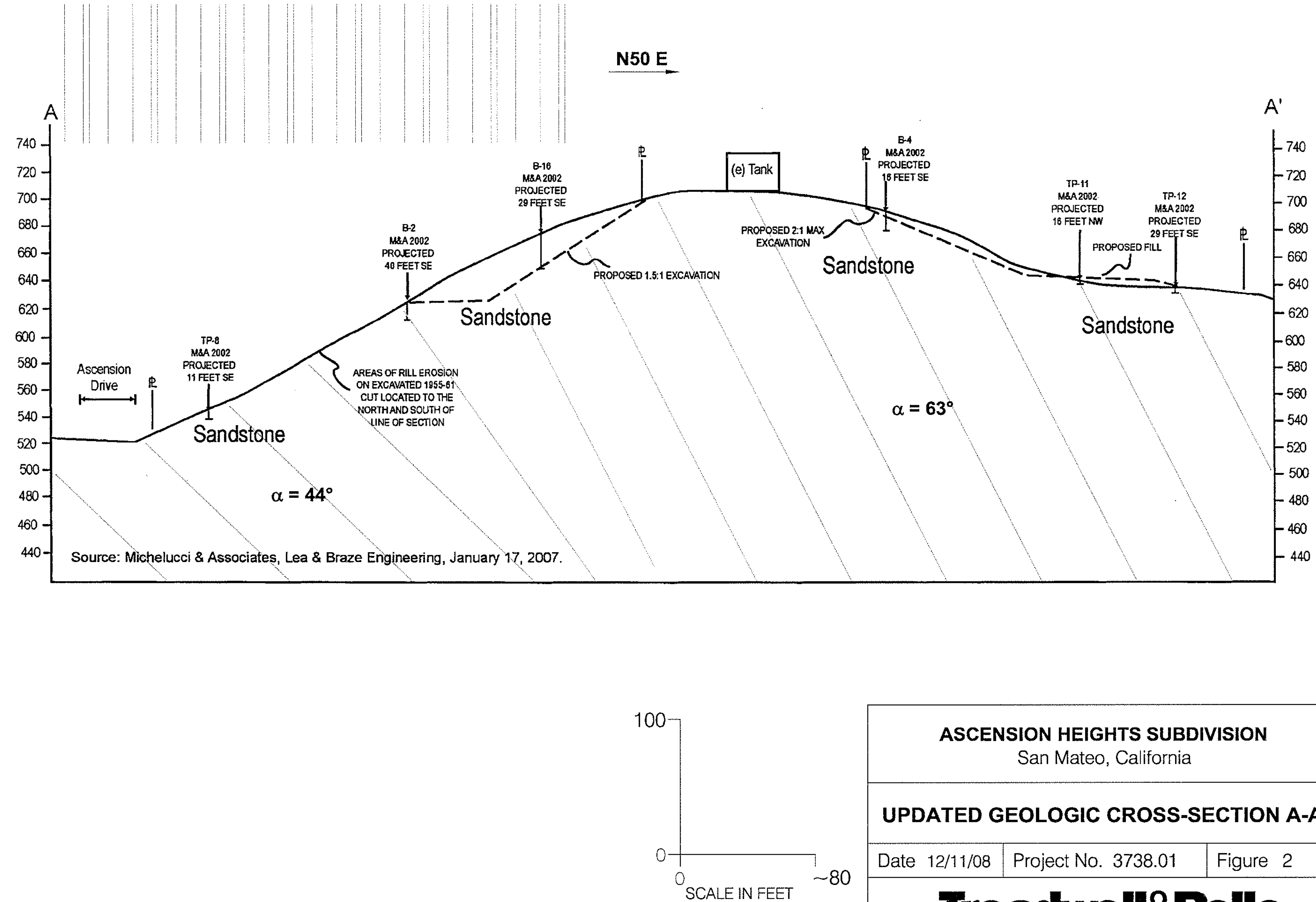
UPDATED SITE GEOLOGIC MAP

Date 12/11/08	Project No. 3738.01	Figure 1

Treadwell&Rollo

Source: Drawing titled "Figure IV.D-1, Geology Map", by Christopher A. Joseph & Associates, undated.

R:\Trgraphics\3700's\3738.01\3738.01 Updated Site Geologic Map



ASCENSION HEIGHTS SUBDIVISION
San Mateo, California

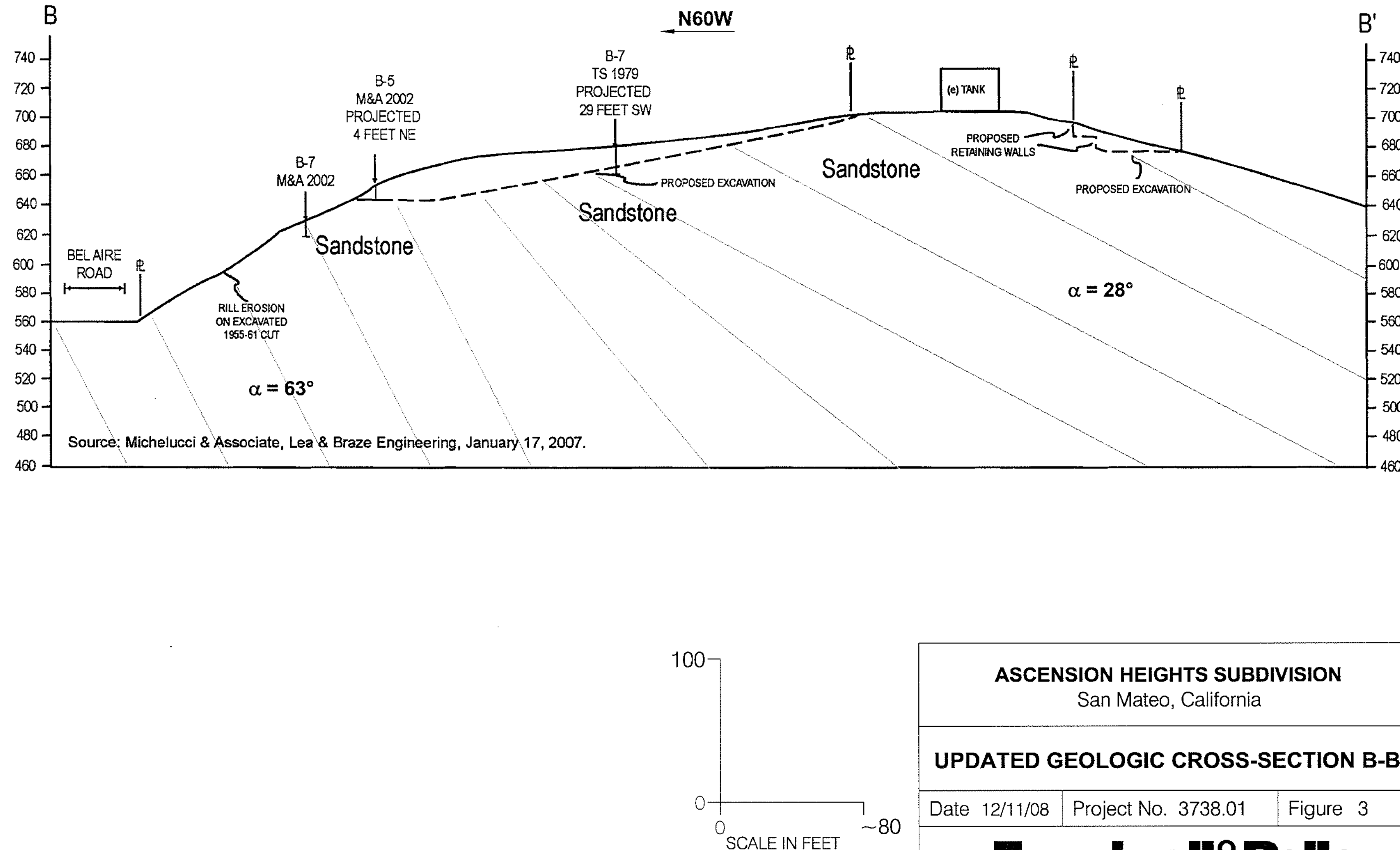
UPDATED GEOLOGIC CROSS-SECTION A-A'

Date 12/11/08 | Project No. 3738.01 | Figure 2

Treadwell&Rollo

Reference: Drawing titled "Figure IV.D-2, Cross Section A-A'", by Christopher A. Joseph & Associates, undated.

R:\Trgraphics\3700's\3738.01\3738.01 Cross Sections.dwg 12/12/08



Reference: Drawing titled "Figure IV.D-3, Cross Section A-A'", by Christopher A. Joseph & Associates, undated.

ASCENSION HEIGHTS SUBDIVISION
San Mateo, California

UPDATED GEOLOGIC CROSS-SECTION B-B'

Date 12/11/08	Project No. 3738.01	Figure 3

Treadwell&Rollo

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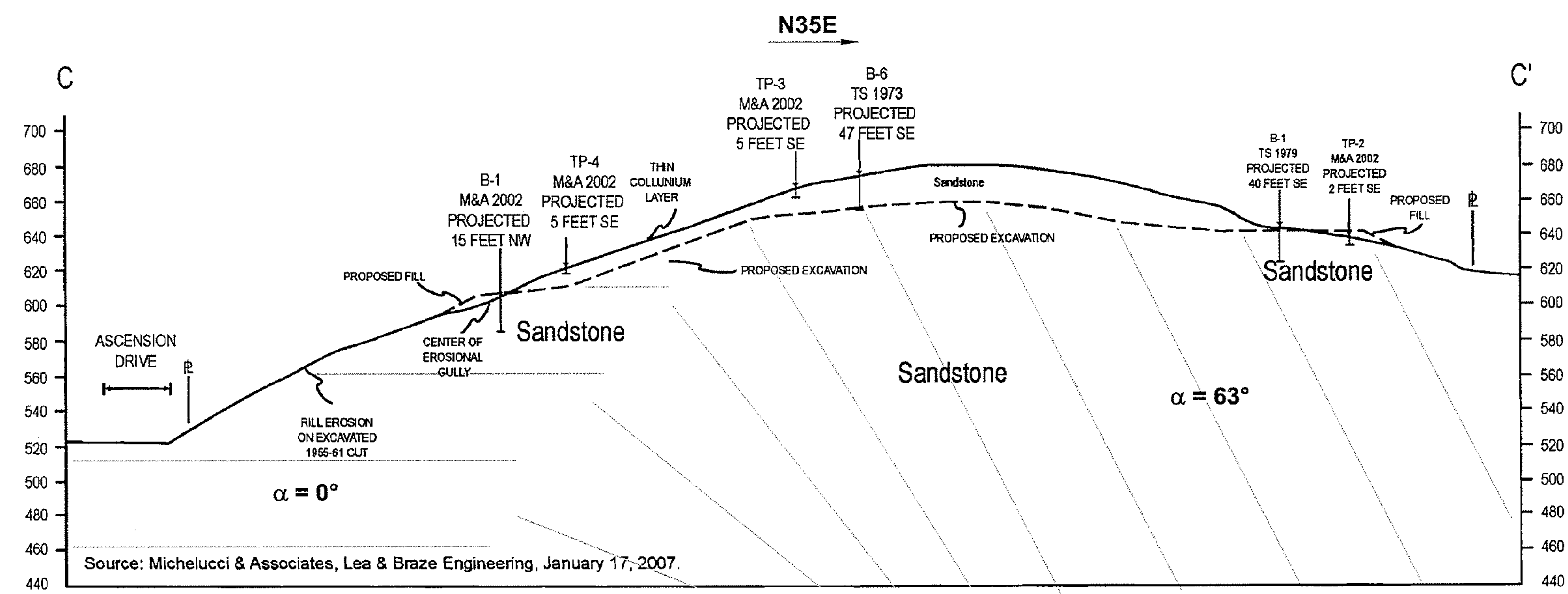

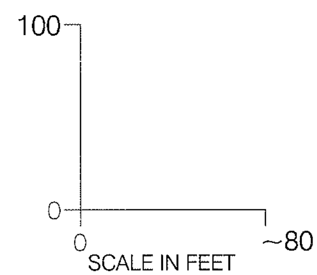

ASCENSION HEIGHTS SUBDIVISION
San Mateo, California

UPDATED GEOLOGIC CROSS-SECTION C-C'

Date 12/11/08	Project No. 3738.01	Figure 4

Treadwell&Rollo

Reference: Drawing titled "Figure IV.D-4, Cross Section A-A'", by Christopher A. Joseph & Associates, undated.

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APPENDIX G

HYDROLOGY DATA

Hydrology Study

Ascension Heights Subdivision
San Mateo, California

Prepared for Dennis Thomas
San Mateo Real Estate and Construction

February 2003
Lea & Sung Job No. 2010135

February 27, 2003

Dennis Thomas
San Mateo Real Estate and Construction
1777 Borel Place, Suite 330
San Mateo, CA 94402

Subject: **Hydrology Study**
Ascension Heights Subdivision, San Mateo, California
Lea & Sung Job No: 2010135

Dear Dennis:

It is my pleasure to present to you the following hydrology study. This study is a detailed analysis of the proposed storm drain system that is planned for the project. This report presents our analysis and conclusions on the adequacy of the proposed system as well as the impact on the existing storm drain system it is planned to tie into.

It is our conclusion that the proposed development will have no adverse effect on the adequacy of the existing storm drain system, provided the conditions stipulated in the recommendations portion of this report are incorporated into the final design.

Please feel free to call at any time should you have any questions.

Very truly yours,

Jeffrey C. Lea, Principal
P.E. 31878, expires 12-31-04

Table of Contents

INTRODUCTION

Ascension Heights Subdivision is a proposed 25-lot development that is situated in the San Mateo Hills area near the College of San Mateo. A new looping public roadway will service the 25 lots proposed by this development. The land is currently undeveloped with the exception of an existing water tank owned by California Water Service, Inc. The tank is located on a separate parcel located in the middle of the property and is not a part of the proposed subdivision. This parcel is made accessible by a paved roadway with an access easement through the project. The existing property currently drains downhill to public roadways of Bel Aire Road and Ascension Drive to the west and south. The northerly side of the property currently drains down to the existing houses on Parrott Drive while the southerly side drains to the houses on CSM Drive.

The current storm drain system appears to have been installed in the late 1950's when the current subdivision was constructed. The system starts in various locations throughout the neighborhood. All systems then drain into the main line, which follows Ascension Drive from the intersection of Ascension Drive and Bel Aire Road and then flows downhill to a drop inlet at the intersection of Ascension Drive and Polhemus Road. At this point the runoff flows across Polhemus Road and outfalls into Polhemus Creek.

This report is an analysis of and recommendation on the adequacy of the proposed system as well as the impact on the existing storm drain system into which it is planned to. This study is concentrated on the main storm drain line that follows Ascension Drive from the intersection of Bel Aire Road and Ascension Drive to the outfall in Polhemus Creek.

DRAINAGE NARRATIVE

The new development will add approximately 4.55 acres of impervious surface (roads, house, and flatwork) to the site which is now currently undeveloped except for the water tank and access road. The new storm drain system proposed as part of the Tentative Subdivision Map will consist of County-approved inlets, drainage structures, concrete valley gutters and underground pipes. The majority of the proposed system will be smooth-walled High Density Polyethylene (HDPE) plastic pipe. The proposed on-site system will constitute two separate lines, designated in this report as Line "A" and Line "B", which serve the northerly side of the property and the southerly side, respectively. All the drainage uphill of the proposed public streets will flow towards the new roadways and follow the curb and gutter until it enters an inlet. The area downhill of the roadways will drain into valley gutters, which will be designed to accommodate the anticipated runoff. (valley gutter design will be done during the construction drawing phase and has been omitted from this report.) The runoff from these valley gutters will enter inlets at the downhill end of the valley gutters and then the underground system. Once all the water has been collected into the underground system, the water is conveyed to a new line in both Bel Aire Road and Ascension Drive. This new storm drain lines will then connect into a new common manhole at the intersection of Ascension Drive and Bel Aire Road. The system then connects into the existing system, following Ascension Drive down to Polhemus Road. The runoff is then released into Polhemus Creek.

The site currently has extensive soil erosion on portions of the site as discussed in the *"Geotechnical and Engineering Geologic Investigation"* [1] This surface erosion is proposed to be repaired as part of the subdivision. The new valley gutters and storm drain infrastructure are designed to take a significant amount of runoff away from these areas and thus help prevent future erosion.

The new impervious surface runoff associated with the development consists of the following:

New roadway and sidewalk surface	2.25 Acres
New house and driveways (Assumed at 4000 s.f. per lot)	2.30 Acres
Total	4.55 Acres

ASSUMPTIONS AND METHODOLOGY

In performing the hydrological calculations, the Rational Method (Q=C*I*A) was used, as specified in the "San Mateo County, Guidelines for Drainage Review". A 10-year storm event interval was used in the calculations. Per instructions in the guideline and confirmation with Pete Bentley, engineer with the County. The project is outside of any floodplain.

The size, slope, material type and location of the existing system was done in combination of a field survey which located and verified "As-built" conditions of the system and the original improvement plans[2] for the system.

[1] *"Geotechnical and Engineering Geologic Investigation*", by Michelucci and Associates, Inc., dated December 16, 2002, Job No. 01-3186
2 Improvement Plans – Enchanted Hills Unit No. 2, dated November 1959.

The runoff coefficient "C" was determined in two ways. The first method used to determine the "C" values was by using the values given in the Rainfall Runoff Data Chart[3]. The second method used for determining "C" values for areas that include the large areas of undeveloped land that compromise the parcel was determined by a weighted average method of calculating the percentage of each type of surface, whether residential, asphalt streets or open space.[4]

The Time of Concentration (Tc) was determined by assuming an initial Tc at the uppermost inlet. Starting with the initial Tc and adding the pipe flow time, we then computed the actual Tc at each structure. Since multiple storm drain systems connected to the main system, the overall area and the longest Tc value was used for each structure. Thus some structures jump dramatically in time from the upstream inlet because the runoff took longer to get to this inlet via the branch system that connected to it.

The values for the frictional coefficient, "n" were determined by both manufacturers specifications for the new Corrugated HDPE smooth wall pipe and a good condition for the existing reinforced concrete pipe.

Pipe	"n"
HANCOR Hi-Q® PIPE[5]	0.011
Reinforced Concrete Pipe (good condition)[6]	0.013

Hydraulic information was also omitted in this report. Since the slope of the majority of the pipes is in excess of 10% and the new and existing systems are located in a very steep environment, there is negligible chance of having any hydraulic problems. In most instances the hydraulic grade line will simply be the actual water level of the runoff in the pipe section itself. Pete Bentley, engineer for the County of San Mateo, agreed and said that the County would not require any hydraulic calculations.

[3] Rainfall Runoff Data, San Mateo County
[4] Drainage Manual, County of Santa Clara, Department of Public Works.
[5] HANCOR Hi-Q® PIPE SPECIFICATION, http://www.hancor.com/product/hiqspecs.html
[6] Drainage Manual, County of Santa Clara, Department of Public Works.

RESULTS

Detailed hydrology calculations for both the existing and proposed systems are shown in Exhibit “A”. The calculations take into account all the information shown in the references sheet, the assumptions and methodology section of this report and good engineering judgment.

EXISTING SYSTEM

The results of the calculations shown in Exhibit “A.1” show that the existing system is able to handle to current pre-development runoff with two pipe run exceptions. Pipe P-6 as shown on the existing hydrology base map is a 15” RCP sloped at 2%. This exceeds capacity of the pipe by almost 20%. This is primarily due to its flat slope. The outfall pipe, P-12 that crosses Polhemus Road is also over capacity. This is a 30” RCP sloped at 1.3%. This too has capacity problems due to its flat slope. All other pipes exceed the capacity requirements.

PROPOSED SYSTEM

The proposed system is specifically designed to not only handle a 10 year event, but also a 100 year event. As the calculations shown on “Exhibit A.2” show both Line “A” and Line “B” have been designed to fully handle any anticipated runoff caused by both a 10 year and 100 year event.

HOW THE PROPOSED SYSTEM WILL IMPACT THE EXISTING SYSTEM

The proposed design will have little impact on the existing system. Since the proposed system has a great deal of capacity to it and a long time of concentration, the runoff will be contained in the pipe for some time before it has a chance to severely impact the existing system. The actual system flow is increased with the additional impervious surfaces, however the majority of the pipes in the system are able to handle the additional runoff with no adverse effects. As with the existing system, however, the added runoff has an adverse effect on the same two pipes that posed problems on the existing system.

Should the rainfall from a severe storm exceed that of a 10-year event, or the lines or inlets get clogged, the water does have an overland release via the public streets. Due to the extreme slope of the existing streets, any runoff that is not intercepted by the existing storm drain system will simply drain down Ascension and flow over Pulhemus

Road and into the creek. Thus it is anticipated that none of the existing houses or neighboring hillsides in the neighborhood would be affected by any flooding as a result of additional runoff imposed by this development. The proposed on-site system does have some low spots to it in the new public street that would prevent overland release via the streets. In this case the pipes have been intentionally oversized to handle as much capacity as possible, even in the event of some blockage.

RECOMMENDATIONS

The analysis incorporated in this report has shown that the existing system can handle the anticipated additional runoff from the proposed development, except for two specific pipes. It is recommended that these pipes be redesigned and upsized to increase their capacity, both for the existing condition and the proposed development.

In the case of pipe P-C7, in which a 15" RCP flowing at 2.0% is crossing Ascension Drive at Enchanted Way, we recommend a new 21" RCP replace the existing pipe. Since the upstream and downstream pipe are of adequate size, it is more reasonable to simply replace the pipe at the same invert locations as is currently in place.

In the case of pipe P-C13, in which a 30" RCP flows at 1.3%, it is feasible to both increase the size of the pipe as well as increase the slope. The upstream invert of this outgoing pipe is several feet lower than the incoming pipe invert, thus the invert can be raised and not affect the upstream pipe. We recommend replacing the existing 30" RCP with a 36" RCP sloped at 2%.

In both cases, the recommendations will allow the entire system to handle the design storm event with a factor of safety built into it.

The calculations for the above recommendations are shown in Exhibit A.3

References

1. Rainfall Runoff Data, San Mateo County, California
2. San Mateo County, Guideline for Drainage Review
3. Tentative Subdivision Map dated 8-23-02 and revised 1-31-03.
4. County Aerial Map 9E
5. Improvement Plans – Enchanted Hills Unit No. 2, dated November 1959.``
6. "Drainage Manual", Santa Clara County, Department of Public Works
7. "Geotechnical and Engineering Geologic Investigation", by Michelucci and Associates, Inc., dated December 16, 2002, Job No. 01-3186
8. HANCOR Hi-Q® PIPE SPECIFICATION, http://www.hancor.com/product/hiqspecs.html

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Storm Drain Design by Rational Formula - County of San Mateo

Acension Heights Subdivision

LINE "B"
Exhbit A.2

Project Acension Heights Subdivision
Location Ascension Dr and Bel Aire, San Mateo
Lea & sung Job # 2010135
Storm 10 YEAR EVENT

Label	Notes	Tc (min)	Local Intensity (in/hr)	Area Designation	Inlet AREA (acres)	Inlet C	System Contributing flow (cfs)	Total System Flow (cfs)	Section Size (inches)	PIPE TYPE	Manning's "n"	Length (ft)	Constructed Slope (ft/ft)	Average Velocity (ft/s)	Pipe Flow Time (min)	Capacity (cfs)	Exceeds Capacity	System Flow/Capacity
I-B1	(N) COUNTY INLET	10	2.33	AREA B-1	1.2	0.5	1.40											
P-B1								1.40	12	HDPE	0.010	139	19.40%	8.662	0.27	20.39	'NO	7%
I-B2	(N) COUNTY INLET	10.27	2.31	AREA B-2	0.97	0.5	1.12											
P-B2								2.52	12	HDPE	0.010	43	2.33%	3.002	0.24	7.07	'NO	36%
JB-B1	(N) V-24 JUNCTION BOX	10.51																
P-B3								2.52	12	HDPE	0.010	100	52.00%	14.182	0.12	33.39	'NO	8%
I-B4	(N) COUNTY INLET	10.00	2.33	AREA B-3	0.37	0.75	0.65											
P-B4								0.65	12	HDPE	0.010	116	40.10%	12.454	0.16	29.32	'NO	2%
CB-B4	(N) V-24 CATCH BASIN	10.16	2.32	AREA B-4	0.31	0.5	0.36											
P-B5								1.00	12	HDPE	0.010	74	16.20%	7.916	0.16	18.64	'NO	5%
CB-B3	(N) V-24 CATCH BASIN	10.00	2.33	AREA B-5	0.12	0.5	0.14											
P-B6								1.14	12	HDPE	0.010	136	20.60%	8.926	0.25	21.01	'NO	5%
I-B3	(N) COUNTY INLET	10.25	2.31	AREA B-6	0.48	0.5	0.55											
P-B7								0.55	12	HDPE	0.010	115	55.60%	14.665	0.13	34.52	'NO	2%
CB-B2	(N) V-24 CATCH BASIN	10.38	2.30	AREA B-7	0.39	0.5	0.45											
P-B8								2.15	12	HDPE	0.010	191	7.30%	5.314	0.60	12.51	'NO	17%
CB-B1	(N) V-24 CATCH BASIN	11.11	2.24	AREA B-8	1.49	0.5	1.67											
P-B9								4.66	12	HDPE	0.010	57	50.90%	14.031	0.07	33.03	'NO	14%
JB-B2	(N) V-24 JUNCTION BOX	11.17																
P-B10								4.66	15	HDPE	0.010	16	3.10%	5.410	0.05	14.78	'NO	32%
SDMH-B1	(N) COUNTY MANHOLE	11.22																
P-B11								4.66	15	HDPE	0.010	130	1.92%	4.258	0.51	11.63	'NO	40%
SDMH-B2	(N) COUNTY MANHOLE	11.73																
P-B12								4.66	15	HDPE	0.010	438	5.25%	7.041	1.04	19.23	'NO	24%
SDMH-7	(N) COUNTY MANHOLE	12.77																

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Storm Drain Design by Rational Formula - County of San Mateo

Acension Heights Subdivision

Existing system
Exhbit A.3

Project Acension Heights Subdivision
Location Ascension Dr and Bel Aire, San Mateo
Lea & sung Job # 2010135
Storm 10 YEAR EVENT

Label	Comments	Tc (min)	Local Intensity (in/hr)	Area Designation	Inlet AREA (acres)	Inlet C	System Contributing flow (cfs)	Total System Flow (cfs)	Section Size (inches)	PIPE TYPE	Manning's "n"	Length (ft)	Constructed Slope (ft/ft)	Average Velocity (ft/s)	Pipe Flow Time (min)	Capacity (cfs)	Exceeds Capacity	System Flow/Capcity
I-1	(E) COUNTY INLET	10	2.32	AREA 1	0.42	0.85	0.83											
P-1								0.83	15	RCP	0.013	38	1.80%	3.171	0.20	8.66	'NO	10%
I-2	(E) COUNTY INLET	10.20	2.31	AREA 2	6.93	0.24	3.84											
P-2								4.67	15	RCP	0.013	18	2.80%	3.955	0.08	10.81	'NO	43%
I-3	(E) COUNTY INLET	10.00	2.32	AREA 3	3.27	0.25	1.90											
P-3								1.90	15	RCP	0.013	34	23.20%	11.385	0.05	31.10	'NO	6%
SDMH-1	(E) COUNTY MANHOLE																	
P-4								6.57	15	RCP	0.013	56	5.80%	5.693	0.16	15.55	'NO	42%
I-4	(E) COUNTY INLET	10.36	2.30	AREA 4	0.26	0.85	0.51											
P-5								8.46	15	RCP	0.013	164	15.70%	9.366	0.29	25.59	'NO	33%
I-5	(E) COUNTY INLET	10.66	2.28	AREA 5	2.12	0.5	2.42											
P-6								10.88	**21**	RCP	0.013	60	2.00%	6.552	0.15	22.40	'NO	49%
I-6	(E) COUNTY INLET	15.55	1.91	AREA 6	17.4	0.45	14.99											
P-7								25.87	18	RCP	0.013	278	14.50%	12.961	0.36	39.99	'NO	65%
I-7	(E) COUNTY INLET	15.91	1.89	AREA 7	2.35	0.5	2.22											
P-8								28.09	18	RCP	0.013	200	13.26%	12.395	0.27	38.24	'NO	73%
I-8	(E) COUNTY INLET	16.17	1.88	AREA 8	15.1	0.5	14.16											
P-9								42.26	21	RCP	0.013	130	12.42%	16.328	0.13	55.82	'NO	76%
I-9	(E) COUNTY INLET	16.31	1.87	AREA 9	7.6	0.5	7.10											
P-10								49.36	24	RCP	0.013	374	14.30%	22.883	0.27	85.52	'NO	58%
I-10	(E) COUNTY INLET	16.58	1.85	AREA 10	0.49	0.85	0.77											
P-11								50.13	24	RCP	0.013	64	10.00%	19.136	0.06	71.51	'NO	70%
I-11	(E) COUNTY INLET	16.63	1.85	AREA 11	3.41	0.5	3.15											
P-12								53.28	**36**	RCP	0.013	116	**2.00%**	19.255	0.10	94.29	'NO	57%
OUTLET	PULHEMUS CREEK																	

REVISIONS	BY

JOB NO: 2010135
DATE: 11-15-02
SCALE: 1" = 40'
DRAWN BY: MC
SHEET NO: 1 OF 2 SHEETS

EXHIBIT A.2
PROPOSED STORM DRAIN SYSTEM
HYDRO BASE MAP

ASCENSION DR. & BEL AIRE RD.
SAN MATEO, CA

SAN MATEO COUNTY

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REGISTERED PROFESSIONAL ENGINEER
JEFFREY C. LEA
No. 31878
Exp. 12-31-00
CIVIL
STATE OF CALIFORNIA

REVISIONS	BY

JOB NO. 201035
DATE: 11-15-02
SCALE: 1" = 40'
DRAWN BY: MC
SHEET NO. 2 OF 2 SHEETS

EXHIBIT A.2
PROPOSED STORM DRAIN SYSTEM
HYDRO BASE MAP

ASCENSION DR. & BEL AIRE RD.
SAN MATEO, CA

SAN MATEO COUNTY

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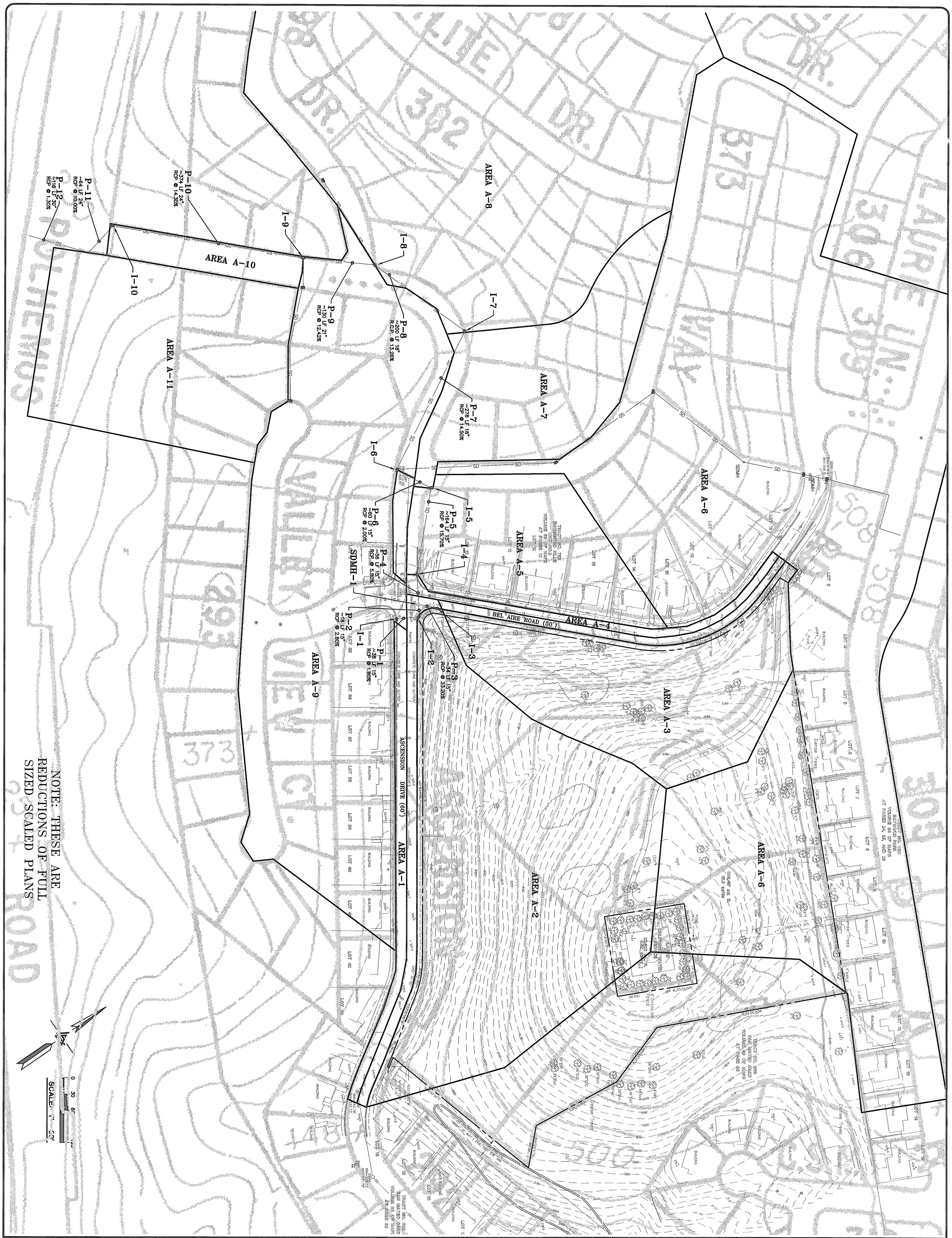

JOB NO:	2010135
DATE:	11-15-02
SCALE:	1" = 60'
DRAWN BY:	JT
SHEET NO:	1
OF 1 SHEETS	

REVISIONS | BY

EXHIBIT A.1
EXISTING STORM DRAIN SYSTEM
HYDROLOGY BASE MAP

ASCENSION DR. & BEL AIRE RD.
SAN MATEO, CA

SAN MATEO COUNTY

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August 20, 2003

Mr. Geoffrey A. Reilly
Principal / Regional Manager
Christopher A. Joseph & Associates
101 H Street, Suite Q
Petaluma, California 94952

Subject: Review of Hydrology Study for Ascension Heights Subdivision in San Mateo

Dear Mr. Reilly:

I have completed my peer review of hydrologic analyses submitted for the Thomas Subdivision in San Mateo County. My opinions are based on two visits to the proposed project site and a review of these documents:

1. "Hydrology Study: Ascension Heights Subdivision,; San Mateo, California" prepared by Lea & Sung in February 2003; and

2. "Geotechnical and Engineering Geologic Investigation: Proposed Ascension Heights Subdivision; San Mateo County, California" prepared by Michelucci & Associates, Inc. in December 2002.

Although I have reviewed the geotechnical and geologic investigation, my opinions are limited to erosion caused by storm and subsurface runoff rather than gross geotechnical stability.

Scope of Review

Our scope of review is to evaluate the applicant's hydrology and drainage report for completeness and appropriateness in the following areas:

- methodologies
- rainfall and design storm
- soil infiltration and other losses
- safe discharge
- erosion potential during and after construction

Summary of Findings

Based on my review of the reports' completeness relative to the areas of hydrology listed above, I have a few major issues, and several minor issues.

Major Issues

1. Project impacts for more severe runoff events (in excess of a ten-year design storm) are examined in only a very cursory fashion, and are not supported by the calculations submitted. Project impacts in terms of runoff and erosion should be quantitatively analyzed for the 100-year event, which is the national standard and has been adopted by the City of San Mateo for their planning. (Runoff eventually reaches San Mateo Creek, which is maintained by the City further downstream.) Potential impacts to the site and surrounding properties during more extreme runoff events should be addressed.

2. Safe release of runoff from the project site should be provided in the event that design storm drain capacity is exceeded, even if due to debris. Again only a cursory statement is made regarding this issue, which could have serious consequences regarding erosion.

3. A more defined erosion control plan should be provided. In particular, the plan should guarantee that the developer will implement Best Management Practices during construction, and select which erosion repair option is to be used at specific locations. It is not entirely clear who is responsible for erosion repair and stabilizing slopes. In my opinion this work should not be left to individual lot builders.

Minor Issues

1. Runoff coefficients for residential development on steep slopes tend to be higher than used in the Hydrology Study. Given the steep slopes, however, storm drain performance may not be significantly affected.

2. When evaluating storm drain performance, the standard of practice is to analyze the system using a range of pipe roughness coefficients – lower to evaluate the potential for high pipe velocities; higher to evaluate pipe capacity. Energy dissipation may be an issue.

3. The capacity of street inlets should be checked to determine how much runoff is flowing in the streets, particularly for more severe runoff events. Inlet capacity at the intersection of Ascension Drive with Bel Aire Road may be fairly important.

4. For the ten-year design event, the proposed project increases peak runoff by about one cubic feet per second, or about two percent. I would tend to agree that this is not a significant impact to either Pulhemus Creek or San Mateo Creek, if the applicant can demonstrate that peak 100-year runoff is safely conveyed to Pulhemus Creek with no significant impact to other properties. However, it may be noted that County policy is to allow no increase in post-project runoff.

Methodologies

The applicant follows the Rational Method methodology specified in *San Mateo County, Guidelines for Drainage Review*. This method estimates peak rates of runoff and is an appropriate methodology to analyze project impacts, particularly drainage impacts.

The potential for the project to increase erosion due to an increased duration of runoff relative to pre-development flows (particularly in the more frequent storm events) can be addressed simply by having a comprehensive erosion control plan; that is, one that does not allow site erosion. The potential for increased erosion in Pulhemus Creek or San Mateo Creek due to the project is likely to be less than significant.

The Hydrology Study adequately addresses ten-year design runoff assuming that the storm drain system is functional. On Page 4 of the study, the applicant's engineer states: "The proposed system is specifically designed to not only handle a 10 year event, but also a 100 year event. As the calculations shown on 'Exhibit A.2' show both Line "A" and Line "B" have been designed to fully handle any anticipated runoff caused by both a 10 year and 100 year event." However, the spreadsheets appended as Exhibit A.2 do not include 100-year calculations.

Furthermore, the 100-year design event should be routed through the proposed storm drain system and streets if necessary, based on an analysis of inlet capacities. Surface drainage ditches protecting neighboring properties to the southeast along Ascension Drive and Los Altos Drive, and to the north along Parrott Drive should be designed to contain 100-year runoff with a modicum of freeboard.

Rainfall and Design Storm

The applicant's engineer uses rainfall-frequency-duration data published by the San Mateo County Department of Public Works. This data is reasonable and is generally within about ten percent of values obtained using a methodology adopted by the City of San Mateo and approved by FEMA, which is based on Santa Clara Valley Water District regression analyses for precipitation data in the Bay Area.

Again, the 100-year design storm should be used to analyze project impacts in addition to the 10-year storm used by the applicant's engineer.

Soil Infiltration and Other Losses

A runoff coefficient of 0.5 is used in the Hydrology Study for newly developed residential lots. Experience with other projects involving higher-end homes on steep slopes suggests that a runoff coefficient of 0.6 (ASCE, 1996) is more appropriate. This change, however, may not have a significant impact on the impact analysis.

Safe Discharge

Due to the relative steepness of the site and surrounding areas, the applicant omitted hydraulic information. However, it can be difficult to intercept gutter flow on relatively steep slopes (up to 50 percent). The safe discharge of runoff in excess of storm drain or inlet capacity, and the impact of the project on that discharge should be examined in more detail.

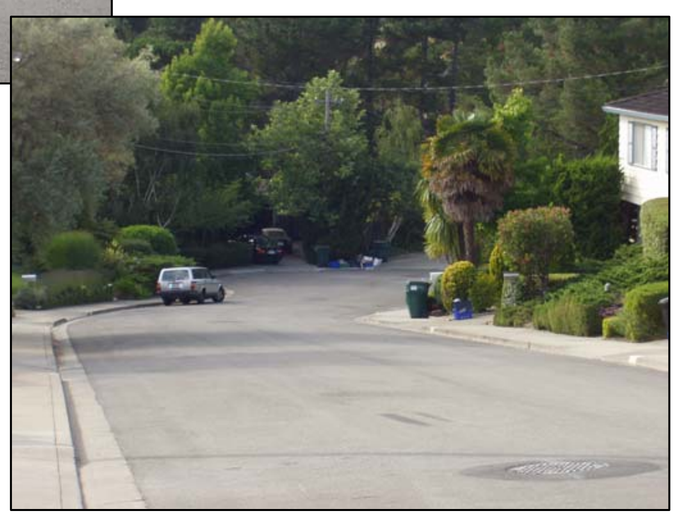
The relative split of excess street flow at the intersection of Ascension Drive and Bel Aire Road is of concern. A statement is made in the Hydrology Study:

> "Should the rainfall from a severe storm exceed that of a 10-year event, or the lines or inlets get clogged, the water does have an overland release via the public streets. Due to the extreme slope of the existing streets, any runoff that is not intercepted by the existing storm drain system will simply drain down Ascension and flow over Pulhemus Road and into the creek. Thus it is anticipated that none of the existing houses of neighboring hillsides in the neighborhood would be affected by any flooding as a result of additional runoff imposed by this development."

(A statement such as this should be limited to estimated runoff from a specified return period. There is always a finite probability that neighboring properties will be impacted, it is a matter of how significant that probability is.)

Site topography and reconnaissance indicate that some of the excess flow may actually drain down Bel Aire Road to the south rather than Ascension Drive. This storm runoff could flow downhill to Valley View Court which terminates in a cul-de-sac with no safe release for drainage in excess of its single catch basin. If the project causes additional runoff to split down Bel Aire Road, there could be a significant impact to properties along Bel Aire Road and Valley View Court, particularly those at the end of the cul-de-sac.

Left: Intersection of Bell Aire Road and Ascension Drive showing potential spill of excess flows toward Valley View Court.



Right: Cul-de-sac on Valley View Court (No overland release)

The Hydrology Study also states:

> "The proposed on-site system does have some low spots to it in the new public street that would prevent overland release via the streets. In this case the pipes have been intentionally oversized to handle as much capacity as possible, even in the event of some blockage."

The sag points without release appear to be at the boundary of Lots 19 and 20, and at the street corner near Lot 6. Standard practice is to provide a safe overland release of stormwater in the event that the underground storm drain system's capacity is exceeded, through blockage or otherwise. The applicant should address how deep water could become if the storm drain system were to become plugged, where that water might go, and if there could be unintentional breakouts that might exacerbate site erosion or damage adjacent properties.

Erosion Potential During and after Construction

The applicant should mitigate for increased on-site erosion and pollutant discharges to the storm drain system and San Mateo Creek watershed during construction activities. Some mechanism for protecting against the impacts of building on individual lots over time should also be in place. Reference is made to Best Management Practices published by San Mateo County, the California Regional Water Quality Control Board, the Santa Clara Valley Urban Runoff Pollution Prevention Program, and similar agencies.

The geotechnical report recommends subdrain systems at foundation walls, tightline disposal pipes from roof downspouts, and concrete "v" ditches at strategic locations to protect slopes from erosion. These features should be coordinated with the storm drainage system if necessary; even if just to indicate that subdrains and roof leaders will discharge to the street.

To properly assess project impacts, the responsibility for erosion control measures should be made clearer. Will complete and comprehensive measures be taken at the time the subdivision is mass-graded, or are individual lot builders expected to provide their own erosion control plans? Will some of the site be left in this condition if lots do not sell quickly?

The following photograph illustrates the potential problem of providing a safe overland release of runoff. Site design should be conservative to help prevent a repeat of this situation, where runoff eroded its own path to the street below, completely bypassing the designed drainage facility:

Please feel free to call me to discuss any of my opinions, and if you feel that I have not addressed an issue outlined in our scope of review. I look forward to hearing from you in the near future. Thank you for relying upon Schaaf & Wheeler for this portion of your project.

Very truly yours,
SCHAAF & WHEELER

Charles D. Anderson, P.E.
Vice President

Hydrology Study

Ascension Heights Subdivision
Ascension Drive at Bel Aire Road
San Mateo, California
(Unincorporated)

Prepared for San Mateo Real Estate & Construction

October 17, 2006
Lea & Braze Job No. 2010135

Jeffrey C. Lea, Principal Engineer
Lea & Braze Engineering, Inc.

October 17, 2006

Dennis Thomas
San Mateo Real Estate & Construction
1777 Borel Place
San Mateo, CA 94402

Subject: **Hydrology Study**
Ascension Heights Subdivision, San Mateo (Unincorporated)
Lea & Braze Job No: 2010135

Dear Dennis:

It is my pleasure to present to you the following hydrology study for an on-site retention system. This study is a detailed analysis of the proposed storm drain retention system that is planned for this project. This report presents our analysis and conclusions on the design of a retention system capable of containing and treating on-site post-development flows and releasing flows at pre-development rates.

The intent of this study is to demonstrate the adequacy of the system to fulfill San Mateo County's C.3 storm water quality requirements for on-site retention and treatment. The purpose of this system is to release the flows into the County storm drain system at or below pre-development rates. The treatment portion of the C.3 requirements will be fulfilled with CDS stormwater hydrodynamic separators and grassy lined swales. Please feel free to call at any time should you have any questions.

Very truly yours,

Jim Toby, P.E.
Project Manager

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Hydrology Study

Ascension Heights Subdivision
Ascension Drive at Bel Aire Road
San Mateo, California
(Unincorporated)

Prepared for San Mateo Real Estate & Construction

October 17, 2006
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Jeffrey C. Lea, Principal Engineer
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Very truly yours,

Jim Toby, P.E.
Project Manager

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INTRODUCTION

Ascension Heights Subdivision is a new 25 lot subdivision on a moderately steep slope in San Mateo (Unincorporated). The project is surrounded on two sides by developed streets with curb, gutter and sidewalk and is serviced by a traditional storm drain system. The project includes new private streets with grades up to 20%. Runoff is generally directed to an on-site storm drain system. Each individual lot of this project will have its own retention system which will retain runoff. Before the runoff leaves the site, it will be treated by a CDS (continuous deflective separation) hydrodynamic separator runoff treatment device.

DRAINAGE NARRATIVE

The project has been designed with several permanent "Best Management Practice" (BMP's) for long term treatment of the runoff. Each lot will have its own individual retention system comprising of a two large diameter pipes. The pipe size and length are specified in the enclosed calculations. Lots 1-10, 14-18, and 20 will have 2-24" diameter x 50' long retention pipes. Lots 11-13 and 21-25 will have 2-24" diameter x 60' long retention pipes. Lot 19 will have 2-36" diameter x 60' long retention pipes. The sizing was determined by assuming that each lot will be built out to the full extent of the zoning code which states that the maximum hardscape area is 40% of each lot. This system will retain stormwater runoff in each lot prior to entering the storm drain system. Then, the runoff will be collected in a common main and conveyed to the adjacent existing storm drain system in either Ascension Drive or Bel Aire Road.

The premise for the design is to allow significant portions of the runoff from the lots to flow through the landscaping vegetation prior to entering the storm drain and exiting the site. Once the runoff leaves the individual retention system, it then enters the main storm drain system and will be directed towards a "CDS" filtration chamber. This chamber is designed to remove as many pollutants as possible. The device is specifically designed to remove large trash, oil and small sedimentation particles. Please note that the "CDS" needs to have a regular maintenance schedule to perform properly. It will need to be cleaned out from time to time per the manufacturer's recommendations or at an interval established by the County of San Mateo. It is anticipated that any CC&Rs will require a maintenance agreement. It is recommended that a maintenance agreement be made part of any conditions of approval for the tentative map.

The goal of this design was to retain the runoff and release it at predevelopment rates and to treat it in the CDS units before it leaves the project site. Our design philosophy was to only have retention on individual lots and not retain the roadway runoff. We will however treat the runoff in the CDS units. Therefore, each lot retention system has been oversized in order to compensate for the runoff from the roadway. The total predevelopment runoff from the entire project was 12.46 cfs. The total post development runoff including the roadway was determined to be 15.26 cfs. The net flow rate difference, which is also the amount of runoff that we required to retain on-site, is 2.8 cfs. The proposed system of oversized retention pipes on each lot can retain a maximum of 2.8 cfs total. Therefore, the system can retain and meter release the flows at predevelopment rate of 12.46 cfs. The calculations within this report demonstrate that each lot has the ability to retain enough runoff that collectively, all 25 lots aid in releasing runoff at a predevelopment rate to compensate for all new impervious surfaces resulting from the new private streets. Retention is thereby provided for the runoff resulting from the streets.

NPDES C.3 COMPLIANCE

Two changes occur over the course of this development. First, natural pervious ground cover is converted to impervious areas such as rooftops and roads. Natural soil acts as an absorbent for rainwater and also removes pollutants through purification and filtration. Impervious areas can neither absorb rainwater nor remove pollutants. Due to this increase of impervious area, increase flows and volumes of stormwater will be released from the development which may adversely impact environmentally sensitive areas. Secondly, this development can create new pollution such as oils and trash from the roadway. As rain becomes runoff, it will carry the untreated pollutants over the impervious area to a storm drain system which leads to a body of water. As a result, the goal of the NPDES Provision C.3 is to release the stormwater at pre-development rates and treat the runoff prior to it leaving the site.

In the Ascension Heights Subdivision, great care has been taken to comply with the NPDES Provision C.3. For design and calculation purposes only, each residential lot is assumed to have the maximum of 40% impervious surface area, which leaves 60% of each lot as pervious ground for filtration purposes. Each residential lot will also have a series of large diameter retention pipes to meter the stormwater at pre-development rates. Each retention system will be reevaluated for adequacy at the time of construction. Prior to leaving the site, the stormwater will be treated for pollutants by either one of the two CDS (continuous deflective separator) units located at the outlets on the storm drain system prior to leaving the subdivision. Please see separate CDS report for additional information.

Thus, we are proposing to release runoff at pre-development rates and treat all runoff prior it leaving the project and entering the County storm drain system.

ASSUMPTIONS AND METHODOLOGY

This section includes data used in calculating the pre-development and post-development runoff volumes.

References:

- Topographic Survey by Lea & Braze Engineering, Inc.
- San Mateo County Rainfall Runoff Data Map
- HydroCAD 7.0 UNIT HYDROGRAPH Definitions Copyright (c) 1990-2003 Applied Microcomputer Systems

Project Information:

Project Location:	Ascension Drive at Bel Aire Road San Mateo, California (Unincorporated) APN: 041-111-020, 130, 160, 270, 280, 320, 360

Hydrology Information:

Storm Interval:	10 Year Return, 10 min. rainfall intensity
Roughness coefficient "n":	0.011, HDPE Storage Pipes
Rainfall Intensity (I):	2.21 in/hour (Per San Mateo County Rainfall Runoff Data Map) Initial Intensity (10 Minutes)

RECOMMENDATIONS

Lots 1, 6, 18 – Retention System:

Based on our calculations assuming a 40% impervious surface build out, pre-construction flow is 0.11 cfs. The post-construction flow is 0.23 cfs. The net increase due to the construction is 0.12 cfs. The proposed detention system retains and meters release of 0.12 cfs for a 10 year storm. This proposed storm study is for a 10 minute time of concentration. The proposed retention system consists of (2) 24" diameter x 50' long solid wall HDPE pipes. The primary outlet pipe is a 2" PVC with an 8" secondary emergency overflow pipe. The secondary outlet will not be used for drainage but would be utilized only in an emergency situation. The system slows down the incoming flow and meters the outflow over a 1 (or more) hour time period. This amount of runoff will be held in the retention pipes.

Lots 2-5 – Retention System:

Based on our calculations assuming a 40% impervious surface build out, pre-construction flow is 0.11 cfs. The post-construction flow is 0.21 cfs. The net increase due to the construction is 0.10 cfs. The proposed detention system retains and meters release of 0.10 cfs for a 10 year storm. This proposed storm study is for a 10 minute time of concentration. The proposed retention system consists of (2) 24" diameter x 50' long solid wall HDPE pipes. The primary outlet pipe is a 2" PVC with an 8" secondary emergency overflow pipe. The secondary outlet will not be used for drainage but would be utilized only in an emergency situation. The system slows down the incoming flow and meters the outflow over a 1 (or more) hour time period. This amount of runoff will be held in the retention pipes.

Lot 7, 10, 14, 20 – Retention System:

Based on our calculations assuming a 40% impervious surface build out, pre-construction flow is 0.11 cfs. The post-construction flow is 0.22 cfs. The net increase due to the construction is 0.11 cfs. The proposed detention system retains and meters release of 0.11 cfs for a 10 year storm. This proposed storm study is for a 10 minute time of concentration. The proposed retention system consists of (2) 24" diameter x 50' long solid wall HDPE pipes. The primary outlet pipe is a 2" PVC with an 8" secondary emergency overflow pipe. The secondary outlet will not be used for drainage but would be utilized only in an emergency situation. The system slows down the incoming flow and meters the outflow over a 1 (or more) hour time period. This amount of runoff will be held in the retention pipes.

Lot 11 – Retention System:

Based on our calculations assuming a 40% impervious surface build out, pre-construction flow is 0.13 cfs. The post-construction flow is 0.29 cfs. The net increase due to the construction is 0.16 cfs. The proposed detention system retains and meters release of 0.16 cfs for a 10 year storm. This proposed storm study is for a 10 minute time of concentration. The proposed retention system consists of (2) 24" diameter x 60' long solid wall HDPE pipes. The primary outlet pipe is a 2" PVC with an 8" secondary emergency overflow pipe. The secondary outlet will not be used for drainage but would be utilized only in an emergency situation. The system slows down the incoming flow and meters the outflow over a 1 (or more) hour time period. This amount of runoff will be held in the retention pipes.

Lots 12-13 – Retention System:

Based on our calculations assuming a 40% impervious surface build out, pre-construction flow is 0.11 cfs. The post-construction flow is 0.23 cfs. The net increase due to the construction is 0.12 cfs. The proposed detention system retains and meters release of 0.16 cfs for a 10 year storm. This proposed storm study is for a 10 minute time of concentration. The proposed retention system consists of (2) 24" diameter x 60' long solid wall HDPE pipes. The primary outlet pipe is a 2" PVC with an 8" secondary emergency overflow pipe. The secondary outlet will not be used for drainage but would be utilized only in an emergency situation. The system slows down the incoming flow and meters the outflow over a 1 (or more) hour time period. This amount of runoff will be held in the retention pipes.

Lots 15-16 – Retention System:

Based on our calculations assuming a 40% impervious surface build out, pre-construction flow is 0.11 cfs. The post-construction flow is 0.21 cfs. The net increase due to the construction is 0.10 cfs. The proposed detention system retains and meters release of 0.10 cfs for a 10 year storm. This proposed storm study is for a 10 minute time of concentration. The proposed retention system consists of (2) 24" diameter x 50' long solid wall HDPE pipes. The primary outlet pipe is a 2" PVC with an 8" secondary emergency overflow pipe. The secondary outlet will not be used for drainage but would be utilized only in an emergency situation. The system slows down the incoming flow and meters the outflow over a 1 (or more) hour time period. This amount of runoff will be held in the retention pipes.

Lot 17 – Retention System:

Based on our calculations assuming a 40% impervious surface build out, pre-construction flow is 0.11 cfs. The post-construction flow is 0.21 cfs. The net increase due to the construction is 0.10 cfs. The proposed detention system retains and meters release 0.10 cfs for a 10 year storm. This proposed storm study is for a 10 minute time of concentration. The proposed retention system consists of (2) 24" diameter x 50' long solid wall HDPE pipes. The primary outlet pipe is a 2" PVC with an 8" secondary emergency overflow pipe. The secondary outlet will not be used for drainage but would be utilized only in an emergency situation. The system slows down the incoming flow and meters the outflow over a 1 (or more) hour time period. This amount of runoff will be held in the retention pipes.

Lot 19 – Retention System:

Based on our calculations assuming a 40% impervious surface build out, pre-construction flow is 0.12 cfs. The post-construction flow is 0.24 cfs. The net increase due to the construction is 0.12 cfs. The proposed detention system retains and meters release of 0.12 cfs for a 10 year storm. This proposed storm study is for a 10 minute time of concentration. The proposed retention system consists of (2) 36" diameter x 60' long solid wall HDPE pipes. The primary outlet pipe is a 2" PVC with an 8" secondary emergency overflow pipe. The secondary outlet will not be used for drainage but would be utilized only in an emergency situation. The system slows down the incoming flow and meters the outflow over a 1 (or more) hour time period. This amount of runoff will be held in the retention pipes.

Lots 21-25 – Retention System:

Based on our calculations assuming a 40% impervious surface build out, pre-construction flow is 0.10 cfs. The post-construction flow is 0.20 cfs. The net increase due to the construction is 0.10 cfs. The proposed detention system retains and meters release of 0.10 cfs for a 10 year storm. This proposed storm study is for a 10 minute time of concentration. The proposed retention system consists of (2) 24" diameter x 60' long solid wall HDPE pipes. The primary outlet pipe is a 2" PVC with an 8" secondary emergency overflow pipe. The secondary outlet will not be used for drainage but would be utilized only in an emergency situation. The system slows down the incoming flow and meters the outflow over a 1 (or more) hour time period. This amount of runoff will be held in the retention pipes.

APPENDIX A

Subcatchment 1S: EXISTING SITE TOTAL PRE

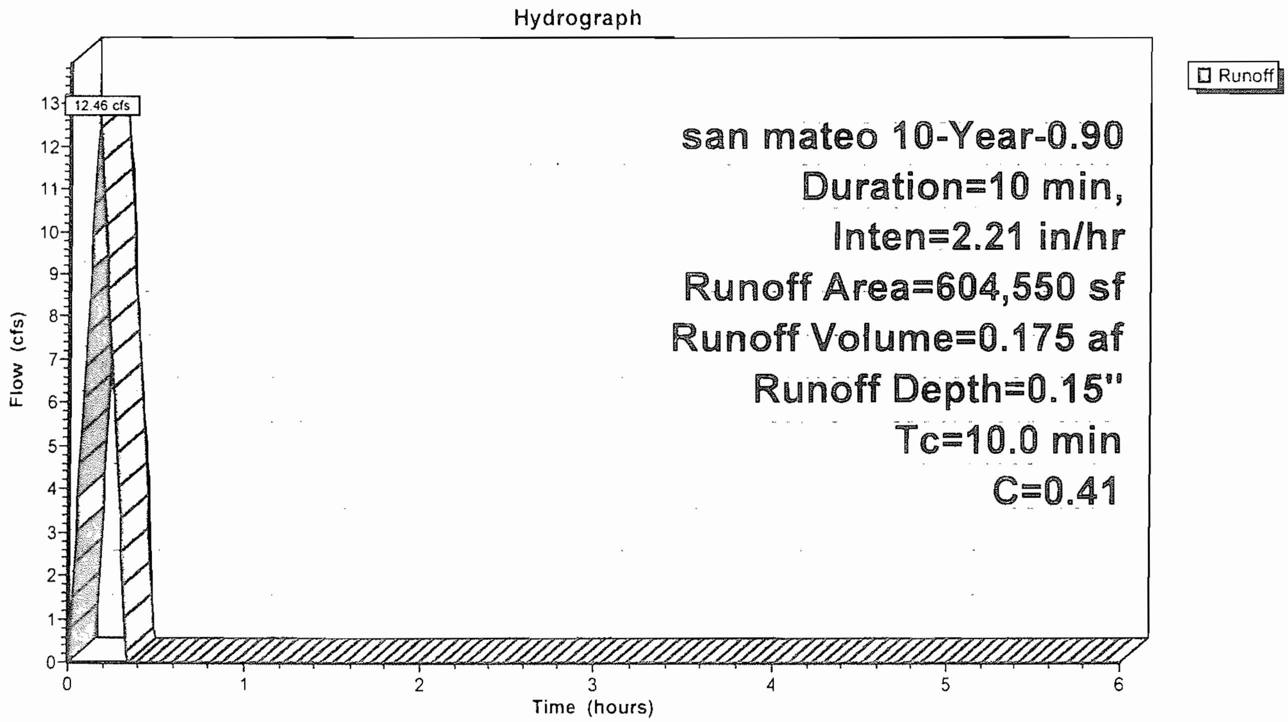
Runoff = 12.46 cfs @ 0.17 hrs, Volume= 0.175 af, Depth= 0.15"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
san mateo 10-Year-0.90 Duration=10 min, Inten=2.21 in/hr

Area (sf)	C	Description
10,867	0.95	Impervious Areas
593,683	0.40	Pervious Areas
604,550	0.41	Weighted Average
604,550	0.41	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, net increase**

Subcatchment 1S: EXISTING SITE TOTAL PRE



Hydrograph for Subcatchment 1S: EXISTING SITE TOTAL PRE

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.60	0.00	5.20	0.00
0.05	3.80	2.65	0.00	5.25	0.00
0.10	7.61	2.70	0.00	5.30	0.00
0.15	**11.41**	2.75	0.00	5.35	0.00
0.20	**10.14**	2.80	0.00	5.40	0.00
0.25	6.34	2.85	0.00	5.45	0.00
0.30	2.54	2.90	0.00	5.50	0.00
0.35	0.00	2.95	0.00	5.55	0.00
0.40	0.00	3.00	0.00	5.60	0.00
0.45	0.00	3.05	0.00	5.65	0.00
0.50	0.00	3.10	0.00	5.70	0.00
0.55	0.00	3.15	0.00	5.75	0.00
0.60	0.00	3.20	0.00	5.80	0.00
0.65	0.00	3.25	0.00	5.85	0.00
0.70	0.00	3.30	0.00	5.90	0.00
0.75	0.00	3.35	0.00	5.95	0.00
0.80	0.00	3.40	0.00	6.00	0.00
0.85	0.00	3.45	0.00		
0.90	0.00	3.50	0.00		
0.95	0.00	3.55	0.00		
1.00	0.00	3.60	0.00		
1.05	0.00	3.65	0.00		
1.10	0.00	3.70	0.00		
1.15	0.00	3.75	0.00		
1.20	0.00	3.80	0.00		
1.25	0.00	3.85	0.00		
1.30	0.00	3.90	0.00		
1.35	0.00	3.95	0.00		
1.40	0.00	4.00	0.00		
1.45	0.00	4.05	0.00		
1.50	0.00	4.10	0.00		
1.55	0.00	4.15	0.00		
1.60	0.00	4.20	0.00		
1.65	0.00	4.25	0.00		
1.70	0.00	4.30	0.00		
1.75	0.00	4.35	0.00		
1.80	0.00	4.40	0.00		
1.85	0.00	4.45	0.00		
1.90	0.00	4.50	0.00		
1.95	0.00	4.55	0.00		
2.00	0.00	4.60	0.00		
2.05	0.00	4.65	0.00		
2.10	0.00	4.70	0.00		
2.15	0.00	4.75	0.00		
2.20	0.00	4.80	0.00		
2.25	0.00	4.85	0.00		
2.30	0.00	4.90	0.00		
2.35	0.00	4.95	0.00		
2.40	0.00	5.00	0.00		
2.45	0.00	5.05	0.00		
2.50	0.00	5.10	0.00		
2.55	0.00	5.15	0.00		

APPENDIX B

Subcatchment 1S: Lot 1

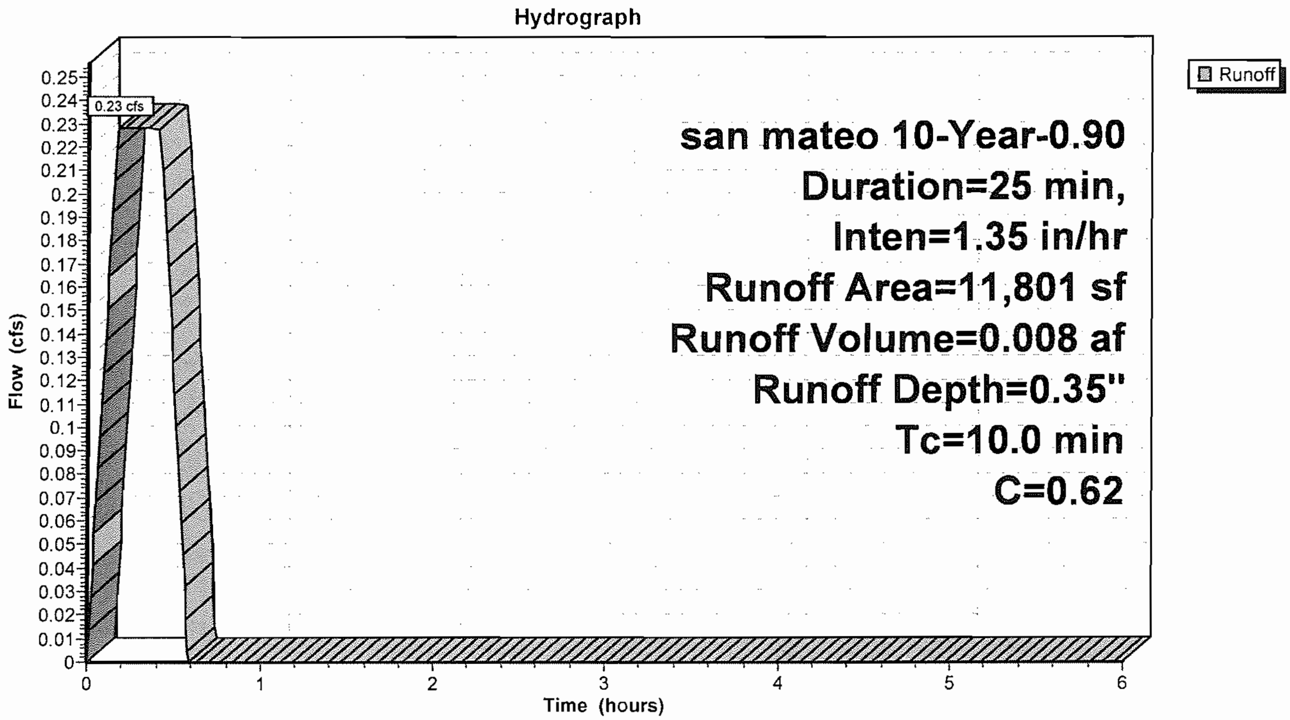
Runoff = 0.23 cfs @ 0.17 hrs, Volume= 0.008 af, Depth= 0.35"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
san mateo 10-Year-0.90 Duration=25 min, Inten=1.35 in/hr

Area (sf)	C	Description
4,720	0.95	Impervious Areas
7,081	0.40	Pervious Areas
11,801	0.62	Weighted Average
11,801	0.62	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, net increase**

Subcatchment 1S: Lot 1



Hydrograph for Subcatchment 1S: Lot 1

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.60	0.00	5.20	0.00
0.05	0.07	2.65	0.00	5.25	0.00
0.10	0.14	2.70	0.00	5.30	0.00
0.15	**0.21**	2.75	0.00	5.35	0.00
0.20	**0.23**	2.80	0.00	5.40	0.00
0.25	0.23	2.85	0.00	5.45	0.00
0.30	0.23	2.90	0.00	5.50	0.00
0.35	0.23	2.95	0.00	5.55	0.00
0.40	0.23	3.00	0.00	5.60	0.00
0.45	0.18	3.05	0.00	5.65	0.00
0.50	0.11	3.10	0.00	5.70	0.00
0.55	0.05	3.15	0.00	5.75	0.00
0.60	0.00	3.20	0.00	5.80	0.00
0.65	0.00	3.25	0.00	5.85	0.00
0.70	0.00	3.30	0.00	5.90	0.00
0.75	0.00	3.35	0.00	5.95	0.00
0.80	0.00	3.40	0.00	6.00	0.00
0.85	0.00	3.45	0.00		
0.90	0.00	3.50	0.00		
0.95	0.00	3.55	0.00		
1.00	0.00	3.60	0.00		
1.05	0.00	3.65	0.00		
1.10	0.00	3.70	0.00		
1.15	0.00	3.75	0.00		
1.20	0.00	3.80	0.00		
1.25	0.00	3.85	0.00		
1.30	0.00	3.90	0.00		
1.35	0.00	3.95	0.00		
1.40	0.00	4.00	0.00		
1.45	0.00	4.05	0.00		
1.50	0.00	4.10	0.00		
1.55	0.00	4.15	0.00		
1.60	0.00	4.20	0.00		
1.65	0.00	4.25	0.00		
1.70	0.00	4.30	0.00		
1.75	0.00	4.35	0.00		
1.80	0.00	4.40	0.00		
1.85	0.00	4.45	0.00		
1.90	0.00	4.50	0.00		
1.95	0.00	4.55	0.00		
2.00	0.00	4.60	0.00		
2.05	0.00	4.65	0.00		
2.10	0.00	4.70	0.00		
2.15	0.00	4.75	0.00		
2.20	0.00	4.80	0.00		
2.25	0.00	4.85	0.00		
2.30	0.00	4.90	0.00		
2.35	0.00	4.95	0.00		
2.40	0.00	5.00	0.00		
2.45	0.00	5.05	0.00		
2.50	0.00	5.10	0.00		
2.55	0.00	5.15	0.00		

Hydrograph for Pond 5P: detention basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	**0.00**	0.000	625.00	0.00	0.00	**0.00**
0.20	**0.23**	0.001	625.52	0.08	0.08	0.00
0.40	0.23	**0.004**	**626.03**	**0.11**	**0.11**	0.00
0.60	0.00	**0.004**	**626.04**	**0.11**	**0.11**	0.00
0.80	0.00	0.002	625.69	0.09	0.09	0.00
1.00	0.00	0.001	625.37	0.06	0.06	0.00
1.20	0.00	0.000	625.09	0.03	0.03	0.00
1.40	0.00	0.000	625.00	0.00	0.00	0.00
1.60	0.00	0.000	625.00	0.00	0.00	0.00
1.80	0.00	0.000	625.00	0.00	0.00	0.00
2.00	0.00	0.000	625.00	0.00	0.00	0.00
2.20	0.00	0.000	625.00	0.00	0.00	0.00
2.40	0.00	0.000	625.00	0.00	0.00	0.00
2.60	0.00	0.000	625.00	0.00	0.00	0.00
2.80	0.00	0.000	625.00	0.00	0.00	0.00
3.00	0.00	0.000	625.00	0.00	0.00	0.00
3.20	0.00	0.000	625.00	0.00	0.00	0.00
3.40	0.00	0.000	625.00	0.00	0.00	0.00
3.60	0.00	0.000	625.00	0.00	0.00	0.00
3.80	0.00	0.000	625.00	0.00	0.00	0.00
4.00	0.00	0.000	625.00	0.00	0.00	0.00
4.20	0.00	0.000	625.00	0.00	0.00	0.00
4.40	0.00	0.000	625.00	0.00	0.00	0.00
4.60	0.00	0.000	625.00	0.00	0.00	0.00
4.80	0.00	0.000	625.00	0.00	0.00	0.00
5.00	0.00	0.000	625.00	0.00	0.00	0.00
5.20	0.00	0.000	625.00	0.00	0.00	0.00
5.40	0.00	0.000	625.00	0.00	0.00	0.00
5.60	0.00	0.000	625.00	0.00	0.00	0.00
5.80	0.00	0.000	625.00	0.00	0.00	0.00
6.00	0.00	0.000	625.00	0.00	0.00	0.00

Stage-Discharge for Pond 5P: detention basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
625.00	0.00	0.00	0.00
625.05	0.02	0.02	0.00
625.10	0.03	0.03	0.00
625.15	0.04	0.04	0.00
625.20	0.05	0.05	0.00
625.25	0.05	0.05	0.00
625.30	0.06	0.06	0.00
625.35	0.06	0.06	0.00
625.40	0.07	0.07	0.00
625.45	0.07	0.07	0.00
625.50	0.07	0.07	0.00
625.55	0.08	0.08	0.00
625.60	0.08	0.08	0.00
625.65	0.08	0.08	0.00
625.70	0.09	0.09	0.00
625.75	0.09	0.09	0.00
625.80	0.09	0.09	0.00
625.85	0.10	0.10	0.00
625.90	0.10	0.10	0.00
625.95	0.10	0.10	0.00
626.00	0.11	0.11	0.00
626.05	0.11	0.11	0.00
626.10	0.11	0.11	0.00
626.15	0.11	0.11	0.00
626.20	0.12	0.12	0.00
626.25	0.12	0.12	0.00
626.30	0.12	0.12	0.00
626.35	0.12	0.12	0.00
626.40	0.12	0.12	0.00
626.45	0.13	0.13	0.00
626.50	0.13	0.13	0.00
626.55	0.13	0.13	0.00
626.60	0.13	0.13	0.00
626.65	0.13	0.13	0.00
626.70	0.14	0.14	0.00
626.75	0.14	0.14	0.00
626.80	0.14	0.14	0.00
626.85	0.14	0.14	0.00
626.90	0.14	0.14	0.00
626.95	0.15	0.15	0.00
627.00	0.15	0.15	0.00
627.05	0.16	0.15	0.01
627.10	0.19	0.15	0.04
627.15	0.23	0.15	0.08
627.20	0.29	0.16	0.13
627.25	0.36	0.16	0.20
627.30	0.44	0.16	0.28
627.35	0.53	0.16	0.37
627.40	0.63	0.16	0.47
627.45	0.74	0.16	0.57
627.50	0.84	0.17	0.68
627.55	0.95	0.17	0.78
627.60	1.04	0.17	0.87
627.65	**1.12**	**0.17**	**0.95**

Stage-Area-Storage for Pond 5P: detention basin

Elevation (feet)	Storage (acre-feet)
625.00	0.000
625.02	0.000
625.04	0.000
625.06	0.000
625.08	0.000
625.10	0.000
625.12	0.000
625.14	0.000
625.16	0.000
625.18	0.000
625.20	0.000
625.22	0.000
625.24	0.000
625.26	0.001
625.28	0.001
625.30	0.001
625.32	0.001
625.34	0.001
625.36	0.001
625.38	0.001
625.40	0.001
625.42	0.001
625.44	0.001
625.46	0.001
625.48	0.001
625.50	0.001
625.52	0.001
625.54	0.002
625.56	0.002
625.58	0.002
625.60	0.002
625.62	0.002
625.64	0.002
625.66	0.002
625.68	0.002
625.70	0.002
625.72	0.002
625.74	0.002
625.76	0.003
625.78	0.003
625.80	0.003
625.82	0.003
625.84	0.003
625.86	0.003
625.88	0.003
625.90	0.003
625.92	0.003
625.94	0.003
625.96	0.003
625.98	0.004
626.00	0.004
626.02	0.004
626.04	0.004
626.06	0.004
626.08	0.004
626.10	0.004
626.12	0.004
626.14	0.004
626.16	0.004
626.18	0.004
626.20	0.005
626.22	0.005
626.24	0.005
626.26	0.005
626.28	0.005
626.30	0.005
626.32	0.005
626.34	0.005
626.36	0.005
626.38	0.005
626.40	0.005
626.42	0.005
626.44	0.006
626.46	0.006
626.48	0.006
626.50	0.006
626.52	0.006
626.54	0.006
626.56	0.006
626.58	0.006
626.60	0.006
626.62	0.006
626.64	0.006
626.66	0.006
626.68	0.006
626.70	0.007
626.72	0.007
626.74	0.007
626.76	0.007
626.78	0.007
626.80	0.007
626.82	0.007
626.84	0.007
626.86	0.007
626.88	0.007
626.90	0.007
626.92	0.007
626.94	0.007
626.96	0.007
626.98	0.007
627.00	**0.007**
627.02	0.007
627.04	0.007
627.06	0.007
627.08	0.007
627.10	0.007
627.12	0.007
627.14	0.007
627.16	0.007
627.18	0.007
627.20	0.007
627.22	0.007
627.24	0.007
627.26	0.007
627.28	0.007
627.30	0.007
627.32	0.007
627.34	0.007
627.36	0.007
627.38	0.007
627.40	0.007
627.42	0.007
627.44	0.007
627.46	0.007
627.48	0.007
627.50	0.007
627.52	0.007
627.54	0.007
627.56	0.007
627.58	0.007
627.60	0.007
627.62	0.007
627.64	0.007
627.66	0.007

Subcatchment 1S: Lots 2-5

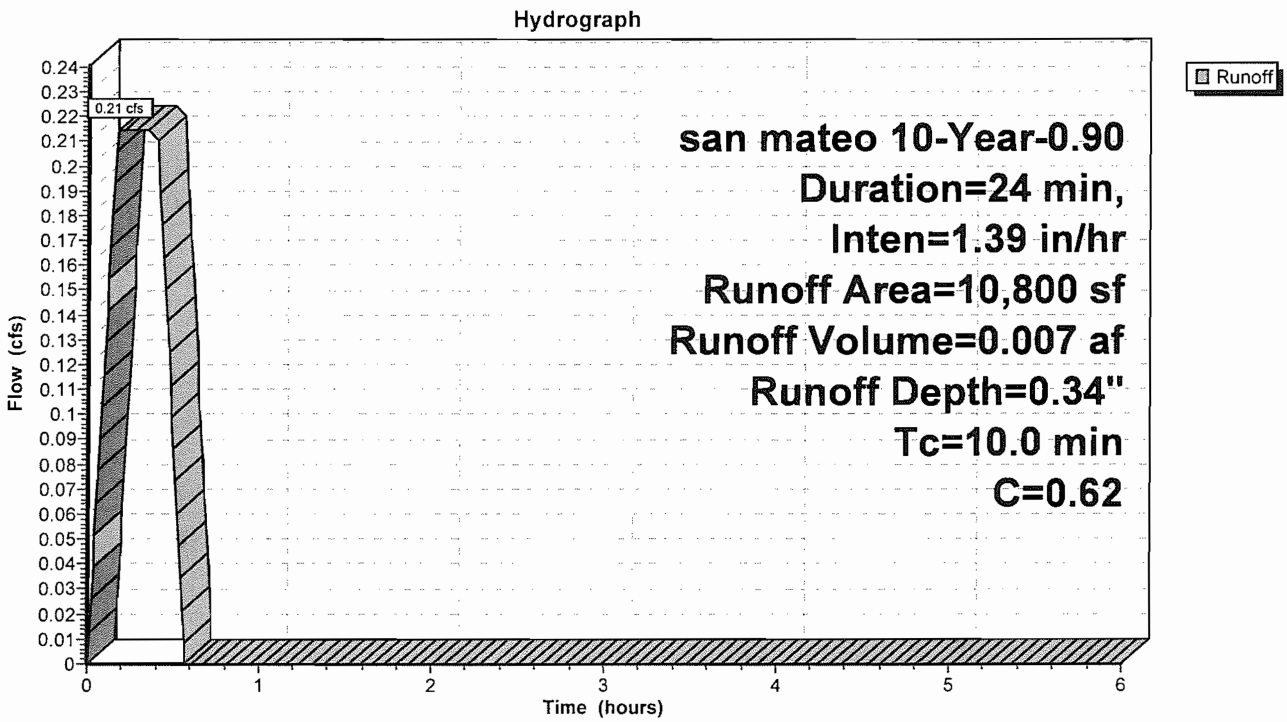
Runoff = 0.21 cfs @ 0.17 hrs, Volume= 0.007 af, Depth= 0.34"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
san mateo 10-Year-0.90 Duration=24 min, Inten=1.39 in/hr

Area (sf)	C	Description
4,320	0.95	Impervious Areas
6,480	0.40	Pervious Areas
10,800	0.62	Weighted Average
10,800	0.62	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, net increase**

Subcatchment 1S: Lots 2-5



Hydrograph for Subcatchment 1S: Lots 2-5

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.60	0.00	5.20	0.00
0.05	0.06	2.65	0.00	5.25	0.00
0.10	0.13	2.70	0.00	5.30	0.00
0.15	**0.19**	2.75	0.00	5.35	0.00
0.20	**0.21**	2.80	0.00	5.40	0.00
0.25	0.21	2.85	0.00	5.45	0.00
0.30	0.21	2.90	0.00	5.50	0.00
0.35	0.21	2.95	0.00	5.55	0.00
0.40	0.21	3.00	0.00	5.60	0.00
0.45	0.15	3.05	0.00	5.65	0.00
0.50	0.09	3.10	0.00	5.70	0.00
0.55	0.02	3.15	0.00	5.75	0.00
0.60	0.00	3.20	0.00	5.80	0.00
0.65	0.00	3.25	0.00	5.85	0.00
0.70	0.00	3.30	0.00	5.90	0.00
0.75	0.00	3.35	0.00	5.95	0.00
0.80	0.00	3.40	0.00	6.00	0.00
0.85	0.00	3.45	0.00		
0.90	0.00	3.50	0.00		
0.95	0.00	3.55	0.00		
1.00	0.00	3.60	0.00		
1.05	0.00	3.65	0.00		
1.10	0.00	3.70	0.00		
1.15	0.00	3.75	0.00		
1.20	0.00	3.80	0.00		
1.25	0.00	3.85	0.00		
1.30	0.00	3.90	0.00		
1.35	0.00	3.95	0.00		
1.40	0.00	4.00	0.00		
1.45	0.00	4.05	0.00		
1.50	0.00	4.10	0.00		
1.55	0.00	4.15	0.00		
1.60	0.00	4.20	0.00		
1.65	0.00	4.25	0.00		
1.70	0.00	4.30	0.00		
1.75	0.00	4.35	0.00		
1.80	0.00	4.40	0.00		
1.85	0.00	4.45	0.00		
1.90	0.00	4.50	0.00		
1.95	0.00	4.55	0.00		
2.00	0.00	4.60	0.00		
2.05	0.00	4.65	0.00		
2.10	0.00	4.70	0.00		
2.15	0.00	4.75	0.00		
2.20	0.00	4.80	0.00		
2.25	0.00	4.85	0.00		
2.30	0.00	4.90	0.00		
2.35	0.00	4.95	0.00		
2.40	0.00	5.00	0.00		
2.45	0.00	5.05	0.00		
2.50	0.00	5.10	0.00		
2.55	0.00	5.15	0.00		

Pond 5P: detention basin

Inflow Area =	0.248 ac, Inflow Depth = 0.34"	for 10-Year-0.90 event	
Inflow =	0.21 cfs @ 0.17 hrs, Volume=	0.007 af	
Outflow =	0.11 cfs @ 0.48 hrs, Volume=	0.007 af,	Atten= 50%, Lag= 18.8 min
Primary =	0.11 cfs @ 0.48 hrs, Volume=	0.007 af	
Secondary =	0.00 cfs @ 0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 626.05' @ 0.48 hrs Surf.Area= 0.005 ac Storage= 0.004 af

Plug-Flow detention time= 17.4 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 17.4 min (34.4 - 17.0)

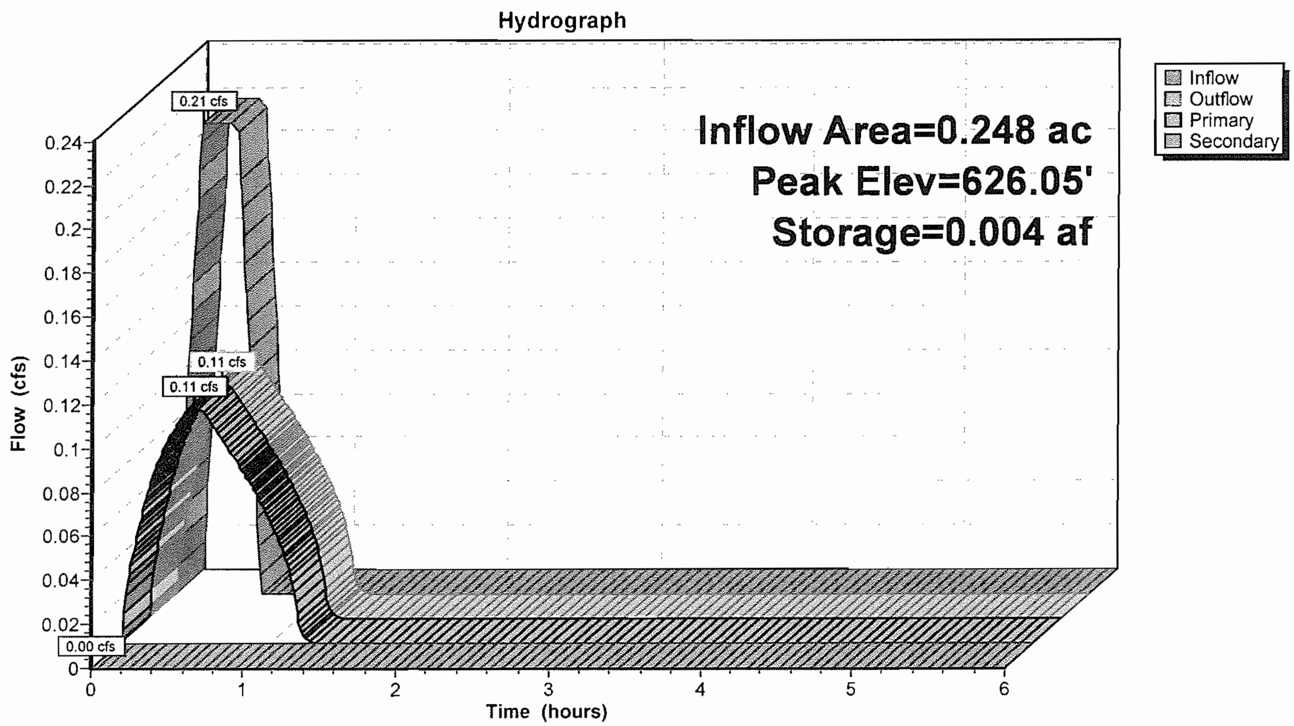
Volume	Invert	Avail.Storage	Storage Description
#1	625.00'	0.007 af	**24.0"D x 50.00'L Horizontal Cylinder**x 2

Device	Routing	Invert	Outlet Devices
#1	Primary	625.00'	**2.0" Horiz. Orifice/Grate 2.0"** Limited to weir flow C= 0.600
#2	Secondary	627.00'	**8.0" Vert. Orifice/Grate** C= 0.600

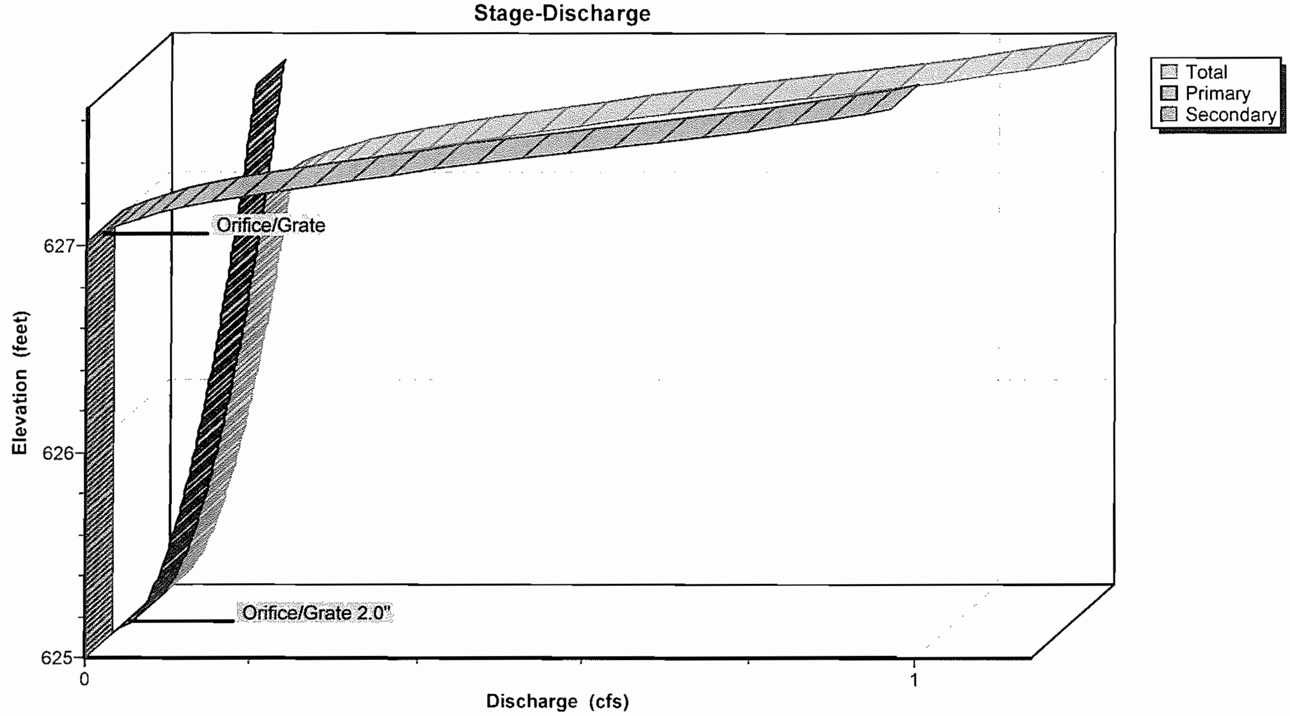
Primary OutFlow Max=0.11 cfs @ 0.48 hrs HW=626.05' (Free Discharge)
└─**1=Orifice/Grate 2.0"** (Orifice Controls 0.11 cfs @ 4.92 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=625.00' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

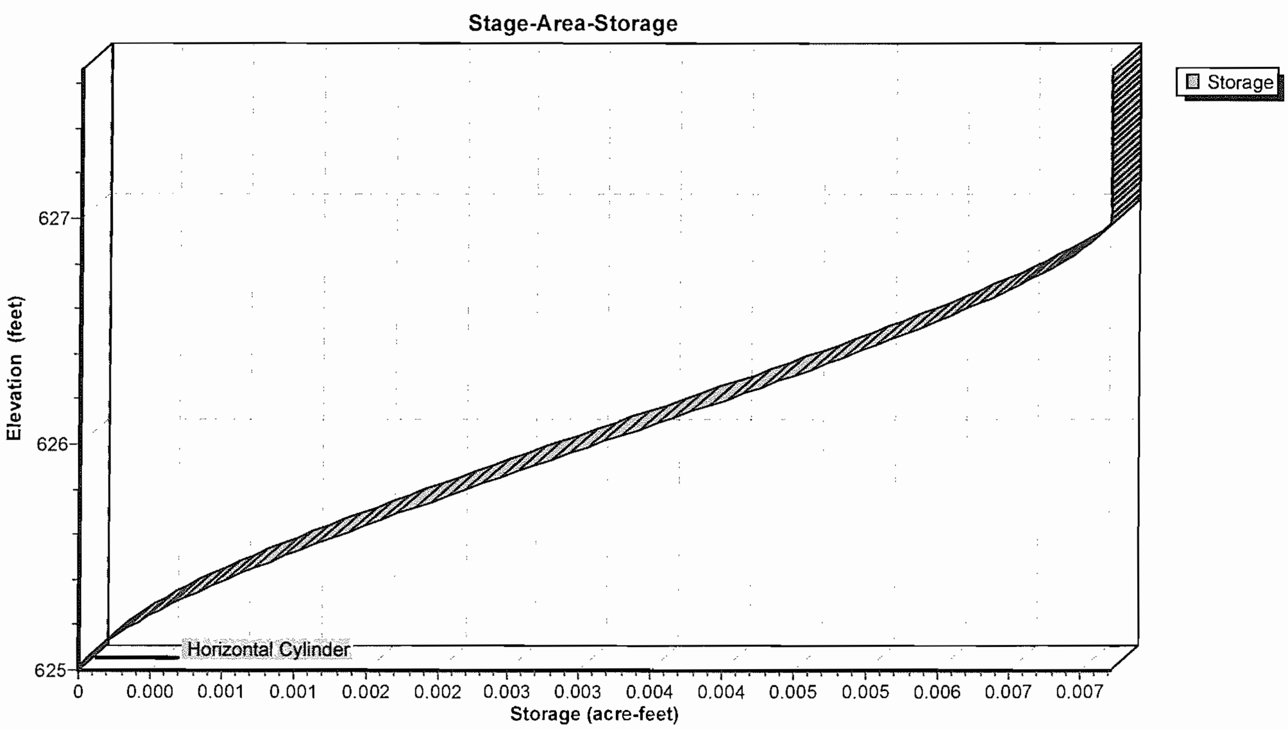
Pond 5P: detention basin



Pond 5P: detention basin



Pond 5P: detention basin



Hydrograph for Pond 5P: detention basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	**0.00**	0.000	625.00	0.00	0.00	**0.00**
0.20	**0.21**	0.001	625.49	0.07	0.07	0.00
0.40	0.21	**0.003**	**625.96**	**0.10**	**0.10**	0.00
0.60	0.00	**0.003**	**625.91**	**0.10**	**0.10**	0.00
0.80	0.00	0.002	625.57	0.08	0.08	0.00
1.00	0.00	0.001	625.27	0.05	0.05	0.00
1.20	0.00	0.000	625.02	0.00	0.00	0.00
1.40	0.00	0.000	625.00	0.00	0.00	0.00
1.60	0.00	0.000	625.00	0.00	0.00	0.00
1.80	0.00	0.000	625.00	0.00	0.00	0.00
2.00	0.00	0.000	625.00	0.00	0.00	0.00
2.20	0.00	0.000	625.00	0.00	0.00	0.00
2.40	0.00	0.000	625.00	0.00	0.00	0.00
2.60	0.00	0.000	625.00	0.00	0.00	0.00
2.80	0.00	0.000	625.00	0.00	0.00	0.00
3.00	0.00	0.000	625.00	0.00	0.00	0.00
3.20	0.00	0.000	625.00	0.00	0.00	0.00
3.40	0.00	0.000	625.00	0.00	0.00	0.00
3.60	0.00	0.000	625.00	0.00	0.00	0.00
3.80	0.00	0.000	625.00	0.00	0.00	0.00
4.00	0.00	0.000	625.00	0.00	0.00	0.00
4.20	0.00	0.000	625.00	0.00	0.00	0.00
4.40	0.00	0.000	625.00	0.00	0.00	0.00
4.60	0.00	0.000	625.00	0.00	0.00	0.00
4.80	0.00	0.000	625.00	0.00	0.00	0.00
5.00	0.00	0.000	625.00	0.00	0.00	0.00
5.20	0.00	0.000	625.00	0.00	0.00	0.00
5.40	0.00	0.000	625.00	0.00	0.00	0.00
5.60	0.00	0.000	625.00	0.00	0.00	0.00
5.80	0.00	0.000	625.00	0.00	0.00	0.00
6.00	0.00	0.000	625.00	0.00	0.00	0.00

Stage-Discharge for Pond 5P: detention basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
625.00	0.00	0.00	0.00
625.05	0.02	0.02	0.00
625.10	0.03	0.03	0.00
625.15	0.04	0.04	0.00
625.20	0.05	0.05	0.00
625.25	0.05	0.05	0.00
625.30	0.06	0.06	0.00
625.35	0.06	0.06	0.00
625.40	0.07	0.07	0.00
625.45	0.07	0.07	0.00
625.50	0.07	0.07	0.00
625.55	0.08	0.08	0.00
625.60	0.08	0.08	0.00
625.65	0.08	0.08	0.00
625.70	0.09	0.09	0.00
625.75	0.09	0.09	0.00
625.80	0.09	0.09	0.00
625.85	0.10	0.10	0.00
625.90	0.10	0.10	0.00
625.95	0.10	0.10	0.00
626.00	0.11	0.11	0.00
626.05	0.11	0.11	0.00
626.10	0.11	0.11	0.00
626.15	0.11	0.11	0.00
626.20	0.12	0.12	0.00
626.25	0.12	0.12	0.00
626.30	0.12	0.12	0.00
626.35	0.12	0.12	0.00
626.40	0.12	0.12	0.00
626.45	0.13	0.13	0.00
626.50	0.13	0.13	0.00
626.55	0.13	0.13	0.00
626.60	0.13	0.13	0.00
626.65	0.13	0.13	0.00
626.70	0.14	0.14	0.00
626.75	0.14	0.14	0.00
626.80	0.14	0.14	0.00
626.85	0.14	0.14	0.00
626.90	0.14	0.14	0.00
626.95	0.15	0.15	0.00
627.00	0.15	0.15	0.00
627.05	0.16	0.15	0.01
627.10	0.19	0.15	0.04
627.15	0.23	0.15	0.08
627.20	0.29	0.16	0.13
627.25	0.36	0.16	0.20
627.30	0.44	0.16	0.28
627.35	0.53	0.16	0.37
627.40	0.63	0.16	0.47
627.45	0.74	0.16	0.57
627.50	0.84	0.17	0.68
627.55	0.95	0.17	0.78
627.60	1.04	0.17	0.87
627.65	**1.12**	**0.17**	**0.95**

Stage-Area-Storage for Pond 5P: detention basin

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
625.00	0.000	626.04	0.004	627.08	0.007
625.02	0.000	626.06	0.004	627.10	0.007
625.04	0.000	626.08	0.004	627.12	0.007
625.06	0.000	626.10	0.004	627.14	0.007
625.08	0.000	626.12	0.004	627.16	0.007
625.10	0.000	626.14	0.004	627.18	0.007
625.12	0.000	626.16	0.004	627.20	0.007
625.14	0.000	626.18	0.004	627.22	0.007
625.16	0.000	626.20	0.005	627.24	0.007
625.18	0.000	626.22	0.005	627.26	0.007
625.20	0.000	626.24	0.005	627.28	0.007
625.22	0.000	626.26	0.005	627.30	0.007
625.24	0.000	626.28	0.005	627.32	0.007
625.26	0.001	626.30	0.005	627.34	0.007
625.28	0.001	626.32	0.005	627.36	0.007
625.30	0.001	626.34	0.005	627.38	0.007
625.32	0.001	626.36	0.005	627.40	0.007
625.34	0.001	626.38	0.005	627.42	0.007
625.36	0.001	626.40	0.005	627.44	0.007
625.38	0.001	626.42	0.005	627.46	0.007
625.40	0.001	626.44	0.006	627.48	0.007
625.42	0.001	626.46	0.006	627.50	0.007
625.44	0.001	626.48	0.006	627.52	0.007
625.46	0.001	626.50	0.006	627.54	0.007
625.48	0.001	626.52	0.006	627.56	0.007
625.50	0.001	626.54	0.006	627.58	0.007
625.52	0.001	626.56	0.006	627.60	0.007
625.54	0.002	626.58	0.006	627.62	0.007
625.56	0.002	626.60	0.006	627.64	0.007
625.58	0.002	626.62	0.006	627.66	0.007
625.60	0.002	626.64	0.006		
625.62	0.002	626.66	0.006		
625.64	0.002	626.68	0.006		
625.66	0.002	626.70	0.007		
625.68	0.002	626.72	0.007		
625.70	0.002	626.74	0.007		
625.72	0.002	626.76	0.007		
625.74	0.002	626.78	0.007		
625.76	0.003	626.80	0.007		
625.78	0.003	626.82	0.007		
625.80	0.003	626.84	0.007		
625.82	0.003	626.86	0.007		
625.84	0.003	626.88	0.007		
625.86	0.003	626.90	0.007		
625.88	0.003	626.92	0.007		
625.90	0.003	626.94	0.007		
625.92	0.003	626.96	0.007		
625.94	0.003	626.98	0.007		
625.96	0.003	627.00	**0.007**		
625.98	0.004	627.02	0.007		
626.00	0.004	627.04	0.007		
626.02	0.004	627.06	0.007		

Subcatchment 1S: Lot 6

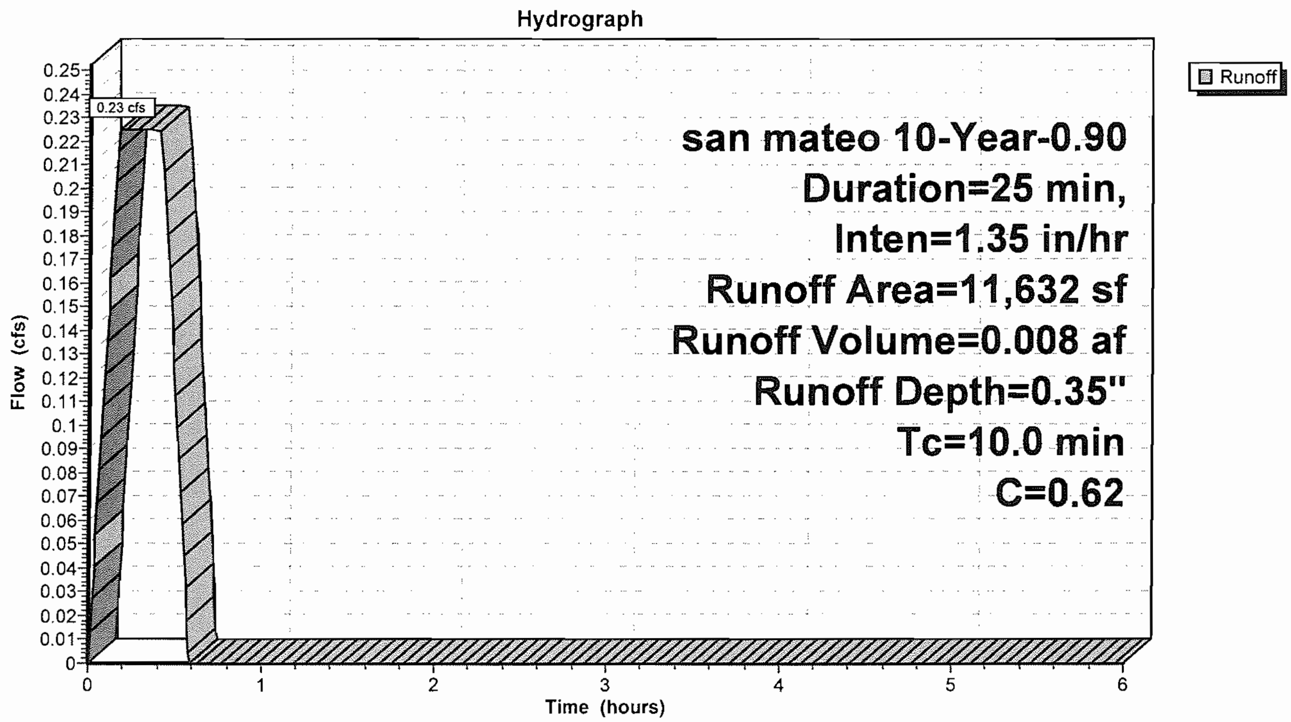
Runoff = 0.23 cfs @ 0.17 hrs, Volume= 0.008 af, Depth= 0.35"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
san mateo 10-Year-0.90 Duration=25 min, Inten=1.35 in/hr

Area (sf)	C	Description
4,653	0.95	Impervious Areas
6,979	0.40	Pervious Areas
11,632	0.62	Weighted Average
11,632	0.62	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, net increase**

Subcatchment 1S: Lot 6



Hydrograph for Subcatchment 1S: Lot 6

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.60	0.00	5.20	0.00
0.05	0.07	2.65	0.00	5.25	0.00
0.10	0.14	2.70	0.00	5.30	0.00
0.15	**0.20**	2.75	0.00	5.35	0.00
0.20	**0.23**	2.80	0.00	5.40	0.00
0.25	0.23	2.85	0.00	5.45	0.00
0.30	0.23	2.90	0.00	5.50	0.00
0.35	0.23	2.95	0.00	5.55	0.00
0.40	0.23	3.00	0.00	5.60	0.00
0.45	0.18	3.05	0.00	5.65	0.00
0.50	0.11	3.10	0.00	5.70	0.00
0.55	0.05	3.15	0.00	5.75	0.00
0.60	0.00	3.20	0.00	5.80	0.00
0.65	0.00	3.25	0.00	5.85	0.00
0.70	0.00	3.30	0.00	5.90	0.00
0.75	0.00	3.35	0.00	5.95	0.00
0.80	0.00	3.40	0.00	6.00	0.00
0.85	0.00	3.45	0.00		
0.90	0.00	3.50	0.00		
0.95	0.00	3.55	0.00		
1.00	0.00	3.60	0.00		
1.05	0.00	3.65	0.00		
1.10	0.00	3.70	0.00		
1.15	0.00	3.75	0.00		
1.20	0.00	3.80	0.00		
1.25	0.00	3.85	0.00		
1.30	0.00	3.90	0.00		
1.35	0.00	3.95	0.00		
1.40	0.00	4.00	0.00		
1.45	0.00	4.05	0.00		
1.50	0.00	4.10	0.00		
1.55	0.00	4.15	0.00		
1.60	0.00	4.20	0.00		
1.65	0.00	4.25	0.00		
1.70	0.00	4.30	0.00		
1.75	0.00	4.35	0.00		
1.80	0.00	4.40	0.00		
1.85	0.00	4.45	0.00		
1.90	0.00	4.50	0.00		
1.95	0.00	4.55	0.00		
2.00	0.00	4.60	0.00		
2.05	0.00	4.65	0.00		
2.10	0.00	4.70	0.00		
2.15	0.00	4.75	0.00		
2.20	0.00	4.80	0.00		
2.25	0.00	4.85	0.00		
2.30	0.00	4.90	0.00		
2.35	0.00	4.95	0.00		
2.40	0.00	5.00	0.00		
2.45	0.00	5.05	0.00		
2.50	0.00	5.10	0.00		
2.55	0.00	5.15	0.00		

Pond 5P: detention basin

Inflow Area =	0.267 ac, Inflow Depth = 0.35"	for 10-Year-0.90 event	
Inflow =	0.23 cfs @	0.17 hrs, Volume=	0.008 af
Outflow =	0.11 cfs @	0.50 hrs, Volume=	0.008 af, Atten= 50%, Lag= 19.8 min
Primary =	0.11 cfs @	0.50 hrs, Volume=	0.008 af
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 626.14' @ 0.50 hrs Surf.Area= 0.005 ac Storage= 0.004 af

Plug-Flow detention time= 18.4 min calculated for 0.008 af (100% of inflow)
Center-of-Mass det. time= 18.5 min (36.0 - 17.5)

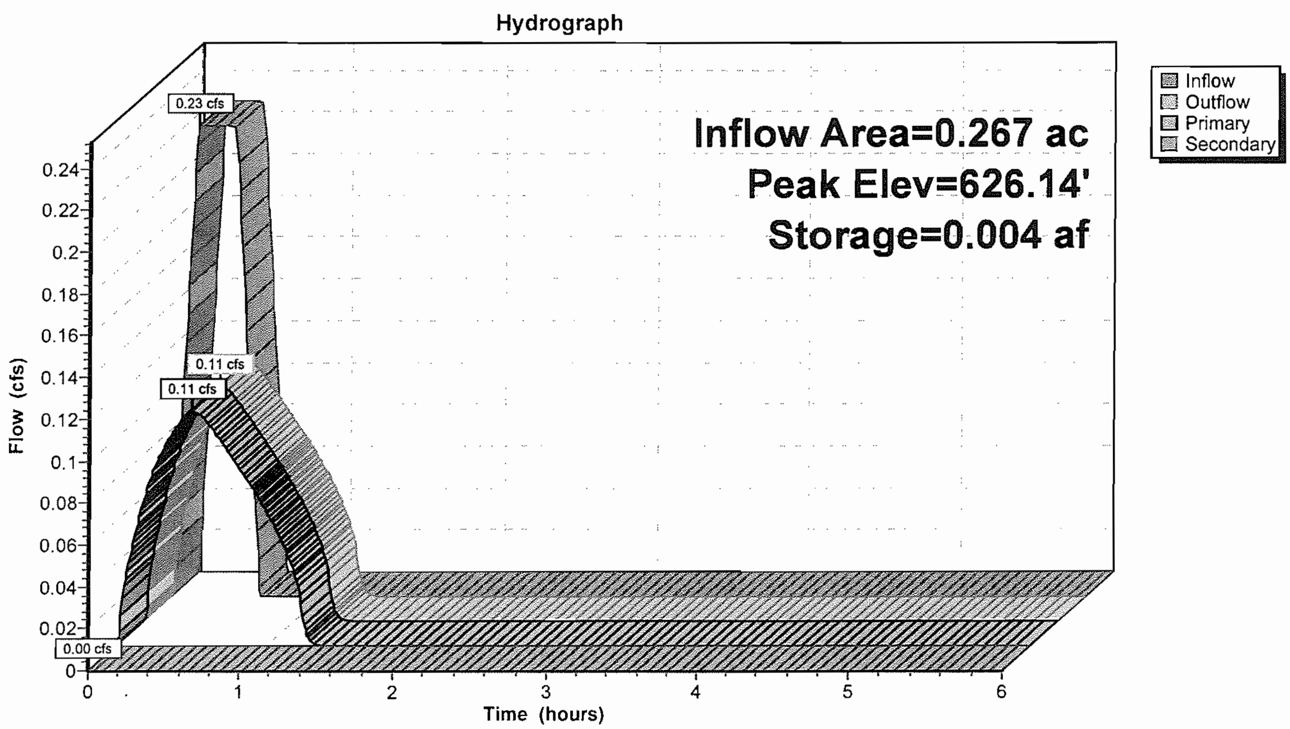
Volume	Invert	Avail.Storage	Storage Description
#1	625.00'	0.007 af	**24.0"D x 50.00'L Horizontal Cylinder**x 2

Device	Routing	Invert	Outlet Devices
#1	Primary	625.00'	**2.0" Horiz. Orifice/Grate 2.0"** Limited to weir flow C= 0.600
#2	Secondary	627.00'	**8.0" Vert. Orifice/Grate** C= 0.600

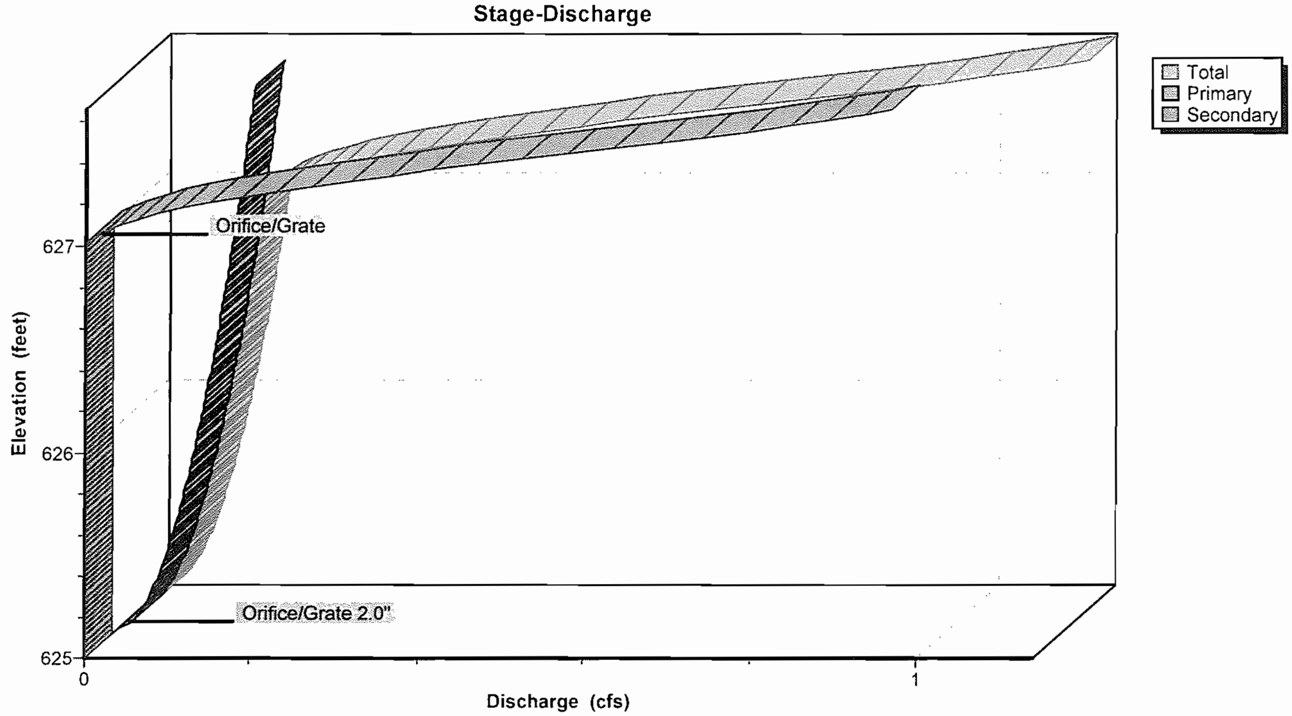
Primary OutFlow Max=0.11 cfs @ 0.50 hrs HW=626.14' (Free Discharge)
└─**1=Orifice/Grate 2.0"** (Orifice Controls 0.11 cfs @ 5.13 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=625.00' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

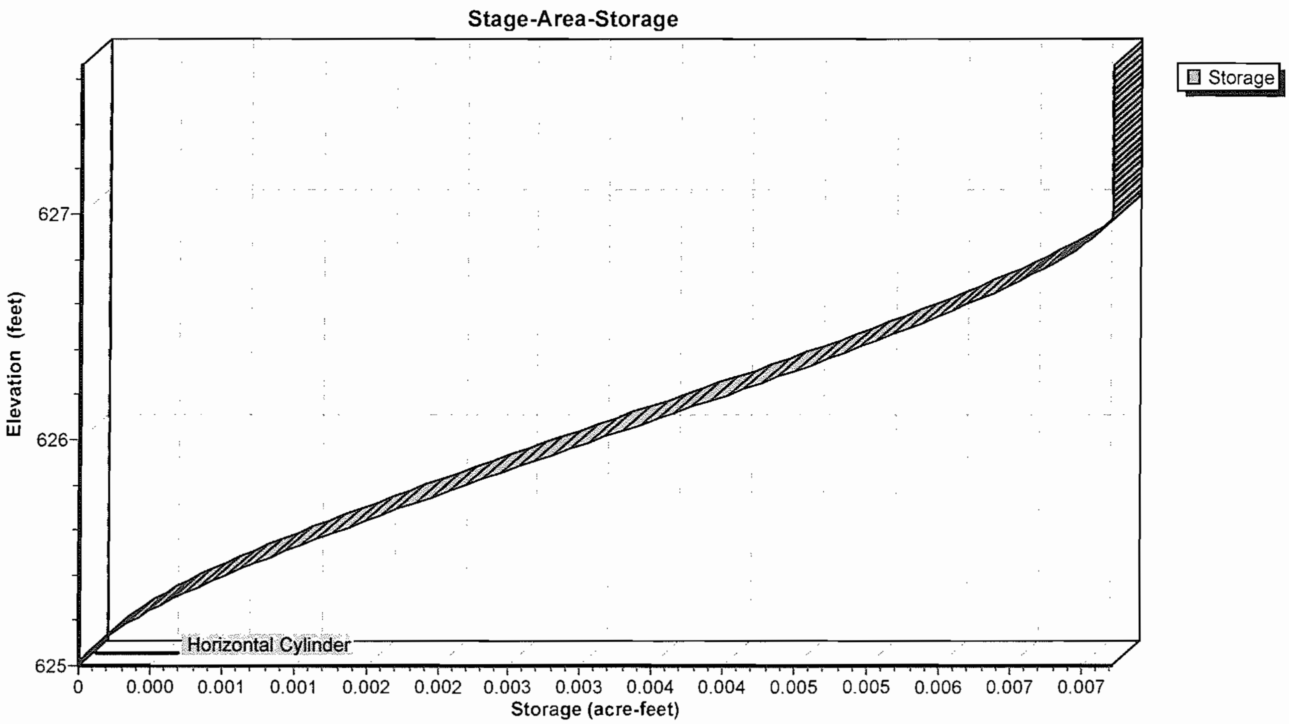
Pond 5P: detention basin



Pond 5P: detention basin



Pond 5P: detention basin



Hydrograph for Pond 5P: detention basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	**0.00**	0.000	625.00	0.00	0.00	**0.00**
0.20	**0.23**	0.001	625.51	0.08	0.08	0.00
0.40	0.23	**0.004**	**626.01**	**0.11**	**0.11**	0.00
0.60	0.00	**0.004**	**626.02**	**0.11**	**0.11**	0.00
0.80	0.00	0.002	625.67	0.09	0.09	0.00
1.00	0.00	0.001	625.36	0.06	0.06	0.00
1.20	0.00	0.000	625.08	0.03	0.03	0.00
1.40	0.00	0.000	625.00	0.00	0.00	0.00
1.60	0.00	0.000	625.00	0.00	0.00	0.00
1.80	0.00	0.000	625.00	0.00	0.00	0.00
2.00	0.00	0.000	625.00	0.00	0.00	0.00
2.20	0.00	0.000	625.00	0.00	0.00	0.00
2.40	0.00	0.000	625.00	0.00	0.00	0.00
2.60	0.00	0.000	625.00	0.00	0.00	0.00
2.80	0.00	0.000	625.00	0.00	0.00	0.00
3.00	0.00	0.000	625.00	0.00	0.00	0.00
3.20	0.00	0.000	625.00	0.00	0.00	0.00
3.40	0.00	0.000	625.00	0.00	0.00	0.00
3.60	0.00	0.000	625.00	0.00	0.00	0.00
3.80	0.00	0.000	625.00	0.00	0.00	0.00
4.00	0.00	0.000	625.00	0.00	0.00	0.00
4.20	0.00	0.000	625.00	0.00	0.00	0.00
4.40	0.00	0.000	625.00	0.00	0.00	0.00
4.60	0.00	0.000	625.00	0.00	0.00	0.00
4.80	0.00	0.000	625.00	0.00	0.00	0.00
5.00	0.00	0.000	625.00	0.00	0.00	0.00
5.20	0.00	0.000	625.00	0.00	0.00	0.00
5.40	0.00	0.000	625.00	0.00	0.00	0.00
5.60	0.00	0.000	625.00	0.00	0.00	0.00
5.80	0.00	0.000	625.00	0.00	0.00	0.00
6.00	0.00	0.000	625.00	0.00	0.00	0.00

Stage-Discharge for Pond 5P: detention basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
625.00	0.00	0.00	0.00
625.05	0.02	0.02	0.00
625.10	0.03	0.03	0.00
625.15	0.04	0.04	0.00
625.20	0.05	0.05	0.00
625.25	0.05	0.05	0.00
625.30	0.06	0.06	0.00
625.35	0.06	0.06	0.00
625.40	0.07	0.07	0.00
625.45	0.07	0.07	0.00
625.50	0.07	0.07	0.00
625.55	0.08	0.08	0.00
625.60	0.08	0.08	0.00
625.65	0.08	0.08	0.00
625.70	0.09	0.09	0.00
625.75	0.09	0.09	0.00
625.80	0.09	0.09	0.00
625.85	0.10	0.10	0.00
625.90	0.10	0.10	0.00
625.95	0.10	0.10	0.00
626.00	0.11	0.11	0.00
626.05	0.11	0.11	0.00
626.10	0.11	0.11	0.00
626.15	0.11	0.11	0.00
626.20	0.12	0.12	0.00
626.25	0.12	0.12	0.00
626.30	0.12	0.12	0.00
626.35	0.12	0.12	0.00
626.40	0.12	0.12	0.00
626.45	0.13	0.13	0.00
626.50	0.13	0.13	0.00
626.55	0.13	0.13	0.00
626.60	0.13	0.13	0.00
626.65	0.13	0.13	0.00
626.70	0.14	0.14	0.00
626.75	0.14	0.14	0.00
626.80	0.14	0.14	0.00
626.85	0.14	0.14	0.00
626.90	0.14	0.14	0.00
626.95	0.15	0.15	0.00
627.00	0.15	0.15	0.00
627.05	0.16	0.15	0.01
627.10	0.19	0.15	0.04
627.15	0.23	0.15	0.08
627.20	0.29	0.16	0.13
627.25	0.36	0.16	0.20
627.30	0.44	0.16	0.28
627.35	0.53	0.16	0.37
627.40	0.63	0.16	0.47
627.45	0.74	0.16	0.57
627.50	0.84	0.17	0.68
627.55	0.95	0.17	0.78
627.60	1.04	0.17	0.87
627.65	**1.12**	**0.17**	**0.95**

Stage-Area-Storage for Pond 5P: detention basin

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
625.00	0.000	626.04	0.004	627.08	0.007
625.02	0.000	626.06	0.004	627.10	0.007
625.04	0.000	626.08	0.004	627.12	0.007
625.06	0.000	626.10	0.004	627.14	0.007
625.08	0.000	626.12	0.004	627.16	0.007
625.10	0.000	626.14	0.004	627.18	0.007
625.12	0.000	626.16	0.004	627.20	0.007
625.14	0.000	626.18	0.004	627.22	0.007
625.16	0.000	626.20	0.005	627.24	0.007
625.18	0.000	626.22	0.005	627.26	0.007
625.20	0.000	626.24	0.005	627.28	0.007
625.22	0.000	626.26	0.005	627.30	0.007
625.24	0.000	626.28	0.005	627.32	0.007
625.26	0.001	626.30	0.005	627.34	0.007
625.28	0.001	626.32	0.005	627.36	0.007
625.30	0.001	626.34	0.005	627.38	0.007
625.32	0.001	626.36	0.005	627.40	0.007
625.34	0.001	626.38	0.005	627.42	0.007
625.36	0.001	626.40	0.005	627.44	0.007
625.38	0.001	626.42	0.005	627.46	0.007
625.40	0.001	626.44	0.006	627.48	0.007
625.42	0.001	626.46	0.006	627.50	0.007
625.44	0.001	626.48	0.006	627.52	0.007
625.46	0.001	626.50	0.006	627.54	0.007
625.48	0.001	626.52	0.006	627.56	0.007
625.50	0.001	626.54	0.006	627.58	0.007
625.52	0.001	626.56	0.006	627.60	0.007
625.54	0.002	626.58	0.006	627.62	0.007
625.56	0.002	626.60	0.006	627.64	0.007
625.58	0.002	626.62	0.006	627.66	0.007
625.60	0.002	626.64	0.006		
625.62	0.002	626.66	0.006		
625.64	0.002	626.68	0.006		
625.66	0.002	626.70	0.007		
625.68	0.002	626.72	0.007		
625.70	0.002	626.74	0.007		
625.72	0.002	626.76	0.007		
625.74	0.002	626.78	0.007		
625.76	0.003	626.80	0.007		
625.78	0.003	626.82	0.007		
625.80	0.003	626.84	0.007		
625.82	0.003	626.86	0.007		
625.84	0.003	626.88	0.007		
625.86	0.003	626.90	0.007		
625.88	0.003	626.92	0.007		
625.90	0.003	626.94	0.007		
625.92	0.003	626.96	0.007		
625.94	0.003	626.98	0.007		
625.96	0.003	627.00	**0.007**		
625.98	0.004	627.02	0.007		
626.00	0.004	627.04	0.007		
626.02	0.004	627.06	0.007		

Subcatchment 1S: Lot 7

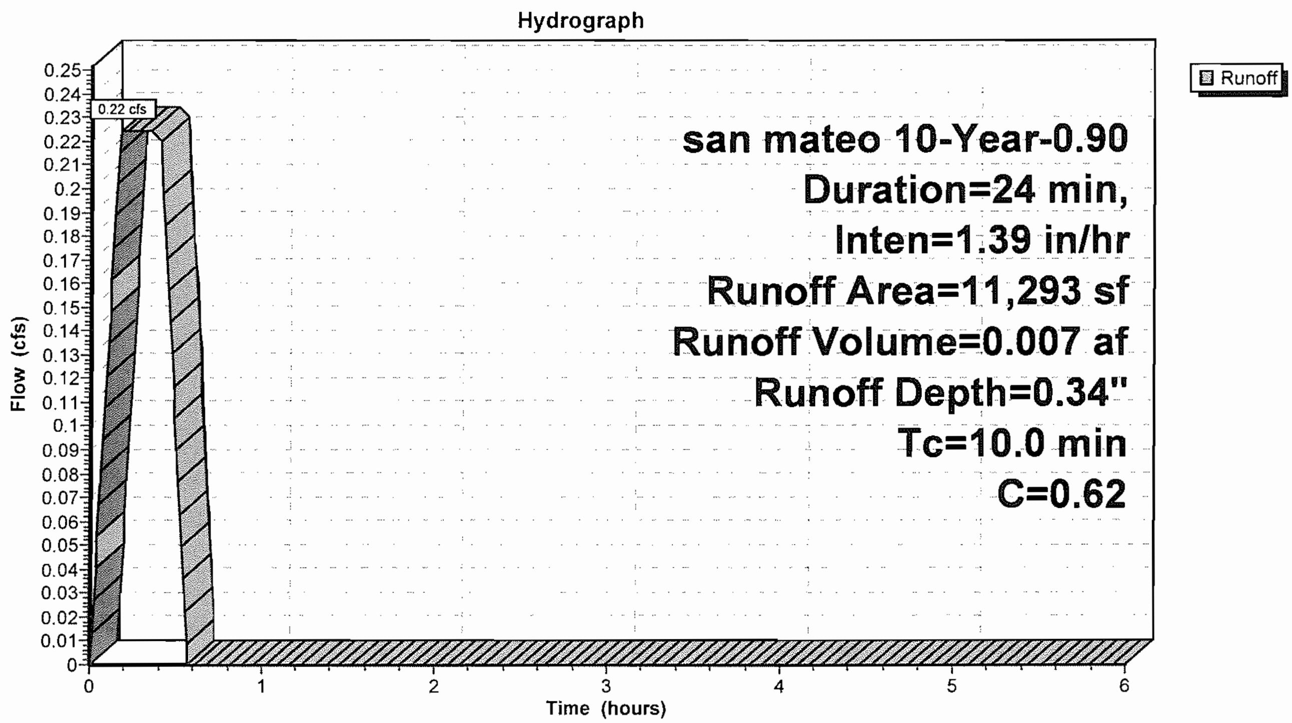
Runoff = 0.22 cfs @ 0.17 hrs, Volume= 0.007 af, Depth= 0.34"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
san mateo 10-Year-0.90 Duration=24 min, Inten=1.39 in/hr

Area (sf)	C	Description
4,517	0.95	Impervious Areas
6,776	0.40	Pervious Areas
11,293	0.62	Weighted Average
11,293	0.62	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, net increase**

Subcatchment 1S: Lot 7



Hydrograph for Subcatchment 1S: Lot 7

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.60	0.00	5.20	0.00
0.05	0.07	2.65	0.00	5.25	0.00
0.10	0.13	2.70	0.00	5.30	0.00
0.15	**0.20**	2.75	0.00	5.35	0.00
0.20	**0.22**	2.80	0.00	5.40	0.00
0.25	0.22	2.85	0.00	5.45	0.00
0.30	0.22	2.90	0.00	5.50	0.00
0.35	0.22	2.95	0.00	5.55	0.00
0.40	0.22	3.00	0.00	5.60	0.00
0.45	0.16	3.05	0.00	5.65	0.00
0.50	0.09	3.10	0.00	5.70	0.00
0.55	0.02	3.15	0.00	5.75	0.00
0.60	0.00	3.20	0.00	5.80	0.00
0.65	0.00	3.25	0.00	5.85	0.00
0.70	0.00	3.30	0.00	5.90	0.00
0.75	0.00	3.35	0.00	5.95	0.00
0.80	0.00	3.40	0.00	6.00	0.00
0.85	0.00	3.45	0.00		
0.90	0.00	3.50	0.00		
0.95	0.00	3.55	0.00		
1.00	0.00	3.60	0.00		
1.05	0.00	3.65	0.00		
1.10	0.00	3.70	0.00		
1.15	0.00	3.75	0.00		
1.20	0.00	3.80	0.00		
1.25	0.00	3.85	0.00		
1.30	0.00	3.90	0.00		
1.35	0.00	3.95	0.00		
1.40	0.00	4.00	0.00		
1.45	0.00	4.05	0.00		
1.50	0.00	4.10	0.00		
1.55	0.00	4.15	0.00		
1.60	0.00	4.20	0.00		
1.65	0.00	4.25	0.00		
1.70	0.00	4.30	0.00		
1.75	0.00	4.35	0.00		
1.80	0.00	4.40	0.00		
1.85	0.00	4.45	0.00		
1.90	0.00	4.50	0.00		
1.95	0.00	4.55	0.00		
2.00	0.00	4.60	0.00		
2.05	0.00	4.65	0.00		
2.10	0.00	4.70	0.00		
2.15	0.00	4.75	0.00		
2.20	0.00	4.80	0.00		
2.25	0.00	4.85	0.00		
2.30	0.00	4.90	0.00		
2.35	0.00	4.95	0.00		
2.40	0.00	5.00	0.00		
2.45	0.00	5.05	0.00		
2.50	0.00	5.10	0.00		
2.55	0.00	5.15	0.00		

Pond 5P: detention basin

Inflow Area =	0.259 ac,	Inflow Depth = 0.34"	for 10-Year-0.90 event	
Inflow =	0.22 cfs @	0.17 hrs, Volume=	0.007 af	
Outflow =	0.11 cfs @	0.48 hrs, Volume=	0.007 af,	Atten= 51%, Lag= 18.9 min
Primary =	0.11 cfs @	0.48 hrs, Volume=	0.007 af	
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 626.10' @ 0.48 hrs Surf.Area= 0.005 ac Storage= 0.004 af

Plug-Flow detention time= 18.0 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 18.0 min (35.0 - 17.0)

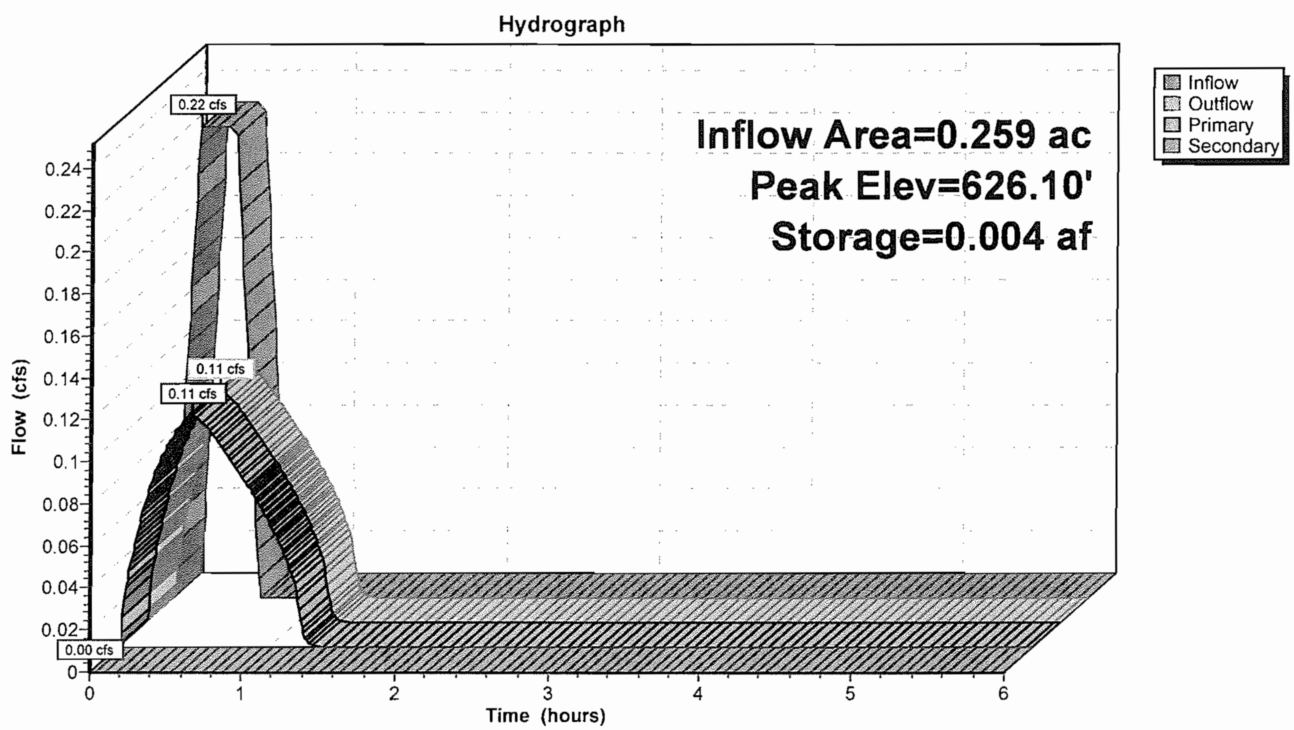
Volume	Invert	Avail.Storage	Storage Description
#1	625.00'	0.007 af	**24.0"D x 50.00'L Horizontal Cylinder**x 2

Device	Routing	Invert	Outlet Devices
#1	Primary	625.00'	**2.0" Horiz. Orifice/Grate 2.0"** Limited to weir flow C= 0.600
#2	Secondary	627.00'	**8.0" Vert. Orifice/Grate** C= 0.600

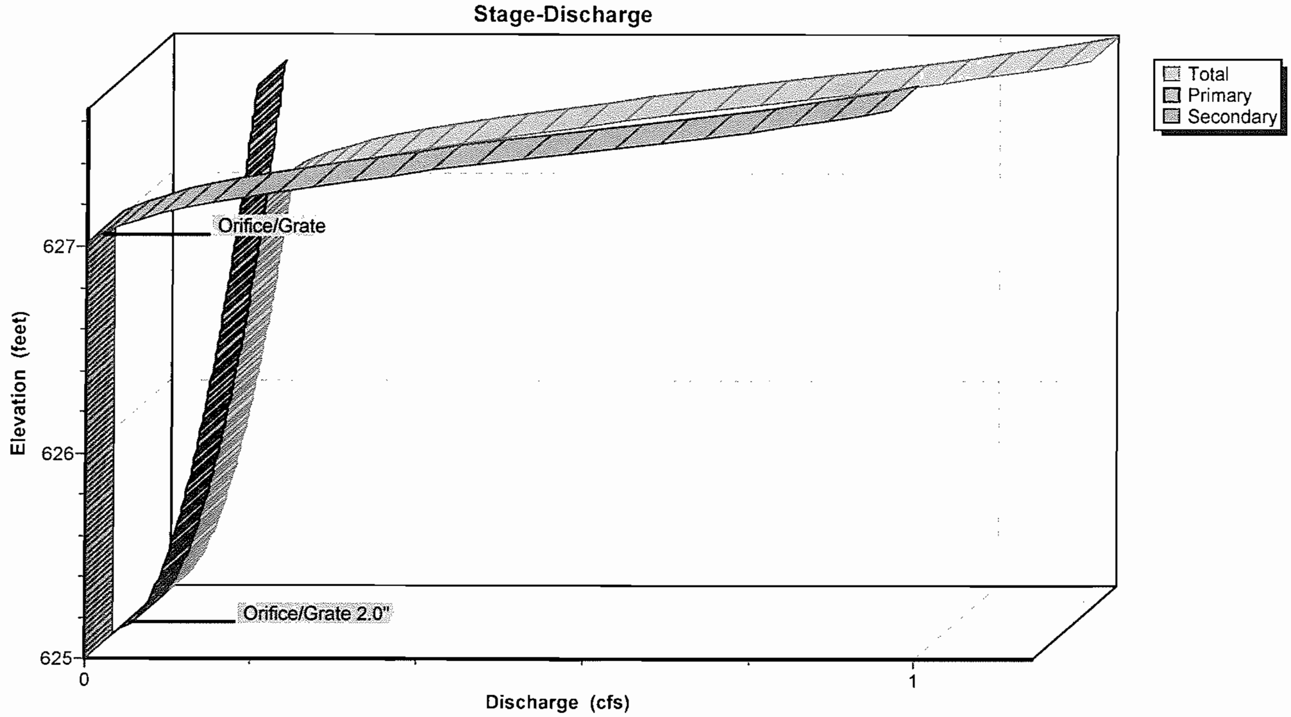
Primary OutFlow Max=0.11 cfs @ 0.48 hrs HW=626.10' (Free Discharge)
1=Orifice/Grate 2.0" (Orifice Controls 0.11 cfs @ 5.05 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=625.00' (Free Discharge)
2=Orifice/Grate (Controls 0.00 cfs)

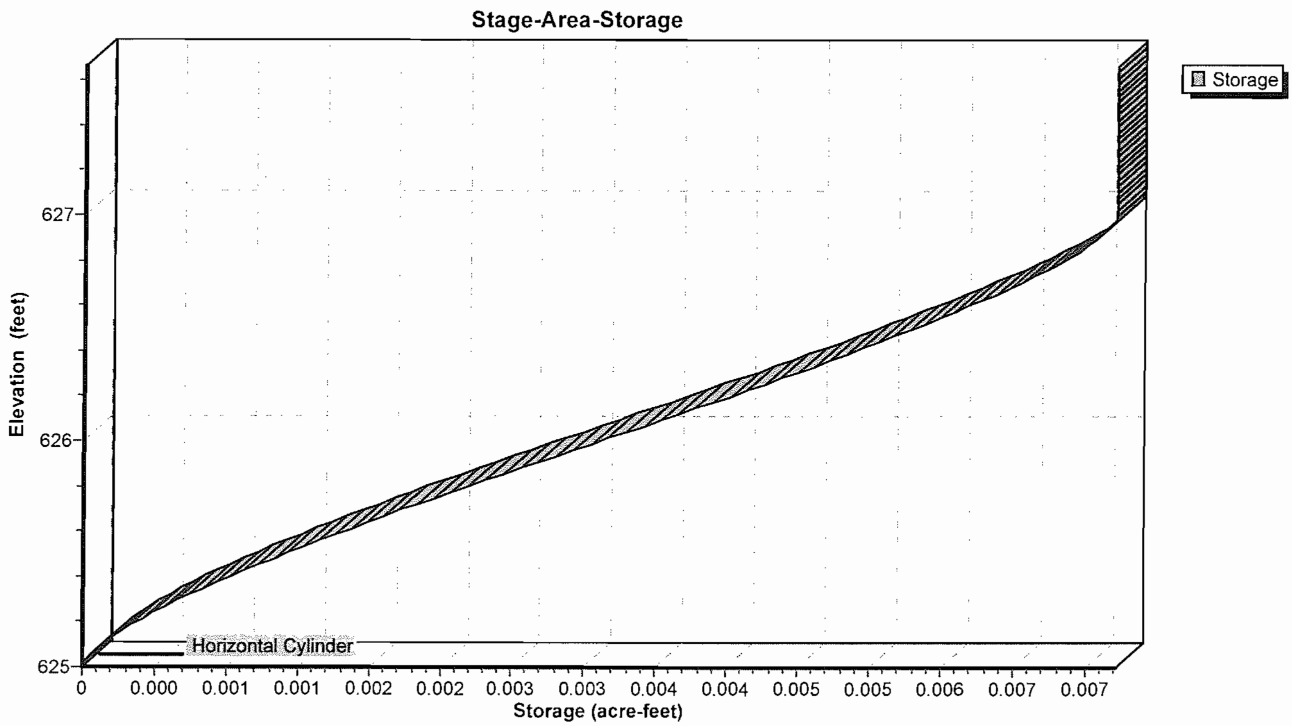
Pond 5P: detention basin



Pond 5P: detention basin



Pond 5P: detention basin



Hydrograph for Pond 5P: detention basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	**0.00**	0.000	625.00	0.00	0.00	**0.00**
0.20	**0.22**	0.001	625.51	0.08	0.08	0.00
0.40	0.22	**0.004**	**626.01**	**0.11**	**0.11**	0.00
0.60	0.00	**0.003**	**625.96**	**0.10**	**0.10**	0.00
0.80	0.00	0.002	625.61	0.08	0.08	0.00
1.00	0.00	0.001	625.31	0.06	0.06	0.00
1.20	0.00	0.000	625.04	0.01	0.01	0.00
1.40	0.00	0.000	625.00	0.00	0.00	0.00
1.60	0.00	0.000	625.00	0.00	0.00	0.00
1.80	0.00	0.000	625.00	0.00	0.00	0.00
2.00	0.00	0.000	625.00	0.00	0.00	0.00
2.20	0.00	0.000	625.00	0.00	0.00	0.00
2.40	0.00	0.000	625.00	0.00	0.00	0.00
2.60	0.00	0.000	625.00	0.00	0.00	0.00
2.80	0.00	0.000	625.00	0.00	0.00	0.00
3.00	0.00	0.000	625.00	0.00	0.00	0.00
3.20	0.00	0.000	625.00	0.00	0.00	0.00
3.40	0.00	0.000	625.00	0.00	0.00	0.00
3.60	0.00	0.000	625.00	0.00	0.00	0.00
3.80	0.00	0.000	625.00	0.00	0.00	0.00
4.00	0.00	0.000	625.00	0.00	0.00	0.00
4.20	0.00	0.000	625.00	0.00	0.00	0.00
4.40	0.00	0.000	625.00	0.00	0.00	0.00
4.60	0.00	0.000	625.00	0.00	0.00	0.00
4.80	0.00	0.000	625.00	0.00	0.00	0.00
5.00	0.00	0.000	625.00	0.00	0.00	0.00
5.20	0.00	0.000	625.00	0.00	0.00	0.00
5.40	0.00	0.000	625.00	0.00	0.00	0.00
5.60	0.00	0.000	625.00	0.00	0.00	0.00
5.80	0.00	0.000	625.00	0.00	0.00	0.00
6.00	0.00	0.000	625.00	0.00	0.00	0.00

Stage-Discharge for Pond 5P: detention basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
625.00	0.00	0.00	0.00
625.05	0.02	0.02	0.00
625.10	0.03	0.03	0.00
625.15	0.04	0.04	0.00
625.20	0.05	0.05	0.00
625.25	0.05	0.05	0.00
625.30	0.06	0.06	0.00
625.35	0.06	0.06	0.00
625.40	0.07	0.07	0.00
625.45	0.07	0.07	0.00
625.50	0.07	0.07	0.00
625.55	0.08	0.08	0.00
625.60	0.08	0.08	0.00
625.65	0.08	0.08	0.00
625.70	0.09	0.09	0.00
625.75	0.09	0.09	0.00
625.80	0.09	0.09	0.00
625.85	0.10	0.10	0.00
625.90	0.10	0.10	0.00
625.95	0.10	0.10	0.00
626.00	0.11	0.11	0.00
626.05	0.11	0.11	0.00
626.10	0.11	0.11	0.00
626.15	0.11	0.11	0.00
626.20	0.12	0.12	0.00
626.25	0.12	0.12	0.00
626.30	0.12	0.12	0.00
626.35	0.12	0.12	0.00
626.40	0.12	0.12	0.00
626.45	0.13	0.13	0.00
626.50	0.13	0.13	0.00
626.55	0.13	0.13	0.00
626.60	0.13	0.13	0.00
626.65	0.13	0.13	0.00
626.70	0.14	0.14	0.00
626.75	0.14	0.14	0.00
626.80	0.14	0.14	0.00
626.85	0.14	0.14	0.00
626.90	0.14	0.14	0.00
626.95	0.15	0.15	0.00
627.00	0.15	0.15	0.00
627.05	0.16	0.15	0.01
627.10	0.19	0.15	0.04
627.15	0.23	0.15	0.08
627.20	0.29	0.16	0.13
627.25	0.36	0.16	0.20
627.30	0.44	0.16	0.28
627.35	0.53	0.16	0.37
627.40	0.63	0.16	0.47
627.45	0.74	0.16	0.57
627.50	0.84	0.17	0.68
627.55	0.95	0.17	0.78
627.60	1.04	0.17	0.87
627.65	**1.12**	**0.17**	**0.95**

Stage-Area-Storage for Pond 5P: detention basin

Elevation (feet)	Storage (acre-feet)
625.00	0.000
625.02	0.000
625.04	0.000
625.06	0.000
625.08	0.000
625.10	0.000
625.12	0.000
625.14	0.000
625.16	0.000
625.18	0.000
625.20	0.000
625.22	0.000
625.24	0.000
625.26	0.001
625.28	0.001
625.30	0.001
625.32	0.001
625.34	0.001
625.36	0.001
625.38	0.001
625.40	0.001
625.42	0.001
625.44	0.001
625.46	0.001
625.48	0.001
625.50	0.001
625.52	0.001
625.54	0.002
625.56	0.002
625.58	0.002
625.60	0.002
625.62	0.002
625.64	0.002
625.66	0.002
625.68	0.002
625.70	0.002
625.72	0.002
625.74	0.002
625.76	0.003
625.78	0.003
625.80	0.003
625.82	0.003
625.84	0.003
625.86	0.003
625.88	0.003
625.90	0.003
625.92	0.003
625.94	0.003
625.96	0.003
625.98	0.004
626.00	0.004
626.02	0.004
626.04	0.004
626.06	0.004
626.08	0.004
626.10	0.004
626.12	0.004
626.14	0.004
626.16	0.004
626.18	0.004
626.20	0.005
626.22	0.005
626.24	0.005
626.26	0.005
626.28	0.005
626.30	0.005
626.32	0.005
626.34	0.005
626.36	0.005
626.38	0.005
626.40	0.005
626.42	0.005
626.44	0.006
626.46	0.006
626.48	0.006
626.50	0.006
626.52	0.006
626.54	0.006
626.56	0.006
626.58	0.006
626.60	0.006
626.62	0.006
626.64	0.006
626.66	0.006
626.68	0.006
626.70	0.007
626.72	0.007
626.74	0.007
626.76	0.007
626.78	0.007
626.80	0.007
626.82	0.007
626.84	0.007
626.86	0.007
626.88	0.007
626.90	0.007
626.92	0.007
626.94	0.007
626.96	0.007
626.98	0.007
627.00	**0.007**
627.02	0.007
627.04	0.007
627.06	0.007
627.08	0.007
627.10	0.007
627.12	0.007
627.14	0.007
627.16	0.007
627.18	0.007
627.20	0.007
627.22	0.007
627.24	0.007
627.26	0.007
627.28	0.007
627.30	0.007
627.32	0.007
627.34	0.007
627.36	0.007
627.38	0.007
627.40	0.007
627.42	0.007
627.44	0.007
627.46	0.007
627.48	0.007
627.50	0.007
627.52	0.007
627.54	0.007
627.56	0.007
627.58	0.007
627.60	0.007
627.62	0.007
627.64	0.007
627.66	0.007

Subcatchment 1S: LotS 8-10

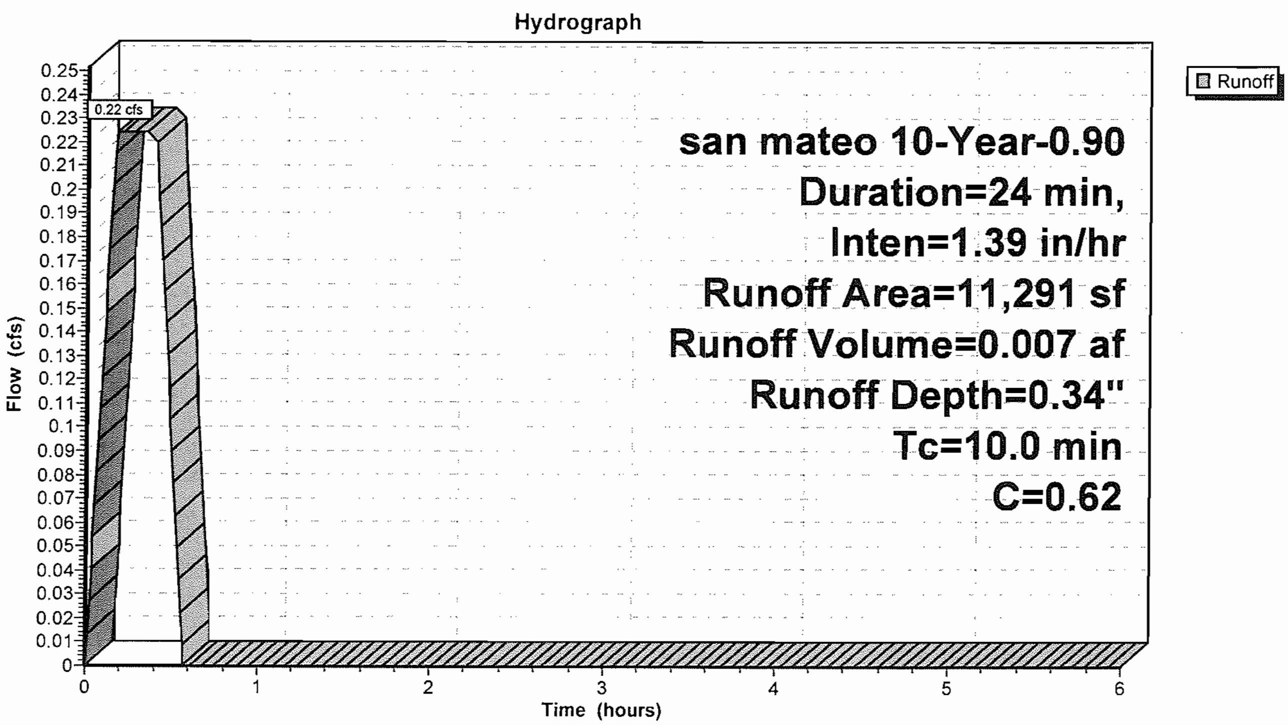
Runoff = 0.22 cfs @ 0.17 hrs, Volume= 0.007 af, Depth= 0.34"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
san mateo 10-Year-0.90 Duration=24 min, Inten=1.39 in/hr

Area (sf)	C	Description
4,516	0.95	Impervious Areas
6,775	0.40	Pervious Areas
11,291	0.62	Weighted Average
11,291	0.62	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, net increase**

Subcatchment 1S: LotS 8-10



Hydrograph for Subcatchment 1S: LotS 8-10

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.60	0.00	5.20	0.00
0.05	0.07	2.65	0.00	5.25	0.00
0.10	0.13	2.70	0.00	5.30	0.00
0.15	**0.20**	2.75	0.00	5.35	0.00
0.20	**0.22**	2.80	0.00	5.40	0.00
0.25	0.22	2.85	0.00	5.45	0.00
0.30	0.22	2.90	0.00	5.50	0.00
0.35	0.22	2.95	0.00	5.55	0.00
0.40	0.22	3.00	0.00	5.60	0.00
0.45	0.16	3.05	0.00	5.65	0.00
0.50	0.09	3.10	0.00	5.70	0.00
0.55	0.02	3.15	0.00	5.75	0.00
0.60	0.00	3.20	0.00	5.80	0.00
0.65	0.00	3.25	0.00	5.85	0.00
0.70	0.00	3.30	0.00	5.90	0.00
0.75	0.00	3.35	0.00	5.95	0.00
0.80	0.00	3.40	0.00	6.00	0.00
0.85	0.00	3.45	0.00		
0.90	0.00	3.50	0.00		
0.95	0.00	3.55	0.00		
1.00	0.00	3.60	0.00		
1.05	0.00	3.65	0.00		
1.10	0.00	3.70	0.00		
1.15	0.00	3.75	0.00		
1.20	0.00	3.80	0.00		
1.25	0.00	3.85	0.00		
1.30	0.00	3.90	0.00		
1.35	0.00	3.95	0.00		
1.40	0.00	4.00	0.00		
1.45	0.00	4.05	0.00		
1.50	0.00	4.10	0.00		
1.55	0.00	4.15	0.00		
1.60	0.00	4.20	0.00		
1.65	0.00	4.25	0.00		
1.70	0.00	4.30	0.00		
1.75	0.00	4.35	0.00		
1.80	0.00	4.40	0.00		
1.85	0.00	4.45	0.00		
1.90	0.00	4.50	0.00		
1.95	0.00	4.55	0.00		
2.00	0.00	4.60	0.00		
2.05	0.00	4.65	0.00		
2.10	0.00	4.70	0.00		
2.15	0.00	4.75	0.00		
2.20	0.00	4.80	0.00		
2.25	0.00	4.85	0.00		
2.30	0.00	4.90	0.00		
2.35	0.00	4.95	0.00		
2.40	0.00	5.00	0.00		
2.45	0.00	5.05	0.00		
2.50	0.00	5.10	0.00		
2.55	0.00	5.15	0.00		

Pond 5P: detention basin

Inflow Area =	0.259 ac,	Inflow Depth = 0.34"	for 10-Year-0.90 event	
Inflow =	0.22 cfs @	0.17 hrs, Volume=	0.007 af	
Outflow =	0.11 cfs @	0.48 hrs, Volume=	0.007 af,	Atten= 51%, Lag= 18.9 min
Primary =	0.11 cfs @	0.48 hrs, Volume=	0.007 af	
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 626.10' @ 0.48 hrs Surf.Area= 0.005 ac Storage= 0.004 af

Plug-Flow detention time= 18.0 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 18.0 min (35.0 - 17.0)

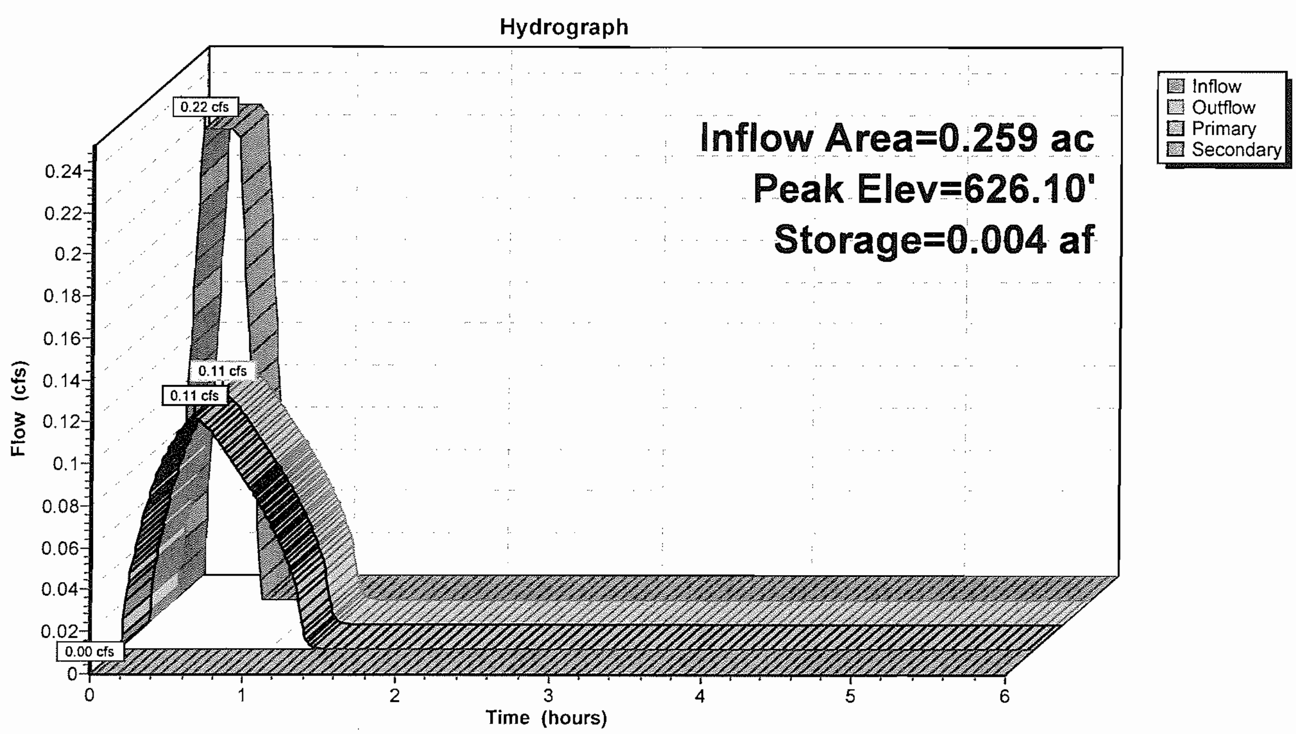
Volume	Invert	Avail.Storage	Storage Description
#1	625.00'	0.007 af	**24.0"D x 50.00'L Horizontal Cylinder**x 2

Device	Routing	Invert	Outlet Devices
#1	Primary	625.00'	**2.0" Horiz. Orifice/Grate 2.0"** Limited to weir flow C= 0.600
#2	Secondary	627.00'	**8.0" Vert. Orifice/Grate** C= 0.600

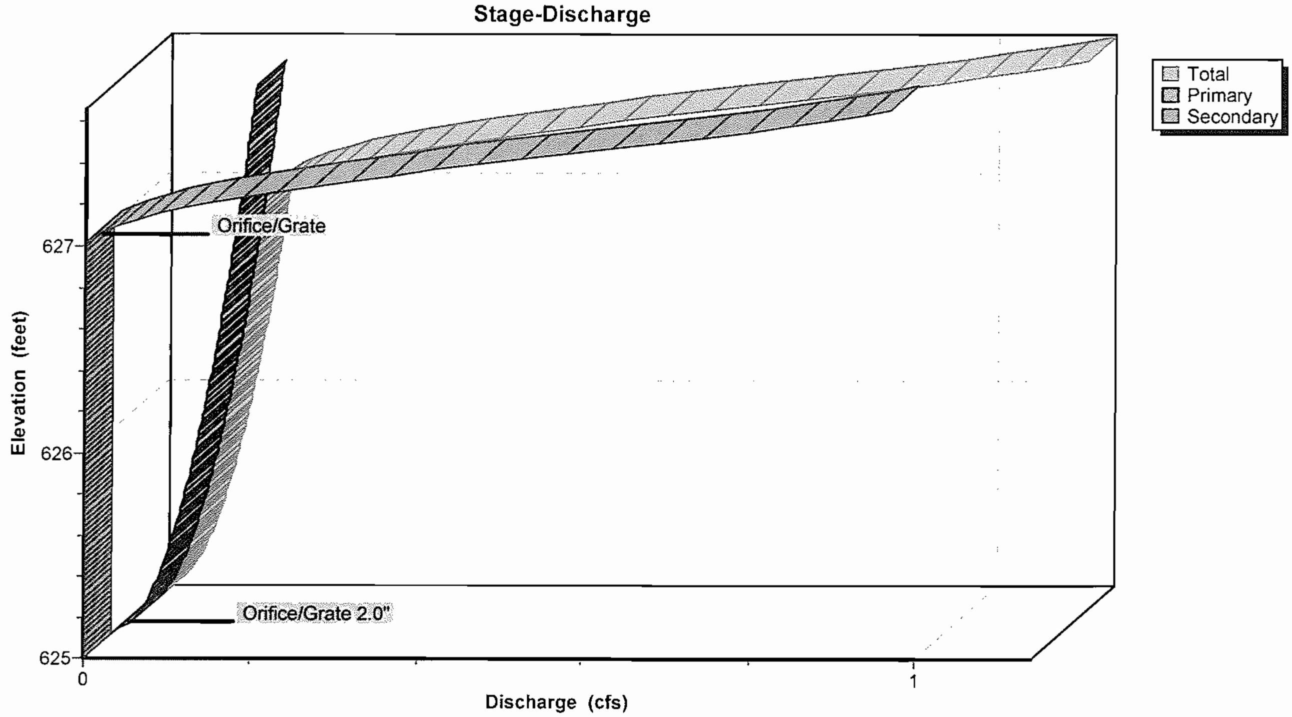
Primary OutFlow Max=0.11 cfs @ 0.48 hrs HW=626.10' (Free Discharge)
└─**1=Orifice/Grate 2.0"** (Orifice Controls 0.11 cfs @ 5.05 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=625.00' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

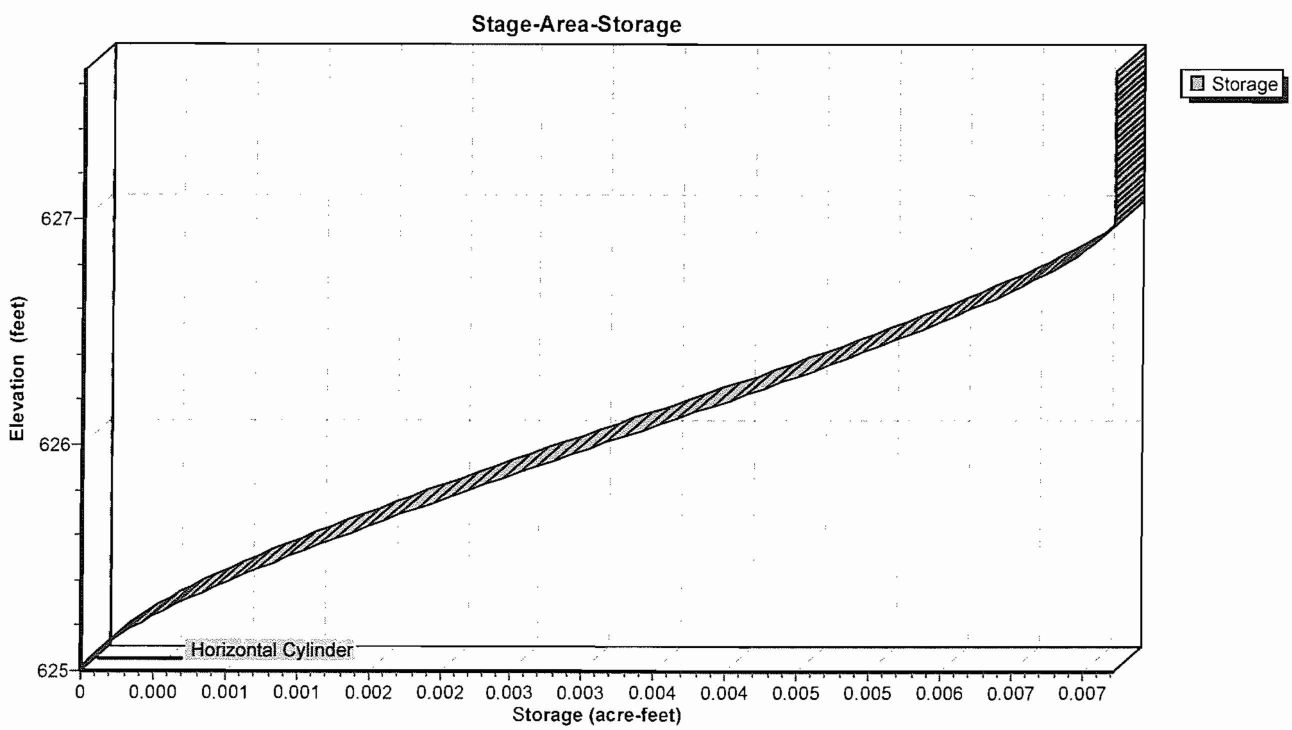
Pond 5P: detention basin



Pond 5P: detention basin



Pond 5P: detention basin



Hydrograph for Pond 5P: detention basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	**0.00**	0.000	625.00	0.00	0.00	**0.00**
0.20	**0.22**	0.001	625.51	0.08	0.08	0.00
0.40	0.22	**0.004**	**626.01**	**0.11**	**0.11**	0.00
0.60	0.00	**0.003**	**625.96**	**0.10**	**0.10**	0.00
0.80	0.00	0.002	625.61	0.08	0.08	0.00
1.00	0.00	0.001	625.31	0.06	0.06	0.00
1.20	0.00	0.000	625.04	0.01	0.01	0.00
1.40	0.00	0.000	625.00	0.00	0.00	0.00
1.60	0.00	0.000	625.00	0.00	0.00	0.00
1.80	0.00	0.000	625.00	0.00	0.00	0.00
2.00	0.00	0.000	625.00	0.00	0.00	0.00
2.20	0.00	0.000	625.00	0.00	0.00	0.00
2.40	0.00	0.000	625.00	0.00	0.00	0.00
2.60	0.00	0.000	625.00	0.00	0.00	0.00
2.80	0.00	0.000	625.00	0.00	0.00	0.00
3.00	0.00	0.000	625.00	0.00	0.00	0.00
3.20	0.00	0.000	625.00	0.00	0.00	0.00
3.40	0.00	0.000	625.00	0.00	0.00	0.00
3.60	0.00	0.000	625.00	0.00	0.00	0.00
3.80	0.00	0.000	625.00	0.00	0.00	0.00
4.00	0.00	0.000	625.00	0.00	0.00	0.00
4.20	0.00	0.000	625.00	0.00	0.00	0.00
4.40	0.00	0.000	625.00	0.00	0.00	0.00
4.60	0.00	0.000	625.00	0.00	0.00	0.00
4.80	0.00	0.000	625.00	0.00	0.00	0.00
5.00	0.00	0.000	625.00	0.00	0.00	0.00
5.20	0.00	0.000	625.00	0.00	0.00	0.00
5.40	0.00	0.000	625.00	0.00	0.00	0.00
5.60	0.00	0.000	625.00	0.00	0.00	0.00
5.80	0.00	0.000	625.00	0.00	0.00	0.00
6.00	0.00	0.000	625.00	0.00	0.00	0.00

Stage-Discharge for Pond 5P: detention basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
625.00	0.00	0.00	0.00
625.05	0.02	0.02	0.00
625.10	0.03	0.03	0.00
625.15	0.04	0.04	0.00
625.20	0.05	0.05	0.00
625.25	0.05	0.05	0.00
625.30	0.06	0.06	0.00
625.35	0.06	0.06	0.00
625.40	0.07	0.07	0.00
625.45	0.07	0.07	0.00
625.50	0.07	0.07	0.00
625.55	0.08	0.08	0.00
625.60	0.08	0.08	0.00
625.65	0.08	0.08	0.00
625.70	0.09	0.09	0.00
625.75	0.09	0.09	0.00
625.80	0.09	0.09	0.00
625.85	0.10	0.10	0.00
625.90	0.10	0.10	0.00
625.95	0.10	0.10	0.00
626.00	0.11	0.11	0.00
626.05	0.11	0.11	0.00
626.10	0.11	0.11	0.00
626.15	0.11	0.11	0.00
626.20	0.12	0.12	0.00
626.25	0.12	0.12	0.00
626.30	0.12	0.12	0.00
626.35	0.12	0.12	0.00
626.40	0.12	0.12	0.00
626.45	0.13	0.13	0.00
626.50	0.13	0.13	0.00
626.55	0.13	0.13	0.00
626.60	0.13	0.13	0.00
626.65	0.13	0.13	0.00
626.70	0.14	0.14	0.00
626.75	0.14	0.14	0.00
626.80	0.14	0.14	0.00
626.85	0.14	0.14	0.00
626.90	0.14	0.14	0.00
626.95	0.15	0.15	0.00
627.00	0.15	0.15	0.00
627.05	0.16	0.15	0.01
627.10	0.19	0.15	0.04
627.15	0.23	0.15	0.08
627.20	0.29	0.16	0.13
627.25	0.36	0.16	0.20
627.30	0.44	0.16	0.28
627.35	0.53	0.16	0.37
627.40	0.63	0.16	0.47
627.45	0.74	0.16	0.57
627.50	0.84	0.17	0.68
627.55	0.95	0.17	0.78
627.60	1.04	0.17	0.87
627.65	**1.12**	**0.17**	**0.95**

Stage-Area-Storage for Pond 5P: detention basin

Elevation (feet)	Storage (acre-feet)
625.00	0.000
625.02	0.000
625.04	0.000
625.06	0.000
625.08	0.000
625.10	0.000
625.12	0.000
625.14	0.000
625.16	0.000
625.18	0.000
625.20	0.000
625.22	0.000
625.24	0.000
625.26	0.001
625.28	0.001
625.30	0.001
625.32	0.001
625.34	0.001
625.36	0.001
625.38	0.001
625.40	0.001
625.42	0.001
625.44	0.001
625.46	0.001
625.48	0.001
625.50	0.001
625.52	0.001
625.54	0.002
625.56	0.002
625.58	0.002
625.60	0.002
625.62	0.002
625.64	0.002
625.66	0.002
625.68	0.002
625.70	0.002
625.72	0.002
625.74	0.002
625.76	0.003
625.78	0.003
625.80	0.003
625.82	0.003
625.84	0.003
625.86	0.003
625.88	0.003
625.90	0.003
625.92	0.003
625.94	0.003
625.96	0.003
625.98	0.004
626.00	0.004
626.02	0.004
626.04	0.004
626.06	0.004
626.08	0.004
626.10	0.004
626.12	0.004
626.14	0.004
626.16	0.004
626.18	0.004
626.20	0.005
626.22	0.005
626.24	0.005
626.26	0.005
626.28	0.005
626.30	0.005
626.32	0.005
626.34	0.005
626.36	0.005
626.38	0.005
626.40	0.005
626.42	0.005
626.44	0.006
626.46	0.006
626.48	0.006
626.50	0.006
626.52	0.006
626.54	0.006
626.56	0.006
626.58	0.006
626.60	0.006
626.62	0.006
626.64	0.006
626.66	0.006
626.68	0.006
626.70	0.007
626.72	0.007
626.74	0.007
626.76	0.007
626.78	0.007
626.80	0.007
626.82	0.007
626.84	0.007
626.86	0.007
626.88	0.007
626.90	0.007
626.92	0.007
626.94	0.007
626.96	0.007
626.98	0.007
627.00	**0.007**
627.02	0.007
627.04	0.007
627.06	0.007
627.08	0.007
627.10	0.007
627.12	0.007
627.14	0.007
627.16	0.007
627.18	0.007
627.20	0.007
627.22	0.007
627.24	0.007
627.26	0.007
627.28	0.007
627.30	0.007
627.32	0.007
627.34	0.007
627.36	0.007
627.38	0.007
627.40	0.007
627.42	0.007
627.44	0.007
627.46	0.007
627.48	0.007
627.50	0.007
627.52	0.007
627.54	0.007
627.56	0.007
627.58	0.007
627.60	0.007
627.62	0.007
627.64	0.007
627.66	0.007

Subcatchment 1S: Lot 10

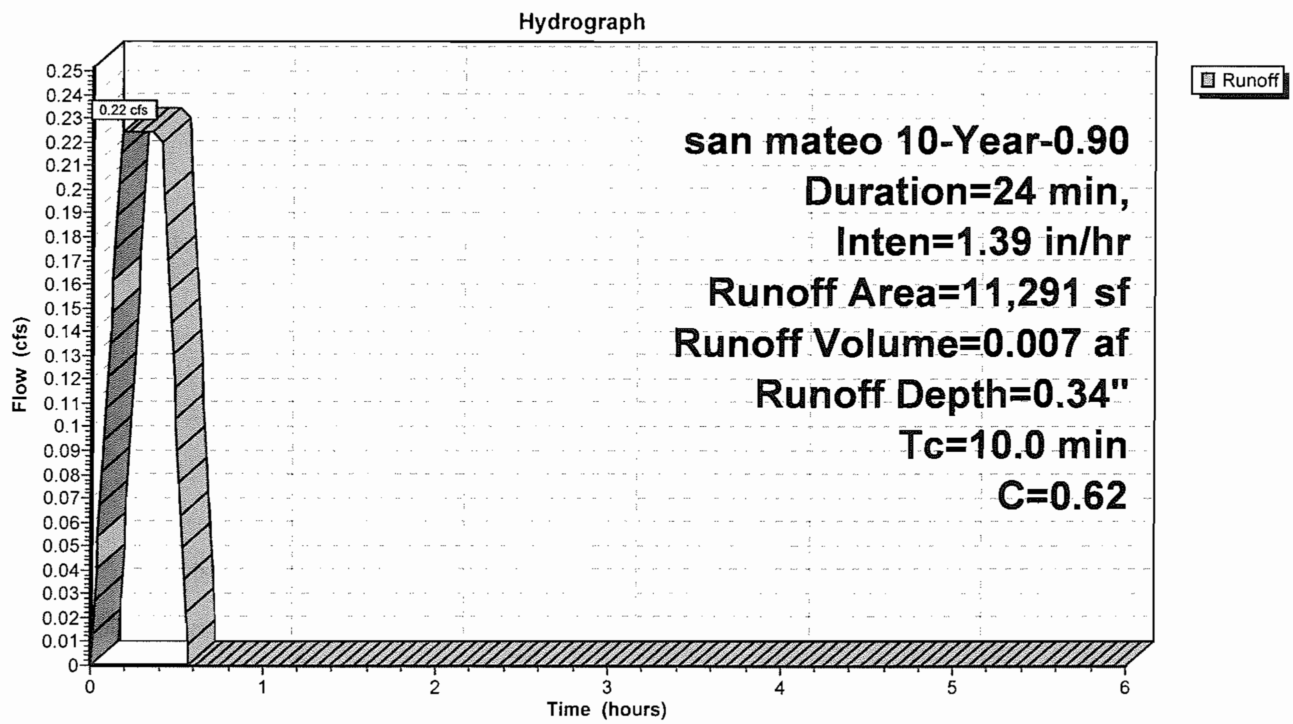
Runoff = 0.22 cfs @ 0.17 hrs, Volume= 0.007 af, Depth= 0.34"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
san mateo 10-Year-0.90 Duration=24 min, Inten=1.39 in/hr

Area (sf)	C	Description
4,516	0.95	Impervious Areas
6,775	0.40	Pervious Areas
11,291	0.62	Weighted Average
11,291	0.62	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, net increase**

Subcatchment 1S: Lot 10



Hydrograph for Subcatchment 1S: Lot 10

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.60	0.00	5.20	0.00
0.05	0.07	2.65	0.00	5.25	0.00
0.10	0.13	2.70	0.00	5.30	0.00
0.15	**0.20**	2.75	0.00	5.35	0.00
0.20	**0.22**	2.80	0.00	5.40	0.00
0.25	0.22	2.85	0.00	5.45	0.00
0.30	0.22	2.90	0.00	5.50	0.00
0.35	0.22	2.95	0.00	5.55	0.00
0.40	0.22	3.00	0.00	5.60	0.00
0.45	0.16	3.05	0.00	5.65	0.00
0.50	0.09	3.10	0.00	5.70	0.00
0.55	0.02	3.15	0.00	5.75	0.00
0.60	0.00	3.20	0.00	5.80	0.00
0.65	0.00	3.25	0.00	5.85	0.00
0.70	0.00	3.30	0.00	5.90	0.00
0.75	0.00	3.35	0.00	5.95	0.00
0.80	0.00	3.40	0.00	6.00	0.00
0.85	0.00	3.45	0.00		
0.90	0.00	3.50	0.00		
0.95	0.00	3.55	0.00		
1.00	0.00	3.60	0.00		
1.05	0.00	3.65	0.00		
1.10	0.00	3.70	0.00		
1.15	0.00	3.75	0.00		
1.20	0.00	3.80	0.00		
1.25	0.00	3.85	0.00		
1.30	0.00	3.90	0.00		
1.35	0.00	3.95	0.00		
1.40	0.00	4.00	0.00		
1.45	0.00	4.05	0.00		
1.50	0.00	4.10	0.00		
1.55	0.00	4.15	0.00		
1.60	0.00	4.20	0.00		
1.65	0.00	4.25	0.00		
1.70	0.00	4.30	0.00		
1.75	0.00	4.35	0.00		
1.80	0.00	4.40	0.00		
1.85	0.00	4.45	0.00		
1.90	0.00	4.50	0.00		
1.95	0.00	4.55	0.00		
2.00	0.00	4.60	0.00		
2.05	0.00	4.65	0.00		
2.10	0.00	4.70	0.00		
2.15	0.00	4.75	0.00		
2.20	0.00	4.80	0.00		
2.25	0.00	4.85	0.00		
2.30	0.00	4.90	0.00		
2.35	0.00	4.95	0.00		
2.40	0.00	5.00	0.00		
2.45	0.00	5.05	0.00		
2.50	0.00	5.10	0.00		
2.55	0.00	5.15	0.00		

Pond 5P: detention basin

Inflow Area = 0.259 ac, Inflow Depth = 0.34" for 10-Year-0.90 event
Inflow = 0.22 cfs @ 0.17 hrs, Volume= 0.007 af
Outflow = 0.11 cfs @ 0.48 hrs, Volume= 0.007 af, Atten= 51%, Lag= 18.9 min
Primary = 0.11 cfs @ 0.48 hrs, Volume= 0.007 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 626.10' @ 0.48 hrs Surf.Area= 0.005 ac Storage= 0.004 af

Plug-Flow detention time= 18.0 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 18.0 min (35.0 - 17.0)

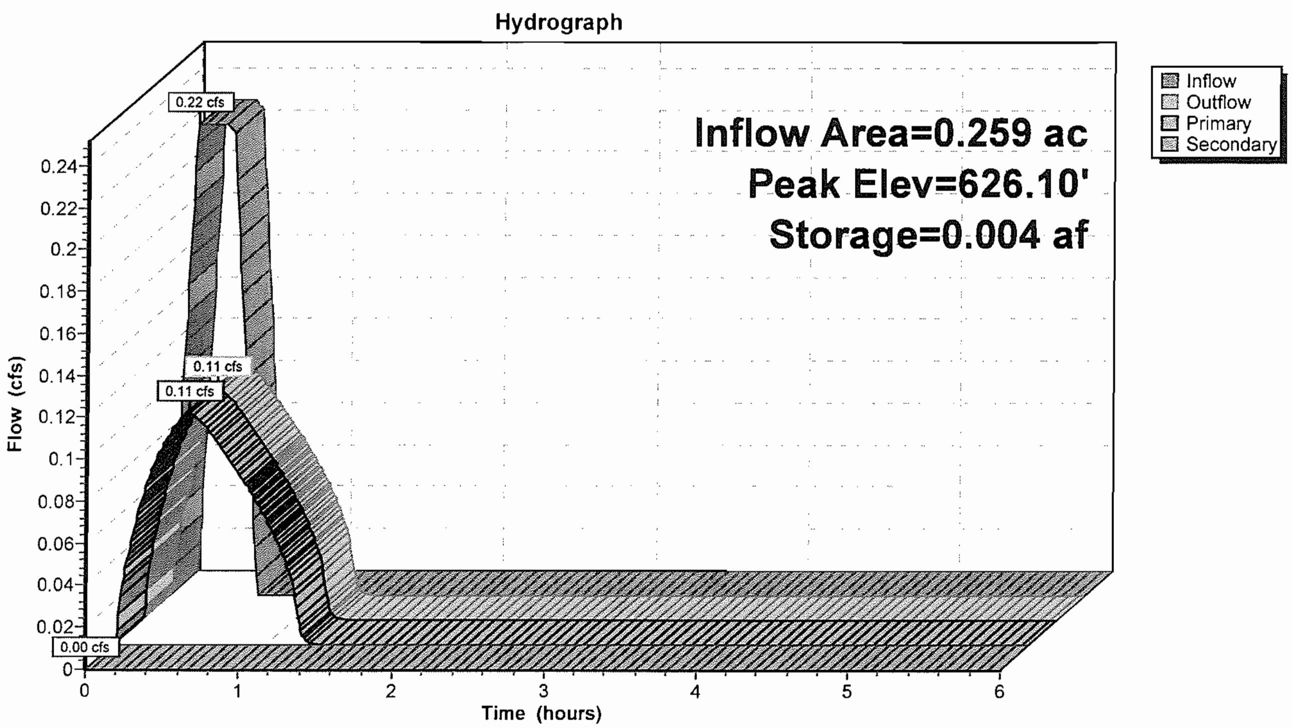
Volume	Invert	Avail.Storage	Storage Description
#1	625.00'	0.007 af	**24.0"D x 50.00'L Horizontal Cylinder**x 2

Device	Routing	Invert	Outlet Devices
#1	Primary	625.00'	**2.0" Horiz. Orifice/Grate 2.0"** Limited to weir flow C= 0.600
#2	Secondary	627.00'	**8.0" Vert. Orifice/Grate** C= 0.600

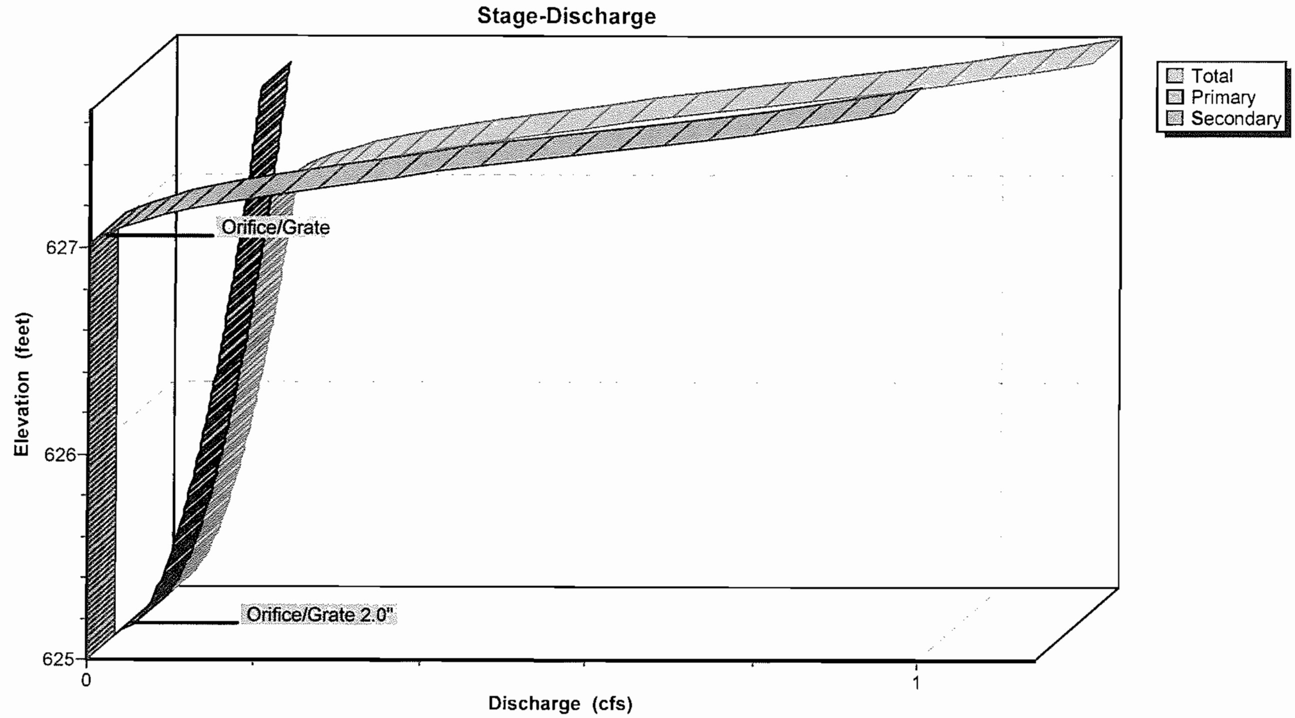
Primary OutFlow Max=0.11 cfs @ 0.48 hrs HW=626.10' (Free Discharge)
1=Orifice/Grate 2.0" (Orifice Controls 0.11 cfs @ 5.05 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=625.00' (Free Discharge)
2=Orifice/Grate (Controls 0.00 cfs)

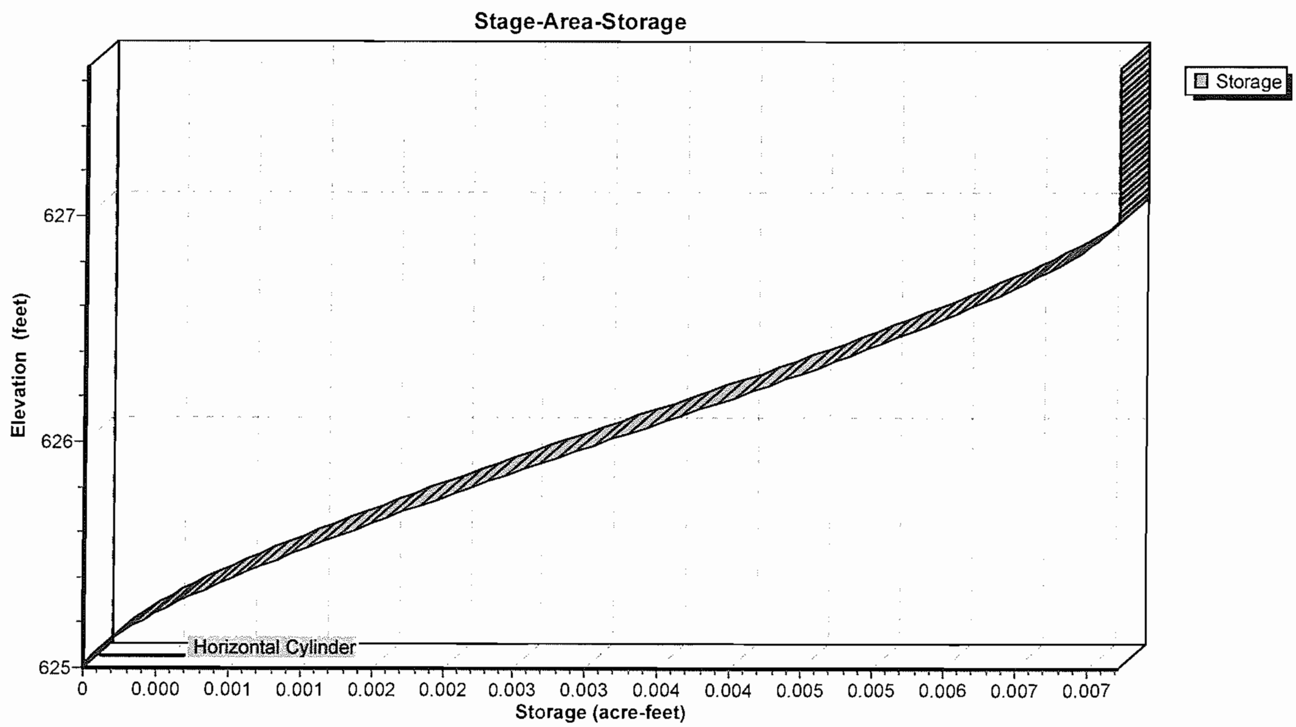
Pond 5P: detention basin



Pond 5P: detention basin



Pond 5P: detention basin



Hydrograph for Pond 5P: detention basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	**0.00**	0.000	625.00	0.00	0.00	**0.00**
0.20	**0.22**	0.001	625.51	0.08	0.08	0.00
0.40	0.22	**0.004**	**626.01**	**0.11**	**0.11**	0.00
0.60	0.00	**0.003**	**625.96**	**0.10**	**0.10**	0.00
0.80	0.00	0.002	625.61	0.08	0.08	0.00
1.00	0.00	0.001	625.31	0.06	0.06	0.00
1.20	0.00	0.000	625.04	0.01	0.01	0.00
1.40	0.00	0.000	625.00	0.00	0.00	0.00
1.60	0.00	0.000	625.00	0.00	0.00	0.00
1.80	0.00	0.000	625.00	0.00	0.00	0.00
2.00	0.00	0.000	625.00	0.00	0.00	0.00
2.20	0.00	0.000	625.00	0.00	0.00	0.00
2.40	0.00	0.000	625.00	0.00	0.00	0.00
2.60	0.00	0.000	625.00	0.00	0.00	0.00
2.80	0.00	0.000	625.00	0.00	0.00	0.00
3.00	0.00	0.000	625.00	0.00	0.00	0.00
3.20	0.00	0.000	625.00	0.00	0.00	0.00
3.40	0.00	0.000	625.00	0.00	0.00	0.00
3.60	0.00	0.000	625.00	0.00	0.00	0.00
3.80	0.00	0.000	625.00	0.00	0.00	0.00
4.00	0.00	0.000	625.00	0.00	0.00	0.00
4.20	0.00	0.000	625.00	0.00	0.00	0.00
4.40	0.00	0.000	625.00	0.00	0.00	0.00
4.60	0.00	0.000	625.00	0.00	0.00	0.00
4.80	0.00	0.000	625.00	0.00	0.00	0.00
5.00	0.00	0.000	625.00	0.00	0.00	0.00
5.20	0.00	0.000	625.00	0.00	0.00	0.00
5.40	0.00	0.000	625.00	0.00	0.00	0.00
5.60	0.00	0.000	625.00	0.00	0.00	0.00
5.80	0.00	0.000	625.00	0.00	0.00	0.00
6.00	0.00	0.000	625.00	0.00	0.00	0.00

Stage-Discharge for Pond 5P: detention basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
625.00	0.00	0.00	0.00
625.05	0.02	0.02	0.00
625.10	0.03	0.03	0.00
625.15	0.04	0.04	0.00
625.20	0.05	0.05	0.00
625.25	0.05	0.05	0.00
625.30	0.06	0.06	0.00
625.35	0.06	0.06	0.00
625.40	0.07	0.07	0.00
625.45	0.07	0.07	0.00
625.50	0.07	0.07	0.00
625.55	0.08	0.08	0.00
625.60	0.08	0.08	0.00
625.65	0.08	0.08	0.00
625.70	0.09	0.09	0.00
625.75	0.09	0.09	0.00
625.80	0.09	0.09	0.00
625.85	0.10	0.10	0.00
625.90	0.10	0.10	0.00
625.95	0.10	0.10	0.00
626.00	0.11	0.11	0.00
626.05	0.11	0.11	0.00
626.10	0.11	0.11	0.00
626.15	0.11	0.11	0.00
626.20	0.12	0.12	0.00
626.25	0.12	0.12	0.00
626.30	0.12	0.12	0.00
626.35	0.12	0.12	0.00
626.40	0.12	0.12	0.00
626.45	0.13	0.13	0.00
626.50	0.13	0.13	0.00
626.55	0.13	0.13	0.00
626.60	0.13	0.13	0.00
626.65	0.13	0.13	0.00
626.70	0.14	0.14	0.00
626.75	0.14	0.14	0.00
626.80	0.14	0.14	0.00
626.85	0.14	0.14	0.00
626.90	0.14	0.14	0.00
626.95	0.15	0.15	0.00
627.00	0.15	0.15	0.00
627.05	0.16	0.15	0.01
627.10	0.19	0.15	0.04
627.15	0.23	0.15	0.08
627.20	0.29	0.16	0.13
627.25	0.36	0.16	0.20
627.30	0.44	0.16	0.28
627.35	0.53	0.16	0.37
627.40	0.63	0.16	0.47
627.45	0.74	0.16	0.57
627.50	0.84	0.17	0.68
627.55	0.95	0.17	0.78
627.60	1.04	0.17	0.87
627.65	**1.12**	**0.17**	**0.95**

Stage-Area-Storage for Pond 5P: detention basin

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
625.00	0.000	626.04	0.004	627.08	0.007
625.02	0.000	626.06	0.004	627.10	0.007
625.04	0.000	626.08	0.004	627.12	0.007
625.06	0.000	626.10	0.004	627.14	0.007
625.08	0.000	626.12	0.004	627.16	0.007
625.10	0.000	626.14	0.004	627.18	0.007
625.12	0.000	626.16	0.004	627.20	0.007
625.14	0.000	626.18	0.004	627.22	0.007
625.16	0.000	626.20	0.005	627.24	0.007
625.18	0.000	626.22	0.005	627.26	0.007
625.20	0.000	626.24	0.005	627.28	0.007
625.22	0.000	626.26	0.005	627.30	0.007
625.24	0.000	626.28	0.005	627.32	0.007
625.26	0.001	626.30	0.005	627.34	0.007
625.28	0.001	626.32	0.005	627.36	0.007
625.30	0.001	626.34	0.005	627.38	0.007
625.32	0.001	626.36	0.005	627.40	0.007
625.34	0.001	626.38	0.005	627.42	0.007
625.36	0.001	626.40	0.005	627.44	0.007
625.38	0.001	626.42	0.005	627.46	0.007
625.40	0.001	626.44	0.006	627.48	0.007
625.42	0.001	626.46	0.006	627.50	0.007
625.44	0.001	626.48	0.006	627.52	0.007
625.46	0.001	626.50	0.006	627.54	0.007
625.48	0.001	626.52	0.006	627.56	0.007
625.50	0.001	626.54	0.006	627.58	0.007
625.52	0.001	626.56	0.006	627.60	0.007
625.54	0.002	626.58	0.006	627.62	0.007
625.56	0.002	626.60	0.006	627.64	0.007
625.58	0.002	626.62	0.006	627.66	0.007
625.60	0.002	626.64	0.006		
625.62	0.002	626.66	0.006		
625.64	0.002	626.68	0.006		
625.66	0.002	626.70	0.007		
625.68	0.002	626.72	0.007		
625.70	0.002	626.74	0.007		
625.72	0.002	626.76	0.007		
625.74	0.002	626.78	0.007		
625.76	0.003	626.80	0.007		
625.78	0.003	626.82	0.007		
625.80	0.003	626.84	0.007		
625.82	0.003	626.86	0.007		
625.84	0.003	626.88	0.007		
625.86	0.003	626.90	0.007		
625.88	0.003	626.92	0.007		
625.90	0.003	626.94	0.007		
625.92	0.003	626.96	0.007		
625.94	0.003	626.98	0.007		
625.96	0.003	627.00	**0.007**		
625.98	0.004	627.02	0.007		
626.00	0.004	627.04	0.007		
626.02	0.004	627.06	0.007		

Subcatchment 1S: Lot 12

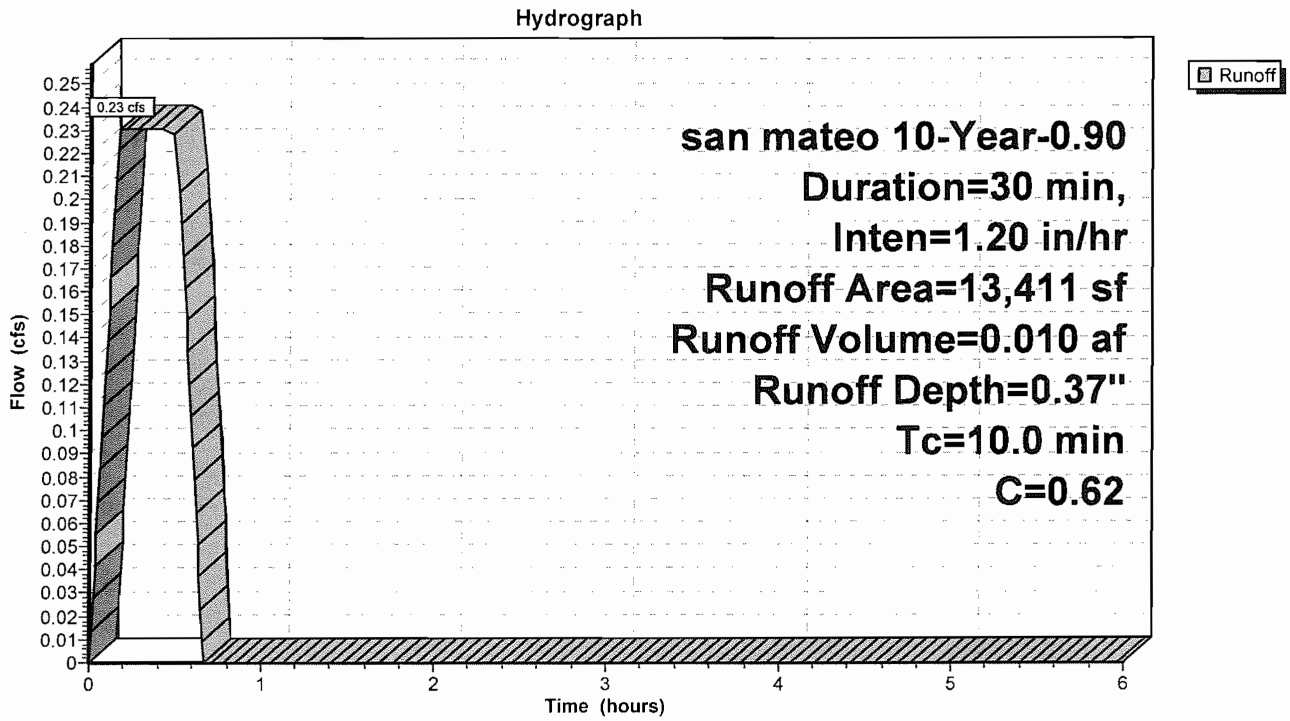
Runoff = 0.23 cfs @ 0.17 hrs, Volume= 0.010 af, Depth= 0.37"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
san mateo 10-Year-0.90 Duration=30 min, Inten=1.20 in/hr

Area (sf)	C	Description
5,364	0.95	Impervious Areas
8,047	0.40	Pervious Areas
13,411	0.62	Weighted Average
13,411	0.62	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, net increase**

Subcatchment 1S: Lot 12



Hydrograph for Subcatchment 1S: Lot 12

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.60	0.00	5.20	0.00
0.05	0.07	2.65	0.00	5.25	0.00
0.10	0.14	2.70	0.00	5.30	0.00
0.15	**0.21**	2.75	0.00	5.35	0.00
0.20	**0.23**	2.80	0.00	5.40	0.00
0.25	0.23	2.85	0.00	5.45	0.00
0.30	0.23	2.90	0.00	5.50	0.00
0.35	0.23	2.95	0.00	5.55	0.00
0.40	0.23	3.00	0.00	5.60	0.00
0.45	0.23	3.05	0.00	5.65	0.00
0.50	0.23	3.10	0.00	5.70	0.00
0.55	0.16	3.15	0.00	5.75	0.00
0.60	0.09	3.20	0.00	5.80	0.00
0.65	0.02	3.25	0.00	5.85	0.00
0.70	0.00	3.30	0.00	5.90	0.00
0.75	0.00	3.35	0.00	5.95	0.00
0.80	0.00	3.40	0.00	6.00	0.00
0.85	0.00	3.45	0.00		
0.90	0.00	3.50	0.00		
0.95	0.00	3.55	0.00		
1.00	0.00	3.60	0.00		
1.05	0.00	3.65	0.00		
1.10	0.00	3.70	0.00		
1.15	0.00	3.75	0.00		
1.20	0.00	3.80	0.00		
1.25	0.00	3.85	0.00		
1.30	0.00	3.90	0.00		
1.35	0.00	3.95	0.00		
1.40	0.00	4.00	0.00		
1.45	0.00	4.05	0.00		
1.50	0.00	4.10	0.00		
1.55	0.00	4.15	0.00		
1.60	0.00	4.20	0.00		
1.65	0.00	4.25	0.00		
1.70	0.00	4.30	0.00		
1.75	0.00	4.35	0.00		
1.80	0.00	4.40	0.00		
1.85	0.00	4.45	0.00		
1.90	0.00	4.50	0.00		
1.95	0.00	4.55	0.00		
2.00	0.00	4.60	0.00		
2.05	0.00	4.65	0.00		
2.10	0.00	4.70	0.00		
2.15	0.00	4.75	0.00		
2.20	0.00	4.80	0.00		
2.25	0.00	4.85	0.00		
2.30	0.00	4.90	0.00		
2.35	0.00	4.95	0.00		
2.40	0.00	5.00	0.00		
2.45	0.00	5.05	0.00		
2.50	0.00	5.10	0.00		
2.55	0.00	5.15	0.00		

Pond 5P: detention basin

Inflow Area =	0.308 ac, Inflow Depth = 0.37"	for 10-Year-0.90 event	
Inflow =	0.23 cfs @ 0.17 hrs, Volume=	0.010 af	
Outflow =	0.11 cfs @ 0.58 hrs, Volume=	0.010 af,	Atten= 50%, Lag= 24.8 min
Primary =	0.11 cfs @ 0.58 hrs, Volume=	0.010 af	
Secondary =	0.00 cfs @ 0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 626.19' @ 0.58 hrs Surf.Area= 0.005 ac Storage= 0.005 af

Plug-Flow detention time= 22.8 min calculated for 0.010 af (100% of inflow)
Center-of-Mass det. time= 22.8 min (42.8 - 20.0)

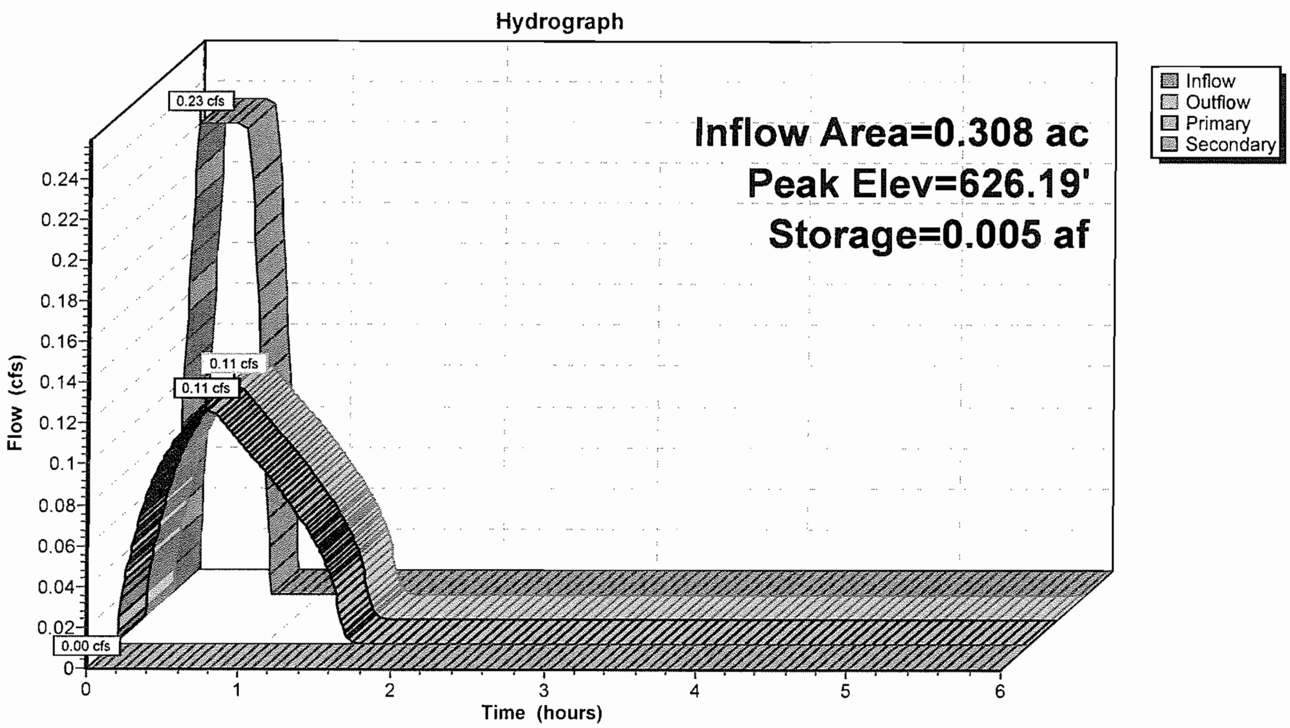
Volume	Invert	Avail.Storage	Storage Description
#1	625.00'	0.009 af	**24.0"D x 60.00'L Horizontal Cylinder**x 2

Device	Routing	Invert	Outlet Devices
#1	Primary	625.00'	**2.0" Horiz. Orifice/Grate 2.0"** Limited to weir flow C= 0.600
#2	Secondary	627.00'	**8.0" Vert. Orifice/Grate** C= 0.600

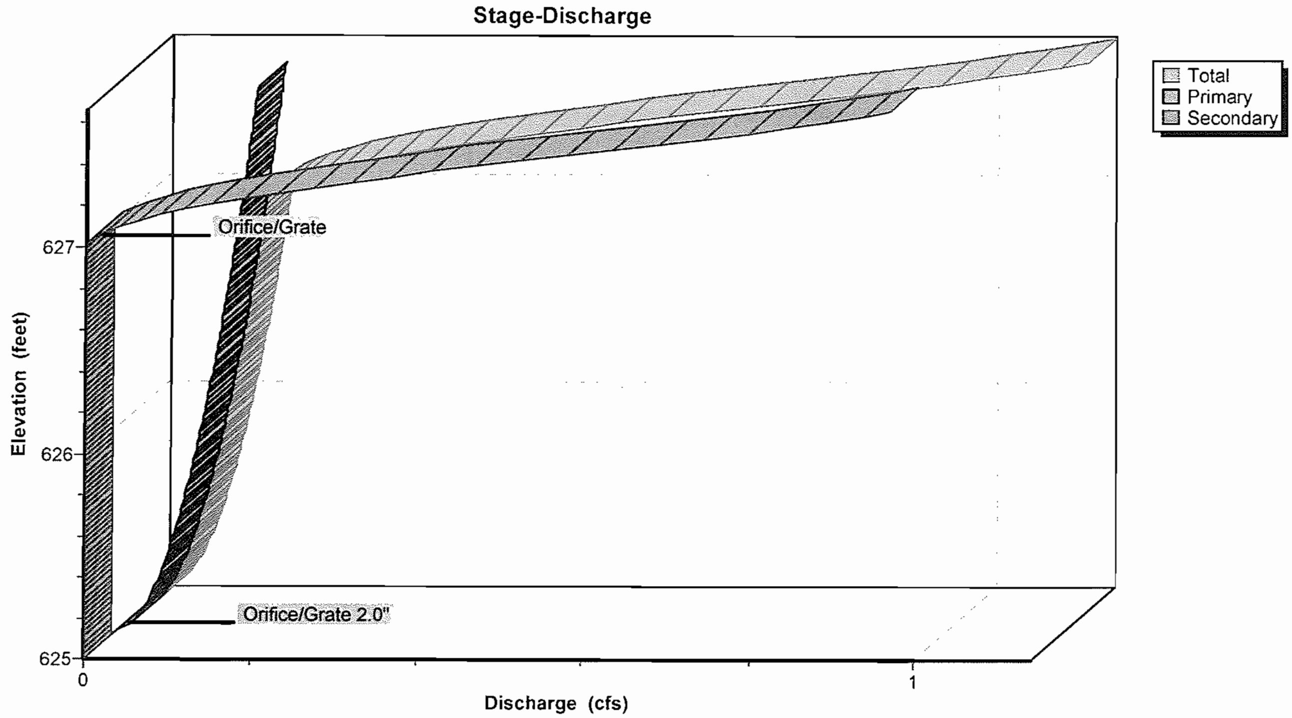
Primary OutFlow Max=0.11 cfs @ 0.58 hrs HW=626.19' (Free Discharge)
└─**1=Orifice/Grate 2.0"** (Orifice Controls 0.11 cfs @ 5.25 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=625.00' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

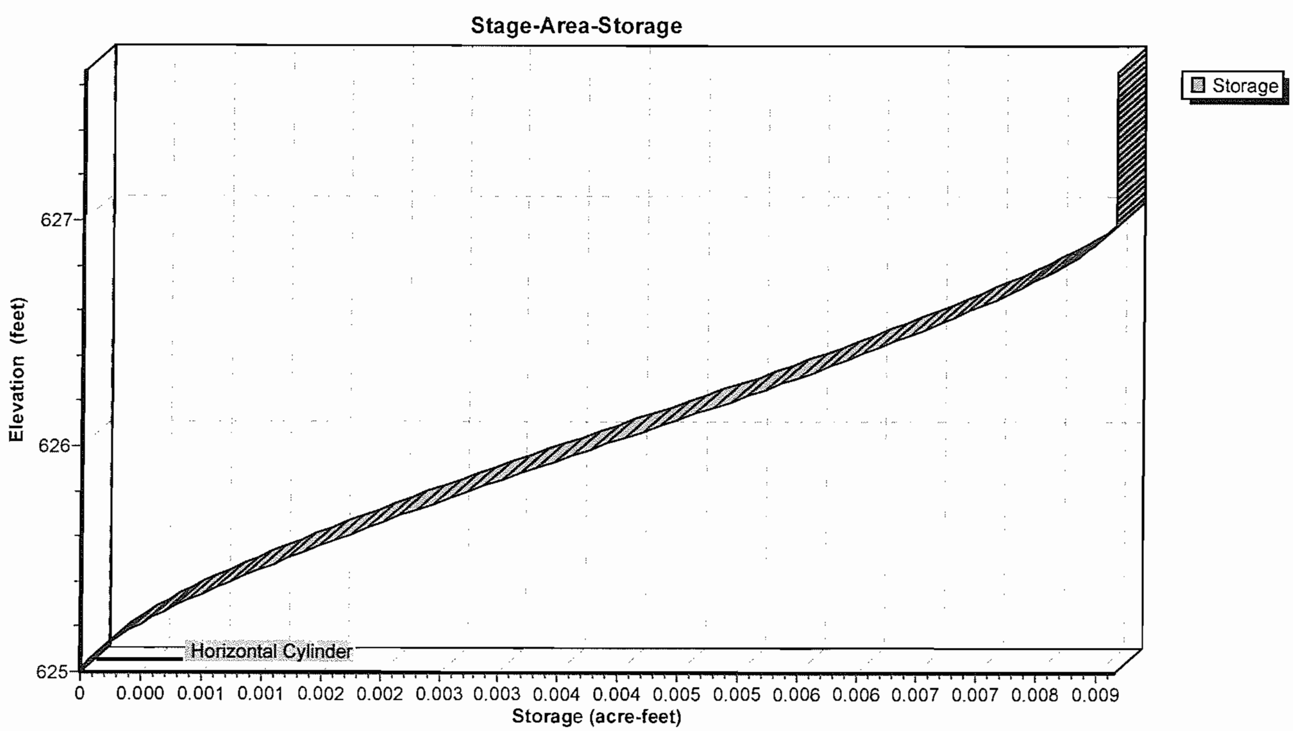
Pond 5P: detention basin



Pond 5P: detention basin



Pond 5P: detention basin



Hydrograph for Pond 5P: detention basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	**0.00**	0.000	625.00	0.00	0.00	**0.00**
0.20	**0.23**	0.002	625.47	0.07	0.07	0.00
0.40	0.23	**0.004**	**625.92**	**0.10**	**0.10**	0.00
0.60	0.09	**0.005**	**626.18**	**0.11**	**0.11**	0.00
0.80	0.00	0.004	625.91	0.10	0.10	0.00
1.00	0.00	0.002	625.62	0.08	0.08	0.00
1.20	0.00	0.001	625.37	0.06	0.06	0.00
1.40	0.00	0.000	625.13	0.04	0.04	0.00
1.60	0.00	0.000	625.00	0.00	0.00	0.00
1.80	0.00	0.000	625.00	0.00	0.00	0.00
2.00	0.00	0.000	625.00	0.00	0.00	0.00
2.20	0.00	0.000	625.00	0.00	0.00	0.00
2.40	0.00	0.000	625.00	0.00	0.00	0.00
2.60	0.00	0.000	625.00	0.00	0.00	0.00
2.80	0.00	0.000	625.00	0.00	0.00	0.00
3.00	0.00	0.000	625.00	0.00	0.00	0.00
3.20	0.00	0.000	625.00	0.00	0.00	0.00
3.40	0.00	0.000	625.00	0.00	0.00	0.00
3.60	0.00	0.000	625.00	0.00	0.00	0.00
3.80	0.00	0.000	625.00	0.00	0.00	0.00
4.00	0.00	0.000	625.00	0.00	0.00	0.00
4.20	0.00	0.000	625.00	0.00	0.00	0.00
4.40	0.00	0.000	625.00	0.00	0.00	0.00
4.60	0.00	0.000	625.00	0.00	0.00	0.00
4.80	0.00	0.000	625.00	0.00	0.00	0.00
5.00	0.00	0.000	625.00	0.00	0.00	0.00
5.20	0.00	0.000	625.00	0.00	0.00	0.00
5.40	0.00	0.000	625.00	0.00	0.00	0.00
5.60	0.00	0.000	625.00	0.00	0.00	0.00
5.80	0.00	0.000	625.00	0.00	0.00	0.00
6.00	0.00	0.000	625.00	0.00	0.00	0.00

Stage-Discharge for Pond 5P: detention basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
625.00	0.00	0.00	0.00
625.05	0.02	0.02	0.00
625.10	0.03	0.03	0.00
625.15	0.04	0.04	0.00
625.20	0.05	0.05	0.00
625.25	0.05	0.05	0.00
625.30	0.06	0.06	0.00
625.35	0.06	0.06	0.00
625.40	0.07	0.07	0.00
625.45	0.07	0.07	0.00
625.50	0.07	0.07	0.00
625.55	0.08	0.08	0.00
625.60	0.08	0.08	0.00
625.65	0.08	0.08	0.00
625.70	0.09	0.09	0.00
625.75	0.09	0.09	0.00
625.80	0.09	0.09	0.00
625.85	0.10	0.10	0.00
625.90	0.10	0.10	0.00
625.95	0.10	0.10	0.00
626.00	0.11	0.11	0.00
626.05	0.11	0.11	0.00
626.10	0.11	0.11	0.00
626.15	0.11	0.11	0.00
626.20	0.12	0.12	0.00
626.25	0.12	0.12	0.00
626.30	0.12	0.12	0.00
626.35	0.12	0.12	0.00
626.40	0.12	0.12	0.00
626.45	0.13	0.13	0.00
626.50	0.13	0.13	0.00
626.55	0.13	0.13	0.00
626.60	0.13	0.13	0.00
626.65	0.13	0.13	0.00
626.70	0.14	0.14	0.00
626.75	0.14	0.14	0.00
626.80	0.14	0.14	0.00
626.85	0.14	0.14	0.00
626.90	0.14	0.14	0.00
626.95	0.15	0.15	0.00
627.00	0.15	0.15	0.00
627.05	0.16	0.15	0.01
627.10	0.19	0.15	0.04
627.15	0.23	0.15	0.08
627.20	0.29	0.16	0.13
627.25	0.36	0.16	0.20
627.30	0.44	0.16	0.28
627.35	0.53	0.16	0.37
627.40	0.63	0.16	0.47
627.45	0.74	0.16	0.57
627.50	0.84	0.17	0.68
627.55	0.95	0.17	0.78
627.60	1.04	0.17	0.87
627.65	**1.12**	**0.17**	**0.95**

Stage-Area-Storage for Pond 5P: detention basin

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
625.00	0.000	626.04	0.005	627.08	0.009
625.02	0.000	626.06	0.005	627.10	0.009
625.04	0.000	626.08	0.005	627.12	0.009
625.06	0.000	626.10	0.005	627.14	0.009
625.08	0.000	626.12	0.005	627.16	0.009
625.10	0.000	626.14	0.005	627.18	0.009
625.12	0.000	626.16	0.005	627.20	0.009
625.14	0.000	626.18	0.005	627.22	0.009
625.16	0.000	626.20	0.005	627.24	0.009
625.18	0.000	626.22	0.006	627.26	0.009
625.20	0.000	626.24	0.006	627.28	0.009
625.22	0.001	626.26	0.006	627.30	0.009
625.24	0.001	626.28	0.006	627.32	0.009
625.26	0.001	626.30	0.006	627.34	0.009
625.28	0.001	626.32	0.006	627.36	0.009
625.30	0.001	626.34	0.006	627.38	0.009
625.32	0.001	626.36	0.006	627.40	0.009
625.34	0.001	626.38	0.006	627.42	0.009
625.36	0.001	626.40	0.006	627.44	0.009
625.38	0.001	626.42	0.007	627.46	0.009
625.40	0.001	626.44	0.007	627.48	0.009
625.42	0.001	626.46	0.007	627.50	0.009
625.44	0.001	626.48	0.007	627.52	0.009
625.46	0.002	626.50	0.007	627.54	0.009
625.48	0.002	626.52	0.007	627.56	0.009
625.50	0.002	626.54	0.007	627.58	0.009
625.52	0.002	626.56	0.007	627.60	0.009
625.54	0.002	626.58	0.007	627.62	0.009
625.56	0.002	626.60	0.007	627.64	0.009
625.58	0.002	626.62	0.008	627.66	0.009
625.60	0.002	626.64	0.008		
625.62	0.002	626.66	0.008		
625.64	0.002	626.68	0.008		
625.66	0.002	626.70	0.008		
625.68	0.003	626.72	0.008		
625.70	0.003	626.74	0.008		
625.72	0.003	626.76	0.008		
625.74	0.003	626.78	0.008		
625.76	0.003	626.80	0.008		
625.78	0.003	626.82	0.008		
625.80	0.003	626.84	0.008		
625.82	0.003	626.86	0.008		
625.84	0.003	626.88	0.008		
625.86	0.004	626.90	0.008		
625.88	0.004	626.92	0.009		
625.90	0.004	626.94	0.009		
625.92	0.004	626.96	0.009		
625.94	0.004	626.98	0.009		
625.96	0.004	627.00	**0.009**		
625.98	0.004	627.02	0.009		
626.00	0.004	627.04	0.009		
626.02	0.004	627.06	0.009		

Subcatchment 1S: Lot 13

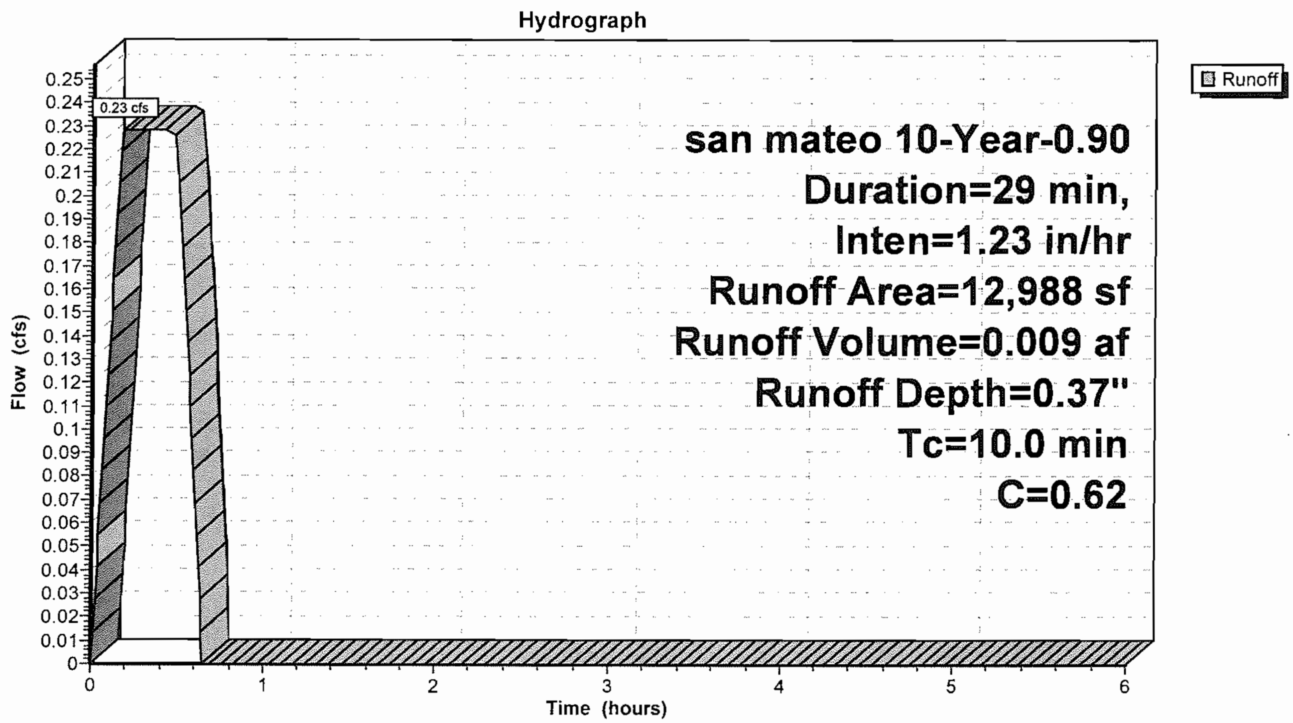
Runoff = 0.23 cfs @ 0.17 hrs, Volume= 0.009 af, Depth= 0.37"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
san mateo 10-Year-0.90 Duration=29 min, Inten=1.23 in/hr

Area (sf)	C	Description
5,195	0.95	Impervious Areas
7,793	0.40	Pervious Areas
12,988	0.62	Weighted Average
12,988	0.62	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, net increase**

Subcatchment 1S: Lot 13



Hydrograph for Subcatchment 1S: Lot 13

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.60	0.00	5.20	0.00
0.05	0.07	2.65	0.00	5.25	0.00
0.10	0.14	2.70	0.00	5.30	0.00
0.15	**0.21**	2.75	0.00	5.35	0.00
0.20	**0.23**	2.80	0.00	5.40	0.00
0.25	0.23	2.85	0.00	5.45	0.00
0.30	0.23	2.90	0.00	5.50	0.00
0.35	0.23	2.95	0.00	5.55	0.00
0.40	0.23	3.00	0.00	5.60	0.00
0.45	0.23	3.05	0.00	5.65	0.00
0.50	0.21	3.10	0.00	5.70	0.00
0.55	0.14	3.15	0.00	5.75	0.00
0.60	0.07	3.20	0.00	5.80	0.00
0.65	0.00	3.25	0.00	5.85	0.00
0.70	0.00	3.30	0.00	5.90	0.00
0.75	0.00	3.35	0.00	5.95	0.00
0.80	0.00	3.40	0.00	6.00	0.00
0.85	0.00	3.45	0.00		
0.90	0.00	3.50	0.00		
0.95	0.00	3.55	0.00		
1.00	0.00	3.60	0.00		
1.05	0.00	3.65	0.00		
1.10	0.00	3.70	0.00		
1.15	0.00	3.75	0.00		
1.20	0.00	3.80	0.00		
1.25	0.00	3.85	0.00		
1.30	0.00	3.90	0.00		
1.35	0.00	3.95	0.00		
1.40	0.00	4.00	0.00		
1.45	0.00	4.05	0.00		
1.50	0.00	4.10	0.00		
1.55	0.00	4.15	0.00		
1.60	0.00	4.20	0.00		
1.65	0.00	4.25	0.00		
1.70	0.00	4.30	0.00		
1.75	0.00	4.35	0.00		
1.80	0.00	4.40	0.00		
1.85	0.00	4.45	0.00		
1.90	0.00	4.50	0.00		
1.95	0.00	4.55	0.00		
2.00	0.00	4.60	0.00		
2.05	0.00	4.65	0.00		
2.10	0.00	4.70	0.00		
2.15	0.00	4.75	0.00		
2.20	0.00	4.80	0.00		
2.25	0.00	4.85	0.00		
2.30	0.00	4.90	0.00		
2.35	0.00	4.95	0.00		
2.40	0.00	5.00	0.00		
2.45	0.00	5.05	0.00		
2.50	0.00	5.10	0.00		
2.55	0.00	5.15	0.00		

Pond 5P: detention basin

Inflow Area =	0.298 ac, Inflow Depth = 0.37"	for 10-Year-0.90 event	
Inflow =	0.23 cfs @ 0.17 hrs, Volume=	0.009 af	
Outflow =	0.11 cfs @ 0.57 hrs, Volume=	0.009 af,	Atten= 51%, Lag= 23.9 min
Primary =	0.11 cfs @ 0.57 hrs, Volume=	0.009 af	
Secondary =	0.00 cfs @ 0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 626.15' @ 0.57 hrs Surf.Area= 0.005 ac Storage= 0.005 af

Plug-Flow detention time= 22.1 min calculated for 0.009 af (100% of inflow)
Center-of-Mass det. time= 22.2 min (41.7 - 19.5)

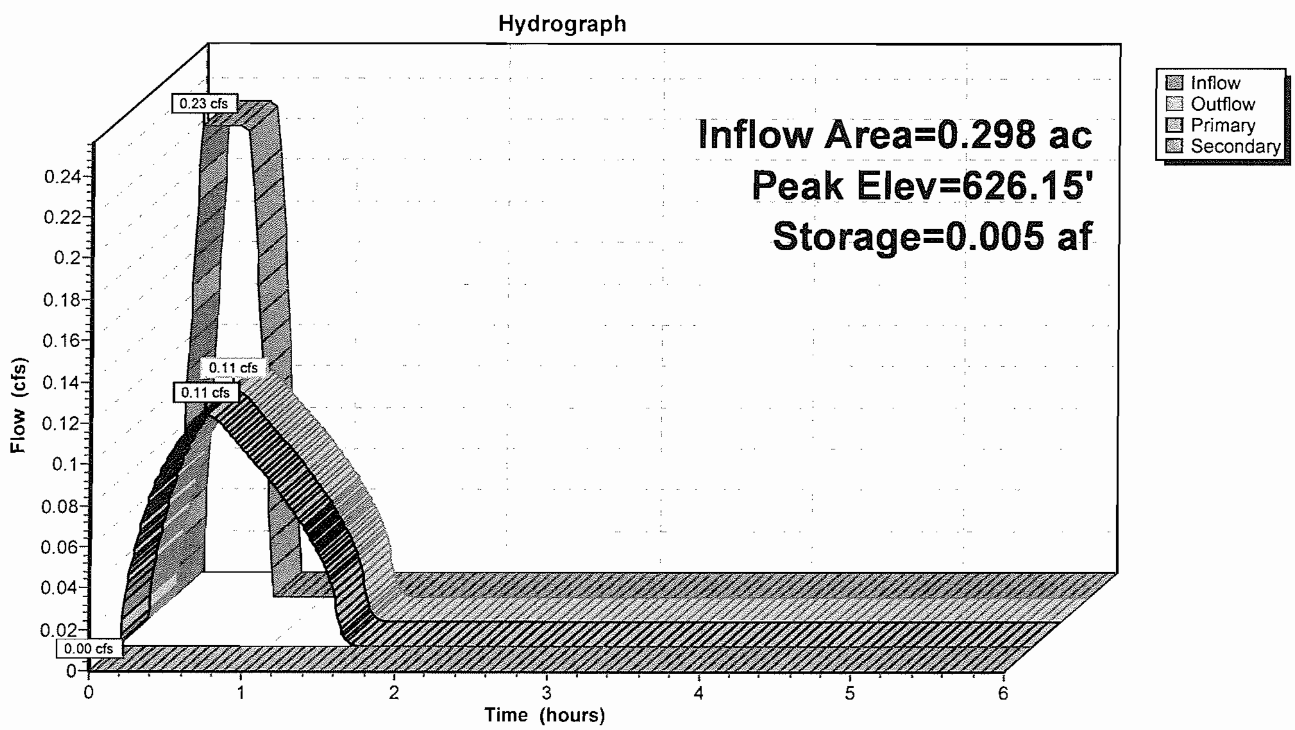
Volume	Invert	Avail.Storage	Storage Description
#1	625.00'	0.009 af	**24.0"D x 60.00'L Horizontal Cylinder**x 2

Device	Routing	Invert	Outlet Devices
#1	Primary	625.00'	**2.0" Horiz. Orifice/Grate 2.0"** Limited to weir flow C= 0.600
#2	Secondary	627.00'	**8.0" Vert. Orifice/Grate** C= 0.600

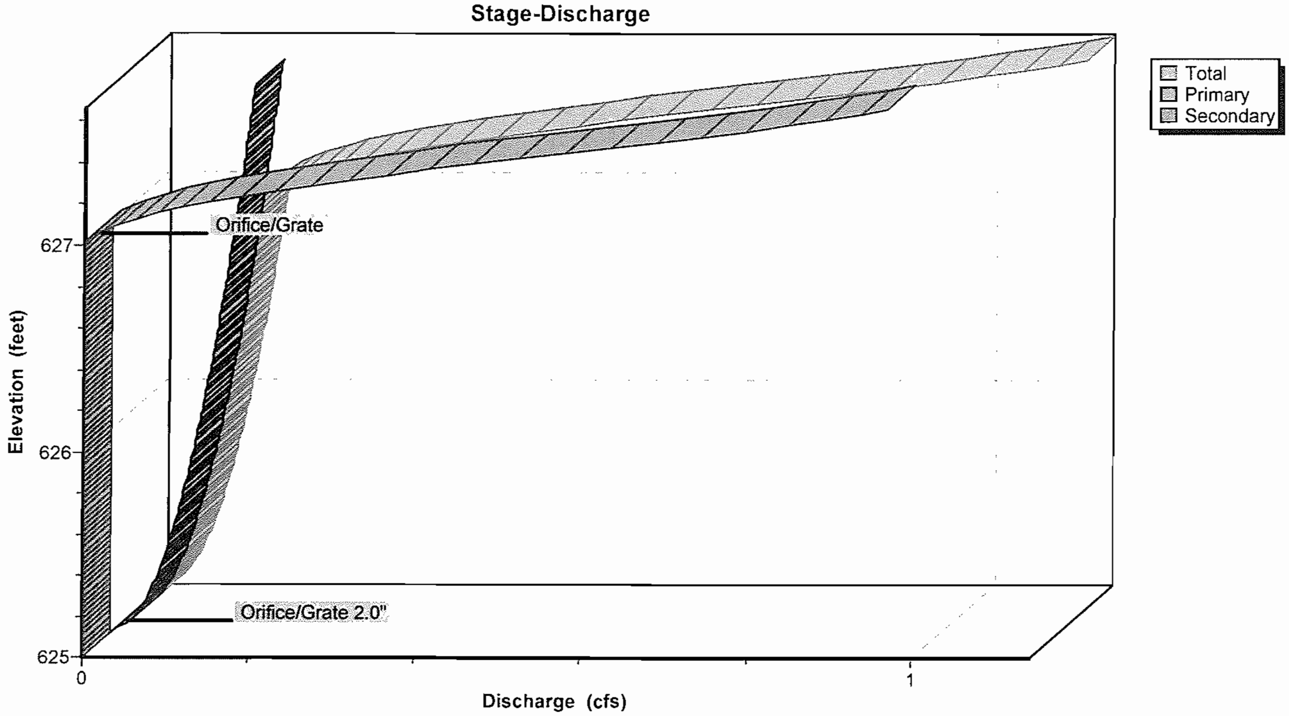
Primary OutFlow Max=0.11 cfs @ 0.57 hrs HW=626.14' (Free Discharge)
└**1=Orifice/Grate 2.0"** (Orifice Controls 0.11 cfs @ 5.15 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=625.00' (Free Discharge)
└**2=Orifice/Grate** (Controls 0.00 cfs)

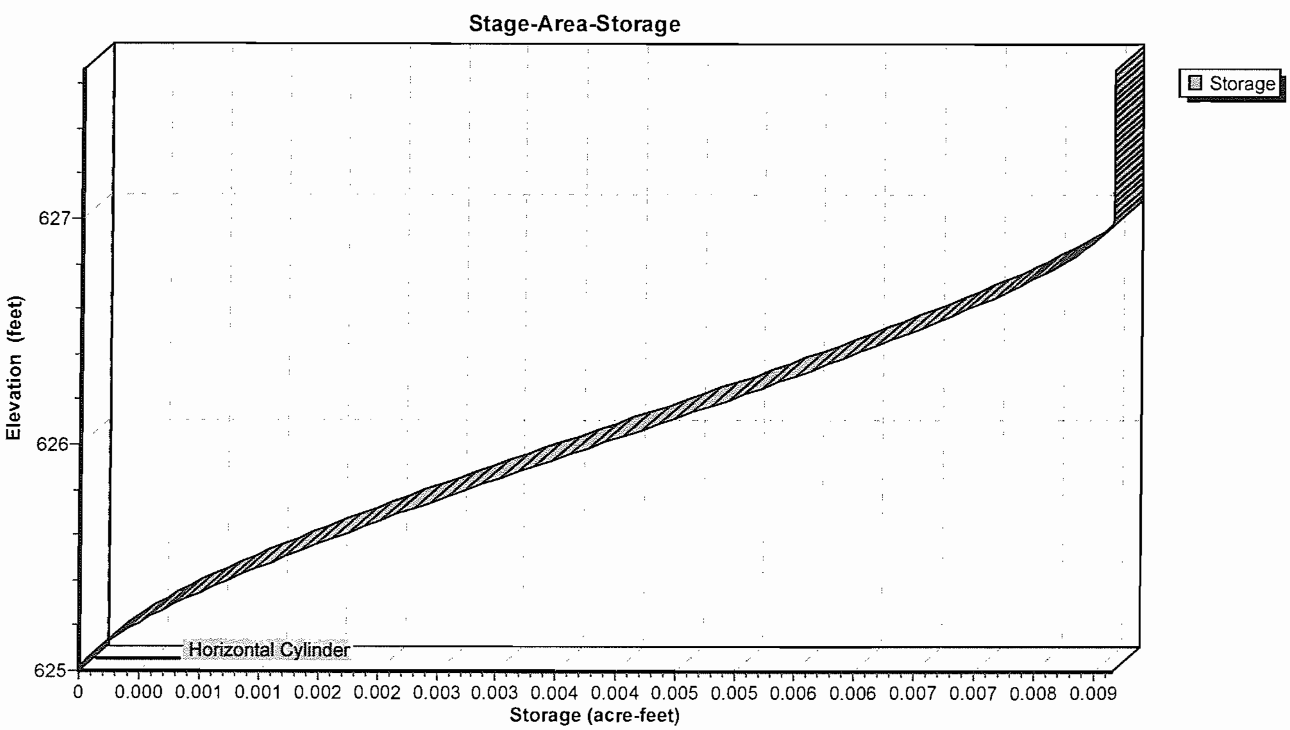
Pond 5P: detention basin



Pond 5P: detention basin



Pond 5P: detention basin



Hydrograph for Pond 5P: detention basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	**0.00**	0.000	625.00	0.00	0.00	**0.00**
0.20	**0.23**	0.002	625.46	0.07	0.07	0.00
0.40	0.23	**0.004**	**625.91**	**0.10**	**0.10**	0.00
0.60	0.07	**0.005**	**626.13**	**0.11**	**0.11**	0.00
0.80	0.00	0.003	625.84	0.10	0.10	0.00
1.00	0.00	0.002	625.57	0.08	0.08	0.00
1.20	0.00	0.001	625.32	0.06	0.06	0.00
1.40	0.00	0.000	625.08	0.03	0.03	0.00
1.60	0.00	0.000	625.00	0.00	0.00	0.00
1.80	0.00	0.000	625.00	0.00	0.00	0.00
2.00	0.00	0.000	625.00	0.00	0.00	0.00
2.20	0.00	0.000	625.00	0.00	0.00	0.00
2.40	0.00	0.000	625.00	0.00	0.00	0.00
2.60	0.00	0.000	625.00	0.00	0.00	0.00
2.80	0.00	0.000	625.00	0.00	0.00	0.00
3.00	0.00	0.000	625.00	0.00	0.00	0.00
3.20	0.00	0.000	625.00	0.00	0.00	0.00
3.40	0.00	0.000	625.00	0.00	0.00	0.00
3.60	0.00	0.000	625.00	0.00	0.00	0.00
3.80	0.00	0.000	625.00	0.00	0.00	0.00
4.00	0.00	0.000	625.00	0.00	0.00	0.00
4.20	0.00	0.000	625.00	0.00	0.00	0.00
4.40	0.00	0.000	625.00	0.00	0.00	0.00
4.60	0.00	0.000	625.00	0.00	0.00	0.00
4.80	0.00	0.000	625.00	0.00	0.00	0.00
5.00	0.00	0.000	625.00	0.00	0.00	0.00
5.20	0.00	0.000	625.00	0.00	0.00	0.00
5.40	0.00	0.000	625.00	0.00	0.00	0.00
5.60	0.00	0.000	625.00	0.00	0.00	0.00
5.80	0.00	0.000	625.00	0.00	0.00	0.00
6.00	0.00	0.000	625.00	0.00	0.00	0.00

Stage-Discharge for Pond 5P: detention basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
625.00	0.00	0.00	0.00
625.05	0.02	0.02	0.00
625.10	0.03	0.03	0.00
625.15	0.04	0.04	0.00
625.20	0.05	0.05	0.00
625.25	0.05	0.05	0.00
625.30	0.06	0.06	0.00
625.35	0.06	0.06	0.00
625.40	0.07	0.07	0.00
625.45	0.07	0.07	0.00
625.50	0.07	0.07	0.00
625.55	0.08	0.08	0.00
625.60	0.08	0.08	0.00
625.65	0.08	0.08	0.00
625.70	0.09	0.09	0.00
625.75	0.09	0.09	0.00
625.80	0.09	0.09	0.00
625.85	0.10	0.10	0.00
625.90	0.10	0.10	0.00
625.95	0.10	0.10	0.00
626.00	0.11	0.11	0.00
626.05	0.11	0.11	0.00
626.10	0.11	0.11	0.00
626.15	0.11	0.11	0.00
626.20	0.12	0.12	0.00
626.25	0.12	0.12	0.00
626.30	0.12	0.12	0.00
626.35	0.12	0.12	0.00
626.40	0.12	0.12	0.00
626.45	0.13	0.13	0.00
626.50	0.13	0.13	0.00
626.55	0.13	0.13	0.00
626.60	0.13	0.13	0.00
626.65	0.13	0.13	0.00
626.70	0.14	0.14	0.00
626.75	0.14	0.14	0.00
626.80	0.14	0.14	0.00
626.85	0.14	0.14	0.00
626.90	0.14	0.14	0.00
626.95	0.15	0.15	0.00
627.00	0.15	0.15	0.00
627.05	0.16	0.15	0.01
627.10	0.19	0.15	0.04
627.15	0.23	0.15	0.08
627.20	0.29	0.16	0.13
627.25	0.36	0.16	0.20
627.30	0.44	0.16	0.28
627.35	0.53	0.16	0.37
627.40	0.63	0.16	0.47
627.45	0.74	0.16	0.57
627.50	0.84	0.17	0.68
627.55	0.95	0.17	0.78
627.60	1.04	0.17	0.87
627.65	**1.12**	**0.17**	**0.95**

Stage-Area-Storage for Pond 5P: detention basin

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
625.00	0.000	626.04	0.005	627.08	0.009
625.02	0.000	626.06	0.005	627.10	0.009
625.04	0.000	626.08	0.005	627.12	0.009
625.06	0.000	626.10	0.005	627.14	0.009
625.08	0.000	626.12	0.005	627.16	0.009
625.10	0.000	626.14	0.005	627.18	0.009
625.12	0.000	626.16	0.005	627.20	0.009
625.14	0.000	626.18	0.005	627.22	0.009
625.16	0.000	626.20	0.005	627.24	0.009
625.18	0.000	626.22	0.006	627.26	0.009
625.20	0.000	626.24	0.006	627.28	0.009
625.22	0.001	626.26	0.006	627.30	0.009
625.24	0.001	626.28	0.006	627.32	0.009
625.26	0.001	626.30	0.006	627.34	0.009
625.28	0.001	626.32	0.006	627.36	0.009
625.30	0.001	626.34	0.006	627.38	0.009
625.32	0.001	626.36	0.006	627.40	0.009
625.34	0.001	626.38	0.006	627.42	0.009
625.36	0.001	626.40	0.006	627.44	0.009
625.38	0.001	626.42	0.007	627.46	0.009
625.40	0.001	626.44	0.007	627.48	0.009
625.42	0.001	626.46	0.007	627.50	0.009
625.44	0.001	626.48	0.007	627.52	0.009
625.46	0.002	626.50	0.007	627.54	0.009
625.48	0.002	626.52	0.007	627.56	0.009
625.50	0.002	626.54	0.007	627.58	0.009
625.52	0.002	626.56	0.007	627.60	0.009
625.54	0.002	626.58	0.007	627.62	0.009
625.56	0.002	626.60	0.007	627.64	0.009
625.58	0.002	626.62	0.008	627.66	0.009
625.60	0.002	626.64	0.008		
625.62	0.002	626.66	0.008		
625.64	0.002	626.68	0.008		
625.66	0.002	626.70	0.008		
625.68	0.003	626.72	0.008		
625.70	0.003	626.74	0.008		
625.72	0.003	626.76	0.008		
625.74	0.003	626.78	0.008		
625.76	0.003	626.80	0.008		
625.78	0.003	626.82	0.008		
625.80	0.003	626.84	0.008		
625.82	0.003	626.86	0.008		
625.84	0.003	626.88	0.008		
625.86	0.004	626.90	0.008		
625.88	0.004	626.92	0.009		
625.90	0.004	626.94	0.009		
625.92	0.004	626.96	0.009		
625.94	0.004	626.98	0.009		
625.96	0.004	627.00	**0.009**		
625.98	0.004	627.02	0.009		
626.00	0.004	627.04	0.009		
626.02	0.004	627.06	0.009		

Subcatchment 1S: Lot 14

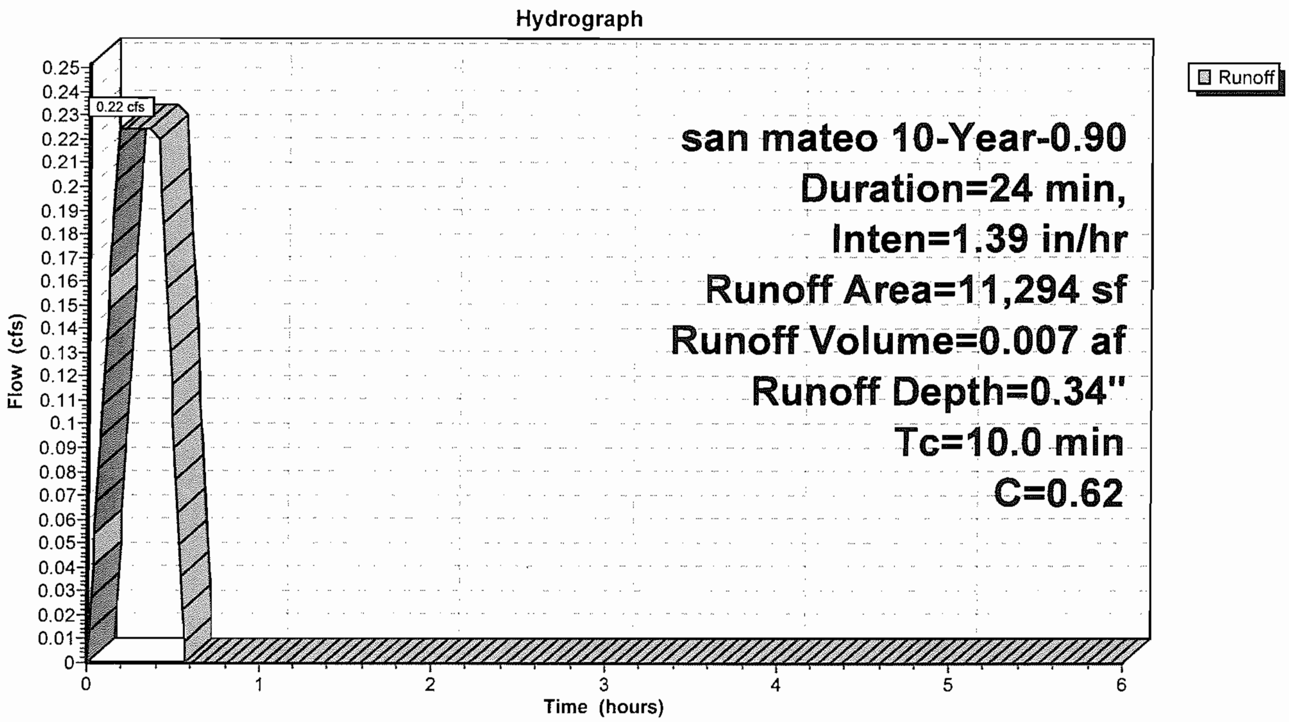
Runoff = 0.22 cfs @ 0.17 hrs, Volume= 0.007 af, Depth= 0.34"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
san mateo 10-Year-0.90 Duration=24 min, Inten=1.39 in/hr

Area (sf)	C	Description
4,518	0.95	Impervious Areas
6,776	0.40	Pervious Areas
11,294	0.62	Weighted Average
11,294	0.62	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, net increase**

Subcatchment 1S: Lot 14



Hydrograph for Subcatchment 1S: Lot 14

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.60	0.00	5.20	0.00
0.05	0.07	2.65	0.00	5.25	0.00
0.10	0.13	2.70	0.00	5.30	0.00
0.15	**0.20**	2.75	0.00	5.35	0.00
0.20	**0.22**	2.80	0.00	5.40	0.00
0.25	0.22	2.85	0.00	5.45	0.00
0.30	0.22	2.90	0.00	5.50	0.00
0.35	0.22	2.95	0.00	5.55	0.00
0.40	0.22	3.00	0.00	5.60	0.00
0.45	0.16	3.05	0.00	5.65	0.00
0.50	0.09	3.10	0.00	5.70	0.00
0.55	0.02	3.15	0.00	5.75	0.00
0.60	0.00	3.20	0.00	5.80	0.00
0.65	0.00	3.25	0.00	5.85	0.00
0.70	0.00	3.30	0.00	5.90	0.00
0.75	0.00	3.35	0.00	5.95	0.00
0.80	0.00	3.40	0.00	6.00	0.00
0.85	0.00	3.45	0.00		
0.90	0.00	3.50	0.00		
0.95	0.00	3.55	0.00		
1.00	0.00	3.60	0.00		
1.05	0.00	3.65	0.00		
1.10	0.00	3.70	0.00		
1.15	0.00	3.75	0.00		
1.20	0.00	3.80	0.00		
1.25	0.00	3.85	0.00		
1.30	0.00	3.90	0.00		
1.35	0.00	3.95	0.00		
1.40	0.00	4.00	0.00		
1.45	0.00	4.05	0.00		
1.50	0.00	4.10	0.00		
1.55	0.00	4.15	0.00		
1.60	0.00	4.20	0.00		
1.65	0.00	4.25	0.00		
1.70	0.00	4.30	0.00		
1.75	0.00	4.35	0.00		
1.80	0.00	4.40	0.00		
1.85	0.00	4.45	0.00		
1.90	0.00	4.50	0.00		
1.95	0.00	4.55	0.00		
2.00	0.00	4.60	0.00		
2.05	0.00	4.65	0.00		
2.10	0.00	4.70	0.00		
2.15	0.00	4.75	0.00		
2.20	0.00	4.80	0.00		
2.25	0.00	4.85	0.00		
2.30	0.00	4.90	0.00		
2.35	0.00	4.95	0.00		
2.40	0.00	5.00	0.00		
2.45	0.00	5.05	0.00		
2.50	0.00	5.10	0.00		
2.55	0.00	5.15	0.00		

Pond 5P: detention basin

Inflow Area = 0.259 ac, Inflow Depth = 0.34" for 10-Year-0.90 event
Inflow = 0.22 cfs @ 0.17 hrs, Volume= 0.007 af
Outflow = 0.11 cfs @ 0.48 hrs, Volume= 0.007 af, Atten= 51%, Lag= 18.9 min
Primary = 0.11 cfs @ 0.48 hrs, Volume= 0.007 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 626.10' @ 0.48 hrs Surf.Area= 0.005 ac Storage= 0.004 af

Plug-Flow detention time= 18.0 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 18.0 min (35.0 - 17.0)

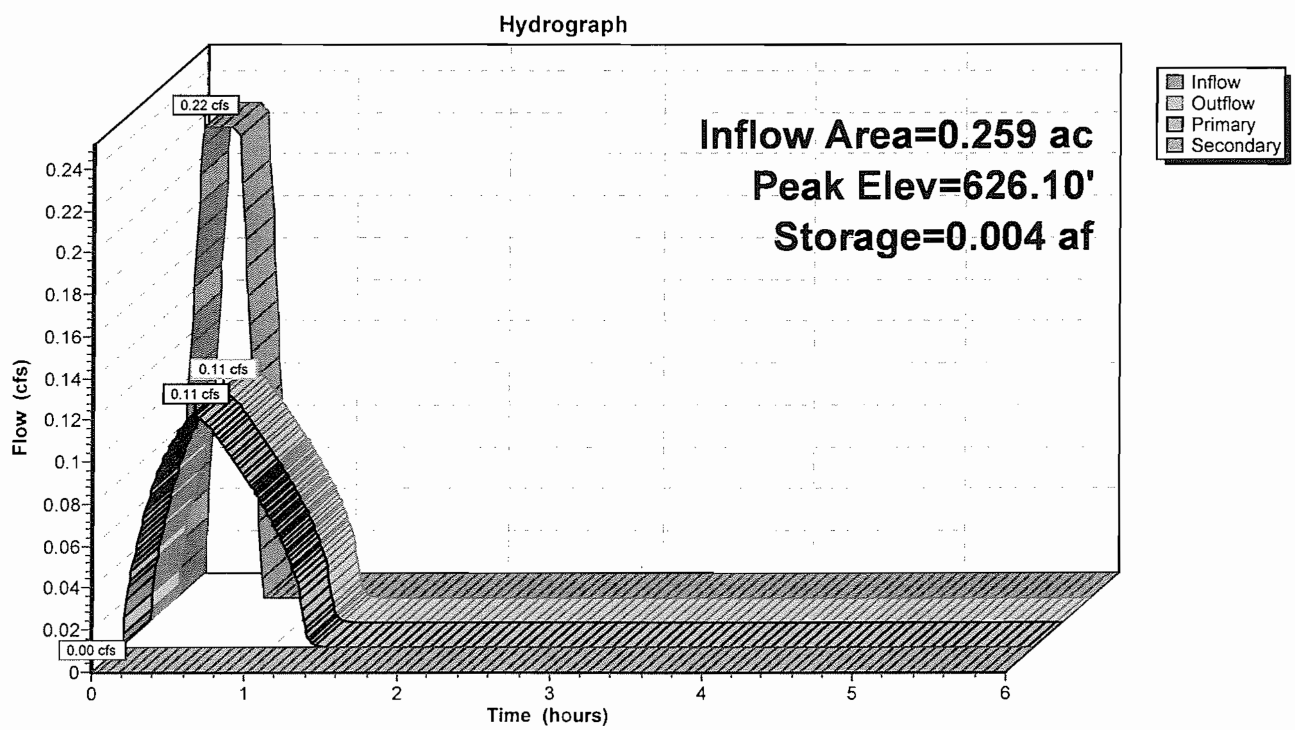
Volume	Invert	Avail.Storage	Storage Description
#1	625.00'	0.007 af	**24.0"D x 50.00'L Horizontal Cylinder**x 2

Device	Routing	Invert	Outlet Devices
#1	Primary	625.00'	**2.0" Horiz. Orifice/Grate 2.0"** Limited to weir flow C= 0.600
#2	Secondary	627.00'	**8.0" Vert. Orifice/Grate** C= 0.600

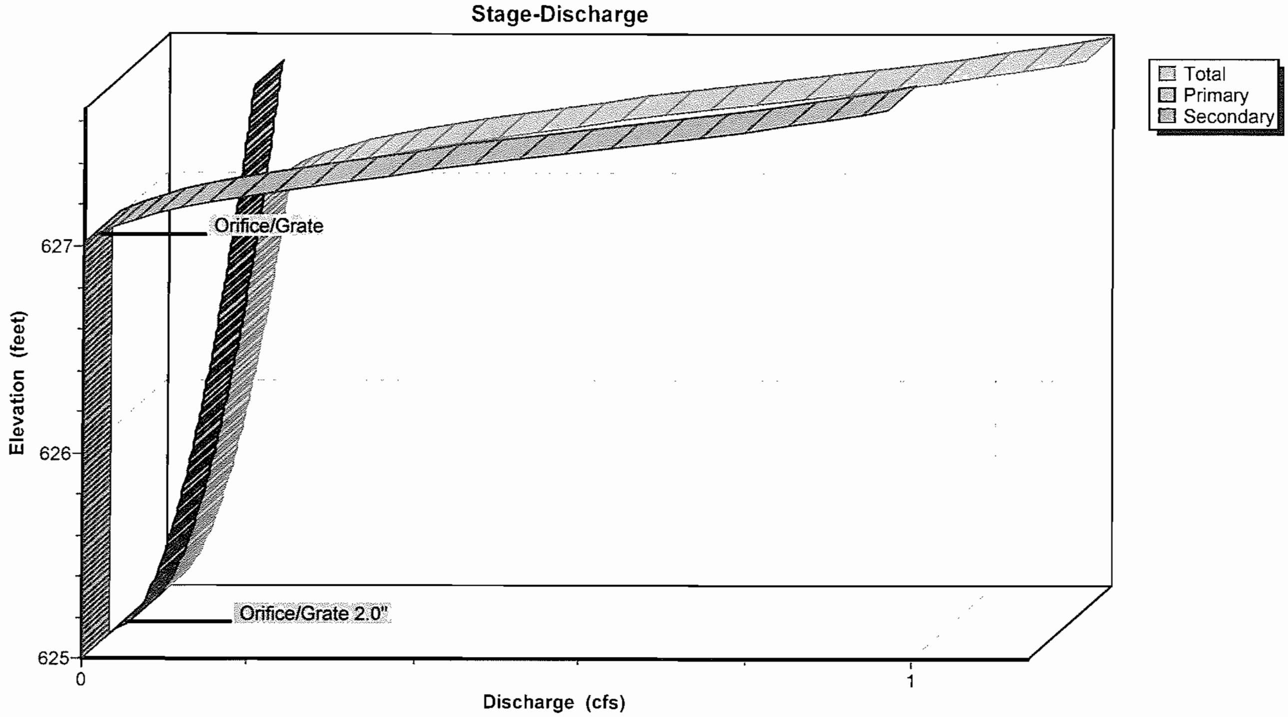
Primary OutFlow Max=0.11 cfs @ 0.48 hrs HW=626.10' (Free Discharge)
↑—**1=Orifice/Grate 2.0"** (Orifice Controls 0.11 cfs @ 5.05 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=625.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

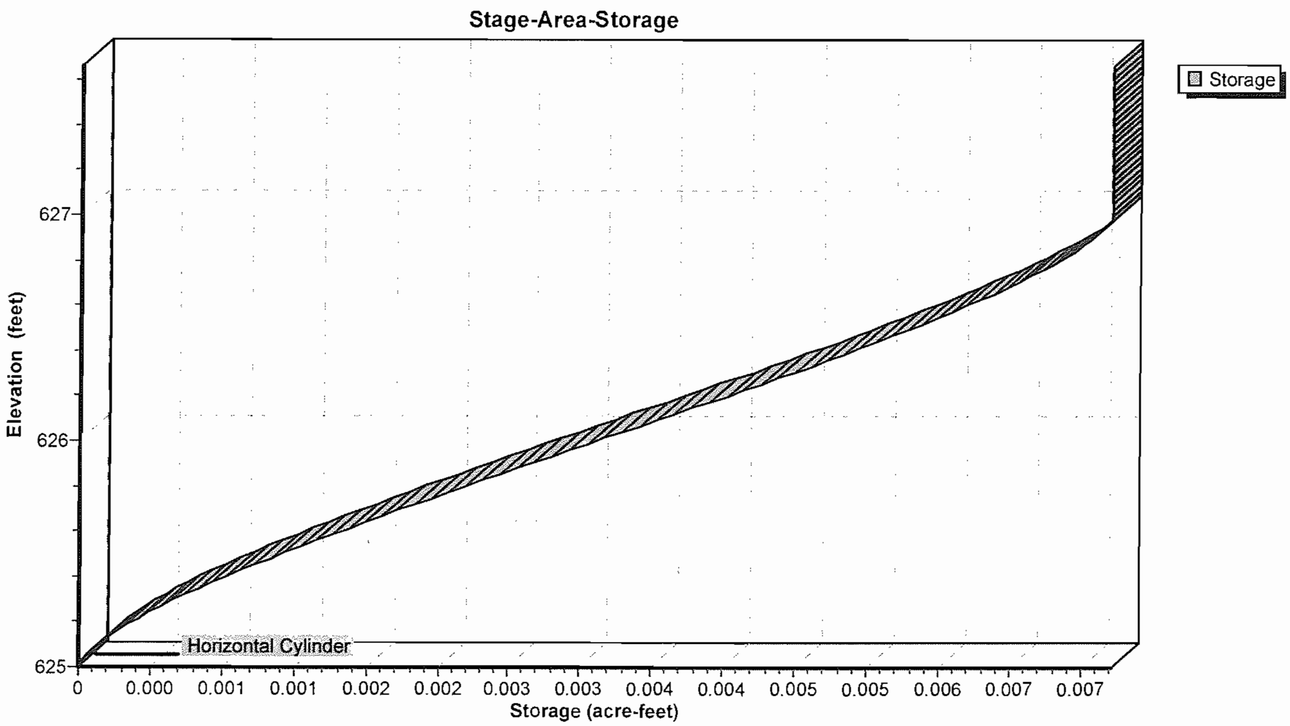
Pond 5P: detention basin



Pond 5P: detention basin



Pond 5P: detention basin



Hydrograph for Pond 5P: detention basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	**0.00**	0.000	625.00	0.00	0.00	**0.00**
0.20	**0.22**	0.001	625.51	0.08	0.08	0.00
0.40	0.22	**0.004**	**626.01**	**0.11**	**0.11**	0.00
0.60	0.00	**0.003**	**625.96**	**0.10**	**0.10**	0.00
0.80	0.00	0.002	625.61	0.08	0.08	0.00
1.00	0.00	0.001	625.31	0.06	0.06	0.00
1.20	0.00	0.000	625.04	0.01	0.01	0.00
1.40	0.00	0.000	625.00	0.00	0.00	0.00
1.60	0.00	0.000	625.00	0.00	0.00	0.00
1.80	0.00	0.000	625.00	0.00	0.00	0.00
2.00	0.00	0.000	625.00	0.00	0.00	0.00
2.20	0.00	0.000	625.00	0.00	0.00	0.00
2.40	0.00	0.000	625.00	0.00	0.00	0.00
2.60	0.00	0.000	625.00	0.00	0.00	0.00
2.80	0.00	0.000	625.00	0.00	0.00	0.00
3.00	0.00	0.000	625.00	0.00	0.00	0.00
3.20	0.00	0.000	625.00	0.00	0.00	0.00
3.40	0.00	0.000	625.00	0.00	0.00	0.00
3.60	0.00	0.000	625.00	0.00	0.00	0.00
3.80	0.00	0.000	625.00	0.00	0.00	0.00
4.00	0.00	0.000	625.00	0.00	0.00	0.00
4.20	0.00	0.000	625.00	0.00	0.00	0.00
4.40	0.00	0.000	625.00	0.00	0.00	0.00
4.60	0.00	0.000	625.00	0.00	0.00	0.00
4.80	0.00	0.000	625.00	0.00	0.00	0.00
5.00	0.00	0.000	625.00	0.00	0.00	0.00
5.20	0.00	0.000	625.00	0.00	0.00	0.00
5.40	0.00	0.000	625.00	0.00	0.00	0.00
5.60	0.00	0.000	625.00	0.00	0.00	0.00
5.80	0.00	0.000	625.00	0.00	0.00	0.00
6.00	0.00	0.000	625.00	0.00	0.00	0.00

Stage-Discharge for Pond 5P: detention basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
625.00	0.00	0.00	0.00
625.05	0.02	0.02	0.00
625.10	0.03	0.03	0.00
625.15	0.04	0.04	0.00
625.20	0.05	0.05	0.00
625.25	0.05	0.05	0.00
625.30	0.06	0.06	0.00
625.35	0.06	0.06	0.00
625.40	0.07	0.07	0.00
625.45	0.07	0.07	0.00
625.50	0.07	0.07	0.00
625.55	0.08	0.08	0.00
625.60	0.08	0.08	0.00
625.65	0.08	0.08	0.00
625.70	0.09	0.09	0.00
625.75	0.09	0.09	0.00
625.80	0.09	0.09	0.00
625.85	0.10	0.10	0.00
625.90	0.10	0.10	0.00
625.95	0.10	0.10	0.00
626.00	0.11	0.11	0.00
626.05	0.11	0.11	0.00
626.10	0.11	0.11	0.00
626.15	0.11	0.11	0.00
626.20	0.12	0.12	0.00
626.25	0.12	0.12	0.00
626.30	0.12	0.12	0.00
626.35	0.12	0.12	0.00
626.40	0.12	0.12	0.00
626.45	0.13	0.13	0.00
626.50	0.13	0.13	0.00
626.55	0.13	0.13	0.00
626.60	0.13	0.13	0.00
626.65	0.13	0.13	0.00
626.70	0.14	0.14	0.00
626.75	0.14	0.14	0.00
626.80	0.14	0.14	0.00
626.85	0.14	0.14	0.00
626.90	0.14	0.14	0.00
626.95	0.15	0.15	0.00
627.00	0.15	0.15	0.00
627.05	0.16	0.15	0.01
627.10	0.19	0.15	0.04
627.15	0.23	0.15	0.08
627.20	0.29	0.16	0.13
627.25	0.36	0.16	0.20
627.30	0.44	0.16	0.28
627.35	0.53	0.16	0.37
627.40	0.63	0.16	0.47
627.45	0.74	0.16	0.57
627.50	0.84	0.17	0.68
627.55	0.95	0.17	0.78
627.60	1.04	0.17	0.87
627.65	**1.12**	**0.17**	**0.95**

Stage-Area-Storage for Pond 5P: detention basin

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
625.00	0.000	626.04	0.004	627.08	0.007
625.02	0.000	626.06	0.004	627.10	0.007
625.04	0.000	626.08	0.004	627.12	0.007
625.06	0.000	626.10	0.004	627.14	0.007
625.08	0.000	626.12	0.004	627.16	0.007
625.10	0.000	626.14	0.004	627.18	0.007
625.12	0.000	626.16	0.004	627.20	0.007
625.14	0.000	626.18	0.004	627.22	0.007
625.16	0.000	626.20	0.005	627.24	0.007
625.18	0.000	626.22	0.005	627.26	0.007
625.20	0.000	626.24	0.005	627.28	0.007
625.22	0.000	626.26	0.005	627.30	0.007
625.24	0.000	626.28	0.005	627.32	0.007
625.26	0.001	626.30	0.005	627.34	0.007
625.28	0.001	626.32	0.005	627.36	0.007
625.30	0.001	626.34	0.005	627.38	0.007
625.32	0.001	626.36	0.005	627.40	0.007
625.34	0.001	626.38	0.005	627.42	0.007
625.36	0.001	626.40	0.005	627.44	0.007
625.38	0.001	626.42	0.005	627.46	0.007
625.40	0.001	626.44	0.006	627.48	0.007
625.42	0.001	626.46	0.006	627.50	0.007
625.44	0.001	626.48	0.006	627.52	0.007
625.46	0.001	626.50	0.006	627.54	0.007
625.48	0.001	626.52	0.006	627.56	0.007
625.50	0.001	626.54	0.006	627.58	0.007
625.52	0.001	626.56	0.006	627.60	0.007
625.54	0.002	626.58	0.006	627.62	0.007
625.56	0.002	626.60	0.006	627.64	0.007
625.58	0.002	626.62	0.006	627.66	0.007
625.60	0.002	626.64	0.006		
625.62	0.002	626.66	0.006		
625.64	0.002	626.68	0.006		
625.66	0.002	626.70	0.007		
625.68	0.002	626.72	0.007		
625.70	0.002	626.74	0.007		
625.72	0.002	626.76	0.007		
625.74	0.002	626.78	0.007		
625.76	0.003	626.80	0.007		
625.78	0.003	626.82	0.007		
625.80	0.003	626.84	0.007		
625.82	0.003	626.86	0.007		
625.84	0.003	626.88	0.007		
625.86	0.003	626.90	0.007		
625.88	0.003	626.92	0.007		
625.90	0.003	626.94	0.007		
625.92	0.003	626.96	0.007		
625.94	0.003	626.98	0.007		
625.96	0.003	627.00	**0.007**		
625.98	0.004	627.02	0.007		
626.00	0.004	627.04	0.007		
626.02	0.004	627.06	0.007		

Subcatchment 1S: Lots 15-16

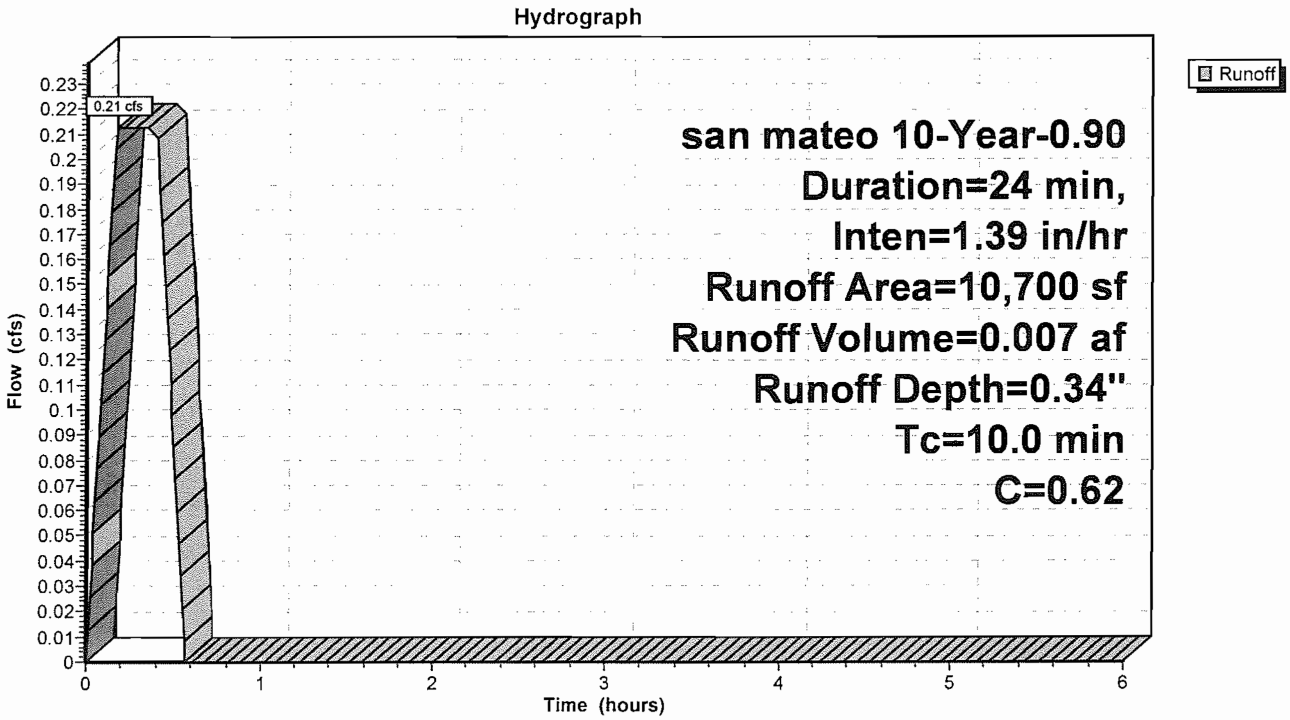
Runoff = 0.21 cfs @ 0.17 hrs, Volume= 0.007 af, Depth= 0.34"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
san mateo 10-Year-0.90 Duration=24 min, Inten=1.39 in/hr

Area (sf)	C	Description
4,280	0.95	Impervious Areas
6,420	0.40	Pervious Areas
10,700	0.62	Weighted Average
10,700	0.62	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, net increase**

Subcatchment 1S: Lots 15-16



Pond 5P: detention basin

Inflow Area =	0.246 ac,	Inflow Depth = 0.34"	for 10-Year-0.90 event	
Inflow =	0.21 cfs @	0.17 hrs, Volume=	0.007 af	
Outflow =	0.11 cfs @	0.48 hrs, Volume=	0.007 af,	Atten= 50%, Lag= 18.8 min
Primary =	0.11 cfs @	0.48 hrs, Volume=	0.007 af	
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 626.04' @ 0.48 hrs Surf.Area= 0.005 ac Storage= 0.004 af

Plug-Flow detention time= 17.2 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 17.2 min (34.2 - 17.0)

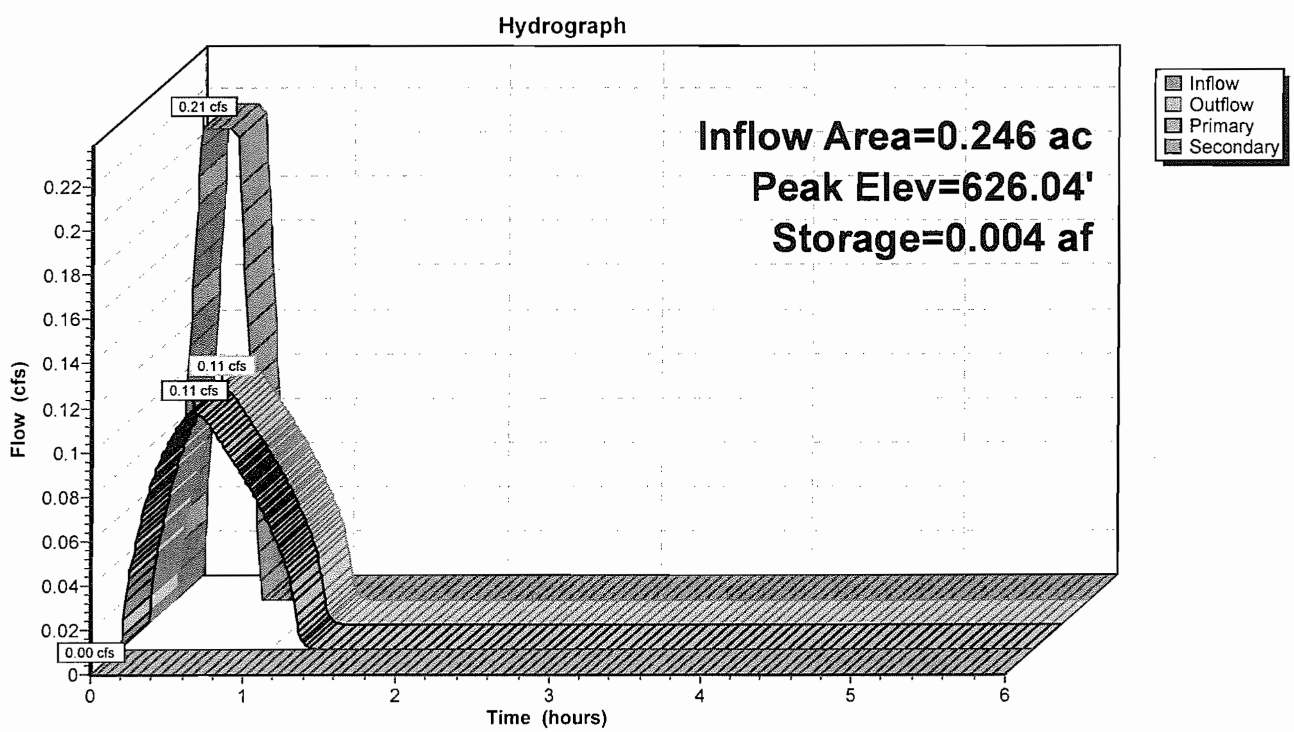
Volume	Invert	Avail.Storage	Storage Description
#1	625.00'	0.007 af	**24.0"D x 50.00'L Horizontal Cylinder**x 2

Device	Routing	Invert	Outlet Devices
#1	Primary	625.00'	**2.0" Horiz. Orifice/Grate 2.0"** Limited to weir flow C= 0.600
#2	Secondary	627.00'	**8.0" Vert. Orifice/Grate** C= 0.600

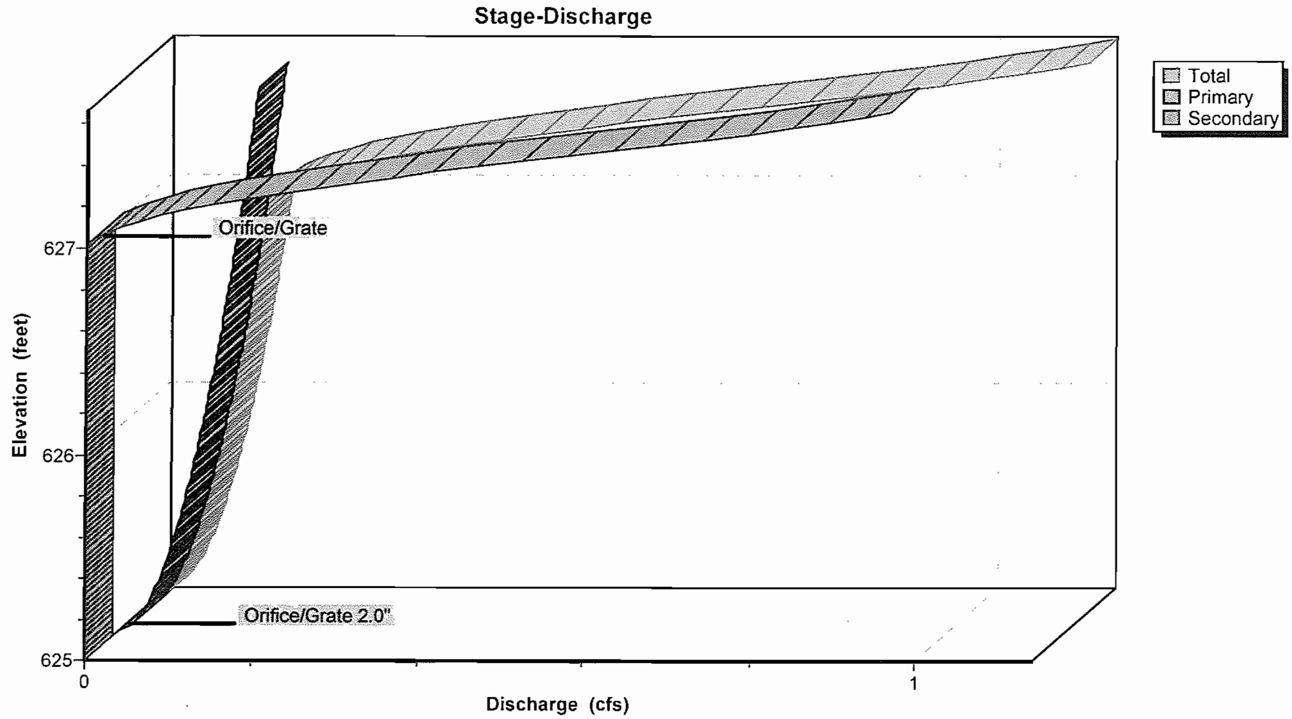
Primary OutFlow Max=0.11 cfs @ 0.48 hrs HW=626.03' (Free Discharge)
└─**1=Orifice/Grate 2.0"** (Orifice Controls 0.11 cfs @ 4.90 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=625.00' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

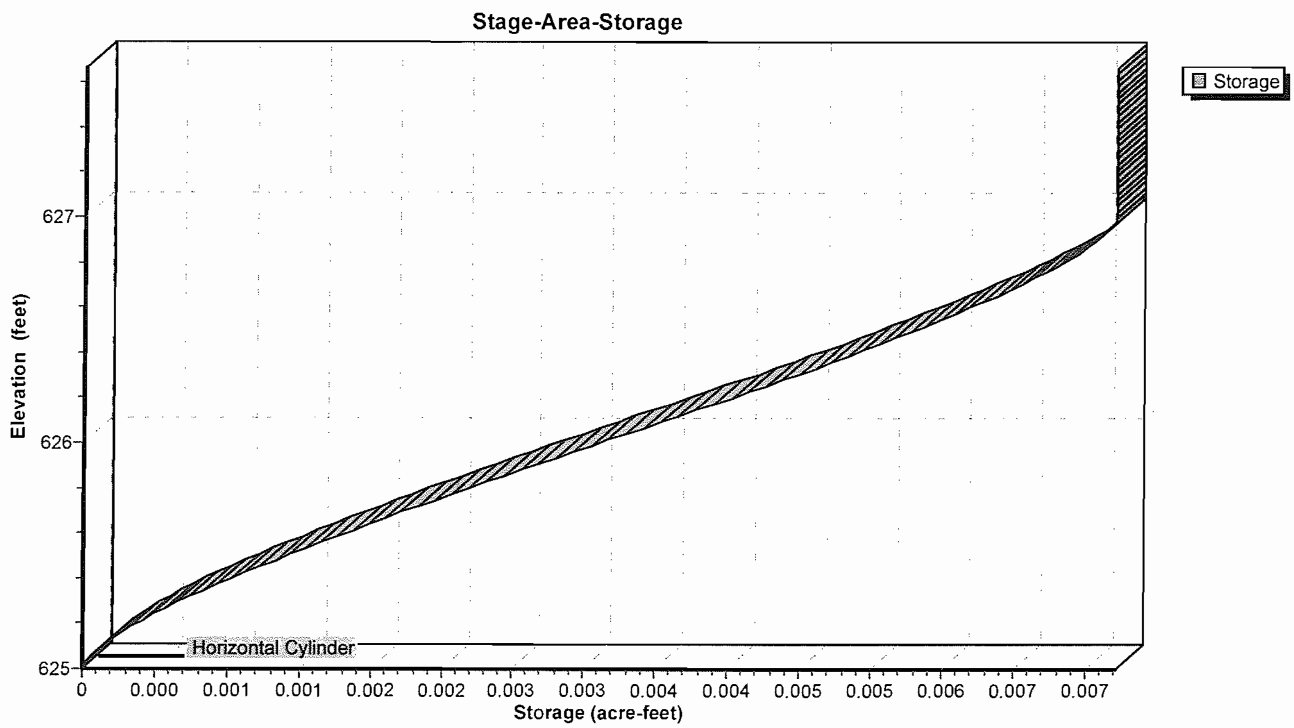
Pond 5P: detention basin



Pond 5P: detention basin



Pond 5P: detention basin



Stage-Discharge for Pond 5P: detention basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
625.00	0.00	0.00	0.00
625.05	0.02	0.02	0.00
625.10	0.03	0.03	0.00
625.15	0.04	0.04	0.00
625.20	0.05	0.05	0.00
625.25	0.05	0.05	0.00
625.30	0.06	0.06	0.00
625.35	0.06	0.06	0.00
625.40	0.07	0.07	0.00
625.45	0.07	0.07	0.00
625.50	0.07	0.07	0.00
625.55	0.08	0.08	0.00
625.60	0.08	0.08	0.00
625.65	0.08	0.08	0.00
625.70	0.09	0.09	0.00
625.75	0.09	0.09	0.00
625.80	0.09	0.09	0.00
625.85	0.10	0.10	0.00
625.90	0.10	0.10	0.00
625.95	0.10	0.10	0.00
626.00	0.11	0.11	0.00
626.05	0.11	0.11	0.00
626.10	0.11	0.11	0.00
626.15	0.11	0.11	0.00
626.20	0.12	0.12	0.00
626.25	0.12	0.12	0.00
626.30	0.12	0.12	0.00
626.35	0.12	0.12	0.00
626.40	0.12	0.12	0.00
626.45	0.13	0.13	0.00
626.50	0.13	0.13	0.00
626.55	0.13	0.13	0.00
626.60	0.13	0.13	0.00
626.65	0.13	0.13	0.00
626.70	0.14	0.14	0.00
626.75	0.14	0.14	0.00
626.80	0.14	0.14	0.00
626.85	0.14	0.14	0.00
626.90	0.14	0.14	0.00
626.95	0.15	0.15	0.00
627.00	0.15	0.15	0.00
627.05	0.16	0.15	0.01
627.10	0.19	0.15	0.04
627.15	0.23	0.15	0.08
627.20	0.29	0.16	0.13
627.25	0.36	0.16	0.20
627.30	0.44	0.16	0.28
627.35	0.53	0.16	0.37
627.40	0.63	0.16	0.47
627.45	0.74	0.16	0.57
627.50	0.84	0.17	0.68
627.55	0.95	0.17	0.78
627.60	1.04	0.17	0.87
627.65	**1.12**	**0.17**	**0.95**

Stage-Area-Storage for Pond 5P: detention basin

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
625.00	0.000	626.04	0.004	627.08	0.007
625.02	0.000	626.06	0.004	627.10	0.007
625.04	0.000	626.08	0.004	627.12	0.007
625.06	0.000	626.10	0.004	627.14	0.007
625.08	0.000	626.12	0.004	627.16	0.007
625.10	0.000	626.14	0.004	627.18	0.007
625.12	0.000	626.16	0.004	627.20	0.007
625.14	0.000	626.18	0.004	627.22	0.007
625.16	0.000	626.20	0.005	627.24	0.007
625.18	0.000	626.22	0.005	627.26	0.007
625.20	0.000	626.24	0.005	627.28	0.007
625.22	0.000	626.26	0.005	627.30	0.007
625.24	0.000	626.28	0.005	627.32	0.007
625.26	0.001	626.30	0.005	627.34	0.007
625.28	0.001	626.32	0.005	627.36	0.007
625.30	0.001	626.34	0.005	627.38	0.007
625.32	0.001	626.36	0.005	627.40	0.007
625.34	0.001	626.38	0.005	627.42	0.007
625.36	0.001	626.40	0.005	627.44	0.007
625.38	0.001	626.42	0.005	627.46	0.007
625.40	0.001	626.44	0.006	627.48	0.007
625.42	0.001	626.46	0.006	627.50	0.007
625.44	0.001	626.48	0.006	627.52	0.007
625.46	0.001	626.50	0.006	627.54	0.007
625.48	0.001	626.52	0.006	627.56	0.007
625.50	0.001	626.54	0.006	627.58	0.007
625.52	0.001	626.56	0.006	627.60	0.007
625.54	0.002	626.58	0.006	627.62	0.007
625.56	0.002	626.60	0.006	627.64	0.007
625.58	0.002	626.62	0.006	627.66	0.007
625.60	0.002	626.64	0.006		
625.62	0.002	626.66	0.006		
625.64	0.002	626.68	0.006		
625.66	0.002	626.70	0.007		
625.68	0.002	626.72	0.007		
625.70	0.002	626.74	0.007		
625.72	0.002	626.76	0.007		
625.74	0.002	626.78	0.007		
625.76	0.003	626.80	0.007		
625.78	0.003	626.82	0.007		
625.80	0.003	626.84	0.007		
625.82	0.003	626.86	0.007		
625.84	0.003	626.88	0.007		
625.86	0.003	626.90	0.007		
625.88	0.003	626.92	0.007		
625.90	0.003	626.94	0.007		
625.92	0.003	626.96	0.007		
625.94	0.003	626.98	0.007		
625.96	0.003	627.00	**0.007**		
625.98	0.004	627.02	0.007		
626.00	0.004	627.04	0.007		
626.02	0.004	627.06	0.007		

Subcatchment 1S: Lot 17

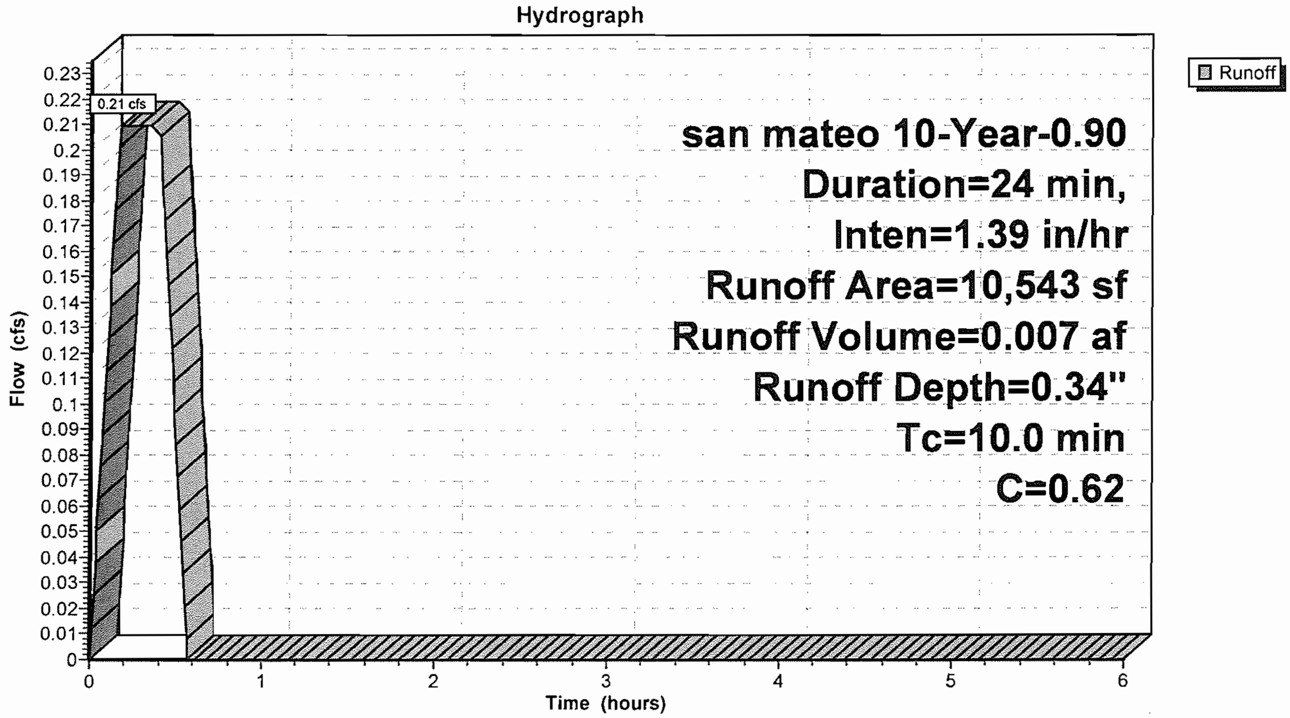
Runoff = 0.21 cfs @ 0.17 hrs, Volume= 0.007 af, Depth= 0.34"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
san mateo 10-Year-0.90 Duration=24 min, Inten=1.39 in/hr

Area (sf)	C	Description
4,217	0.95	Impervious Areas
6,326	0.40	Pervious Areas
10,543	0.62	Weighted Average
10,543	0.62	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, net increase**

Subcatchment 1S: Lot 17



Hydrograph for Subcatchment 1S: Lot 17

Time (hours)	Runoff (cfs)
0.00	0.00
0.05	0.06
0.10	0.13
0.15	**0.19**
0.20	**0.21**
0.25	0.21
0.30	0.21
0.35	0.21
0.40	0.21
0.45	0.15
0.50	0.08
0.55	0.02
0.60	0.00
0.65	0.00
0.70	0.00
0.75	0.00
0.80	0.00
0.85	0.00
0.90	0.00
0.95	0.00
1.00	0.00
1.05	0.00
1.10	0.00
1.15	0.00
1.20	0.00
1.25	0.00
1.30	0.00
1.35	0.00
1.40	0.00
1.45	0.00
1.50	0.00
1.55	0.00
1.60	0.00
1.65	0.00
1.70	0.00
1.75	0.00
1.80	0.00
1.85	0.00
1.90	0.00
1.95	0.00
2.00	0.00
2.05	0.00
2.10	0.00
2.15	0.00
2.20	0.00
2.25	0.00
2.30	0.00
2.35	0.00
2.40	0.00
2.45	0.00
2.50	0.00
2.55	0.00
2.60	0.00
2.65	0.00
2.70	0.00
2.75	0.00
2.80	0.00
2.85	0.00
2.90	0.00
2.95	0.00
3.00	0.00
3.05	0.00
3.10	0.00
3.15	0.00
3.20	0.00
3.25	0.00
3.30	0.00
3.35	0.00
3.40	0.00
3.45	0.00
3.50	0.00
3.55	0.00
3.60	0.00
3.65	0.00
3.70	0.00
3.75	0.00
3.80	0.00
3.85	0.00
3.90	0.00
3.95	0.00
4.00	0.00
4.05	0.00
4.10	0.00
4.15	0.00
4.20	0.00
4.25	0.00
4.30	0.00
4.35	0.00
4.40	0.00
4.45	0.00
4.50	0.00
4.55	0.00
4.60	0.00
4.65	0.00
4.70	0.00
4.75	0.00
4.80	0.00
4.85	0.00
4.90	0.00
4.95	0.00
5.00	0.00
5.05	0.00
5.10	0.00
5.15	0.00
5.20	0.00
5.25	0.00
5.30	0.00
5.35	0.00
5.40	0.00
5.45	0.00
5.50	0.00
5.55	0.00
5.60	0.00
5.65	0.00
5.70	0.00
5.75	0.00
5.80	0.00
5.85	0.00
5.90	0.00
5.95	0.00
6.00	0.00

Pond 5P: detention basin

Inflow Area =	0.242 ac,	Inflow Depth = 0.34"	for 10-Year-0.90 event	
Inflow =	0.21 cfs @	0.17 hrs, Volume=	0.007 af	
Outflow =	0.11 cfs @	0.48 hrs, Volume=	0.007 af,	Atten= 49%, Lag= 18.7 min
Primary =	0.11 cfs @	0.48 hrs, Volume=	0.007 af	
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 626.02' @ 0.48 hrs Surf.Area= 0.005 ac Storage= 0.004 af

Plug-Flow detention time= 17.0 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 17.0 min (34.0 - 17.0)

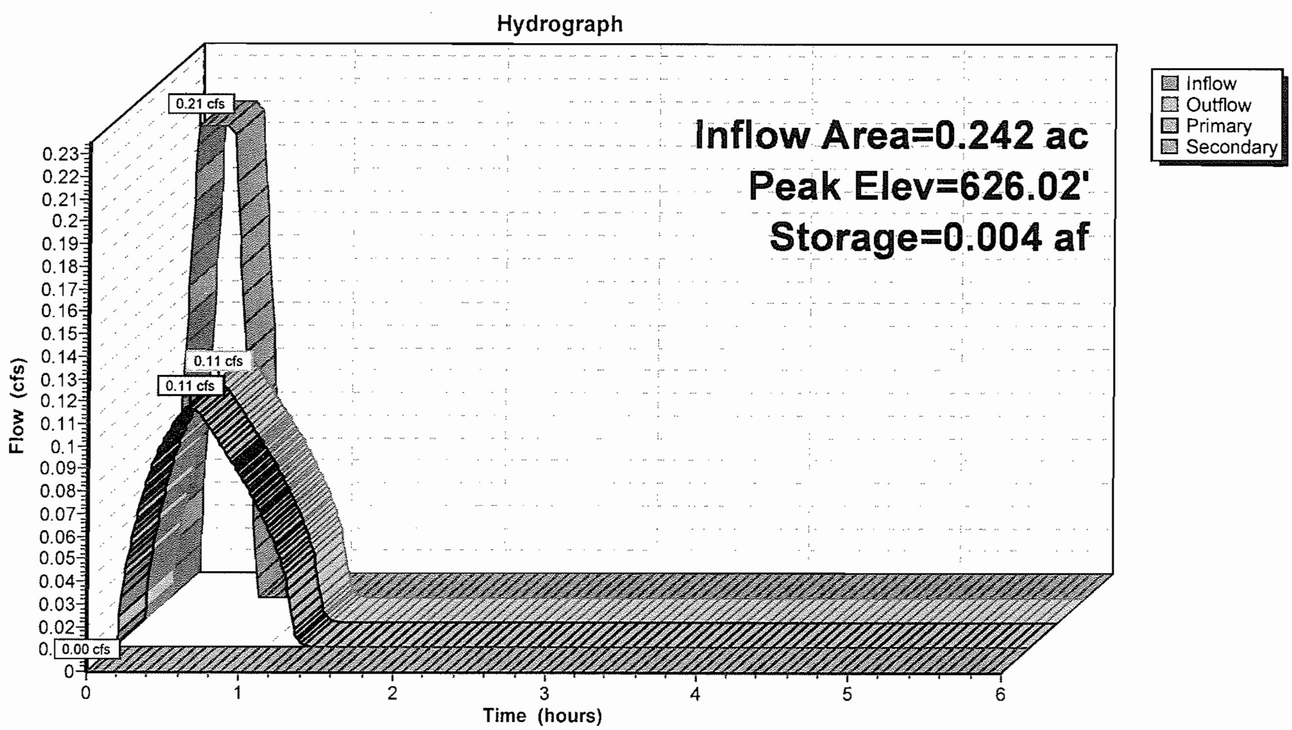
Volume	Invert	Avail.Storage	Storage Description
#1	625.00'	0.007 af	**24.0"D x 50.00'L Horizontal Cylinder**x 2

Device	Routing	Invert	Outlet Devices
#1	Primary	625.00'	**2.0" Horiz. Orifice/Grate 2.0"** Limited to weir flow C= 0.600
#2	Secondary	627.00'	**8.0" Vert. Orifice/Grate** C= 0.600

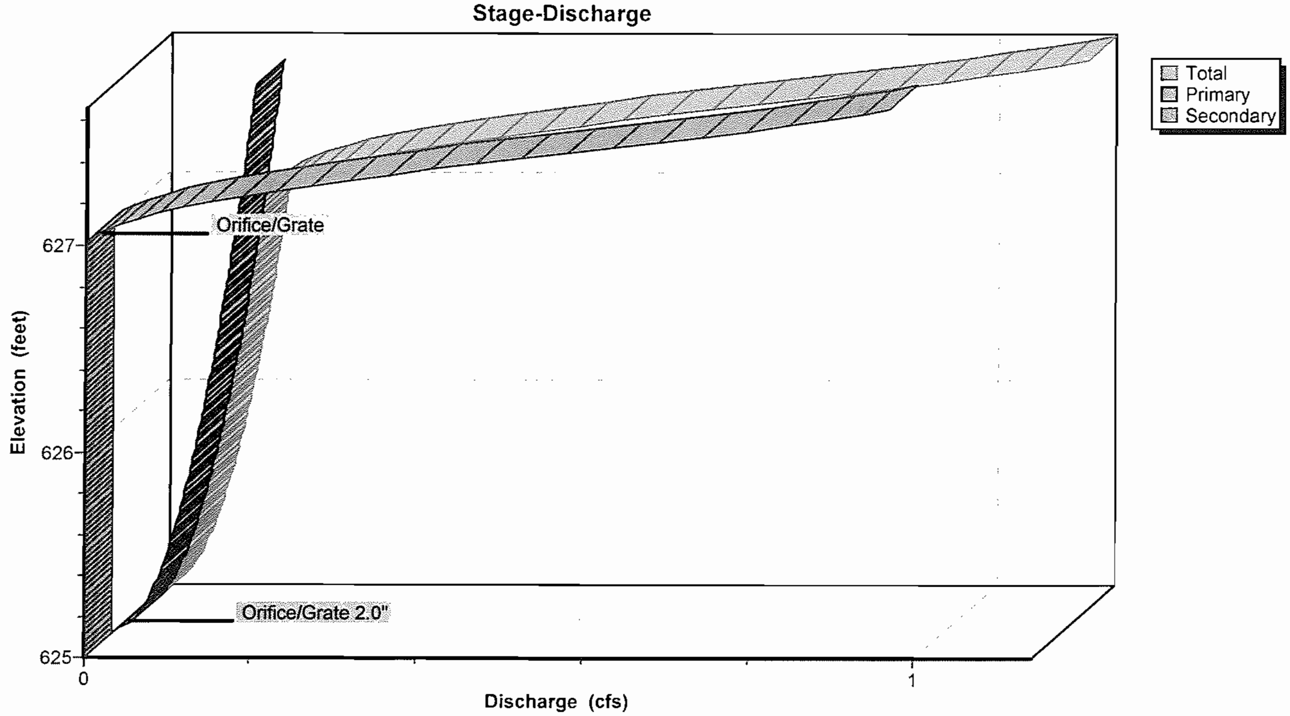
Primary OutFlow Max=0.11 cfs @ 0.48 hrs HW=626.02' (Free Discharge)
└─**1=Orifice/Grate 2.0"** (Orifice Controls 0.11 cfs @ 4.86 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=625.00' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

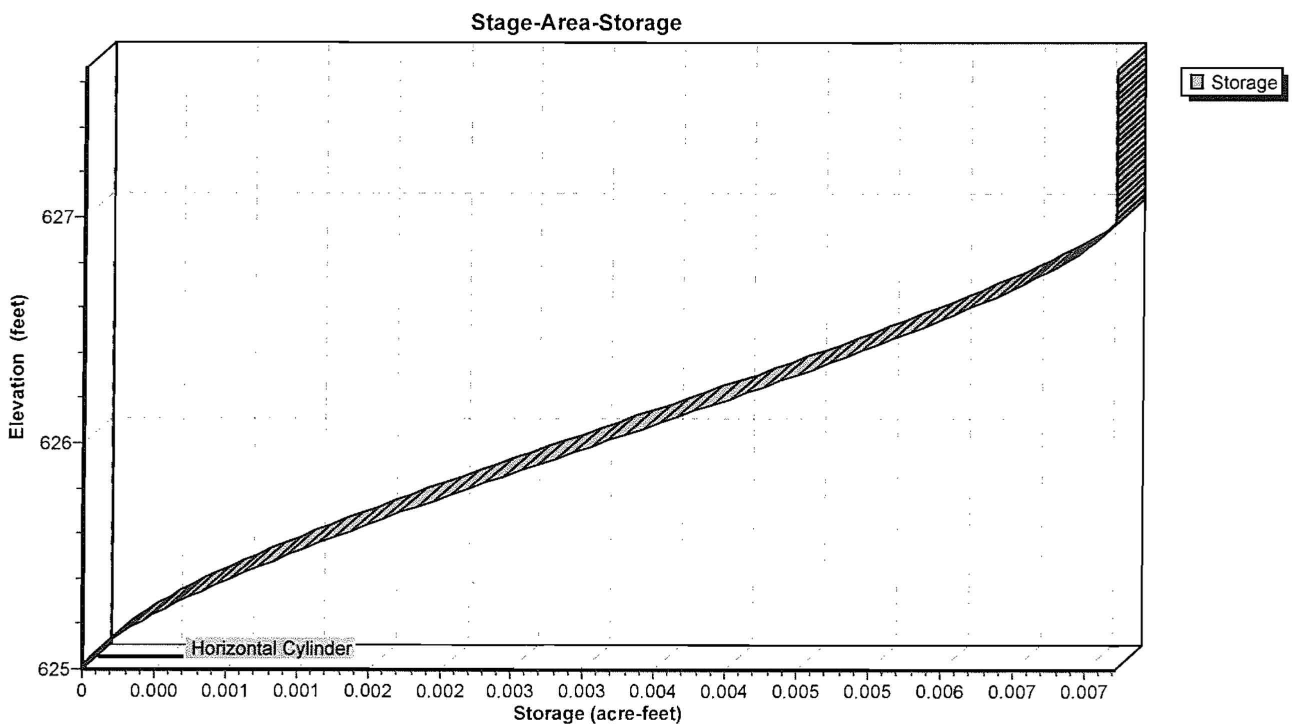
Pond 5P: detention basin



Pond 5P: detention basin



Pond 5P: detention basin



Hydrograph for Pond 5P: detention basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	**0.00**	0.000	625.00	0.00	0.00	**0.00**
0.20	**0.21**	0.001	625.48	0.07	0.07	0.00
0.40	0.21	**0.003**	**625.94**	**0.10**	**0.10**	0.00
0.60	0.00	**0.003**	**625.88**	**0.10**	**0.10**	0.00
0.80	0.00	0.002	625.55	0.08	0.08	0.00
1.00	0.00	0.001	625.25	0.05	0.05	0.00
1.20	0.00	0.000	625.01	0.00	0.00	0.00
1.40	0.00	0.000	625.00	0.00	0.00	0.00
1.60	0.00	0.000	625.00	0.00	0.00	0.00
1.80	0.00	0.000	625.00	0.00	0.00	0.00
2.00	0.00	0.000	625.00	0.00	0.00	0.00
2.20	0.00	0.000	625.00	0.00	0.00	0.00
2.40	0.00	0.000	625.00	0.00	0.00	0.00
2.60	0.00	0.000	625.00	0.00	0.00	0.00
2.80	0.00	0.000	625.00	0.00	0.00	0.00
3.00	0.00	0.000	625.00	0.00	0.00	0.00
3.20	0.00	0.000	625.00	0.00	0.00	0.00
3.40	0.00	0.000	625.00	0.00	0.00	0.00
3.60	0.00	0.000	625.00	0.00	0.00	0.00
3.80	0.00	0.000	625.00	0.00	0.00	0.00
4.00	0.00	0.000	625.00	0.00	0.00	0.00
4.20	0.00	0.000	625.00	0.00	0.00	0.00
4.40	0.00	0.000	625.00	0.00	0.00	0.00
4.60	0.00	0.000	625.00	0.00	0.00	0.00
4.80	0.00	0.000	625.00	0.00	0.00	0.00
5.00	0.00	0.000	625.00	0.00	0.00	0.00
5.20	0.00	0.000	625.00	0.00	0.00	0.00
5.40	0.00	0.000	625.00	0.00	0.00	0.00
5.60	0.00	0.000	625.00	0.00	0.00	0.00
5.80	0.00	0.000	625.00	0.00	0.00	0.00
6.00	0.00	0.000	625.00	0.00	0.00	0.00

Stage-Discharge for Pond 5P: detention basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
625.00	0.00	0.00	0.00
625.05	0.02	0.02	0.00
625.10	0.03	0.03	0.00
625.15	0.04	0.04	0.00
625.20	0.05	0.05	0.00
625.25	0.05	0.05	0.00
625.30	0.06	0.06	0.00
625.35	0.06	0.06	0.00
625.40	0.07	0.07	0.00
625.45	0.07	0.07	0.00
625.50	0.07	0.07	0.00
625.55	0.08	0.08	0.00
625.60	0.08	0.08	0.00
625.65	0.08	0.08	0.00
625.70	0.09	0.09	0.00
625.75	0.09	0.09	0.00
625.80	0.09	0.09	0.00
625.85	0.10	0.10	0.00
625.90	0.10	0.10	0.00
625.95	0.10	0.10	0.00
626.00	0.11	0.11	0.00
626.05	0.11	0.11	0.00
626.10	0.11	0.11	0.00
626.15	0.11	0.11	0.00
626.20	0.12	0.12	0.00
626.25	0.12	0.12	0.00
626.30	0.12	0.12	0.00
626.35	0.12	0.12	0.00
626.40	0.12	0.12	0.00
626.45	0.13	0.13	0.00
626.50	0.13	0.13	0.00
626.55	0.13	0.13	0.00
626.60	0.13	0.13	0.00
626.65	0.13	0.13	0.00
626.70	0.14	0.14	0.00
626.75	0.14	0.14	0.00
626.80	0.14	0.14	0.00
626.85	0.14	0.14	0.00
626.90	0.14	0.14	0.00
626.95	0.15	0.15	0.00
627.00	0.15	0.15	0.00
627.05	0.16	0.15	0.01
627.10	0.19	0.15	0.04
627.15	0.23	0.15	0.08
627.20	0.29	0.16	0.13
627.25	0.36	0.16	0.20
627.30	0.44	0.16	0.28
627.35	0.53	0.16	0.37
627.40	0.63	0.16	0.47
627.45	0.74	0.16	0.57
627.50	0.84	0.17	0.68
627.55	0.95	0.17	0.78
627.60	1.04	0.17	0.87
627.65	**1.12**	**0.17**	**0.95**

Stage-Area-Storage for Pond 5P: detention basin

Elevation (feet)	Storage (acre-feet)
625.00	0.000
625.02	0.000
625.04	0.000
625.06	0.000
625.08	0.000
625.10	0.000
625.12	0.000
625.14	0.000
625.16	0.000
625.18	0.000
625.20	0.000
625.22	0.000
625.24	0.000
625.26	0.001
625.28	0.001
625.30	0.001
625.32	0.001
625.34	0.001
625.36	0.001
625.38	0.001
625.40	0.001
625.42	0.001
625.44	0.001
625.46	0.001
625.48	0.001
625.50	0.001
625.52	0.001
625.54	0.002
625.56	0.002
625.58	0.002
625.60	0.002
625.62	0.002
625.64	0.002
625.66	0.002
625.68	0.002
625.70	0.002
625.72	0.002
625.74	0.002
625.76	0.003
625.78	0.003
625.80	0.003
625.82	0.003
625.84	0.003
625.86	0.003
625.88	0.003
625.90	0.003
625.92	0.003
625.94	0.003
625.96	0.003
625.98	0.004
626.00	0.004
626.02	0.004
626.04	0.004
626.06	0.004
626.08	0.004
626.10	0.004
626.12	0.004
626.14	0.004
626.16	0.004
626.18	0.004
626.20	0.005
626.22	0.005
626.24	0.005
626.26	0.005
626.28	0.005
626.30	0.005
626.32	0.005
626.34	0.005
626.36	0.005
626.38	0.005
626.40	0.005
626.42	0.005
626.44	0.006
626.46	0.006
626.48	0.006
626.50	0.006
626.52	0.006
626.54	0.006
626.56	0.006
626.58	0.006
626.60	0.006
626.62	0.006
626.64	0.006
626.66	0.006
626.68	0.006
626.70	0.007
626.72	0.007
626.74	0.007
626.76	0.007
626.78	0.007
626.80	0.007
626.82	0.007
626.84	0.007
626.86	0.007
626.88	0.007
626.90	0.007
626.92	0.007
626.94	0.007
626.96	0.007
626.98	0.007
627.00	**0.007**
627.02	0.007
627.04	0.007
627.06	0.007
627.08	0.007
627.10	0.007
627.12	0.007
627.14	0.007
627.16	0.007
627.18	0.007
627.20	0.007
627.22	0.007
627.24	0.007
627.26	0.007
627.28	0.007
627.30	0.007
627.32	0.007
627.34	0.007
627.36	0.007
627.38	0.007
627.40	0.007
627.42	0.007
627.44	0.007
627.46	0.007
627.48	0.007
627.50	0.007
627.52	0.007
627.54	0.007
627.56	0.007
627.58	0.007
627.60	0.007
627.62	0.007
627.64	0.007
627.66	0.007

Subcatchment 1S: Lot 18

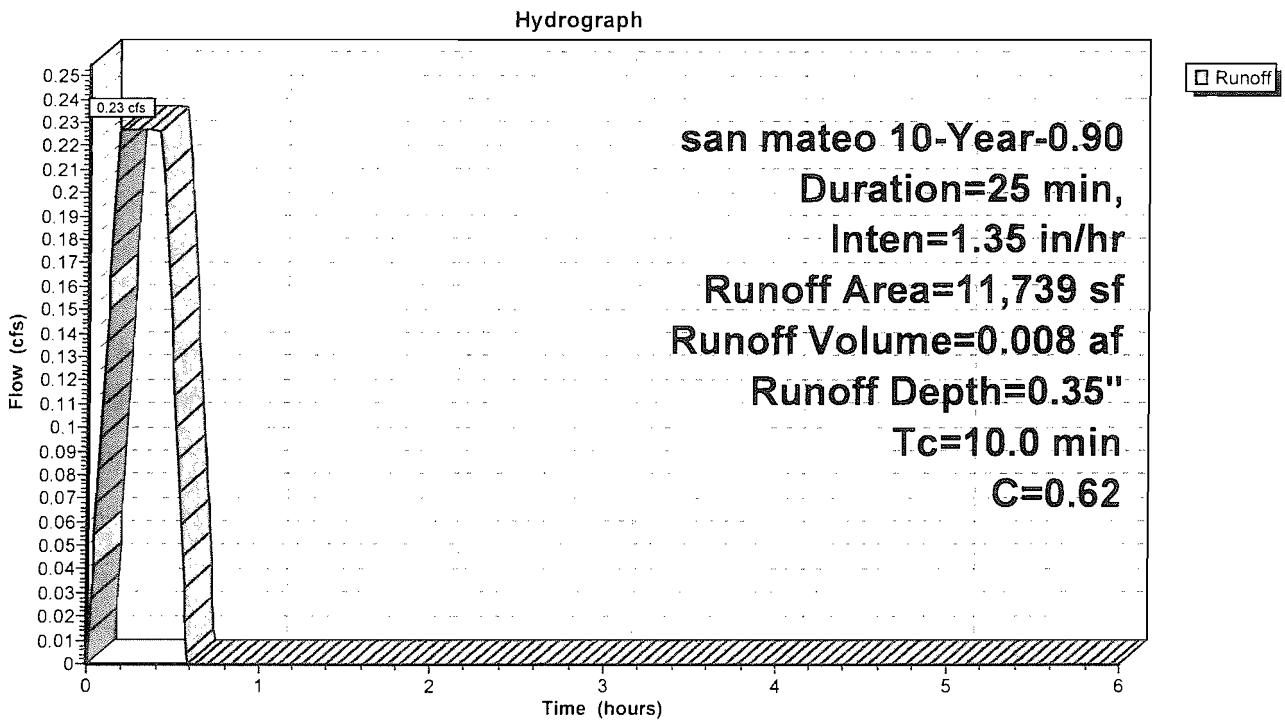
Runoff = 0.23 cfs @ 0.17 hrs, Volume= 0.008 af, Depth= 0.35"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
san mateo 10-Year-0.90 Duration=25 min, Inten=1.35 in/hr

Area (sf)	C	Description
4,696	0.95	Impervious Areas
7,043	0.40	Pervious Areas
11,739	0.62	Weighted Average
11,739	0.62	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, net increase**

Subcatchment 1S: Lot 18



Hydrograph for Subcatchment 1S: Lot 18

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.60	0.00	5.20	0.00
0.05	0.07	2.65	0.00	5.25	0.00
0.10	0.14	2.70	0.00	5.30	0.00
0.15	**0.20**	2.75	0.00	5.35	0.00
0.20	**0.23**	2.80	0.00	5.40	0.00
0.25	0.23	2.85	0.00	5.45	0.00
0.30	0.23	2.90	0.00	5.50	0.00
0.35	0.23	2.95	0.00	5.55	0.00
0.40	0.23	3.00	0.00	5.60	0.00
0.45	0.18	3.05	0.00	5.65	0.00
0.50	0.11	3.10	0.00	5.70	0.00
0.55	0.05	3.15	0.00	5.75	0.00
0.60	0.00	3.20	0.00	5.80	0.00
0.65	0.00	3.25	0.00	5.85	0.00
0.70	0.00	3.30	0.00	5.90	0.00
0.75	0.00	3.35	0.00	5.95	0.00
0.80	0.00	3.40	0.00	6.00	0.00
0.85	0.00	3.45	0.00		
0.90	0.00	3.50	0.00		
0.95	0.00	3.55	0.00		
1.00	0.00	3.60	0.00		
1.05	0.00	3.65	0.00		
1.10	0.00	3.70	0.00		
1.15	0.00	3.75	0.00		
1.20	0.00	3.80	0.00		
1.25	0.00	3.85	0.00		
1.30	0.00	3.90	0.00		
1.35	0.00	3.95	0.00		
1.40	0.00	4.00	0.00		
1.45	0.00	4.05	0.00		
1.50	0.00	4.10	0.00		
1.55	0.00	4.15	0.00		
1.60	0.00	4.20	0.00		
1.65	0.00	4.25	0.00		
1.70	0.00	4.30	0.00		
1.75	0.00	4.35	0.00		
1.80	0.00	4.40	0.00		
1.85	0.00	4.45	0.00		
1.90	0.00	4.50	0.00		
1.95	0.00	4.55	0.00		
2.00	0.00	4.60	0.00		
2.05	0.00	4.65	0.00		
2.10	0.00	4.70	0.00		
2.15	0.00	4.75	0.00		
2.20	0.00	4.80	0.00		
2.25	0.00	4.85	0.00		
2.30	0.00	4.90	0.00		
2.35	0.00	4.95	0.00		
2.40	0.00	5.00	0.00		
2.45	0.00	5.05	0.00		
2.50	0.00	5.10	0.00		
2.55	0.00	5.15	0.00		

Pond 5P: detention basin

Inflow Area =	0.269 ac,	Inflow Depth = 0.35"	for 10-Year-0.90 event	
Inflow =	0.23 cfs @	0.17 hrs, Volume=	0.008 af	
Outflow =	0.11 cfs @	0.50 hrs, Volume=	0.008 af,	Atten= 51%, Lag= 19.9 min
Primary =	0.11 cfs @	0.50 hrs, Volume=	0.008 af	
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 626.15' @ 0.50 hrs Surf.Area= 0.005 ac Storage= 0.004 af

Plug-Flow detention time= 18.6 min calculated for 0.008 af (100% of inflow)
Center-of-Mass det. time= 18.6 min (36.1 - 17.5)

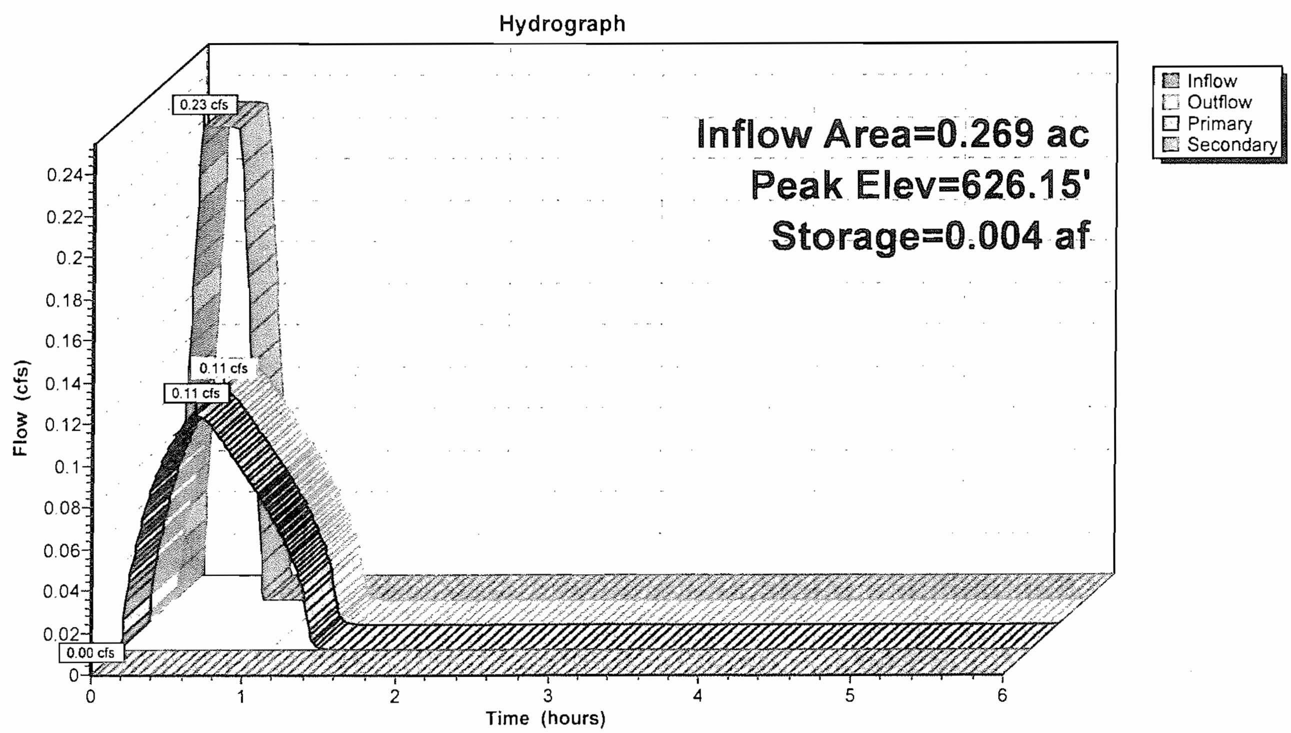
Volume	Invert	Avail.Storage	Storage Description
#1	625.00'	0.007 af	**24.0"D x 50.00'L Horizontal Cylinder**x 2

Device	Routing	Invert	Outlet Devices
#1	Primary	625.00'	**2.0" Horiz. Orifice/Grate 2.0"** Limited to weir flow C= 0.600
#2	Secondary	627.00'	**8.0" Vert. Orifice/Grate** C= 0.600

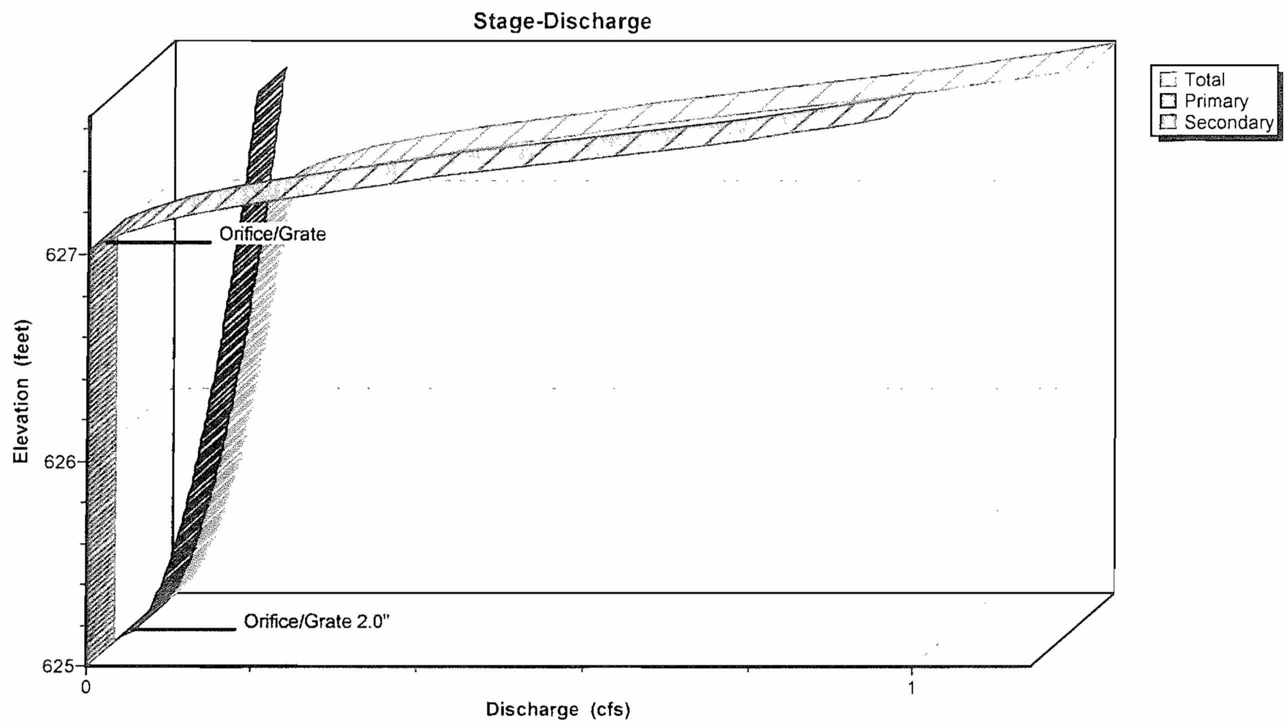
Primary OutFlow Max=0.11 cfs @ 0.50 hrs HW=626.15' (Free Discharge)
└─**1=Orifice/Grate 2.0"** (Orifice Controls 0.11 cfs @ 5.16 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=625.00' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

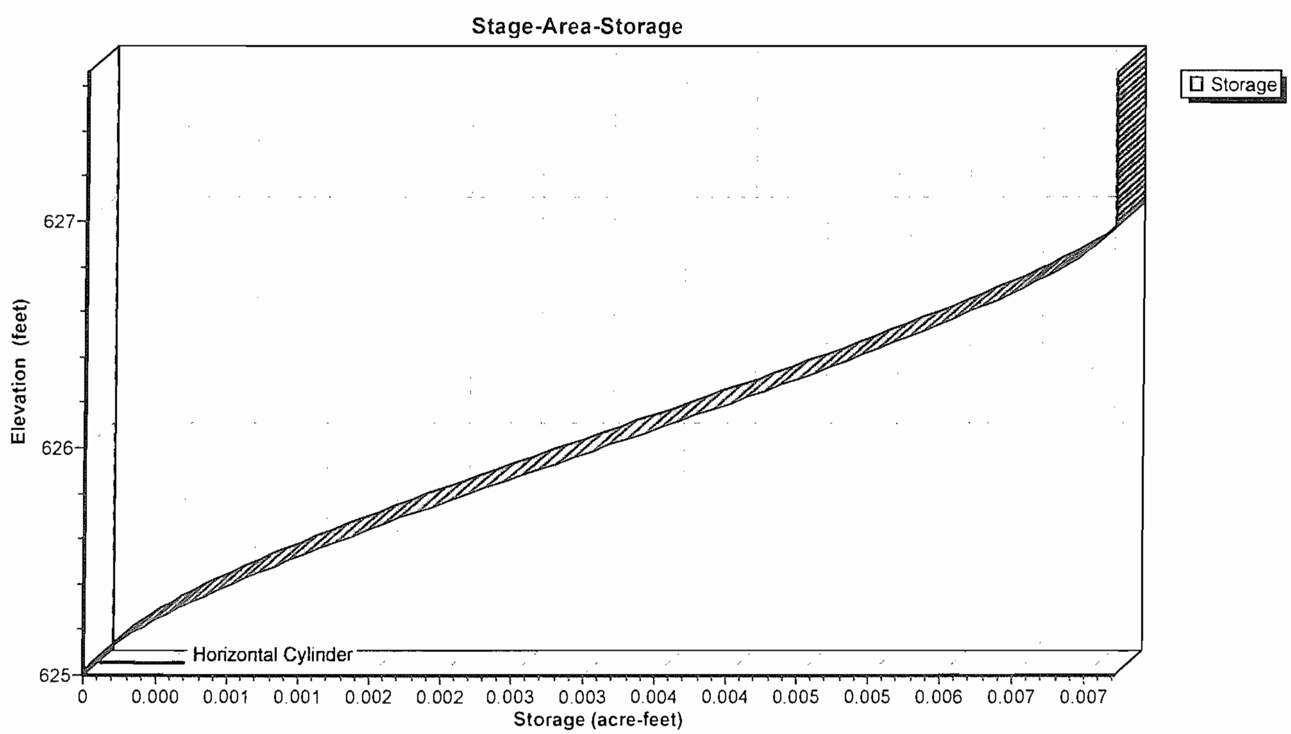
Pond 5P: detention basin



Pond 5P: detention basin



Pond 5P: detention basin



Hydrograph for Pond 5P: detention basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	**0.00**	0.000	625.00	0.00	0.00	**0.00**
0.20	**0.23**	0.001	625.52	0.08	0.08	0.00
0.40	0.23	**0.004**	**626.02**	**0.11**	**0.11**	0.00
0.60	0.00	**0.004**	**626.03**	**0.11**	**0.11**	0.00
0.80	0.00	0.002	625.68	0.09	0.09	0.00
1.00	0.00	0.001	625.37	0.06	0.06	0.00
1.20	0.00	0.000	625.08	0.03	0.03	0.00
1.40	0.00	0.000	625.00	0.00	0.00	0.00
1.60	0.00	0.000	625.00	0.00	0.00	0.00
1.80	0.00	0.000	625.00	0.00	0.00	0.00
2.00	0.00	0.000	625.00	0.00	0.00	0.00
2.20	0.00	0.000	625.00	0.00	0.00	0.00
2.40	0.00	0.000	625.00	0.00	0.00	0.00
2.60	0.00	0.000	625.00	0.00	0.00	0.00
2.80	0.00	0.000	625.00	0.00	0.00	0.00
3.00	0.00	0.000	625.00	0.00	0.00	0.00
3.20	0.00	0.000	625.00	0.00	0.00	0.00
3.40	0.00	0.000	625.00	0.00	0.00	0.00
3.60	0.00	0.000	625.00	0.00	0.00	0.00
3.80	0.00	0.000	625.00	0.00	0.00	0.00
4.00	0.00	0.000	625.00	0.00	0.00	0.00
4.20	0.00	0.000	625.00	0.00	0.00	0.00
4.40	0.00	0.000	625.00	0.00	0.00	0.00
4.60	0.00	0.000	625.00	0.00	0.00	0.00
4.80	0.00	0.000	625.00	0.00	0.00	0.00
5.00	0.00	0.000	625.00	0.00	0.00	0.00
5.20	0.00	0.000	625.00	0.00	0.00	0.00
5.40	0.00	0.000	625.00	0.00	0.00	0.00
5.60	0.00	0.000	625.00	0.00	0.00	0.00
5.80	0.00	0.000	625.00	0.00	0.00	0.00
6.00	0.00	0.000	625.00	0.00	0.00	0.00

Stage-Discharge for Pond 5P: detention basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
625.00	0.00	0.00	0.00
625.05	0.02	0.02	0.00
625.10	0.03	0.03	0.00
625.15	0.04	0.04	0.00
625.20	0.05	0.05	0.00
625.25	0.05	0.05	0.00
625.30	0.06	0.06	0.00
625.35	0.06	0.06	0.00
625.40	0.07	0.07	0.00
625.45	0.07	0.07	0.00
625.50	0.07	0.07	0.00
625.55	0.08	0.08	0.00
625.60	0.08	0.08	0.00
625.65	0.08	0.08	0.00
625.70	0.09	0.09	0.00
625.75	0.09	0.09	0.00
625.80	0.09	0.09	0.00
625.85	0.10	0.10	0.00
625.90	0.10	0.10	0.00
625.95	0.10	0.10	0.00
626.00	0.11	0.11	0.00
626.05	0.11	0.11	0.00
626.10	0.11	0.11	0.00
626.15	0.11	0.11	0.00
626.20	0.12	0.12	0.00
626.25	0.12	0.12	0.00
626.30	0.12	0.12	0.00
626.35	0.12	0.12	0.00
626.40	0.12	0.12	0.00
626.45	0.13	0.13	0.00
626.50	0.13	0.13	0.00
626.55	0.13	0.13	0.00
626.60	0.13	0.13	0.00
626.65	0.13	0.13	0.00
626.70	0.14	0.14	0.00
626.75	0.14	0.14	0.00
626.80	0.14	0.14	0.00
626.85	0.14	0.14	0.00
626.90	0.14	0.14	0.00
626.95	0.15	0.15	0.00
627.00	0.15	0.15	0.00
627.05	0.16	0.15	0.01
627.10	0.19	0.15	0.04
627.15	0.23	0.15	0.08
627.20	0.29	0.16	0.13
627.25	0.36	0.16	0.20
627.30	0.44	0.16	0.28
627.35	0.53	0.16	0.37
627.40	0.63	0.16	0.47
627.45	0.74	0.16	0.57
627.50	0.84	0.17	0.68
627.55	0.95	0.17	0.78
627.60	1.04	0.17	0.87
627.65	**1.12**	**0.17**	**0.95**

Stage-Area-Storage for Pond 5P: detention basin

Elevation (feet)	Storage (acre-feet)
625.00	0.000
625.02	0.000
625.04	0.000
625.06	0.000
625.08	0.000
625.10	0.000
625.12	0.000
625.14	0.000
625.16	0.000
625.18	0.000
625.20	0.000
625.22	0.000
625.24	0.000
625.26	0.001
625.28	0.001
625.30	0.001
625.32	0.001
625.34	0.001
625.36	0.001
625.38	0.001
625.40	0.001
625.42	0.001
625.44	0.001
625.46	0.001
625.48	0.001
625.50	0.001
625.52	0.001
625.54	0.002
625.56	0.002
625.58	0.002
625.60	0.002
625.62	0.002
625.64	0.002
625.66	0.002
625.68	0.002
625.70	0.002
625.72	0.002
625.74	0.002
625.76	0.003
625.78	0.003
625.80	0.003
625.82	0.003
625.84	0.003
625.86	0.003
625.88	0.003
625.90	0.003
625.92	0.003
625.94	0.003
625.96	0.003
625.98	0.004
626.00	0.004
626.02	0.004
626.04	0.004
626.06	0.004
626.08	0.004
626.10	0.004
626.12	0.004
626.14	0.004
626.16	0.004
626.18	0.004
626.20	0.005
626.22	0.005
626.24	0.005
626.26	0.005
626.28	0.005
626.30	0.005
626.32	0.005
626.34	0.005
626.36	0.005
626.38	0.005
626.40	0.005
626.42	0.005
626.44	0.006
626.46	0.006
626.48	0.006
626.50	0.006
626.52	0.006
626.54	0.006
626.56	0.006
626.58	0.006
626.60	0.006
626.62	0.006
626.64	0.006
626.66	0.006
626.68	0.006
626.70	0.007
626.72	0.007
626.74	0.007
626.76	0.007
626.78	0.007
626.80	0.007
626.82	0.007
626.84	0.007
626.86	0.007
626.88	0.007
626.90	0.007
626.92	0.007
626.94	0.007
626.96	0.007
626.98	0.007
627.00	**0.007**
627.02	0.007
627.04	0.007
627.06	0.007
627.08	0.007
627.10	0.007
627.12	0.007
627.14	0.007
627.16	0.007
627.18	0.007
627.20	0.007
627.22	0.007
627.24	0.007
627.26	0.007
627.28	0.007
627.30	0.007
627.32	0.007
627.34	0.007
627.36	0.007
627.38	0.007
627.40	0.007
627.42	0.007
627.44	0.007
627.46	0.007
627.48	0.007
627.50	0.007
627.52	0.007
627.54	0.007
627.56	0.007
627.58	0.007
627.60	0.007
627.62	0.007
627.64	0.007
627.66	0.007

Subcatchment 1S: Lot 19

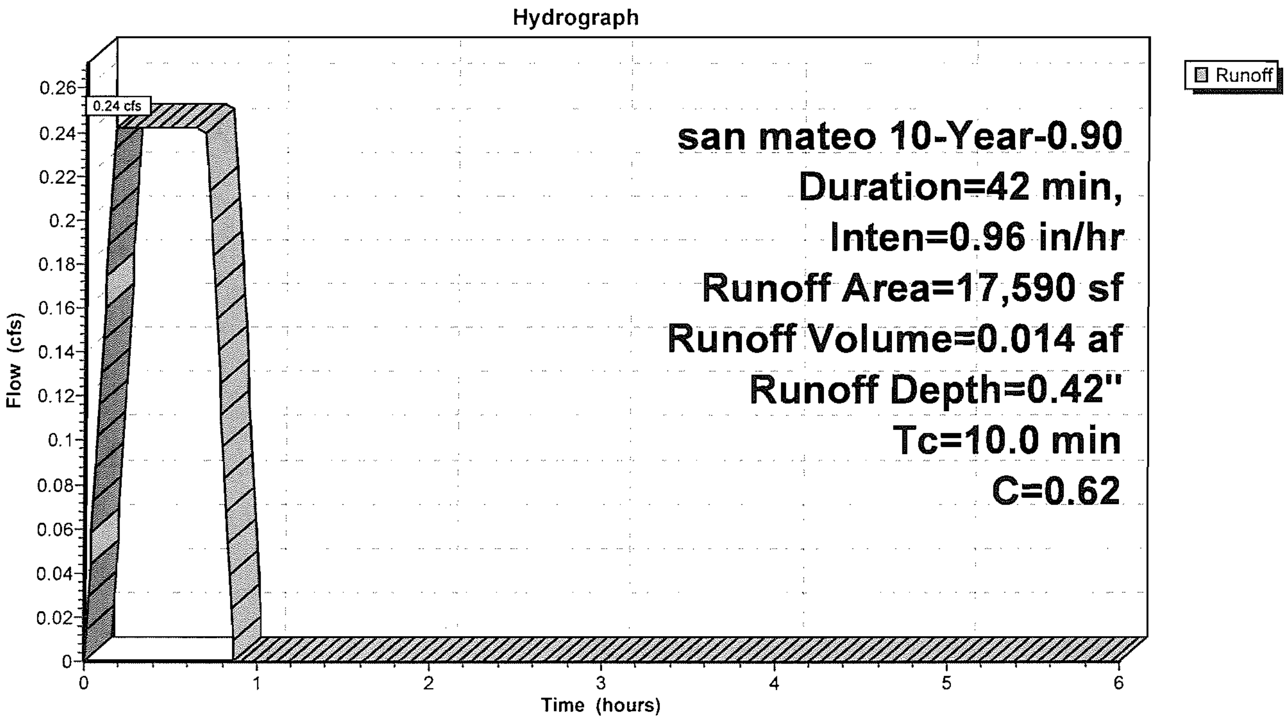
Runoff = 0.24 cfs @ 0.17 hrs, Volume= 0.014 af, Depth= 0.42"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
san mateo 10-Year-0.90 Duration=42 min, Inten=0.96 in/hr

Area (sf)	C	Description
7,036	0.95	Impervious Areas
10,554	0.40	Pervious Areas
17,590	0.62	Weighted Average
17,590	0.62	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, net increase**

Subcatchment 1S: Lot 19



Hydrograph for Subcatchment 1S: Lot 19

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.60	0.00	5.20	0.00
0.05	0.07	2.65	0.00	5.25	0.00
0.10	0.15	2.70	0.00	5.30	0.00
0.15	**0.22**	2.75	0.00	5.35	0.00
0.20	**0.24**	2.80	0.00	5.40	0.00
0.25	0.24	2.85	0.00	5.45	0.00
0.30	0.24	2.90	0.00	5.50	0.00
0.35	0.24	2.95	0.00	5.55	0.00
0.40	0.24	3.00	0.00	5.60	0.00
0.45	0.24	3.05	0.00	5.65	0.00
0.50	0.24	3.10	0.00	5.70	0.00
0.55	0.24	3.15	0.00	5.75	0.00
0.60	0.24	3.20	0.00	5.80	0.00
0.65	0.24	3.25	0.00	5.85	0.00
0.70	0.24	3.30	0.00	5.90	0.00
0.75	0.17	3.35	0.00	5.95	0.00
0.80	0.10	3.40	0.00	6.00	0.00
0.85	0.02	3.45	0.00		
0.90	0.00	3.50	0.00		
0.95	0.00	3.55	0.00		
1.00	0.00	3.60	0.00		
1.05	0.00	3.65	0.00		
1.10	0.00	3.70	0.00		
1.15	0.00	3.75	0.00		
1.20	0.00	3.80	0.00		
1.25	0.00	3.85	0.00		
1.30	0.00	3.90	0.00		
1.35	0.00	3.95	0.00		
1.40	0.00	4.00	0.00		
1.45	0.00	4.05	0.00		
1.50	0.00	4.10	0.00		
1.55	0.00	4.15	0.00		
1.60	0.00	4.20	0.00		
1.65	0.00	4.25	0.00		
1.70	0.00	4.30	0.00		
1.75	0.00	4.35	0.00		
1.80	0.00	4.40	0.00		
1.85	0.00	4.45	0.00		
1.90	0.00	4.50	0.00		
1.95	0.00	4.55	0.00		
2.00	0.00	4.60	0.00		
2.05	0.00	4.65	0.00		
2.10	0.00	4.70	0.00		
2.15	0.00	4.75	0.00		
2.20	0.00	4.80	0.00		
2.25	0.00	4.85	0.00		
2.30	0.00	4.90	0.00		
2.35	0.00	4.95	0.00		
2.40	0.00	5.00	0.00		
2.45	0.00	5.05	0.00		
2.50	0.00	5.10	0.00		
2.55	0.00	5.15	0.00		

Pond 5P: detention basin

Inflow Area =	0.404 ac,	Inflow Depth = 0.42"	for 10-Year-0.90 event	
Inflow =	0.24 cfs @	0.17 hrs, Volume=	0.014 af	
Outflow =	0.12 cfs @	0.78 hrs, Volume=	0.014 af,	Atten= 51%, Lag= 36.9 min
Primary =	0.12 cfs @	0.78 hrs, Volume=	0.014 af	
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 626.30' @ 0.78 hrs Surf.Area= 0.008 ac Storage= 0.008 af

Plug-Flow detention time= 32.5 min calculated for 0.014 af (100% of inflow)
Center-of-Mass det. time= 32.5 min (58.5 - 26.0)

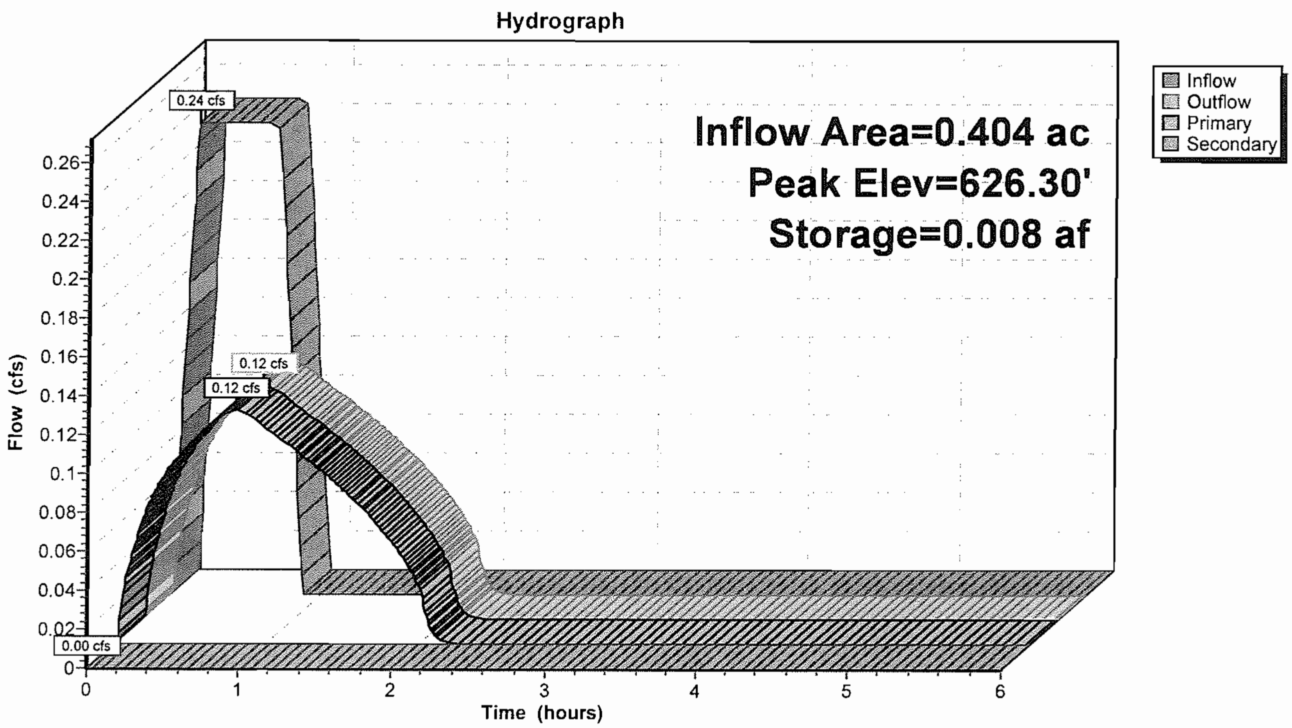
Volume	Invert	Avail.Storage	Storage Description
#1	625.00'	0.019 af	**36.0"D x 60.00'L Horizontal Cylinder**x 2

Device	Routing	Invert	Outlet Devices
#1	Primary	625.00'	**2.0" Horiz. Orifice/Grate 2.0"** Limited to weir flow C= 0.600
#2	Secondary	628.00'	**8.0" Vert. Orifice/Grate** C= 0.600

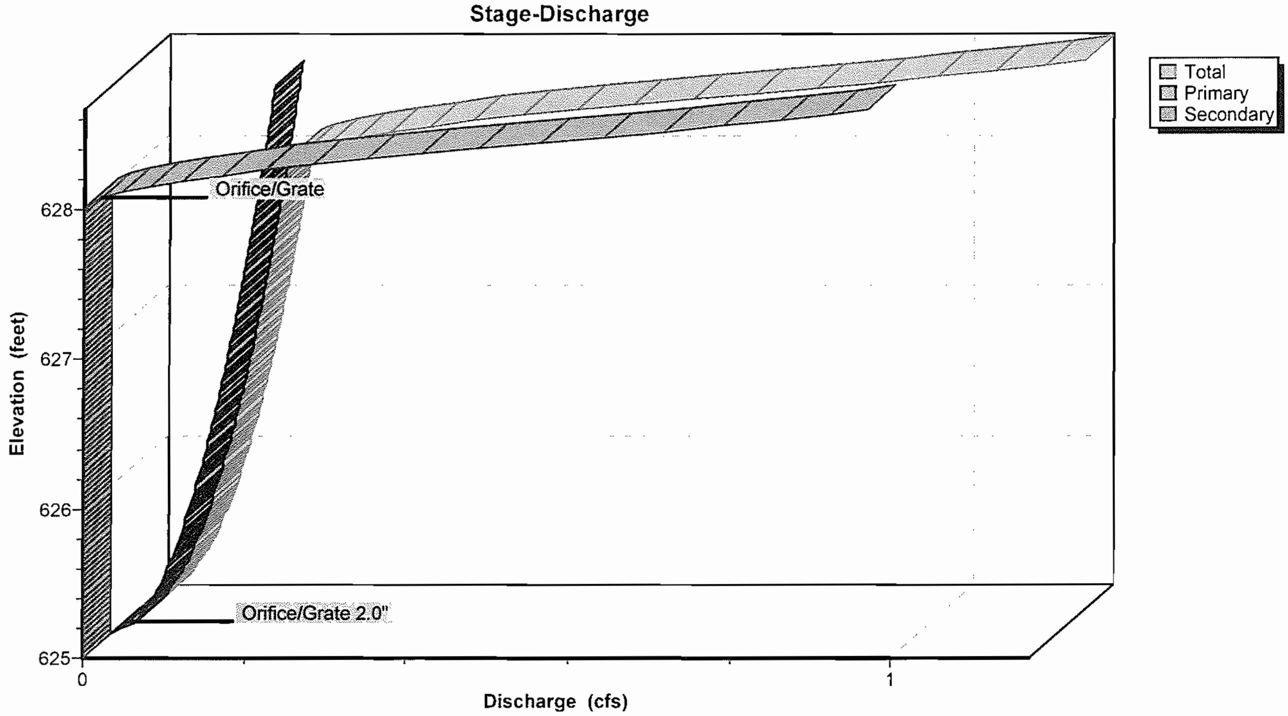
Primary OutFlow Max=0.12 cfs @ 0.78 hrs HW=626.30' (Free Discharge)
└─**1=Orifice/Grate 2.0"** (Orifice Controls 0.12 cfs @ 5.49 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=625.00' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

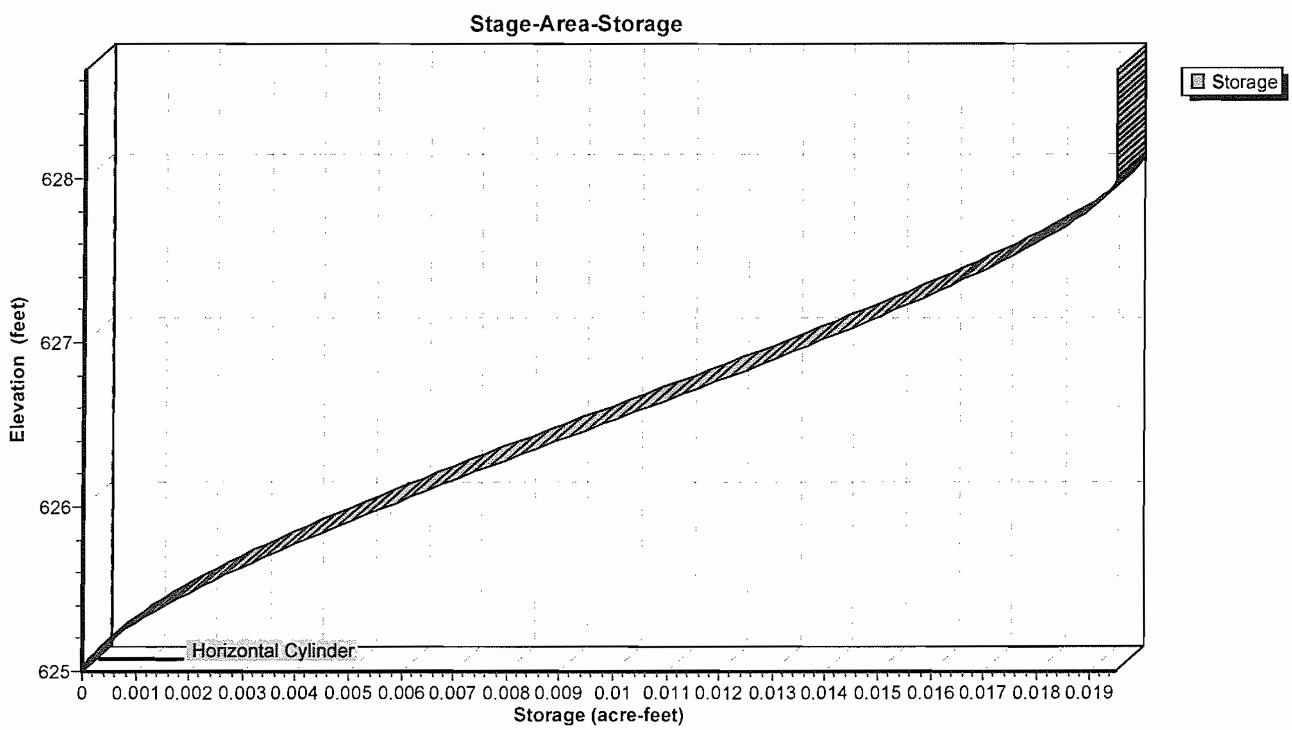
Pond 5P: detention basin



Pond 5P: detention basin



Pond 5P: detention basin



Hydrograph for Pond 5P: detention basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	**0.00**	0.000	625.00	0.00	0.00	**0.00**
0.20	**0.24**	0.002	625.43	0.07	0.07	0.00
0.40	0.24	0.004	625.82	0.10	0.10	0.00
0.60	0.24	**0.007**	**626.12**	**0.11**	**0.11**	0.00
0.80	0.10	**0.008**	**626.30**	**0.12**	**0.12**	0.00
1.00	0.00	0.006	626.10	0.11	0.11	0.00
1.20	0.00	0.005	625.88	0.10	0.10	0.00
1.40	0.00	0.003	625.66	0.09	0.09	0.00
1.60	0.00	0.002	625.46	0.07	0.07	0.00
1.80	0.00	0.001	625.27	0.05	0.05	0.00
2.00	0.00	0.000	625.08	0.03	0.03	0.00
2.20	0.00	0.000	625.00	0.00	0.00	0.00
2.40	0.00	0.000	625.00	0.00	0.00	0.00
2.60	0.00	0.000	625.00	0.00	0.00	0.00
2.80	0.00	0.000	625.00	0.00	0.00	0.00
3.00	0.00	0.000	625.00	0.00	0.00	0.00
3.20	0.00	0.000	625.00	0.00	0.00	0.00
3.40	0.00	0.000	625.00	0.00	0.00	0.00
3.60	0.00	0.000	625.00	0.00	0.00	0.00
3.80	0.00	0.000	625.00	0.00	0.00	0.00
4.00	0.00	0.000	625.00	0.00	0.00	0.00
4.20	0.00	0.000	625.00	0.00	0.00	0.00
4.40	0.00	0.000	625.00	0.00	0.00	0.00
4.60	0.00	0.000	625.00	0.00	0.00	0.00
4.80	0.00	0.000	625.00	0.00	0.00	0.00
5.00	0.00	0.000	625.00	0.00	0.00	0.00
5.20	0.00	0.000	625.00	0.00	0.00	0.00
5.40	0.00	0.000	625.00	0.00	0.00	0.00
5.60	0.00	0.000	625.00	0.00	0.00	0.00
5.80	0.00	0.000	625.00	0.00	0.00	0.00
6.00	0.00	0.000	625.00	0.00	0.00	0.00

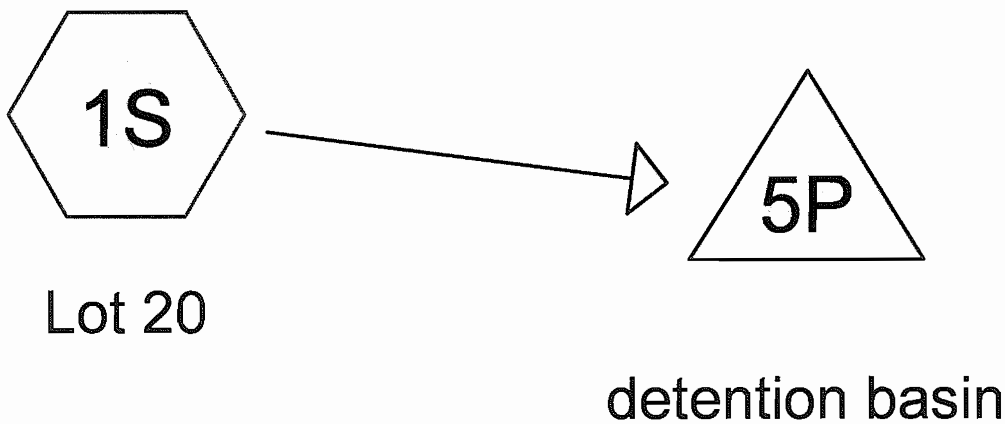
Stage-Discharge for Pond 5P: detention basin

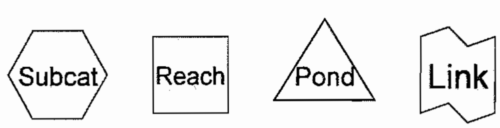
Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
625.00	0.00	0.00	0.00
625.05	0.02	0.02	0.00
625.10	0.03	0.03	0.00
625.15	0.04	0.04	0.00
625.20	0.05	0.05	0.00
625.25	0.05	0.05	0.00
625.30	0.06	0.06	0.00
625.35	0.06	0.06	0.00
625.40	0.07	0.07	0.00
625.45	0.07	0.07	0.00
625.50	0.07	0.07	0.00
625.55	0.08	0.08	0.00
625.60	0.08	0.08	0.00
625.65	0.08	0.08	0.00
625.70	0.09	0.09	0.00
625.75	0.09	0.09	0.00
625.80	0.09	0.09	0.00
625.85	0.10	0.10	0.00
625.90	0.10	0.10	0.00
625.95	0.10	0.10	0.00
626.00	0.11	0.11	0.00
626.05	0.11	0.11	0.00
626.10	0.11	0.11	0.00
626.15	0.11	0.11	0.00
626.20	0.12	0.12	0.00
626.25	0.12	0.12	0.00
626.30	0.12	0.12	0.00
626.35	0.12	0.12	0.00
626.40	0.12	0.12	0.00
626.45	0.13	0.13	0.00
626.50	0.13	0.13	0.00
626.55	0.13	0.13	0.00
626.60	0.13	0.13	0.00
626.65	0.13	0.13	0.00
626.70	0.14	0.14	0.00
626.75	0.14	0.14	0.00
626.80	0.14	0.14	0.00
626.85	0.14	0.14	0.00
626.90	0.14	0.14	0.00
626.95	0.15	0.15	0.00
627.00	0.15	0.15	0.00
627.05	0.15	0.15	0.00
627.10	0.15	0.15	0.00
627.15	0.15	0.15	0.00
627.20	0.16	0.16	0.00
627.25	0.16	0.16	0.00
627.30	0.16	0.16	0.00
627.35	0.16	0.16	0.00
627.40	0.16	0.16	0.00
627.45	0.16	0.16	0.00
627.50	0.17	0.17	0.00
627.55	0.17	0.17	0.00

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
627.60	0.17	0.17	0.00
627.65	0.17	0.17	0.00
627.70	0.17	0.17	0.00
627.75	0.17	0.17	0.00
627.80	0.18	0.18	0.00
627.85	0.18	0.18	0.00
627.90	0.18	0.18	0.00
627.95	0.18	0.18	0.00
628.00	0.18	0.18	0.00
628.05	0.19	0.18	0.01
628.10	0.22	0.18	0.04
628.15	0.26	0.19	0.08
628.20	0.32	0.19	0.13
628.25	0.39	0.19	0.20
628.30	0.47	0.19	0.28
628.35	0.57	0.19	0.37
628.40	0.66	0.19	0.47
628.45	0.77	0.20	0.57
628.50	0.87	0.20	0.68
628.55	0.98	0.20	0.78
628.60	1.07	0.20	0.87
628.65	**1.15**	**0.20**	**0.95**

Stage-Area-Storage for Pond 5P: detention basin

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
625.00	0.000	627.60	0.018
625.05	0.000	627.65	0.018
625.10	0.000	627.70	0.018
625.15	0.000	627.75	0.019
625.20	0.001	627.80	0.019
625.25	0.001	627.85	0.019
625.30	0.001	627.90	0.019
625.35	0.001	627.95	0.019
625.40	0.002	628.00	**0.019**
625.45	0.002	628.05	0.019
625.50	0.002	628.10	0.019
625.55	0.002	628.15	0.019
625.60	0.003	628.20	0.019
625.65	0.003	628.25	0.019
625.70	0.003	628.30	0.019
625.75	0.004	628.35	0.019
625.80	0.004	628.40	0.019
625.85	0.005	628.45	0.019
625.90	0.005	628.50	0.019
625.95	0.005	628.55	0.019
626.00	0.006	628.60	0.019
626.05	0.006	628.65	0.019
626.10	0.006		
626.15	0.007		
626.20	0.007		
626.25	0.008		
626.30	0.008		
626.35	0.008		
626.40	0.009		
626.45	0.009		
626.50	0.010		
626.55	0.010		
626.60	0.011		
626.65	0.011		
626.70	0.011		
626.75	0.012		
626.80	0.012		
626.85	0.013		
626.90	0.013		
626.95	0.013		
627.00	0.014		
627.05	0.014		
627.10	0.015		
627.15	0.015		
627.20	0.015		
627.25	0.016		
627.30	0.016		
627.35	0.016		
627.40	0.017		
627.45	0.017		
627.50	0.017		
627.55	0.018		





Drainage Diagram for LOT 20
Prepared by {enter your company name here} 12/17/2008
HydroCAD® 8.00 s/n 002830 © 2006 HydroCAD Software Solutions LLC

Subcatchment 1S: Lot 20

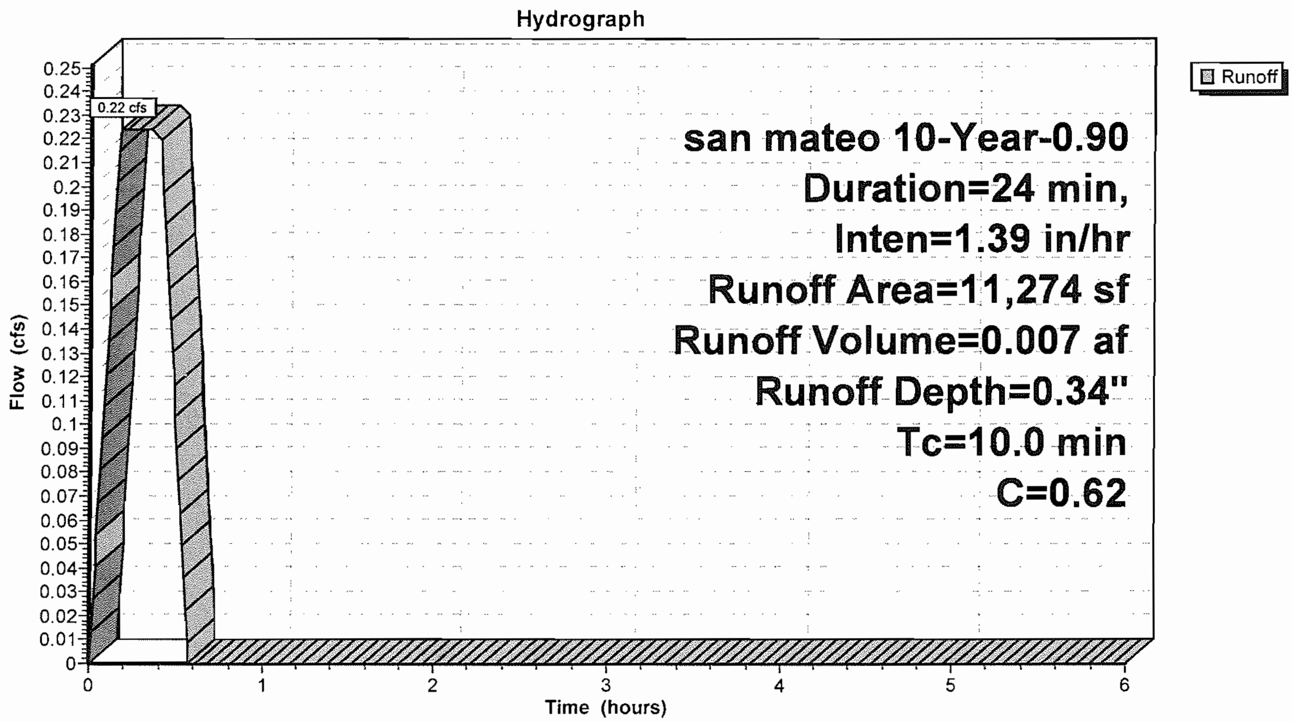
Runoff = 0.22 cfs @ 0.17 hrs, Volume= 0.007 af, Depth= 0.34"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
san mateo 10-Year-0.90 Duration=24 min, Inten=1.39 in/hr

Area (sf)	C	Description
4,510	0.95	Impervious Areas
6,764	0.40	Pervious Areas
11,274	0.62	Weighted Average
11,274	0.62	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, net increase**

Subcatchment 1S: Lot 20



Hydrograph for Subcatchment 1S: Lot 20

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.60	0.00	5.20	0.00
0.05	0.07	2.65	0.00	5.25	0.00
0.10	0.13	2.70	0.00	5.30	0.00
0.15	**0.20**	2.75	0.00	5.35	0.00
0.20	**0.22**	2.80	0.00	5.40	0.00
0.25	0.22	2.85	0.00	5.45	0.00
0.30	0.22	2.90	0.00	5.50	0.00
0.35	0.22	2.95	0.00	5.55	0.00
0.40	0.22	3.00	0.00	5.60	0.00
0.45	0.16	3.05	0.00	5.65	0.00
0.50	0.09	3.10	0.00	5.70	0.00
0.55	0.02	3.15	0.00	5.75	0.00
0.60	0.00	3.20	0.00	5.80	0.00
0.65	0.00	3.25	0.00	5.85	0.00
0.70	0.00	3.30	0.00	5.90	0.00
0.75	0.00	3.35	0.00	5.95	0.00
0.80	0.00	3.40	0.00	6.00	0.00
0.85	0.00	3.45	0.00		
0.90	0.00	3.50	0.00		
0.95	0.00	3.55	0.00		
1.00	0.00	3.60	0.00		
1.05	0.00	3.65	0.00		
1.10	0.00	3.70	0.00		
1.15	0.00	3.75	0.00		
1.20	0.00	3.80	0.00		
1.25	0.00	3.85	0.00		
1.30	0.00	3.90	0.00		
1.35	0.00	3.95	0.00		
1.40	0.00	4.00	0.00		
1.45	0.00	4.05	0.00		
1.50	0.00	4.10	0.00		
1.55	0.00	4.15	0.00		
1.60	0.00	4.20	0.00		
1.65	0.00	4.25	0.00		
1.70	0.00	4.30	0.00		
1.75	0.00	4.35	0.00		
1.80	0.00	4.40	0.00		
1.85	0.00	4.45	0.00		
1.90	0.00	4.50	0.00		
1.95	0.00	4.55	0.00		
2.00	0.00	4.60	0.00		
2.05	0.00	4.65	0.00		
2.10	0.00	4.70	0.00		
2.15	0.00	4.75	0.00		
2.20	0.00	4.80	0.00		
2.25	0.00	4.85	0.00		
2.30	0.00	4.90	0.00		
2.35	0.00	4.95	0.00		
2.40	0.00	5.00	0.00		
2.45	0.00	5.05	0.00		
2.50	0.00	5.10	0.00		
2.55	0.00	5.15	0.00		

Pond 5P: detention basin

Inflow Area =	0.259 ac, Inflow Depth = 0.34"	for 10-Year-0.90 event	
Inflow =	0.22 cfs @	0.17 hrs, Volume=	0.007 af
Outflow =	0.11 cfs @	0.48 hrs, Volume=	0.007 af, Atten= 51%, Lag= 18.9 min
Primary =	0.11 cfs @	0.48 hrs, Volume=	0.007 af
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 626.10' @ 0.48 hrs Surf.Area= 0.005 ac Storage= 0.004 af

Plug-Flow detention time= 17.9 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 18.0 min (35.0 - 17.0)

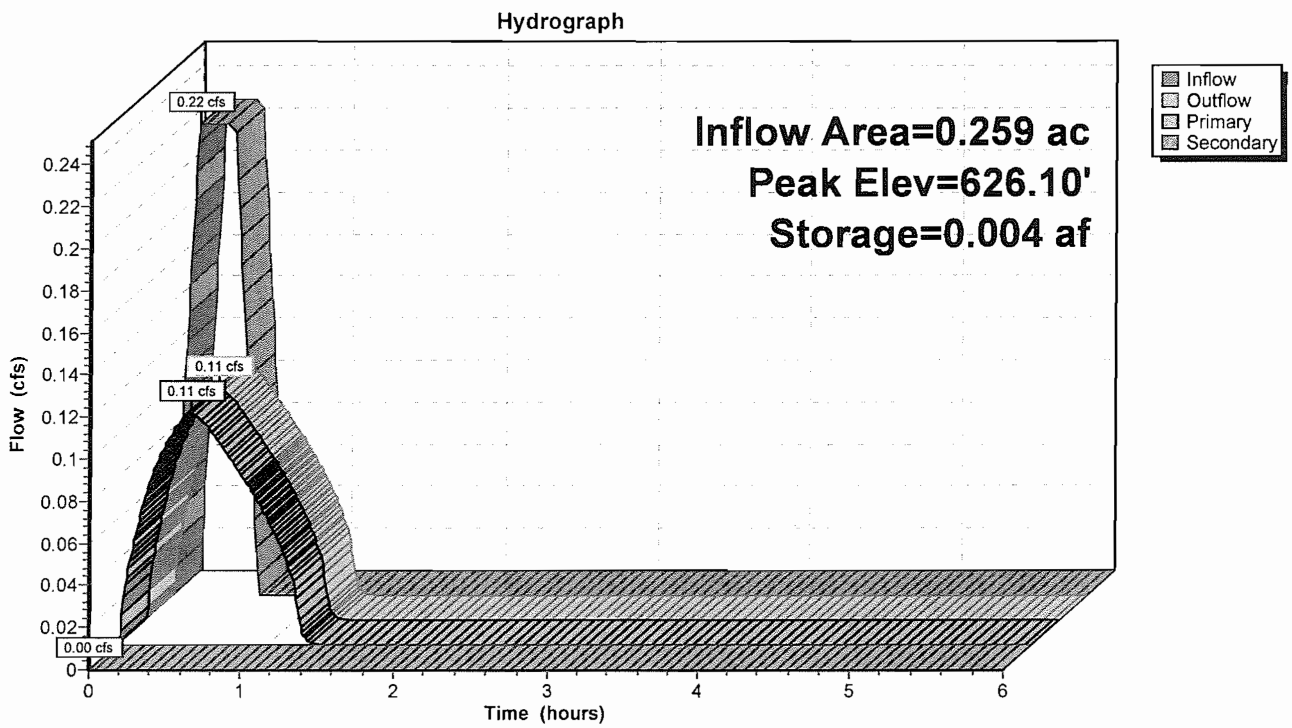
Volume	Invert	Avail.Storage	Storage Description
#1	625.00'	0.007 af	**24.0"D x 50.00'L Horizontal Cylinder**x 2

Device	Routing	Invert	Outlet Devices
#1	Primary	625.00'	**2.0" Horiz. Orifice/Grate 2.0"** Limited to weir flow C= 0.600
#2	Secondary	627.00'	**8.0" Vert. Orifice/Grate** C= 0.600

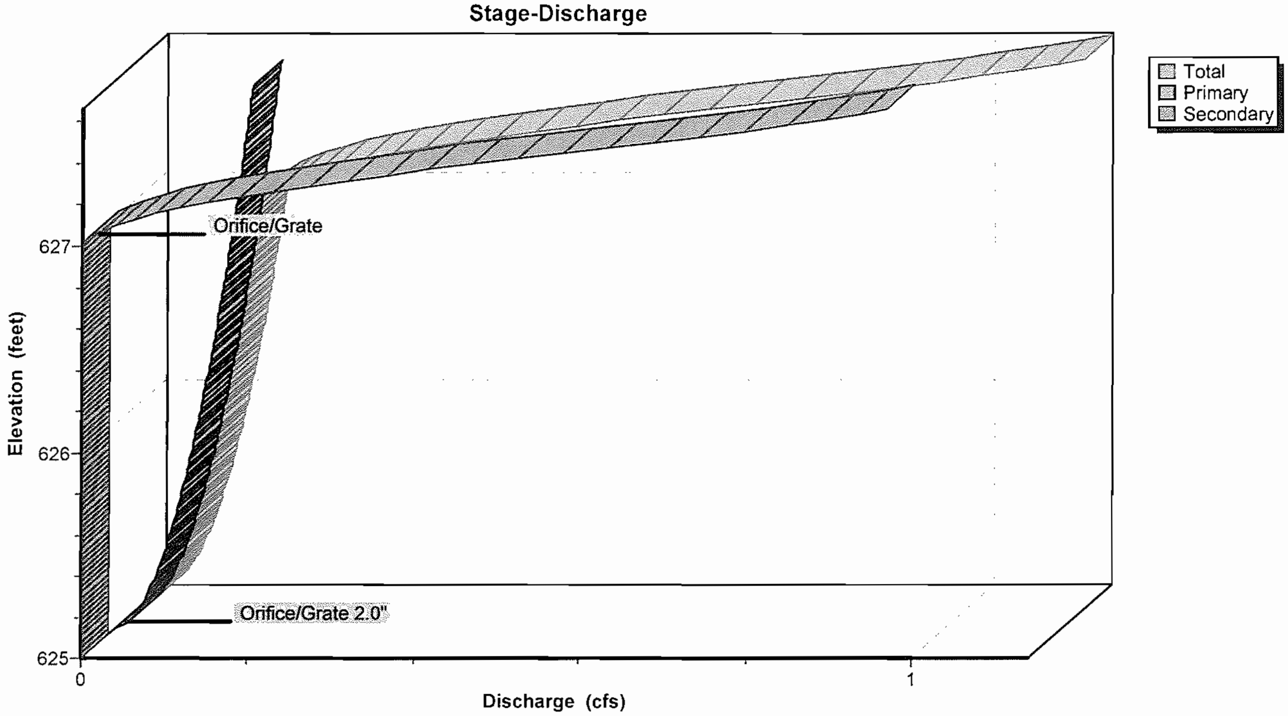
Primary OutFlow Max=0.11 cfs @ 0.48 hrs HW=626.10' (Free Discharge)
└─**1=Orifice/Grate 2.0"** (Orifice Controls 0.11 cfs @ 5.04 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=625.00' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

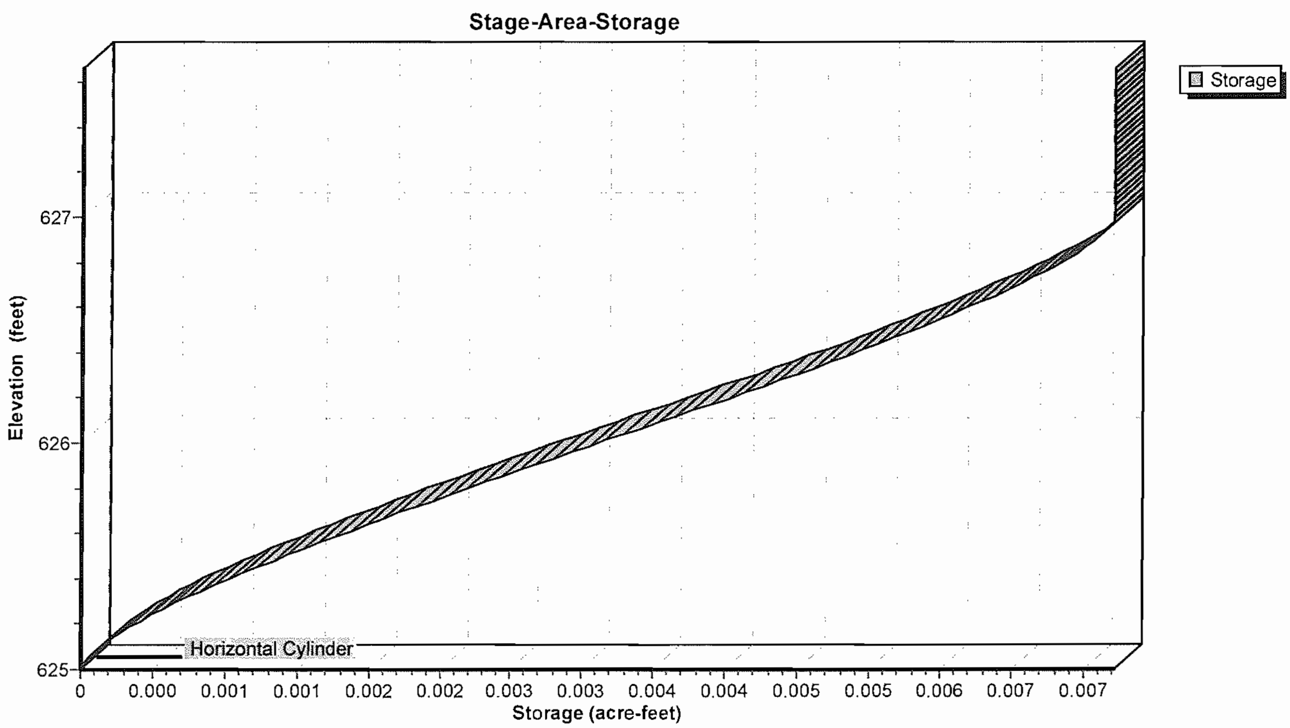
Pond 5P: detention basin



Pond 5P: detention basin



Pond 5P: detention basin



Hydrograph for Pond 5P: detention basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	**0.00**	0.000	625.00	0.00	0.00	**0.00**
0.20	**0.22**	0.001	625.51	0.08	0.08	0.00
0.40	0.22	**0.004**	**626.01**	**0.11**	**0.11**	0.00
0.60	0.00	**0.003**	**625.96**	**0.10**	**0.10**	0.00
0.80	0.00	0.002	625.61	0.08	0.08	0.00
1.00	0.00	0.001	625.31	0.06	0.06	0.00
1.20	0.00	0.000	625.04	0.01	0.01	0.00
1.40	0.00	0.000	625.00	0.00	0.00	0.00
1.60	0.00	0.000	625.00	0.00	0.00	0.00
1.80	0.00	0.000	625.00	0.00	0.00	0.00
2.00	0.00	0.000	625.00	0.00	0.00	0.00
2.20	0.00	0.000	625.00	0.00	0.00	0.00
2.40	0.00	0.000	625.00	0.00	0.00	0.00
2.60	0.00	0.000	625.00	0.00	0.00	0.00
2.80	0.00	0.000	625.00	0.00	0.00	0.00
3.00	0.00	0.000	625.00	0.00	0.00	0.00
3.20	0.00	0.000	625.00	0.00	0.00	0.00
3.40	0.00	0.000	625.00	0.00	0.00	0.00
3.60	0.00	0.000	625.00	0.00	0.00	0.00
3.80	0.00	0.000	625.00	0.00	0.00	0.00
4.00	0.00	0.000	625.00	0.00	0.00	0.00
4.20	0.00	0.000	625.00	0.00	0.00	0.00
4.40	0.00	0.000	625.00	0.00	0.00	0.00
4.60	0.00	0.000	625.00	0.00	0.00	0.00
4.80	0.00	0.000	625.00	0.00	0.00	0.00
5.00	0.00	0.000	625.00	0.00	0.00	0.00
5.20	0.00	0.000	625.00	0.00	0.00	0.00
5.40	0.00	0.000	625.00	0.00	0.00	0.00
5.60	0.00	0.000	625.00	0.00	0.00	0.00
5.80	0.00	0.000	625.00	0.00	0.00	0.00
6.00	0.00	0.000	625.00	0.00	0.00	0.00

Stage-Discharge for Pond 5P: detention basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
625.00	0.00	0.00	0.00
625.05	0.02	0.02	0.00
625.10	0.03	0.03	0.00
625.15	0.04	0.04	0.00
625.20	0.05	0.05	0.00
625.25	0.05	0.05	0.00
625.30	0.06	0.06	0.00
625.35	0.06	0.06	0.00
625.40	0.07	0.07	0.00
625.45	0.07	0.07	0.00
625.50	0.07	0.07	0.00
625.55	0.08	0.08	0.00
625.60	0.08	0.08	0.00
625.65	0.08	0.08	0.00
625.70	0.09	0.09	0.00
625.75	0.09	0.09	0.00
625.80	0.09	0.09	0.00
625.85	0.10	0.10	0.00
625.90	0.10	0.10	0.00
625.95	0.10	0.10	0.00
626.00	0.11	0.11	0.00
626.05	0.11	0.11	0.00
626.10	0.11	0.11	0.00
626.15	0.11	0.11	0.00
626.20	0.12	0.12	0.00
626.25	0.12	0.12	0.00
626.30	0.12	0.12	0.00
626.35	0.12	0.12	0.00
626.40	0.12	0.12	0.00
626.45	0.13	0.13	0.00
626.50	0.13	0.13	0.00
626.55	0.13	0.13	0.00
626.60	0.13	0.13	0.00
626.65	0.13	0.13	0.00
626.70	0.14	0.14	0.00
626.75	0.14	0.14	0.00
626.80	0.14	0.14	0.00
626.85	0.14	0.14	0.00
626.90	0.14	0.14	0.00
626.95	0.15	0.15	0.00
627.00	0.15	0.15	0.00
627.05	0.16	0.15	0.01
627.10	0.19	0.15	0.04
627.15	0.23	0.15	0.08
627.20	0.29	0.16	0.13
627.25	0.36	0.16	0.20
627.30	0.44	0.16	0.28
627.35	0.53	0.16	0.37
627.40	0.63	0.16	0.47
627.45	0.74	0.16	0.57
627.50	0.84	0.17	0.68
627.55	0.95	0.17	0.78
627.60	1.04	0.17	0.87
627.65	**1.12**	**0.17**	**0.95**

Stage-Area-Storage for Pond 5P: detention basin

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
625.00	0.000	626.04	0.004	627.08	0.007
625.02	0.000	626.06	0.004	627.10	0.007
625.04	0.000	626.08	0.004	627.12	0.007
625.06	0.000	626.10	0.004	627.14	0.007
625.08	0.000	626.12	0.004	627.16	0.007
625.10	0.000	626.14	0.004	627.18	0.007
625.12	0.000	626.16	0.004	627.20	0.007
625.14	0.000	626.18	0.004	627.22	0.007
625.16	0.000	626.20	0.005	627.24	0.007
625.18	0.000	626.22	0.005	627.26	0.007
625.20	0.000	626.24	0.005	627.28	0.007
625.22	0.000	626.26	0.005	627.30	0.007
625.24	0.000	626.28	0.005	627.32	0.007
625.26	0.001	626.30	0.005	627.34	0.007
625.28	0.001	626.32	0.005	627.36	0.007
625.30	0.001	626.34	0.005	627.38	0.007
625.32	0.001	626.36	0.005	627.40	0.007
625.34	0.001	626.38	0.005	627.42	0.007
625.36	0.001	626.40	0.005	627.44	0.007
625.38	0.001	626.42	0.005	627.46	0.007
625.40	0.001	626.44	0.006	627.48	0.007
625.42	0.001	626.46	0.006	627.50	0.007
625.44	0.001	626.48	0.006	627.52	0.007
625.46	0.001	626.50	0.006	627.54	0.007
625.48	0.001	626.52	0.006	627.56	0.007
625.50	0.001	626.54	0.006	627.58	0.007
625.52	0.001	626.56	0.006	627.60	0.007
625.54	0.002	626.58	0.006	627.62	0.007
625.56	0.002	626.60	0.006	627.64	0.007
625.58	0.002	626.62	0.006	627.66	0.007
625.60	0.002	626.64	0.006		
625.62	0.002	626.66	0.006		
625.64	0.002	626.68	0.006		
625.66	0.002	626.70	0.007		
625.68	0.002	626.72	0.007		
625.70	0.002	626.74	0.007		
625.72	0.002	626.76	0.007		
625.74	0.002	626.78	0.007		
625.76	0.003	626.80	0.007		
625.78	0.003	626.82	0.007		
625.80	0.003	626.84	0.007		
625.82	0.003	626.86	0.007		
625.84	0.003	626.88	0.007		
625.86	0.003	626.90	0.007		
625.88	0.003	626.92	0.007		
625.90	0.003	626.94	0.007		
625.92	0.003	626.96	0.007		
625.94	0.003	626.98	0.007		
625.96	0.003	627.00	**0.007**		
625.98	0.004	627.02	0.007		
626.00	0.004	627.04	0.007		
626.02	0.004	627.06	0.007		

Subcatchment 1S: Lot 21

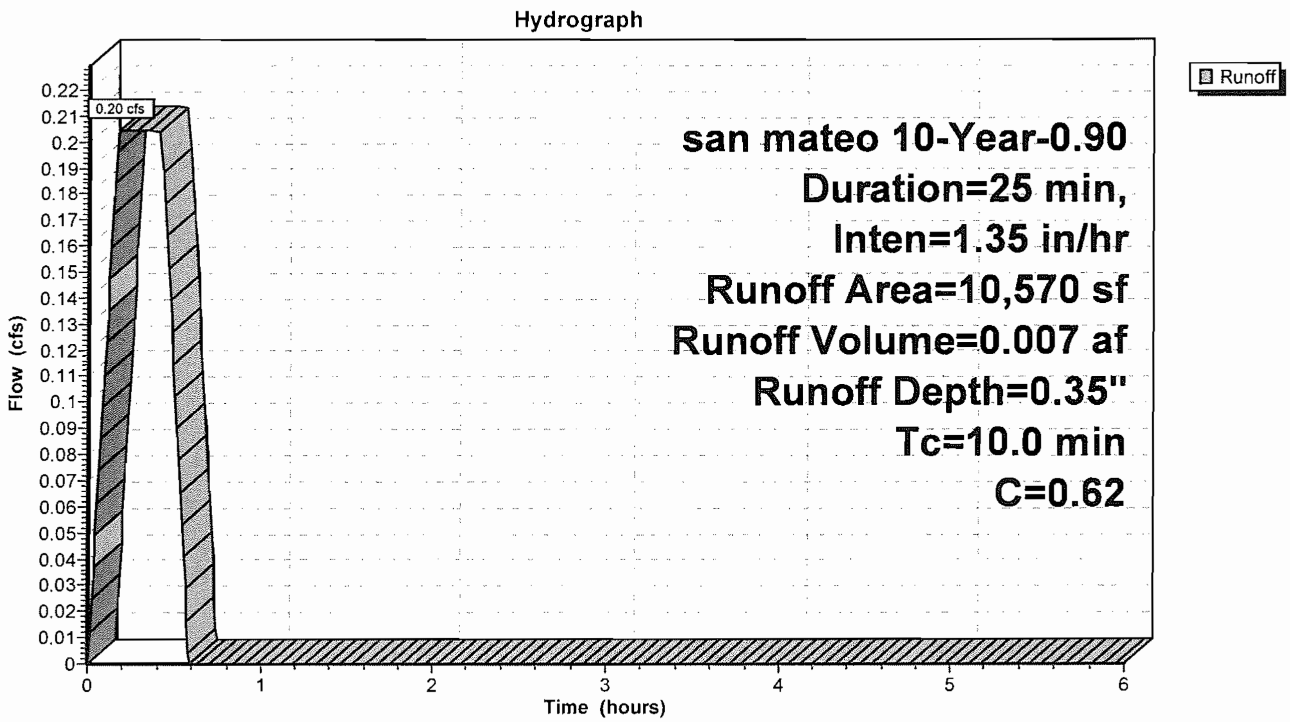
Runoff = 0.20 cfs @ 0.17 hrs, Volume= 0.007 af, Depth= 0.35"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
san mateo 10-Year-0.90 Duration=25 min, Inten=1.35 in/hr

Area (sf)	C	Description
4,228	0.95	Impervious Areas
6,342	0.40	Pervious Areas
10,570	0.62	Weighted Average
10,570	0.62	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, net increase**

Subcatchment 1S: Lot 21



Hydrograph for Subcatchment 1S: Lot 21

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.60	0.00	5.20	0.00
0.05	0.06	2.65	0.00	5.25	0.00
0.10	0.12	2.70	0.00	5.30	0.00
0.15	**0.18**	2.75	0.00	5.35	0.00
0.20	**0.20**	2.80	0.00	5.40	0.00
0.25	0.20	2.85	0.00	5.45	0.00
0.30	0.20	2.90	0.00	5.50	0.00
0.35	0.20	2.95	0.00	5.55	0.00
0.40	0.20	3.00	0.00	5.60	0.00
0.45	0.16	3.05	0.00	5.65	0.00
0.50	0.10	3.10	0.00	5.70	0.00
0.55	0.04	3.15	0.00	5.75	0.00
0.60	0.00	3.20	0.00	5.80	0.00
0.65	0.00	3.25	0.00	5.85	0.00
0.70	0.00	3.30	0.00	5.90	0.00
0.75	0.00	3.35	0.00	5.95	0.00
0.80	0.00	3.40	0.00	6.00	0.00
0.85	0.00	3.45	0.00		
0.90	0.00	3.50	0.00		
0.95	0.00	3.55	0.00		
1.00	0.00	3.60	0.00		
1.05	0.00	3.65	0.00		
1.10	0.00	3.70	0.00		
1.15	0.00	3.75	0.00		
1.20	0.00	3.80	0.00		
1.25	0.00	3.85	0.00		
1.30	0.00	3.90	0.00		
1.35	0.00	3.95	0.00		
1.40	0.00	4.00	0.00		
1.45	0.00	4.05	0.00		
1.50	0.00	4.10	0.00		
1.55	0.00	4.15	0.00		
1.60	0.00	4.20	0.00		
1.65	0.00	4.25	0.00		
1.70	0.00	4.30	0.00		
1.75	0.00	4.35	0.00		
1.80	0.00	4.40	0.00		
1.85	0.00	4.45	0.00		
1.90	0.00	4.50	0.00		
1.95	0.00	4.55	0.00		
2.00	0.00	4.60	0.00		
2.05	0.00	4.65	0.00		
2.10	0.00	4.70	0.00		
2.15	0.00	4.75	0.00		
2.20	0.00	4.80	0.00		
2.25	0.00	4.85	0.00		
2.30	0.00	4.90	0.00		
2.35	0.00	4.95	0.00		
2.40	0.00	5.00	0.00		
2.45	0.00	5.05	0.00		
2.50	0.00	5.10	0.00		
2.55	0.00	5.15	0.00		

Pond 5P: detention basin

Inflow Area =	0.243 ac, Inflow Depth = 0.35"	for 10-Year-0.90 event	
Inflow =	0.20 cfs @	0.17 hrs, Volume=	0.007 af
Outflow =	0.10 cfs @	0.50 hrs, Volume=	0.007 af, Atten= 51%, Lag= 19.9 min
Primary =	0.10 cfs @	0.50 hrs, Volume=	0.007 af
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 625.92' @ 0.50 hrs Surf.Area= 0.005 ac Storage= 0.004 af

Plug-Flow detention time= 18.6 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 18.7 min (36.2 - 17.5)

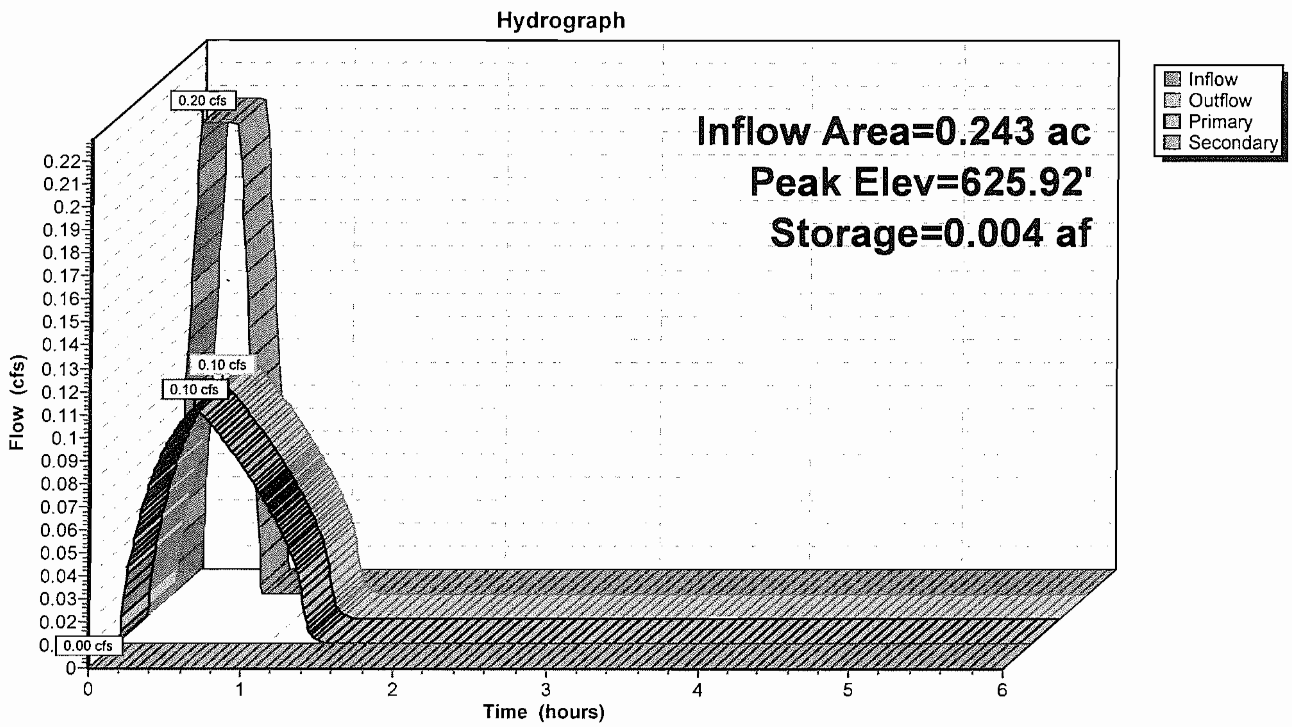
Volume	Invert	Avail.Storage	Storage Description
#1	625.00'	0.009 af	**24.0"D x 60.00'L Horizontal Cylinder**x 2

Device	Routing	Invert	Outlet Devices
#1	Primary	625.00'	**2.0" Horiz. Orifice/Grate 2.0"** Limited to weir flow C= 0.600
#2	Secondary	627.00'	**8.0" Vert. Orifice/Grate** C= 0.600

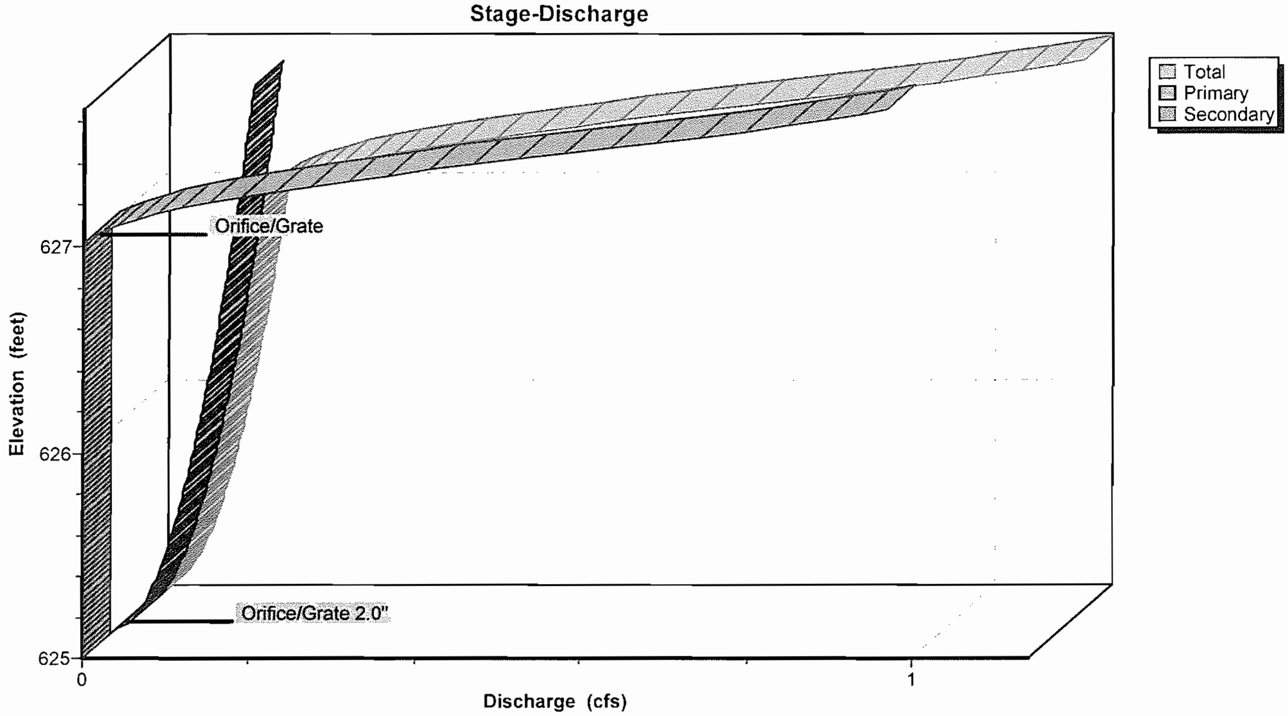
Primary OutFlow Max=0.10 cfs @ 0.50 hrs HW=625.92' (Free Discharge)
↑—**1=Orifice/Grate 2.0"** (Orifice Controls 0.10 cfs @ 4.61 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=625.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

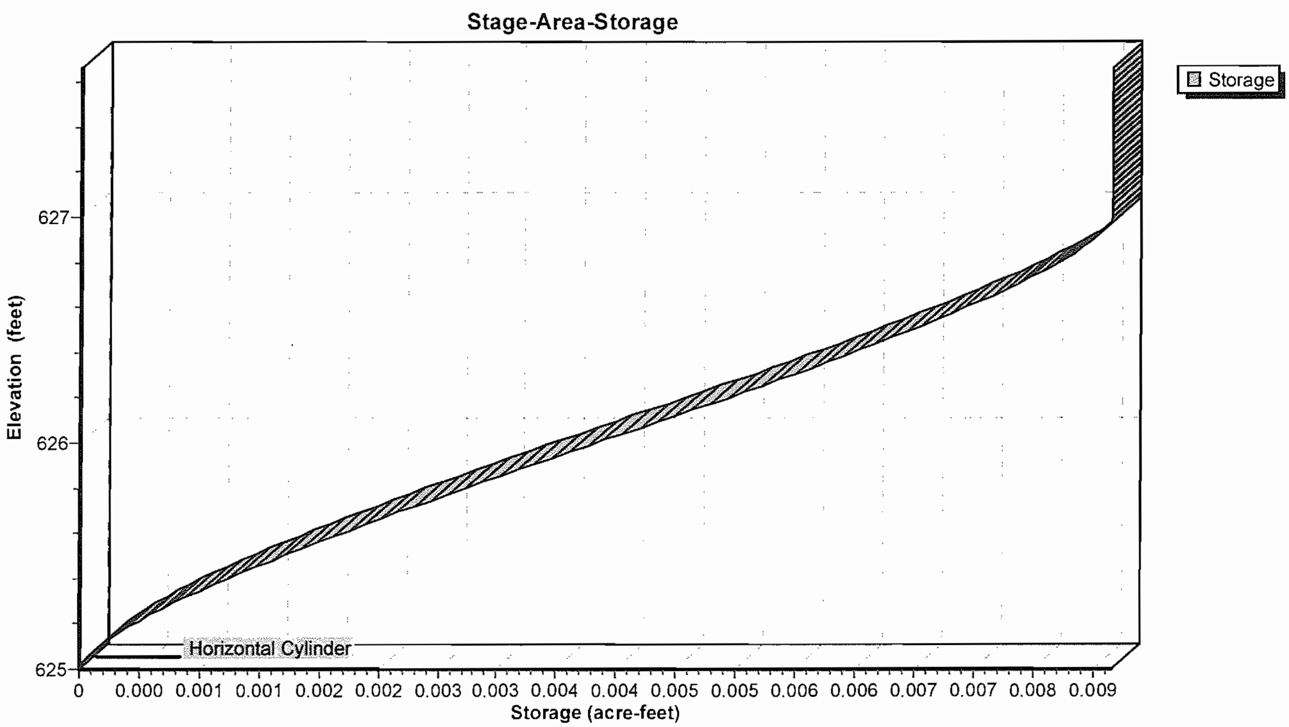
Pond 5P: detention basin



Pond 5P: detention basin



Pond 5P: detention basin



Hydrograph for Pond 5P: detention basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	**0.00**	0.000	625.00	0.00	0.00	**0.00**
0.20	**0.20**	0.001	625.42	0.07	0.07	0.00
0.40	0.20	**0.003**	**625.82**	**0.10**	**0.10**	0.00
0.60	0.00	**0.003**	**625.83**	**0.10**	**0.10**	0.00
0.80	0.00	0.002	625.55	0.08	0.08	0.00
1.00	0.00	0.001	625.30	0.06	0.06	0.00
1.20	0.00	0.000	625.07	0.03	0.03	0.00
1.40	0.00	0.000	625.00	0.00	0.00	0.00
1.60	0.00	0.000	625.00	0.00	0.00	0.00
1.80	0.00	0.000	625.00	0.00	0.00	0.00
2.00	0.00	0.000	625.00	0.00	0.00	0.00
2.20	0.00	0.000	625.00	0.00	0.00	0.00
2.40	0.00	0.000	625.00	0.00	0.00	0.00
2.60	0.00	0.000	625.00	0.00	0.00	0.00
2.80	0.00	0.000	625.00	0.00	0.00	0.00
3.00	0.00	0.000	625.00	0.00	0.00	0.00
3.20	0.00	0.000	625.00	0.00	0.00	0.00
3.40	0.00	0.000	625.00	0.00	0.00	0.00
3.60	0.00	0.000	625.00	0.00	0.00	0.00
3.80	0.00	0.000	625.00	0.00	0.00	0.00
4.00	0.00	0.000	625.00	0.00	0.00	0.00
4.20	0.00	0.000	625.00	0.00	0.00	0.00
4.40	0.00	0.000	625.00	0.00	0.00	0.00
4.60	0.00	0.000	625.00	0.00	0.00	0.00
4.80	0.00	0.000	625.00	0.00	0.00	0.00
5.00	0.00	0.000	625.00	0.00	0.00	0.00
5.20	0.00	0.000	625.00	0.00	0.00	0.00
5.40	0.00	0.000	625.00	0.00	0.00	0.00
5.60	0.00	0.000	625.00	0.00	0.00	0.00
5.80	0.00	0.000	625.00	0.00	0.00	0.00
6.00	0.00	0.000	625.00	0.00	0.00	0.00

Stage-Discharge for Pond 5P: detention basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
625.00	0.00	0.00	0.00
625.05	0.02	0.02	0.00
625.10	0.03	0.03	0.00
625.15	0.04	0.04	0.00
625.20	0.05	0.05	0.00
625.25	0.05	0.05	0.00
625.30	0.06	0.06	0.00
625.35	0.06	0.06	0.00
625.40	0.07	0.07	0.00
625.45	0.07	0.07	0.00
625.50	0.07	0.07	0.00
625.55	0.08	0.08	0.00
625.60	0.08	0.08	0.00
625.65	0.08	0.08	0.00
625.70	0.09	0.09	0.00
625.75	0.09	0.09	0.00
625.80	0.09	0.09	0.00
625.85	0.10	0.10	0.00
625.90	0.10	0.10	0.00
625.95	0.10	0.10	0.00
626.00	0.11	0.11	0.00
626.05	0.11	0.11	0.00
626.10	0.11	0.11	0.00
626.15	0.11	0.11	0.00
626.20	0.12	0.12	0.00
626.25	0.12	0.12	0.00
626.30	0.12	0.12	0.00
626.35	0.12	0.12	0.00
626.40	0.12	0.12	0.00
626.45	0.13	0.13	0.00
626.50	0.13	0.13	0.00
626.55	0.13	0.13	0.00
626.60	0.13	0.13	0.00
626.65	0.13	0.13	0.00
626.70	0.14	0.14	0.00
626.75	0.14	0.14	0.00
626.80	0.14	0.14	0.00
626.85	0.14	0.14	0.00
626.90	0.14	0.14	0.00
626.95	0.15	0.15	0.00
627.00	0.15	0.15	0.00
627.05	0.16	0.15	0.01
627.10	0.19	0.15	0.04
627.15	0.23	0.15	0.08
627.20	0.29	0.16	0.13
627.25	0.36	0.16	0.20
627.30	0.44	0.16	0.28
627.35	0.53	0.16	0.37
627.40	0.63	0.16	0.47
627.45	0.74	0.16	0.57
627.50	0.84	0.17	0.68
627.55	0.95	0.17	0.78
627.60	1.04	0.17	0.87
627.65	**1.12**	**0.17**	**0.95**

Stage-Area-Storage for Pond 5P: detention basin

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
625.00	0.000	626.04	0.005	627.08	0.009
625.02	0.000	626.06	0.005	627.10	0.009
625.04	0.000	626.08	0.005	627.12	0.009
625.06	0.000	626.10	0.005	627.14	0.009
625.08	0.000	626.12	0.005	627.16	0.009
625.10	0.000	626.14	0.005	627.18	0.009
625.12	0.000	626.16	0.005	627.20	0.009
625.14	0.000	626.18	0.005	627.22	0.009
625.16	0.000	626.20	0.005	627.24	0.009
625.18	0.000	626.22	0.006	627.26	0.009
625.20	0.000	626.24	0.006	627.28	0.009
625.22	0.001	626.26	0.006	627.30	0.009
625.24	0.001	626.28	0.006	627.32	0.009
625.26	0.001	626.30	0.006	627.34	0.009
625.28	0.001	626.32	0.006	627.36	0.009
625.30	0.001	626.34	0.006	627.38	0.009
625.32	0.001	626.36	0.006	627.40	0.009
625.34	0.001	626.38	0.006	627.42	0.009
625.36	0.001	626.40	0.006	627.44	0.009
625.38	0.001	626.42	0.007	627.46	0.009
625.40	0.001	626.44	0.007	627.48	0.009
625.42	0.001	626.46	0.007	627.50	0.009
625.44	0.001	626.48	0.007	627.52	0.009
625.46	0.002	626.50	0.007	627.54	0.009
625.48	0.002	626.52	0.007	627.56	0.009
625.50	0.002	626.54	0.007	627.58	0.009
625.52	0.002	626.56	0.007	627.60	0.009
625.54	0.002	626.58	0.007	627.62	0.009
625.56	0.002	626.60	0.007	627.64	0.009
625.58	0.002	626.62	0.008	627.66	0.009
625.60	0.002	626.64	0.008		
625.62	0.002	626.66	0.008		
625.64	0.002	626.68	0.008		
625.66	0.002	626.70	0.008		
625.68	0.003	626.72	0.008		
625.70	0.003	626.74	0.008		
625.72	0.003	626.76	0.008		
625.74	0.003	626.78	0.008		
625.76	0.003	626.80	0.008		
625.78	0.003	626.82	0.008		
625.80	0.003	626.84	0.008		
625.82	0.003	626.86	0.008		
625.84	0.003	626.88	0.008		
625.86	0.004	626.90	0.008		
625.88	0.004	626.92	0.009		
625.90	0.004	626.94	0.009		
625.92	0.004	626.96	0.009		
625.94	0.004	626.98	0.009		
625.96	0.004	627.00	**0.009**		
625.98	0.004	627.02	0.009		
626.00	0.004	627.04	0.009		
626.02	0.004	627.06	0.009		

Subcatchment 1S: Lots 22-23

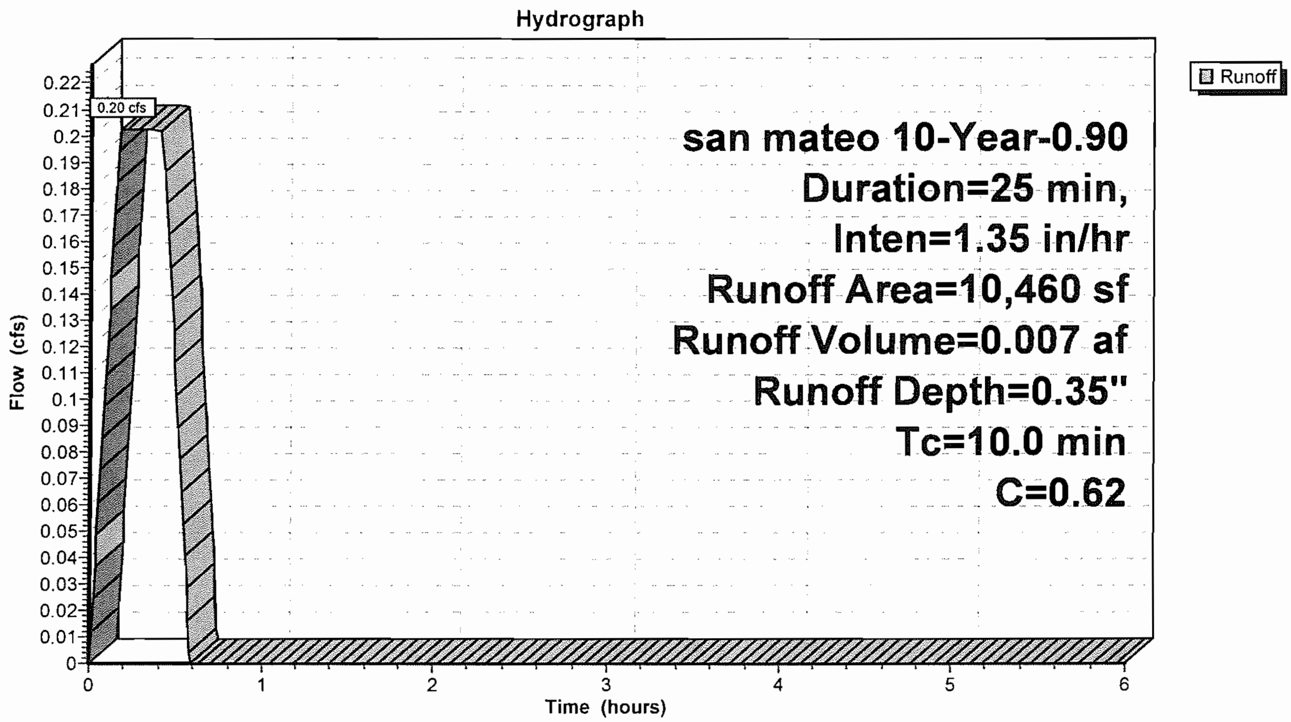
Runoff = 0.20 cfs @ 0.17 hrs, Volume= 0.007 af, Depth= 0.35"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
san mateo 10-Year-0.90 Duration=25 min, Inten=1.35 in/hr

Area (sf)	C	Description
4,184	0.95	Impervious Areas
6,276	0.40	Pervious Areas
10,460	0.62	Weighted Average
10,460	0.62	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, net increase**

Subcatchment 1S: Lots 22-23



Hydrograph for Subcatchment 1S: Lots 22-23

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.60	0.00	5.20	0.00
0.05	0.06	2.65	0.00	5.25	0.00
0.10	0.12	2.70	0.00	5.30	0.00
0.15	**0.18**	2.75	0.00	5.35	0.00
0.20	**0.20**	2.80	0.00	5.40	0.00
0.25	0.20	2.85	0.00	5.45	0.00
0.30	0.20	2.90	0.00	5.50	0.00
0.35	0.20	2.95	0.00	5.55	0.00
0.40	0.20	3.00	0.00	5.60	0.00
0.45	0.16	3.05	0.00	5.65	0.00
0.50	0.10	3.10	0.00	5.70	0.00
0.55	0.04	3.15	0.00	5.75	0.00
0.60	0.00	3.20	0.00	5.80	0.00
0.65	0.00	3.25	0.00	5.85	0.00
0.70	0.00	3.30	0.00	5.90	0.00
0.75	0.00	3.35	0.00	5.95	0.00
0.80	0.00	3.40	0.00	6.00	0.00
0.85	0.00	3.45	0.00		
0.90	0.00	3.50	0.00		
0.95	0.00	3.55	0.00		
1.00	0.00	3.60	0.00		
1.05	0.00	3.65	0.00		
1.10	0.00	3.70	0.00		
1.15	0.00	3.75	0.00		
1.20	0.00	3.80	0.00		
1.25	0.00	3.85	0.00		
1.30	0.00	3.90	0.00		
1.35	0.00	3.95	0.00		
1.40	0.00	4.00	0.00		
1.45	0.00	4.05	0.00		
1.50	0.00	4.10	0.00		
1.55	0.00	4.15	0.00		
1.60	0.00	4.20	0.00		
1.65	0.00	4.25	0.00		
1.70	0.00	4.30	0.00		
1.75	0.00	4.35	0.00		
1.80	0.00	4.40	0.00		
1.85	0.00	4.45	0.00		
1.90	0.00	4.50	0.00		
1.95	0.00	4.55	0.00		
2.00	0.00	4.60	0.00		
2.05	0.00	4.65	0.00		
2.10	0.00	4.70	0.00		
2.15	0.00	4.75	0.00		
2.20	0.00	4.80	0.00		
2.25	0.00	4.85	0.00		
2.30	0.00	4.90	0.00		
2.35	0.00	4.95	0.00		
2.40	0.00	5.00	0.00		
2.45	0.00	5.05	0.00		
2.50	0.00	5.10	0.00		
2.55	0.00	5.15	0.00		

Pond 5P: detention basin

Inflow Area =	0.240 ac,	Inflow Depth = 0.35"	for 10-Year-0.90 event	
Inflow =	0.20 cfs @	0.17 hrs, Volume=	0.007 af	
Outflow =	0.10 cfs @	0.50 hrs, Volume=	0.007 af,	Atten= 51%, Lag= 19.9 min
Primary =	0.10 cfs @	0.50 hrs, Volume=	0.007 af	
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 625.91' @ 0.50 hrs Surf.Area= 0.005 ac Storage= 0.004 af

Plug-Flow detention time= 18.5 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 18.5 min (36.0 - 17.5)

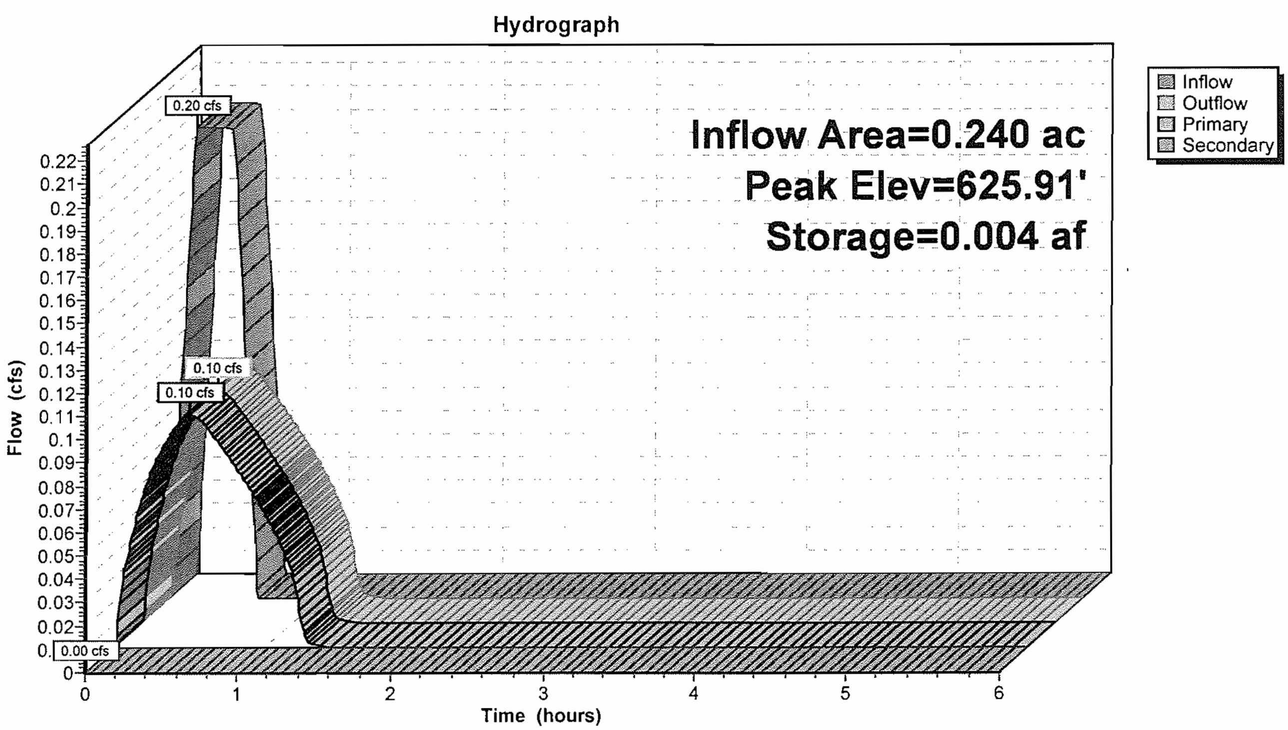
Volume	Invert	Avail.Storage	Storage Description
#1	625.00'	0.009 af	**24.0"D x 60.00'L Horizontal Cylinder**x 2

Device	Routing	Invert	Outlet Devices
#1	Primary	625.00'	**2.0" Horiz. Orifice/Grate 2.0"** Limited to weir flow C= 0.600
#2	Secondary	627.00'	**8.0" Vert. Orifice/Grate** C= 0.600

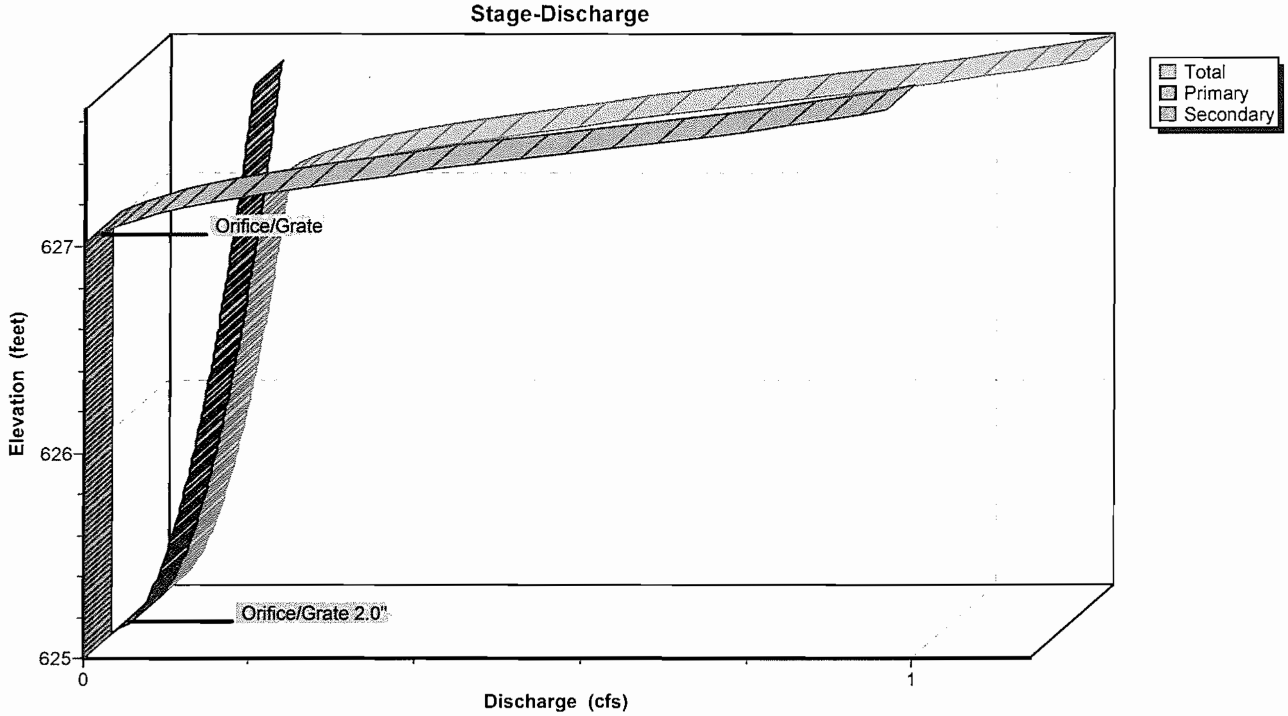
Primary OutFlow Max=0.10 cfs @ 0.50 hrs HW=625.91' (Free Discharge)
└─**1=Orifice/Grate 2.0"** (Orifice Controls 0.10 cfs @ 4.58 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=625.00' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

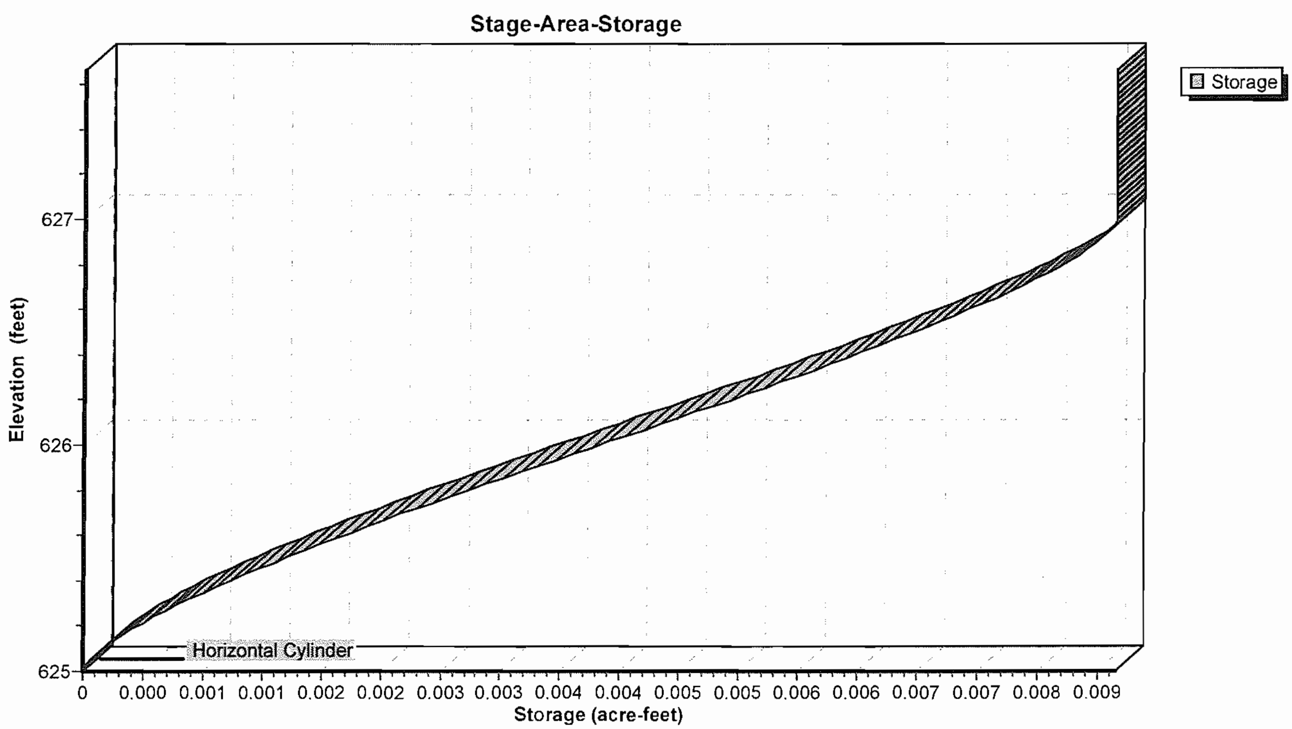
Pond 5P: detention basin



Pond 5P: detention basin



Pond 5P: detention basin



Hydrograph for Pond 5P: detention basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	**0.00**	0.000	625.00	0.00	0.00	**0.00**
0.20	**0.20**	0.001	625.42	0.07	0.07	0.00
0.40	0.20	**0.003**	**625.81**	**0.09**	**0.09**	0.00
0.60	0.00	**0.003**	**625.82**	**0.10**	**0.10**	0.00
0.80	0.00	0.002	625.55	0.08	0.08	0.00
1.00	0.00	0.001	625.29	0.06	0.06	0.00
1.20	0.00	0.000	625.06	0.02	0.02	0.00
1.40	0.00	0.000	625.00	0.00	0.00	0.00
1.60	0.00	0.000	625.00	0.00	0.00	0.00
1.80	0.00	0.000	625.00	0.00	0.00	0.00
2.00	0.00	0.000	625.00	0.00	0.00	0.00
2.20	0.00	0.000	625.00	0.00	0.00	0.00
2.40	0.00	0.000	625.00	0.00	0.00	0.00
2.60	0.00	0.000	625.00	0.00	0.00	0.00
2.80	0.00	0.000	625.00	0.00	0.00	0.00
3.00	0.00	0.000	625.00	0.00	0.00	0.00
3.20	0.00	0.000	625.00	0.00	0.00	0.00
3.40	0.00	0.000	625.00	0.00	0.00	0.00
3.60	0.00	0.000	625.00	0.00	0.00	0.00
3.80	0.00	0.000	625.00	0.00	0.00	0.00
4.00	0.00	0.000	625.00	0.00	0.00	0.00
4.20	0.00	0.000	625.00	0.00	0.00	0.00
4.40	0.00	0.000	625.00	0.00	0.00	0.00
4.60	0.00	0.000	625.00	0.00	0.00	0.00
4.80	0.00	0.000	625.00	0.00	0.00	0.00
5.00	0.00	0.000	625.00	0.00	0.00	0.00
5.20	0.00	0.000	625.00	0.00	0.00	0.00
5.40	0.00	0.000	625.00	0.00	0.00	0.00
5.60	0.00	0.000	625.00	0.00	0.00	0.00
5.80	0.00	0.000	625.00	0.00	0.00	0.00
6.00	0.00	0.000	625.00	0.00	0.00	0.00

Stage-Discharge for Pond 5P: detention basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
625.00	0.00	0.00	0.00
625.05	0.02	0.02	0.00
625.10	0.03	0.03	0.00
625.15	0.04	0.04	0.00
625.20	0.05	0.05	0.00
625.25	0.05	0.05	0.00
625.30	0.06	0.06	0.00
625.35	0.06	0.06	0.00
625.40	0.07	0.07	0.00
625.45	0.07	0.07	0.00
625.50	0.07	0.07	0.00
625.55	0.08	0.08	0.00
625.60	0.08	0.08	0.00
625.65	0.08	0.08	0.00
625.70	0.09	0.09	0.00
625.75	0.09	0.09	0.00
625.80	0.09	0.09	0.00
625.85	0.10	0.10	0.00
625.90	0.10	0.10	0.00
625.95	0.10	0.10	0.00
626.00	0.11	0.11	0.00
626.05	0.11	0.11	0.00
626.10	0.11	0.11	0.00
626.15	0.11	0.11	0.00
626.20	0.12	0.12	0.00
626.25	0.12	0.12	0.00
626.30	0.12	0.12	0.00
626.35	0.12	0.12	0.00
626.40	0.12	0.12	0.00
626.45	0.13	0.13	0.00
626.50	0.13	0.13	0.00
626.55	0.13	0.13	0.00
626.60	0.13	0.13	0.00
626.65	0.13	0.13	0.00
626.70	0.14	0.14	0.00
626.75	0.14	0.14	0.00
626.80	0.14	0.14	0.00
626.85	0.14	0.14	0.00
626.90	0.14	0.14	0.00
626.95	0.15	0.15	0.00
627.00	0.15	0.15	0.00
627.05	0.16	0.15	0.01
627.10	0.19	0.15	0.04
627.15	0.23	0.15	0.08
627.20	0.29	0.16	0.13
627.25	0.36	0.16	0.20
627.30	0.44	0.16	0.28
627.35	0.53	0.16	0.37
627.40	0.63	0.16	0.47
627.45	0.74	0.16	0.57
627.50	0.84	0.17	0.68
627.55	0.95	0.17	0.78
627.60	1.04	0.17	0.87
627.65	**1.12**	**0.17**	**0.95**

Stage-Area-Storage for Pond 5P: detention basin

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
625.00	0.000	626.04	0.005	627.08	0.009
625.02	0.000	626.06	0.005	627.10	0.009
625.04	0.000	626.08	0.005	627.12	0.009
625.06	0.000	626.10	0.005	627.14	0.009
625.08	0.000	626.12	0.005	627.16	0.009
625.10	0.000	626.14	0.005	627.18	0.009
625.12	0.000	626.16	0.005	627.20	0.009
625.14	0.000	626.18	0.005	627.22	0.009
625.16	0.000	626.20	0.005	627.24	0.009
625.18	0.000	626.22	0.006	627.26	0.009
625.20	0.000	626.24	0.006	627.28	0.009
625.22	0.001	626.26	0.006	627.30	0.009
625.24	0.001	626.28	0.006	627.32	0.009
625.26	0.001	626.30	0.006	627.34	0.009
625.28	0.001	626.32	0.006	627.36	0.009
625.30	0.001	626.34	0.006	627.38	0.009
625.32	0.001	626.36	0.006	627.40	0.009
625.34	0.001	626.38	0.006	627.42	0.009
625.36	0.001	626.40	0.006	627.44	0.009
625.38	0.001	626.42	0.007	627.46	0.009
625.40	0.001	626.44	0.007	627.48	0.009
625.42	0.001	626.46	0.007	627.50	0.009
625.44	0.001	626.48	0.007	627.52	0.009
625.46	0.002	626.50	0.007	627.54	0.009
625.48	0.002	626.52	0.007	627.56	0.009
625.50	0.002	626.54	0.007	627.58	0.009
625.52	0.002	626.56	0.007	627.60	0.009
625.54	0.002	626.58	0.007	627.62	0.009
625.56	0.002	626.60	0.007	627.64	0.009
625.58	0.002	626.62	0.008	627.66	0.009
625.60	0.002	626.64	0.008		
625.62	0.002	626.66	0.008		
625.64	0.002	626.68	0.008		
625.66	0.002	626.70	0.008		
625.68	0.003	626.72	0.008		
625.70	0.003	626.74	0.008		
625.72	0.003	626.76	0.008		
625.74	0.003	626.78	0.008		
625.76	0.003	626.80	0.008		
625.78	0.003	626.82	0.008		
625.80	0.003	626.84	0.008		
625.82	0.003	626.86	0.008		
625.84	0.003	626.88	0.008		
625.86	0.004	626.90	0.008		
625.88	0.004	626.92	0.009		
625.90	0.004	626.94	0.009		
625.92	0.004	626.96	0.009		
625.94	0.004	626.98	0.009		
625.96	0.004	627.00	**0.009**		
625.98	0.004	627.02	0.009		
626.00	0.004	627.04	0.009		
626.02	0.004	627.06	0.009		

Subcatchment 1S: Lot 24

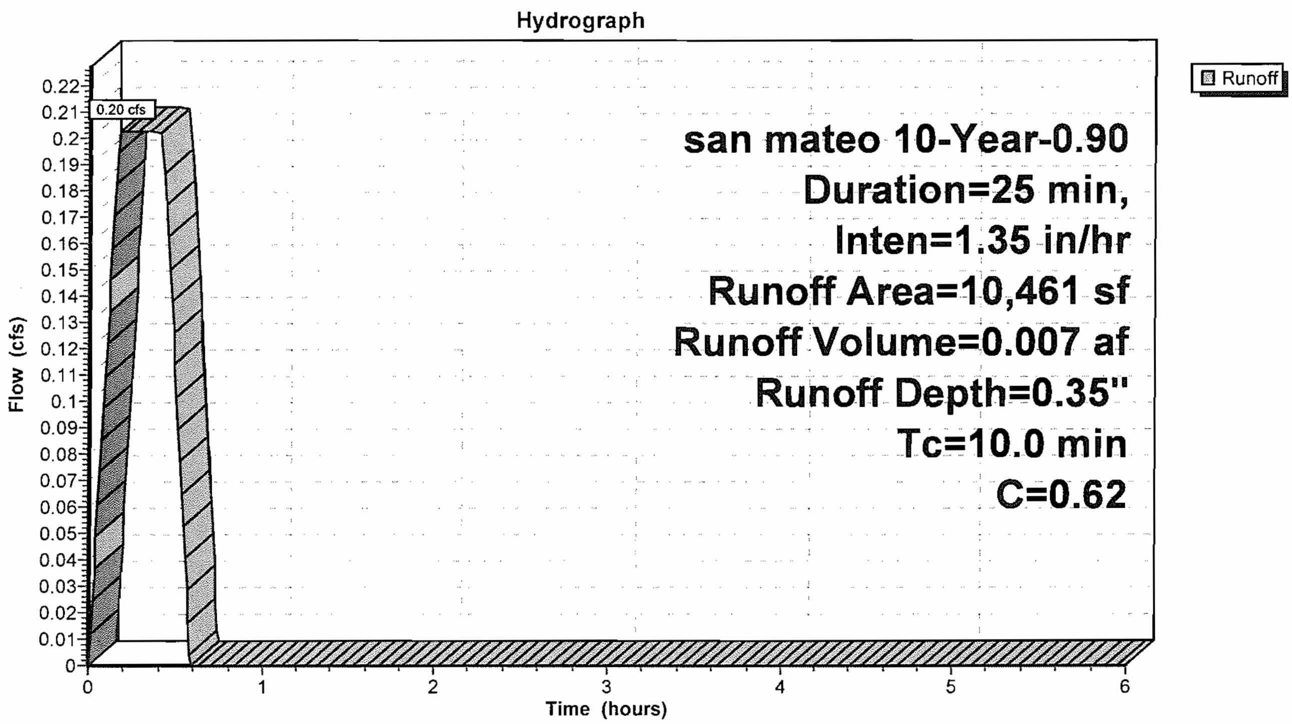
Runoff = 0.20 cfs @ 0.17 hrs, Volume= 0.007 af, Depth= 0.35"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
san mateo 10-Year-0.90 Duration=25 min, Inten=1.35 in/hr

Area (sf)	C	Description
4,184	0.95	Impervious Areas
6,277	0.40	Pervious Areas
10,461	0.62	Weighted Average
10,461	0.62	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, net increase**

Subcatchment 1S: Lot 24



Hydrograph for Subcatchment 1S: Lot 24

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.60	0.00	5.20	0.00
0.05	0.06	2.65	0.00	5.25	0.00
0.10	0.12	2.70	0.00	5.30	0.00
0.15	**0.18**	2.75	0.00	5.35	0.00
0.20	**0.20**	2.80	0.00	5.40	0.00
0.25	0.20	2.85	0.00	5.45	0.00
0.30	0.20	2.90	0.00	5.50	0.00
0.35	0.20	2.95	0.00	5.55	0.00
0.40	0.20	3.00	0.00	5.60	0.00
0.45	0.16	3.05	0.00	5.65	0.00
0.50	0.10	3.10	0.00	5.70	0.00
0.55	0.04	3.15	0.00	5.75	0.00
0.60	0.00	3.20	0.00	5.80	0.00
0.65	0.00	3.25	0.00	5.85	0.00
0.70	0.00	3.30	0.00	5.90	0.00
0.75	0.00	3.35	0.00	5.95	0.00
0.80	0.00	3.40	0.00	6.00	0.00
0.85	0.00	3.45	0.00		
0.90	0.00	3.50	0.00		
0.95	0.00	3.55	0.00		
1.00	0.00	3.60	0.00		
1.05	0.00	3.65	0.00		
1.10	0.00	3.70	0.00		
1.15	0.00	3.75	0.00		
1.20	0.00	3.80	0.00		
1.25	0.00	3.85	0.00		
1.30	0.00	3.90	0.00		
1.35	0.00	3.95	0.00		
1.40	0.00	4.00	0.00		
1.45	0.00	4.05	0.00		
1.50	0.00	4.10	0.00		
1.55	0.00	4.15	0.00		
1.60	0.00	4.20	0.00		
1.65	0.00	4.25	0.00		
1.70	0.00	4.30	0.00		
1.75	0.00	4.35	0.00		
1.80	0.00	4.40	0.00		
1.85	0.00	4.45	0.00		
1.90	0.00	4.50	0.00		
1.95	0.00	4.55	0.00		
2.00	0.00	4.60	0.00		
2.05	0.00	4.65	0.00		
2.10	0.00	4.70	0.00		
2.15	0.00	4.75	0.00		
2.20	0.00	4.80	0.00		
2.25	0.00	4.85	0.00		
2.30	0.00	4.90	0.00		
2.35	0.00	4.95	0.00		
2.40	0.00	5.00	0.00		
2.45	0.00	5.05	0.00		
2.50	0.00	5.10	0.00		
2.55	0.00	5.15	0.00		

Pond 5P: detention basin

Inflow Area =	0.240 ac,	Inflow Depth = 0.35"	for 10-Year-0.90 event	
Inflow =	0.20 cfs @	0.17 hrs, Volume=	0.007 af	
Outflow =	0.10 cfs @	0.50 hrs, Volume=	0.007 af,	Atten= 51%, Lag= 19.9 min
Primary =	0.10 cfs @	0.50 hrs, Volume=	0.007 af	
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 625.91' @ 0.50 hrs Surf.Area= 0.005 ac Storage= 0.004 af

Plug-Flow detention time= 18.5 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 18.5 min (36.0 - 17.5)

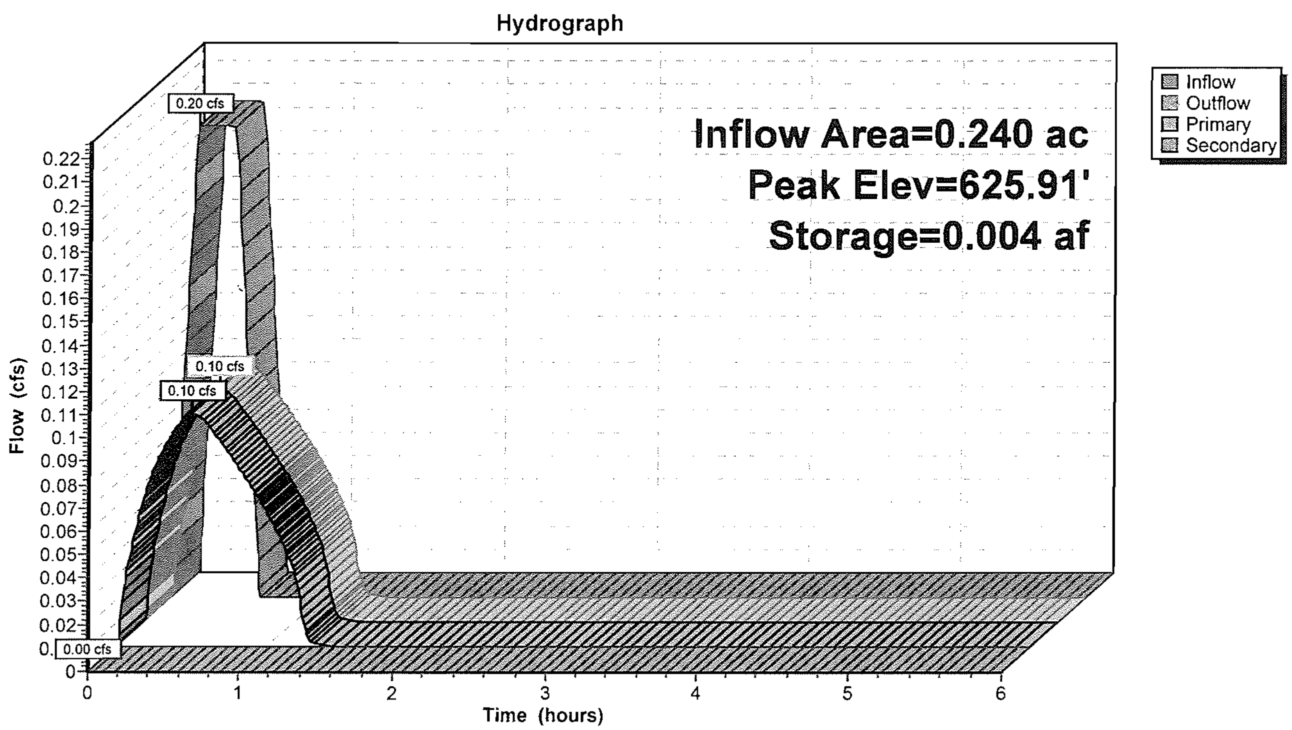
Volume	Invert	Avail.Storage	Storage Description
#1	625.00'	0.009 af	**24.0"D x 60.00'L Horizontal Cylinder**x 2

Device	Routing	Invert	Outlet Devices
#1	Primary	625.00'	**2.0" Horiz. Orifice/Grate 2.0"** Limited to weir flow C= 0.600
#2	Secondary	627.00'	**8.0" Vert. Orifice/Grate** C= 0.600

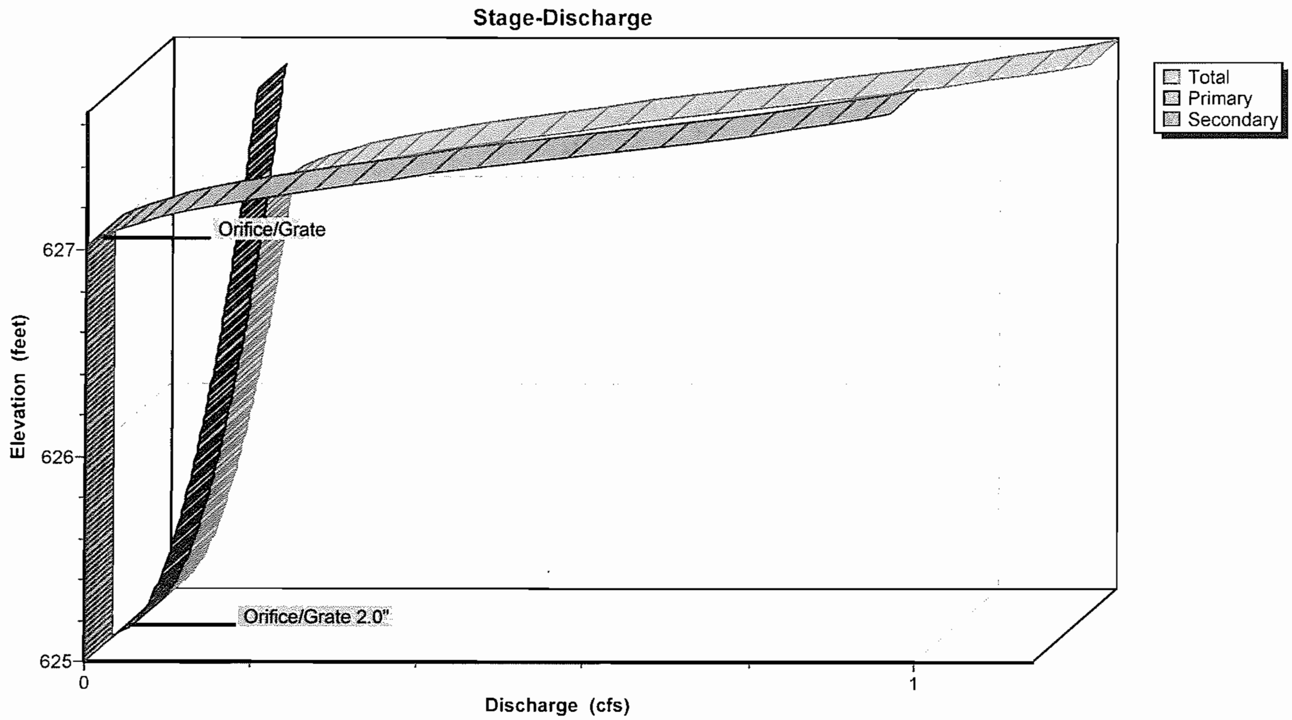
Primary OutFlow Max=0.10 cfs @ 0.50 hrs HW=625.91' (Free Discharge)
└─**1=Orifice/Grate 2.0"** (Orifice Controls 0.10 cfs @ 4.58 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=625.00' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

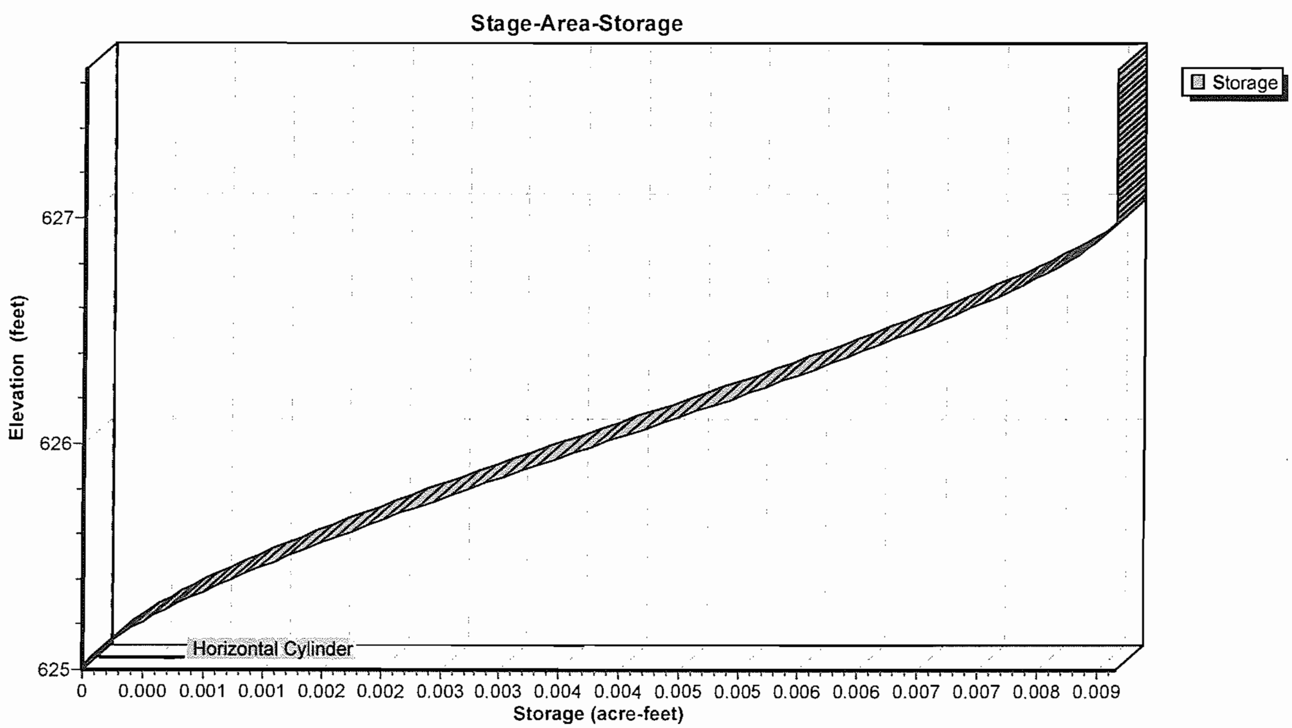
Pond 5P: detention basin



Pond 5P: detention basin



Pond 5P: detention basin



Hydrograph for Pond 5P: detention basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	**0.00**	0.000	625.00	0.00	0.00	**0.00**
0.20	**0.20**	0.001	625.42	0.07	0.07	0.00
0.40	0.20	**0.003**	**625.81**	**0.09**	**0.09**	0.00
0.60	0.00	**0.003**	**625.82**	**0.10**	**0.10**	0.00
0.80	0.00	0.002	625.55	0.08	0.08	0.00
1.00	0.00	0.001	625.30	0.06	0.06	0.00
1.20	0.00	0.000	625.06	0.02	0.02	0.00
1.40	0.00	0.000	625.00	0.00	0.00	0.00
1.60	0.00	0.000	625.00	0.00	0.00	0.00
1.80	0.00	0.000	625.00	0.00	0.00	0.00
2.00	0.00	0.000	625.00	0.00	0.00	0.00
2.20	0.00	0.000	625.00	0.00	0.00	0.00
2.40	0.00	0.000	625.00	0.00	0.00	0.00
2.60	0.00	0.000	625.00	0.00	0.00	0.00
2.80	0.00	0.000	625.00	0.00	0.00	0.00
3.00	0.00	0.000	625.00	0.00	0.00	0.00
3.20	0.00	0.000	625.00	0.00	0.00	0.00
3.40	0.00	0.000	625.00	0.00	0.00	0.00
3.60	0.00	0.000	625.00	0.00	0.00	0.00
3.80	0.00	0.000	625.00	0.00	0.00	0.00
4.00	0.00	0.000	625.00	0.00	0.00	0.00
4.20	0.00	0.000	625.00	0.00	0.00	0.00
4.40	0.00	0.000	625.00	0.00	0.00	0.00
4.60	0.00	0.000	625.00	0.00	0.00	0.00
4.80	0.00	0.000	625.00	0.00	0.00	0.00
5.00	0.00	0.000	625.00	0.00	0.00	0.00
5.20	0.00	0.000	625.00	0.00	0.00	0.00
5.40	0.00	0.000	625.00	0.00	0.00	0.00
5.60	0.00	0.000	625.00	0.00	0.00	0.00
5.80	0.00	0.000	625.00	0.00	0.00	0.00
6.00	0.00	0.000	625.00	0.00	0.00	0.00

Stage-Discharge for Pond 5P: detention basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
625.00	0.00	0.00	0.00
625.05	0.02	0.02	0.00
625.10	0.03	0.03	0.00
625.15	0.04	0.04	0.00
625.20	0.05	0.05	0.00
625.25	0.05	0.05	0.00
625.30	0.06	0.06	0.00
625.35	0.06	0.06	0.00
625.40	0.07	0.07	0.00
625.45	0.07	0.07	0.00
625.50	0.07	0.07	0.00
625.55	0.08	0.08	0.00
625.60	0.08	0.08	0.00
625.65	0.08	0.08	0.00
625.70	0.09	0.09	0.00
625.75	0.09	0.09	0.00
625.80	0.09	0.09	0.00
625.85	0.10	0.10	0.00
625.90	0.10	0.10	0.00
625.95	0.10	0.10	0.00
626.00	0.11	0.11	0.00
626.05	0.11	0.11	0.00
626.10	0.11	0.11	0.00
626.15	0.11	0.11	0.00
626.20	0.12	0.12	0.00
626.25	0.12	0.12	0.00
626.30	0.12	0.12	0.00
626.35	0.12	0.12	0.00
626.40	0.12	0.12	0.00
626.45	0.13	0.13	0.00
626.50	0.13	0.13	0.00
626.55	0.13	0.13	0.00
626.60	0.13	0.13	0.00
626.65	0.13	0.13	0.00
626.70	0.14	0.14	0.00
626.75	0.14	0.14	0.00
626.80	0.14	0.14	0.00
626.85	0.14	0.14	0.00
626.90	0.14	0.14	0.00
626.95	0.15	0.15	0.00
627.00	0.15	0.15	0.00
627.05	0.16	0.15	0.01
627.10	0.19	0.15	0.04
627.15	0.23	0.15	0.08
627.20	0.29	0.16	0.13
627.25	0.36	0.16	0.20
627.30	0.44	0.16	0.28
627.35	0.53	0.16	0.37
627.40	0.63	0.16	0.47
627.45	0.74	0.16	0.57
627.50	0.84	0.17	0.68
627.55	0.95	0.17	0.78
627.60	1.04	0.17	0.87
627.65	**1.12**	**0.17**	**0.95**

Stage-Area-Storage for Pond 5P: detention basin

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
625.00	0.000	626.04	0.005	627.08	0.009
625.02	0.000	626.06	0.005	627.10	0.009
625.04	0.000	626.08	0.005	627.12	0.009
625.06	0.000	626.10	0.005	627.14	0.009
625.08	0.000	626.12	0.005	627.16	0.009
625.10	0.000	626.14	0.005	627.18	0.009
625.12	0.000	626.16	0.005	627.20	0.009
625.14	0.000	626.18	0.005	627.22	0.009
625.16	0.000	626.20	0.005	627.24	0.009
625.18	0.000	626.22	0.006	627.26	0.009
625.20	0.000	626.24	0.006	627.28	0.009
625.22	0.001	626.26	0.006	627.30	0.009
625.24	0.001	626.28	0.006	627.32	0.009
625.26	0.001	626.30	0.006	627.34	0.009
625.28	0.001	626.32	0.006	627.36	0.009
625.30	0.001	626.34	0.006	627.38	0.009
625.32	0.001	626.36	0.006	627.40	0.009
625.34	0.001	626.38	0.006	627.42	0.009
625.36	0.001	626.40	0.006	627.44	0.009
625.38	0.001	626.42	0.007	627.46	0.009
625.40	0.001	626.44	0.007	627.48	0.009
625.42	0.001	626.46	0.007	627.50	0.009
625.44	0.001	626.48	0.007	627.52	0.009
625.46	0.002	626.50	0.007	627.54	0.009
625.48	0.002	626.52	0.007	627.56	0.009
625.50	0.002	626.54	0.007	627.58	0.009
625.52	0.002	626.56	0.007	627.60	0.009
625.54	0.002	626.58	0.007	627.62	0.009
625.56	0.002	626.60	0.007	627.64	0.009
625.58	0.002	626.62	0.008	627.66	0.009
625.60	0.002	626.64	0.008		
625.62	0.002	626.66	0.008		
625.64	0.002	626.68	0.008		
625.66	0.002	626.70	0.008		
625.68	0.003	626.72	0.008		
625.70	0.003	626.74	0.008		
625.72	0.003	626.76	0.008		
625.74	0.003	626.78	0.008		
625.76	0.003	626.80	0.008		
625.78	0.003	626.82	0.008		
625.80	0.003	626.84	0.008		
625.82	0.003	626.86	0.008		
625.84	0.003	626.88	0.008		
625.86	0.004	626.90	0.008		
625.88	0.004	626.92	0.009		
625.90	0.004	626.94	0.009		
625.92	0.004	626.96	0.009		
625.94	0.004	626.98	0.009		
625.96	0.004	627.00	**0.009**		
625.98	0.004	627.02	0.009		
626.00	0.004	627.04	0.009		
626.02	0.004	627.06	0.009		

Subcatchment 1S: Lot 25

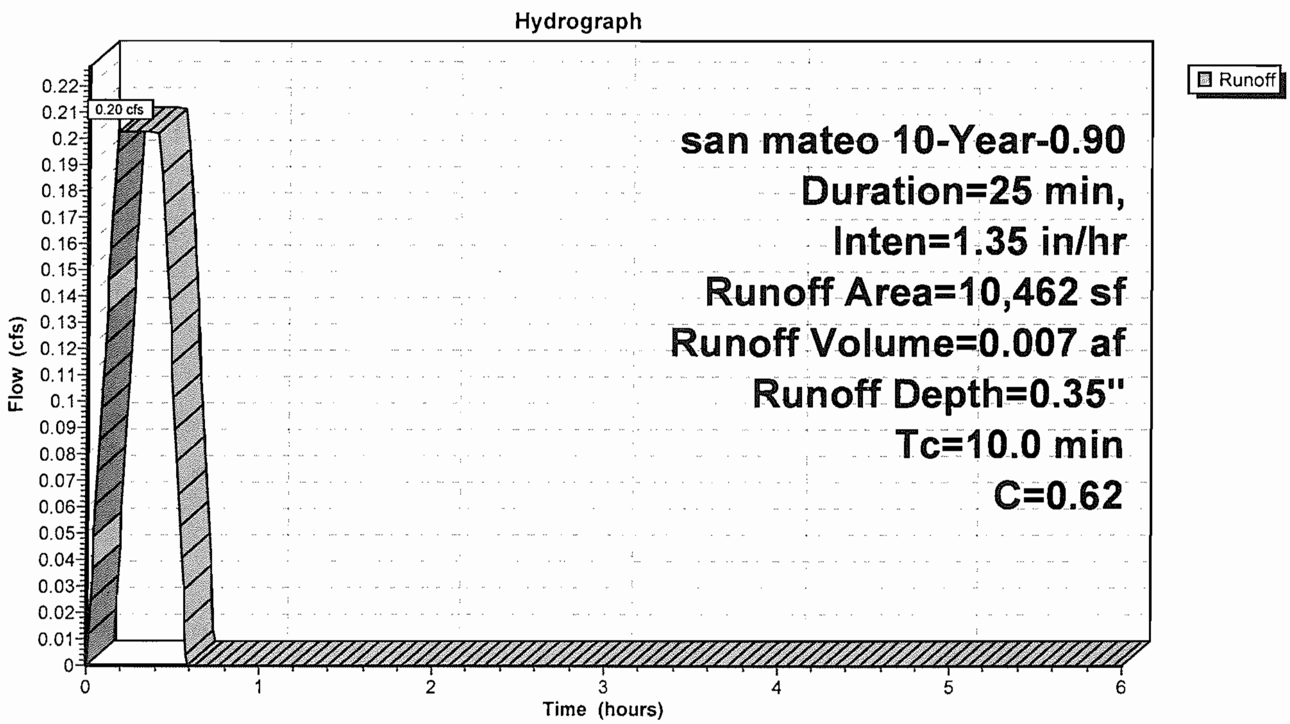
Runoff = 0.20 cfs @ 0.17 hrs, Volume= 0.007 af, Depth= 0.35"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
san mateo 10-Year-0.90 Duration=25 min, Inten=1.35 in/hr

Area (sf)	C	Description
4,185	0.95	Impervious Areas
6,277	0.40	Pervious Areas
10,462	0.62	Weighted Average
10,462	0.62	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, net increase**

Subcatchment 1S: Lot 25



Hydrograph for Subcatchment 1S: Lot 25

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	2.60	0.00	5.20	0.00
0.05	0.06	2.65	0.00	5.25	0.00
0.10	0.12	2.70	0.00	5.30	0.00
0.15	**0.18**	2.75	0.00	5.35	0.00
0.20	**0.20**	2.80	0.00	5.40	0.00
0.25	0.20	2.85	0.00	5.45	0.00
0.30	0.20	2.90	0.00	5.50	0.00
0.35	0.20	2.95	0.00	5.55	0.00
0.40	0.20	3.00	0.00	5.60	0.00
0.45	0.16	3.05	0.00	5.65	0.00
0.50	0.10	3.10	0.00	5.70	0.00
0.55	0.04	3.15	0.00	5.75	0.00
0.60	0.00	3.20	0.00	5.80	0.00
0.65	0.00	3.25	0.00	5.85	0.00
0.70	0.00	3.30	0.00	5.90	0.00
0.75	0.00	3.35	0.00	5.95	0.00
0.80	0.00	3.40	0.00	6.00	0.00
0.85	0.00	3.45	0.00		
0.90	0.00	3.50	0.00		
0.95	0.00	3.55	0.00		
1.00	0.00	3.60	0.00		
1.05	0.00	3.65	0.00		
1.10	0.00	3.70	0.00		
1.15	0.00	3.75	0.00		
1.20	0.00	3.80	0.00		
1.25	0.00	3.85	0.00		
1.30	0.00	3.90	0.00		
1.35	0.00	3.95	0.00		
1.40	0.00	4.00	0.00		
1.45	0.00	4.05	0.00		
1.50	0.00	4.10	0.00		
1.55	0.00	4.15	0.00		
1.60	0.00	4.20	0.00		
1.65	0.00	4.25	0.00		
1.70	0.00	4.30	0.00		
1.75	0.00	4.35	0.00		
1.80	0.00	4.40	0.00		
1.85	0.00	4.45	0.00		
1.90	0.00	4.50	0.00		
1.95	0.00	4.55	0.00		
2.00	0.00	4.60	0.00		
2.05	0.00	4.65	0.00		
2.10	0.00	4.70	0.00		
2.15	0.00	4.75	0.00		
2.20	0.00	4.80	0.00		
2.25	0.00	4.85	0.00		
2.30	0.00	4.90	0.00		
2.35	0.00	4.95	0.00		
2.40	0.00	5.00	0.00		
2.45	0.00	5.05	0.00		
2.50	0.00	5.10	0.00		
2.55	0.00	5.15	0.00		

Pond 5P: detention basin

Inflow Area =	0.240 ac,	Inflow Depth = 0.35"	for 10-Year-0.90 event	
Inflow =	0.20 cfs @	0.17 hrs, Volume=	0.007 af	
Outflow =	0.10 cfs @	0.50 hrs, Volume=	0.007 af,	Atten= 51%, Lag= 19.9 min
Primary =	0.10 cfs @	0.50 hrs, Volume=	0.007 af	
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 625.91' @ 0.50 hrs Surf.Area= 0.005 ac Storage= 0.004 af

Plug-Flow detention time= 18.5 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 18.5 min (36.0 - 17.5)

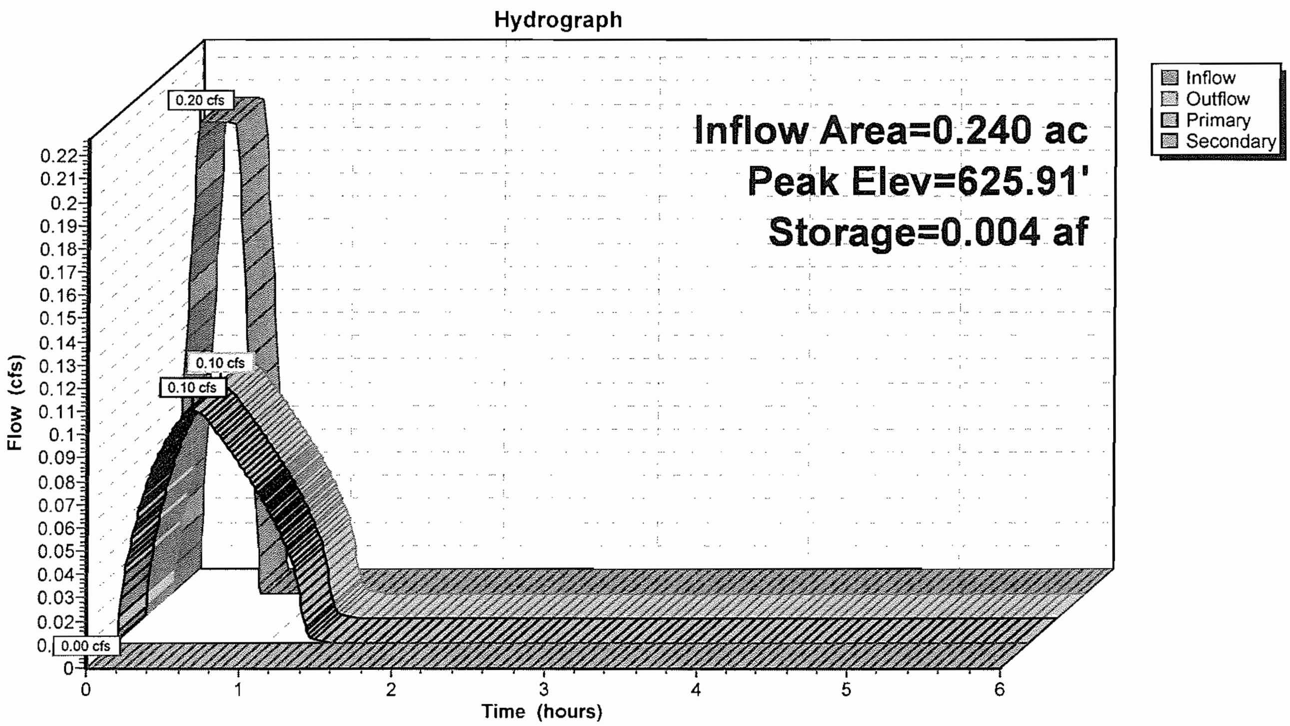
Volume	Invert	Avail.Storage	Storage Description
#1	625.00'	0.009 af	**24.0"D x 60.00'L Horizontal Cylinder**x 2

Device	Routing	Invert	Outlet Devices
#1	Primary	625.00'	**2.0" Horiz. Orifice/Grate 2.0"** Limited to weir flow C= 0.600
#2	Secondary	627.00'	**8.0" Vert. Orifice/Grate** C= 0.600

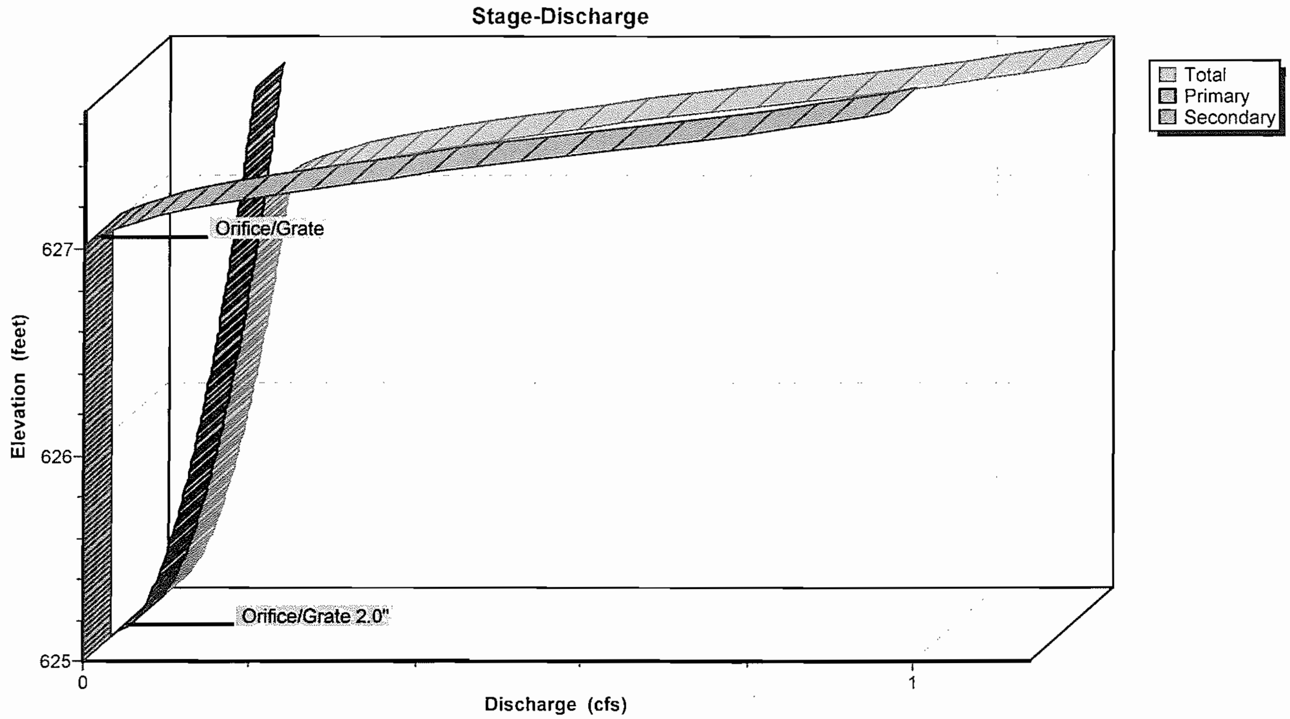
Primary OutFlow Max=0.10 cfs @ 0.50 hrs HW=625.91' (Free Discharge)
└─**1=Orifice/Grate 2.0"** (Orifice Controls 0.10 cfs @ 4.58 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=625.00' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

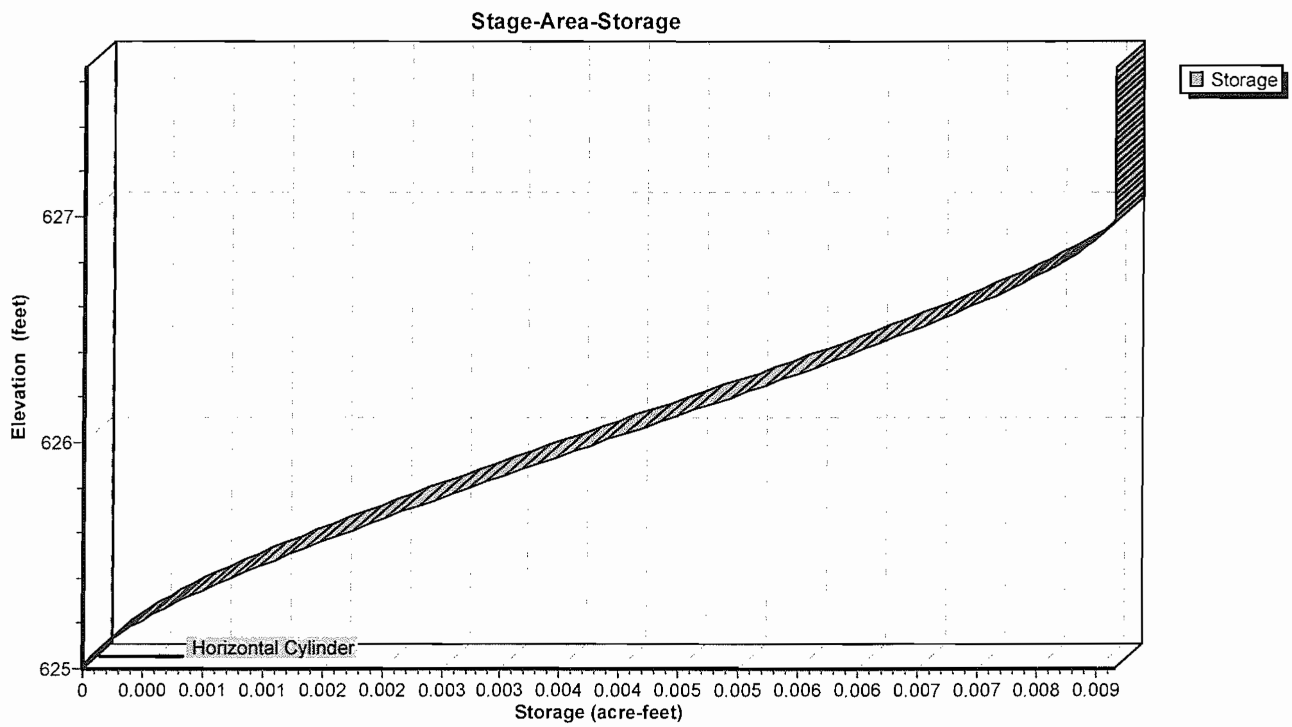
Pond 5P: detention basin



Pond 5P: detention basin



Pond 5P: detention basin



Hydrograph for Pond 5P: detention basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	**0.00**	0.000	625.00	0.00	0.00	**0.00**
0.20	**0.20**	0.001	625.42	0.07	0.07	0.00
0.40	0.20	**0.003**	**625.81**	**0.09**	**0.09**	0.00
0.60	0.00	**0.003**	**625.82**	**0.10**	**0.10**	0.00
0.80	0.00	0.002	625.55	0.08	0.08	0.00
1.00	0.00	0.001	625.30	0.06	0.06	0.00
1.20	0.00	0.000	625.06	0.02	0.02	0.00
1.40	0.00	0.000	625.00	0.00	0.00	0.00
1.60	0.00	0.000	625.00	0.00	0.00	0.00
1.80	0.00	0.000	625.00	0.00	0.00	0.00
2.00	0.00	0.000	625.00	0.00	0.00	0.00
2.20	0.00	0.000	625.00	0.00	0.00	0.00
2.40	0.00	0.000	625.00	0.00	0.00	0.00
2.60	0.00	0.000	625.00	0.00	0.00	0.00
2.80	0.00	0.000	625.00	0.00	0.00	0.00
3.00	0.00	0.000	625.00	0.00	0.00	0.00
3.20	0.00	0.000	625.00	0.00	0.00	0.00
3.40	0.00	0.000	625.00	0.00	0.00	0.00
3.60	0.00	0.000	625.00	0.00	0.00	0.00
3.80	0.00	0.000	625.00	0.00	0.00	0.00
4.00	0.00	0.000	625.00	0.00	0.00	0.00
4.20	0.00	0.000	625.00	0.00	0.00	0.00
4.40	0.00	0.000	625.00	0.00	0.00	0.00
4.60	0.00	0.000	625.00	0.00	0.00	0.00
4.80	0.00	0.000	625.00	0.00	0.00	0.00
5.00	0.00	0.000	625.00	0.00	0.00	0.00
5.20	0.00	0.000	625.00	0.00	0.00	0.00
5.40	0.00	0.000	625.00	0.00	0.00	0.00
5.60	0.00	0.000	625.00	0.00	0.00	0.00
5.80	0.00	0.000	625.00	0.00	0.00	0.00
6.00	0.00	0.000	625.00	0.00	0.00	0.00

Stage-Discharge for Pond 5P: detention basin

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
625.00	0.00	0.00	0.00
625.05	0.02	0.02	0.00
625.10	0.03	0.03	0.00
625.15	0.04	0.04	0.00
625.20	0.05	0.05	0.00
625.25	0.05	0.05	0.00
625.30	0.06	0.06	0.00
625.35	0.06	0.06	0.00
625.40	0.07	0.07	0.00
625.45	0.07	0.07	0.00
625.50	0.07	0.07	0.00
625.55	0.08	0.08	0.00
625.60	0.08	0.08	0.00
625.65	0.08	0.08	0.00
625.70	0.09	0.09	0.00
625.75	0.09	0.09	0.00
625.80	0.09	0.09	0.00
625.85	0.10	0.10	0.00
625.90	0.10	0.10	0.00
625.95	0.10	0.10	0.00
626.00	0.11	0.11	0.00
626.05	0.11	0.11	0.00
626.10	0.11	0.11	0.00
626.15	0.11	0.11	0.00
626.20	0.12	0.12	0.00
626.25	0.12	0.12	0.00
626.30	0.12	0.12	0.00
626.35	0.12	0.12	0.00
626.40	0.12	0.12	0.00
626.45	0.13	0.13	0.00
626.50	0.13	0.13	0.00
626.55	0.13	0.13	0.00
626.60	0.13	0.13	0.00
626.65	0.13	0.13	0.00
626.70	0.14	0.14	0.00
626.75	0.14	0.14	0.00
626.80	0.14	0.14	0.00
626.85	0.14	0.14	0.00
626.90	0.14	0.14	0.00
626.95	0.15	0.15	0.00
627.00	0.15	0.15	0.00
627.05	0.16	0.15	0.01
627.10	0.19	0.15	0.04
627.15	0.23	0.15	0.08
627.20	0.29	0.16	0.13
627.25	0.36	0.16	0.20
627.30	0.44	0.16	0.28
627.35	0.53	0.16	0.37
627.40	0.63	0.16	0.47
627.45	0.74	0.16	0.57
627.50	0.84	0.17	0.68
627.55	0.95	0.17	0.78
627.60	1.04	0.17	0.87
627.65	**1.12**	**0.17**	**0.95**

Stage-Area-Storage for Pond 5P: detention basin

Elevation (feet)	Storage (acre-feet)
625.00	0.000
625.02	0.000
625.04	0.000
625.06	0.000
625.08	0.000
625.10	0.000
625.12	0.000
625.14	0.000
625.16	0.000
625.18	0.000
625.20	0.000
625.22	0.001
625.24	0.001
625.26	0.001
625.28	0.001
625.30	0.001
625.32	0.001
625.34	0.001
625.36	0.001
625.38	0.001
625.40	0.001
625.42	0.001
625.44	0.001
625.46	0.002
625.48	0.002
625.50	0.002
625.52	0.002
625.54	0.002
625.56	0.002
625.58	0.002
625.60	0.002
625.62	0.002
625.64	0.002
625.66	0.002
625.68	0.003
625.70	0.003
625.72	0.003
625.74	0.003
625.76	0.003
625.78	0.003
625.80	0.003
625.82	0.003
625.84	0.003
625.86	0.004
625.88	0.004
625.90	0.004
625.92	0.004
625.94	0.004
625.96	0.004
625.98	0.004
626.00	0.004
626.02	0.004
626.04	0.005
626.06	0.005
626.08	0.005
626.10	0.005
626.12	0.005
626.14	0.005
626.16	0.005
626.18	0.005
626.20	0.005
626.22	0.006
626.24	0.006
626.26	0.006
626.28	0.006
626.30	0.006
626.32	0.006
626.34	0.006
626.36	0.006
626.38	0.006
626.40	0.006
626.42	0.007
626.44	0.007
626.46	0.007
626.48	0.007
626.50	0.007
626.52	0.007
626.54	0.007
626.56	0.007
626.58	0.007
626.60	0.007
626.62	0.008
626.64	0.008
626.66	0.008
626.68	0.008
626.70	0.008
626.72	0.008
626.74	0.008
626.76	0.008
626.78	0.008
626.80	0.008
626.82	0.008
626.84	0.008
626.86	0.008
626.88	0.008
626.90	0.008
626.92	0.009
626.94	0.009
626.96	0.009
626.98	0.009
627.00	**0.009**
627.02	0.009
627.04	0.009
627.06	0.009
627.08	0.009
627.10	0.009
627.12	0.009
627.14	0.009
627.16	0.009
627.18	0.009
627.20	0.009
627.22	0.009
627.24	0.009
627.26	0.009
627.28	0.009
627.30	0.009
627.32	0.009
627.34	0.009
627.36	0.009
627.38	0.009
627.40	0.009
627.42	0.009
627.44	0.009
627.46	0.009
627.48	0.009
627.50	0.009
627.52	0.009
627.54	0.009
627.56	0.009
627.58	0.009
627.60	0.009
627.62	0.009
627.64	0.009
627.66	0.009

APPENDIX C

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Storm Drain Design by Rational Formula - County of San Mateo
Acension Heights Subdivision
Ascension Dr and Bel Aire, San Mateo
10 YEAR STORM
North Side - Line "N"
Exhibit A.2

Label	Description	Tc (min)	Local Intensity (in/hr)	Area Designation	Area (sf)	Area (acres)	C	System Contributing flow (cfs)	Total System Flow (cfs)	Pipe Size (inches)	Pipe Type	Manning's "n"	Pipe Length (ft)	Pipe Slope (ft/ft)	Average Velocity (ft/s)	Pipe Flow Time (min)	Pipe Capacity (cfs)	Exceeds Capacity
CB-N1	(N) COUNTY INLET	10.00	2.20	AREA N-15	12693	0.29	0.60	0.38										
P-N1									0.38	12	HDPE	0.010	105	17.10%	8.133	0.22	19.15	'NO
CB-N2	(N) COUNTY INLET	10.22	2.19	AREA N-14	10952	0.25	0.95	0.52										
				AREA N-7	12879	0.30		0.22*										
P-N2									1.13	12	HDPE	0.010	21	28.60%	10.518	0.03	24.76	'NO
SDMH-N1	(N) COUNTY MANHOLE	10.25	2.19															
P-N3									1.13	12	HDPE	0.010	123	2.40%	3.047	0.67	7.17	'NO
CB-N3	(N) COUNTY INLET	10.25	2.19	AREA N-6	10973	0.25		0.23*										
SDMH-N2	(N) COUNTY MANHOLE																	
P-N4									1.36	12	HDPE	0.010	181	9.40%	6.030	0.50	14.20	'NO
SDMH-N3	(N) COUNTY MANHOLE	10.25	2.19	AREA N-5	9675	0.22		0.21*										
P-N5									1.57	12	HDPE	0.010	350	1.00%	1.967	2.97	4.63	'NO
SDMH-N4	(N) COUNTY MANHOLE	13.21	1.97	AREA N-4	9665	0.22		0.21*										
				AREA N-3	9684	0.22		0.21*										
				AREA N-2	9675	0.22		0.21*										
				AREA N-1	10558	0.24		0.23*										
P-N6									2.43	12	HDPE	0.010	103	0.97%	1.937	0.89	4.56	'NO
CB-N4	(N) COUNTY INLET	10.00	2.20	AREA N-8	11686	0.27		0.22*										
				AREA N-9	11686	0.27		0.22*										
				AREA N-13	2669	0.06	0.95	0.13										
P-N7									3.00	12	HDPE	0.010	123	2.40%	3.047	0.67	7.17	'NO
CB-N5	(N) COUNTY INLET	10.67	2.16	AREA N-10	12013	0.28		0.22*										
				AREA N-12	24709	0.57	0.95	1.16										
P-N8									4.38	12	HDPE	0.010	123	2.40%	3.047	0.67	7.17	'NO
CB-N6	(N) COUNTY INLET	10.00	2.21															
SDMH-N5	(N) COUNTY MANHOLE																	
P-N9									4.38	12	HDPE	0.010	123	2.40%	3.047	0.67	7.17	'NO
SDMH-N6	(N) COUNTY MANHOLE	10.67	2.16															
P-N10									4.38	12	HDPE	0.010	44	9.40%	6.030	0.12	14.20	'NO
CB-N7	(N) COUNTY INLET	10.79	2.15	AREA N-11	20427	0.47	0.60	0.60										
SDMH-N7	(N) COUNTY MANHOLE	10.79	2.15															
P-N11									4.98	12	HDPE	0.010	33	9.40%	6.030	0.09	14.20	'NO
SDMH-N8	(N) COUNTY MANHOLE	10.89	2.14															
P-N12									4.98	12	HDPE	0.010	158	9.40%	6.030	0.44	14.20	'NO
SDMH-N9	(N) COUNTY MANHOLE	11.32	2.11															
P-N13									4.98	12	HDPE	0.010	500	13.10%	7.118	1.17	16.76	'NO
SDMH-C2	(N) COUNTY MANHOLE	12.49	2.03															

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Lea & Braze Job # 2010135

Storm Drain Design by Rational Formula - County of San Mateo

Acension Heights Subdivision

Ascension Dr and Bel Aire, San Mateo

10 YEAR STORM

South Side - Line "S"

Exhibit A.2

Label	Description	Tc (min)	Local Intensity (in/hr)	Area Designation	Area (sf)	Area (acres)	C	System Contributing flow (cfs)	Total System Flow (cfs)	Pipe Size (inches)	Pipe Type	Manning's "n"	Pipe Length (ft)	Pipe Slope (ft/ft)	Average Velocity (ft/s)	Pipe Flow Time (min)	Pipe Capacity (cfs)	Exceeds Capacity
CB-S1	(N) COUNTY INLET	10.00	2.20	AREA S-1	12750.00	0.293		0.29*										
				AREA S-2	11050.00	0.254		0.23*										
				AREA S-3	13372.57	0.307		0.23*										
				AREA S-22	4947.93	0.114	0.95	0.24										
P-S1									0.99	12	HDPE	0.010	139	19.40%	8.662	0.27	20.39	'NO
CB-S2	(N) COUNTY INLET	10.27	2.19	AREA S-21	15545.85	0.357	0.95	0.74										
P-S2									1.73	12	HDPE	0.010	43	2.33%	3.002	0.24	7.07	'NO
CB-S3	(N) V-24 JUNCTION BOX	10.51	2.17	AREA S-4	11974.14	0.275		0.22*										
P-S3									1.95	12	HDPE	0.010	110	52.00%	14.182	0.13	33.39	'NO
CB-S4	(N) COUNTY INLET	10.64	2.16	AREA S-5	11074.50	0.254		0.21*										
				AREA S-6	11074.50	0.254		0.21*										
				AREA S-20	7109.87	0.163	0.95	0.33										
P-S4									0.75	12	HDPE	0.010	115	55.60%	14.665	0.13	34.52	'NO
CB-S5	(N) COUNTY INLET	10.00	2.21	AREA S-7	11709.48	0.269		0.21*										
				AREA S-19	20536.86	0.471	0.6	0.62										
P-S5									0.83	12	HDPE	0.010	116	40.10%	12.454	0.16	29.32	'NO
CB-S6	(N) V-24 CATCH BASIN	10.16	2.19	AREA S-15	12634.44	0.290		0.20*										
P-S6									1.03	12	HDPE	0.010	103	20.60%	8.926	0.19	21.01	'NO
CB-S7	(N) V-24 CATCH BASIN	10.35	2.18	AREA S-14	10627.57	0.244		0.20*										
P-S7									1.23	12	HDPE	0.010	92	20.60%	8.926	0.17	21.01	'NO
CB-S8	(N) V-24 CATCH BASIN	10.52	2.17	AREA S-13	10798.53	0.248		0.20*										
P-S8									2.19	12	HDPE	0.010	92	20.60%	8.926	0.17	21.01	'NO
CB-S9	(N) V-24 CATCH BASIN	10.81	2.15	AREA S-12	10787.89	0.248		0.20*										
P-S9									2.39	12	HDPE	0.010	97	20.60%	8.926	0.18	21.01	'NO
CB-S12	(N) V-24 JUNCTION BOX	10.00	2.21	AREA S-8	12099.67	0.278		0.23*										
P-S12									0.23	12	HDPE	0.010	136	3.10%	3.463	0.65	8.15	'NO
CB-S11	(N) V-24 CATCH BASIN	10.65	2.16	AREA S-9	17789.20	0.408		0.24*										
P-S11						0.000			0.47	12	HDPE	0.010	142	3.10%	3.463	0.68	8.15	'NO
CB-S10	(N) V-24 CATCH BASIN	11.34	2.11	AREA S-11	10891.51	0.250		0.20*										
				AREA S-10	11461.10	0.263		0.22*										
P-S10									5.23	12	HDPE	0.010	35	3.10%	3.463	0.17	8.15	'NO
CB-S13	(N) V-24 CATCH BASIN	10.00	2.21	AREA S-16	17203.00	0.395	0.6	0.52										
P-S12									0.52	12	HDPE	0.010	135	3.10%	3.463	0.65	8.15	'NO
CB-S14	(N) V-24 CATCH BASIN	10.65	2.16	AREA S-17	13823.18	0.317	0.6	0.41										
P-S11									0.93	12	HDPE	0.010	145	3.10%	3.463	0.70	8.15	'NO
CB-S15	(N) V-24 JUNCTION BOX	11.35	2.11	AREA S-18	7945.45	0.182	0.6	0.23										
P-S13									6.39	15	HDPE	0.010	38	3.10%	5.410	0.12	14.78	'NO
SDMH-S1	(N) COUNTY MANHOLE	11.46	2.10															
P-S16									6.39	15	HDPE	0.010	130	1.92%	4.258	0.51	11.63	'NO
SDMH-S2	(N) COUNTY MANHOLE	11.97	2.06															
P-S17									6.39	15	HDPE	0.010	130	1.92%	4.258	0.51	11.63	'NO
SDMH-C2	(N) COUNTY MANHOLE	12.48	2.03															

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Storm Drain Design by Rational Formula - County of San Mateo

Acension Heights Subdivision

Ascension Dr and Bel Aire, San Mateo

10 YEAR STORM

County - Line "C"

Exhibit A.2

Lea & Braze Job # 2010135

Label	Description	Tc (min)	Local Intensity (in/hr)	Area Designation	Area (acres)	C	System Contributing flow (cfs)	Total System Flow (cfs)	Pipe Size (inches)	Pipe Type	Manning's "n"	Pipe Length (ft)	Pipe Slope (ft/ft)	Average Velocity (ft/s)	Pipe Flow Time (min)	Pipe Capacity (cfs)	Exceeds Capacity
I-C1	(E) COUNTY INLET	10.00	2.32	AREA C-1	0.41	0.95	0.90										
P-C1								0.90	15	RCP	0.013	38	1.80%	3.171	0.20	8.66	'NO
I-C2	(E) COUNTY INLET	10.20	2.24	AREA C-2	6.49	0.40	5.81										
P-C2								6.72	15	RCP	0.013	17	2.8%	3.955	0.07	10.81	'NO
I-C3	(E) COUNTY INLET	10.00	2.32	AREA C-3	3.03	0.35	2.46										
P-C3								2.46	15	RCP	0.013	34	23.2%	11.385	0.05	31.10	'NO
SDMH-C1	(E) COUNTY MANHOLE	10.05	2.13														
P-C4								9.18	15	RCP	0.013	26	5.8%	5.693	0.08	15.55	'NO
SDMH-C2	(N) COUNTY MANHOLE	12.49	1.99	NORTH			4.98										
SDMH-C2	(N) COUNTY MANHOLE	12.48	1.99	SOUTH			6.39										
P-C5								20.55	18	RCP	0.013	30	5.8%	8.198	0.06	25.29	'NO
I-C4	(E) COUNTY INLET	12.54	1.99	AREA C-4	0.24	0.95	0.45										
P-C6								21.00	15	RCP	0.013	164	15.7%	9.366	0.29	25.59	'NO
I-C5	(E) COUNTY INLET	12.84	1.97	AREA C-5	2.12	0.40	1.67										
P-C7								22.67	15	RCP	0.013	60	2.0%	3.343	0.30	9.13	'YES
I-C6	(E) COUNTY INLET	13.13	1.95	AREA C-6	0.13	0.95	0.24										
		13.13	1.95	AREA C-7	17.41	0.45	15.30										
P-C8								38.21	18	RCP	0.013	278	14.5%	12.961	0.36	39.99	'NO
I-C7	(E) COUNTY INLET	13.49	1.93	AREA C-8	2.36	0.50	2.28										
P-C9								40.49	18	RCP	0.013	200	13.3%	12.414	0.27	38.29	'YES
I-C8	(E) COUNTY INLET	13.76	1.92	AREA C-9	15.10	0.50	14.47										
P-C10								54.96	21	RCP	0.013	130	12.4%	16.328	0.13	55.82	'NO
I-C9	(E) COUNTY INLET	13.89	1.91	AREA C-10	7.59	0.50	7.24										
P-C11								62.20	24	RCP	0.013	374	14.3%	22.883	0.27	85.52	'NO
I-C10	(E) COUNTY INLET	14.17	1.89	AREA C-11	0.45	0.95	0.81										
P-C12								63.01	24	RCP	0.013	64	10.0%	19.136	0.06	71.51	'NO
I-C11	(E) COUNTY INLET	14.22	1.89	AREA C-12	3.41	0.45	2.90										
P-C13								65.91	30	RCP	0.013	116	1.3%	10.781	0.18	46.75	'YES
OUTLET	PULHEMUS CREEK																

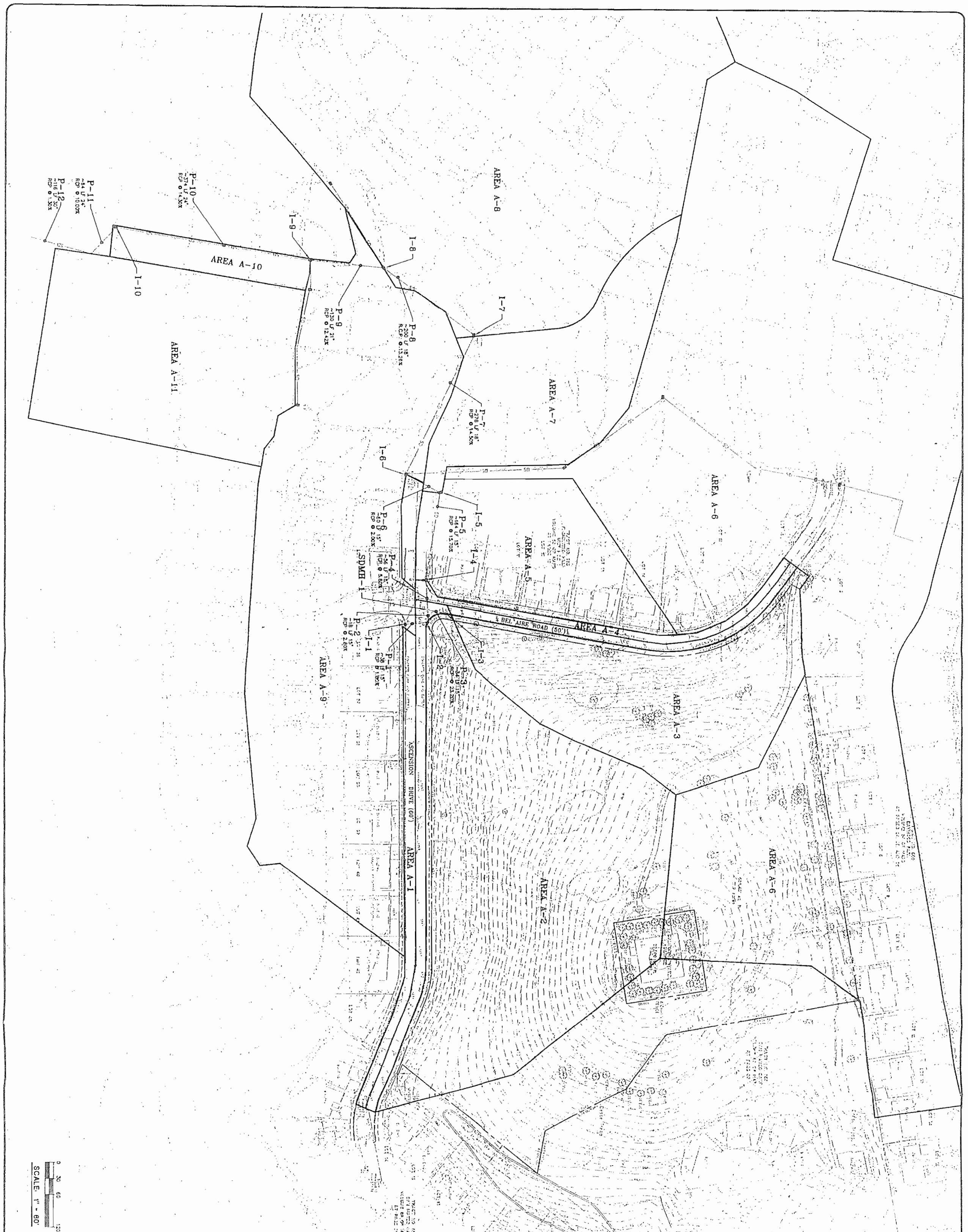


EXHIBIT A.1
EXISTING STORM DRAIN SYSTEM
HYDROLOGY BASE MAP

ASCENSION DR. & BEL AIRE RD.
SAN MATEO, CA
SAN MATEO COUNTY

LEA & SUNG ENGINEERING, INC.
CIVIL ENGINEERS · LAND SURVEYORS
2495 INDUSTRIAL PARKWAY WEST
HAYWARD, CALIFORNIA 94545
(510) 887-4086
FAX (510) 887-3019

JEFFREY C. LEA
No. 31678
Exp. 12-31-00
CIVIL

1

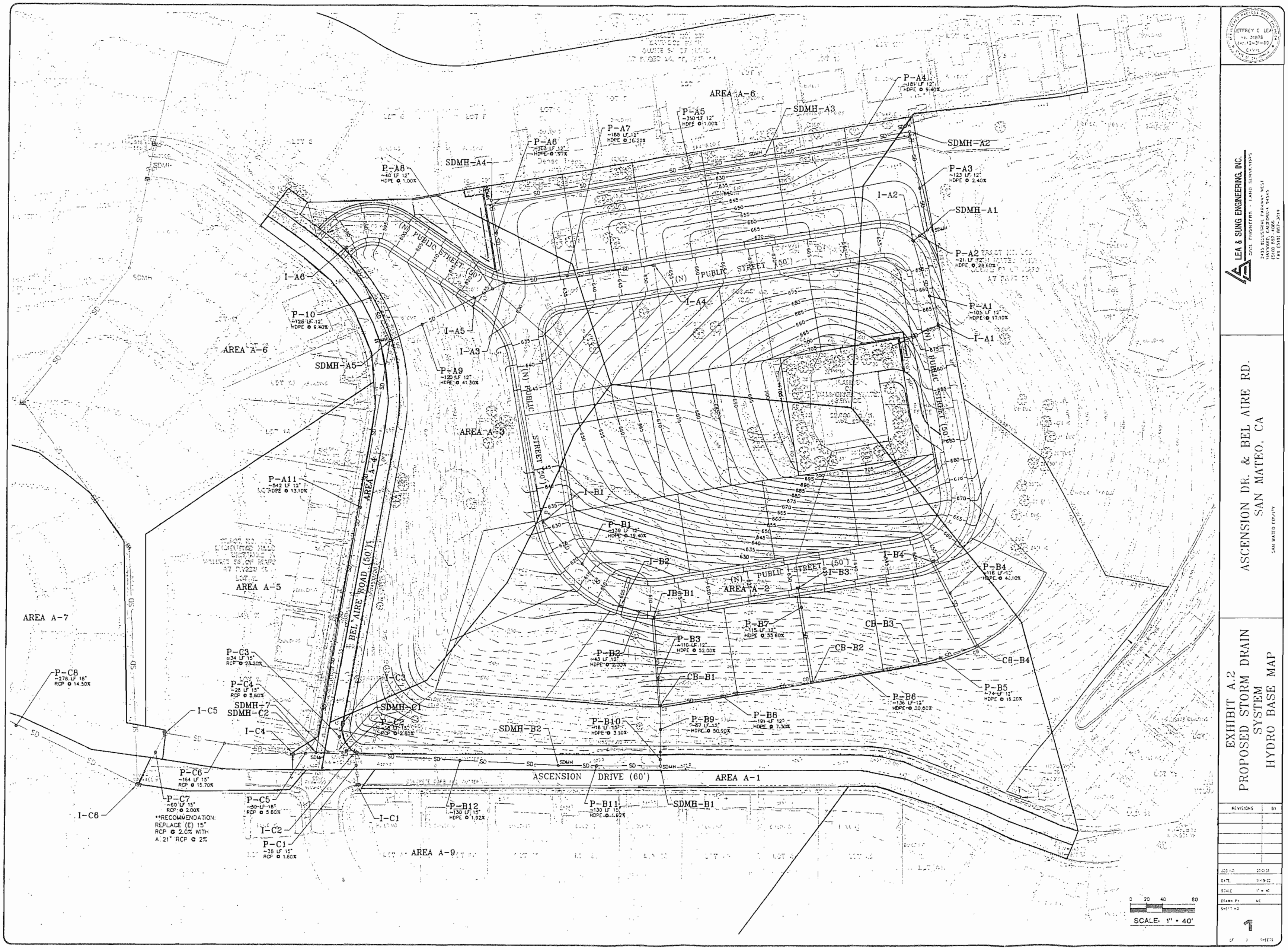
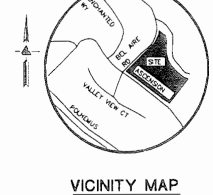


EXHIBIT A.2
PROPOSED STORM DRAIN SYSTEM
HYDRO BASE MAP
ASCENSION DR. & BEL AIRE RD.
SAN MATEO, CA
SAN MATEO COUNTY
LEA & SUNG ENGINEERING, INC.
CIVIL ENGINEERS · LAND SURVEYORS
SCALE: 1" = 40'
ASCENSION DRIVE (60')
BEL AIRE ROAD (50')
(N) PUBLIC STREET (50')
AREA A-1
AREA A-2
AREA A-3
AREA A-4
AREA A-5
AREA A-6
AREA A-7
AREA A-9
SDMH-A1
SDMH-A2
SDMH-A3
SDMH-A4
SDMH-A5
SDMH-B1
SDMH-B2
SDMH-C1
SDMH-C2
SDMH-7
I-A1
I-A2
I-A3
I-A4
I-A5
I-A6
I-B1
I-B2
I-B3
I-B4
JB-B1
CB-B1
CB-B2
CB-B3
CB-B4
I-C1
I-C2
I-C3
I-C4
I-C5
I-C6
P-A1
P-A2
P-A3
P-A4
P-A5
P-A6
P-A7
P-A8
P-A9
P-10
P-A11
P-B1
P-B2
P-B3
P-B4
P-B5
P-B6
P-B7
P-B8
P-B9
P-B10
P-B11
P-B12
P-C1
P-C2
P-C3
P-C4
P-C5
P-C6
P-C7
P-C8
**RECOMMENDATION: REPLACE (E) 15" RCP @ 2.0% WITH A 21" RCP @ 2%

EXHIBIT A.2
PROPOSED STORM DRAIN
SYSTEM
HYDRO BASE MAP
ASCENSION DR. & BEL AIRE RD.
SAN MATEO, CA
LEA & SUNG ENGINEERING, INC.
SCALE: 1" = 40'
ASCENSION DRIVE (60')
BEL AIRE ROAD (50')
(N) PUBLIC STREET (50')
AREA A-1
AREA A-2
AREA A-5
AREA A-7
AREA A-8
AREA A-9
AREA A-10
AREA A-11
P-A11
P-B1
P-B2
P-B3
P-B7
P-B8
P-B9
P-B10
P-B11
P-B12
I-B1
I-B2
I-B3
JB-B1
CB-B1
SDMH-B1
SDMH-B2
SDMH-C1
SDMH-C2
SDMH-7
P-C1
P-C2
P-C3
P-C4
P-C5
P-C6
P-C7
P-C8
P-C9
P-C10
P-C11
P-C12
P-C13
I-C1
I-C2
I-C3
I-C4
I-C5
I-C6
I-C7
I-C8
**RECOMMENDATION:
REPLACE (E) 15"
RCP @ 2.0% WITH
A 21" RCP @ 2%
**RECOMMENDATION:
REPLACE (E) 30"
RCP @ 1.3% WITH
A 36" RCP @ 2%

APPENDIX D

VESTING TENTATIVE SUBDIVISION MAP
ASCENSION HEIGHTS SUBDIVISION
SAN MATEO, CALIFORNIA
(UNINCORPORATED)



VICINITY MAP
NO SCALE

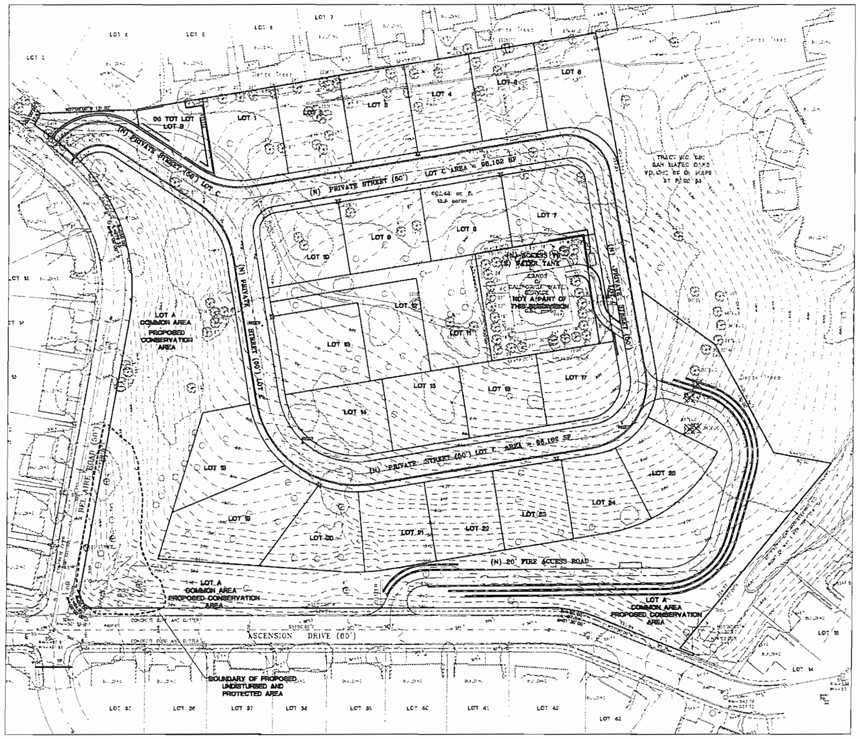
LEGEND

EXISTING | PROPOSED | DESCRIPTION

- BOUNDARY
- PROPERTY LINE
- STORM DRAIN LINE
- SANITARY SEWER LINE
- WATER LINE
- SET BACK LINE
- FLOW DIRECTION
- RETAINING WALL
- CONCRETE VALLEY GUTTER
- SWALE FLOW DIRECTION
- CONTOURS
- SANITARY SEWER MAN HOLE
- SANITARY SEWER CLEANOUT
- STORM DRAIN MAN HOLE
- OVERHEAD UTILITY LINE
- STORM WATER TREATMENT UNIT
- SANITARY SEWER UNDERGROUND LINE
- STORM DRAIN UNDERGROUND LINE
- PINE TREE (UNLESS NOTED)
- MISC. UTILITIES
- FIRE HYDRANT
- ELECTRIC POLE
- TREE
- JOINT POLE
- CATCH BASIN
- CURB INLET
- JUNCTION BOX
- ELECTROLIER
- SMALL SIGN
- LIGHT ON POLE
- GUY ANCHOR
- POST
- FENCE
- TREE
- DENSE TREE LINE
- SPOT ELEVATION
- HORIZONTAL AND VERTICAL CONTROL
- PALM TREE
- CITY MONUMENT
- PACIFIC BELL VAULT
- PG&E VAULT
- GUY ANCHOR
- AREA DRAIN
- TREE TO BE REMOVED

⊕ BENCHMARK

IRON PIPE MONUMENT IN HAND HOLE
PER. TRACT NO. 763
ENCHANTED HILL UNIT NO. 2
VOLUME 53 OF MAPS
AT PAGE 10
ELEVATION=563.81'
ASSUMED



KEY MAP
SCALE: 1" = 60'

PROJECT INFORMATION

OWNER:	JOHN O' ROURKE CHRIS T. JAMES
AREA:	13.25± ACRES
ASSESSOR'S PARCEL NOS.:	1. 041-111-020 2. 041-111-130 3. 041-111-160 4. 041-111-270 5. 041-111-280 6. 041-111-320 7. 041-111-360
CONSULTANTS	
CIVIL ENGINEER/SURVEYOR:	LEA & BRAZE ENGINEERING, INC. 2495 INDUSTRIAL PARKWAY WEST HAYWARD, CA 94545 PH: (510) 887-4086 FAX: (510) 887-3019 CONTACT: JIM TOBY
SUBDIVIDER:	SAN MATEO REAL ESTATE & CONSTRUCTION 1777 BOREL PLACE, SUITE 330 SAN MATEO, CA 94402 PH: (650) 578-0330 CONTACT: DENNIS THOMAS
SUBDIVISION NAME:	ASCENSION HEIGHTS SUBDIVISION
COUNTY/DISTRICT APPROVALS	
ZONING:	R-1/S-8

LOT COVERAGE

		% OF TOTAL BEFORE DEDICATION
INDIVIDUAL LOTS TOTAL:	291,258 S.F.	50%
PRIVATE STREETS:	98,102 S.F.	17%
CONSERVATION/TRAIL/TOT LOT AREA	187,884 S.F.	33%
	TOTAL	
AREA TO BE DEDICATED TO CALIFORNIA WATER	2,821 S.F.	
	TOTAL AREA AFTER DEDICATION	

TREES ON SITE:	78
TREES TO BE REMOVED:	37
	EXISTING TREES REMOVED WILL BE REPLANTED WITH NEW NATIVE TREES AT A 3:1 RATIO.
UTILITY SERVICES:	
STORM DRAIN:	SAN MATEO COUNTY
SANITARY SEWER:	CRYSTAL SPRINGS SANITARY DISTRICT
WATER:	CALIFORNIA WATER
FIRE:	CALIFORNIA DEPARTMENT OF FORESTRY
CABLE:	AT&T CABLE SERVICES
GAS & ELECTRICAL:	PG&E
TELEPHONE:	PACIFIC BELL
EXISTING USE:	VACANT LOT
PROPOSED USE:	-SINGLE FAMILY, RESIDENTIAL HOUSING WITH PUBLIC STREETS -OPEN SPACE WITH TRAILS -TOT LOT

SHEET INDEX

REGISTERED PROFESSIONAL ENGINEER JEFFREY C. LEA No. 31875 Exp. 12-31-08 CIVIL STATE OF CALIFORNIA

LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS · LAND SURVEYORS
2495 INDUSTRIAL PARKWAY WEST
HAYWARD, CALIFORNIA 94545
(510) 887-4086
FAX (510) 887-3019
WWW.LEABRAZE.COM

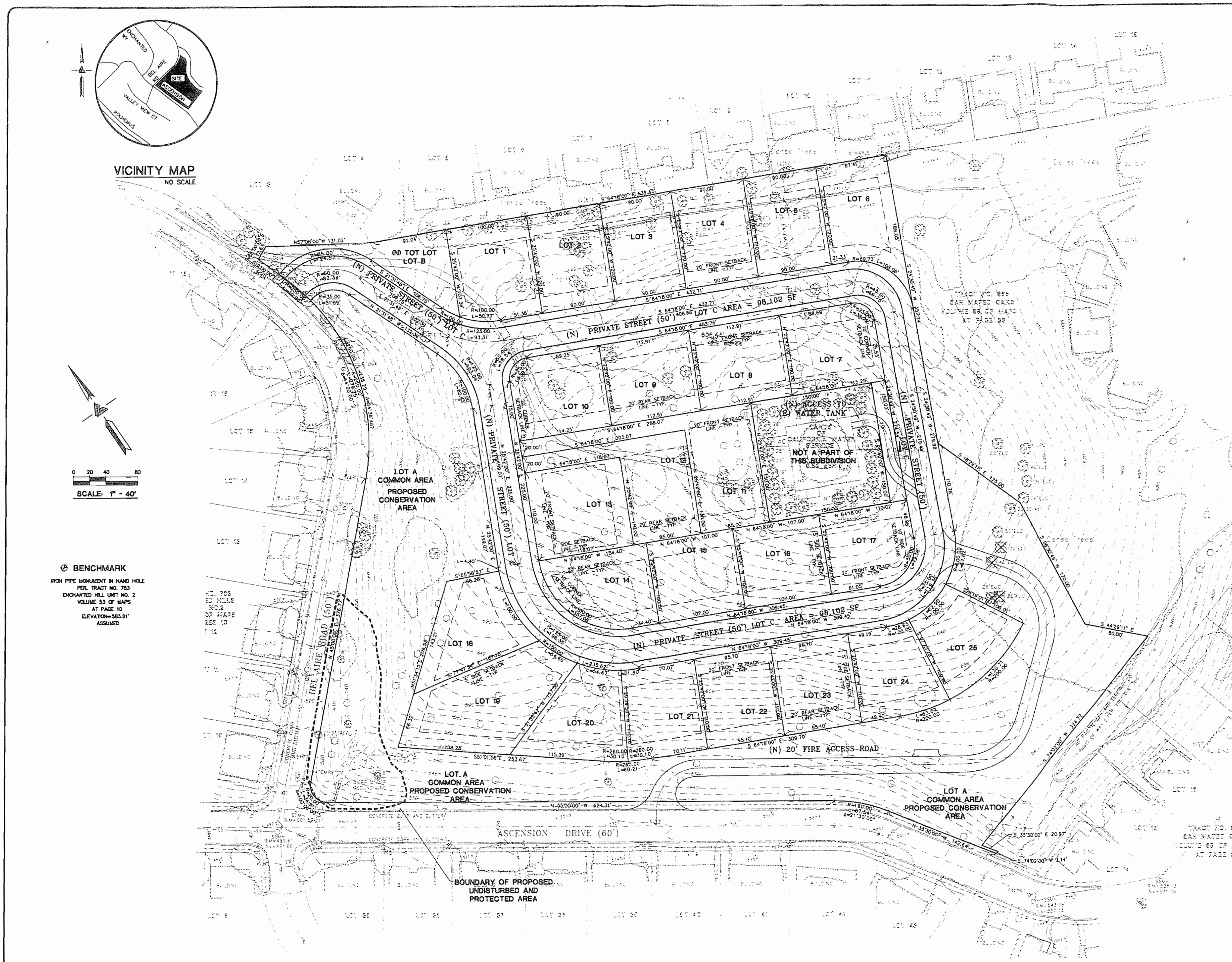
ASCENSION HEIGHTS
SUBDIVISION
SAN MATEO, CALIFORNIA
(UNINCORPORATED) SAN MATEO COUNTY

VESTING TENTATIVE
SUBDIVISION MAP
TITLE SHEET

REVISIONS	BY
6 ENVIRO COMMENTS 1-8-2008	JT

JOB NO:	2010135
DATE:	8-23-02
SCALE:	1" = 40'
DESIGN BY:	JT
DRAWN BY:	MYC
SHEET NO:	C-1

OF 6 SHEETS



LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS · LAND SURVEYORS
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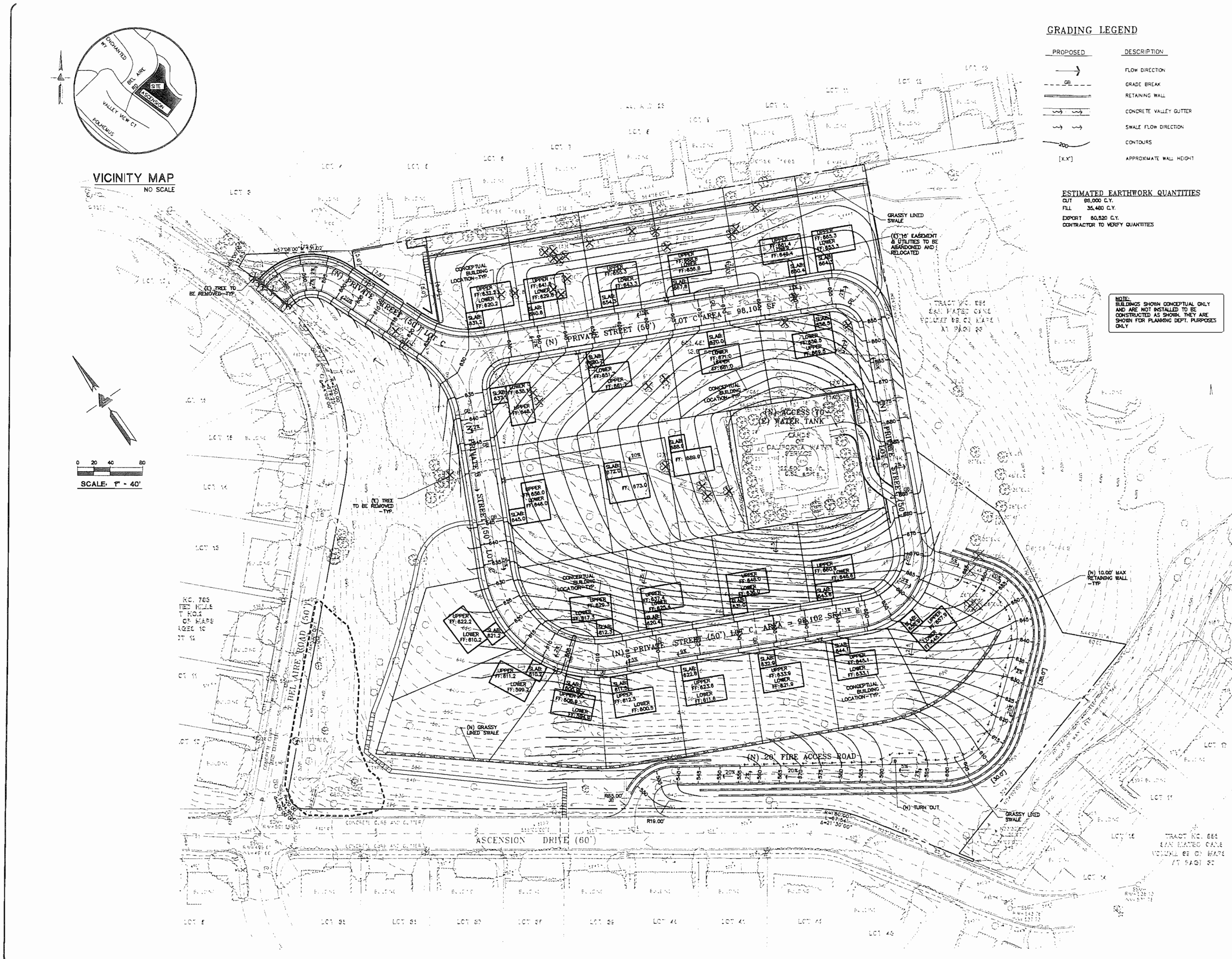
HAYWARD, CALIFORNIA 94545
(510) 887-4086
FAX (510) 887-3019
WWW.LEABRAZE.COM

ASCENSION HEIGHTS
SUBDIVISION
SAN MATEO, CALIFORNIA
(UNINCORPORATED) SAN MATEO COUNTY

VESTING TENTATIVE
SUBDIVISION MAP
LOT LAYOUT PLAN

1	ENVIRO COMMENTS 1-8-2008	JT
	REVISIONS	BY

JOB NO: 2010135
DATE: 8-23-02
SCALE: 1" = 40'
DESIGN BY: JT
DRAWN BY: MP/MYC
SHEET NO:
C-2
OF 6 SHEETS



JEFFREY C. LEA No. 31876 Exp. 12-31-05 CIVIL STATE OF CALIFORNIA

LEA & BRAZE ENGINEERING, INC.
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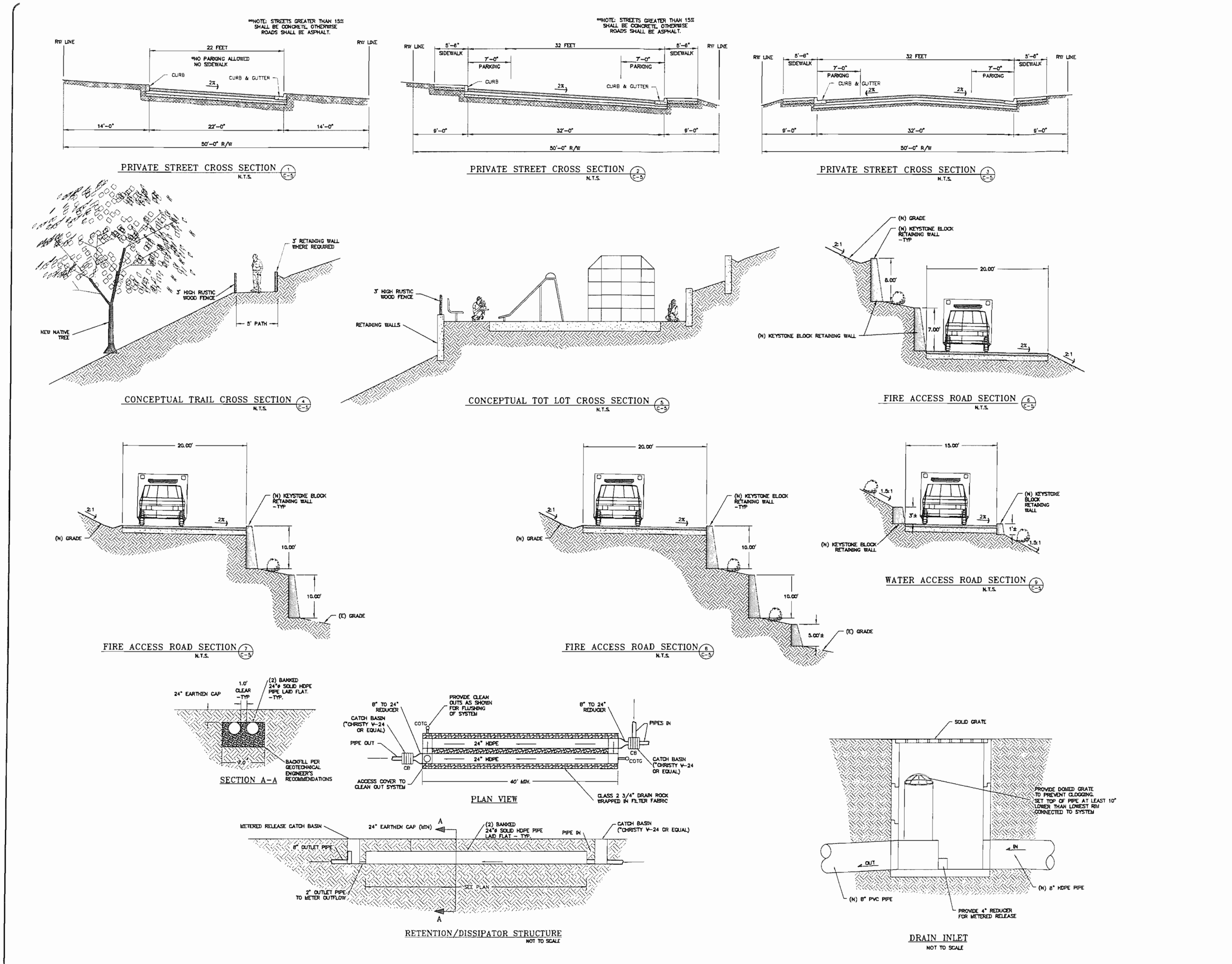
HAYWARD, CALIFORNIA 94545
(510) 887-4086
FAX (510) 887-3019
WWW.LEABRAZE.COM

ASCENSION HEIGHTS SUBDIVISION
SAN MATEO, CALIFORNIA
(UNINCORPORATED) SAN MATEO COUNTY

VESTING TENTATIVE SUBDIVISION MAP PRELIMINARY GRADING AND DRAINAGE PLAN

1 ENVIRO COMMENTS 1-8-2006	JT
REVISIONS	BY
JOB NO:	2010135
DATE:	8-23-02
SCALE:	1" = 40'
DESIGN BY:	JT
DRAWN BY:	MP/MYC
SHEET NO:	C-3
	OF 6 SHEETS

UTILITY LEGEND
PROPOSED
DESCRIPTION
STORM DRAIN LINE
SANITARY SEWER LINE
WATER LINE
SANITARY SEWER MAN HOLE
SANITARY SEWER CLEAN OUT
STORM DRAIN MAIN HOLE
FIRE HYDRANT
CATCH BASIN
CURB INLET
JUNCTION BOX
RETENTION SYSTEM NOTE:
EACH LOT SHALL HAVE ITS OWN INDIVIDUAL RETENTION SYSTEM.
LOTS 1-10, 14-18, & 20 SHALL HAVE (2)-24"ø X 50' LONG SMOOTH-WALLED HDPE RETENTION PIPES. LOTS 11-13, 19, 21-25, SHALL HAVE (2)-24"ø X 60' LONG SMOOTH-WALLED HDPE RETENTION PIPES.
VICINITY MAP
NO SCALE
SITE
ASCENSION
BEL AIRE
ENCHANTED WY
VALLEY VIEW CT
POLHEMUS
SCALE: 1" = 40'
0
20
40
80
LOT 1
LOT 2
LOT 3
LOT 4
LOT 5
LOT 6
LOT 7
LOT 8
LOT 9
LOT 10
LOT 11
LOT 12
LOT 13
LOT 14
LOT 15
LOT 16
LOT 17
LOT 18
LOT 19
LOT 20
LOT 21
LOT 22
LOT 23
LOT 24
LOT 25
(N) TOT LOT
LOT B
LOT C AREA = 98,102 SF
LOT D AREA = 98,102 SF
(N) PRIVATE STREET (50')
(N) PRIVATE STREET (50') LOT C
(N) 20' FIRE ACCESS ROAD
(N) ACCESS TO (E) WATER TANK
CALIFORNIA WATER SERVICE
NOT A PART OF THIS SUBDIVISION
LOT A
COMMON AREA
PROPOSED CONSERVATION
AREA
BOUNDARY OF PROPOSED
UNDISTURBED AND
PROTECTED AREA
25.00' UTILITY & TRAIL EASEMENT
(N) RETAINING WALL
(N) WATER PRESSURE PUMP
(N) RETENTION PIPES - TYP.
(N) GRASSY SWALE
(N) GRASSY LINED SWALE
6.00' STORM DRAIN EASEMENT
6.00' SS EASEMENT
6.00' SD EASEMENT
(N) TURN OUT
(N) CDS STORM TREATMENT UNIT
(E) ERODED SURFACE WITHIN PROTECTED AREA
REMOVE (E) SD IMPROVEMENTS. ACTIVITY OCCURS WITHIN PROTECTED AREA
CONCRETE CURB AND GUTTER
ASCENSION DRIVE (60')
BEL AIRE ROAD (60')
N57°06'00"W 131.02'
10.00' P.U.E.
TRACT NO. 660
HAYWARD PARK
VOLUME 34 OF MAPS
AT PAGES 14, 15, AND 16
TRACT NO. 655
SAN MATEO OAKS
VOLUME 65 OF MAPS
AT PAGE 30
LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS - LAND SURVEYORS
2495 INDUSTRIAL PARKWAY WEST
HAYWARD, CALIFORNIA 94545
(510) 887-4086
FAX (510) 887-3019
WWW.LEABRAZE.COM
ASCENSION HEIGHTS
SUBDIVISION
SAN MATEO, CALIFORNIA
(UNINCORPORATED) SAN MATEO COUNTY
VESTING TENTATIVE
SUBDIVISION MAP
PRELIMINARY UTILITY
COMPOSITE PLAN
ENVIRO COMMENTS 11-8-2006
JT
REVISIONS
BY
JOB NO: 2010135
DATE: 8-23-02
SCALE: 1" = 40'
DESIGN BY: JT
DRAWN BY: MF/MYC
SHEET NO:
C-4
OF 5 SHEETS



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ASCENSION HEIGHTS SUBDIVISION
SAN MATEO, CALIFORNIA
(UNINCORPORATED) SAN MATEO COUNTY

VESTING TENTATIVE SUBDIVISION MAP
CONCEPTUAL DETAILS

ENVIRO COMMENTS 11-8-2006	JT
REVISIONS	BY
JOB NO:	2010135
DATE:	8-23-02
SCALE:	AS NOTED
DESIGN BY:	JT
DRAWN BY:	MP/WYC
SHEET NO:	C-5

OF 5 SHEETS

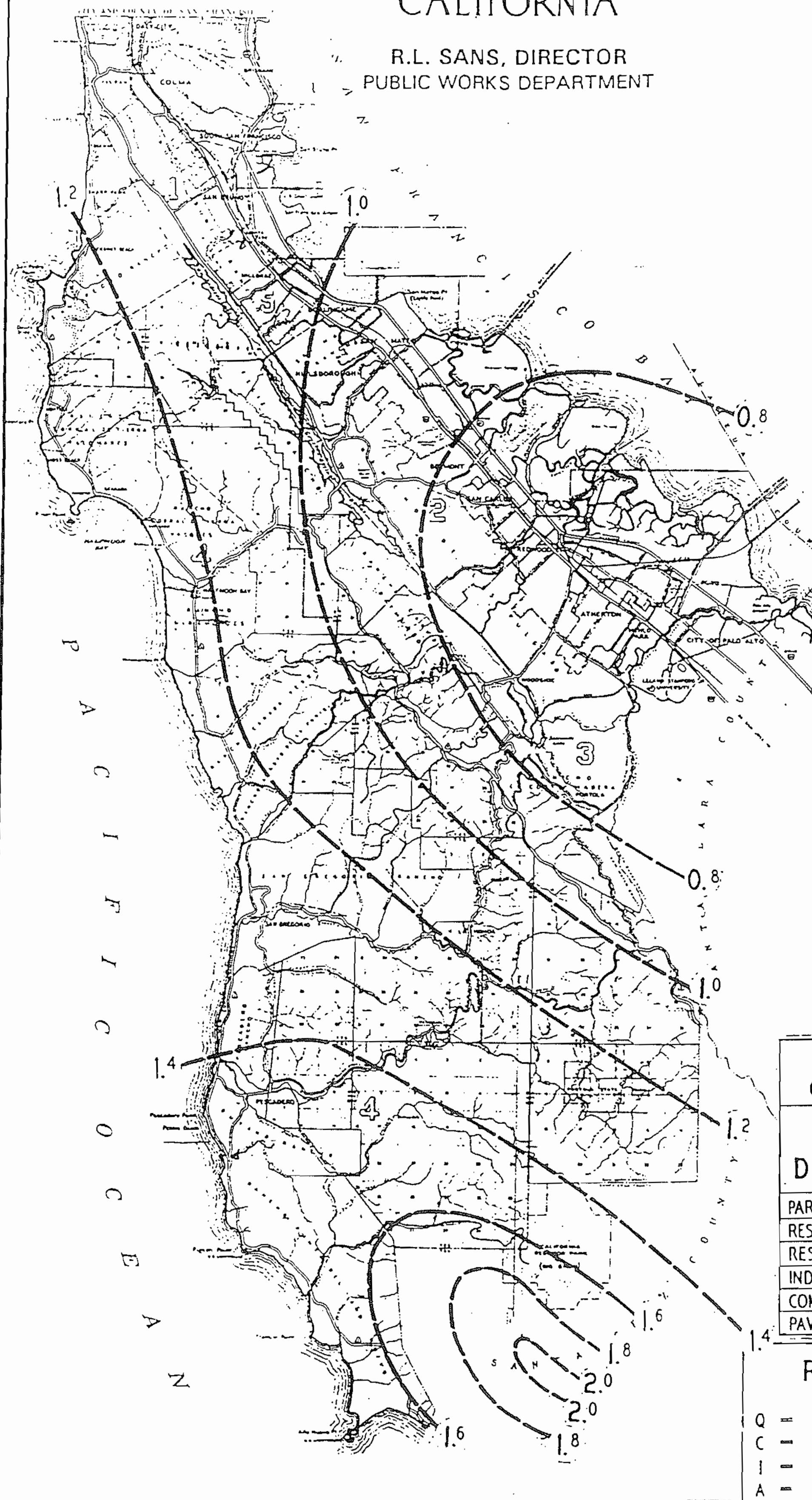
APPENDIX E

RAINFALL RUNOFF DATA

SAN MATEO COUNTY

CALIFORNIA

R.L. SANS, DIRECTOR
PUBLIC WORKS DEPARTMENT



RAINFALL		
TIME OF CONCENTRATION	INTENSITY INCHES PER HOUR	
HRS. MIN.	10 YR.	100 YR.
0 — 10	2.45	3.60
0 — 15	2.05	3.00
0 — 20	1.73	2.55
0 — 25	1.50	2.22
0 — 30	1.33	1.95
0 — 35	1.20	1.75
0 — 40	1.10	1.61
0 — 45	1.02	1.49
0 — 50	0.95	1.37
0 — 55	0.90	1.28
1 — 00	0.86	1.21
1 — 15	0.75	1.07
1 — 30	0.67	0.95
1 — 45	0.61	0.87
2 — 00	0.56	0.80
2 — 30	0.49	0.70
3 — 00	0.44	0.63
3 — 30	0.40	0.57
4 — 00	0.37	0.53
4 — 30	0.34	0.49
5 — 00	0.32	0.45
6 — 00	0.29	0.41
7 — 00	0.26	0.38
8 — 00	0.24	0.35
9 — 00	0.23	0.33
10 — 00	0.21	0.30
12 — 00	0.19	0.27
24 — 00	0.13	0.18

RUNOFF COEFFICIENTS	
TYPE OF DEVELOPMENT	COEF.
PARKS AND CEMETERIES	0.30
RESIDENTIAL - ACRES	0.40
RESIDENTIAL - REGULAR	0.50
INDUSTRIAL	0.65
COMMERCIAL	0.75
PAVED AREAS	0.85

RATIONAL FORMULA

Q = C. I. A. F.

Q = RUNOFF-CUBIC FEET PER SECOND
C = RUNOFF COEFFICIENT - PER CENT
I = RAINFALL INTENSITY - INCHES PER HOUR
A = DRAINAGE AREA - ACRES
F = INTENSITY FACTOR (FROM MAP)

Dr. 22-1846

INTRODUCTION

Ascension Heights Subdivision is a proposed 25-lot development that is situated in the San Mateo Hills area near the College of San Mateo. A new looping public roadway will service the 25 lots proposed by this development. Along with this is a new secondary access road for emergency purposes only. No regular vehicular traffic will be allowed. The land is currently undeveloped with the exception of an existing water tank owned by California Water Service, Inc. The tank is located on a separate parcel located in the middle of the property and is not a part of the proposed subdivision. This parcel is made accessible by a paved roadway with an access easement through the project. The existing property currently drains downhill to public roadways of Bel Aire Road and Ascension Drive to the west and south. The northerly side of the property currently drains down to the existing houses on Parrott Drive while the southerly side drains to the houses on CSM Drive.

The current storm drain system appears to have been installed in the late 1950's when the current subdivision was constructed. The system starts in various locations throughout the neighborhood. All systems then drain into the main line, which follows Ascension Drive from the intersection of Ascension Drive and Bel Aire Road and then flows downhill to a drop inlet at the intersection of Ascension Drive and Polhemus Road. At this point the runoff flows across Polhemus Road and outfalls into Polhemus Creek.

This report is an analysis of and recommendation on the adequacy of the proposed system as well as the impact on the existing storm drain system into which it is planned to. This study is concentrated on the main storm drain line that follows Ascension Drive from the intersection of Bel Aire Road and Ascension Drive to the outfall in Polhemus Creek.

DRAINAGE NARRATIVE

The new development will add approximately 4.55 acres of impervious surface (roads, house, and flatwork) to the site which is now currently undeveloped except for the water tank and access road. The new storm drain system proposed as part of the Tentative Subdivision Map will consist of County-approved inlets, drainage structures, concrete valley gutters and underground pipes. The majority of the proposed system will be smooth-walled High Density Polyethylene (HDPE) plastic pipe. The proposed on-site system will constitute two separate lines, designated in this report as Line "A" and Line "B", which serve the northerly side of the property and the southerly side, respectively.

In compliance with San Mateo County's C.3 requirements, we are proposing to release runoff at predevelopment rates. To accomplish this, all new lots will be constructed with its own detention system. Runoff will be collected in large underground storage pipes and the runoff will released through a metered pipe to restrict runoff. Cumulatively the detention systems have been sized to detain enough runoff to offset the amount of runoff being released through the direct tie in of the street inlets. All runoff is then directed to a new storm drain main on both Ascension and Bel Aire. Prior to leaving the site, the runoff is also proposed to be treated via a CDS mechanical separator unit.

This new storm drain lines will then connect into a new common manhole at the intersection of Ascension Drive and Bel Aire Road. The system then connects into the existing system, following Ascension Drive down to Polhemus Road. The runoff is then released into Polhemus Creek.

The site currently has extensive soil erosion on portions of the site as discussed in the *"Geotechnical and Engineering Geologic Investigation"* [1] This surface erosion is proposed to be repaired as part of the subdivision. The new valley gutters and storm drain infrastructure are designed to take a significant amount of runoff away from these areas and thus help prevent future erosion.

The new impervious surface runoff associated with the development consists of the following:

New roadway and sidewalk surface	2.25 Acres
New house and driveways	2.30 Acres
(Assumed at 4000 s.f. per lot)	
Total	4.55 Acres

ASSUMPTIONS AND METHODOLOGY

In performing the hydrological calculations, the Rational Method (Q=C*I*A) was used, as specified in the "San Mateo County, Guidelines for Drainage Review". A 10-year storm event interval was used in the calculations. Per instructions in the guideline and confirmation with Pete Bentley, engineer with the County. The project is outside of any floodplain. Please note that several flows are shown that have been determined via computer hydrograph analysis submitted as a separate report..

[1] *"Geotechnical and Engineering Geologic Investigation"*, by Michelucci and Associates, Inc., dated December 16, 2002, Job No. 01-3186

The size, slope, material type and location of the existing system was done in combination of a field survey which located and verified "As-built" conditions of the system and the original improvement plans[2] for the system.

The runoff coefficient "C" was determined in two ways. The first method used to determine the "C" values was by using the values given in the Rainfall Runoff Data Chart[3]. The second method used for determining "C" values for areas that include the large areas of undeveloped land that compromise the parcel was determined by a weighted average method of calculating the percentage of each type of surface, whether residential, asphalt streets or open space.[4]

The Time of Concentration (Tc) was determined by assuming an initial Tc at the uppermost inlet. Starting with the initial Tc and adding the pipe flow time, we then computed the actual Tc at each structure. Since multiple storm drain systems connected to the main system, the overall area and the longest Tc value was used for each structure. Thus some structures jump dramatically in time from the upstream inlet because the runoff took longer to get to this inlet via the branch system that connected to it.

The values for the frictional coefficient, "n" were determined by both manufacturers specifications for the new Corrugated HDPE smooth wall pipe and a good condition for the existing reinforced concrete pipe.

Pipe	"n"
HANCOR Hi-Q® PIPE[5]	0.011
Reinforced Concrete Pipe (good condition)[6]	0.013

Hydraulic information was also omitted in this report. Since the slope of the majority of the pipes is in excess of 10% and the new and existing systems are located in a very steep environment, there is negligible chance of having any hydraulic problems. In most instances the hydraulic grade line will simply be the actual water level of the runoff in the pipe section itself. Pete Bentley, engineer for the County of San Mateo, agreed and said that the County would not require any hydraulic calculations.

2 Improvement Plans – Enchanted Hills Unit No. 2, dated November 1959.
3 Rainfall Runoff Data, San Mateo County
4 Drainage Manual, County of Santa Clara, Department of Public Works.
5 HANCOR Hi-Q® PIPE SPECIFICATION, http://www.hancor.com/product/hiqspecs.html
6 Drainage Manual, County of Santa Clara, Department of Public Works.

RESULTS

Detailed hydrology calculations for both the existing and proposed systems are shown in Exhibit “A”. The calculations take into account all the information shown in the references sheet, the assumptions and methodology section of this report and good engineering judgment.

EXISTING SYSTEM

The results of the calculations shown in Exhibit “A.1” show that the existing system is able to handle to current pre-development runoff with two pipe run exceptions. Pipe PC-7 as shown on the existing hydrology base map is a 15” RCP sloped at 2%. This exceeds capacity of the pipe by almost 20%. This is primarily due to its flat slope. The outfall pipe, PC-13 that crosses Polhemus Road is also over capacity. This is a 30” RCP sloped at 1.3%. This too has capacity problems due to its flat slope. All other pipes exceed the capacity requirements.

PROPOSED SYSTEM

The proposed system is specifically designed to not only handle a 10 year event, but also a 100 year event.

HOW THE PROPOSED SYSTEM WILL IMPACT THE EXISTING SYSTEM

The proposed design will have little impact on the existing system. Since the proposed system has a great deal of capacity to it and a long time of concentration, the runoff will be contained in the pipe for some time before it has a chance to severely impact the existing system. The actual system flow is increased with the additional impervious surfaces, however the majority of the pipes in the system are able to handle the additional runoff with no adverse effects. As with the existing system, however, the added runoff has an adverse effect on the same two pipes that posed problems on the existing system.

Should the rainfall from a severe storm exceed that of a 10-year event, or the lines or inlets get clogged, the water does have an overland release via the public streets. Due to the extreme slope of the existing streets, any runoff that is not intercepted by the existing storm drain system will simply drain down Ascension and flow over Pulhemus Road and into the creek. Thus it is anticipated that none of the existing houses or neighboring hillsides in the neighborhood would be affected by any flooding as a result of additional runoff imposed by this development. The proposed on-site system does have some low spots to it in the new public street that would prevent overland release via the streets. In this case the pipes have been intentionally oversized to handle as much capacity as possible, even in the event of some blockage.

RECOMMENDATIONS

The analysis incorporated in this report has shown that the existing system can handle the anticipated additional runoff from the proposed development, except for two specific pipes. It is recommended that these pipes be redesigned and upsized to increase their capacity, both for the existing condition and the proposed development.

In the case of pipe PC-7, in which a 15" RCP flowing at 2.0% is crossing Ascension Drive at Enchanted Way, we recommend a new 21" RCP replace the existing pipe. Since the upstream and downstream pipe are of adequate size, it is more reasonable to simply replace the pipe at the same invert locations as is currently in place.

In the case of pipe PC-13, in which a 30" RCP flows at 1.3%, it is feasible to both increase the size of the pipe as well as increase the slope. The upstream invert of this outgoing pipe is several feet lower than the incoming pipe invert, thus the invert can be raised and not affect the upstream pipe. We recommend replacing the existing 30" RCP with a 36" RCP sloped at 2%.

In both cases, the recommendations will allow the entire system to handle the design storm event with a factor of safety built into it.

The calculations for the above recommendations are shown in Exhibit A.3

References

1. Rainfall Runoff Data, San Mateo County, California
2. San Mateo County, Guideline for Drainage Review
3. Tentative Subdivision Map dated 8-23-02 and revised 1-31-03.
4. County Aerial Map 9E
5. Improvement Plans – Enchanted Hills Unit No. 2, dated November 1959.``
6. "Drainage Manual", Santa Clara County, Department of Public Works
7. "Geotechnical and Engineering Geologic Investigation", by Michelucci and Associates, Inc., dated December 16, 2002, Job No. 01-3186
8. HANCOR Hi-Q® PIPE SPECIFICATION, http://www.hancor.com/product/hiqspecs.html

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Storm Drain Design by Rational Formula - County of San Mateo
Acension Heights Subdivision
Ascension Dr and Bel Aire, San Mateo
10 YEAR STORM
South Side - Line "S"
Exhibit A.2

Label	Description	Tc (min)	Local Intensity (in/hr)	Area Designation	Area (sf)	Area (acres)	C	System Contributing flow (cfs)	Total System Flow (cfs)	Pipe Size (inches)	Pipe Type	Manning's "n"	Pipe Length (ft)	Pipe Slope (ft/ft)	Average Velocity (ft/s)	Pipe Flow Time (min)	Pipe Capacity (cfs)	Exceeds Capacity
CB-S1	(N) COUNTY INLET	10.00	2.20	AREA S-1	12750.00	0.293	*	0.13										
				AREA S-2	11050.00	0.254	*	0.11										
				AREA S-3	13372.57	0.307	*	0.11										
				AREA S-22	4947.93	0.114	0.95	0.24										
P-S1									0.59	12	HDPE	0.010	139	19.40%	8.662	0.27	20.39	'NO
CB-S2	(N) COUNTY INLET	10.27	2.19	AREA S-21	15545.85	0.357	0.95	0.74										
P-S2									1.33	12	HDPE	0.010	43	2.33%	3.002	0.24	7.07	'NO
CB-S3	(N) V-24 JUNCTION BOX	10.51	2.17	AREA S-4	11974.14	0.275	*	0.11										
P-S3									1.44	12	HDPE	0.010	110	52.00%	14.182	0.13	33.39	'NO
CB-S4	(N) COUNTY INLET	10.64	2.16	AREA S-5	11074.50	0.254	*	0.11										
				AREA S-6	11074.50	0.254	*	0.11										
				AREA S-20	7109.87	0.163	0.95	0.33										
P-S4									0.55	12	HDPE	0.010	115	55.60%	14.665	0.13	34.52	'NO
CB-S5	(N) COUNTY INLET	10.00	2.21	AREA S-7	11709.48	0.269	*	0.11										
				AREA S-19	20536.86	0.471	0.6	0.62										
P-S5									0.73	12	HDPE	0.010	116	40.10%	12.454	0.16	29.32	'NO
CB-S6	(N) V-24 CATCH BASIN	10.16	2.19	AREA S-15	12634.44	0.290	*	0.10										
P-S6									0.83	12	HDPE	0.010	103	20.60%	8.926	0.19	21.01	'NO
CB-S7	(N) V-24 CATCH BASIN	10.35	2.18	AREA S-14	10627.57	0.244	*	0.10										
P-S7									0.93	12	HDPE	0.010	92	20.60%	8.926	0.17	21.01	'NO
CB-S8	(N) V-24 CATCH BASIN	10.52	2.17	AREA S-13	10798.53	0.248	*	0.10										
P-S8									1.59	12	HDPE	0.010	92	20.60%	8.926	0.17	21.01	'NO
CB-S9	(N) V-24 CATCH BASIN	10.81	2.15	AREA S-12	10787.89	0.248	*	0.10										
P-S9									1.69	12	HDPE	0.010	97	20.60%	8.926	0.18	21.01	'NO
CB-S12	(N) V-24 JUNCTION BOX	10.00	2.21	AREA S-8	12099.67	0.278	*	0.11										
P-S12									0.11	12	HDPE	0.010	136	3.10%	3.463	0.65	8.15	'NO
CB-S11	(N) V-24 CATCH BASIN	10.65	2.16	AREA S-9	17789.20	0.408	*	0.11										
P-S11						0.000			0.22	12	HDPE	0.010	142	3.10%	3.463	0.68	8.15	'NO
CB-S10	(N) V-24 CATCH BASIN	11.34	2.11	AREA S-11	10891.51	0.250	*	0.10										
				AREA S-10	11461.10	0.263	*	0.11										
P-S10									3.56	12	HDPE	0.010	35	3.10%	3.463	0.17	8.15	'NO
CB-S13	(N) V-24 CATCH BASIN	10.00	2.21	AREA S-16	17203.00	0.395	0.6	0.52										
P-S12									0.52	12	HDPE	0.010	135	3.10%	3.463	0.65	8.15	'NO
CB-S14	(N) V-24 CATCH BASIN	10.65	2.16	AREA S-17	13823.18	0.317	0.6	0.41										
P-S11									0.93	12	HDPE	0.010	145	3.10%	3.463	0.70	8.15	'NO
CB-S15	(N) V-24 JUNCTION BOX	11.35	2.11	AREA S-18	7945.45	0.182	0.6	0.23										
P-S13									4.72	15	HDPE	0.010	38	3.10%	5.410	0.12	14.78	'NO
SDMH-S1	(N) COUNTY MANHOLE	11.46	2.10	**														
P-S16									4.72	15	HDPE	0.010	130	1.92%	4.258	0.51	11.63	'NO
SDMH-S2	(N) COUNTY MANHOLE	11.97	2.06	**														
P-S17									4.72	15	HDPE	0.010	130	1.92%	4.258	0.51	11.63	'NO
SDMH-C2	(N) COUNTY MANHOLE	12.48	2.03	**														

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Storm Drain Design by Rational Formula - County of San Mateo

Acension Heights Subdivision

Ascension Dr and Bel Aire, San Mateo
10 YEAR STORM
North Side - Line "N"
Exhibit A.2

Lea & Braze Job # 2010135

Label	Description	Tc (min)	Local Intensity (in/hr)	Area Designation	Area (sf)	Area (acres)	C	System Contributing flow (cfs)	Total System Flow (cfs)	Pipe Size (inches)	Pipe Type	Manning's "n"	Pipe Length (ft)	Pipe Slope (ft/ft)	Average Velocity (ft/s)	Pipe Flow Time (min)	Pipe Capacity (cfs)	Exceeds Capacity
CB-N1	(N) COUNTY INLET	10.00	2.20	AREA N-15	12693	0.29	0.60	0.38										
P-N1									0.38	12	HDPE	0.010	105	17.10%	8.133	0.22	19.15	'NO
CB-N2	(N) COUNTY INLET	10.22	2.19	AREA N-14	10952	0.25	0.95	0.52										
				AREA N-7	12879	0.30	*	0.11										
P-N2									1.02	12	HDPE	0.010	21	28.60%	10.518	0.03	24.76	'NO
SDMH-N1	(N) COUNTY MANHOLE	10.25	2.19	**														
P-N3									1.02	12	HDPE	0.010	123	2.40%	3.047	0.67	7.17	'NO
CB-N3	(N) COUNTY INLET	10.25	2.19	AREA N-6	10973	0.25	*	0.11										
SDMH-N2	(N) COUNTY MANHOLE			**														
P-N4									1.13	12	HDPE	0.010	181	9.40%	6.030	0.50	14.20	'NO
SDMH-N3	(N) COUNTY MANHOLE	10.25	2.19	AREA N-5	9675	0.22	*	0.11										
P-N5									1.24	12	HDPE	0.010	350	1.00%	1.967	2.97	4.63	'NO
SDMH-N4	(N) COUNTY MANHOLE	13.21	1.97	AREA N-4	9665	0.22	*	0.11										
				AREA N-3	9684	0.22	*	0.11										
				AREA N-2	9675	0.22	*	0.11										
				AREA N-1	10558	0.24	*	0.11										
P-N6									1.68	12	HDPE	0.010	103	0.97%	1.937	0.89	4.56	'NO
CB-N4	(N) COUNTY INLET	10.00	2.20	AREA N-8	11686	0.27	*	0.11										
				AREA N-9	11686	0.27	*	0.11										
				AREA N-13	2669	0.06	0.95	0.13										
P-N7									2.03	12	HDPE	0.010	123	2.40%	3.047	0.67	7.17	'NO
CB-N5	(N) COUNTY INLET	10.67	2.16	AREA N-10	12013	0.28	*	0.11										
				AREA N-12	24709	0.57	0.95	1.16										
P-N8									3.30	12	HDPE	0.010	123	2.40%	3.047	0.67	7.17	'NO
CB-N6	(N) COUNTY INLET	10.00	2.21	**														
SDMH-N5	(N) COUNTY MANHOLE			**														
P-N9									3.30	12	HDPE	0.010	123	2.40%	3.047	0.67	7.17	'NO
SDMH-N6	(N) COUNTY MANHOLE	10.67	2.16	**														
P-N10									3.30	12	HDPE	0.010	44	9.40%	6.030	0.12	14.20	'NO
CB-N7	(N) COUNTY INLET	10.79	2.15	AREA N-11	20427	0.47	0.60	0.60										
SDMH-N7	(N) COUNTY MANHOLE	10.79	2.15	**														
P-N11									3.90	12	HDPE	0.010	33	9.40%	6.030	0.09	14.20	'NO
SDMH-N8	(N) COUNTY MANHOLE	10.89	2.14	**														
P-N12									3.90	12	HDPE	0.010	158	9.40%	6.030	0.44	14.20	'NO
SDMH-N9	(N) COUNTY MANHOLE	11.32	2.11	**														
P-N13									3.90	12	HDPE	0.010	500	13.10%	7.118	1.17	16.76	'NO
SDMH-C2	(N) COUNTY MANHOLE	12.49	2.03	**														

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Storm Drain Design by Rational Formula - County of San Mateo
Acension Heights Subdivision
Ascension Dr and Bel Aire, San Mateo
10 YEAR STORM
County - Line "C"
Exhibit A.2

Lea & Braze Job # 2010135

Label	Description	Tc (min)	Local Intensity (in/hr)	Area Designation	Area (acres)	C	System Contributing flow (cfs)	Total System Flow (cfs)	Pipe Size (inches)	Pipe Type	Manning's "n"	Pipe Length (ft)	Pipe Slope (ft/ft)	Average Velocity (ft/s)	Pipe Flow Time (min)	Pipe Capacity (cfs)	Exceeds Capacity
I-C1	(E) COUNTY INLET	10.00	2.32	AREA C-1	0.41	0.95	0.90										
P-C1								0.90	15	RCP	0.013	38	1.80%	3.171	0.20	8.66	'NO
I-C2	(E) COUNTY INLET	10.20	2.24	AREA C-2	6.49	0.40	5.81										
P-C2								6.72	15	RCP	0.013	17	2.8%	3.955	0.07	10.81	'NO
I-C3	(E) COUNTY INLET	10.00	2.32	AREA C-3	3.03	0.35	2.46										
P-C3								2.46	15	RCP	0.013	34	23.2%	11.385	0.05	31.10	'NO
SDMH-C1	(E) COUNTY MANHOLE	10.05	2.13	**													
P-C4								9.18	15	RCP	0.013	26	5.8%	5.693	0.08	15.55	'NO
SDMH-C2	(N) COUNTY MANHOLE	12.49	1.99	NORTH			3.90										
SDMH-C2	(N) COUNTY MANHOLE	12.48	1.99	SOUTH			4.98										
P-C5								18.06	18	RCP	0.013	30	5.8%	8.198	0.06	25.29	'NO
I-C4	(E) COUNTY INLET	12.54	1.99	AREA C-4	0.24	0.95	0.45										
P-C6								18.51	15	RCP	0.013	164	15.7%	9.366	0.29	25.59	'NO
I-C5	(E) COUNTY INLET	12.84	1.97	AREA C-5	2.12	0.40	1.67										
P-C7								20.18	15	RCP	0.013	60	2.0%	3.343	0.30	9.13	'YES
I-C6	(E) COUNTY INLET	13.13	1.95	AREA C-6	0.13	0.95	0.24										
		13.13	1.95	AREA C-7	17.41	0.45	15.30										
P-C8								35.72	18	RCP	0.013	278	14.5%	12.961	0.36	39.99	'NO
I-C7	(E) COUNTY INLET	13.49	1.93	AREA C-8	2.36	0.50	2.28										
P-C9								38.00	18	RCP	0.013	200	13.3%	12.414	0.27	38.29	'NO
I-C8	(E) COUNTY INLET	13.76	1.92	AREA C-9	15.10	0.50	14.47										
P-C10								52.47	21	RCP	0.013	130	12.4%	16.328	0.13	55.82	'NO
I-C9	(E) COUNTY INLET	13.89	1.91	AREA C-10	7.59	0.50	7.24										
P-C11								59.71	24	RCP	0.013	374	14.3%	22.883	0.27	85.52	'NO
I-C10	(E) COUNTY INLET	14.17	1.89	AREA C-11	0.45	0.95	0.81										
P-C12								60.52	24	RCP	0.013	64	10.0%	19.136	0.06	71.51	'NO
I-C11	(E) COUNTY INLET	14.22	1.89	AREA C-12	3.41	0.45	2.90										
P-C13								63.42	30	RCP	0.013	116	1.3%	10.781	0.18	46.75	'YES
OUTLET	PULHEMUS CREEK																

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September 18, 2008

Ms. Jennie Anderson
Project Manager
Christopher A. Joseph & Associates
101 H Street, Suite Q
Petaluma, California 94592

Subject: ***Review of Revised Hydrology Studies for Ascension Heights Subdivision in San Mateo County***

Dear Ms. Anderson:

Schaaf & Wheeler first reviewed the applicant's hydrologic analyses for this proposed subdivision in August 2003. At your request, I have reviewed additional materials provided by Christopher A. Joseph including:

1. A project description (Section III of your Administrative Draft EIR) dated September 2008;
2. "Hydrology Study: Ascension Heights Subdivision," by Lea & Braze, October 17, 2006; and
3. Drainage report prepared by Lea & Braze, received by San Mateo County on July 16, 2007.

This review places new information within the context of your DEIR Hydrology and Water Quality narrative (Section IV.E), particularly the project impacts and mitigation measures. I have also reviewed issues discussed in our August 20, 2003 peer review and assess whether those issues have been adequately addressed.

Impact HYDRO-1 Violate Water Quality Standards or Waste Discharge Requirements

In 2003 the San Mateo countywide municipal stormwater permit was amended to include stricter requirements for post-construction stormwater control measures. New development projects such as Ascension Heights are required by the NPDES permit to incorporate site design, source control, and treatment measures to the "maximum extent practicable" and to use stormwater control measures that are technically feasible (likely to be effective) and not cost prohibitive. "C.3" Provisions of the NPDES permit describe these requirements.

Beginning in August 2006, any project that creates at least 10,000 square feet of impervious surface must comply with C.3 Provisions of the NPDES permit. Based on an assumption of maximum allowable building footprint, the proposed Ascension Heights subdivision is estimated to create 233,000 square feet (5.35 acres) of impervious surface and must therefore comply with C.3 Provisions. San Mateo County has regulatory authority to administer the permit and enforce its requirements.

Since more than one acre of impervious surface would be created, and the project is not located in an exempt area, the project must also incorporate hydromodification management (HMP) measures. (NPDES Provision C.3.f) We have not been provided with any specific HMP calculations or discussion for Ascension Heights, although the on-site detention systems as described may also serve to meet hydromodification goals, which are to minimize the change in the rate of runoff after development. As explained subsequently, the on-site storage calculations are based on the control of event-based stormwater runoff, and are not equivalent to analytical techniques for hydromodification currently employed in the industry.

Acceptable site design measures undertaken by the project applicant include:

- Preserving existing trees and vegetation. Lot A is proposed by the applicant as a conservation area and preserves a significant number of the existing trees on site. The applicant proposes to remove 37 of the 78 trees on site, and replace removed trees at a three to one ratio with new native trees.

- Using self-treated areas. Lot A will be left in its natural condition and stormwater runoff treatment is not required for this drainage.

- Minimizing impervious surfaces. If maximum allowable building coverage is assumed for each lot, approximately 40 percent of the total site will be covered by impervious surface at build-out. While this percentage is higher than in the existing condition, it is reasonably comparable to existing development within adjacent neighborhoods.

- Storing rainwater on-site. While rainwater will not be stored on-site indefinitely (e.g. in cisterns), "retention pipes" (actually detention pipes) are proposed to limit stormwater runoff to existing rates.

- The use of alternative surfaces allowing infiltration. The use of alternative surfaces such as permeable pavements is beyond the scope of the applicant's project at this time, and left largely to individual lot owners. The use of alternative surfaces will need to be balanced with erosion control issues on site as well.

Source control measures are applicable at the individual lot and house design stage, and are not expected to be addressed at this time.

While passive stormwater treatment measures such as bioswales, buffer strips, flow through planter boxes, infiltration trenches, extended detention, and bioretention may be preferred by the Regional Board, the use of a properly sized continuous deflector separator (CDS) treatment unit is an acceptable means of treatment, particularly if the applicant has discussed its use and maintenance with the County. Individual lot owners should still be encouraged to incorporate stormwater treatment features on site.

Impact HYDRO-2 Substantially Deplete Ground Water Supplies or Substantially Interfere with Ground Water Recharge

I am in agreement with this section as written in the ADEIR.

Impact HYDRO-3 Alteration of Drainage Patterns Resulting in Erosion or Siltation

I am also in agreement with this section as written, noting that the improved erosion control could be considered a beneficial impact to water quality, with fewer pollutants carried off site.

Impact HYDRO-4 Create or Contribute Runoff Water Which Would Exceed the Capacity of Existing or Planned Storm Drain Systems or Provide Substantial Additional Sources of Polluted Runoff

It is understood that the County has directed the applicant to design a storm drain system capable of accommodating 10-year runoff. However for CEQA analysis, the generally accepted threshold for impact analysis is a 100-year return period. The applicant claims that the planned storm drain system, which includes a portion of an existing County system, has sufficient capacity to accommodate predicted post-development runoff from a 100-year storm event and discharge that runoff to Polhemus Creek, with the exception of two storm drain segments proposed to be upsized as mitigation. Providing post-developed 100-year storm drain capacity to Polhemus Creek without additional off-site runoff would mitigate this impact to less than significant. We have not yet been provided with 100-year calculations showing that this is the case.

One of the concerns we expressed in August 2003 was the potential for stormwater runoff to flow past catch basins due to the steep site slopes, remain uncaptured and result in excess runoff flowing toward the cul-de-sac on Valley View Court, which has no overland release. If the proposed on-site detention system works up to the 100-year runoff event, this would no longer be a concern.

Additional Peer Review Comments Regarding Applicant's Hydrologic Analyses

As stated previously, a 100-year calculation showing that post-development stormwater runoff is contained in the system from each inlet to the Polhemus Creek outfall would alleviate most of our previously stated concerns. Alternatively this could be a condition of final design.

Furthermore, it would be desirable to route the 100-year hydrograph through the proposed on-site detention pipes and storm drain system to the outfall at Polhemus Creek to demonstrate that stormwater is not discharged at a higher velocity than under existing conditions, possibly increasing the scour potential at the creek outflow.

Also, the County may want to see HMP calculations using current state of the art methods; for example, the Bay Area Hydrology Model (BAHM).

Please feel free to call me to discuss our latest review, or if you feel we need to address additional issues. I look forward to hearing from you.

Very truly yours,

SCHAAF & WHEELER

Charles D. Anderson

Charles D. Anderson, PE
President

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January 12, 2009

Diana Shu, Road Operations Manager
Department of Public Works
San Mateo County
555 County Center 5th Floor
Redwood City, CA 94063

Subject: **Hydrology Study for Ascension Heights**
Job No. 2010135

Dear Ms. Shu:

I am writing to you as a follow-up to our meeting in your office on November 25th. In this meeting we discussed the BAHM software that the County is requesting we use to design our hydromodification plan on the Ascension project. During the meeting we spoke with Charles Anderson from Schaaf and Wheeler, the EIR consultant's project hydrologist. In our conversations, it became clear that the impact of doing the BAHM hydromodification would not be justified compared to the cost and physical space requirements for the system the software requires.

In working with the BAHM software, the program generated a system so large, as to be completely cost prohibitive (hundreds of thousands of dollars) and which would be physically impossible to build. In accordance with the software handbook and at the suggestion of Arleen Feng, BAHM coordinator for the County of Alameda, I then utilized a grassy swale in the calculations to bring the time of concentration down and thus reduce the size of the system necessary. To accomplish this, I separated the site into two sections, similar to the proposed storm drain system. About two-thirds of the site was able to be directed to a potential swale, while the remainder third would have to be routed directly to the storm drain system, due to the steepness of the site and the lack of usable space for any other treatment devise.

The north system was run under the assumption that the street and house runoff would flow to a 500' long grassy swale with only 1% of slope that runs behind lots 1-6 prior to entering the storm drain system.

The south system would be similar and channel all the runoff from the streets and future houses to a grassy swale along the rear of lots 18-25. This swale due to the topography on-site would have about a 10% slope to it and would have to be lined with fabric to protect it from erosion.

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It is clear that the swale used as a treatment facility would also function to delay the initial time of concentration and thus the pipe system could potentially be smaller than a facility that is not proceeded by a swale.

At your request, we have also done an analysis of the site with a single family house on it, rather than the subdivision and large streets. To accomplish this, we placed a fairly large single family house with a pool and pool house near the uphill edge of the site accessed off the existing roadway that services the water tank owned by CalWater. In this scenario, we also used a grassy swale to treat the runoff and delay the time of concentration. In the scenario as with the other ones, the size of the pipe far exceeds what would be deemed as reasonable.

Please note that we did review other alternatives within the BAHM software to accomplish our results. One suggestion is the use of perforated pipes to allow the runoff to percolate into the ground. We have determined that due to the steepness of the site and the risk of slope stability that this would not be feasible. All other options such as ponds, soil filters, or gravel filters are not feasible on such a steep site.

Our results of the BAHM analysis are as follows:

Designation	Impervious Surface	Open Space	Total Area	Pipe Dia.	Length	Outlet hole	Wier Size
North	2.27 Acres	2.27 Acres	4.54 Acres	60”	620 l.f.	1"	3" x 24"
South	2.87 Acres	3.18 Acres	6.05 Acres	60”	840 l.f.	1"	4"x24"
Individual House	0.46 Acres	1.04 Acres	1.50 Acres	48”	260 l.f.	0.6”	3" x 24"

As you can see the software resulted in significant pipe storage and small outlet sizes. The one inch hole the software requires is not practical for storm drainage as it will clog very quickly and require constant maintenance.

In our conversations with you, Joe Brasher of Clear Creek Solutions and Arleen Feng, I feel that we are using the software correctly and realize that the software will give us much higher recommendations than would previously be expected with a volume based calculation. However, the size and length of the pipes are simply so far beyond what is normally required that this becomes an undue hardship.

In reviewing these requirements, we have determined that the system would not only cost a tremendous amount of money, but also be physically impossible to construct. There is no room to place almost 1,500 l.f. of 60” diameter pipe on-site. The site is very steep and the placement of horizontal piping is not feasible.

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I recognize and agree with the need for hydromodification and also agree with a flow base calculation such as the BAHM, but I do feel that the results of using the software are impractical and not necessary.

Aside from the BAHM, we took it upon ourselves to perform a simple analysis of the impact of our project on Polhemus Creek. Our project is more than a quarter mile away from the creek and all runoff would first run through City/County storm drains prior to reaching the creek. Our analysis shows that the new development would only lead to an increase of 3.6 cfs or an increase of 0.6%. Since this percentage is less than 1%, we feel that the expense and lack of constructability warrants the use of the BAHM. In other words any hydromodification as shown in the BAHM would have negligible effect on the actual creek.

In lieu of the BAHM, we are proposing to maintain our previous hydrology study that is volume based and provides metered release and storage on each lot, thus releasing runoff at a predevelopment rate for a 10 year storm.

As support with this letter, we are furnishing the following information:

- Original Volume based hydromodification study, utilizing a HydroCAD hydrograph analysis. This has not changed from our previous submittal.
- CD of BAHM analysis for both North and South portion of the project and a potential single family home on the site.
- Rational based calculations of the impacts to Pulhemus Creek.

I would be happy to discuss this with you further and look forward to hearing from you on your thoughts on this letter.

Please feel free to call or email if you have any questions.

Very truly yours,

Jim Toby, P.E., P.L.S.
Senior Project Manager

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January 19, 2009

Diana Shu, Road Operations Manager
Department of Public Works
San Mateo County
555 County Center 5th Floor
Redwood City, CA 94063

Subject: **Hydrology Study for Ascension Heights**
Job No. 2010135

Dear Ms. Shu:

Per the County's request, accompanying this letter are our hydrology calculations for on-site retention for a 10 year storm. This has previously been submitted to the County. I have updated our spreadsheets for the analysis of the pipe flows to include the metered release for not only the on-site system, but also the existing off-site system to include the metered release as we have shown on our hydromodification analysis. Per our previous analysis, there are several existing storm drain pipes downstream of this project that we are proposing to replace with larger pipes to accommodate the larger storms. During our analysis, we determined the existing system would not have the capacity for a 10 year storm even before any development occurs. Thus with our metered release, we have determined that we are not adding any additional runoff to the existing system.

Recently the County requested us to update our calculations for a 100 year storm. I am happy to provide this if absolutely necessary, but I do not feel it is warranted. We have been working on this project since 2001 and have worked with many engineers and planners within the County during this time. At the time of the initial work on this project, we specifically asked which storm we should be designing to. It was very specific that we use the 10 year storm and historically the 100 year storm is primarily used in flood prone areas. I have confirmed this in recent projects with Lisa Ekers and Richard Lee.

Due to the steep terrain in the area, during our initial analysis and report we pointed out that if the storm drain system was to become over burdened with runoff, any additional water would simply flow down the street and eventually make it to Pulhemous Creek, the same as the storm drain system itself.

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Since my understanding from various County staff over the years is that the 100 year storm calculation is used in flood prone areas and this is clearly not a flood prone area, I am requesting that we forego the calculations and instead stay with the calculations that we are providing for the 10 year storm.

I would be happy to discuss this with you further and look forward to hearing from you on your thoughts on this letter.

Please feel free to call or email if you have any questions.

Very truly yours,

Jim Toby, P.E., P.L.S.
Senior Project Manager

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January 21, 2009

Ms. Jennie Anderson
Project Manager
Christopher A. Joseph & Associates
101 H Street, Suite Q
Petaluma, California 94592

Subject: ***Additional Peer Review of Revised Hydrology Studies for Ascension Heights Subdivision in San Mateo County***

Dear Ms. Anderson:

Schaaf & Wheeler first reviewed the Applicant's hydrologic analyses for this proposed subdivision in August 2003, and again in September 2008. At your request, I have reviewed a January 12, 2009 letter from Lea & Braze to Diana Shu of San Mateo County that describes the Applicant's efforts to meet County hydromodification requirements.

This review places new information within the context of your DEIR Hydrology and Water Quality narrative (Section IV.E), particularly the project impacts and mitigation measures. Only those unresolved issues raised in our September 18, 2008 peer review are assessed herein.

Local Regulatory Setting – Hydromodification Management Plan (HMP)

In our September 2008 review, we stated that the Applicant should provide HMP calculations using the Bay Area Hydrology Model (BAHM). The Applicant complied and discussed the results of their HMP analysis in the January 9, 2009 letter referenced above.

The Applicant concludes that hydromodification due to site development is not a significant problem and implementing a mitigation plan would be cost prohibited and technically problematic. We concur with this conclusion and offer the following supporting evidence.

Polhemus Creek is the nearest receiving water where potential hydromodification is of concern. The creek is a quarter mile away from the project and all of the project's offsite runoff is conveyed to the creek through hardened drainage elements such as pavement, gutters, and storm drain pipe. Lea & Braze states that an analysis they conducted outside of the BAHM indicates that the new development would increase runoff by less than one percent. This assertion has been reviewed by Schaaf & Wheeler using the BAHM.

The BAHM has been used to analyze pre-project and post-project flow-duration curves at the Polhemus Creek outfall from the County storm drain system to which the proposed development will connect. At this location, approximately 811 acres are tributary to Polhemus Creek, including the 13-acre project site, which represents 1.6 percent of the tributary watershed. Figure 1 shows the watershed area analyzed.

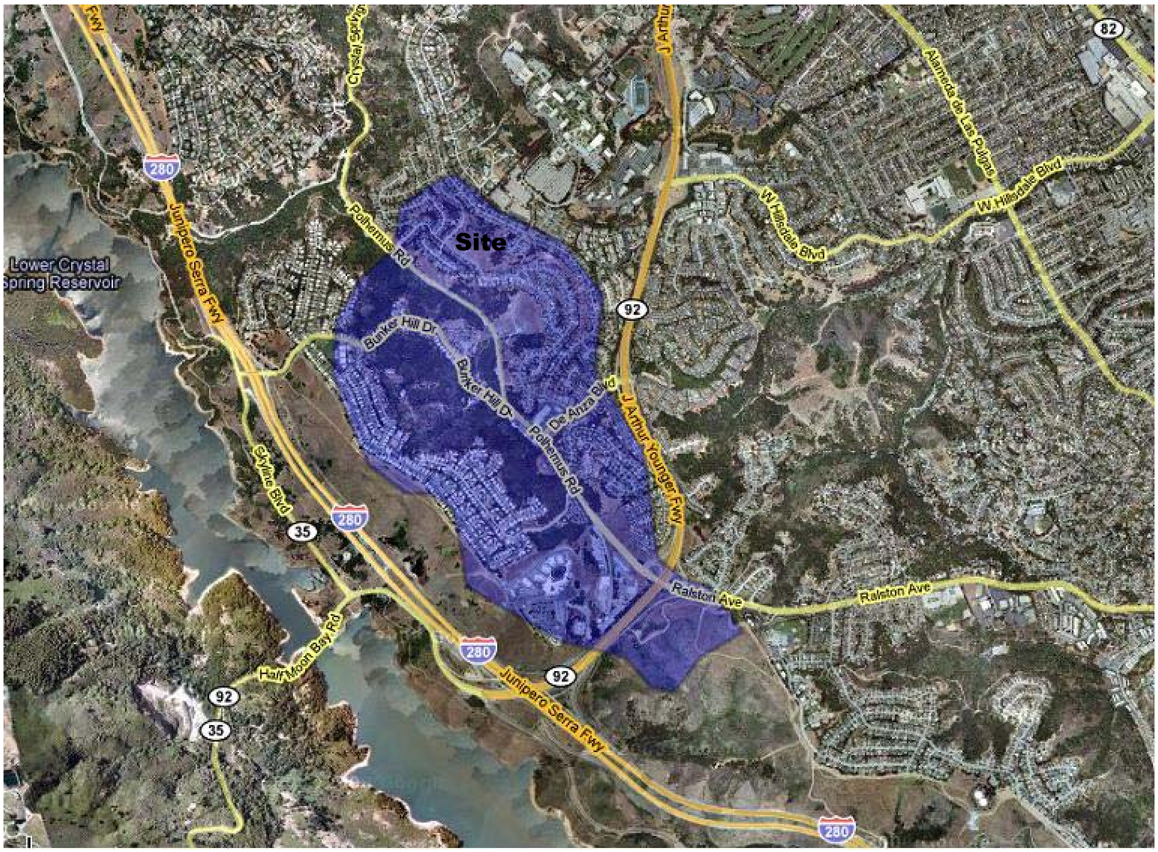


Figure 1. Watershed Analyzed for Hydromodification Impacts

The watershed contains various soil types and land uses that are input into the BAHM and then changed based on how the proposed development affects the model parameters. Table 1 provides a summary. It is noted that the watershed is estimated to be approximately 35 percent impervious in its existing condition. SCS Hydrologic Soil Types are calculated using data from the NRCS National Cooperative Soil Survey (Web Soil Survey 2.1) for San Mateo (Eastern Part) and San Francisco Counties.

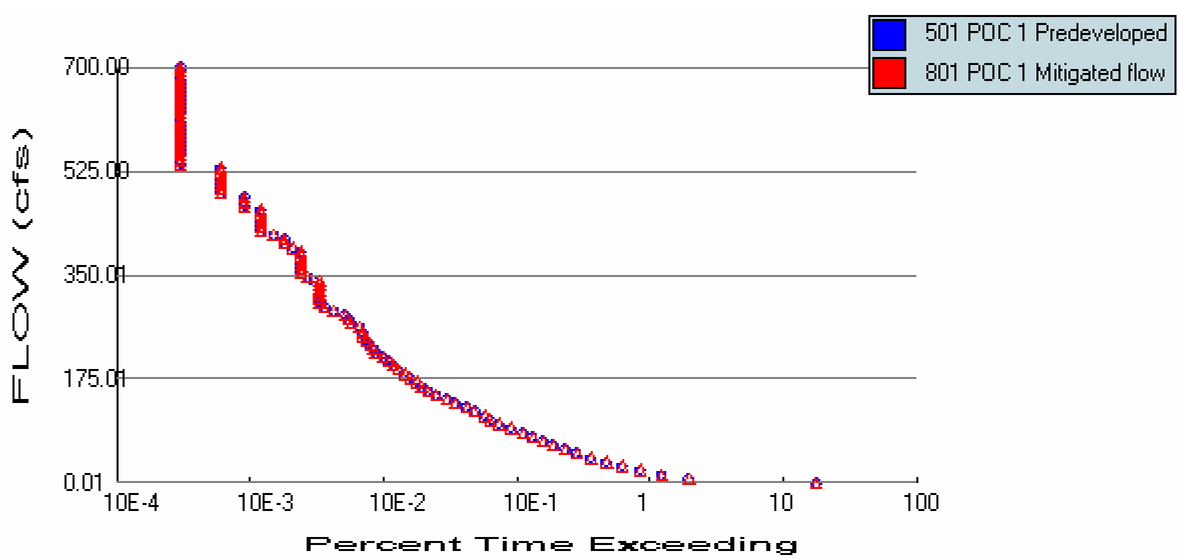
Table 1. BAHM Input

BAHM Parameter	Pre-Project (acres)	Post-Project (acres)
Forest Cover on B Soil	341.0	341.0
Shrub Cover on C or D Soil	186.0	181.5
Impervious Cover	284.0	288.5
	811.0	811.0

Table 2 presents BAHM output for the location of interest and the corresponding flow-duration curves are shown below. The approximate average increase in flow is about 0.2 percent. Most development is on rock (orthents). BAHM lumps Type C and Type D soils together, which makes the BAHM results conservative considering that orthents are usually less pervious than typical C or D soils. If BAHM had an option for rock instead of C/D soil, the calculated increase in flow might be even less. In reality, if top soil is imported for landscaping purposes, improvements on individual lots could potentially further mitigate the very small calculated increase in post-developed flows.

Table 2. BAHM Output

Return Period	Polhemus Creek Discharge (cfs)	
	Pre-Project	Post-Project
2-year	182.0	182.3
5-year	359.1	359.8
10-year	421.4	422.4
25-year	630.5	631.1



The Municipal Regional Permit Tentative Order (NPDES No. CA S612008; December 4, 2007) states that "the post-project flow duration curve shall not deviate above the pre-project flow duration curve by more than 10 percent over more than 10 percent of the length of the curve corresponding to the range of flows to control," which is from ten percent of the two-year flow to the ten-year flow. For Ascension Heights, the post-project flow duration curve does not exceed the pre-project flow curve by an average of more than 0.2 percent over the entire length of the curve corresponding to the range of flows to control. While not explicitly meeting the NPDES requirements, the proposed development clearly has little impact on Polhemus Creek hydromodification.

Further, it is noted that the Central Coast Regional Board is adopting criteria that requires no more than a one percent increase in the post-project flow duration curves from the one-year to the ten-year return periods. The "one-year" flow is equivalent to the flow that is exceeded one hundred times in one hundred years based on partial-duration analysis. A technique derived by Walter Langbein can be used to transform a frequency curve derived from annual events into a corresponding partial duration curve. (Ref. Beard, Statistical Methods in Hydrology, 1966) Based on the Langbein criteria, the "one-year" annual return period based on the flood-frequency analysis presented in Table 2 is about 130 cfs or about 72 percent of the two-year flow. Therefore if the average increase in flow from 10 percent of the two-year flow to the ten-year flow is less than one percent (0.2 percent is less than one percent), it is less than one percent from the one-year flow to the ten year flow.

San Mateo County offers an HMP exemption where the cost of plan implementation is greater than two percent of the total project cost. The Applicant cites a "tremendous amount of money" as the cost to implement, and we agree. Alternatives such as allowing runoff to percolate or the construction of surface storage facilities pose a public safety threat due to the steepness of the site and slope stability issues. Therefore the only possible implementation alternative is underground horizontal pipe. The Applicant found the longest required pipe length to be 840 feet. The entire project site is about 700 feet by 700 feet, with a total change in elevation across the site (to the drainage outlet) of more than 100 feet. Installing a buried system is simply not feasible.

Impact HYDRO-4 Create or Contribute Runoff Water Which Would Exceed the Capacity of Existing or Planned Storm Drain Systems or Provide Substantial Additional Sources of Polluted Runoff

It is understood that the County has directed the Applicant to design a storm drain system capable of accommodating 10-year runoff. However for CEQA analysis, the generally accepted threshold for impact analysis is a 100-year return period. The Applicant has not provided post-development calculations for the 100-year storm event including discharge to Polhemus Creek, so we have provided 100-year calculations based on the 10-year spreadsheets provided by the Applicant. Calculations are attached to this letter.

Under existing conditions the 100-year discharge to Polhemus Creek is 73 cfs with a velocity of 14.9 feet per second at the outfall. Capacity in the existing County storm drain system is exceeded at two locations, labeled “P-6” and “P-12” respectively. The total estimated flow in excess of pipe capacity is 28 cfs. The Applicant proposes to upsize these two storm drain segments, from 15-inch diameter to 21-inch diameter and from 30-inch diameter to 36-inch diameter, as mitigation. Post-developed 100-year storm drain capacity calculations include these proposed storm drain upgrades. A simplified volumetric calculation is used to model the effect of the Applicant’s proposal to store excess stormwater runoff storage and meter the release at individual home sites.

After the proposed project, the 100-year discharge to Polhemus Creek is 72 cfs with a velocity of 10.2 fps at the outfall. Improved storm drain capacity would be exceeded at the location labeled “P-C9”, but only by 0.5 cfs. The total estimated flow in excess of pipe capacity would drop from 28 cfs to almost zero. (It may be noted that by upsizing the existing 18-inch storm drain at this location to a 21-inch storm drain, estimated flow would not exceed storm drain capacity.)

The Applicant should also be aware that very high flow velocities are predicted for both the 10-year and 100-year events, so precautions to protect against pipe damage and scour at the Polhemus Creek outfall should be part of the final design.

Please feel free to call me to discuss our latest review, or if you feel we need to address additional issues. I look forward to hearing from you.

Very truly yours,

SCHAAF & WHEELER

Charles D. Anderson

Charles D. Anderson, PE
President

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Storm Drain Design by Rational Formula - County of San Mateo

Acension Heights Subdivision

Existing system
Exhbit A.1

Project: Acension Heights Subdivision
Location: Ascension Dr and Bel Aire, San Mateo
Lea & sung Job #: 2010135
Storm: 10 YEAR EVENT
100 YEAR IN RED

Label	Comments	Tc (min)	Local Intensity (in/hr)	Area Designation	Inlet AREA (acres)	Inlet C	System Contributing flow (cfs)	Total System Flow (cfs)	Section Size (inches)	PIPE TYPE	Manning's "n"	Length (ft)	Constructed Slope (ft/ft)	Average Velocity (ft/s)	Pipe Flow Time (min)	Capacity (cfs)	Exceeds Capacity	System Flow/Capacity
I-1	(E) COUNTY INLET	10	2.32	AREA 1	0.42	0.85	0.83											
			3.42	C×A	0.36		1.22											
P-1								0.83	15	RCP	0.013	38	1.80%	3.171	0.20	8.66	'NO	10%
								1.22						4.49	0.13		NO	14%
I-2	(E) COUNTY INLET	10.20	2.31	AREA 2	6.93	0.24	3.84											
		10.13	3.41				5.67											
P-2				ΣC×A	2.02			4.67	15	RCP	0.013	18	2.80%	3.955	0.08	10.81	'NO	43%
								6.89						5.83	0.05			64%
I-3	(E) COUNTY INLET	10.00	2.32	AREA 3	3.27	0.25	1.90											
			3.42				2.80											
P-3								1.90	15	RCP	0.013	34	23.20%	11.385	0.05	31.10	'NO	6%
								2.80						17.0	0.03			9%
SDMH-1	(E) COUNTY MANHOLE																	
P-4		10.18	3.40	ΣC×A	2.84			6.57	15	RCP	0.013	56	5.80%	5.693	0.16	15.55	'NO	42%
								9.65						13.35	0.07			62%
I-4	(E) COUNTY INLET	10.36	2.30	AREA 4	0.26	0.85	0.51											
		10.25	3.39															
P-5				ΣC×A	3.06			8.46	15	RCP	0.013	164	15.70%	9.366	0.29	25.59	'NO	33%
								10.38						14.4	0.14			41%
I-5	(E) COUNTY INLET	10.66	2.28	AREA 5	2.12	0.5	2.42											
		10.39	3.38															
P-6				ΣC×A	4.12			10.88	15	RCP	0.013	60	2.00%	3.343	0.30	9.13	'YES	119%
								13.93						7.44	0.13			152%
I-6	(E) COUNTY INLET	15.55	1.91	AREA 6	17.4	0.45	14.99											
			2.80															
P-7				ΣC×A	11.45			25.87	18	RCP	0.013	278	14.50%	12.961	0.36	39.99	'NO	65%
								33.46						25.1	0.18			84%
I-7	(E) COUNTY INLET	15.91	1.89	AREA 7	2.35	0.5	2.22											
		15.73	2.79															
P-8				ΣC×A	13.13			28.09	18	RCP	0.013	200	13.26%	12.395	0.27	38.24	'NO	73%
								36.60						24.2	0.14			96%
I-8	(E) COUNTY INLET	16.17	1.88	AREA 8	15.1	0.5	14.16											
		15.87	2.78															
P-9				ΣC×A	20.68			42.26	21	RCP	0.013	130	12.42%	16.328	0.13	55.82	'NO	76%
								57.40						26.0	0.08			103%
I-9	(E) COUNTY INLET	16.31	1.87	AREA 9	7.6	0.5	7.10											
		15.95	2.77															
P-10				ΣC×A	24.48			49.36	24	RCP	0.013	374	14.30%	22.883	0.27	85.52	'NO	58%
								67.77						29.9	0.21			77%
I-10	(E) COUNTY INLET	16.58	1.85	AREA 10	0.49	0.85	0.77											
		16.16	2.75															
P-11				ΣC×A	24.90			50.13	24	RCP	0.013	64	10.00%	19.136	0.06	71.51	'NO	70%
								68.50						25.9	0.04			95%
I-11	(E) COUNTY INLET	16.63	1.85	AREA 11	3.41	0.5	3.15											
		16.2	2.75															
P-12				ΣC×A	26.61			53.28	30	RCP	0.013	116	1.30%	10.781	0.18	46.75	'YES	114%
								73.11										156%
OUTLET	PULHEMUS CREEK																	

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Lea & Braze Job # 2010135

Storm Drain Design by Rational Formula - County of San Mateo

Acension Heights Subdivision

Ascension Dr and Bel Aire, San Mateo

10 YEAR STORM

County - Line "C"

Exhibit A.2

Label	Description	Tc (min)	Local Intensity (in/hr)	Area Designation	Area (acres)	C	System Contributing flow (cfs)	Total System Flow (cfs)	Pipe Size (inches)	Pipe Type	Manning's "n"	Pipe Length (ft)	Pipe Slope (ft/ft)	Average Velocity (ft/s)	Pipe Flow Time (min)	Pipe Capacity (cfs)	Exceeds Capacity
I-C1	(E) COUNTY INLET	10.00	2.32	AREA C-1	0.41	0.95	0.90	1.33						5.11	0.12		NO
P-C1			3.42					0.90	15	RCP	0.013	38	1.80%	3.171	0.20	8.66	'NO
I-C2	(E) COUNTY INLET	10.20	2.24	AREA C-2	6.49	0.40	5.81	10.18						10.02	0.03		NO
P-C2		10.12	3.41	ΣC×A	2.99			6.72	15	RCP	0.013	17	2.8%	3.955	0.07	10.81	'NO
I-C3	(E) COUNTY INLET	10.00	2.32	AREA C-3	3.03	0.35	2.46	3.63						16.7	0.03		NO
P-C3			3.42					2.46	15	RCP	0.013	34	23.2%	11.385	0.05	31.10	'NO
SDMH-C1	(E) COUNTY MANHOLE	10.05	2.13	**				13.85						14.33	0.03		NO
P-C4		10.03	3.42	ΣC×A	4.05			9.18	15	RCP	0.013	26	5.8%	5.693	0.08	15.55	'NO
SDMH-C2	(N) COUNTY MANHOLE	12.49	1.99	NORTH			3.90										
SDMH-C2	(N) COUNTY MANHOLE	12.48	1.99	SOUTH			4.98	20.99						16.01	0.03		NO
P-C5		25.41	2.08	ΣC×A	10.09			18.06	18	RCP	0.013	30	5.8%	8.198	0.06	25.29	'NO
I-C4	(E) COUNTY INLET	12.54	1.99	AREA C-4	0.24	0.95	0.45	21.46						23.15	0.12		NO
P-C6		25.52	2.08		10.32			18.51	15	RCP	0.013	164	15.7%	9.366	0.29	25.59	'NO
I-C5	(E) COUNTY INLET	12.84	1.97	AREA C-5	2.12	0.40	1.67	23.23						10.58	0.09	22.41	NO
P-C7*		25.64	2.08		16.17			20.18	~~15~~ 21	RCP	0.013	60	2.0%	3.343	0.30	~~9.13~~	'YES
I-C6	(E) COUNTY INLET	13.13	1.95	AREA C-6	0.13	0.95	0.24										
		13.13	1.95	AREA C-7	17.41	0.45	15.30	39.59						25.3	0.18		NO
P-C8		25.73	2.07		19.13			35.72	18	RCP	0.013	278	14.5%	12.961	0.36	39.99	'NO
I-C7	(E) COUNTY INLET	13.49	1.93	AREA C-8	2.36	0.50	2.28	41.84						23.8	0.14	(41.3)	YES
P-C9**		25.91	2.06		20.31			38.00	18 **	RCP	0.013	200	13.3%	12.414	0.27	38.29	'NO
I-C8	(E) COUNTY INLET	13.76	1.92	AREA C-9	15.10	0.50	14.47	57.39						25.8	0.08	(60.0)	NO
P-C10		26.05	2.06		27.86			52.47	21 ***	RCP	0.013	130	12.4%	16.328	0.13	55.82	'NO
I-C9	(E) COUNTY INLET	13.89	1.91	AREA C-10	7.59	0.50	7.24	64.89						29.7	0.07		NO
P-C11		26.13	2.05		31.66			59.71	24	RCP	0.013	374	14.3%	22.883	0.27	85.52	'NO
I-C10	(E) COUNTY INLET	14.17	1.89	AREA C-11	0.45	0.95	0.81	65.78						25.83	0.04		NO
P-C12		26.20	2.05		32.09			60.52	24	RCP	0.013	64	10.0%	19.136	0.06	71.51	'NO
I-C11	(E) COUNTY INLET	14.22	1.89	AREA C-12	3.41	0.45	2.90	72.29					2.0			94.32	NO
P-C13		26.24	2.15		33.62			63.42	~~30~~ 36	RCP	0.013	116	~~1.3%~~	10.781	0.18	~~46.75~~	'YES
OUTLET	PULHEMUS CREEK																

* PIPE REPLACEMENT PER DRAINAGE REPORT RECOMMENDATIONS

** CHECK HGL SLOPE = 15.9% HGL ~ 5.2 ft above T.O.P. If cover < 5 ft HGL not contained

NOTE Capacity of 21" RCP @ 13.3% slope is 65cfs

$d/D = .82$ $d = 14.8"$ OK

*** Capacity > @ $d/D > 0.8$ $\frac{Q}{Q_{full}} = \frac{57.39}{55.82} = 1.03$

Discharge to Creek @ >10fps

⇒ Provide Scour Protection @ (N) 36" RCP outfall

Note (E) Discharge is 73 cfs @ 14.9 fps

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Storm Drain Design by Rational Formula - County of San Mateo

Acension Heights Subdivision

Ascension Dr and Bel Aire, San Mateo
10 YEAR STORM
South Side - Line "S"
Exhibit A.2
100-YEAR IN RED

Lea & Braze Job # 2010135

Label	Description	Tc (min)	Local Intensity (in/hr)	Area Designation	Area (sf)	Area (acres)	C	System Contributing flow (cfs)	Total System Flow (cfs)	Pipe Size (inches)	Pipe Type	Manning's "n"	Pipe Length (ft)	Pipe Slope (ft/ft)	Average Velocity (ft/s)	Pipe Flow Time (min)	Pipe Capacity (cfs)	Exceeds Capacity
CB-S1	(N) COUNTY INLET	10.00	2.20 / 2.29	AREA S-1	12750.00	0.293	0.5*	0.13										
			2.39	AREA S-2	11050.00	0.254	0.5*	0.11										
		22.75 ←	2.25	AREA S-3	13372.57	0.307	0.5*	0.11										
			3.42	AREA S-22	4947.93	0.114	0.95	0.24	1.20						12.48	0.18		NO
P-S1					2C×A	0.54			0.59	12	HDPE	0.010	139	19.40%	8.662	0.27	20.39	'NO
CB-S2	(N) COUNTY INLET	10.27	2.19	AREA S-21	15545.85	0.357	0.95	0.74	1.97						7.71	0.09		NO
P-S2		22.93	2.24		2C×A	0.88			1.33	12	HDPE	0.010	43	2.33%	3.002	0.24	7.07	'NO
CB-S3	(N) V-24 JUNCTION BOX	10.51	2.17	AREA S-4	11974.14	0.275	0.5	0.11	2.28						22.5	0.08		NO
P-S3		23.02	2.23		2C×A	1.02			1.44	(1) 12	HDPE	0.010	110	52.00%	14.182	0.13	33.39	'NO
CB-S4	(N) COUNTY INLET	10.64	2.16	AREA S-5	11074.50	0.254	0.5	0.11										
			2.39	AREA S-6	11074.50	0.254	0.5	0.11										
				AREA S-20	7109.87	0.163	0.95	0.33	0.98						18.9	0.10		NO
P-S4		20.52	2.39		2C×A	0.41			0.55	(4) 12	HDPE	0.010	115	55.60%	14.665	0.13	34.52	'NO
CB-S5	(N) COUNTY INLET	10.00	2.21	AREA S-7	11709.48	0.269	0.5	0.11										
		21.16	2.35	AREA S-19	20536.86	0.471	0.6	0.62	0.98						16.1	0.12		NO
P-S5					2C×A	0.42			0.73	12	HDPE	0.010	116	40.10%	12.454	0.16	29.32	'NO
CB-S6	(N) V-24 CATCH BASIN	10.16	2.19	AREA S-15	12634.44	0.290	0.5	0.10	1.32						13.6	0.13		NO
P-S6		21.28	2.34		2C×A	0.57			0.83	12	HDPE	0.010	103	20.60%	8.926	0.19	21.01	'NO
CB-S7	(N) V-24 CATCH BASIN	10.35	2.18	AREA S-14	10627.57	0.244	0.5	0.10	1.61						16.0	0.10		NO
P-S7		21.41	2.33		2C×A	0.69			0.93	12	HDPE	0.010	92	20.60%	8.926	0.17	21.01	'NO
CB-S8	(N) V-24 CATCH BASIN	10.52	2.17	AREA S-13	10798.53	0.248	0.5	0.10	2.84 +(2)						18.7	0.08		NO
P-S8		21.51	2.33		2C×A	1.22			1.59	12	HDPE	0.010	92	20.60%	8.926	0.17	21.01	'NO
CB-S9	(N) V-24 CATCH BASIN	10.81	2.15	AREA S-12	10787.89	0.248	0.5	0.10	3.12						19.0	0.09		NO
P-S9		21.59	2.32		2C×A	1.34			1.69	(3) 12	HDPE	0.010	97	20.60%	8.926	0.18	21.01	'NO
CB-S12	(N) V-24 JUNCTION BOX	10.00	2.21	AREA S-8	12099.67	0.278	0.5	0.11	0.32						5.03	0.45		NO
P-S12		21.48	2.33		2C×A	0.14			0.11	12	HDPE	0.010	136	3.10%	3.463	0.65	8.15	'NO
CB-S11	(N) V-24 CATCH BASIN	10.65	2.16	AREA S-9	17789.20	0.408	0.5	0.11	0.77						6.58	0.36		NO
P-S11		21.93	2.30			0.000 / 0.34			0.22	(A) 12	HDPE	0.010	142	3.10%	3.463	0.68	8.15	'NO
CB-S10	(N) V-24 CATCH BASIN	11.34	2.11	AREA S-11	10891.51	0.250	0.5	0.10										
				AREA S-10	11461.10	0.263	0.5	0.11	6.75 (1)+(5)+(A)=(5)						11.60	0.05		NO
P-S10		22.29	2.28		2C×A	2.96			3.56	12	HDPE	0.010	35	3.10%	3.463	0.17	8.15	'NO
CB-S13	(N) V-24 CATCH BASIN	10.00	2.21	AREA S-16	17203.00	0.395	0.6	0.52	0.81						6.63	0.34		NO
P-S12			3.42						0.52	12	HDPE	0.010	135	3.10%	3.463	0.65	8.15	'NO
CB-S14	(N) V-24 CATCH BASIN	10.65	2.16	AREA S-17	13823.18	0.317	0.6	0.41	1.44						7.82	0.31		NO
P-S11		10.34	3.38						0.93	12	HDPE	0.010	145	3.10%	3.463	0.70	8.15	'NO
CB-S15	(N) V-24 JUNCTION BOX	11.35	2.11	AREA S-18	7945.45	0.182	0.6	0.23	7.97						12.27	0.05		NO
P-S13		22.34	2.28			3.50			4.72	15	HDPE	0.010	38	3.10%	5.410	0.12	14.78	'NO
SDMH-S1	(N) COUNTY MANHOLE	11.46	2.10	**					7.95						10.21	0.21		NO
P-S16		22.39	2.27						4.72	15	HDPE	0.010	130	1.92%	4.258	0.51	11.63	'NO
SDMH-S2	(N) COUNTY MANHOLE	11.97	2.06	**					7.91						10.19	0.21		NO
P-S17		22.60	2.26						4.72	15	HDPE	0.010	130	1.92%	4.258	0.51	11.63	'NO
SDMH-C2	(N) COUNTY MANHOLE	12.48	2.03	**														

22.81

3.50

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Storm Drain Design by Rational Formula - County of San Mateo

Acension Heights Subdivision

Ascension Dr and Bel Aire, San Mateo

10 YEAR STORM

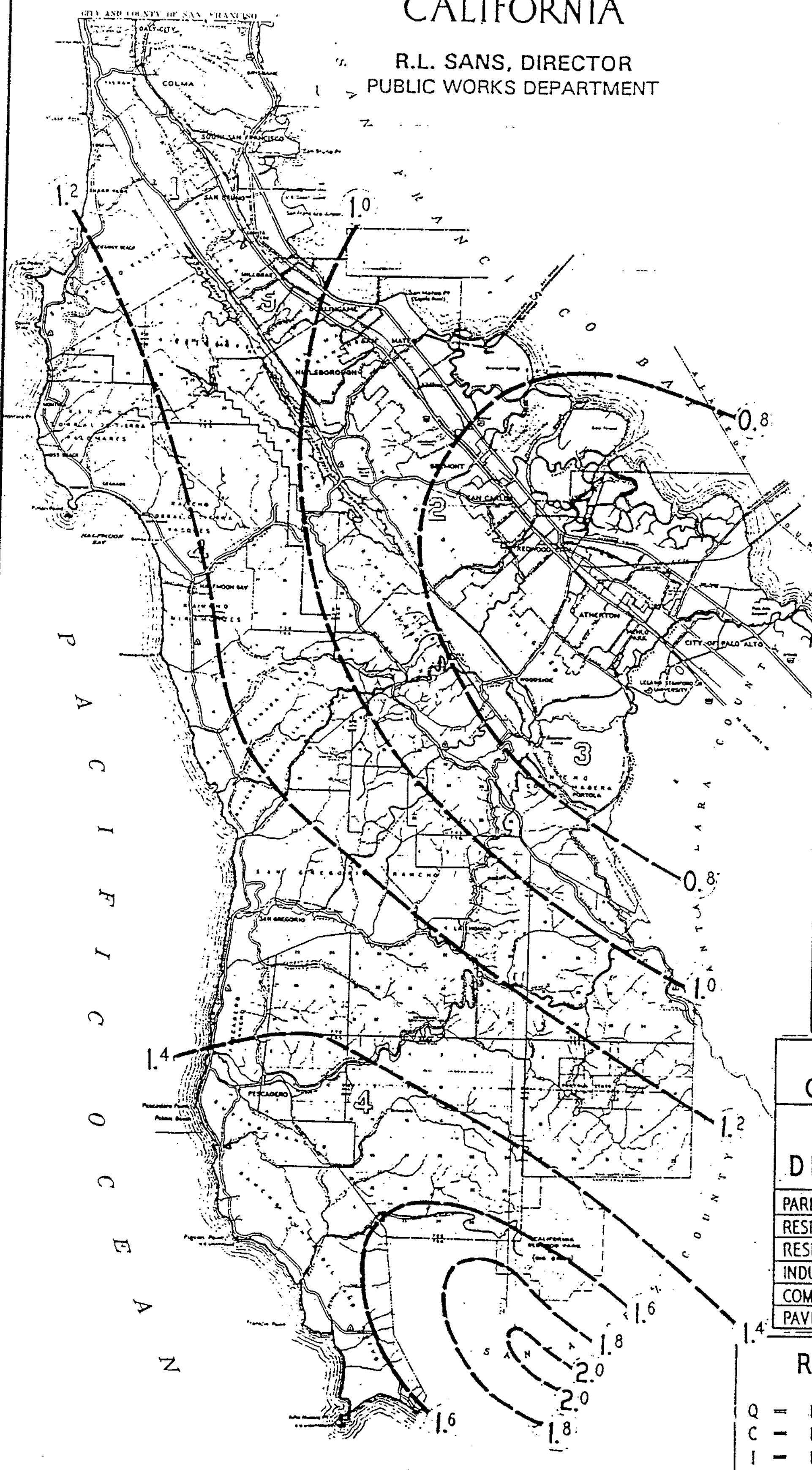
North Side - Line "N"

Exhibit A.2

Label	Description	Tc (min)	Local Intensity (in/hr)	Area Designation	Area (sf)	Area (acres)	C	System Contributing flow (cfs)	Total System Flow (cfs)	Pipe Size (inches)	Pipe Type	Manning's "n"	Pipe Length (ft)	Pipe Slope (ft/ft)	Average Velocity (ft/s)	Pipe Flow Time (min)	Pipe Capacity (cfs)	Exceeds Capacity
CB-N1	(N) COUNTY INLET	10.00	2.20	AREA N-15	12693	0.29	0.60	0.38	0.60						10.2	0.17		NO
P-N1			3.42						0.38	12	HDPE	0.010	105	17.10%	8.133	0.22	19.15	'NO
CB-N2	(N) COUNTY INLET	10.22	2.19	AREA N-14	10952	0.25	0.95	0.52										
		22.27	2.28	AREA N-7	12879	0.30	0.5	0.11	1.28						15.8	0.02		NO
P-N2					ΣC×A	0.56			1.02	12	HDPE	0.010	21	28.60%	10.518	0.03	24.76	'NO
SDMH-N1	(N) COUNTY MANHOLE	10.25	2.19	**					1.28						6.90	0.30		NO
P-N3		22.29	2.28						1.02	12	HDPE	0.010	123	2.40%	3.047	0.67	7.17	'NO
CB-N3	(N) COUNTY INLET	10.25	2.19	AREA N-6	10973	0.25	0.5	0.11										
SDMH-N2	(N) COUNTY MANHOLE	22.59	2.26	**	ΣC×A	0.69			1.55						11.86	0.25		NO
P-N4									1.13	12	HDPE	0.010	181	9.40%	6.030	0.50	14.20	'NO
SDMH-N3	(N) COUNTY MANHOLE	10.25	2.19	AREA N-5	9675	0.22	0.5	0.11	1.79						5.52	1.06		NO
P-N5		22.84	2.24		ΣC×A	0.80			1.24	12	HDPE	0.010	350	1.00%	1.967	2.97	4.63	'NO
SDMH-N4	(N) COUNTY MANHOLE	13.21	1.97	AREA N-4	9665	0.22	0.5	0.11										
				AREA N-3	9684	0.22	0.5	0.11										
				AREA N-2	9675	0.22	0.5	0.11										
				AREA N-1	10558	0.24	0.5	0.11	2.73						6.07	0.28		NO
P-N6		23.10	2.18		ΣC×A	1.25			1.68	12	HDPE	0.010	103	0.97%	1.937	0.89	4.56	'NO
CB-N4	(N) COUNTY INLET	10.00	2.20	AREA N-8	11686	0.27	0.5	0.11										
				AREA N-9	11686	0.27	0.5	0.11										
				AREA N-13	2669	0.06	0.95	0.13	3.41						9.02	0.23		NO
P-N7		24.18	2.16		ΣC×A	1.58			2.03	12	HDPE	0.010	123	2.40%	3.047	0.67	7.17	'NO
CB-N5	(N) COUNTY INLET	10.67	2.16	AREA N-10	12013	0.28	0.5	0.11										
				AREA N-12	24709	0.57	0.95	1.16	4.86						9.81	0.21		NO
P-N8		24.41	2.15		ΣC×A	2.26			3.30	12	HDPE	0.010	123	2.40%	3.047	0.67	7.17	'NO
CB-N6	(N) COUNTY INLET	10.00	2.21	**														
SDMH-N5	(N) COUNTY MANHOLE			**					4.82						9.80	0.21		NO
P-N9		24.62	2.13						3.30	12	HDPE	0.010	123	2.40%	3.047	0.67	7.17	'NO
SDMH-N6	(N) COUNTY MANHOLE	10.67	2.16	**					4.79						16.32	0.04		NO
P-N10		24.83	2.12						3.30	12	HDPE	0.010	44	9.40%	6.030	0.12	14.20	'NO
CB-N7	(N) COUNTY INLET	10.79	2.15	AREA N-11	20427	0.47	0.60	0.60										
SDMH-N7	(N) COUNTY MANHOLE	10.79	2.15	**					5.39						16.84	0.03		NO
P-N11		24.87	2.12		ΣC×A	2.54			3.90	12	HDPE	0.010	33	9.40%	6.030	0.09	14.20	'NO
SDMH-N8	(N) COUNTY MANHOLE	10.89	2.14	**					5.37						16.82	0.16		NO
P-N12		24.90	2.12						3.90	12	HDPE	0.010	158	9.40%	6.030	0.44	14.20	'NO
SDMH-N9	(N) COUNTY MANHOLE	11.32	2.11	**					5.35						19.2	0.43		NO
P-N13		25.06	2.11						3.90	12	HDPE	0.010	500	13.10%	7.118	1.17	16.76	'NO
SDMH-C2	(N) COUNTY MANHOLE	12.49	2.03	**														
		25.41				2.54												

RAINFALL RUNOFF DATA
SAN MATEO COUNTY
CALIFORNIA

R.L. SANS, DIRECTOR
PUBLIC WORKS DEPARTMENT



RAINFALL		
TIME OF CONCENTRATION	INTENSITY INCHES PER HOUR	
HRS. MIN.	10 YR.	100 YR.
0 — 10	2.45	3.60
0 — 15	2.05	3.00
0 — 20	1.73	2.55
0 — 25	1.50	2.22
0 — 30	1.33	1.95
0 — 35	1.20	1.75
0 — 40	1.10	1.61
0 — 45	1.02	1.49
0 — 50	0.95	1.37
0 — 55	0.90	1.28
1 — 00	0.86	1.21
1 — 15	0.75	1.07
1 — 30	0.67	0.95
1 — 45	0.61	0.87
2 — 00	0.56	0.80
2 — 30	0.49	0.70
3 — 00	0.44	0.63
3 — 30	0.40	0.57
4 — 00	0.37	0.53
4 — 30	0.34	0.49
5 — 00	0.32	0.45
6 — 00	0.29	0.41
7 — 00	0.26	0.38
8 — 00	0.24	0.35
9 — 00	0.23	0.33
10 — 00	0.21	0.30
12 — 00	0.19	0.27
24 — 00	0.13	0.18

RUNOFF COEFFICIENTS	
TYPE OF DEVELOPMENT	COEF.
PARKS AND CEMETERIES	0.30
RESIDENTIAL - ACRES	0.40
RESIDENTIAL - REGULAR	0.50
INDUSTRIAL	0.65
COMMERCIAL	0.75
PAVED AREAS	0.85

RATIONAL FORMULA

Q = C. I. A. F.

- Q = RUNOFF - CUBIC FEET PER SECOND
- C — RUNOFF COEFFICIENT - PERCENT
- I — RAINFALL INTENSITY - INCHES PER HOUR
- A — DRAINAGE AREA - ACRES
- F — INTENSITY FACTOR (FROM MAP)

Dr. 22-1846

Site Area S1	0.293	acres	12750	sq. ft.	Storage:	2	24	inch pipe	50	feet long
Runoff Coefficient	0.5				Release:	2	inch orifice with assumed free discharge			
					C	0.6		0.087266	sq ft	
					Secondary Orifice at		2	ft Depth		
Duration (min.)	Intensity (in/hr)	Rain Depth (inches)	Volume In (cu. ft.)	Depth	Phi	Storage (cu. Ft.)	Release (cfs)	Volume Out (cu. ft.)	Volume Stored (cu. ft.)	Calc Diff
10	3.42	0.57	302.81	0.7195	2.57	101.72	**0.34**	201.08	101.73	0.00
				1	3.14	157.08	0.40	241.38	61.43	95.65
11	3.31	0.61	322.38	0.71804	2.57	101.44	0.33	220.94	101.44	0.00
				1	3.14	157.08	0.40	265.52	56.86	100.22
15	2.85	0.71	378.52	0.66213	2.45	90.81	0.32	287.70	90.81	0.00
				1	3.14	157.08	0.40	362.07	16.45	140.63
					eq. intensity		2.29			

Site Area S2	0.254	acres	11050	sq. ft.						
Runoff Coefficient	0.5									
Duration (min.)	Intensity (in/hr)	Rain Depth (inches)	Volume In (cu. ft.)	Depth	Phi	Storage (cu. Ft.)	Release (cfs)	Volume Out (cu. ft.)	Volume Stored (cu. ft.)	Calc Diff
10	3.42	0.57	262.44	0.60545	2.33	80.27	**0.30**	182.17	80.27	0.00
				1	3.14	157.08	0.40	241.38	21.06	136.02
					eq. intensity		2.39			

Site Area S3	0.307	acres	13373	sq. ft.	Storage:	2	24	inch pipe	50	feet long
Runoff Coefficient	0.5				Release:	2	inch orifice with assumed free discharge			
					C	0.6		0.087266	sq ft	
					Secondary Orifice at		2	ft Depth		
Duration (min.)	Intensity (in/hr)	Rain Depth (inches)	Volume In (cu. ft.)	Depth	Phi	Storage (cu. Ft.)	Release (cfs)	Volume Out (cu. ft.)	Volume Stored (cu. ft.)	Calc Diff
10	3.42	0.57	317.60	0.76191	2.66	109.92	**0.35**	207.68	109.92	0.00
				1	3.14	157.08	0.40	241.38	76.22	80.86
					eq. intensity		2.25			

Site Area S5, S6	0.254	acres	11075	sq. ft.	Storage:	2	24	inch pipe	50	feet long
Runoff Coefficient	0.5				Release:	2	inch orifice with assumed free discharge			
					C	0.6		0.087266	sq ft	
					Secondary Orifice at		2	ft Depth		
Duration (min.)	Intensity (in/hr)	Rain Depth (inches)	Volume In (cu. ft.)	Depth	Phi	Storage (cu. Ft.)	Release (cfs)	Volume Out (cu. ft.)	Volume Stored (cu. ft.)	Calc Diff
10	3.42	0.57	263.02	0.60708	2.33	80.57	**0.30**	182.45	80.57	0.00
				1	3.14	157.08	0.40	241.38	21.64	135.44
					eq. intensity		2.39			

Site Area S7	0.269	acres	11709	sq. ft.	Storage:	2	24	inch pipe	50	feet long
Runoff Coefficient	0.5				Release:	2	inch orifice with assumed free discharge			
					C	0.6		0.087266	sq ft	
					Secondary Orifice at		2	ft Depth		
Duration (min.)	Intensity (in/hr)	Rain Depth (inches)	Volume In (cu. ft.)	Depth	Phi	Storage (cu. Ft.)	Release (cfs)	Volume Out (cu. ft.)	Volume Stored (cu. ft.)	Calc Diff
10	3.42	0.57	278.10	0.64937	2.43	88.42	**0.32**	189.68	88.42	0.00
				1	3.14	157.08	0.40	241.38	36.72	120.36
					eq. intensity		2.35			

Site Area S8	0.278	acres	12100	sq. ft.	Storage:	2	24	inch pipe	50	feet long
Runoff Coefficient	0.5				Release:	2	inch orifice with assumed free discharge			
					C	0.6		0.087266	sq ft	
					Secondary Orifice at		2	ft Depth		
Duration (min.)	Intensity (in/hr)	Rain Depth (inches)	Volume In (cu. ft.)	Depth	Phi	Storage (cu. Ft.)	Release (cfs)	Volume Out (cu. ft.)	Volume Stored (cu. ft.)	Calc Diff
10	3.42	0.57	287.37	0.67558	2.48	93.35	**0.32**	194.02	93.35	0.00
				1	3.14	157.08	0.40	241.38	45.99	111.09
					eq. intensity		2.33			

Site Area N7	0.296	acres	12879	sq. ft.	Storage:	2	24	inch pipe	50	feet long
Runoff Coefficient	0.5				Release:	2	inch orifice with assumed free discharge			
					C	0.6		0.087266	sq ft	
					Secondary Orifice at		2	ft Depth		
Duration (min.)	Intensity (in/hr)	Rain Depth (inches)	Volume In (cu. ft.)	Depth	Phi	Storage (cu. Ft.)	Release (cfs)	Volume Out (cu. ft.)	Volume Stored (cu. ft.)	Calc Diff
10	3.42	0.57	305.88	0.72826	2.59	103.41	**0.34**	202.46	103.41	0.00
				1	3.14	157.08	0.40	241.38	64.50	92.58
					eq. intensity		2.28			

APPENDIX H

NOISE DATA

THOMAS SUBDIVISION EIR ENVIRONMENTAL NOISE ASSESSMENT SAN MATEO COUNTY, CALIFORNIA

March 19, 2004

DRAFT

♦ ♦ ♦

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Job No. 03-122

INTRODUCTION

The following report contains the findings of Illingworth &Rodkin Inc.'s (I&R) assessment of potential environmental noise impacts associated with the development of the Thomas Subdivision, which proposes 25 single family detached homes on 13.3 acres of land in unincorporated San Mateo County, California. The project site is located east of the Bel Aire Road and Ascension Drive intersection and shown in Figure 1.

This study has been prepared with respect to guidelines set forth by San Mateo County's General Plan, and the State of California Environmental Quality Act (CEQA). The following report includes a discussion of the fundamentals of environmental acoustics, a summary of the applicable noise regulations, the results of the noise monitoring survey, an evaluation of the site's noise exposure with respect to applicable standards, and recommendations to mitigate environmental noise impacts on the proposed project to a level of insignificance.

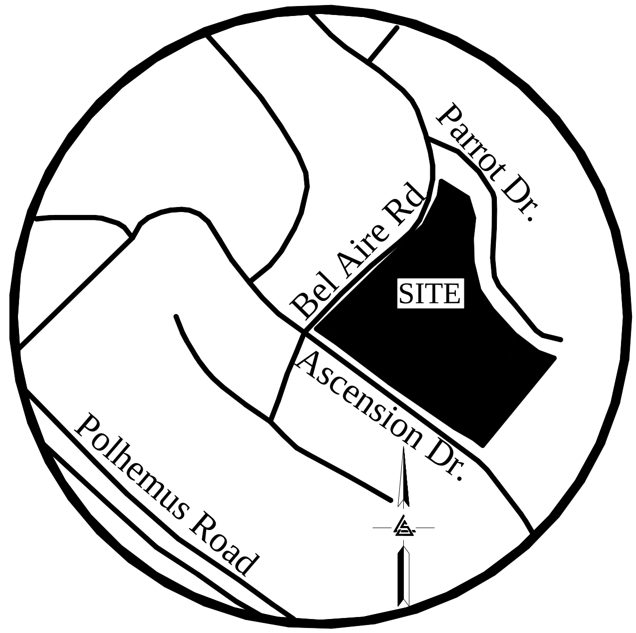

FIGURE 1: VICINITY MAP

FUNDAMENTAL CONCEPTS OF ENVIRONMENTAL ACOUSTICS

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. Possible causes of this objectionable nature are the pitch and/or loudness of a given sound. Pitch is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. Loudness is the intensity of sound waves combined with the reception characteristics of the ear. The intensity of sound may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales that are used to describe noise in a particular location. A decibel (dB) is a unit of measurement that indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 dB increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

TERM	DEFINITIONS
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per m^2).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
Day/Night Noise Level, L_{dn}	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Definitions Of Acoustical Terms	**Table 1**

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There are several methods of characterizing sound. The most common in California is the A-weighted sound level or dBA. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called Leq. The most common averaging period is hourly, but Leq can describe any series of noise events of arbitrary duration. The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to plus or minus 1 dBA.

Since the sensitivity to noise increases during the evening and at night (excessive noise interferes with the ability to sleep) 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Day/Night Average Sound Level, L_{dn}*, is a measure of the cumulative noise exposure in a community, with a 10 dB addition to nighttime (10:00 pm - 7:00 am) noise levels.

At a Given Distance From Noise Source	**A-Weighted Sound Level in Decibels**	**Noise Environments**	**Subjective Impression**
	140		
Civil Defense Siren (100')	130		
	120		Pain Threshold
Jet Takeoff (200')	110	Rock Music Concert	
	100		Very Loud
Diesel Pile Driver (100')	90	Boiler Room Printing Press Plant	
	80		
Freight Cars (50') Pneumatic Drill (50') Freeway (100')	70	In Kitchen With Garbage Disposal Running	Moderately Loud
Vacuum Cleaner (10')	60	Data Processing Center	
	50	Department Store	
Light Traffic (100')	40	Private Business Office	Quiet
Large Transformer (200')	30	Quiet Bedroom	
	20	Recording Studio	
Soft Whisper (5')	10		Threshold of Hearing
	0		

Typical Sound Levels Measured in the Environment and Industry — **Table 2**

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The thresholds for speech interference indoors are about 45 dBA, if the noise is steady, and above 55 dBA, if the noise is fluctuating. Outdoors these thresholds are about 15 dBA higher. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA L_{dn}. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} and nighttime levels are 10 dBA lower.

APPLICABLE NOISE GUIDELINES

State of California - CEQA

The California State Environmental Quality Act (CEQA) asks the following questions regarding potential noise effects to evaluate the significance of potential project impacts. Potential noise effects from a project could be considered significant if any of the following occur:

1. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
2. Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;
3. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
4. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

CEQA does not define what noise level increase would be considered substantial. Typically, an increase in the L_{dn} noise level resulting from the project at noise sensitive land uses of 3 dBA or greater would be considered a significant impact when projected noise levels would exceed those considered satisfactory for the affected land use.

San Mateo County

The Noise Element of the San Mateo County General Plan states the following policies and objectives:

- Strive Toward a Livable Noise Environment: Strive toward an environment for all residents of San Mateo County, which is free from unnecessary, annoying, and injurious noise.
- Reduce Noise Impacts Through Noise/Land Use Compatibility and Noise Mitigation: Reduce noise impacts within San Mateo County through measures, which promote noise/land use compatibility and noise mitigation.
- Promote Protection of Noise Sensitive Land Uses and Noise Reduction in Quiet Areas and Noise Impact Areas: Promote measures which: (1) protect noise sensitive land uses, (2) preserve and protect existing quiet areas, especially those, which contain noise sensitive land uses.
- Site Planning Noise Control: Incorporate acoustic site planning into the design of new development, particularly large scale, master planned development, through measures which may include: (1) separation of noise sensitive buildings from noise generating sources and (2) use of natural topography and intervening structures to shield noise sensitive land uses.
- Noise Barriers Noise Control: Promote measures, which incorporate use of noise barriers into the design of new development, particularly within Noise Impact Areas. Noise barriers may include earth berms, walls, fencing, or landscaping.

- Architectural Design Noise Control: Promote measures, which incorporate architectural techniques into the design of new buildings, particularly buildings within Noise Impact Areas. Architectural design techniques may include: (1) grouping noise sensitive rooms together separated from noise sources, (2) placing windows, vents and other openings away from noise sources, and (3) avoidance of structural features which direct noise toward interior spaces.

- Construction Techniques Noise Control: Promote measures, which incorporate noise control into the construction of existing and new buildings, including, but not limited to, use of dense noise insulating building materials.

The General Plan Noise Element also adopts State land use-noise compatibility standards to guide unincorporated development such that new residential development is considered to be normally acceptable in noise environments with a noise exposure of 60 dBA Ldn or less and conditionally acceptable with a noise exposure of 55 to 70 dBA Ldn.

EXISTING NOISE ENVIRONMENT

The project site is located in unincorporated San Mateo County east of the Bel Aire Road /Ascension Drive intersection. The property is currently vacant with surrounding residential and open space land-uses. The major noise source affecting the site is traffic passing on Ascension Drive and Bel Aire Road, with noise from Polhemus Road and Interstate 280, both located to the west, contributing to background noise levels on the site.

To evaluate the existing noise environment on the site, two long-term noise measurements were conducted. The first long-term measurement (Site 1) was conducted over a four (4) day period beginning at 8:00 p.m. on August 13th, 2003 at an approximate distance of 100 feet from the centerline of Bel Aire Road and approximately 600 feet from the intersection of Bel Aire Road and Ascension Drive. The hourly trend in noise levels measured for each day and averaged over the four day measurement period including the energy equivalent noise level (L_{eq}), and the noise levels exceeded 01, 10, 50 and 90 percent of the time (indicated as L_{1}, L_{10}, L_{50} and L_{90}) are shown on Charts 1-1 through 1-4 and 1-A in Appendix A.

The second long-term measurement (Site 2) was conducted over a seven (7) day period beginning at 8:00 p.m. on August 18th, 2003 at an approximate distance of 80 feet from the centerline of Ascension Drive near the south eastern edge of the site. The hourly trend in noise levels measured for each day and averaged over the seven day measurement period including the energy equivalent noise level (L_{eq}), and the noise levels exceeded 01, 10, 50 and 90 percent of the time (indicated as L_{1}, L_{10}, L_{50} and L_{90}) are shown on Charts 2-1 through 2-7 and 2-A in Appendix A.

When interpreting the noise measurement data, the L_{eq} noise level is typically considered the average noise level, while the L_1 is considered the intrusive level, the L_{50} is considered the median noise level and the L_{90} is considered the background noise level. From a review of the charts in Appendix A the measurement results may be summarized as follows:

Site 1: The daytime and nighttime average (L_{eq}) noise levels at Site 1 were found to range from 44 to 50 dBA and 36 to 44 dBA, respectively with an average daytime L_{eq} of 47 dBA and an average nighttime Leq of 41 dBA. The average four day Day-Night average noise Level (L_{dn}) at this position was calculated to be 49 dBA.

Site 2: The daytime and nighttime average (L_{eq}) noise levels at Site 2 were found to range from 43 to 49 dBA and 36 to 43 dBA, respectively with an average daytime L_{eq} of 47 dBA and an average nighttime Leq of 40 dBA. The average seven day Day-Night average noise Level (L_{dn}) at this position was calculated to be 48 dBA.

Based on the results of our measurements all proposed lots in the subdivision would be considered to be normally acceptable for single-family residential uses.

FUTURE CONDITIONS

Traffic Noise

Based on a review of existing, background, project and cumulative traffic volumes for the area roadways shown in the Hexagon Transportation Consultants traffic study for the project it can be concluded that traffic noise at land uses along area roadways under both the *existing to existing plus project* and *existing to cumulative without project* scenarios will increase by one (1) decibel (dB) or less. The results of this study also demonstrate that under the *existing to cumulative with project* conditions noise levels at land uses along area roadways will increase by less than 2 dB.

Operational Noise

Following construction of the project the occupation and use of the 25 single-family homes proposed by the project would be expected to result in the typical noises associated with residential development, including voices of the new residents, home maintenance activities, barking dogs and children being heard more frequently. Though the noise environment may change noticeably in some areas due to the occupation of the new residences, as opposed to the existing open space, the noise associated with new single-family homes residences is expected to be similar to that of the existing homes in the area.

PROJECT NOISE IMPACTS AND MITIGATION

Noise impacts resulting from and on the proposed project fall into three major categories:

1. The potential environmental noise to impact the intended use of the project site;
2. Potential increases in traffic noise at adjacent noise sensitive residential uses resulting from project-generated traffic;
3. Operational Noise Impacts from the proposed use of the site on adjacent land uses.
4. Noise impacts resulting from the grading and construction of the project on adjacent residential land uses adjacent to the project site and truck trips required to haul soil off site at residential land uses adjacent to the haul route.

Impact N1: Noise and Land Use Compatibility for the intended use of the Project Site.
Based on the results of the long-term noise measurements and the project traffic report, all proposed home lots on the project site will be exposed to environmental noise levels of less than 55 dBA under existing and future conditions and will thus be fully compatible with the intended use. *This is not a significant noise impact.*

Mitigation N1: *None required.*

Impact N2: Project-generated traffic noise on adjacent land uses.
Based on an analysis of the project traffic shown in the traffic report, project generated traffic will increase under existing plus project conditions by up to 25% on area roadways. Considering that the make-up of the traffic will remain essentially constant, this level of increase in traffic volumes will result in an increase in average traffic noise levels along these roadways of one decibel (1 dB) or less. Under cumulative (future) conditions the percentage increase due to project traffic will diminish to 22%, with the average traffic noise levels along these roadways remaining at one decibel (1 dB) or less. *This impact is considered to be less than significant.*

Mitigation N2: *None required.*

Impact N3: Operational Noise Impacts from the proposed use of the site on adjacent land uses
The proposed project would place 25 new single-family homes on the currently vacant site adjacent to the existing single-family homes at the periphery of the site. The occupation and use of these homes would be expected to result in the typical noises associated with residential development, including voices of the new residents, home maintenance activities, barking dogs and children being heard more frequently. Though the noise environment may change noticeably in some areas due to the occupation of the new residences, the noise associated with new single-family homes residences is not typically incompatible with existing single-family uses, therefore the operational noise associated with the new uses would not result in a noise impact on the existing uses in the area.

Mitigation N3: *None required.*

Impact N4: Construction Noise Impacts on existing land uses.
Current estimates place the time required to complete the grading of the site at 34-44 days and the construction of the roadway on the to take an additional 6 months. Following completion of the site work, and depending on the housing market, the current estimate is that up to 8 homes will be completed every 14 months. Based on this, the completion of the entire project would take about four (4) years from start to finish.

Based on a review of the proposed site plan and vicinity maps, site grading and home construction on the northeast portion of the site will take place as close as 50 feet from the rear of the existing residences fronting on Parrot Drive. Other area residences will be further removed from the construction activities at 200 feet or more from the proposed home pads. No pile driving or blasting activities are anticipated for the project and groundborne vibration levels produced by earth moving and grading equipment at 25 feet (0.035 to 0.210 in/sec PPV[1]) are below vibration impact threshold for residential structures (0.5 in/sec PPV[2]), and thus groundborne vibration from site work would not be expected to impact the adjacent residences.

Noise generated during construction would differ depending on the construction phase and the type and amount of equipment used at the construction site. Table 3, below, presents typical ranges of energy equivalent noise levels (Leq) at 50 feet for housing construction.

Table 3: Noise Levels by Construction Phases for Domestic Housing

Typical Ranges of Energy Equivalent Noise Levels at 50 Feet, L_{eq} in dBA, at Construction Sites		
Construction Phase	**All pertinent equipment present at the site.**	**Minimum required equipment present at the site.**
Ground Clearing	83	83
Excavation	88	75
Foundations	81	81
Erection	81	65
Finishing	88	72

Source: U.S.E.P.A., Legal Compilation on Noise, Vol. 1, p. 2-104, 1973.

Construction activities would include site grading, road paving, removal of material, foundation work, framing, and exterior & interior finishing. The highest noise levels would be generated during site

[1] PPV = Peak Particle Velocity which is defined as the maximum instantaneous positive or negative peak of the vibration wave. The PPV is typically used to evaluate the potential for vibration induced building damage.

[2] Source: National Cooperative Highway Research Program, 1997

grading, with somewhat lower noise levels occurring during building construction and finishing. When site work (ground clearing, excavation, paving and foundation work) activities are occurring near the residences adjacent to the site along the edges of the site, daytime levels can be expected to significantly exceed existing noise levels. As construction proceeds to the interior of the site noise levels at these residences will diminish. Noise produced by construction activities would, however, be audible and exceed the measurement average existing noise levels by 3 dBA or more during the entire construction period at nearby residences.

It is estimated that approximately 108 soil haul truck trips per day for 40 days will be needed to complete site grading. Though the route used to haul material from the site has not been established at this time, since the final destination of the soil has not been determined, the trucks will likely head to Hwy 92 via Bel Aire Road, Ascension Drive and Polhemus Road. The typical maximum (Lmax) noise levels generated by slow moving heavy duty trucks would be expected to range from 70 to 75 dBA at a typical residential façade setback from the roadway centerline of 50 feet. If the number of haul trucks per hour leaving the site are considered to be reletively constant over the 40-day material removal period (i.e. ten to eleven trips per hour between 8 a.m. and 6 p.m.) then the average hourly noise levels at the residential facades along the haul route would increase from current noise levels in the high 40 to low 50 decibel range to the low to mid 60 decibel range. Based on this analysis noise produced by the soil haul trucks trips associated with the site grading would cause average noise levels at residential uses along the haul route to increase by much more than 3 dBA during the period of site grading requiring soil removal.

Based on the above discussion noise generated on-site and along the soil haul truck route on local, residential, roads would constitute a *significant, unavoidable, short-term noise impact*.

Mitigation N4: Construction Noise Mitigation Measures

Incorporating the following conditions in the construction contract agreements can reduce construction-period noise impacts to the existing residential uses in the site vicinity:

1. *Construction Scheduling.* The following measures are recommended to limit construction and related activities to the portion of the day when the number of persons in the adjacent residential uses is lowest.
   a. Limited construction hours to between 7 a.m. and 6 p.m. Monday through Friday and 9:00 a.m. to 5:00 p.m. on Saturdays. Prohibit construction on Sundays and all holidays recognized by the City of Walnut Creek.
   b. Do not allow Machinery to be cleaned past 6:00 p.m or serviced past 6:45 p.m. Monday through Friday.
   c. Limit the allowable hours for the delivery of materials or equipment to the site and truck traffic coming to and from the site for any purpose to weekday (Monday through Friday) non-holiday hours between 7:30 a.m. and 5:00 p.m.

2. *Construction Equipment Mufflers and Maintenance.* Properly muffle and maintain all construction equipment powered by internal combustion engines.

3. *Idling Prohibitions.* Prohibit unnecessary idling of internal combustion engines Equipment should be turned off when not in use.

4. *Equipment Location and Shielding.* Locate all stationary noise-generating construction equipment such as air compressors as far as practical from existing nearby residences and other noise-sensitive land uses. Acoustically shield such equipment.

5. *Quiet Equipment Selection.* Select quiet construction equipment, particularly air compressors whenever possible. (Fit motorized equipment with proper mufflers in good working order.)

6. *On-Site Equipment Storage.* Store heavy equipment, such as paving and grading equipment, on-site whenever possible to minimize the need for extra heavy truck trip on local, residential, streets.

7. *Noise Disturbance Coordinator.* Designate a "noise disturbance coordinator" who would be responsible for responding to any local complaints about construction noise. This individual would most likely be the contractor or a contractors representative. The disturbance coordinator would determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and would require that reasonable measures warranted to correct the problem be implemented. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule. Implementation of the above measures will limit the overall noise levels and duration of intrusive noise at adjacent residences due to construction activities, while also giving any persons disturbed by said activities an identifiable method of recourse.

CUMULATIVE NOISE IMPACTS

Based on a review and analysis of cumulative and cumulative-plus-project traffic projections traffic noise on area roadways will increase by less than 1 dBA due to project generated traffic. Once the project is completed, the occupation and use of these homes would be expected to result in the typical noises associated with residential development, which is considered to be compatible with the surrounding residential land uses. Based on these conclusions, the project would not produce any cumulative noise impacts on the surrounding residential land uses.

APPENDIX N1:

NOISE MEASURMENT DATA

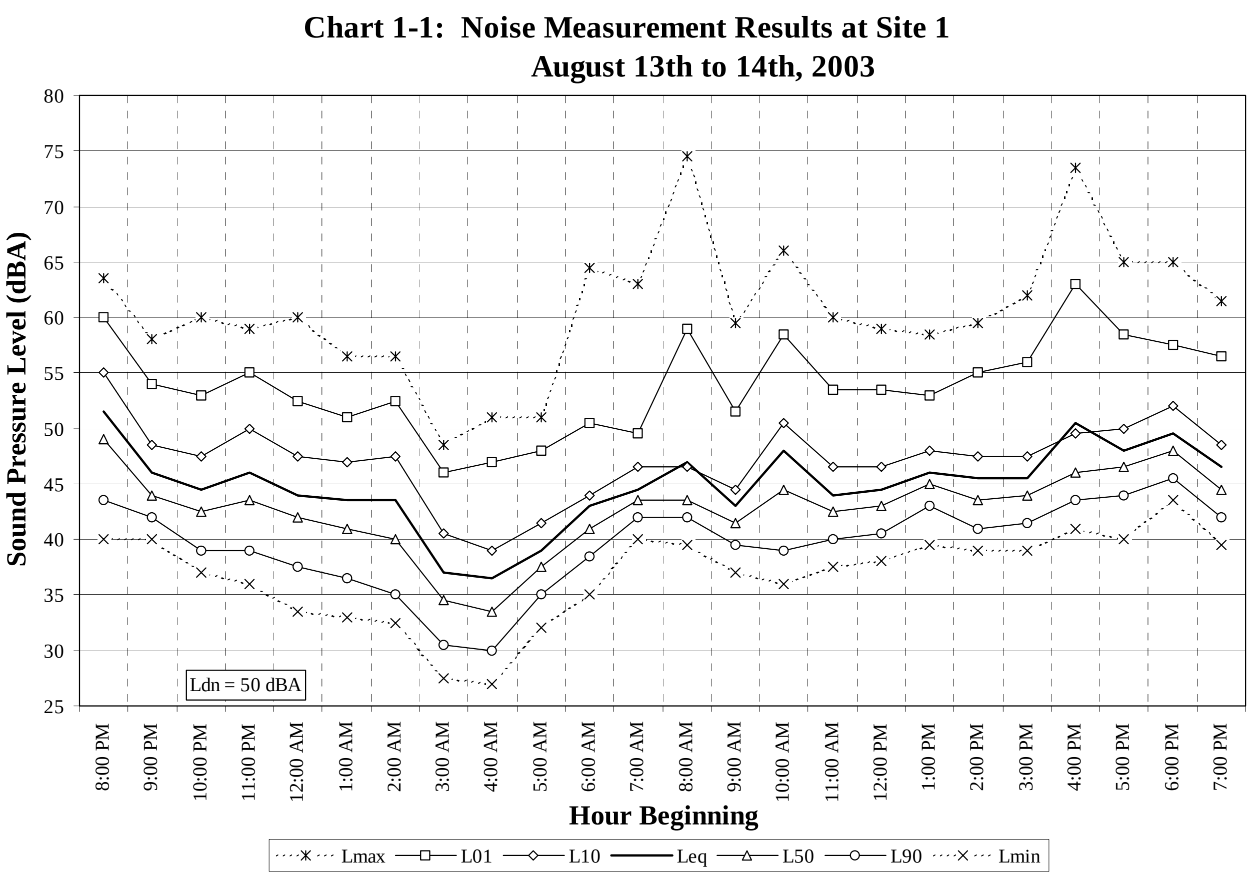


Chart 1-2: Noise Measurement Results at Site 1
August 14th to 15th, 2003

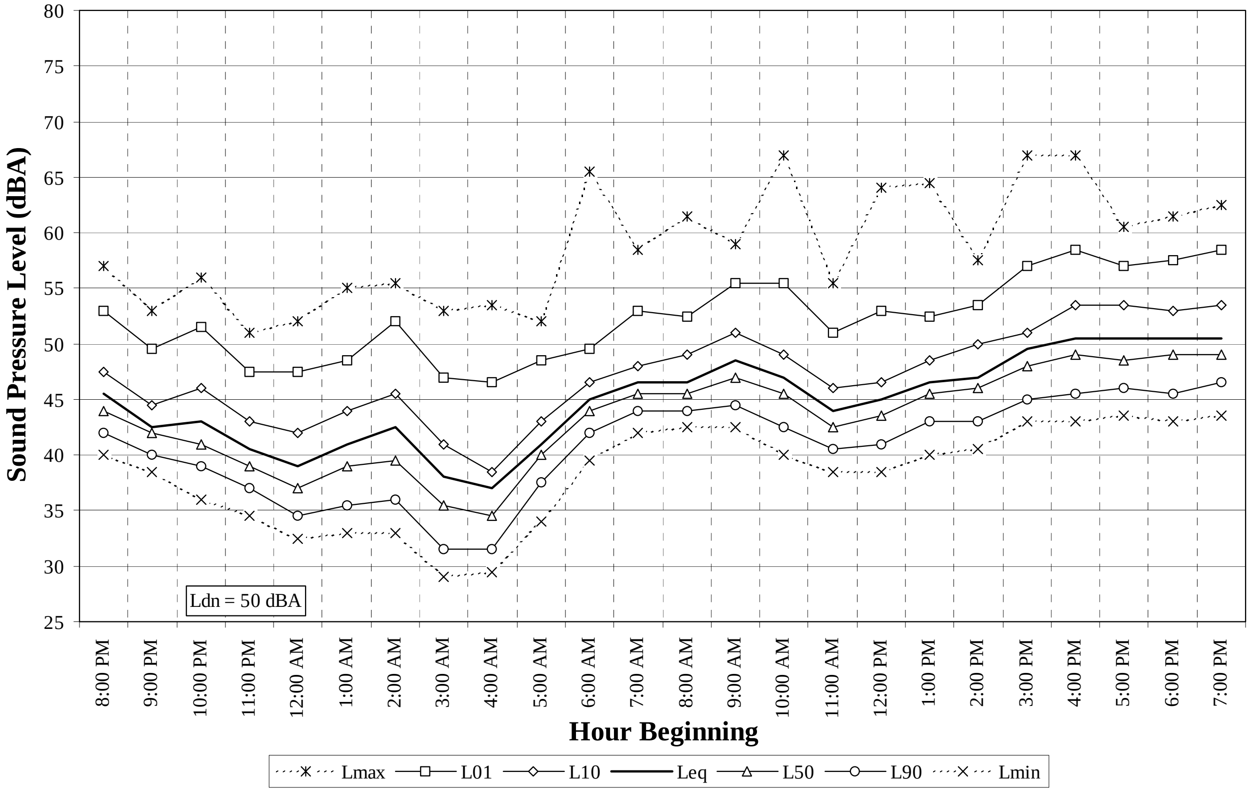


Chart 1-3: Noise Measurement Results at Site 1
August 15th to 16th, 2003

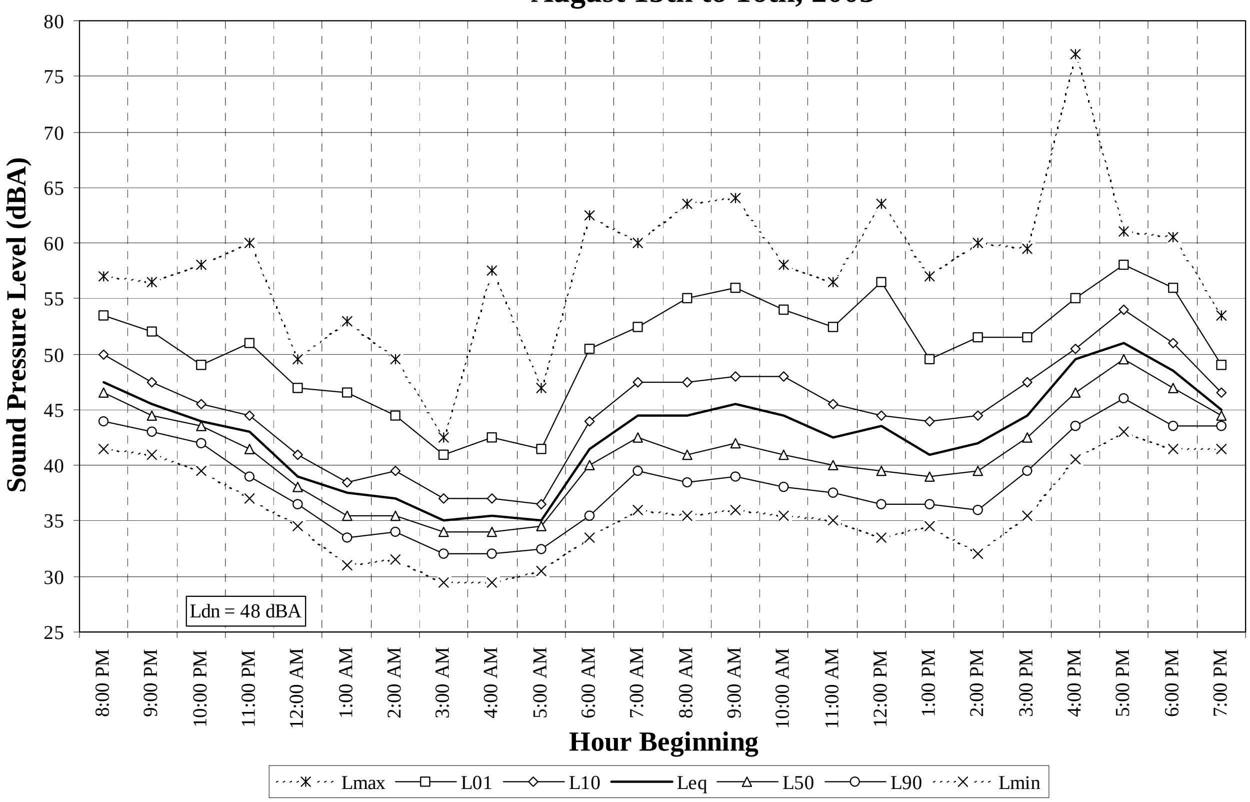


Chart 1-4: Noise Measurement Results at Site 1
August 16th to 17th, 2003

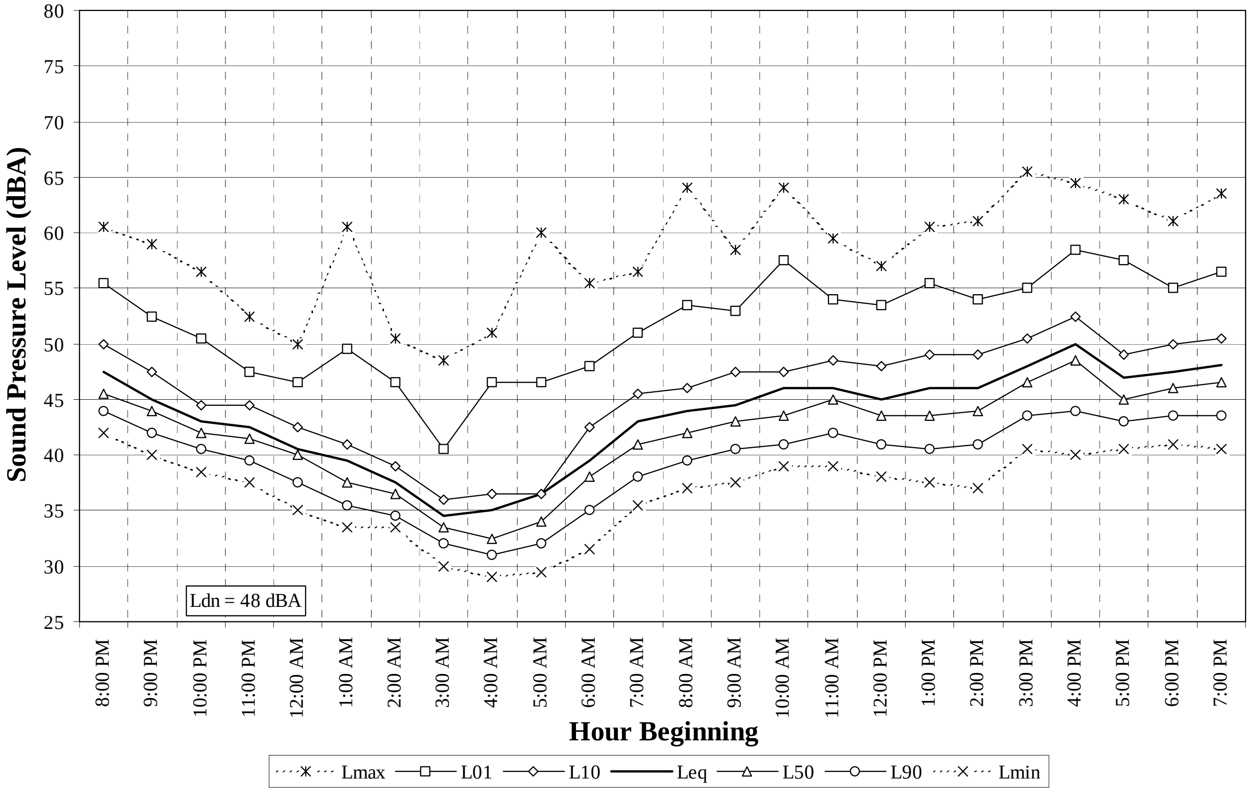


Chart 1-A: Average Daily Noise Measurement Results at Site 1
August 13th to 17th, 2003

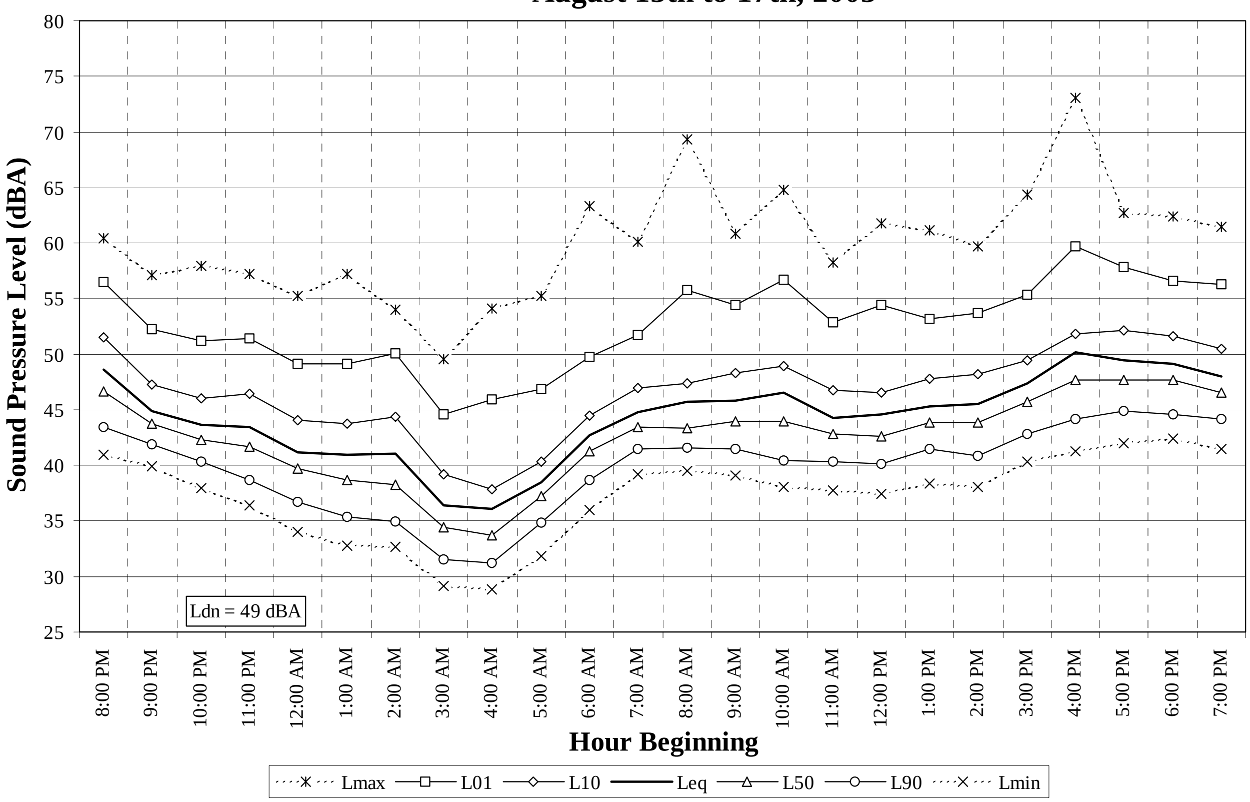


Chart 2-1 - Noise Measurement Results at LT-1 on Day 1: August 18th to 19th,2003

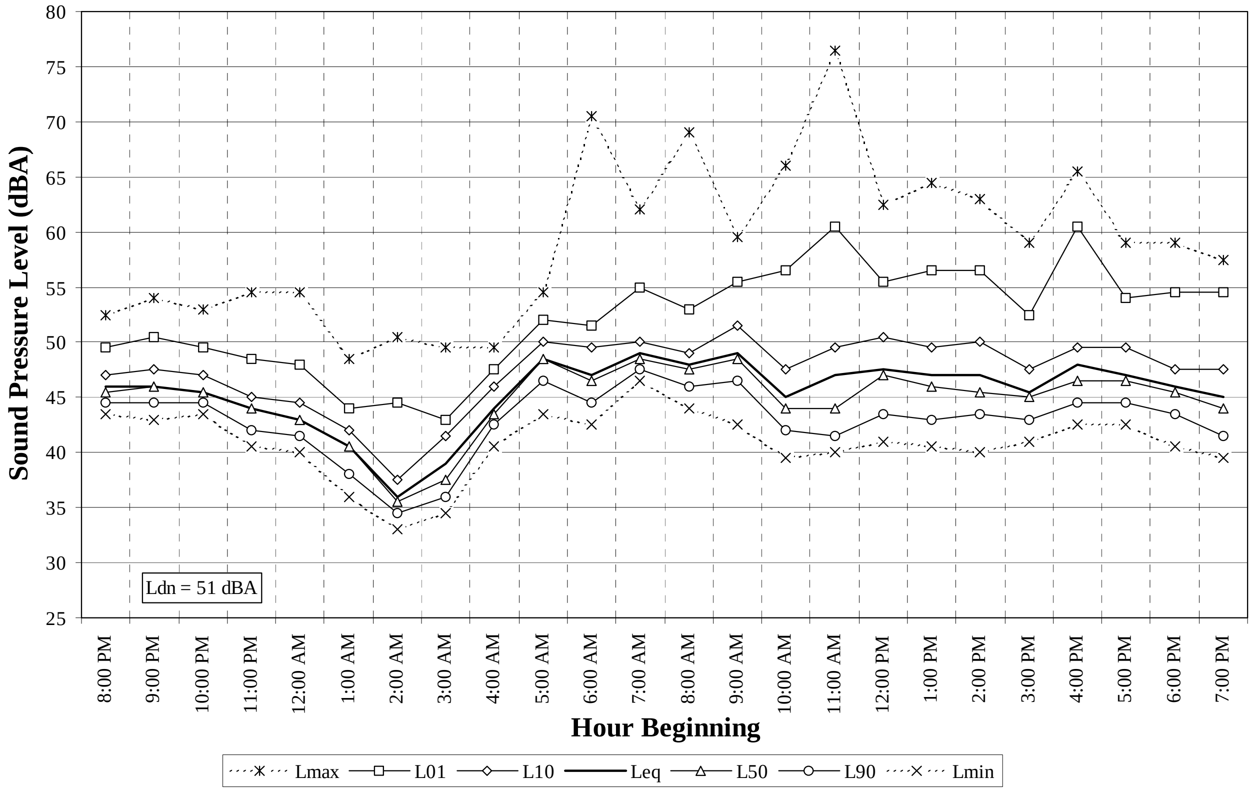


Chart 2-2 - Noise Measurement Results at LT-1 on Day 2: August 19th to 20th,2003

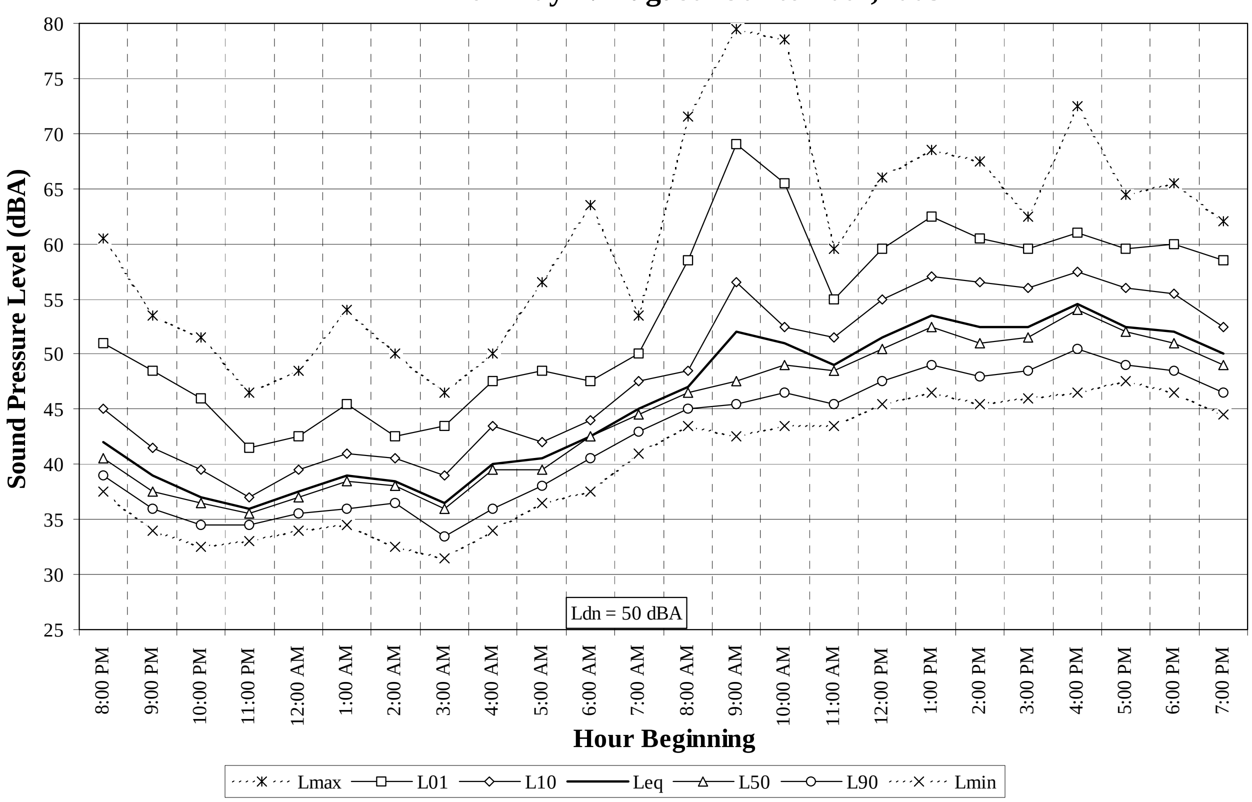


Chart 2-3 - Noise Measurement Results at LT-1 on Day 3: August 20th to 21st,2003

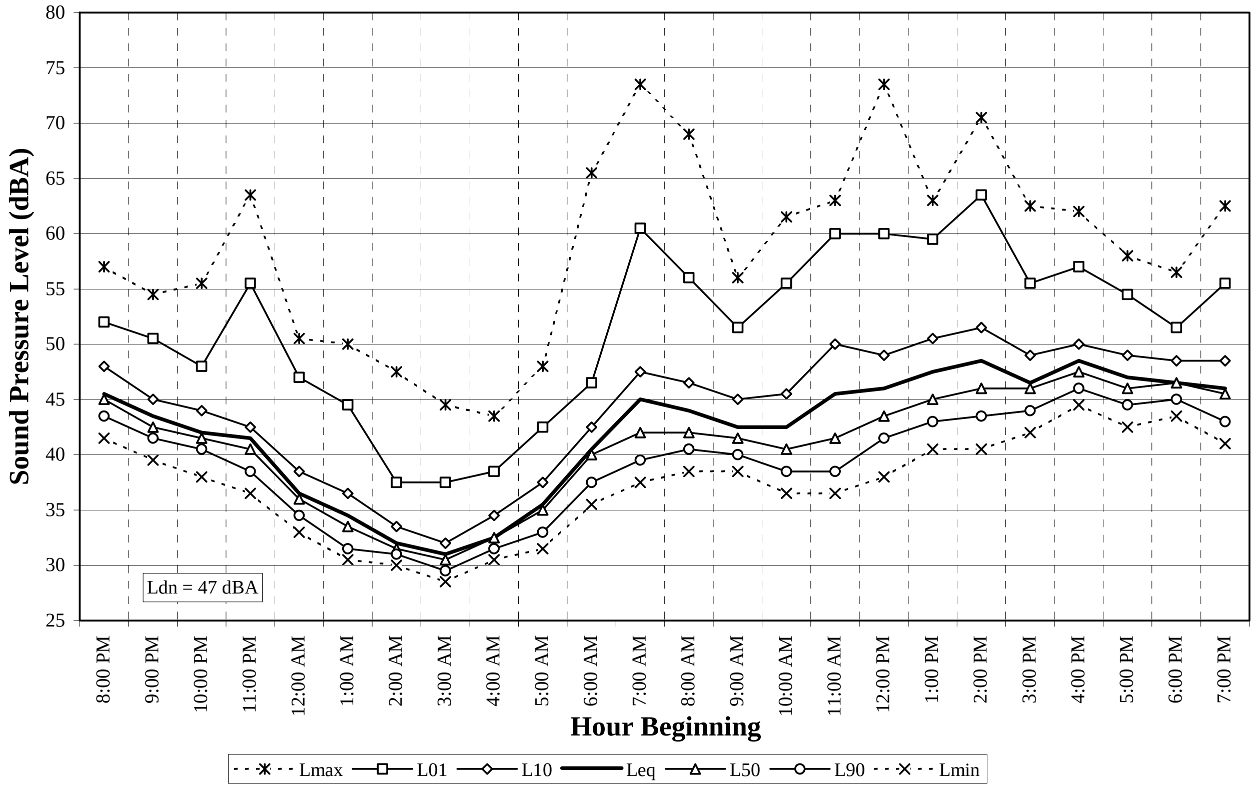


Chart 2-4 - Noise Measurement Results at LT-1 on Day 4: August 21st to 22nd,2003

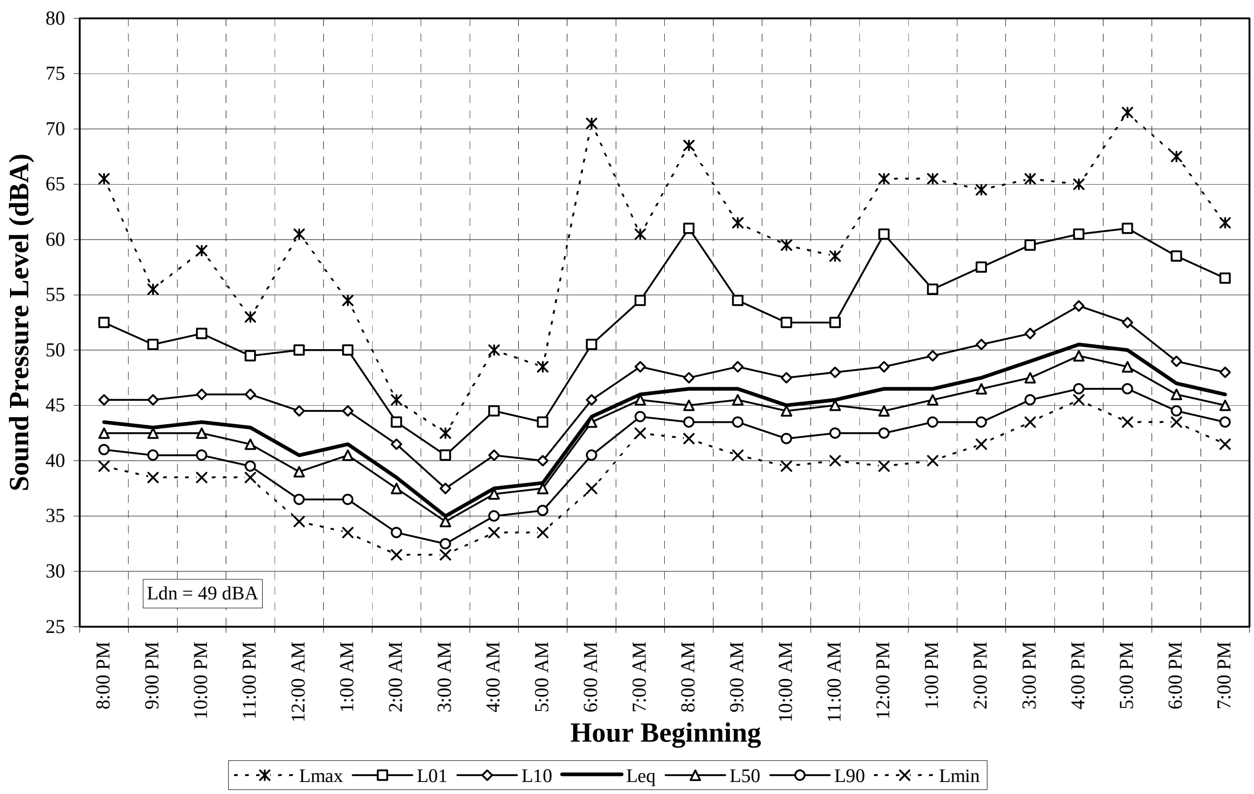


Chart 2-5 - Noise Measurement Results at LT-1 on Day 5: August 22nd to 23rd,2003

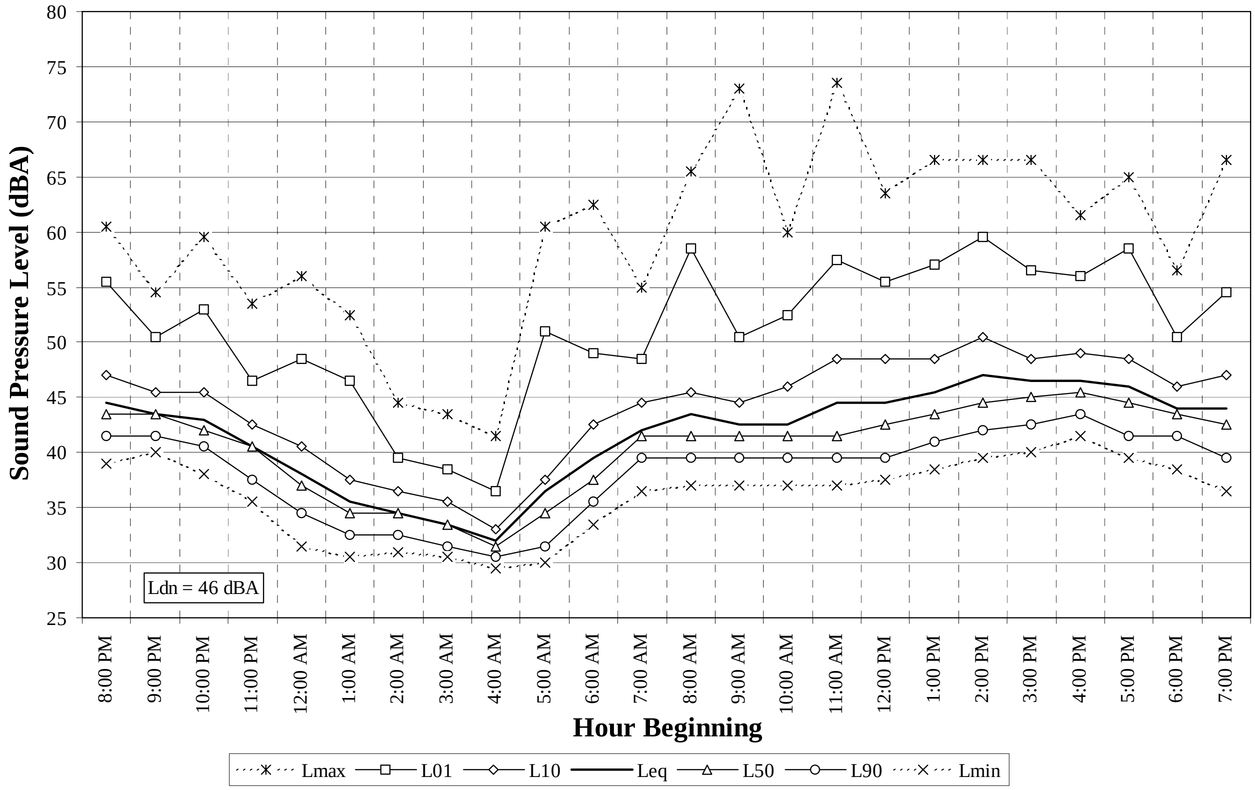


Chart 2-6 - Noise Measurement Results at LT-1 on Day 6: August 23rd to 24th,2003

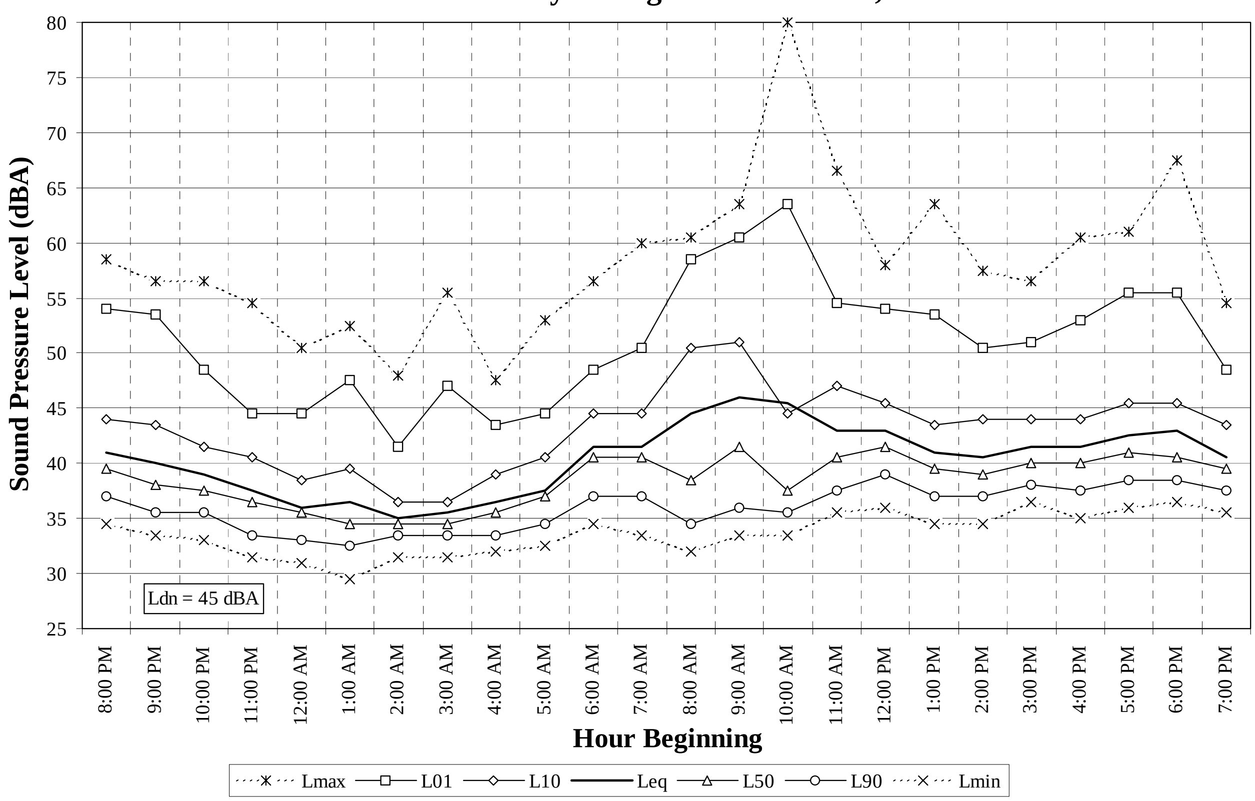


Chart 2-7 - Noise Measurement Results at LT-1 on Day 7: August 24th to 25th,2003

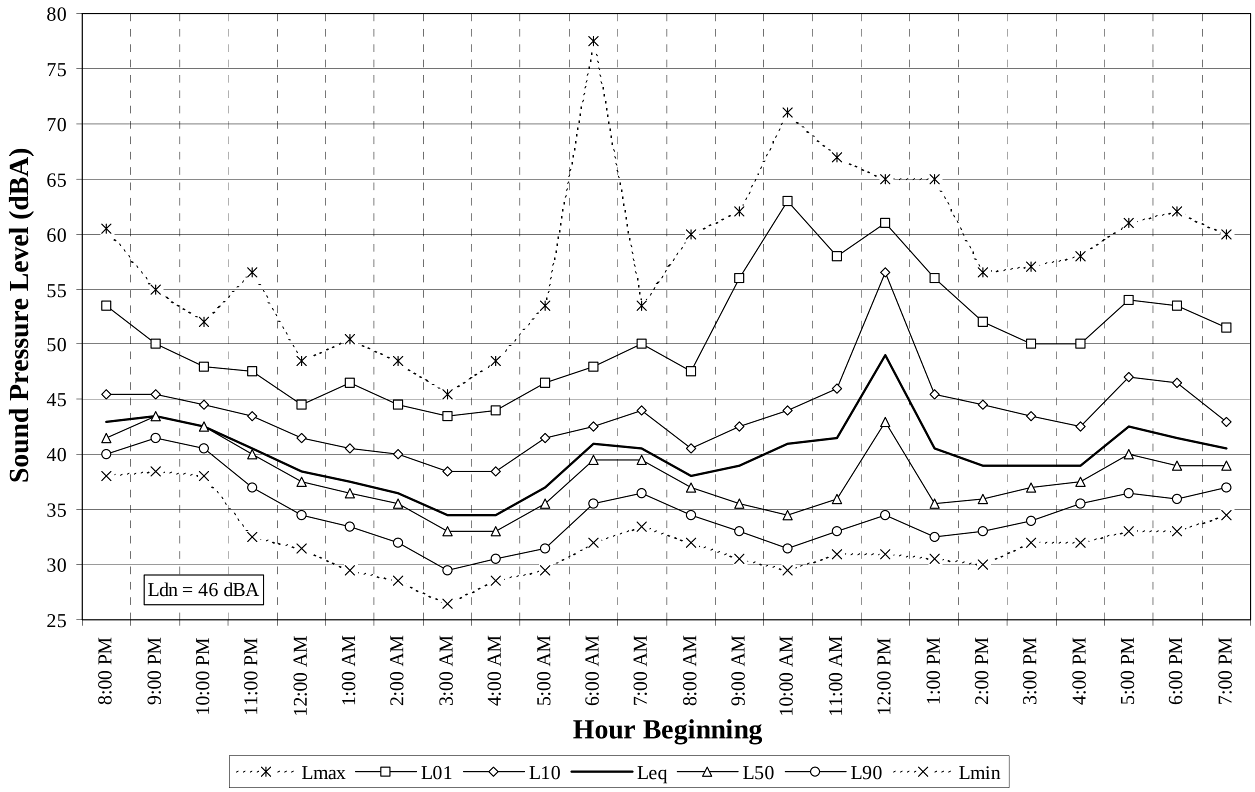
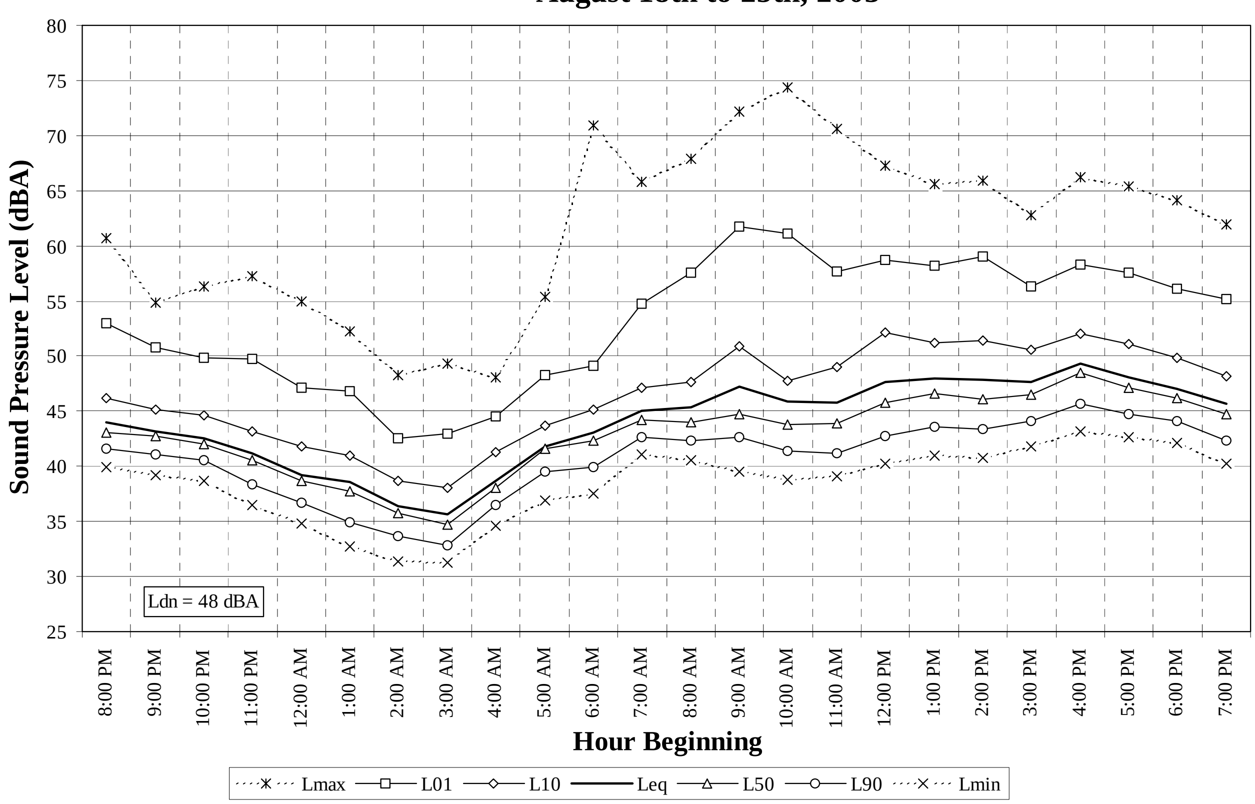


Chart 2-A - Average Daily Noise Measurement Results at LT-1 August 18th to 25th, 2003



APPENDIX I

TRAFFIC DATA

Traffic Analysis Report

Prepared for:

San Mateo County

Prepared by:

Hexagon Transportation Consultants, Inc.

March 9, 2004

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Thomas Subdivision Report.doc

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1. Introduction

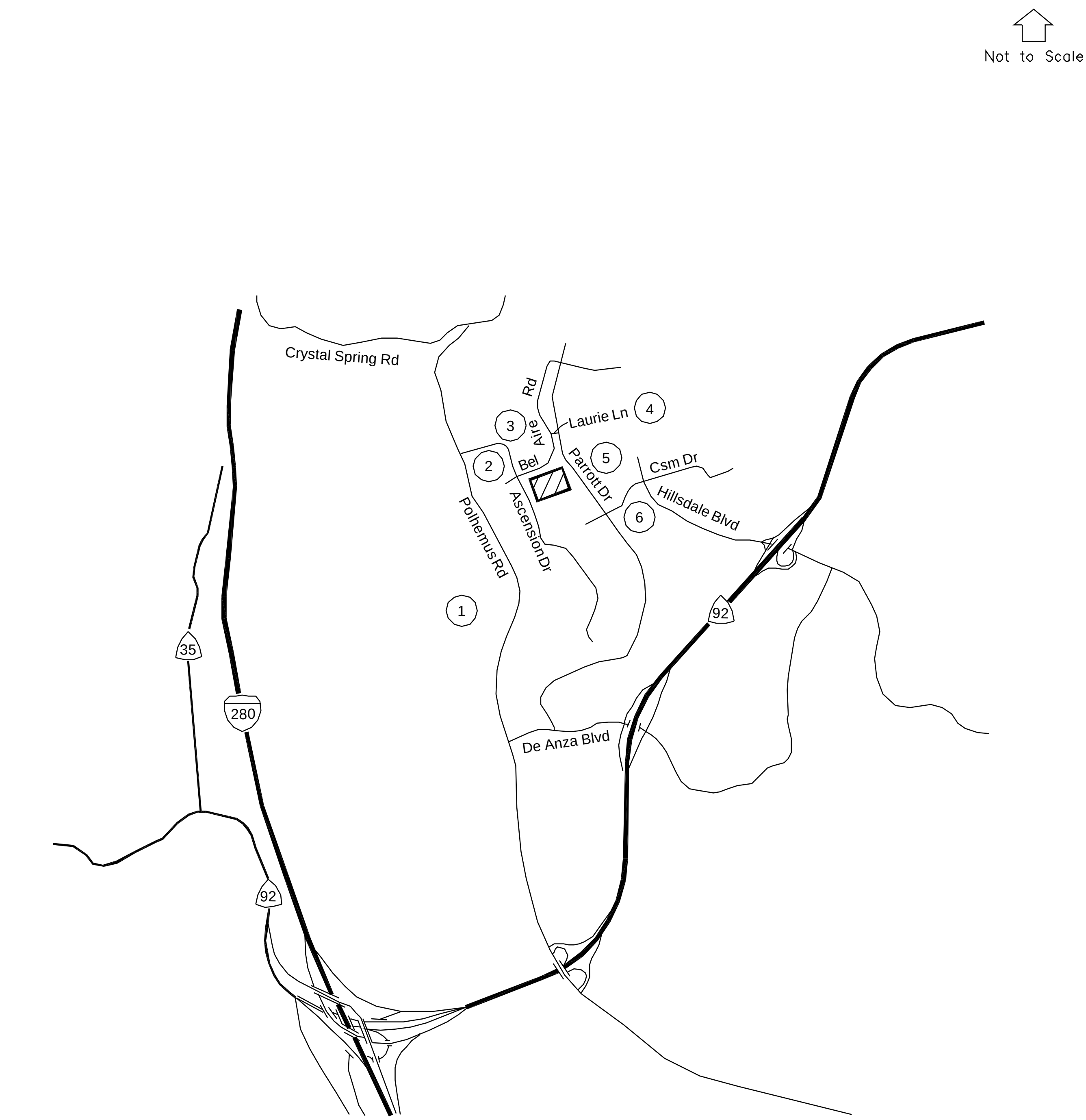
This report presents the results of the traffic impact analysis conducted for the Thomas Subdivision residential development in San Mateo County, California. The project site is located at the northwest corner of Bel Aire Road and Ascension Drive in the San Mateo Highlands, an unincorporated area in San Mateo County. The project consists of development of six parcels totaling 13.3 acres to construct 25 new single-family-detached residential dwelling units. The site is currently vacant. Parking will be provided on site at the individual residences and in designated areas on the street system on site. Access to the site is provided via Bel Aire Road. The project site location and the surrounding study area are shown on Figure 1.

Scope of Study

This study was conducted for the purpose of identifying the potential traffic impacts related to the proposed development. The impacts of the project were evaluated following the standards and methodologies set forth by San Mateo County. Since the project would add less than 100 peak hour trips to regional roads, no analysis under the Congestion Management Program (CMP) of the City/County Association of Governments (C/CAG) is required. The traffic analysis is based on 24-hour daily traffic volumes and project trips on the study roadway segments. The study roadway segments are identified below.

Study Roadway Segments

Polhemus Road
Ascension Drive
Bel Aire Road
Laurie Lane
Parrott Drive
Csm Drive



LEGEND

= Site

= Study Roadway Segments

Figure 1

SITE LOCATION AND STUDY ROADWAY SEGMENTS

Thomas Subdivision–Residential Development

Hexagon
Transportation Consultants, Inc.

thomas subdivision\figures\figures.dwg
K.S.

These are the roadways that would be most affected by project traffic. Traffic conditions on the roadway segments were analyzed for 24-hours and for the weekday AM and PM peak hours of traffic. The AM peak hour of traffic is generally between 7:00 and 9:00 AM, and the PM peak hour is typically between 4:00 and 6:00 PM. It is during these periods that the most congested traffic conditions occur on an average day.

Analysis Scenarios

Traffic conditions were evaluated for the following scenarios:

- *Existing Conditions* Year 2003
- *Background Conditions* Existing traffic plus traffic added by approved development
- *Project Conditions* Background Conditions plus the proposed project
- *Cumulative Conditions* Cumulative conditions *with/without* the project

The data required for the analysis were obtained from new traffic counts, previous traffic studies, and the C/CAG Travel Demand Forecasting Model.

Analysis Methodologies and Level of Service Standards

Traffic conditions were evaluated using level of service (LOS). *Level of Service* is a qualitative description of operating conditions ranging from LOS A, or free-flow conditions with little or no delay, to LOS F, or forced-flow conditions with extreme delays. Roadway segments are analyzed by comparing the volume to capacity ratios. Typical capacity is about 2,000 vehicles per hour on two-lane arterials and collectors and 200 vehicles per hour on a residential street. If an increase of 5% or more in v/c ratio on a deficient roadway segment were to occur, it would be considered significant.

TIRE Index

Traffic conditions also were evaluated using the TIRE index (Traffic Infusion in Residential Environments). The TIRE index is a numerical representation of a resident's perception of the effect of street traffic on activities such as walking, cycling and playing, and on daily tasks such as maneuvering an auto out of a residential driveway. The acronym for "Traffic Infusion on Residential Environments," TIRE, is expressed by index values that range from zero, representing the least effect of traffic, to five representing the severest affect:

0–1	1–2	2–3	3–4	4–5
Very Low	Low	Moderate	High	Very High

According to the TIRE index, a given change in traffic volume will cause a greater impact on a residential environment with a low pre-existing volume than it would on a street with a higher pre-existing volume. Any traffic change that would cause an index change of 0.1 or more would be noticeable to street residents. Streets with TIRE levels above the midrange index of 3 are traffic-dominated, while those with indexes below 3 are better suited for residential activities (See Appendix C).

On-Site Circulation

Any feature of the site layout that might result in unsafe pedestrian or vehicular circulation would be considered a significant impact. Revisions to the site plan also may be recommended to make the site circulation function more efficiently. Any on-site circulation recommendations that are not related to safety are not considered significant impacts under the California Environmental Quality Act (CEQA) but may be required as a condition of approval.

2. Existing Conditions

The project site is located at the northwest corner of Bel Aire Road and Ascension Drive in the San Mateo Highlands, an unincorporated area in San Mateo County. The project consists of development of six parcels totaling 13.3 acres to construct 25 new single-family-detached residential dwelling units. The site is currently vacant. Parking will be provided on site at the individual residences and in designated areas on the street system on site. Access to the site is provided via Bel Aire Road.

Site Access and Surrounding Roadway Network

Regional access to the project site is provided via State Route (SR) 92.

SR 92 is a four-lane east-west freeway in the vicinity of the site. SR 92 extends from Half Moon Bay in west San Mateo County to Hayward in Alameda County. Access to the project site is provided by its interchanges at Polhemus Road, De Anza Boulevard, and Hillsdale Boulevard.

Local access to the site is provided by Polhemus Road, Ascension Drive, Bel Aire Road, De Anza Boulevard, Parrott Drive, Laurie Lane, West Hillsdale Boulevard, and Csm Drive. These roadways and other local streets are described below.

Polhemus Road is a two-lane north-south arterial. Polhemus Road begins north of SR-92 and terminates at Crystal Springs. South of SR-92 it becomes Ralston Avenue. Access to the site is provided via Ascension Drive.

Ascension Drive is a two-lane east-west residential street that begins east of Polhemus Road and terminates at Los Altos Drive. Ascension Drive has sidewalks except along the project frontage. Access to the site is provided via Bel Aire Road.

Bel Aire Road is a two-lane local residential street with sidewalks and on-street parking on one side of the street. There are no sidewalks on the project frontage. The project would have direct access to Bel Aire Road via a new subdivision street.

De Anza Boulevard is a two-lane east west collector with sidewalks, it begins east of Polhemus Road and continues over SR-92 and terminates at West Hillsdale Boulevard. Access to site is provided via Parrott Drive and Polhemus Road.

Parrott Drive is a two-lane north-south collector street with sidewalks, it begins north of De Anza Boulevard and continues across Laurie Lane. Access to the site is provided via Laurie Lane.

Laurie Lane is a short two-lane east-west local residential street with sidewalks. It begins at Bel Aire Road and terminates at Parrott Drive.

West Hillsdale Boulevard in the vicinity of the project site, is a two-to-six-lane east west arterial. West Hillsdale Boulevard has six lanes with a landscaped median west of SR-92, four lanes with a striped median between SR-92 and Glendora Drive, and two lanes east of Glendora Drive. Access to the site is provided via Csm Drive.

Csm Drive is a two-lane east-west collector street with sidewalks, it begins within the College of San Mateo and terminates west of Parrott Drive. Access to site is provided via Parrott Drive.

Existing Transit Service

Transit service to the study area is provided by the San Mateo County Transit District (SamTrans) and Caltrain. These services are described below.

SamTrans Bus Service

There are two bus lines that operate near the project site. The *260 line* provides service between the College of San Mateo and the San Carlos Caltrain station, via Polhemus Road-Ralston Avenue, Marine World Parkway and Redwood Shores, with 60-minute headways during commute hours. Line 53 has limited service on Ascension Drive and Bel Aire Road. It runs on school days only with one run in the morning around 8 a.m. and two runs in the afternoon around 2:30 – 3:00 p.m. The nearest bus stop is at the intersection of Bel Aire Road and Ascension Drive.

Caltrain Service

Commuter rail service between San Francisco and Gilroy is provided by Caltrain. The project is located approximately three miles from the Hillsdale Caltrain station. The Hillsdale station is located near the interchange of Hillsdale Boulevard and El Camino Real. At the Hillsdale station, Caltrain provides service with approximately 10- to 20-minute headways during commute hours. The Hillsdale station has park and ride lots. There is no direct bus service from the site to Caltrain.

Existing Traffic Volumes

The existing peak hour and 24-hour traffic volumes were obtained from new tube counts on the study roadway segments. The counts were conducted in late August 2003 while the college of San Mateo was in session. The existing AM, PM, and daily traffic volumes are shown on Figure 2. The 24 hour existing volume profiles are shown in Appendix B. The traffic count data are included in Appendix A.

Existing Volume to Capacity Ratios

The results of the v/c analysis under Existing Conditions are summarized in Table 1. The results show that most of the study roadway segments operate well within acceptable limits. The volume on Ascension Drive in the morning is nearing the acceptable limit for a local residential street.

Existing TIRE Index

The results of the TIRE index analysis under existing conditions are summarized in Table 2. Of the three local residential streets, Ascension Drive is operating slightly above the mid-range of the TIRE index. Polhemus Road, Parrott Drive and Csm Drive are more traffic-dominated, which is expected for collector or arterial streets.

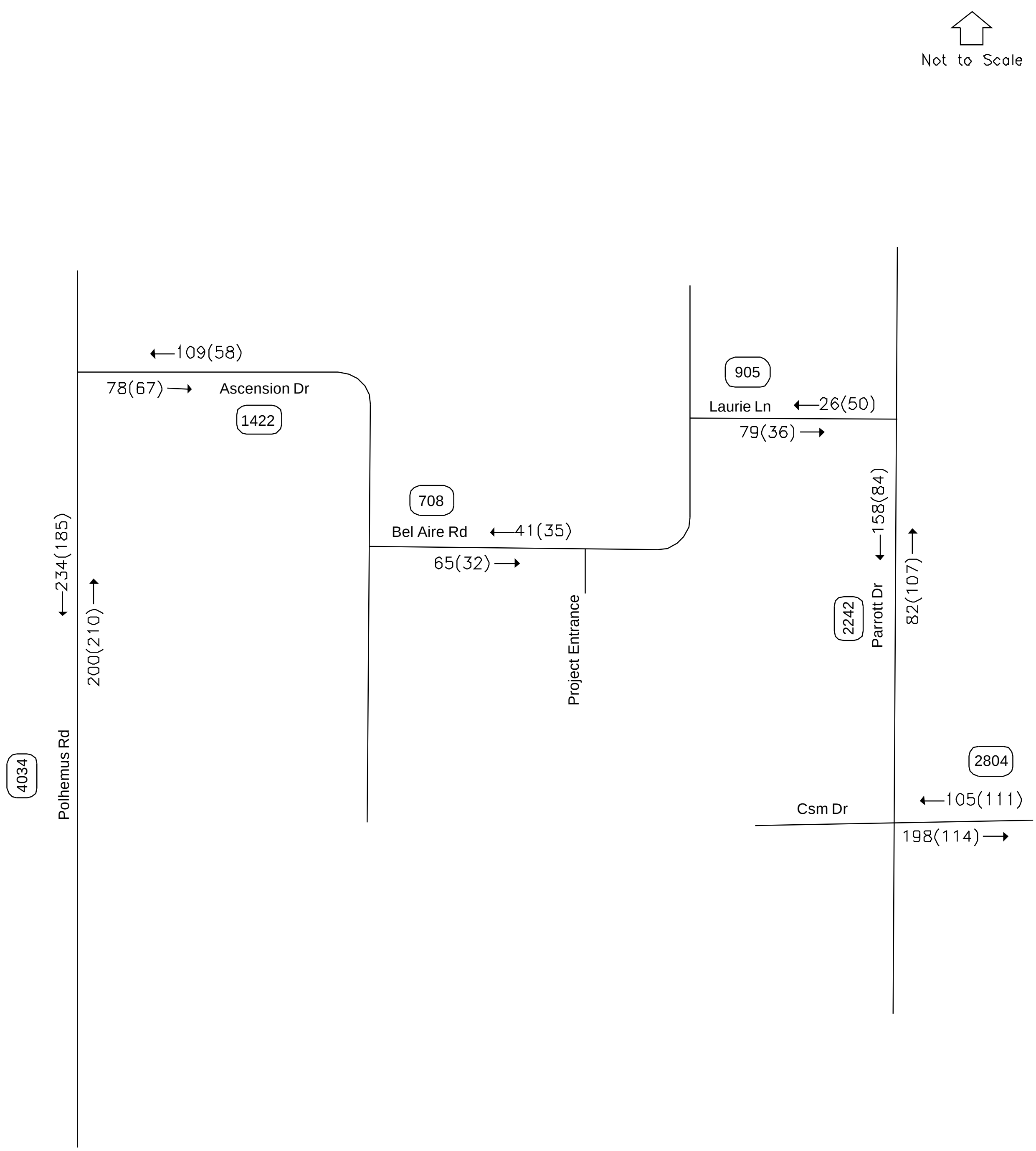
Table 1
Existing Volume to Capacity Ratios

Roadway Segment	Street Classification	Peak Hour	Capacity	Existing Volume	Existing v/c
Polhemus Rd (Ascension Dr to De Anza Blvd)	Arterial	AM	2000	423	0.21
		PM		387	0.19
Ascension Dr (Polhemus Rd to Bel Aire Road)	Local	AM	200	181	0.91
		PM		114	0.57
Bel Aire Rd (Ascension Dr to Laurie Ln)	Local	AM	200	101	0.51
		PM		62	0.31
Laurie Ln (Bel Aire Rd to Parrott Dr)	Local	AM	200	103	0.52
		PM		82	0.41
Parrott Dr (Laurie Ln to Csm Dr)	Collector	AM	2000	230	0.12
		PM		187	0.09
Csm Dr (Parrott Dr to Hillsdale Blvd)	Collector	AM	2000	259	0.13
		PM		214	0.11

Table 2
Existing TIRE Index of Roadway Segments

Roadway Segment	Existing Volume (vpd)	Existing TIRE[/a/] Index
Polhemus Rd (btwn Ascension Dr & De Anza Blvd)	4034	3.6
Ascension Dr (btwn Polhemus Rd & Rainbow Dr)	1422	3.2
Bel Aire Rd (btwn Ascension Dr & Laurie Ln)	708	2.8
Laurie Ln (btwn Bel Aire Rd & Parrott Dr)	905	3.0
Parrott Dr (btwn Laurie Ln & Csm Dr)	2242	3.4
Csm Dr (btwn Parrott Dr & Hillsdale Blvd)	2804	3.5

/a/ Source: Goodrich Traffic Group
(vpd) = Vehicles per day



LEGEND

= Site

XX(XX) = AM Peak Hour (PM Peak Hour)

\# = Daily Traffic Volumes

Hexagon
Transportation Consultants, Inc.

Figure 2

EXISTING TRAFFIC VOLUMES

Thomas Subdivision–Residential Development

4. Background Conditions

Background conditions represent the traffic conditions that are expected to occur with the addition of traffic from approved developments and, as applicable, with the addition of developer-conditioned transportation improvements. Approved projects are those developments that have been approved but which are not yet constructed or occupied.

Approved Development

There are no developments that have been approved but not yet constructed in the vicinity of the project site. Trips generated by small or distant developments would be negligible on the study roadway segments. The effect of other foreseeable development that has not been approved by the County of San Mateo is addressed in the Cumulative analysis presented later in this report.

4. Project Conditions

Project conditions are defined as background conditions with the addition of traffic generated by the project.

The project site is located at the northwest corner of Bel Aire Road and Ascension Drive in the San Mateo Highlands, an unincorporated area in San Mateo County. The project consists of development of six parcels totaling 13.3 acres to construct 25 new single-family-detached residential dwelling units. The site is currently vacant. Access to the site will be provided via Bel Aire Road.

Project Trip Generation, Distribution and Assignment

The magnitude of traffic added to the roadway system by the project was estimated by multiplying the applicable trip generation rates by the size of the development. Trip generation for the proposed project was estimated using the rates published in the Institute of Transportation Engineers (ITE) manual titled *Trip Generation*, Seventh Edition, 2003. The published rates are based on data collected from hundreds of studies conducted for projects with land uses similar to the use proposed for this project. The estimated peak-hour and daily trip generation totals for the project are shown in Table 3.

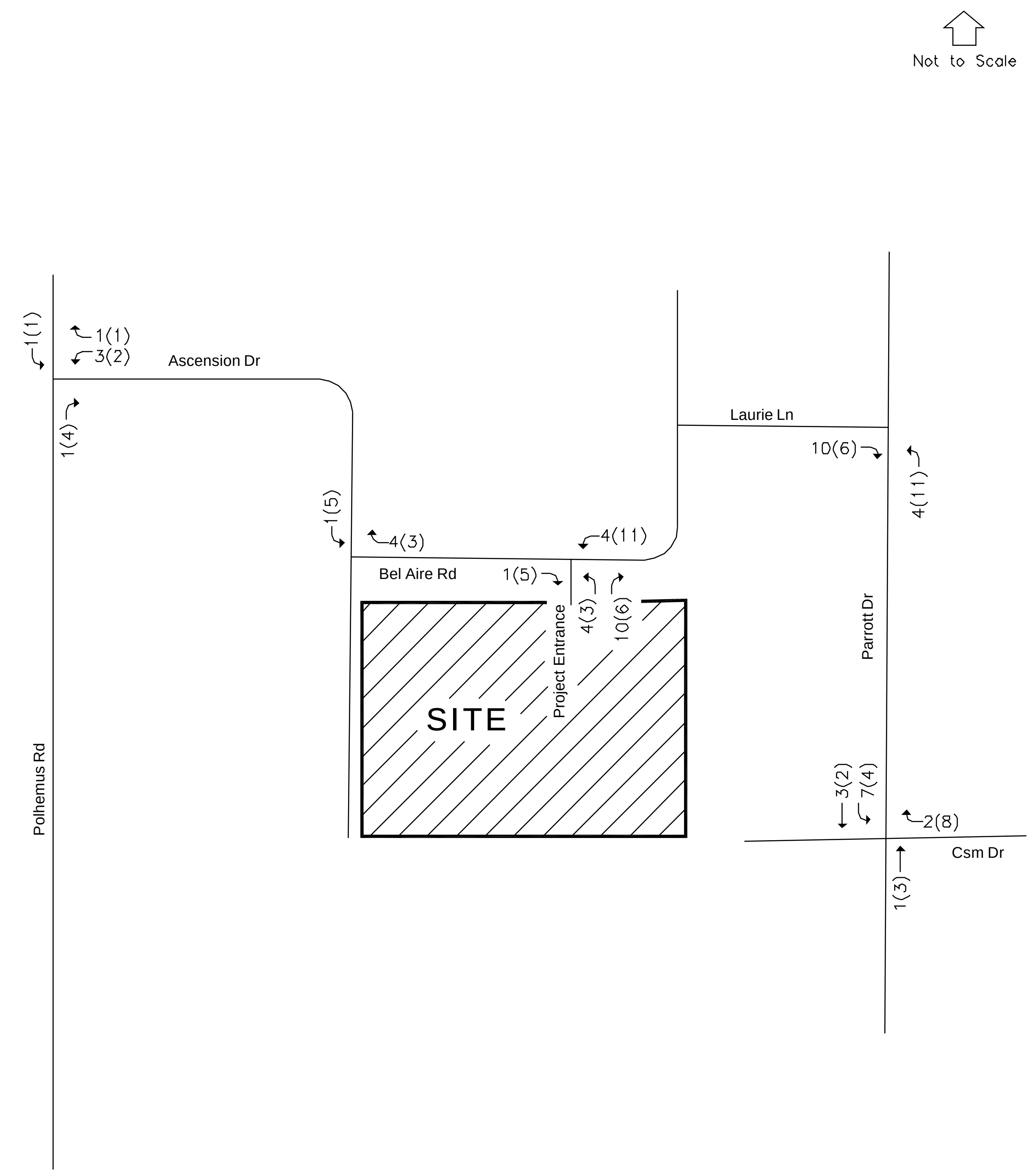
Table 3
Project Trip Generation

		Daily		AM Peak Hour				PM Peak Hour			
					Trips				Trips		
Use	Size/a/	Rate	Trips	Rate	In	Out	Total	Rate	In	Out	Total
Single Family Detached Residential	25	9.57	239	0.75	5	14	19	1.01	16	9	25

/a/ Size expressed in dwelling units (d.u.)
Source: Institute of Transportation Engineers, *Trip Generation, 7* th Edition, 2003.

The table shows that the project would generate 239 new daily trips, with 19 new trips occurring during the AM peak hour and 25 new trips occurring during the PM peak hour.

The trip distribution pattern for the proposed project was estimated based on existing travel patterns on the surrounding roadway system and minimum travel times between the site and SR92. Travel time runs conducted for this study showed that the fastest route between the site and SR92 is via Laurie Lane, Parrott Drive, CSM Drive, and Hillsdale Boulevard. Nevertheless, some traffic was assumed to use Ascension Drive and Polhemus Road. The project trip distribution is shown on Figure 3. Based on the trip distribution shown, the peak-hour trips generated by the proposed development were assigned to the roadway system following logical paths. The project trip assignment is shown in Figure 3.



LEGEND

= Site

XX(XX) = AM Peak Hour (PM Peak Hour)

Figure 3

PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

Thomas Subdivision–Residential Development

Hexagon Transportation Consultants, Inc.

thomas subdivision\figures\figure3.dwg
K.S./JH

Project Peak Hour Traffic Volumes and v/c

The project trips, estimated as described above, were added to background traffic volumes to obtain project traffic volumes. The project traffic volumes are shown on Figure 4. The traffic volumes are tabulated in the Volume Summary Tables in Appendix B.

Traffic conditions at the study roadway segments were evaluated using v/c. The roadway segments v/c for project conditions are summarized in Table 4. The results show that traffic increase on the all study streets would be less than significant.

Table 4
Project Volume to Capacity Ratios

	Peak	Existing		Project	
Roadway Segment	Hour	Volume	v/c	Volume	v/c
Polhemus Rd (Ascension Dr to De Anza Blvd)	AM	423	0.21	427	0.21
	PM	387	0.19	391	0.20
Ascension Dr (Polhemus Rd to Bel Aire Road)	AM	181	0.91	186	0.93
	PM	114	0.57	122	0.61
Bel Aire Rd (Ascension Dr to Laurie Ln)	AM	101	0.51	120	0.60
	PM	62	0.31	87	0.44
Laurie Ln (Bel Aire Rd to Parrott Dr)	AM	103	0.52	117	0.59
	PM	82	0.41	99	0.50
Parrott Dr (Laurie Ln to Csm Dr)	AM	230	0.12	244	0.12
	PM	187	0.09	204	0.10
Csm Dr (Parrott Dr to Hillsdale Blvd)	AM	259	0.13	268	0.13
	PM	214	0.11	226	0.11

Project TIRE Index

The project trips were added to the background daily traffic volumes to obtain daily traffic volumes with the project. Traffic conditions at the study roadway segments were evaluated using TIRE index (See Table 5). The results show that all but one of the study roadway segments would have no change to the TIRE index. The exception is Bel Aire Road which would change from an index of 2.8 to 3.0. The definition of change in TIRE index is that the traffic increase would be noticeable to residents along the street. Thus, the traffic increase due to the project would be noticeable on Bel Aire Road but not noticeable on other area streets. Even though the change would be noticeable the traffic volume on Bel Aire Road would be well below the residential street threshold of 2,000 vehicles per day. Therefore, the traffic increase on Bel Aire Road is considered less than significant.

Table 5
Project TIRE Index of Roadway Segments

Roadway Segment	Existing Volume (vpd)	Existing TIRE[a] Index	Project Proj Trips (vpd)	Project Volume (vpd)	Project TIRE[a] Index
Polhemus Rd (btwn Ascension Dr & De Anza Blvd)	4034	3.6	+ 60	4094	3.6
Ascension Dr (btwn Polhemus Rd & Rainbow Dr)	1422	3.2	+ 72	1494	3.2
Bel Aire Rd (btwn Ascension Dr & Laurie Ln)	708	2.8	+ 240	948	3.0
Laurie Ln (btwn Bel Aire Rd & Parrott Dr)	905	3.0	+ 168	1073	3.0
Parrott Dr (btwn Laurie Ln & Csm Dr)	2242	3.4	+ 168	2410	3.4
Csm Dr (btwn Parrott Dr & Hillsdale Blvd)	2804	3.5	+ 118	2922	3.5

/a/ Source: Goodrich Traffic Group
(vpd) = Vehicles per day

Site Access, Circulation and Parking

Site access, circulation and parking were evaluated based on the site plan dated August 23, 2002. The site plan is shown on Figure 4.

Site Access

Access to the site would be provided via a new subdivision street connecting to Bel Aire Road. The new subdivision street would be a public street.

Sight Distances On Bel Aire Road

At the intersection of Bel Aire Road and the new subdivision street sight distance was checked.
For inbound left turns the sight distance is 210 feet. The Caltrans *Highway Design Manual* specifies minimum required sight distances as a function of vehicle speed. Vehicle speed is, in turn, a function of the design of Bel Aire Road. The estimated 85th percentile speed on Bel Aire Road is 29 miles per hour, which requires a minimum stopping sight distance of 200 feet. Since the available sight distance (210 feet) is greater than the minimum stopping sight distance (200 feet), the sight distance at this location is satisfactory.

For outbound left or right turns the sight distance is at least 260 feet. This sight distance is satisfactory for the prevailing speeds on Bel Aire Road.

Accident Evaluation

Traffic accident records were obtained from the county for the years 1996 to 2002 for Polhemus Road, Ascension Road, Bel Aire Road, Laurie Lane, Parrott Drive, and Csm Drive (See Table 6). The records show that there has been one accident in the six-year period at each of the locations shown in Table 6. None of the accidents involved pedestrians. Also, none of accidents reported were due to lack of sight distance or roadway design features. Due to the low accident history, no further analysis was warranted.

Table 6
Accident Data Summary

Location	No. of Accidents	Year	Type of Collision
Parrott Dr & Csm Dr	1	2001	Side Swipe
Parrott Dr & Bel Aire Rd	1	1997	Side Swipe
Bel Aire & Laurie Ln	1	1997	Side Swipe
Polhemus Rd & Ascension Dr	1	1996	Hit Fixed Object
Source: San Mateo County - Collision Location Details			

Source: Lea & Sung Engineering, Inc., Aug 23, 2002.

CHRISTOPHER A. JOSEPH & ASSOCIATES
Environmental Planning and Research

Figure III-1
Proposed Site Plan

On-Site Circulation

On-site circulation issues include street widths, grades, and curves.

Street Widths

The new subdivision street is shown to be generally 32 feet wide curb-to-curb. There is one section that would be 22 feet wide. Because of the steep grades and curves on site, it would be difficult for drivers to maneuver within 32 feet with parking on both sides. Therefore parking should be allowed on only one side of the street. Parking should not be allowed on the 22-foot wide section.

Street Grades

The Site plan shows a maximum grade of 20%. According to San Mateo County standards, the typical maximum grade is 15% with up to 20% allowed by design exception. Thus, the proposed grades are acceptable by design exception.

Street Curves

The street curves were analyzed with typical vehicle templates, including cars and trucks, such as fire trucks or garbage trucks. The analysis showed that both cars and trucks could maneuver around the curves.

Pedestrian Access

Pedestrian facilities in the area consist of sidewalks on the neighborhood streets. However, there are no sidewalks along the project frontage on Ascension Drive or Bel Aire Road. The project site plan is unclear about whether sidewalks would be provided on these frontages. The project needs to construct sidewalks along Ascension Drive and Bel Aire Road on its frontage.

The project site plan does show that the new subdivision street would have sidewalks along most of its length. Also, there would be separate sidewalks down the hill to Ascension Drive.

Congestion Management Program

The CMP guidelines specify that a project must implement travel demand management (TDM) measures if the project produces 100 or more new peak hour trips on CMP roadways. The analysis of project traffic on CMP roadway facilities indicates that the project would add approximately 19 trips to SR 92 during the AM peak hour and approximately 25 trips during the PM peak hour. Therefore this project is not required to implement any TDM measures.

Construction Impacts

The most noticeable traffic impact during construction will be hauling excavated soil from the site. The project civil engineer estimated 86,000 cubic yards of soil would need to be exported from the site. Depending on the type of truck used, a truck can carry about 10 to 20 cubic yards of soil per trip. Therefore there would be 4,300 to 8,600 truck round trips for exporting soil. The grading is estimated to be completed in about 40 days, so this calculates to between 108 to 215 truck round trips per day. The project applicant has stated that parking for construction vehicles and workers can occur entirely on site. There would not be a need to park on Bel Aire Road.

Although construction traffic is a temporary condition, it is recognized that it could contribute to a noticeable traffic increase on Ascension Drive, Bel Aire Road, Laurie Lane, Parrott Drive, and Csm Drive. The mitigation measures listed below are required to minimize the disruption and inconvenience to residents and other traffic in the vicinity:

- The haul route should be limited to Hillsdale Boulevard, Csm Drive, Parrott Drive, Laurie Lane, and Bel Aire Road. That would minimize the number of residential streets used by trucks. Trucks should not utilize Ascension Drive because of the existing traffic level and the steep grade.

- Construction activity should be limited to the hours of 8:00 a.m. and 4:30 p.m. Monday through Friday. No activity or staging should occur outside these hours.

- No staging of trucks or construction equipment should occur within the adjacent residential area at any time.

- Temporary “truck crossing” signs should be placed in both directions on Bel Aire Road near the site entrance. Flagmen should be used, as necessary, to control traffic during the arrival and departure of trucks and equipment.

- Construction workers should be required to park on site, i.e., no parking on Bel Aire Road or Ascension Drive.

5. Cumulative Conditions

Project buildout is expected to take approximately 5 years, so the expected completion date would be around 2010. The San Mateo County traffic model 2020 forecasts were used to estimate that growth in the area is projected to be about 5% per year. Thus, the existing volumes were increased 25% to represent 2010 conditions. This increase would cover currently proposed projects, such as the CSM housing, and other growth not yet defined.

Table 7 shows the resulting volumes and V/C ratios on the study roadways. Most roadways would continue to operate well within capacity. The exception is Ascension Drive during the morning peak hour, which is shown to have a volume greater than desirable for a local residential street. However, the project would increase traffic on Ascension Drive by less than 5%, so its impact would be insignificant.

Table 7
Cumulative Volume to Capacity Ratios

Roadway Segment	Peak Hour	Cumulative Volume	Cumulative v/c	Project Traffic	Threshold*
PolhemusRd (Ascension Dr to De Anza Blvd)	AM	529	0.26	4	100
	PM	484	0.24	4	100
Ascension Dr (Polhemus Rd to Bel Aire Rd)	AM	226	1.13	5	10
	PM	143	0.72	8	10
Bel Aire Rd (Ascension Dr to Laurie Ln)	AM	126	0.63	19	10
	PM	78	0.39	25	10
Laurie Ln (Bel Aire Rd to Parrott Dr)	AM	129	0.65	14	10
	PM	103	0.52	17	10
Parrott Dr (Laurie Ln to Csm Dr)	AM	288	0.14	14	100
	PM	234	0.12	17	100
Csm Dr (Parrott Dr to Hillsdale Blvd)	AM	324	0.16	9	100
	PM	268	0.13	12	100

* 5% of capacity

6. Summary of Findings

The potential impacts of the project were evaluated in accordance with typical traffic engineering standards. The study included the analysis of AM, PM peak hour and daily traffic conditions for six roadway segments. Site access and on-site circulation also were analyzed, as well as construction impacts.

Impacts and Recommendations

- The new subdivision street is planned to be 32 feet in width. Given the grades and curves, this width is inadequate to allow parking on both sides. Therfore, parking should be allowed on one side only.

- The project should construct sidewalks along its frontage on Bel Aire Road and Ascension Drive.

- To minimize construction impacts, the project should implement the following measures:

    - The haul route should be limited to Hillsdale Boulevard, Csm Drive, Parrott Drive, Laurie Lane, and Bel Aire Road. That would minimize the number of residential streets used by trucks. Trucks should not utilize Ascension Drive because of the existing traffic level and the steep grade.

    - Construction activity should be limited to the hours of 8:00 a.m. and 4:30 p.m. Monday through Friday. No activity or staging should occur outside these hours.

    - No staging of trucks or construction equipment should occur within the adjacent residential area at any time.

    - Temporary "truck crossing" signs should be placed in both directions on Bel Aire Road near the site entrance. Flagmen should be used, as necessary, to control traffic during the arrival and departure of trucks and equipment.

    - Construction workers should be required to park on site, i.e., no parking on Bel Aire Road or Ascension Drive.

Thomas Subdivision
Residential Development

Traffic Analysis Report

Technical Appendices

March 9, 2004

Appendix A

Traffic Counts

MARKS TRAFFIC DATA

POLHEMUS RD. btwn ASCENSION & DE ANZA BL

CITY OF SAN MATEO

Site Code: 1
polhemus

Start Time	28-Aug-Thu	SB A.M.	SB P.M.	NB A.M.	NB P.M.	Combined A.M.	Combined P.M.	29-Aug-Fri	SB A.M.	SB P.M.	NB A.M.	NB P.M.	Combined A.M.	Combined P.M.
12:00		2	30	1	37	3	67		*	*	*	*	*	*
12:15		0	29	3	34	3	63		*	*	*	*	*	*
12:30		1	23	3	32	4	55		*	*	*	*	*	*
12:45		0	25	1	35	1	60		*	*	*	*	*	*
01:00		0	34	0	33	0	67		*	*	*	*	*	*
01:15		0	32	0	29	0	61		*	*	*	*	*	*
01:30		1	23	0	35	1	58		*	*	*	*	*	*
01:45		2	35	1	25	3	60		*	*	*	*	*	*
02:00		0	30	0	30	0	60		*	*	*	*	*	*
02:15		1	30	2	31	3	61		*	*	*	*	*	*
02:30		0	24	0	42	0	66		*	*	*	*	*	*
02:45		3	30	0	42	3	72		*	*	*	*	*	*
03:00		0	39	1	53	1	92		*	*	*	*	*	*
03:15		2	31	0	35	2	66		*	*	*	*	*	*
03:30		1	38	0	35	1	73		*	*	*	*	*	*
03:45		1	37	0	44	1	81		*	*	*	*	*	*
04:00		1	33	0	50	1	83		*	*	*	*	*	*
04:15		1	43	1	42	2	85		*	*	*	*	*	*
04:30		0	27	1	36	1	63		*	*	*	*	*	*
04:45		0	*49*	1	50	1	*99*		*	*	*	*	*	*
05:00		0	*43*	1	*53*	1	*96*		*	*	*	*	*	*
05:15		1	*42*	3	*45*	4	*87*		*	*	*	*	*	*
05:30		1	*51*	3	*54*	4	*105*		*	*	*	*	*	*
05:45		3	29	5	*58*	8	87		*	*	*	*	*	*
06:00		5	41	5	42	10	83		*	*	*	*	*	*
06:15		10	21	5	40	15	61		*	*	*	*	*	*
06:30		14	33	11	37	25	70		*	*	*	*	*	*
06:45		17	31	11	40	28	71		*	*	*	*	*	*
07:00		26	23	19	36	45	59		*	*	*	*	*	*
07:15		40	13	22	30	62	43		*	*	*	*	*	*
07:30		44	18	*54*	17	*98*	35		*	*	*	*	*	*
07:45		*59*	17	*52*	27	*111*	44		*	*	*	*	*	*
08:00		*65*	12	*41*	12	*106*	24		*	*	*	*	*	*
08:15		*55*	11	*53*	19	*108*	30		*	*	*	*	*	*
08:30		*55*	8	42	15	97	23		*	*	*	*	*	*
08:45		45	10	40	14	85	24		*	*	*	*	*	*
09:00		48	12	46	14	94	26		*	*	*	*	*	*
09:15		32	9	28	3	60	12		*	*	*	*	*	*
09:30		30	9	20	11	50	20		*	*	*	*	*	*
09:45		31	9	31	20	62	29		*	*	*	*	*	*
10:00		30	10	23	7	53	17		*	*	*	*	*	*
10:15		29	3	25	9	54	12		*	*	*	*	*	*
10:30		27	3	29	6	56	9		*	*	*	*	*	*
10:45		28	4	32	6	60	10		*	*	*	*	*	*
11:00		31	2	24	6	55	8		*	*	*	*	*	*
11:15		26	6	22	3	48	9		*	*	*	*	*	*
11:30		20	1	33	3	53	4		*	*	*	*	*	*
11:45		31	2	25	3	56	5		*	*	*	*	*	*
Total		819	1115	720	1380	1539	2495		0	0	0	0	0	0
Day Total		1934		2100		4034			0		0		0	
Percent	0.0%	20.3%	27.6%	17.8%	34.2%				0.0%	0.0%	0.0%	0.0%		
Peak		07:45	04:45	07:30	05:00	07:30	04:45							
Vol.		234	185	200	210	423	387							
P.H.F.		0.900	0.907	0.926	0.905	0.953	0.921							

TO: KAMAL SINGH

FROM: MIETEK @ MTDS

MARKS TRAFFIC DATA

ASCENSION DR. btwn POLHEMUS & RAINBOW DR

CITY OF SAN MATEO

Site Code: 2
ascension

Start Time	28-Aug-Thu	EB A.M.	EB P.M.	WB A.M.	WB P.M.	Combined A.M.	Combined P.M.	29-Aug-Fri	EB A.M.	EB P.M.	WB A.M.	WB P.M.	Combined A.M.	Combined P.M.
12:00		2	10	0	18	2	28		*	*	*	*	*	*
12:15		1	9	0	6	1	15		*	*	*	*	*	*
12:30		0	6	0	9	0	15		*	*	*	*	*	*
12:45		0	7	0	8	0	15		*	*	*	*	*	*
01:00		0	9	1	8	1	17		*	*	*	*	*	*
01:15		0	10	0	16	0	26		*	*	*	*	*	*
01:30		0	13	0	4	0	17		*	*	*	*	*	*
01:45		1	8	1	13	2	21		*	*	*	*	*	*
02:00		0	8	0	13	0	21		*	*	*	*	*	*
02:15		3	12	1	16	4	28		*	*	*	*	*	*
02:30		0	21	0	8	0	29		*	*	*	*	*	*
02:45		0	5	1	14	1	19		*	*	*	*	*	*
03:00		0	*16*	0	14	0	30		*	*	*	*	*	*
03:15		0	*20*	0	6	0	26		*	*	*	*	*	*
03:30		0	*11*	0	8	0	19		*	*	*	*	*	*
03:45		0	*20*	0	14	0	34		*	*	*	*	*	*
04:00		0	14	1	4	1	18		*	*	*	*	*	*
04:15		0	10	0	11	0	21		*	*	*	*	*	*
04:30		0	16	0	10	0	26		*	*	*	*	*	*
04:45		1	13	0	*18*	1	*31*		*	*	*	*	*	*
05:00		0	18	1	*10*	1	*28*		*	*	*	*	*	*
05:15		2	11	0	*12*	2	*23*		*	*	*	*	*	*
05:30		0	14	*4*	*18*	4	*32*		*	*	*	*	*	*
05:45		1	12	4	7	5	19		*	*	*	*	*	*
06:00		0	28	1	11	1	39		*	*	*	*	*	*
06:15		3	8	11	12	14	20		*	*	*	*	*	*
06:30		1	15	6	13	7	28		*	*	*	*	*	*
06:45		2	16	16	11	18	27		*	*	*	*	*	*
07:00		6	16	14	16	20	32		*	*	*	*	*	*
07:15		5	12	*18*	6	23	18		*	*	*	*	*	*
07:30		*21*	5	*25*	9	*46*	14		*	*	*	*	*	*
07:45		*26*	12	*32*	1	*58*	13		*	*	*	*	*	*
08:00		*15*	4	*34*	4	*49*	8		*	*	*	*	*	*
08:15		*16*	3	12	4	*28*	7		*	*	*	*	*	*
08:30		21	0	12	2	33	2		*	*	*	*	*	*
08:45		14	7	15	4	29	11		*	*	*	*	*	*
09:00		19	4	11	4	30	8		*	*	*	*	*	*
09:15		17	2	9	3	26	5		*	*	*	*	*	*
09:30		12	4	8	3	20	7		*	*	*	*	*	*
09:45		14	3	7	4	21	7		*	*	*	*	*	*
10:00		10	4	9	3	19	7		*	*	*	*	*	*
10:15		6	2	7	0	13	2		*	*	*	*	*	*
10:30		4	1	12	2	16	3		*	*	*	*	*	*
10:45		13	1	9	1	22	2		*	*	*	*	*	*
11:00		8	2	9	0	17	2		*	*	*	*	*	*
11:15		11	1	10	0	21	1		*	*	*	*	*	*
11:30		10	4	6	0	15	4		*	*	*	*	*	*
11:45		8	4	12	2	20	6		*	*	*	*	*	*
Total		273	451	318	380	591	831		0	0	0	0	0	0
Day Total		724		698		1422			0		0		0	
Percent	0.0%	19.2%	31.7%	22.4%	26.7%				0.0%	0.0%	0.0%	0.0%		
Peak		07:30	03:00	07:15	04:45	07:30	04:45							
Vol.		78	67	109	58	181	114							
P.H.F.		0.750	0.598	0.801	0.806	0.780	0.731							

MARKS TRAFFIC DATA

BEL AIRE RD. btwn ASCENSION DR. & LAURIE

CITY OF SAN MATEO

Site Code: 3
bel_aire

Start Time	28-Aug-Thu	WB A.M.	WB P.M.	EB A.M.	EB P.M.	Combined A.M.	Combined P.M.	29-Aug-Fri	WB A.M.	WB P.M.	EB A.M.	EB P.M.	Combined A.M.	Combined P.M.
12:00		0	8	0	3	0	11		*	*	*	*	*	*
12:15		0	8	0	2	0	10		*	*	*	*	*	*
12:30		0	9	0	5	0	14		*	*	*	*	*	*
12:45		0	1	0	1	0	2		*	*	*	*	*	*
01:00		0	2	0	2	0	4		*	*	*	*	*	*
01:15		0	5	0	3	0	8		*	*	*	*	*	*
01:30		0	3	0	3	0	6		*	*	*	*	*	*
01:45		0	5	0	3	0	8		*	*	*	*	*	*
02:00		1	7	0	6	1	13		*	*	*	*	*	*
02:15		0	8	0	4	0	12		*	*	*	*	*	*
02:30		0	5	1	5	1	10		*	*	*	*	*	*
02:45		0	0	0	6	0	6		*	*	*	*	*	*
03:00		0	8	0	8	0	16		*	*	*	*	*	*
03:15		0	11	0	6	0	17		*	*	*	*	*	*
03:30		0	6	0	9	0	15		*	*	*	*	*	*
03:45		0	4	0	4	0	8		*	*	*	*	*	*
04:00		0	12	0	3	0	15		*	*	*	*	*	*
04:15		0	4	0	5	0	9		*	*	*	*	*	*
04:30		0	10	0	5	0	15		*	*	*	*	*	*
04:45		0	9	1	5	1	14		*	*	*	*	*	*
05:00		0	6	0	4	0	10		*	*	*	*	*	*
05:15		0	6	1	8	1	14		*	*	*	*	*	*
05:30		0	9	1	7	1	16		*	*	*	*	*	*
05:45		2	6	1	9	3	15		*	*	*	*	*	*
06:00		1	4	0	5	1	9		*	*	*	*	*	*
06:15		0	7	1	8	1	15		*	*	*	*	*	*
06:30		1	8	0	6	1	14		*	*	*	*	*	*
06:45		2	6	1	11	3	17		*	*	*	*	*	*
07:00		1	9	3	7	4	16		*	*	*	*	*	*
07:15		2	8	1	6	3	14		*	*	*	*	*	*
07:30		6	7	11	2	17	9		*	*	*	*	*	*
07:45		13	3	26	4	39	7		*	*	*	*	*	*
08:00		15	0	18	4	33	4		*	*	*	*	*	*
08:15		7	5	5	1	12	6		*	*	*	*	*	*
08:30		1	2	16	2	17	4		*	*	*	*	*	*
08:45		1	3	12	0	13	3		*	*	*	*	*	*
09:00		8	5	10	2	18	7		*	*	*	*	*	*
09:15		1	2	13	0	14	2		*	*	*	*	*	*
09:30		4	1	18	1	22	2		*	*	*	*	*	*
09:45		2	2	10	1	12	3		*	*	*	*	*	*
10:00		3	5	6	2	9	7		*	*	*	*	*	*
10:15		2	3	4	0	6	3		*	*	*	*	*	*
10:30		4	0	3	0	7	0		*	*	*	*	*	*
10:45		6	3	5	0	11	3		*	*	*	*	*	*
11:00		5	0	3	1	8	1		*	*	*	*	*	*
11:15		9	0	5	1	14	1		*	*	*	*	*	*
11:30		1	1	5	0	6	1		*	*	*	*	*	*
11:45		4	0	6	3	10	3		*	*	*	*	*	*
Total		102	236	187	183	289	419		0	0	0	0	0	0
Day Total		338		370		708			0		0		0	
Percent	0.0%	14.4%	33.3%	26.4%	25.8%				0.0%	0.0%	0.0%	0.0%		
Peak		07:30	04:00	07:45	06:15	07:30	06:15							
Vol.		41	35	65	32	101	62							
P.H.F.		0.683	0.729	0.625	0.727	0.647	0.912							

MARKS TRAFFIC DATA

LAURIE LN. btwn BEL AIRE RD. & PARROT DR

CITY OF SAN MATEO

Site Code: 4
laurie

Start Time	28-Aug-Thu	EB A.M.	EB P.M.	WB A.M.	WB P.M.	Combined A.M.	Combined P.M.	29-Aug-Fri	EB A.M.	EB P.M.	WB A.M.	WB P.M.	Combined A.M.	Combined P.M.
12:00		0	7	0	10	0	17		*	*	*	*	*	*
12:15		0	2	0	8	0	10		*	*	*	*	*	*
12:30		0	4	1	6	1	10		*	*	*	*	*	*
12:45		0	2	1	3	1	5		*	*	*	*	*	*
01:00		0	3	1	3	1	6		*	*	*	*	*	*
01:15		0	6	1	6	1	12		*	*	*	*	*	*
01:30		0	3	0	4	0	7		*	*	*	*	*	*
01:45		0	6	0	9	0	15		*	*	*	*	*	*
02:00		0	10	1	5	1	15		*	*	*	*	*	*
02:15		0	10	1	10	1	20		*	*	*	*	*	*
02:30		0	6	0	3	0	9		*	*	*	*	*	*
02:45		0	9	0	3	0	12		*	*	*	*	*	*
03:00		0	7	0	6	0	13		*	*	*	*	*	*
03:15		0	9	0	15	0	24		*	*	*	*	*	*
03:30		0	5	0	4	0	9		*	*	*	*	*	*
03:45		0	4	0	1	0	5		*	*	*	*	*	*
04:00		0	8	0	12	0	20		*	*	*	*	*	*
04:15		0	6	0	6	0	12		*	*	*	*	*	*
04:30		0	9	0	12	0	21		*	*	*	*	*	*
04:45		1	6	0	10	1	16		*	*	*	*	*	*
05:00		2	5	1	6	3	11		*	*	*	*	*	*
05:15		0	9	0	11	0	20		*	*	*	*	*	*
05:30		1	9	0	11	1	20		*	*	*	*	*	*
05:45		3	10	2	13	5	23		*	*	*	*	*	*
06:00		2	8	0	8	2	16		*	*	*	*	*	*
06:15		2	7	0	12	2	19		*	*	*	*	*	*
06:30		0	10	3	7	3	17		*	*	*	*	*	*
06:45		3	11	3	17	6	28		*	*	*	*	*	*
07:00		5	7	1	11	6	18		*	*	*	*	*	*
07:15		9	3	5	9	14	12		*	*	*	*	*	*
07:30		17	7	5	13	22	20		*	*	*	*	*	*
07:45		32	4	9	6	41	10		*	*	*	*	*	*
08:00		18	2	7	5	25	7		*	*	*	*	*	*
08:15		10	0	5	7	15	7		*	*	*	*	*	*
08:30		19	6	1	4	20	10		*	*	*	*	*	*
08:45		13	0	2	3	15	3		*	*	*	*	*	*
09:00		12	3	7	6	19	9		*	*	*	*	*	*
09:15		16	0	1	7	17	7		*	*	*	*	*	*
09:30		20	3	3	2	23	5		*	*	*	*	*	*
09:45		13	3	2	6	15	9		*	*	*	*	*	*
10:00		7	2	1	6	8	8		*	*	*	*	*	*
10:15		10	0	5	7	15	7		*	*	*	*	*	*
10:30		3	2	2	0	5	2		*	*	*	*	*	*
10:45		7	0	7	3	14	3		*	*	*	*	*	*
11:00		4	2	6	0	10	2		*	*	*	*	*	*
11:15		4	1	9	3	13	4		*	*	*	*	*	*
11:30		9	0	4	2	13	2		*	*	*	*	*	*
11:45		2	1	5	1	7	2		*	*	*	*	*	*
Total		244	237	102	322	346	559		0	0	0	0	0	0
Day Total		481		424		905			0		0		0	
Percent	0.0%	27.0%	26.2%	11.3%	35.6%				0.0%	0.0%	0.0%	0.0%		

Peak	07:45	05:15	07:15	06:45	07:30	06:15
Vol.	79	36	26	50	103	82
P.H.F.	0.617	0.818	0.722	0.735	0.628	0.732

MARKS TRAFFIC DATA

CITY OF SAN MATEO

PARROT DR. btwn LAURIE LN. & CSM DR.

Site Code: 5
parrot

Start Time	28-Aug-Thu	NB A.M.	NB P.M.	SB A.M.	SB P.M.	Combined A.M.	Combined P.M.	29-Aug-Fri	NB A.M.	NB P.M.	SB A.M.	SB P.M.	Combined A.M.	Combined P.M.
12:00		3	22	0	12	3	34		*	*	*	*	*	*
12:15		3	17	0	16	3	33		*	*	*	*	*	*
12:30		2	15	0	11	2	26		*	*	*	*	*	*
12:45		1	13	1	15	2	28		*	*	*	*	*	*
01:00		2	14	0	14	2	28		*	*	*	*	*	*
01:15		2	20	0	13	2	33		*	*	*	*	*	*
01:30		1	26	1	13	2	39		*	*	*	*	*	*
01:45		1	15	0	13	1	28		*	*	*	*	*	*
02:00		1	13	0	19	1	32		*	*	*	*	*	*
02:15		1	26	0	19	1	45		*	*	*	*	*	*
02:30		0	11	0	18	0	29		*	*	*	*	*	*
02:45		1	15	0	11	1	26		*	*	*	*	*	*
03:00		0	21	0	23	0	44		*	*	*	*	*	*
03:15		1	25	0	17	1	42		*	*	*	*	*	*
03:30		0	15	0	12	0	27		*	*	*	*	*	*
03:45		1	16	0	12	1	28		*	*	*	*	*	*
04:00		0	29	1	16	1	45		*	*	*	*	*	*
04:15		0	15	0	15	0	30		*	*	*	*	*	*
04:30		0	25	0	24	0	49		*	*	*	*	*	*
04:45		0	29	2	18	2	47		*	*	*	*	*	*
05:00		1	20	1	17	2	37		*	*	*	*	*	*
05:15		1	23	3	17	4	40		*	*	*	*	*	*
05:30		0	26	3	25	3	51		*	*	*	*	*	*
05:45		0	26	2	18	2	44		*	*	*	*	*	*
06:00		0	26	6	24	6	50		*	*	*	*	*	*
06:15		1	28	5	14	6	42		*	*	*	*	*	*
06:30		2	21	5	24	7	45		*	*	*	*	*	*
06:45		1	32	9	16	10	48		*	*	*	*	*	*
07:00		3	24	13	9	16	33		*	*	*	*	*	*
07:15		7	22	18	8	25	30		*	*	*	*	*	*
07:30		38	19	31	10	69	29		*	*	*	*	*	*
07:45		18	16	56	8	74	24		*	*	*	*	*	*
08:00		15	11	36	8	51	19		*	*	*	*	*	*
08:15		11	15	25	5	36	20		*	*	*	*	*	*
08:30		6	15	41	13	47	28		*	*	*	*	*	*
08:45		14	7	40	6	54	13		*	*	*	*	*	*
09:00		18	15	20	7	38	22		*	*	*	*	*	*
09:15		10	10	40	3	50	13		*	*	*	*	*	*
09:30		15	13	34	6	49	19		*	*	*	*	*	*
09:45		7	18	24	2	31	20		*	*	*	*	*	*
10:00		14	7	17	0	31	7		*	*	*	*	*	*
10:15		14	15	18	3	32	18		*	*	*	*	*	*
10:30		11	11	11	4	22	15		*	*	*	*	*	*
10:45		10	2	16	5	26	7		*	*	*	*	*	*
11:00		24	3	21	2	45	5		*	*	*	*	*	*
11:15		20	3	12	0	32	3		*	*	*	*	*	*
11:30		13	4	19	2	32	6		*	*	*	*	*	*
11:45		17	2	15	2	32	4		*	*	*	*	*	*
Total		311	816	546	569	857	1385		0	0	0	0	0	0
Day Total		1127		1115		2242			0		0		0	
Percent	0.0%	13.9%	36.4%	24.4%	25.4%				0.0%	0.0%	0.0%	0.0%		
Peak		07:30	06:00	07:45	05:15	07:30	05:30							
Vol.		82	107	158	84	230	187							
P.H.F.		0.539	0.836	0.705	0.840	0.777	0.917							

MARKS TRAFFIC DATA

CSM DR. btwn PARROT DR. & HILLSDALE BL.

CITY OF SAN MATEO

Site Code: 6
csm

Start Time	28-Aug-Thu	EB A.M.	EB P.M.	WB A.M.	WB P.M.	Combined A.M.	Combined P.M.	29-Aug-Fri	EB A.M.	EB P.M.	WB A.M.	WB P.M.	Combined A.M.	Combined P.M.
12:00		0	18	4	31	4	49		*	*	*	*	*	*
12:15		3	17	5	30	8	47		*	*	*	*	*	*
12:30		0	18	2	23	2	41		*	*	*	*	*	*
12:45		2	17	1	25	3	42		*	*	*	*	*	*
01:00		4	25	4	33	8	58		*	*	*	*	*	*
01:15		0	18	2	19	2	37		*	*	*	*	*	*
01:30		2	17	2	29	4	46		*	*	*	*	*	*
01:45		0	18	0	19	0	37		*	*	*	*	*	*
02:00		0	22	1	28	1	50		*	*	*	*	*	*
02:15		2	21	1	27	3	48		*	*	*	*	*	*
02:30		1	20	1	21	2	41		*	*	*	*	*	*
02:45		0	21	1	19	1	40		*	*	*	*	*	*
03:00		0	27	0	23	0	50		*	*	*	*	*	*
03:15		0	8	1	28	1	36		*	*	*	*	*	*
03:30		0	18	0	19	0	37		*	*	*	*	*	*
03:45		0	18	1	18	1	36		*	*	*	*	*	*
04:00		1	14	0	35	1	49		*	*	*	*	*	*
04:15		0	13	0	21	0	34		*	*	*	*	*	*
04:30		0	30	0	22	0	52		*	*	*	*	*	*
04:45		1	23	0	29	1	52		*	*	*	*	*	*
05:00		3	21	2	24	5	45		*	*	*	*	*	*
05:15		2	20	0	26	2	46		*	*	*	*	*	*
05:30		2	26	3	22	5	48		*	*	*	*	*	*
05:45		4	38	2	25	6	63		*	*	*	*	*	*
06:00		7	30	1	24	8	54		*	*	*	*	*	*
06:15		8	18	2	31	10	49		*	*	*	*	*	*
06:30		9	25	3	17	12	42		*	*	*	*	*	*
06:45		17	24	0	35	17	59		*	*	*	*	*	*
07:00		18	15	4	25	22	40		*	*	*	*	*	*
07:15		19	7	7	25	26	32		*	*	*	*	*	*
07:30		33	10	14	23	47	33		*	*	*	*	*	*
07:45		75	7	11	18	86	25		*	*	*	*	*	*
08:00		48	5	15	14	63	19		*	*	*	*	*	*
08:15		26	5	11	19	37	24		*	*	*	*	*	*
08:30		49	13	14	16	63	29		*	*	*	*	*	*
08:45		44	9	13	10	57	19		*	*	*	*	*	*
09:00		36	10	23	16	59	26		*	*	*	*	*	*
09:15		44	13	17	18	61	31		*	*	*	*	*	*
09:30		61	8	21	19	82	27		*	*	*	*	*	*
09:45		35	11	12	28	47	39		*	*	*	*	*	*
10:00		17	2	17	10	34	12		*	*	*	*	*	*
10:15		22	2	19	18	41	20		*	*	*	*	*	*
10:30		18	3	13	7	31	10		*	*	*	*	*	*
10:45		33	4	13	3	46	7		*	*	*	*	*	*
11:00		22	4	34	3	56	7		*	*	*	*	*	*
11:15		16	0	31	7	47	7		*	*	*	*	*	*
11:30		21	3	20	4	41	7		*	*	*	*	*	*
11:45		25	1	20	3	45	4		*	*	*	*	*	*
Total		730	717	368	989	1098	1706		0	0	0	0	0	0
Day Total		1447		1357		2804			0		0		0	
Percent	0.0%	26.0%	25.6%	13.1%	35.3%				0.0%	0.0%	0.0%	0.0%		
Peak		07:45	05:15	11:00	00:15	08:45	05:30							
Vol.		198	114	105	111	259	214							
P.H.F.		0.660	0.750	0.772	0.793	0.753	0.849							

Appendix B

Volume Summary Tables

Location: Polhemus Rd (btwn Ascension Dr & De Anza Blvd)

	AM	PM
	Peak Hour	
PHF	0.953	0.921
Volume	423	387
Vp	444	420
v/c	0.14	0.13

Date of Count: 8/28/2003 **Thursday**

AM Peak Hour						PM Peak Hour					
	Direction						Direction				
Time	SB	Hour Total	NB	Hour Total	Total	Time	SB	Hour Total	NB	Hour Total	Total
7:00	26		19		45	4:00	33		50		83
7:15	40		22		62	4:15	43		42		85
7:30	44		54		98	4:30	27		36		63
7:45	59	169	52	147	111	4:45	49	152	50	178	99
8:00	65		41		106	5:00	43		53		96
8:15	55		53		108	5:15	42		45		87
8:30	55		42		97	5:30	51		54		105
8:45	45	220	40	176	85	5:45	29	165	58	210	87
9:00	48		46		94	6:00	41		42		83
9:15	32		28		60	6:15	21		40		61
9:30	30		20		50	6:30	33		37		70
9:45	31	141	31	125	62	6:45	31	126	40	159	71
10:00	30		23		53	7:00	23		36		59
10:15	29		25		54	7:15	13		30		43
10:30	27		29		56	7:30	18		17		35
10:45	28	114	32	109	60	7:45	17	71	27	110	44
Total	644	644	557	557	1201	Total	514	514	657	657	1171

Location: Ascension Dr (bwtn - Polhemus Rd & Rainbow Dr)

Date of Count: 8/28/2003 Thursday

	AM	PM
	Peak Hour	
PHF	0.780	0.731
Volume	181	114
Vp	232	156
v/c	0.07	0.05

AM Peak Hour					
	Direction				
Time	EB	Hour Total	WB	Hour Total	Total
7:00	6		14		20
7:15	5		18		23
7:30	21		25		46
7:45	26	58	32	89	58
8:00	15		34		49
8:15	16		12		28
8:30	21		12		33
8:45	14	66	15	73	29
9:00	19		11		30
9:15	17		9		26
9:30	12		8		20
9:45	14	62	7	35	21
10:00	10		9		19
10:15	6		7		13
10:30	4		12		16
10:45	13	33	9	37	22
Total	219	219	234	234	453

PM Peak Hour					
	Direction				
Time	EB	Hour Total	WB	Hour Total	Total
4:00	14		4		18
4:15	10		11		21
4:30	16		10		26
4:45	13	53	18	43	31
5:00	18		10		28
5:15	11		12		23
5:30	14		18		32
5:45	12	55	7	47	19
6:00	28		11		39
6:15	8		12		20
6:30	15		13		28
6:45	16	67	11	47	27
7:00	16		16		32
7:15	12		6		18
7:30	5		9		14
7:45	12	45	1	32	13
Total	220	220	169	169	389

Location: Bel Aire Rd (bwtn - Ascension Dr & Laurie Ln)

Date of Count: 8/28/2003 Thursday

	AM	PM
	Peak Hour	
PHF	0.647	0.912
Volume	101	62
Vp	156	68
v/c	0.05	0.02

AM Peak Hour

	Direction				
Time	WB	Hour Total	EB	Hour Total	Total
7:00	1		3		4
7:15	2		1		3
7:30	6		11		17
7:45	13	22	26	41	39
8:00	15		18		33
8:15	7		5		12
8:30	1		16		17
8:45	1	24	12	51	13
9:00	8		10		18
9:15	1		13		14
9:30	4		18		22
9:45	2	15	10	51	12
10:00	3		6		9
10:15	2		4		6
10:30	4		3		7
10:45	6	15	5	18	11
Total	76	76	161	161	237

PM Peak Hour

	Direction				
Time	WB	Hour Total	EB	Hour Total	Total
4:00	12		3		15
4:15	4		5		9
4:30	10		5		15
4:45	9	35	5	18	14
5:00	6		4		10
5:15	6		8		14
5:30	9		7		16
5:45	6	27	9	28	15
6:00	4		5		9
6:15	7		8		15
6:30	8		6		14
6:45	6	25	11	30	17
7:00	9		7		16
7:15	8		6		14
7:30	7		2		9
7:45	3	27	4	19	7
Total	114	114	95	95	209

Location: Laurie Ln (btwn Bel Aire Rd & Parrot Dr)

Date of Count: 8/28/2003 **Thursday**

	AM	PM
	Peak Hour	
PHF	0.628	0.732
Volume	103	82
Vp	164	112
v/c	0.05	0.04

AM Peak Hour

Time	EB	Hour Total	WB	Hour Total	Total
	Direction				
7:00	5		1		6
7:15	9		5		14
7:30	17		5		22
7:45	32	63	9	20	41
8:00	18		7		25
8:15	10		5		15
8:30	19		1		20
8:45	13	60	2	15	15
9:00	12		7		19
9:15	16		1		17
9:30	20		3		23
9:45	13	61	2	13	15
10:00	7		1		8
10:15	10		5		15
10:30	3		2		5
10:45	7	27	7	15	14
Total	211	211	63	63	274

PM Peak Hour

Time	EB	Hour Total	WB	Hour Total	Total
	Direction				
4:00	8		12		20
4:15	6		6		12
4:30	9		12		21
4:45	6	29	10	40	16
5:00	5		6		11
5:15	9		11		20
5:30	9		11		20
5:45	10	33	13	41	23
6:00	8		8		16
6:15	7		12		19
6:30	10		7		17
6:45	11	36	17	44	28
7:00	7		11		18
7:15	3		9		12
7:30	7		13		20
7:45	4	21	6	39	10
Total	119	119	164	164	283

Location: Parrot Dr (btwn Laurie Ln & Csm Dr)

Date of Count: 8/28/2003 Thursday

	AM	PM
	Peak Hour	
PHF	0.777	0.917
Volume	230	187
Vp	296	204
v/c	0.09	0.06

AM Peak Hour

	Direction				
Time	EB	Hour Total	WB	Hour Total	Total
7:00	3		13		16
7:15	7		18		25
7:30	38		31		69
7:45	18	66	56	118	74
8:00	15		36		51
8:15	11		25		36
8:30	6		41		47
8:45	14	46	40	142	54
9:00	18		20		38
9:15	10		40		50
9:30	15		34		49
9:45	7	50	24	118	31
10:00	14		17		31
10:15	14		18		32
10:30	11		11		22
10:45	10	49	16	62	26
Total	211	211	440	440	651

PM Peak Hour

	Direction				
Time	EB	Hour Total	WB	Hour Total	Total
4:00	29		16		45
4:15	15		15		30
4:30	25		24		49
4:45	29	98	18	73	47
5:00	20		17		37
5:15	23		17		40
5:30	26		25		51
5:45	26	95	18	77	44
6:00	26		24		50
6:15	28		14		42
6:30	21		24		45
6:45	32	107	16	78	48
7:00	24		9		33
7:15	22		8		30
7:30	19		10		29
7:45	16	81	8	35	24
Total	381	381	263	263	644

Location: Csm Dr (bwtn - Parrot Dr & Hillsdale Blvd)

Date of Count: 8/28/2003 Thursday

	AM Peak Hour	PM Peak Hour
PHF	0.753	0.849
Volume	259	214
Vp	344	252
v/c	0.11	0.08

AM Peak Hour

Time	EB	Hour Total	WB	Hour Total	Total
7:00	18		4		22
7:15	19		7		26
7:30	33		14		47
7:45	75	145	11	36	86
8:00	48		15		63
8:15	26		11		37
8:30	49		14		63
8:45	44	167	13	53	57
9:00	36		23		59
9:15	44		17		61
9:30	61		21		82
9:45	35	176	12	73	47
10:00	17		17		34
10:15	22		19		41
10:30	18		13		31
10:45	33	90	13	62	46
Total	578	578	224	224	802

PM Peak Hour

Time	EB	Hour Total	WB	Hour Total	Total
4:00	14		35		49
4:15	13		21		34
4:30	30		22		52
4:45	23	80	29	107	52
5:00	21		24		45
5:15	20		26		46
5:30	26		22		48
5:45	38	105	25	97	63
6:00	30		24		54
6:15	18		31		49
6:30	25		17		42
6:45	24	97	35	107	59
7:00	15		25		40
7:15	7		25		32
7:30	10		23		33
7:45	7	39	18	91	25
Total	321	321	402	402	723

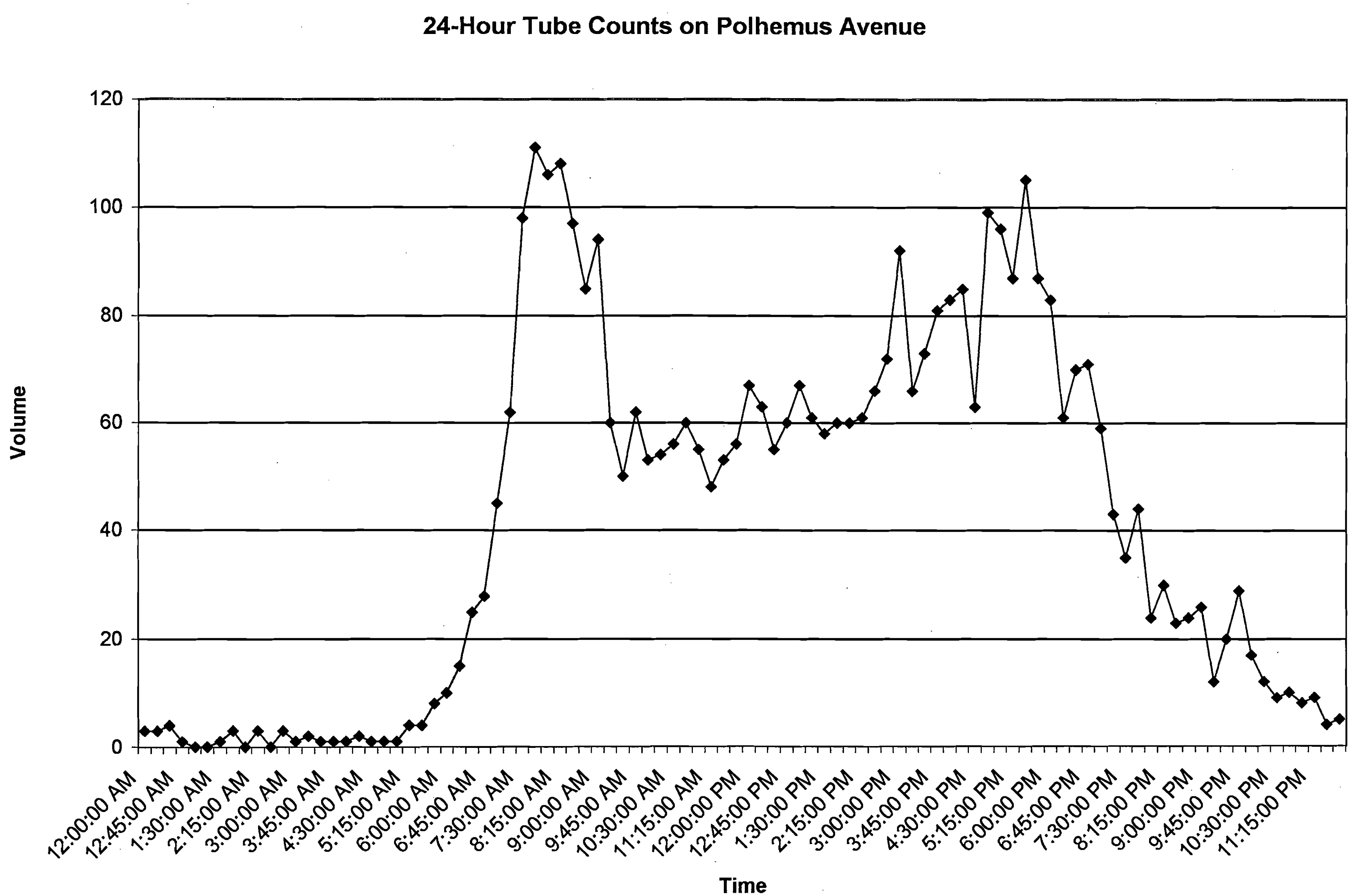

24-Hour Tube Counts on Polhemus Avenue
Volume
120
100
80
60
40
20
0
12:00:00 AM
12:45:00 AM
1:30:00 AM
2:15:00 AM
3:00:00 AM
3:45:00 AM
4:30:00 AM
5:15:00 AM
6:00:00 AM
6:45:00 AM
7:30:00 AM
8:15:00 AM
9:00:00 AM
9:45:00 AM
10:30:00 AM
11:15:00 AM
12:00:00 PM
12:45:00 PM
1:30:00 PM
2:15:00 PM
3:00:00 PM
3:45:00 PM
4:30:00 PM
5:15:00 PM
6:00:00 PM
6:45:00 PM
7:30:00 PM
8:15:00 PM
9:00:00 PM
9:45:00 PM
10:30:00 PM
11:15:00 PM
Time

Figure 5

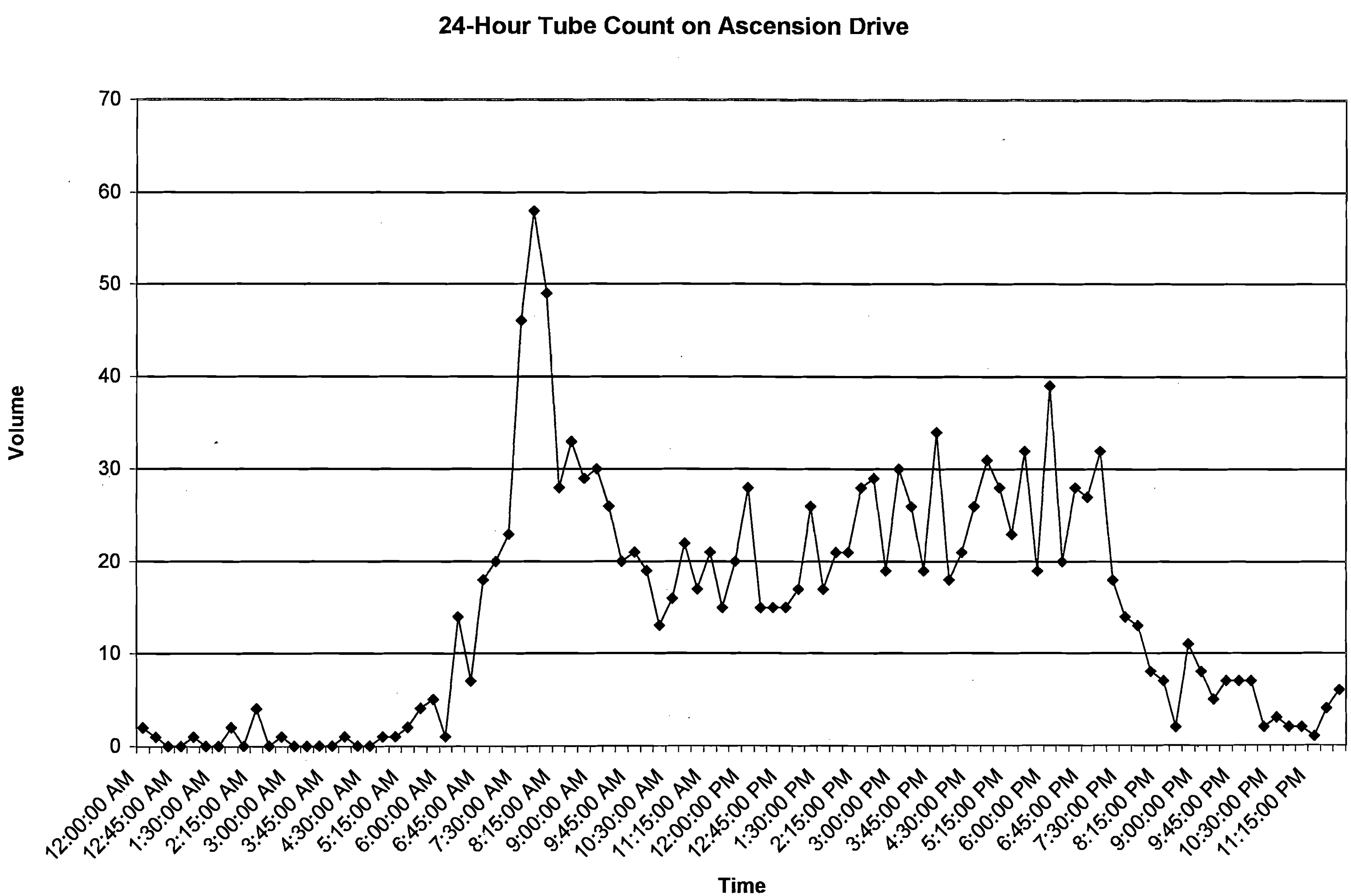

24-Hour Tube Count on Ascension Drive
Volume
0
10
20
30
40
50
60
70
12:00:00 AM
12:45:00 AM
1:30:00 AM
2:15:00 AM
3:00:00 AM
3:45:00 AM
4:30:00 AM
5:15:00 AM
6:00:00 AM
6:45:00 AM
7:30:00 AM
8:15:00 AM
9:00:00 AM
9:45:00 AM
10:30:00 AM
11:15:00 AM
12:00:00 PM
12:45:00 PM
1:30:00 PM
2:15:00 PM
3:00:00 PM
3:45:00 PM
4:30:00 PM
5:15:00 PM
6:00:00 PM
6:45:00 PM
7:30:00 PM
8:15:00 PM
9:00:00 PM
9:45:00 PM
10:30:00 PM
11:15:00 PM
Time

Figure 6

24-Hour Tube Count on Bel Aire Road

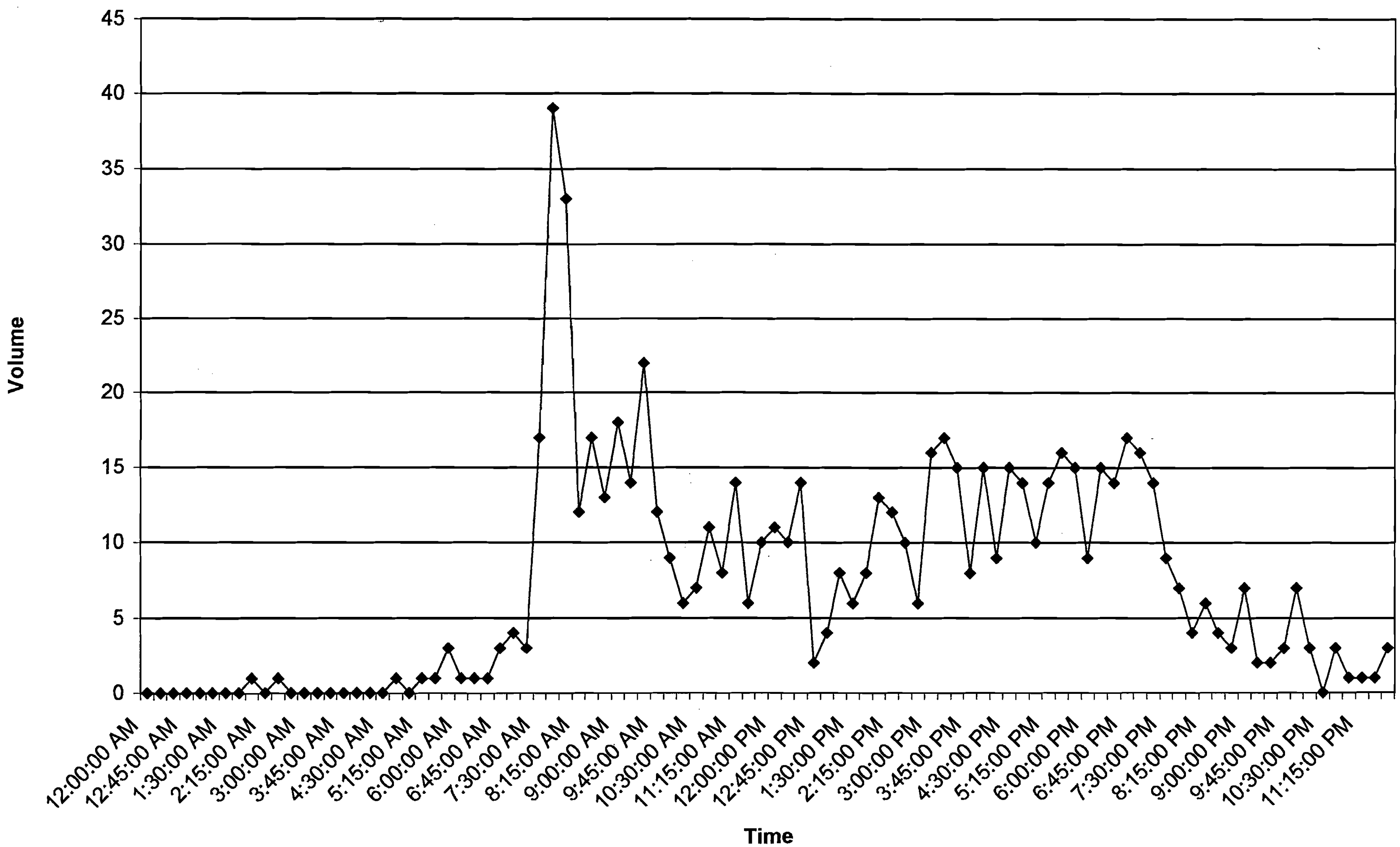


Figure 7

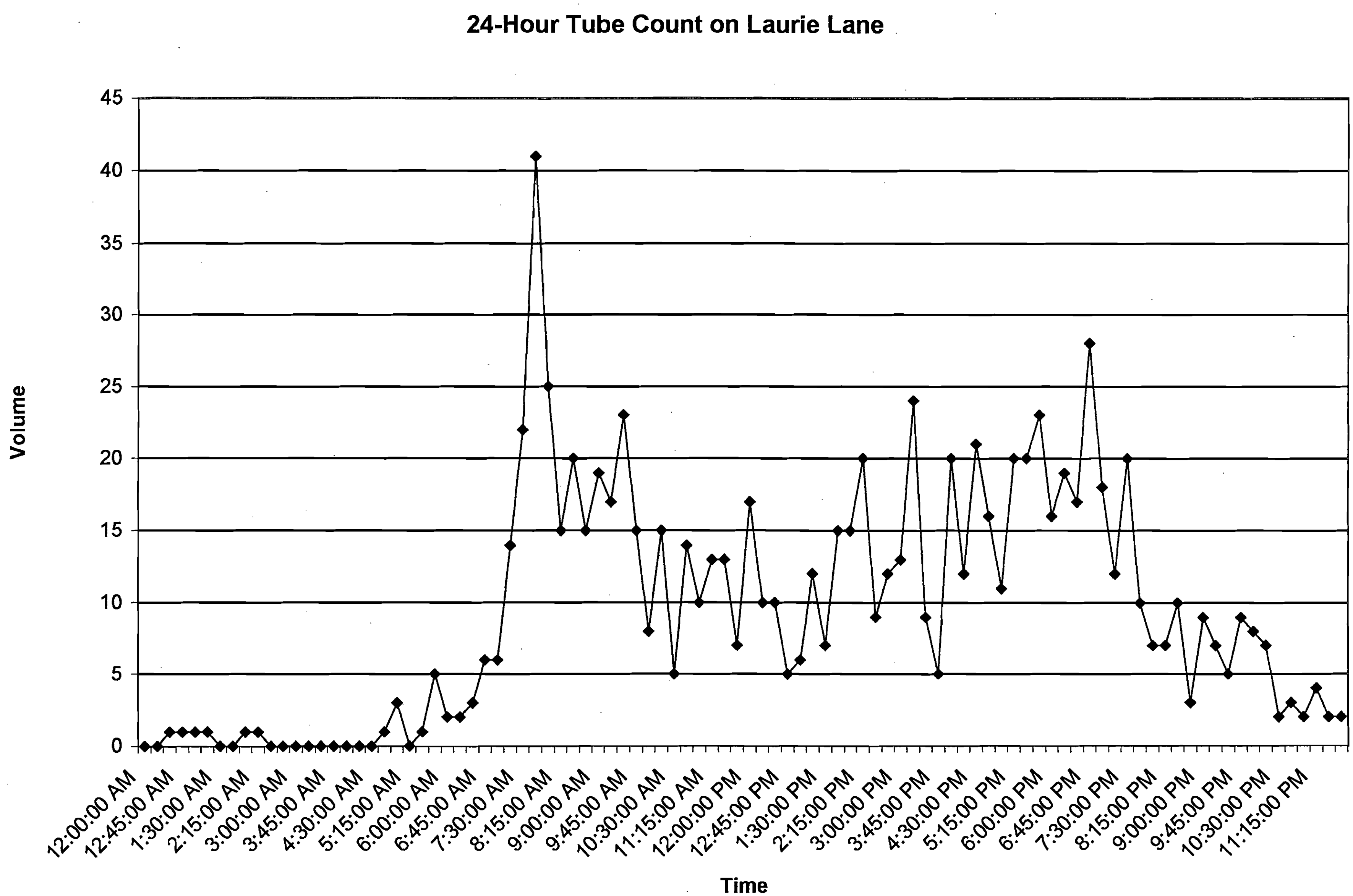

24-Hour Tube Count on Laurie Lane
Volume
45
40
35
30
25
20
15
10
5
0
12:00:00 AM
12:45:00 AM
1:30:00 AM
2:15:00 AM
3:00:00 AM
3:45:00 AM
4:30:00 AM
5:15:00 AM
6:00:00 AM
6:45:00 AM
7:30:00 AM
8:15:00 AM
9:00:00 AM
9:45:00 AM
10:30:00 AM
11:15:00 AM
12:00:00 PM
12:45:00 PM
1:30:00 PM
2:15:00 PM
3:00:00 PM
3:45:00 PM
4:30:00 PM
5:15:00 PM
6:00:00 PM
6:45:00 PM
7:30:00 PM
8:15:00 PM
9:00:00 PM
9:45:00 PM
10:30:00 PM
11:15:00 PM
Time

Figure 8

24-Hour Tube Count on Parrott Drive

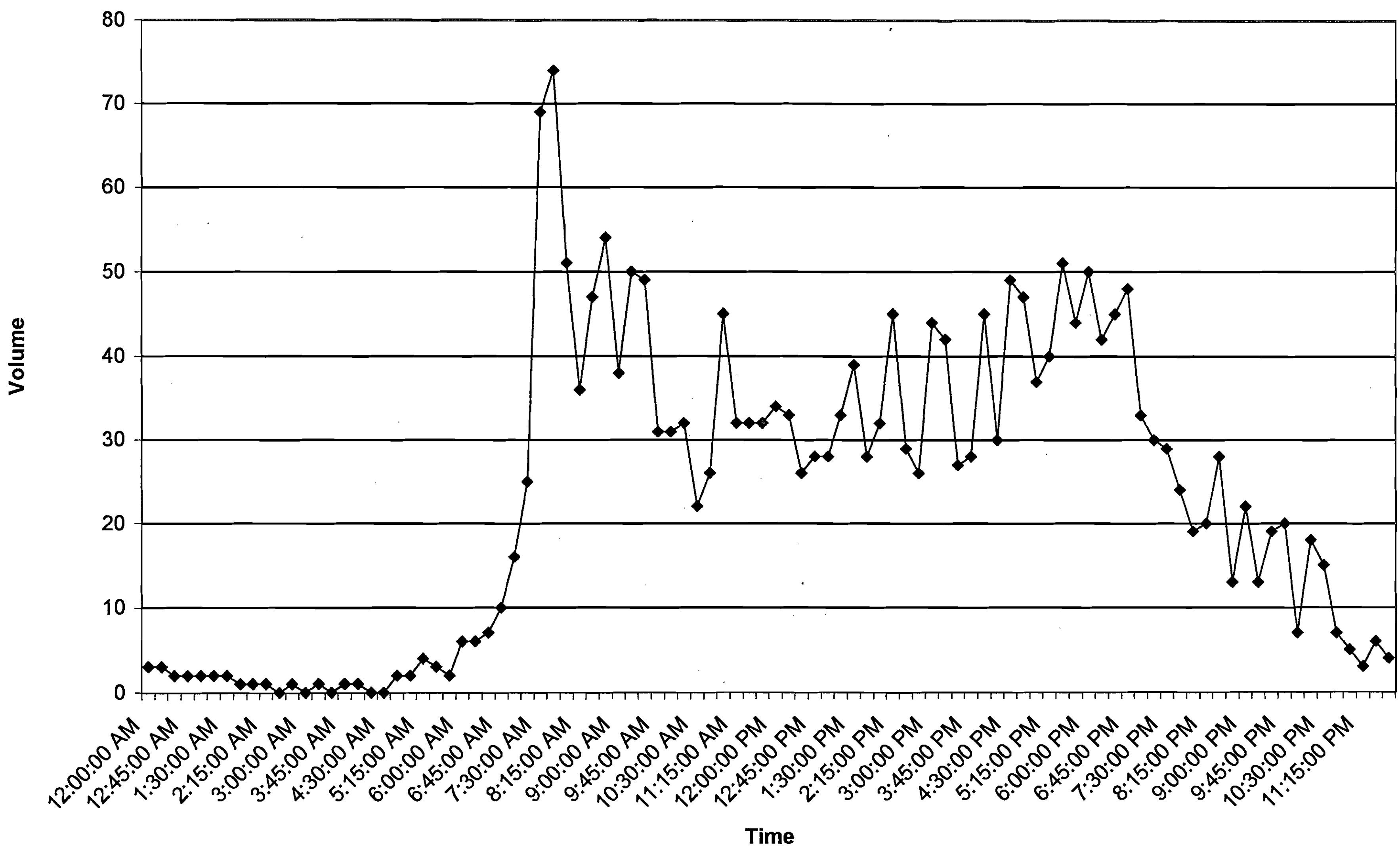


Figure 9

24-Hour Tube Count on Csm Drive

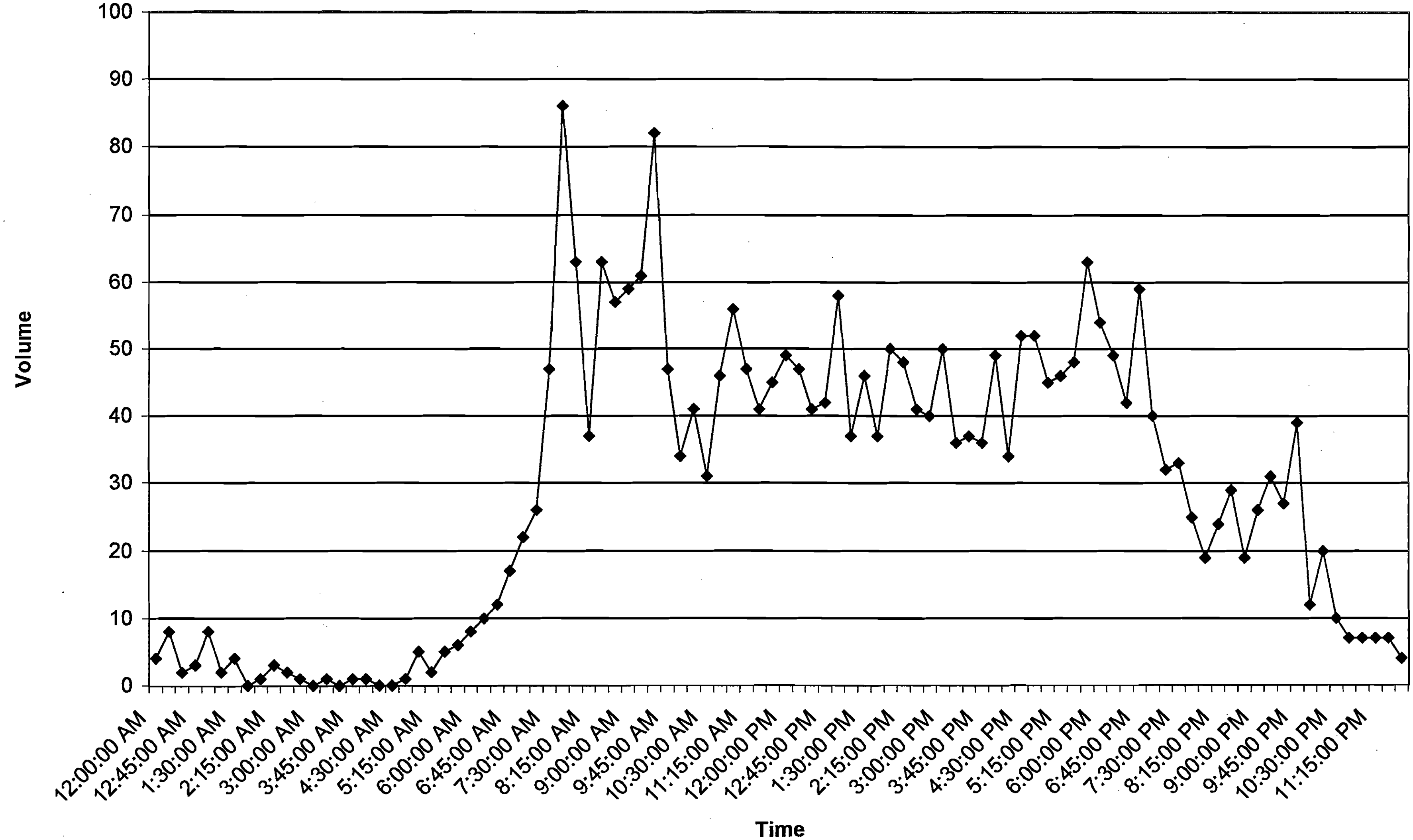


Figure 10

TIRE INDEX TABLE

Existing Volume Range (Vehicles Per Day)	TIRE Index	Minimum Daily Volume Increase to Produce a .1 Change in the TIRE Index	Minimum Daily Volume Increase to Produce a .2 Change in the TIRE Index
29-35	1.5	+6	+15
36-44	1.6	+8	+20
45-56	1.7	+10	+25
57-70	1.8	+13	+32
71-89	1.9	+17	+41
90-110	2.0	+22	+52
111-140	2.1	+29	+65
141-180	2.2	+40	+80
181-220	2.3	+52	+100
221-280	2.4	+65	+125
281-350	2.5	+79	+160
351-450	2.6	+94	+205
451-560	2.7	+114	+260
561-710	2.8	+140	+330
711-890	2.9	+170	+415
891-1,100	3.0	+220	+520
1,101-1,400	3.1	+290	+650
1,401-1,800	3.2	+380	+800
1,801-2,200	3.3	+500	+1,000
2,201-2,800	3.4	+650	+1,300
2,801-3,500	3.5	+825	+1,700
3,501-4,500	3.6	+1,025	+2,200
4,501-5,600	3.7	+1,250	+2,800
5,601-7,100	3.8	+1,500	+3,500
7,101-8,900	3.9	+1,800	+4,300
8,901-11,000	4.0	+2,300	+5,300
11,001-14,000	4.1	+3,000	+6,500
14,001-18,000	4.2	+4,000	+8,000
18,001-22,000	4.3	+5,200	+10,000
22,001-28,000	4.4	+6,600	+13,000
28,001-35,000	4.5	+8,200	+17,000
35,001-45,000	4.6	+10,000	+22,000
45,001-56,000	4.7	+12,200	+28,000
56,001-71,000	4.8	+14,800	+35,000
71,001-89,000	4.9	+18,000	+43,000

Source: Goodrich Traffic Group

TIRE INDEX TABLE

Existing Volume Range (Vehicles Per Day)	TIRE Index	Minimum Daily Volume Increase to Produce a .1 Change in the TIRE Index	Minimum Daily Volume Increase to Produce a .2 Change in the TIRE Index
29-35	1.5	+6	+15
36-44	1.6	+8	+20
45-56	1.7	+10	+25
57-70	1.8	+13	+32
71-89	1.9	+17	+41
90-110	2.0	+22	+52
111-140	2.1	+29	+65
141-180	2.2	+40	+80
181-220	2.3	+52	+100
221-280	2.4	+65	+125
281-350	2.5	+79	+160
351-450	2.6	+94	+205
451-560	2.7	+114	+260
561-710	2.8	+140	+330
711-890	2.9	+170	+415
891-1,100	3.0	+220	+520
1,101-1,400	3.1	+290	+650
1,401-1,800	3.2	+380	+800
1,801-2,200	3.3	+500	+1,000
2,201-2,800	3.4	+650	+1,300
2,801-3,500	3.5	+825	+1,700
3,501-4,500	3.6	+1,025	+2,200
4,501-5,600	3.7	+1,250	+2,800
5,601-7,100	3.8	+1,500	+3,500
7,101-8,900	3.9	+1,800	+4,300
8,901-11,000	4.0	+2,300	+5,300
11,001-14,000	4.1	+3,000	+6,500
14,001-18,000	4.2	+4,000	+8,000
18,001-22,000	4.3	+5,200	+10,000
22,001-28,000	4.4	+6,600	+13,000
28,001-35,000	4.5	+8,200	+17,000
35,001-45,000	4.6	+10,000	+22,000
45,001-56,000	4.7	+12,200	+28,000
56,001-71,000	4.8	+14,800	+35,000
71,001-89,000	4.9	+18,000	+43,000

Source: Goodrich Traffic Group

TTACHMENT A. DESCRIPTION OF THE TRAFFIC INFUSION ON RESIDENTIAL ENVIRONMENTS (TIRE) SYSTEM

TIRE is a numerical representation of a resident's perception of the effect of street traffic on activities such as walking, cycling and playing, and on daily tasks such as maneuvering an auto out of a residential driveway. The acronym for "Traffic Infusion on Residential Environments," TIRE, is expressed by index values that range from zero, representing the least effect of traffic, to five, representing the severest affect:

0	1	2	3	4	5
Very Low	Low	Moderate	High	Very High	

TIRE is based on a logarithmic association between traffic and a residential environment and as such predicts three interesting relationships. According to TIRE a given change in street traffic volume will cause a greater impact on a residential environment on a street with a low pre-existing traffic volume than it will on a street with a higher pre-existing volume. Any traffic change that would cause an index change of 0.1 or more would be noticeable to street residents. Streets with TIRE levels above the midrange index of 3 are traffic-dominated while those with indexes below 3 are better suited for residential activities.

Changes in the TIRE index are shown as (+) for increased traffic and (-) for reduced traffic; for instance, as shown in Attachment C, a +.1 TIRE index change on Homer Street at intersections east of Bryant indicates an increase in daily volumes or worsening of the present condition; a -.1 TIRE index change on Bryant Street at intersections north of Addison indicates a reduction in daily volumes, or an improvement in the present condition.

The TIRE index values shown in Attachment B were developed by D.K. Goodrich. They reflect curve shapes found in work by Donald Appleyard of the University of California at Berkeley and consider earlier thought by Buchanan of the Ministry of Transport, England.

Appendix D

Roadway Design Guidelines

required 0.2 to 0.3 s under alert conditions required 1.5 s under normal conditions.

Minimum reaction times thus could be at least 1.64 s; 0.64 s for alerted drivers plus 1 s for the unexpected signal. Because the studies used simple prearranged signals, they represent the least complex of roadway conditions. Even under these simple conditions it was found that some operators may take over 3.5 s to respond. Because actual conditions on the highway are generally more complex than those of the studies and because there is wide diversity in the reaction times required, it is evident that the value adopted should be greater than 1.64 s. In determination of sight distance for design, the reaction time should be larger than the average for all drivers under normal conditions. It should be large enough to include the reaction time required for nearly all drivers under most highway conditions. For approximately 90 percent of the drivers in the first study mentioned, a reaction time of 2.5 s was found to be adequate. A reaction time of 2.5 s has thus been assumed in the development of Table III-1.

A reaction time of 2.5 s is considered adequate for more complex conditions than those of the various studies, but it is not adequate for the most complex conditions encountered by the driver. Additional consideration of the most complex conditions such as those found at multiphase at-grade intersections and ramp termini at through roadways can be found later in this chapter in the section "Decision Sight Distance."

Braking Distance

The approximate braking distance of a vehicle on a level roadway may be determined by the use of the standard formula:

$$d = \frac{V^2}{254f}$$

where: d = braking distance, m;
V = initial speed, km/h; and
f = coefficient of friction between tires and roadway.

In this formula for braking distance the f factor is used as an overall or a single value that is representative for the whole of the speed change. Measurements show that f is not the same for all speeds. It decreases as the initial speed increases. It varies considerably because of many physical elements such as air pressure of tires, composition of tires, tire tread pattern and depth of tread, type and condition of the pavement surface, and the presence of moisture, mud,

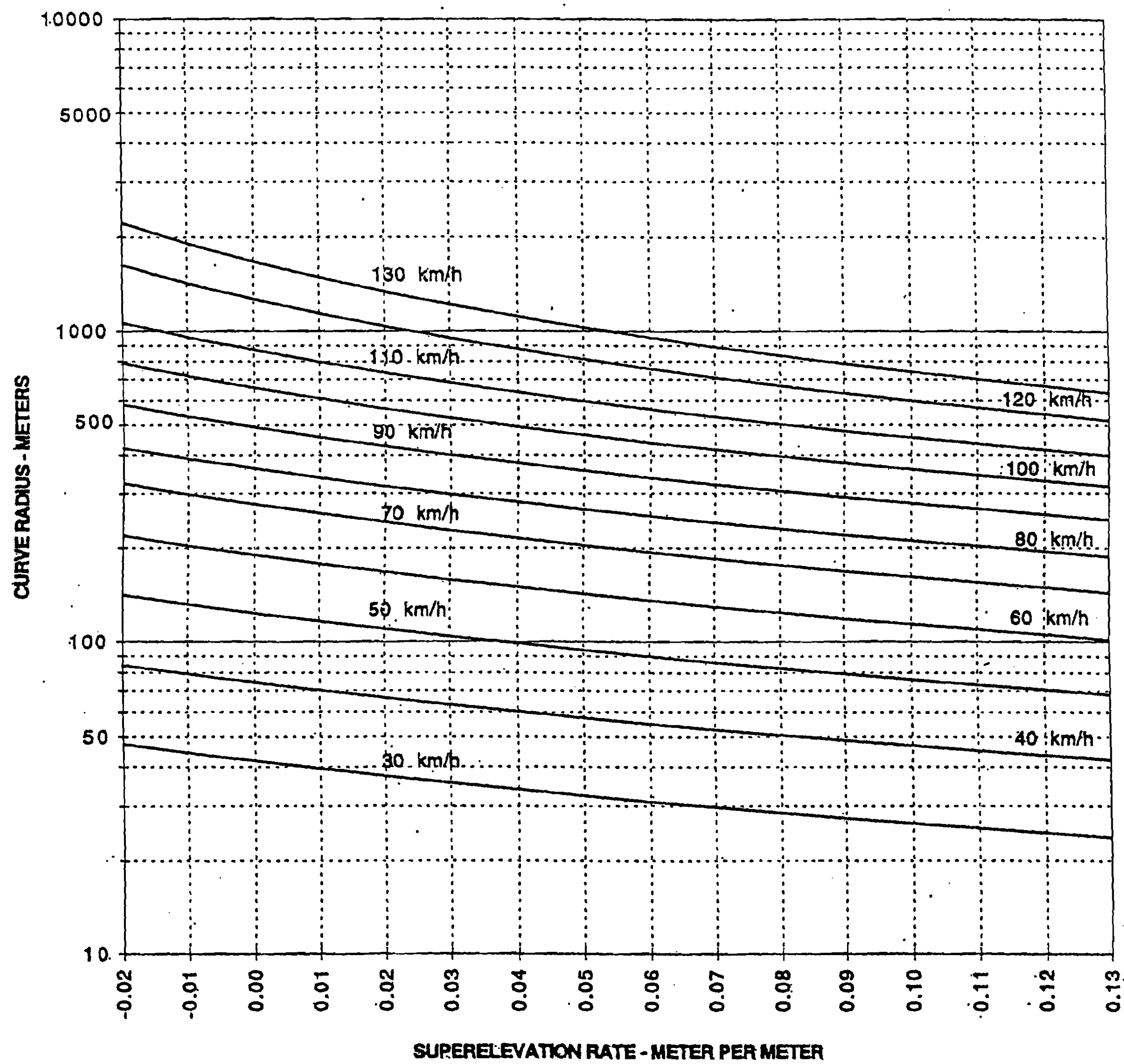
DISTANCES

Design Speed (km/h)	Assumed Speed for Condition (km/h)	Brake Reaction Time (s)	Brake Reaction Distance (m)	Coefficient of Friction[a] f	Breaking Distance on Level (m)	Stopping Sight Distance for Design (m)
30	30-30	2.5	20.8-20.8	0.40	8.8-8.8	29.6-29.6
40	40-40	2.5	27.8-27.8	0.38	16.6-16.6	44.4-44.4
50	47-50	2.5	32.6-34.7	0.35	24.8-28.1	57.4-62.8
60	55-60	2.5	38.2-41.7	0.33	36.1-42.9	74.3-84.6
70	63-70	2.5	43.7-48.6	0.31	50.4-62.2	94.1-110.8
80	70-80	2.5	48.6-55.5	0.30	64.2-83.9	112.8-139.4
90	77-90	2.5	53.5-62.5	0.30	77.7-106.2	131.2-168.7
100	85-100	2.5	59.0-69.4	0.29	98.0-135.6	157.0-205.0
110	91-110	2.5	63.2-76.4	0.28	116.3-170.0	179.5-246.4
120	98-120	2.5	68.0-83.3	0.28	134.9-202.3	202.9-285.6

[a] Values of coefficient of friction generally approximate curves 9 and 10 (coefficient of friction for wet-PC concrete and wet-plant mixes) shown in Figure III-1A.

Table III-1. Stopping sight distance (wet pavements).

Figure 203.2
Comfortable Speed on Horizontal Curves



Speed (km/h)	Side Friction Factor "f"
30	0.17
40	0.17
50	0.16
60	0.15
70	0.14
80	0.14
90	0.13
100	0.12
110	0.11
120	0.09
130	0.08

NOTES:
This figure is not intended to represent standard superelevation rates or curve radius. The standards are contained in Tables 202.2 and 203.2. This figure should be used as an aid to designers to determine comfortable speeds. Use of this figure in lieu of the standards must be documented as discussed in Index 82.2.

e - Superelevation

f - Side Friction Factor

V - Speed (km/h)

R - Radius (meters)

$$e+f = \frac{0.0079\ V^2}{R}$$

Memorandum

Date: May 29, 2008

To: Jennie Anderson, Christopher A. Joseph & Associates

From: Gary Black

Subject: Update to the Traffic Analysis Report for the Proposed Thomas Subdivision Residential Development

Hexagon Transportation Consultants prepared a traffic analysis report dated February 5, 2004 for the proposed Thomas Subdivision Residential Development. In order to determine whether the analysis and conclusions of the 2004 report are still valid, Hexagon has conducted updated traffic counts in the area. The 2004 report utilized count data from August 2003. New 24-hour daily traffic volumes were obtained from tube counts that were conducted on the study roadway segments on Tuesday, May 20, 2008 (see Table 1).

Table 1
Existing Traffic Volumes

	Daily Volume (vehicles)	
Roadway Segment	2003	2008
Polhemus Rd (btwn Ascension Dr & De Anza Blvd)	4,034	4,298
Ascension Dr (btwn Polhemus Rd & Rainbow Dr)	1,422	1,432
Bel Aire Rd (btwn Ascension Dr & Laurie Ln)	708	695
Laurie Ln (btwn Bel Aire Rd & Parrott Dr)	905	953
Parrott Dr (btwn Laurie Ln & CSM Dr)	2,242	2,145
CSM Dr (btwn Parrott Dr & Hillsdale Blvd)	2,804	2,545

The results show that there is no appreciable difference between the 2003 and 2008 counts. Therefore, the conditions presented in the 2004 traffic study are still representative of current conditions in the study area, and the analysis and conclusions of that report are still valid.

Polhemus Rd. :
San Mateo :
Description 3 :

Site: 000000000000
Date: 5/20/2008
Tuesday

24 Hour Volume

Begin	Northbo und		Southbo und		Combined		Begin	Northbo und		Southbo und		Combined	
12:00 AM	1	2	2	4	3	6	12:00 PM	37	139	38	119	75	258
12:15 AM	0		0		0		12:15 PM	31		25		56	
12:30 AM	0		0		0		12:30 PM	38		30		68	
12:45 AM	1		2		3		12:45 PM	33		26		59	
1:00 AM	0	1	0	1	0	2	1:00 PM	35	123	31	125	66	248
1:15 AM	1		1		2		1:15 PM	34		23		57	
1:30 AM	0		0		0		1:30 PM	24		35		59	
1:45 AM	0		0		0		1:45 PM	30		36		66	
2:00 AM	0	0	0	1	0	1	2:00 PM	29	156	29	125	58	281
2:15 AM	0		0		0		2:15 PM	39		32		71	
2:30 AM	0		1		1		2:30 PM	39		32		71	
2:45 AM	0		0		0		2:45 PM	49		32		81	
3:00 AM	0	1	1	1	1	2	3:00 PM	42	167	33	182	75	349
3:15 AM	0		0		0		3:15 PM	37		55		92	
3:30 AM	0		0		0		3:30 PM	50		43		93	
3:45 AM	1		0		1		3:45 PM	38		51		89	
4:00 AM	1	1	0	2	1	3	4:00 PM	59	192	56	184	115	376
4:15 AM	0		0		0		4:15 PM	45		44		89	
4:30 AM	0		1		1		4:30 PM	48		44		92	
4:45 AM	0		1		1		4:45 PM	40		40		80	
5:00 AM	1	5	1	7	2	12	5:00 PM	44	199	48	193	92	392
5:15 AM	1		1		2		5:15 PM	39		56		95	
5:30 AM	2		2		4		5:30 PM	60		51		111	
5:45 AM	1		3		4		5:45 PM	56		38		94	
6:00 AM	3	34	3	47	6	81	6:00 PM	32	145	41	144	73	289
6:15 AM	9		9		18		6:15 PM	38		38		76	
6:30 AM	10		8		18		6:30 PM	37		31		68	
6:45 AM	12		27		39		6:45 PM	38		34		72	
7:00 AM	14	189	11	173	25	362	7:00 PM	32	108	29	75	61	183
7:15 AM	30		31		61		7:15 PM	32		19		51	
7:30 AM	82		61		143		7:30 PM	29		16		45	
7:45 AM	63		70		133		7:45 PM	15		11		26	
8:00 AM	48	209	74	230	122	439	8:00 PM	16	61	19	54	35	115
8:15 AM	68		52		120		8:15 PM	14		10		24	
8:30 AM	51		64		115		8:30 PM	15		14		29	
8:45 AM	42		40		82		8:45 PM	16		11		27	
9:00 AM	33	115	39	133	72	248	9:00 PM	15	55	9	26	24	81
9:15 AM	26		33		59		9:15 PM	21		6		27	
9:30 AM	31		32		63		9:30 PM	8		5		13	
9:45 AM	25		29		54		9:45 PM	11		6		17	
10:00 AM	42	125	30	131	72	256	10:00 PM	6	24	8	22	14	46
10:15 AM	31		22		53		10:15 PM	9		6		15	
10:30 AM	22		36		58		10:30 PM	4		5		9	
10:45 AM	30		43		73		10:45 PM	5		3		8	
11:00 AM	26	133	31	114	57	247	11:00 PM	3	12	3	9	6	21
11:15 AM	45		31		76		11:15 PM	5		2		7	
11:30 AM	29		28		57		11:30 PM	2		2		4	
11:45 AM	33		24		57		11:45 PM	2		2		4	

	Northbo und	Southbo und	Combined
24 Hour Volume	2196 (51.1%)	2102 (48.9%)	4298

	12:00 AM - 12:00 PM			12:00 PM - 12:00 AM		
	Northbo und	Southbo und	Combined	Northbo und	Southbo und	Combined
Count	815	844	1659	1381	1258	2639
	49.1 %	50.9 %		52.3 %	47.7 %	
Peak Hour	7:30 AM	7:45 AM	7:30 AM	5:00 PM	3:15 PM	5:00 PM
Volume	261	260	518	199	205	392
Factor	0.80	0.88	0.91	0.83	0.92	0.88

Ascension Dr. :
San Mateo :
Description 3 :

Site: 000000000000
Date: 5/20/2008
Tuesday

24 Hour Volume

Begin	Eastbou nd		Westbou nd		Combined		Begin	Eastbou nd		Westbou nd		Combined	
12:00 AM	0	0	0	0	0	0	12:00 PM	10	32	12	35	22	67
12:15 AM	0		0		0		12:15 PM	8		10		18	
12:30 AM	0		0		0		12:30 PM	4		8		12	
12:45 AM	0		0		0		12:45 PM	10		5		15	
1:00 AM	1	1	0	0	1	1	1:00 PM	15	39	7	31	22	70
1:15 AM	0		0		0		1:15 PM	8		9		17	
1:30 AM	0		0		0		1:30 PM	5		7		12	
1:45 AM	0		0		0		1:45 PM	11		8		19	
2:00 AM	0	0	0	0	0	0	2:00 PM	10	41	13	42	23	83
2:15 AM	0		0		0		2:15 PM	9		9		18	
2:30 AM	0		0		0		2:30 PM	8		8		16	
2:45 AM	0		0		0		2:45 PM	14		12		26	
3:00 AM	0	0	0	1	0	1	3:00 PM	12	56	22	58	34	114
3:15 AM	0		0		0		3:15 PM	14		12		26	
3:30 AM	0		0		0		3:30 PM	13		10		23	
3:45 AM	0		1		1		3:45 PM	17		14		31	
4:00 AM	1	2	0	3	1	5	4:00 PM	18	53	8	49	26	102
4:15 AM	0		0		0		4:15 PM	9		9		18	
4:30 AM	1		2		3		4:30 PM	15		13		28	
4:45 AM	0		1		1		4:45 PM	11		19		30	
5:00 AM	0	1	0	5	0	6	5:00 PM	14	79	14	34	28	113
5:15 AM	1		1		2		5:15 PM	15		4		19	
5:30 AM	0		3		3		5:30 PM	26		11		37	
5:45 AM	0		1		1		5:45 PM	24		5		29	
6:00 AM	0	4	4	19	4	23	6:00 PM	20	69	14	48	34	117
6:15 AM	0		3		3		6:15 PM	22		15		37	
6:30 AM	1		6		7		6:30 PM	10		9		19	
6:45 AM	3		6		9		6:45 PM	17		10		27	
7:00 AM	5	52	8	85	13	137	7:00 PM	16	37	9	22	25	59
7:15 AM	9		21		30		7:15 PM	5		6		11	
7:30 AM	17		24		41		7:30 PM	11		4		15	
7:45 AM	21		32		53		7:45 PM	5		3		8	
8:00 AM	22	73	38	94	60	167	8:00 PM	6	24	9	21	15	45
8:15 AM	22		21		43		8:15 PM	5		5		10	
8:30 AM	10		19		29		8:30 PM	9		5		14	
8:45 AM	19		16		35		8:45 PM	4		2		6	
9:00 AM	17	56	15	63	32	119	9:00 PM	6	19	2	8	8	27
9:15 AM	15		24		39		9:15 PM	8		3		11	
9:30 AM	14		12		26		9:30 PM	0		1		1	
9:45 AM	10		12		22		9:45 PM	5		2		7	
10:00 AM	13	40	11	46	24	86	10:00 PM	5	10	1	5	6	15
10:15 AM	12		9		21		10:15 PM	2		2		4	
10:30 AM	10		10		20		10:30 PM	1		1		2	
10:45 AM	5		16		21		10:45 PM	2		1		3	
11:00 AM	7	32	8	37	15	69	11:00 PM	0	4	0	2	0	6
11:15 AM	9		13		22		11:15 PM	2		1		3	
11:30 AM	7		11		18		11:30 PM	1		0		1	
11:45 AM	9		5		14		11:45 PM	1		1		2	

	Eastbou nd	Westbou nd	Combined
24 Hour Volume	724 (50.6%)	708 (49.4%)	1432

	12:00 AM - 12:00 PM			12:00 PM - 12:00 AM		
	Eastbou nd	Westbou nd	Combined	Eastbou nd	Westbou nd	Combined
Count	261	353	614	463	355	818
	42.5 %	57.5 %		56.6 %	43.4 %	
Peak Hour	7:30 AM	7:15 AM	7:30 AM	5:30 PM	3:00 PM	5:30 PM
Volume	82	115	197	92	58	137
Factor	0.93	0.76	0.82	0.88	0.66	0.93

Bel Aire :
San Mateo :
Description 3 :

Site: 000000000000
Date: 5/20/2008
Tuesday

24 Hour Volume

Begin	Westbou nd		Eastbou nd		Combined		Begin	Westbou nd		Eastbou nd		Combined	
12:00 AM	0	0	0	0	0	0	12:00 PM	6	21	5	13	11	34
12:15 AM	0		0		0		12:15 PM	4		1		5	
12:30 AM	0		0		0		12:30 PM	5		3		8	
12:45 AM	0		0		0		12:45 PM	6		4		10	
1:00 AM	0	0	0	0	0	0	1:00 PM	5	16	3	16	8	32
1:15 AM	0		0		0		1:15 PM	3		4		7	
1:30 AM	0		0		0		1:30 PM	3		3		6	
1:45 AM	0		0		0		1:45 PM	5		6		11	
2:00 AM	0	0	0	0	0	0	2:00 PM	7	27	4	28	11	55
2:15 AM	0		0		0		2:15 PM	7		4		11	
2:30 AM	0		0		0		2:30 PM	3		9		12	
2:45 AM	0		0		0		2:45 PM	10		11		21	
3:00 AM	0	1	0	0	0	1	3:00 PM	13	31	6	27	19	58
3:15 AM	0		0		0		3:15 PM	3		7		10	
3:30 AM	0		0		0		3:30 PM	6		8		14	
3:45 AM	1		0		1		3:45 PM	9		6		15	
4:00 AM	1	1	0	0	1	1	4:00 PM	8	31	4	15	12	46
4:15 AM	0		0		0		4:15 PM	3		1		4	
4:30 AM	0		0		0		4:30 PM	10		5		15	
4:45 AM	0		0		0		4:45 PM	10		5		15	
5:00 AM	0	1	1	5	1	6	5:00 PM	6	22	4	32	10	54
5:15 AM	0		1		1		5:15 PM	5		10		15	
5:30 AM	1		2		3		5:30 PM	6		6		12	
5:45 AM	0		1		1		5:45 PM	5		12		17	
6:00 AM	1	4	1	3	2	7	6:00 PM	6	17	6	21	12	38
6:15 AM	0		0		0		6:15 PM	4		7		11	
6:30 AM	1		0		1		6:30 PM	2		4		6	
6:45 AM	2		2		4		6:45 PM	5		4		9	
7:00 AM	1	23	4	52	5	75	7:00 PM	5	12	7	14	12	26
7:15 AM	4		6		10		7:15 PM	4		2		6	
7:30 AM	8		15		23		7:30 PM	2		2		4	
7:45 AM	10		27		37		7:45 PM	1		3		4	
8:00 AM	20	43	17	52	37	95	8:00 PM	2	12	3	9	5	21
8:15 AM	10		12		22		8:15 PM	5		3		8	
8:30 AM	9		6		15		8:30 PM	4		1		5	
8:45 AM	4		17		21		8:45 PM	1		2		3	
9:00 AM	6	19	14	43	20	62	9:00 PM	1	4	2	4	3	8
9:15 AM	6		14		20		9:15 PM	2		2		4	
9:30 AM	5		8		13		9:30 PM	1		0		1	
9:45 AM	2		7		9		9:45 PM	0		0		0	
10:00 AM	6	19	8	18	14	37	10:00 PM	1	3	1	3	2	6
10:15 AM	3		5		8		10:15 PM	2		1		3	
10:30 AM	1		1		2		10:30 PM	0		0		0	
10:45 AM	9		4		13		10:45 PM	0		1		1	
11:00 AM	7	18	3	15	10	33	11:00 PM	0	0	0	0	0	0
11:15 AM	7		6		13		11:15 PM	0		0		0	
11:30 AM	1		1		2		11:30 PM	0		0		0	
11:45 AM	3		5		8		11:45 PM	0		0		0	

	Westbou nd	Eastbou nd	Combined
24 Hour Volume	325 (46.8%)	370 (53.2%)	695

	12:00 AM - 12:00 PM			12:00 PM - 12:00 AM		
	Westbou nd	Eastbou nd	Combined	Westbou nd	Eastbou nd	Combined
Count	129	188	317	196	182	378
	40.7 %	59.3 %		51.9 %	48.1 %	
Peak Hour	7:45 AM	7:30 AM	7:30 AM	2:15 PM	5:15 PM	2:45 PM
Volume	49	71	119	33	34	64
Factor	0.61	0.66	0.80	0.63	0.71	0.76

Laurie :
San Mateo :
Description 3 :

Site: 000000000000
Date: 5/20/2008
Tuesday

24 Hour Volume

Begin	Eastbou nd		Westbou nd		Combined		Begin	Eastbou nd		Westbou nd		Combined	
12:00 AM	0	0	0	1	0	1	12:00 PM	7	21	10	32	17	53
12:15 AM	0		0		0		12:15 PM	3		4		7	
12:30 AM	0		0		0		12:30 PM	6		13		19	
12:45 AM	0		1		1		12:45 PM	5		5		10	
1:00 AM	0	0	0	0	0	0	1:00 PM	4	26	12	28	16	54
1:15 AM	0		0		0		1:15 PM	7		6		13	
1:30 AM	0		0		0		1:30 PM	7		6		13	
1:45 AM	0		0		0		1:45 PM	8		4		12	
2:00 AM	0	0	0	0	0	0	2:00 PM	9	41	5	36	14	77
2:15 AM	0		0		0		2:15 PM	5		8		13	
2:30 AM	0		0		0		2:30 PM	13		8		21	
2:45 AM	0		0		0		2:45 PM	14		15		29	
3:00 AM	0	0	0	0	0	0	3:00 PM	8	30	15	41	23	71
3:15 AM	0		0		0		3:15 PM	5		5		10	
3:30 AM	0		0		0		3:30 PM	11		9		20	
3:45 AM	0		0		0		3:45 PM	6		12		18	
4:00 AM	3	3	0	0	3	3	4:00 PM	7	27	9	45	16	72
4:15 AM	0		0		0		4:15 PM	6		8		14	
4:30 AM	0		0		0		4:30 PM	8		13		21	
4:45 AM	0		0		0		4:45 PM	6		15		21	
5:00 AM	0	7	0	2	0	9	5:00 PM	6	35	7	41	13	76
5:15 AM	1		1		2		5:15 PM	10		12		22	
5:30 AM	3		1		4		5:30 PM	8		11		19	
5:45 AM	3		0		3		5:45 PM	11		11		22	
6:00 AM	4	8	1	4	5	12	6:00 PM	7	35	10	41	17	76
6:15 AM	1		0		1		6:15 PM	12		9		21	
6:30 AM	1		0		1		6:30 PM	10		6		16	
6:45 AM	2		3		5		6:45 PM	6		16		22	
7:00 AM	7	62	1	19	8	81	7:00 PM	10	20	6	20	16	40
7:15 AM	4		5		9		7:15 PM	4		11		15	
7:30 AM	19		6		25		7:30 PM	2		2		4	
7:45 AM	32		7		39		7:45 PM	4		1		5	
8:00 AM	21	65	16	30	37	95	8:00 PM	5	12	7	24	12	36
8:15 AM	13		6		19		8:15 PM	1		6		7	
8:30 AM	10		6		16		8:30 PM	2		7		9	
8:45 AM	21		2		23		8:45 PM	4		4		8	
9:00 AM	16	54	7	23	23	77	9:00 PM	1	3	3	13	4	16
9:15 AM	16		8		24		9:15 PM	2		6		8	
9:30 AM	10		6		16		9:30 PM	0		3		3	
9:45 AM	12		2		14		9:45 PM	0		1		1	
10:00 AM	6	20	8	22	14	42	10:00 PM	2	5	3	8	5	13
10:15 AM	4		2		6		10:15 PM	2		4		6	
10:30 AM	4		6		10		10:30 PM	0		0		0	
10:45 AM	6		6		12		10:45 PM	1		1		2	
11:00 AM	3	22	7	25	10	47	11:00 PM	0	0	0	2	0	2
11:15 AM	7		5		12		11:15 PM	0		0		0	
11:30 AM	5		5		10		11:30 PM	0		1		1	
11:45 AM	7		8		15		11:45 PM	0		1		1	

	Eastbou nd	Westbou nd	Combined
24 Hour Volume	496 (52.0%)	457 (48.0%)	953

12:00 AM - 12:00 PM

	Eastbou nd	Westbou nd	Combined
Count	241	126	367
	65.7 %	34.3 %	
Peak Hour	7:30 AM	7:30 AM	7:30 AM
Volume	85	35	120
Factor	0.66	0.55	0.77

12:00 PM - 12:00 AM

	Eastbou nd	Westbou nd	Combined
Count	255	331	586
	43.5 %	56.5 %	
Peak Hour	2:00 PM	4:30 PM	2:15 PM
Volume	41	47	86
Factor	0.73	0.78	0.74

Parrot Drive	:	Site:	000000000000
San Mateo	:	Date:	5/20/2008
Description 3	:		Tuesday

24 Hour Volume

Begin	Northbo und		Southbo und		Combined		Begin	Northbo und		Southbo und		Combined	
12:00 AM	2	4	0	1	2	5	12:00 PM	14	72	13	50	27	122
12:15 AM	0		0		0		12:15 PM	11		14		25	
12:30 AM	1		1		2		12:30 PM	30		10		40	
12:45 AM	1		0		1		12:45 PM	17		13		30	
1:00 AM	2	3	0	1	2	4	1:00 PM	20	65	13	67	33	132
1:15 AM	0		0		0		1:15 PM	18		15		33	
1:30 AM	0		1		1		1:30 PM	16		20		36	
1:45 AM	1		0		1		1:45 PM	11		19		30	
2:00 AM	0	1	0	0	0	1	2:00 PM	19	66	20	70	39	136
2:15 AM	0		0		0		2:15 PM	16		14		30	
2:30 AM	0		0		0		2:30 PM	12		13		25	
2:45 AM	1		0		1		2:45 PM	19		23		42	
3:00 AM	1	2	0	0	1	2	3:00 PM	26	81	15	61	41	142
3:15 AM	0		0		0		3:15 PM	15		12		27	
3:30 AM	1		0		1		3:30 PM	20		18		38	
3:45 AM	0		0		0		3:45 PM	20		16		36	
4:00 AM	0	3	2	3	2	6	4:00 PM	13	92	12	64	25	156
4:15 AM	1		0		1		4:15 PM	22		23		45	
4:30 AM	1		0		1		4:30 PM	30		15		45	
4:45 AM	1		1		2		4:45 PM	27		14		41	
5:00 AM	0	4	2	15	2	19	5:00 PM	15	98	15	84	30	182
5:15 AM	2		2		4		5:15 PM	32		25		57	
5:30 AM	0		5		5		5:30 PM	19		15		34	
5:45 AM	2		6		8		5:45 PM	32		29		61	
6:00 AM	0	8	5	26	5	34	6:00 PM	26	105	22	76	48	181
6:15 AM	1		3		4		6:15 PM	23		25		48	
6:30 AM	1		6		7		6:30 PM	22		11		33	
6:45 AM	6		12		18		6:45 PM	34		18		52	
7:00 AM	11	68	16	96	27	164	7:00 PM	18	68	16	47	34	115
7:15 AM	11		15		26		7:15 PM	26		11		37	
7:30 AM	35		21		56		7:30 PM	14		9		23	
7:45 AM	11		44		55		7:45 PM	10		11		21	
8:00 AM	14	66	46	125	60	191	8:00 PM	9	42	5	19	14	61
8:15 AM	23		24		47		8:15 PM	16		1		17	
8:30 AM	18		23		41		8:30 PM	8		6		14	
8:45 AM	11		32		43		8:45 PM	9		7		16	
9:00 AM	12	62	30	104	42	166	9:00 PM	12	46	3	21	15	67
9:15 AM	22		24		46		9:15 PM	16		6		22	
9:30 AM	17		22		39		9:30 PM	10		8		18	
9:45 AM	11		28		39		9:45 PM	8		4		12	
10:00 AM	15	41	12	53	27	94	10:00 PM	9	23	4	12	13	35
10:15 AM	5		15		20		10:15 PM	6		2		8	
10:30 AM	11		11		22		10:30 PM	3		2		5	
10:45 AM	10		15		25		10:45 PM	5		4		9	
11:00 AM	19	61	12	58	31	119	11:00 PM	2	9	0	2	2	11
11:15 AM	10		16		26		11:15 PM	4		2		6	
11:30 AM	18		11		29		11:30 PM	3		0		3	
11:45 AM	14		19		33		11:45 PM	0		0		0	

	Northbo und	Southbo und	Combined
24 Hour Volume	1090 (50.8%)	1055 (49.2%)	2145

	12:00 AM - 12:00 PM			12:00 PM - 12:00 AM		
	Northbo und	Southbo und	Combined	Northbo und	Southbo und	Combined
Count	323	482	805	767	573	1340
	40.1 %	59.9 %		57.2 %	42.8 %	
Peak Hour	7:30 AM	7:45 AM	7:30 AM	5:15 PM	5:15 PM	5:15 PM
Volume	83	137	218	109	91	200
Factor	0.59	0.74	0.91	0.85	0.78	0.82

CSM :
San Mateo :
Description 3 :

Site: 000000000000
Date: 5/20/2008
Tuesday

24 Hour Volume

Begin	Southbo und		Northbo und		Combined		Begin	Southbo und		Northbo und		Combined	
12:00 AM	2	4	0	2	2	6	12:00 PM	20	99	21	81	41	180
12:15 AM	0		1		1		12:15 PM	21		22		43	
12:30 AM	1		1		2		12:30 PM	35		17		52	
12:45 AM	1		0		1		12:45 PM	23		21		44	
1:00 AM	2	3	0	2	2	5	1:00 PM	23	87	18	79	41	166
1:15 AM	0		1		1		1:15 PM	22		18		40	
1:30 AM	0		1		1		1:30 PM	26		25		51	
1:45 AM	1		0		1		1:45 PM	16		18		34	
2:00 AM	0	1	0	0	0	1	2:00 PM	22	69	23	82	45	151
2:15 AM	0		0		0		2:15 PM	18		12		30	
2:30 AM	0		0		0		2:30 PM	15		21		36	
2:45 AM	1		0		1		2:45 PM	14		26		40	
3:00 AM	1	2	0	0	1	2	3:00 PM	26	90	15	57	41	147
3:15 AM	0		0		0		3:15 PM	20		10		30	
3:30 AM	0		0		0		3:30 PM	21		15		36	
3:45 AM	1		0		1		3:45 PM	23		17		40	
4:00 AM	0	2	2	4	2	6	4:00 PM	18	105	14	70	32	175
4:15 AM	0		1		1		4:15 PM	27		19		46	
4:30 AM	2		0		2		4:30 PM	34		21		55	
4:45 AM	0		1		1		4:45 PM	26		16		42	
5:00 AM	1	16	2	15	3	31	5:00 PM	18	103	19	83	37	186
5:15 AM	5		1		6		5:15 PM	32		22		54	
5:30 AM	8		5		13		5:30 PM	19		23		42	
5:45 AM	2		7		9		5:45 PM	34		19		53	
6:00 AM	2	17	6	44	8	61	6:00 PM	30	119	26	99	56	218
6:15 AM	6		14		20		6:15 PM	33		35		68	
6:30 AM	3		11		14		6:30 PM	24		12		36	
6:45 AM	6		13		19		6:45 PM	32		26		58	
7:00 AM	1	33	18	121	19	154	7:00 PM	28	95	15	42	43	137
7:15 AM	11		19		30		7:15 PM	31		10		41	
7:30 AM	10		33		43		7:30 PM	19		9		28	
7:45 AM	11		51		62		7:45 PM	17		8		25	
8:00 AM	9	56	54	153	63	209	8:00 PM	14	52	9	27	23	79
8:15 AM	21		34		55		8:15 PM	15		5		20	
8:30 AM	13		23		36		8:30 PM	10		7		17	
8:45 AM	13		42		55		8:45 PM	13		6		19	
9:00 AM	15	65	33	147	48	212	9:00 PM	12	53	6	17	18	70
9:15 AM	23		37		60		9:15 PM	18		6		24	
9:30 AM	17		47		64		9:30 PM	11		4		15	
9:45 AM	10		30		40		9:45 PM	12		1		13	
10:00 AM	17	57	14	73	31	130	10:00 PM	9	29	5	14	14	43
10:15 AM	5		15		20		10:15 PM	11		2		13	
10:30 AM	15		16		31		10:30 PM	3		3		6	
10:45 AM	20		28		48		10:45 PM	6		4		10	
11:00 AM	25	84	20	79	45	163	11:00 PM	2	8	1	5	3	13
11:15 AM	18		11		29		11:15 PM	3		2		5	
11:30 AM	21		18		39		11:30 PM	3		2		5	
11:45 AM	20		30		50		11:45 PM	0		0		0	

	Southbo und	Northbo und	Combined
24 Hour Volume	1249 (49.1%)	1296 (50.9%)	2545

12:00 AM - 12:00 PM

	Southbo und	Northbo und	Combined
Count	340	640	980
	34.7 %	65.3 %	
Peak Hour	10:45 AM	7:30 AM	8:45 AM
Volume	84	172	227
Factor	0.84	0.80	0.89

12:00 PM - 12:00 AM

	Southbo und	Northbo und	Combined
Count	909	656	1565
	58.1 %	41.9 %	
Peak Hour	5:45 PM	5:30 PM	5:30 PM
Volume	121	103	219
Factor	0.89	0.74	0.81

Ascension Subdivision Residential Development

Draft Traffic Analysis Report

Prepared for:

San Mateo County

Prepared by:

Hexagon Transportation Consultants, Inc.

August 12, 2008

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Ascension Subdivision Report.doc

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1. Introduction

This report presents the results of the traffic impact analysis conducted for the Ascension Subdivision residential development in San Mateo County, California. The project site is located at the northeast corner of Bel Aire Road and Ascension Drive in the San Mateo Highlands, an unincorporated area in San Mateo County. The project consists of development of six parcels totaling 13.3 acres to construct 25 new single-family-detached residential dwelling units. The site is currently vacant. Parking will be provided on site at the individual residences and in designated areas on the street system on site. Access to the site is provided via Bel Aire Road. The project site location and the surrounding study area are shown on Figure 1.

Scope of Study

This study was conducted for the purpose of identifying the potential traffic impacts related to the proposed development. The impacts of the project were evaluated following the standards and methodologies set forth by San Mateo County. Since the project would add less than 100 peak hour trips to regional roads, no analysis under the Congestion Management Program (CMP) of the City/County Association of Governments (C/CAG) is required. The traffic analysis is based on 24-hour daily traffic volumes and project trips on the study roadway segments. The study roadway segments are identified below.

Study Roadway Segments

Polhemus Road
Ascension Drive
Bel Aire Road
Laurie Lane
Parrott Drive
CSM Drive

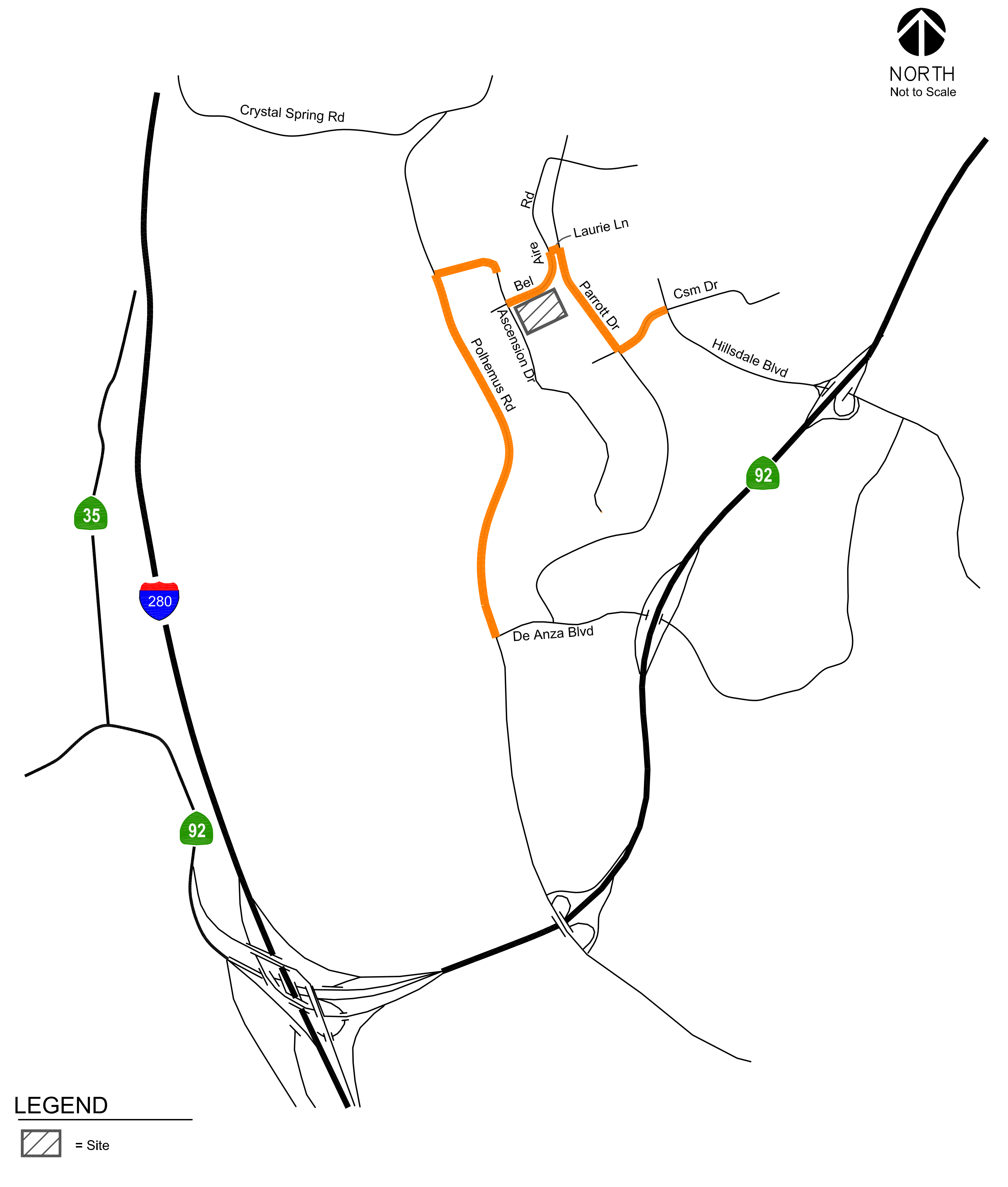

Figure 1

SITE LOCATION AND STUDY ROADWAY SEGMENTS

Hexagon
Transportation Consultants, Inc.

Ascension Subdivision - Residential Development

These are the roadways that would be most affected by project traffic. Traffic conditions on the roadway segments were analyzed for 24-hours and for the weekday AM and PM peak hours of traffic. The AM peak hour of traffic is generally between 7:00 and 9:00 AM, and the PM peak hour is typically between 4:00 and 6:00 PM. It is during these periods that the most congested traffic conditions occur on an average day.

Analysis Scenarios

Traffic conditions were evaluated for the following scenarios:

- *Existing Conditions* — Year 2008
- *Background Conditions* — Existing traffic plus traffic added by approved development
- *Project Conditions* — Background Conditions plus the proposed project
- *Cumulative Conditions* — Cumulative conditions *with/without* the project

The data required for the analysis were obtained from new traffic counts, previous traffic studies, and the C/CAG Travel Demand Forecasting Model.

Analysis Methodologies and Level of Service Standards

Roadway segments are analyzed by comparing the volume to capacity ratios. Typical capacity is about 20,000 vehicles per day on two-lane arterials and collectors and 2,000 vehicles per day on a residential street.

For the purposes of evaluating impacts related to the TIRE index, if (1) the roadway average daily traffic (ADT) with the project is greater than the roadway capacity AND (2) the TIRE index increases by 0.1 or more, then the project has a significant impact on the roadway.

TIRE Index

Traffic conditions also were evaluated using the TIRE index (Traffic Infusion in Residential Environments). The TIRE index is a numerical representation of a resident's perception of the effect of street traffic on activities such as walking, cycling and playing, and on daily tasks such as maneuvering an auto out of a residential driveway. The acronym for "Traffic Infusion on Residential Environments," TIRE, is expressed by index values that range from zero, representing the least effect of traffic, to five representing the most severe effect:

According to the TIRE index, a given change in traffic volume will cause a greater impact on a residential environment with a low pre-existing volume than it would on a street with a higher pre-existing volume. Any traffic change that would cause an index change of 0.1 or more would be noticeable to street residents. Streets with TIRE levels above the midrange index of 3 are traffic-dominated, while those with indexes below 3 are better suited for residential activities (See Appendix B).

On-Site Circulation

Any feature of the site layout that might result in unsafe pedestrian or vehicular circulation would be considered a significant impact. Revisions to the site plan also may be recommended to make the site circulation function more efficiently. Any on-site circulation recommendations that are not related to safety are not considered significant impacts under the California Environmental Quality Act (CEQA) but may be required as a condition of approval.

2. Existing Conditions

The project site is located at the northeast corner of Bel Aire Road and Ascension Drive in the San Mateo Highlands, an unincorporated area in San Mateo County. The project consists of development of six parcels totaling 13.3 acres to construct 25 new single-family-detached residential dwelling units. The site is currently vacant. Parking will be provided on site at the individual residences and in designated areas on the street system on site. Access to the site is provided via Bel Aire Road.

Site Access and Surrounding Roadway Network

Regional access to the project site is provided via State Route (SR) 92.

SR 92 is a four-lane east-west freeway in the vicinity of the site. SR 92 extends from Half Moon Bay in west San Mateo County to Hayward in Alameda County. Access to the project site is provided by its interchanges at Polhemus Road, De Anza Boulevard, and Hillsdale Boulevard.

Local access to the site is provided by Polhemus Road, Ascension Drive, Bel Aire Road, De Anza Boulevard, Parrott Drive, Laurie Lane, West Hillsdale Boulevard, and Csm Drive. These roadways and other local streets are described below.

Polhemus Road is a two-lane north-south arterial. Polhemus Road begins north of SR-92 and terminates at Crystal Springs, south of SR-92 it becomes Ralston Avenue. Access to the site is provided via Ascension Drive.

Ascension Drive is a two-lane east-west residential street with sidewalks; it begins east of Polhemus Road and terminates at Los Altos Drive. Access to the site is provided via Bel Aire Road.

Bel Aire Road is a two-lane local residential street with sidewalks and on-street parking on one side of the street. The project would have direct access to Bel Aire Road via a new subdivision street.

De Anza Boulevard is a two-lane east west collector with sidewalks, it begins east of Polhemus Road and continues over SR-92 and terminates at West Hillsdale Boulevard. Access to site is provided via Parrott Drive and Polhemus Road.

Parrott Drive is a two-lane north-south collector street with sidewalks, it begins north of De Anza Boulevard and continues across Laurie Lane. Access to the site is provided via Laurie Lane.

Laurie Lane is a short two-lane east-west local residential street with sidewalks. It begins at Bel Aire Road and terminates at Parrott Drive.

West Hillsdale Boulevard in the vicinity of the project site, is a two-to-six-lane east west arterial. West Hillsdale Boulevard has six lanes with a landscaped median west of SR-92, four lanes with a striped median between SR-92 and Glendora Drive, and two lanes east of Glendora Drive. Access to the site is provided via Csm Drive.

CSM Drive is a two-lane east-west collector street with sidewalks, it begins within the College of San Mateo and terminates west of Parrott Drive. Access to site is provided via Parrott Drive.

Existing Transit Service

Transit service to the study area is provided by the San Mateo County Transit District (SamTrans) and Caltrain. These services are described below.

SamTrans Bus Service

There is one bus line that operates near the project site. The *260 line* provides service between the College of San Mateo and the San Carlos Caltrain station, via Polhemus Road-Ralston Avenue, Marine World Parkway and Redwood Shores, with 60-minute headways during commute hours.

Caltrain Service

Commuter rail service between San Francisco and Gilroy is provided by Caltrain. The project is located approximately three miles from the Hillsdale Caltrain station. The Hillsdale station is located near the interchange of Hillsdale Boulevard and El Camino Real. At the Hillsdale station, Caltrain provides service with approximately 10- to 20-minute headways during commute hours. The Hillsdale station has park and ride lots. There is no direct bus service from the site to Caltrain.

Existing Traffic Volumes

The existing peak hour and 24-hour traffic volumes were obtained from new tube counts on the study roadway segments. The counts were conducted in late May 2008 while the College of San Mateo was in session. The existing AM, PM, and daily traffic volumes are shown on Figure 2. The traffic count data are included in Appendix A.

Existing Volume to Capacity Ratios

The results of the V/C analysis under Existing Conditions are summarized in Table 1. The results show that the study roadway segments operate well within acceptable limits.

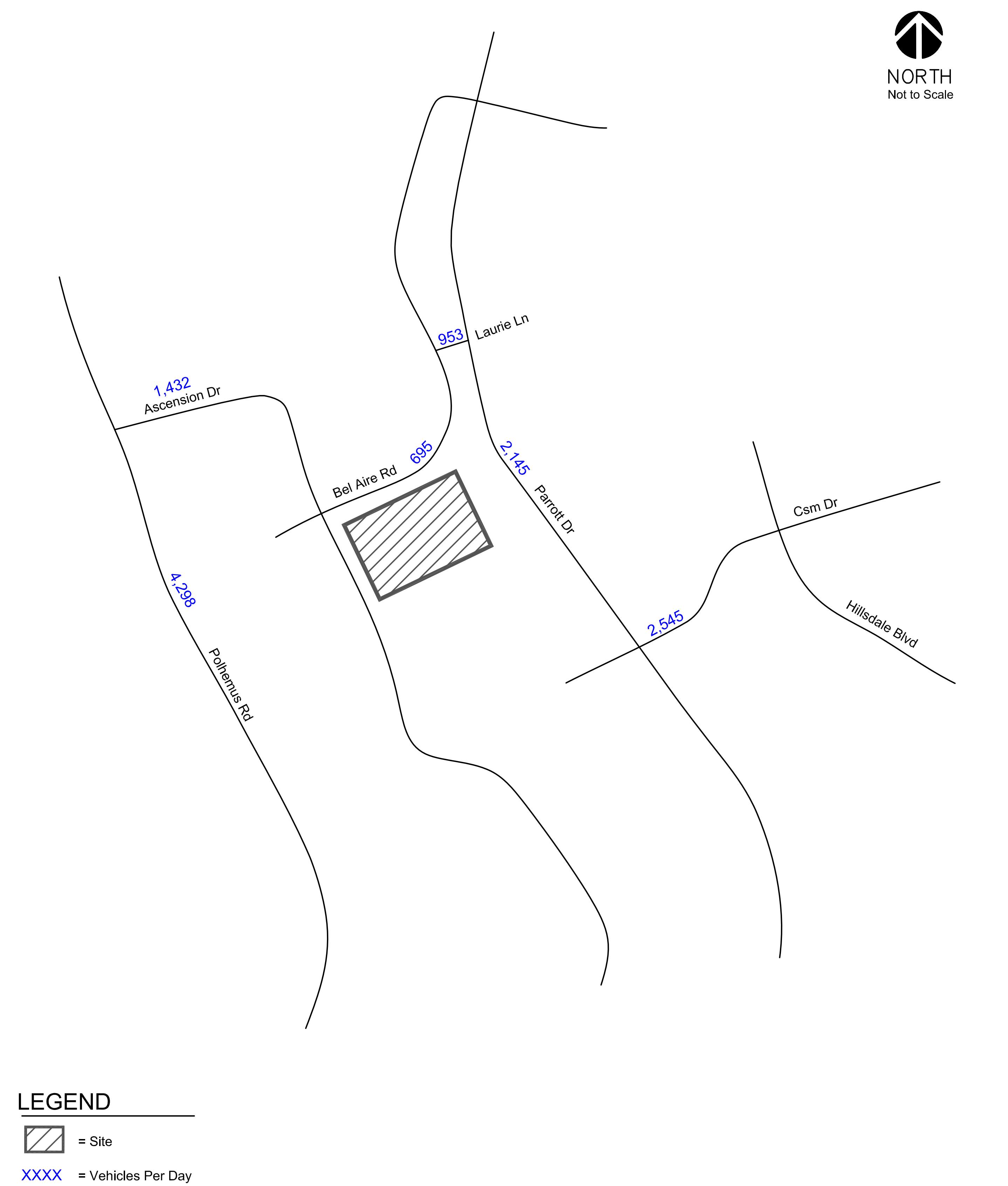

Figure 2

EXISTING TRAFFIC VOLUMES

Hexagon
Transportation Consultants, Inc.

Ascension Subdivision - Residential Development

Table 1
Existing Volume to Capacity Ratios

Roadway Segment	Street Classification	Capacity	Existing Volume (vpd)	Existing V/C
Polhemus Rd (btwn Ascension Dr & De Anza Blvd)	Arterial	20,000	4,298	0.21
Ascension Dr (btwn Polhemus Rd & Rainbow Dr)	Local	2,000	1,432	0.72
Bel Aire Rd (btwn Ascension Dr & Laurie Ln)	Local	2,000	695	0.35
Laurie Ln (btwn Bel Aire Rd & Parrott Dr)	Local	2,000	953	0.48
Parrott Dr (btwn Laurie Ln & Csm Dr)	Collector	20,000	2,145	0.11
CSM Dr (btwn Parrott Dr & Hillsdale Blvd)	Collector	20,000	2,545	0.13

(vpd) = Vehicles per day

Existing TIRE Index

The results of the TIRE index analysis under existing conditions are summarized in Table 2. Of the three local residential streets, Ascension Drive is operating slightly above the mid-range of the TIRE index. Polhemus Road, Parrott Drive and CSM Drive are more traffic-dominated, which is expected for collector or arterial streets.

Table 2
Existing TIRE Index of Roadway Segments

Roadway Segment	Existing Volume (vpd)	Existing TIRE[/a/] Index
Polhemus Rd (btwn Ascension Dr & De Anza Blvd)	4,298	3.6
Ascension Dr (btwn Polhemus Rd & Rainbow Dr)	1,432	3.2
Bel Aire Rd (btwn Ascension Dr & Laurie Ln)	695	2.8
Laurie Ln (btwn Bel Aire Rd & Parrott Dr)	953	3.0
Parrott Dr (btwn Laurie Ln & Csm Dr)	2,145	3.3
CSM Dr (btwn Parrott Dr & Hillsdale Blvd)	2,545	3.4

/a/ Source: Goodrich Traffic Group
(vpd) = Vehicles per day

3. Background Conditions

Background conditions represent the traffic conditions that are expected to occur with the addition of traffic from approved developments and, as applicable, with the addition of developer-conditioned transportation improvements. Approved projects are those developments that have been approved but which are not yet constructed or occupied.

Approved Development

There are no developments that have been approved but not yet constructed in the vicinity of the project site. Trips generated by small or distant developments would be negligible on the study roadway segments. The effect of other foreseeable development that has not been approved by the County of San Mateo is addressed in the Cumulative analysis presented later in this report.

4. Project Conditions

Project conditions are defined as background conditions with the addition of traffic generated by the project.

The project site is located at the northeast corner of Bel Aire Road and Ascension Drive in the San Mateo Highlands, an unincorporated area in San Mateo County. The project consists of development of six parcels totaling 13.3 acres to construct 25 new single-family-detached residential dwelling units. The site is currently vacant. Access to the site will be provided via Bel Aire Road.

Project Trip Generation, Distribution and Assignment

The magnitude of traffic added to the roadway system by the project was estimated by multiplying the applicable trip generation rates by the size of the development. Trip generation for the proposed project was estimated using the rates published in the Institute of Transportation Engineers (ITE) manual titled *Trip Generation*, Seventh Edition, 2003. The published rates are based on data collected from hundreds of studies conducted for projects with land uses similar to the use proposed for this project. The estimated peak-hour and daily trip generation totals for the project are shown in Table 3.

Table 3
Project Trip Generation

				AM Peak Hour				PM Peak Hour			
		Daily			Trips				Trips		
Use	Size/a/	Rate	Trips	Rate	In	Out	Total	Rate	In	Out	Total
Single Family Detached Residential	25	9.57	239	0.75	5	14	19	1.01	16	9	25

/a/ Size expressed in dwelling units (d.u.)
Source: Institute of Transportation Engineers, *Trip Generation, 7* th Edition, 2003.

The table shows that the project would generate 239 new daily trips, with 19 new trips occurring during the AM peak hour and 25 new trips occurring during the PM peak hour.

The trip distribution pattern for the proposed project was estimated based on existing travel patterns on the surrounding roadway system and minimum travel times between the site and SR92. Travel time runs conducted for this study showed that the fastest route between the site and SR92 is via Laurie Lane, Parrott Drive, CSM Drive, and Hillsdale Boulevard. Nevertheless, some traffic was assumed to use Ascension Drive and Polhemus Road. Based on the trip distribution shown, the peak-hour trips generated by the proposed development were assigned to the roadway system following logical paths. The project trip distribution and assignment are shown on Figure 3.

Project Peak Hour Traffic Volumes and V/C

The project trips, estimated as described above, were added to background traffic volumes to obtain project traffic volumes. The project traffic volumes are shown on Figure 4.

Traffic conditions at the study roadway segments were evaluated using V/C. The roadway segments' V/C for project conditions are summarized in Table 4. The results show that traffic increase on the all study roadway segments would be less than significant.

Table 4
Project Volume to Capacity Ratios

		Existing		Project		
Roadway Segment	Capacity (vpd)	Volume (vpd)	V/C	Proj Trips (vpd)	Volume (vpd)	V/C
Polhemus Rd (Ascension Dr to De Anza Blvd)	20,000	4,298	0.21	+ 60	4,358	0.22
Ascension Dr (Polhemus Rd to Bel Aire Road)	2,000	1,432	0.72	+ 72	1,504	0.75
Bel Aire Rd (Ascension Dr to Laurie Ln)	2,000	695	0.35	+ 240	935	0.47
Laurie Ln (Bel Aire Rd to Parrott Dr)	2,000	953	0.48	+ 168	1,121	0.56
Parrott Dr (Laurie Ln to Csm Dr)	20,000	2,145	0.11	+ 168	2,313	0.12
CSM Dr (Parrott Dr to Hillsdale Blvd)	20,000	2,545	0.13	+ 118	2,663	0.13

(vpd) = Vehicles per day

Project TIRE Index

Traffic conditions at the study roadway segments were evaluated using TIRE index (See Table 5). The results show that the traffic increase due to the project would cause three of the study roadway segments to incur a change to the TIRE index.

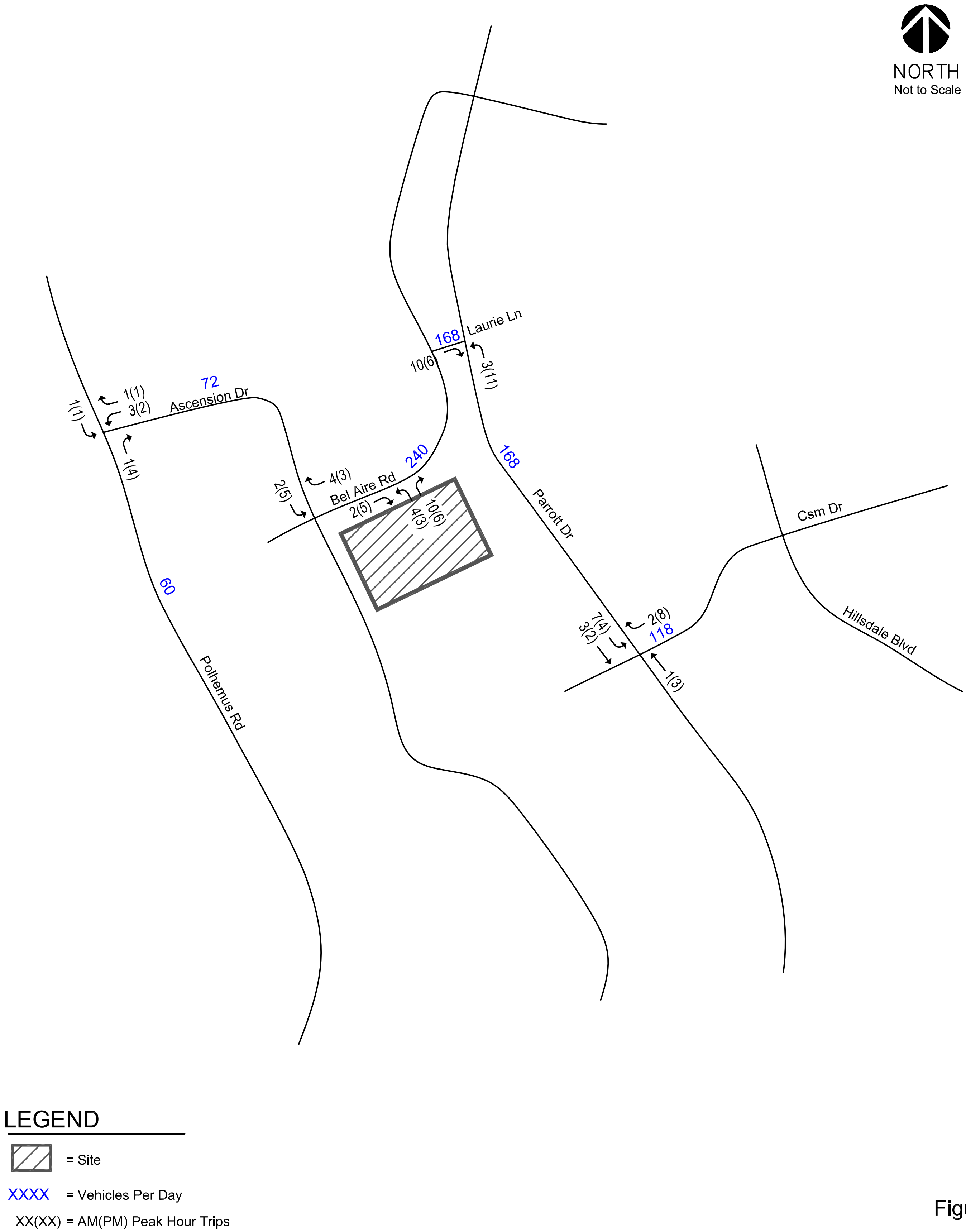

Figure 3

PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

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Ascension Subdivision - Residential Development

LEGEND

= Site

XXXX = Vehicles Per Day

Figure 4

TRAFFIC VOLUMES UNDER PROJECT CONDITIONS

Hexagon
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Ascension Subdivision - Residential Development

Table 5
Project TIRE Index of Roadway Segments

	Existing		Project		
Roadway Segment	Volume (vpd)	TIRE[a] Index	Proj Trips (vpd)	Volume (vpd)	TIRE[a] Index
Polhemus Rd (btwn Ascension Dr & De Anza Blvd)	4,298	3.6	+ 60	4,358	3.6
Ascension Dr (btwn Polhemus Rd & Rainbow Dr)	1,432	3.2	+ 72	1,504	3.2
Bel Aire Rd (btwn Ascension Dr & Laurie Ln)	695	2.8	+ 240	935	3.0
Laurie Ln (btwn Bel Aire Rd & Parrott Dr)	953	3.0	+ 168	1,121	3.1
Parrott Dr (btwn Laurie Ln & Csm Dr)	2,145	3.3	+ 168	2,313	3.4
CSM Dr (btwn Parrott Dr & Hillsdale Blvd)	2,545	3.4	+ 118	2,663	3.4

/a/ Source: Goodrich Traffic Group
(vpd) = Vehicles per day

The increase in traffic due to the project would cause the TIRE index for Bel Aire Road to change from an index of 2.8 to 3.0. Similarly, the TIRE index for Laurie Lane would change from an index of 3.0 to 3.1, and the TIRE index for Parrott Drive would change from an index of 3.3 to 3.4. The definition of change in the TIRE index is that the traffic increase would be noticeable to residents along the street. Thus, the traffic increase due to the project would be noticeable on these roadways but not noticeable on the other area streets. Although the change in traffic volume would be noticeable, the traffic volume on Bel Aire Road and on Laurie Lane, two residential streets, would be well below the residential street threshold of 2,000 vehicles per day. Therefore, the traffic increase on Bel Aire Road and on Laurie Lane is considered less than significant. Similarly, while the increase in traffic would be noticeable on Parrot Drive, the traffic volume would be well below its threshold of 20,000 vehicles per day as a collector street. Therefore, the traffic increase on Parrott Drive is considered less than significant.

Site Access and Circulation

Site access, circulation and parking were evaluated based on the site plan dated January 17, 2007. The site plan is shown on Figure 5.

Site Access

Access to the site would be provided via a new subdivision street connecting to Bel Aire Road. The new subdivision street would be a public street. Emergency vehicle access to the project would be provided via the new subdivision street connecting to Bel Aire Road, as well as a new Emergency Vehicle Access Road to the subdivision, connecting to Ascension Drive.

Source: Lea & Braze Engineering, January 17, 2007.

Figure 5

PROJECT SITE PLAN

Ascension Subdivision - Residential Development

Hexagon Transportation Consultants, Inc.

Sight Distances On Bel Aire Road

At the intersection of Bel Aire Road and the new subdivision street sight distance was checked.

For inbound left turns the sight distance is 210 feet. The Caltrans *Highway Design Manual* specifies minimum required sight distances as a function of vehicle speed. Vehicle speed is, in turn, a function of the design of Bel Aire Road. The estimated 85th percentile speed on Bel Aire Road is 29 miles per hour, which requires a minimum stopping sight distance of 200 feet. Since the available sight distance (210 feet) is greater than the minimum stopping sight distance (200 feet), the sight distance at this location is satisfactory.

For outbound left or right turns the sight distance is at least 260 feet. This sight distance is satisfactory for the prevailing speeds on Bel Aire Road.

Accident Evaluation

Traffic accident records were obtained from the county for the years 1996 to 2002 for Polhemus Road, Ascension Road, Bel Aire Road, Laurie Lane, Parrott Drive, and CSM Drive (See Table 6). The records show that there has been one accident in the six-year period at each of the locations shown in Table 6. None of the accidents involved pedestrians. Also, none of accidents reported were due to lack of sight distance or roadway design features. Due to the low accident history, no further analysis was warranted.

Table 6
Accident Data Summary

Location	No. of Accidents	Year	Type of Collision
Parrott Dr & CSM Dr	1	2001	Side Swipe
Parrott Dr & Bel Aire Rd	1	1997	Side Swipe
Bel Aire Rd & Laurie Ln	1	1997	Side Swipe
Polhemus Rd & Ascension Dr	1	1996	Hit Fixed Object

Source: San Mateo County - Collision Location Details

On-Site Circulation

On-site circulation issues include street widths, grades, and curves.

Street Widths

The new subdivision street is shown to be generally 32 feet wide curb-to-curb. There is one section that would be 22 feet wide. Because of the steep grades and curves on site, it would be difficult for drivers to maneuver within 32 feet with parking on both sides. Therefore, parking should be allowed on only one side of the street. Parking should not be allowed on the 22-foot wide section.

Street Grades

The Site plan shows a maximum grade of 20%. According to San Mateo County standards, the typical maximum grade is 15% with up to 20% allowed by design exception. Thus, the proposed grades are acceptable by design exception. Given the terrain of the site, it would not be possible to reduce the grades to 15%.

Street Curves

The street curves were analyzed with typical vehicle templates, including cars and trucks, such as fire trucks or garbage trucks. The analysis showed that both cars and trucks could maneuver around the curves.

Pedestrian Access

Pedestrian facilities in the area consist of sidewalks on the neighborhood streets. The project site plan shows that the new subdivision street would have sidewalks along most of the new subdivision street. Also, there would be separate sidewalks down the hill to Ascension Drive.

The sidewalks would be adequate to accommodate all pedestrian traffic between the project site and other local streets.

Congestion Management Program

The CMP guidelines specify that a project must implement travel demand management (TDM) measures if the project produces 100 or more new peak hour trips on CMP roadways. The analysis of project traffic on CMP roadway facilities indicates that the project would add approximately 19 trips to SR 92 during the AM peak hour and approximately 25 trips during the PM peak hour. Therefore this project is not required to implement any TDM measures.

Construction Impacts

The most noticeable traffic impact during construction will be hauling excavated soil from the site. The project civil engineer estimated 60,520 cubic yards of soil would need to be exported from the site. It is assumed that a tractor with double trailer would be used to haul the soil. A truck can carry about 20 cubic yards of soil per trip. Therefore there would be 3,026 truck round trips for exporting soil. The grading is estimated to be completed in about 44 days, so this calculates to about 69 truck round trips per day. The haul routes should be limited to SR-92, West Hillsdale Drive, Csm Drive, Parrott Drive, Laurie Lane, and Bel Aire Road. Heavy trucks are not recommended on Ascension Drive because it is so steep. The addition of 69 truck round trips per day to the roads in the area would be a temporary significant impact of the project. The project applicant has stated that parking for construction vehicles and workers can occur entirely on site. There would not be a need to park on Bel Aire Road.

5. Cumulative Conditions

Project buildout is expected to take approximately 5 years, so the expected completion date would be around 2013. The San Mateo County traffic model 2020 forecasts were used to estimate that growth in the area is projected to be about 5% per year. Thus, the existing volumes were increased 25% to represent 2013 conditions. This increase would cover currently proposed projects, such as the CSM housing, and other growth not yet defined. Traffic volumes under cumulative conditions are shown on Figure 6.

Table 7 shows the resulting volumes and V/C ratios on the study roadways. The roadways would continue to operate well within capacity.

Table 7
Cumulative Volume to Capacity Ratios

		Cumulative				
		W/out the Project		With the Project		
Roadway Segment	Cap	Vol (vpd)	V/C	Proj Trips (vpd)	Vol (vpd)	V/C
Polhemus Rd (btwn Ascension Dr & De Anza Blvd)	20,000	5,373	0.27	+ 60	5,433	0.27
Ascension Dr (btwn Polhemus Rd & Rainbow Dr)	2,000	1,790	0.90	+ 72	1,862	0.93
Bel Aire Rd (btwn Ascension Dr & Laurie Ln)	2,000	869	0.43	+ 240	1,109	0.55
Laurie Ln (btwn Bel Aire Rd & Parrott Dr)	2,000	1,191	0.60	+ 168	1,359	0.68
Parrott Dr (btwn Laurie Ln & Csm Dr)	20,000	2,681	0.13	+ 168	2,849	0.14
CSM Dr (btwn Parrott Dr & Hillsdale Blvd)	20,000	3,181	0.16	+ 118	3,299	0.16

(vpd) = Vehicles per day

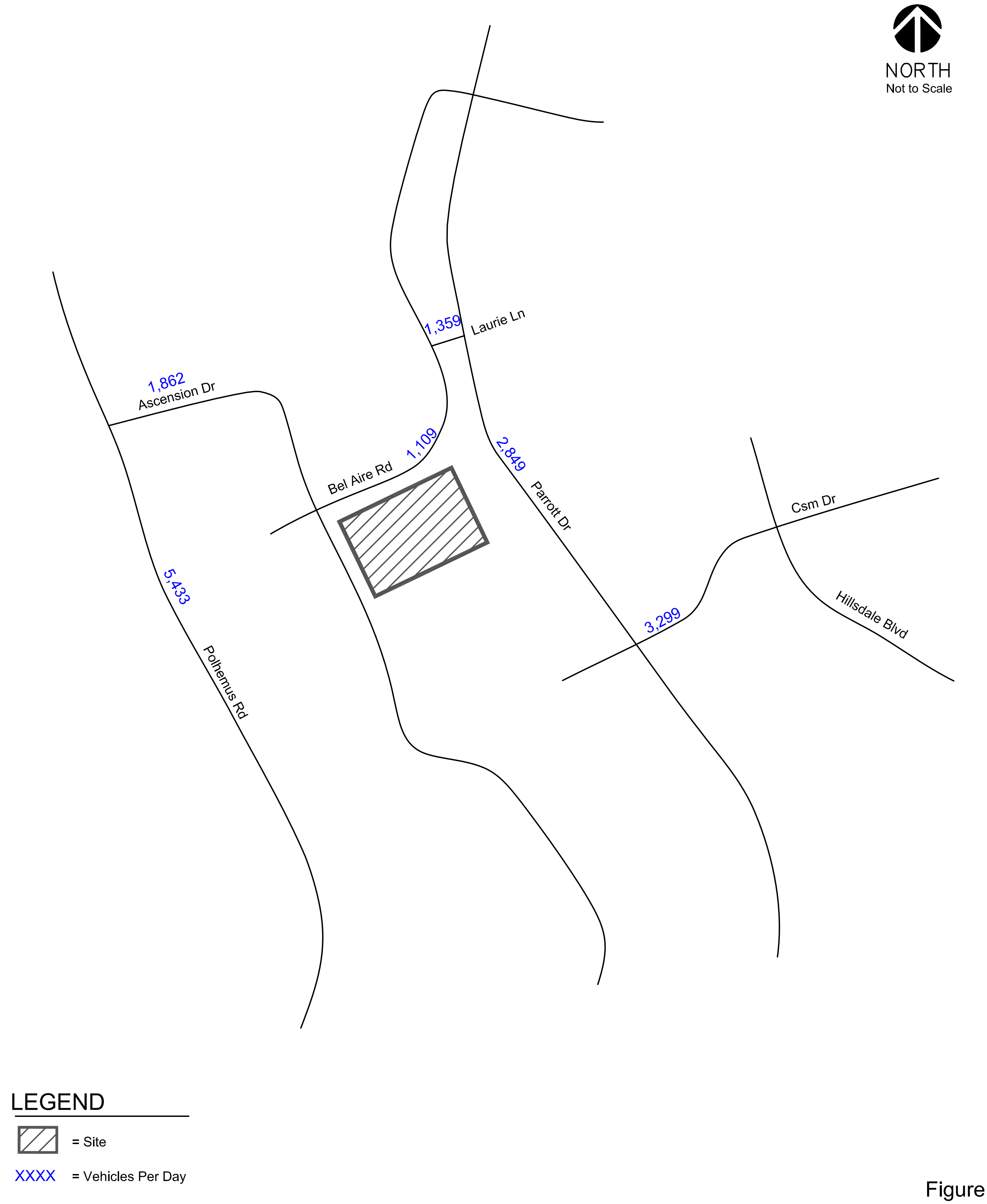

Figure 6

TRAFFIC VOLUMES UNDER CUMULATIVE CONDITIONS (WITH THE PROJECT)

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Ascension Subdivision - Residential Development

6. Summary of Findings

The potential impacts of the project were evaluated in accordance with typical traffic engineering standards. The study included the analysis of AM and PM daily traffic conditions for six roadway segments. Site access and on-site circulation also were analyzed, as well as construction impacts.

Impacts and Recommendations

There would be a temporary significant impact due to truck trips during excavation. According to the applicant, the excavation would last about 44 days. Construction impacts should be minimized by restrictions on operating hours. Also, trucks should avoid Ascension Drive because of the steep grade.

The new subdivision street is planned to be 32 feet in width. Given the grades and curves, this width is inadequate to allow parking on both sides. Therefore, parking should be allowed on one side only.

Ascension Subdivision
Residential Development

Technical Appendices

Appendix A

Traffic Counts

Polhemus Rd. :
San Mateo :
Description 3 :

Site: 000000000000
Date: 5/20/2008
Tuesday

24 Hour Volume

Begin	Northbo und		Southbo und		Combined		Begin	Northbo und		Southbo und		Combined	
12:00 AM	1	2	2	4	3	6	12:00 PM	37	139	38	119	75	258
12:15 AM	0		0		0		12:15 PM	31		25		56	
12:30 AM	0		0		0		12:30 PM	38		30		68	
12:45 AM	1		2		3		12:45 PM	33		26		59	
1:00 AM	0	1	0	1	0	2	1:00 PM	35	123	31	125	66	248
1:15 AM	1		1		2		1:15 PM	34		23		57	
1:30 AM	0		0		0		1:30 PM	24		35		59	
1:45 AM	0		0		0		1:45 PM	30		36		66	
2:00 AM	0	0	0	1	0	1	2:00 PM	29	156	29	125	58	281
2:15 AM	0		0		0		2:15 PM	39		32		71	
2:30 AM	0		1		1		2:30 PM	39		32		71	
2:45 AM	0		0		0		2:45 PM	49		32		81	
3:00 AM	0	1	1	1	1	2	3:00 PM	42	167	33	182	75	349
3:15 AM	0		0		0		3:15 PM	37		55		92	
3:30 AM	0		0		0		3:30 PM	50		43		93	
3:45 AM	1		0		1		3:45 PM	38		51		89	
4:00 AM	1	1	0	2	1	3	4:00 PM	59	192	56	184	115	376
4:15 AM	0		0		0		4:15 PM	45		44		89	
4:30 AM	0		1		1		4:30 PM	48		44		92	
4:45 AM	0		1		1		4:45 PM	40		40		80	
5:00 AM	1	5	1	7	2	12	5:00 PM	44	199	48	193	92	392
5:15 AM	1		1		2		5:15 PM	39		56		95	
5:30 AM	2		2		4		5:30 PM	60		51		111	
5:45 AM	1		3		4		5:45 PM	56		38		94	
6:00 AM	3	34	3	47	6	81	6:00 PM	32	145	41	144	73	289
6:15 AM	9		9		18		6:15 PM	38		38		76	
6:30 AM	10		8		18		6:30 PM	37		31		68	
6:45 AM	12		27		39		6:45 PM	38		34		72	
7:00 AM	14	189	11	173	25	362	7:00 PM	32	108	29	75	61	183
7:15 AM	30		31		61		7:15 PM	32		19		51	
7:30 AM	82		61		143		7:30 PM	29		16		45	
7:45 AM	63		70		133		7:45 PM	15		11		26	
8:00 AM	48	209	74	230	122	439	8:00 PM	16	61	19	54	35	115
8:15 AM	68		52		120		8:15 PM	14		10		24	
8:30 AM	51		64		115		8:30 PM	15		14		29	
8:45 AM	42		40		82		8:45 PM	16		11		27	
9:00 AM	33	115	39	133	72	248	9:00 PM	15	55	9	26	24	81
9:15 AM	26		33		59		9:15 PM	21		6		27	
9:30 AM	31		32		63		9:30 PM	8		5		13	
9:45 AM	25		29		54		9:45 PM	11		6		17	
10:00 AM	42	125	30	131	72	256	10:00 PM	6	24	8	22	14	46
10:15 AM	31		22		53		10:15 PM	9		6		15	
10:30 AM	22		36		58		10:30 PM	4		5		9	
10:45 AM	30		43		73		10:45 PM	5		3		8	
11:00 AM	26	133	31	114	57	247	11:00 PM	3	12	3	9	6	21
11:15 AM	45		31		76		11:15 PM	5		2		7	
11:30 AM	29		28		57		11:30 PM	2		2		4	
11:45 AM	33		24		57		11:45 PM	2		2		4	

	Northbo und	Southbo und	Combined
24 Hour Volume	2196 (51.1%)	2102 (48.9%)	4298

	12:00 AM - 12:00 PM			12:00 PM - 12:00 AM		
	Northbo und	Southbo und	Combined	Northbo und	Southbo und	Combined
Count	815	844	1659	1381	1258	2639
	49.1 %	50.9 %		52.3 %	47.7 %	
Peak Hour	7:30 AM	7:45 AM	7:30 AM	5:00 PM	3:15 PM	5:00 PM
Volume	261	260	518	199	205	392
Factor	0.80	0.88	0.91	0.83	0.92	0.88

Ascension Dr. :
San Mateo :
Description 3 :

Site: 000000000000
Date: 5/20/2008
Tuesday

24 Hour Volume

Begin	Eastbou nd		Westbou nd		Combined	
12:00 AM	0	0	0	0	0	0
12:15 AM	0		0		0	
12:30 AM	0		0		0	
12:45 AM	0		0		0	
1:00 AM	1	1	0	0	1	1
1:15 AM	0		0		0	
1:30 AM	0		0		0	
1:45 AM	0		0		0	
2:00 AM	0	0	0	0	0	0
2:15 AM	0		0		0	
2:30 AM	0		0		0	
2:45 AM	0		0		0	
3:00 AM	0	0	0	1	0	1
3:15 AM	0		0		0	
3:30 AM	0		0		0	
3:45 AM	0		1		1	
4:00 AM	1	2	0	3	1	5
4:15 AM	0		0		0	
4:30 AM	1		2		3	
4:45 AM	0		1		1	
5:00 AM	0	1	0	5	0	6
5:15 AM	1		1		2	
5:30 AM	0		3		3	
5:45 AM	0		1		1	
6:00 AM	0	4	4	19	4	23
6:15 AM	0		3		3	
6:30 AM	1		6		7	
6:45 AM	3		6		9	
7:00 AM	5	52	8	85	13	137
7:15 AM	9		21		30	
7:30 AM	17		24		41	
7:45 AM	21		32		53	
8:00 AM	22	73	38	94	60	167
8:15 AM	22		21		43	
8:30 AM	10		19		29	
8:45 AM	19		16		35	
9:00 AM	17	56	15	63	32	119
9:15 AM	15		24		39	
9:30 AM	14		12		26	
9:45 AM	10		12		22	
10:00 AM	13	40	11	46	24	86
10:15 AM	12		9		21	
10:30 AM	10		10		20	
10:45 AM	5		16		21	
11:00 AM	7	32	8	37	15	69
11:15 AM	9		13		22	
11:30 AM	7		11		18	
11:45 AM	9		5		14	

Begin	Eastbou nd		Westbou nd		Combined	
12:00 PM	10	32	12	35	22	67
12:15 PM	8		10		18	
12:30 PM	4		8		12	
12:45 PM	10		5		15	
1:00 PM	15	39	7	31	22	70
1:15 PM	8		9		17	
1:30 PM	5		7		12	
1:45 PM	11		8		19	
2:00 PM	10	41	13	42	23	83
2:15 PM	9		9		18	
2:30 PM	8		8		16	
2:45 PM	14		12		26	
3:00 PM	12	56	22	58	34	114
3:15 PM	14		12		26	
3:30 PM	13		10		23	
3:45 PM	17		14		31	
4:00 PM	18	53	8	49	26	102
4:15 PM	9		9		18	
4:30 PM	15		13		28	
4:45 PM	11		19		30	
5:00 PM	14	79	14	34	28	113
5:15 PM	15		4		19	
5:30 PM	26		11		37	
5:45 PM	24		5		29	
6:00 PM	20	69	14	48	34	117
6:15 PM	22		15		37	
6:30 PM	10		9		19	
6:45 PM	17		10		27	
7:00 PM	16	37	9	22	25	59
7:15 PM	5		6		11	
7:30 PM	11		4		15	
7:45 PM	5		3		8	
8:00 PM	6	24	9	21	15	45
8:15 PM	5		5		10	
8:30 PM	9		5		14	
8:45 PM	4		2		6	
9:00 PM	6	19	2	8	8	27
9:15 PM	8		3		11	
9:30 PM	0		1		1	
9:45 PM	5		2		7	
10:00 PM	5	10	1	5	6	15
10:15 PM	2		2		4	
10:30 PM	1		1		2	
10:45 PM	2		1		3	
11:00 PM	0	4	0	2	0	6
11:15 PM	2		1		3	
11:30 PM	1		0		1	
11:45 PM	1		1		2	

	Eastbou nd	Westbou nd	Combined
24 Hour Volume	724 (50.6%)	708 (49.4%)	1432

	12:00 AM - 12:00 PM			12:00 PM - 12:00 AM		
	Eastbou nd	Westbou nd	Combined	Eastbou nd	Westbou nd	Combined
Count	261	353	614	463	355	818
	42.5 %	57.5 %		56.6 %	43.4 %	
Peak Hour	7:30 AM	7:15 AM	7:30 AM	5:30 PM	3:00 PM	5:30 PM
Volume	82	115	197	92	58	137
Factor	0.93	0.76	0.82	0.88	0.66	0.93

Bel Aire :
San Mateo :
Description 3 :

Site: 000000000000
Date: 5/20/2008
Tuesday

24 Hour Volume

Begin	Westbou nd		Eastbou nd		Combined		Begin	Westbou nd		Eastbou nd		Combined	
12:00 AM	0	0	0	0	0	0	12:00 PM	6	21	5	13	11	34
12:15 AM	0		0		0		12:15 PM	4		1		5	
12:30 AM	0		0		0		12:30 PM	5		3		8	
12:45 AM	0		0		0		12:45 PM	6		4		10	
1:00 AM	0	0	0	0	0	0	1:00 PM	5	16	3	16	8	32
1:15 AM	0		0		0		1:15 PM	3		4		7	
1:30 AM	0		0		0		1:30 PM	3		3		6	
1:45 AM	0		0		0		1:45 PM	5		6		11	
2:00 AM	0	0	0	0	0	0	2:00 PM	7	27	4	28	11	55
2:15 AM	0		0		0		2:15 PM	7		4		11	
2:30 AM	0		0		0		2:30 PM	3		9		12	
2:45 AM	0		0		0		2:45 PM	10		11		21	
3:00 AM	0	1	0	0	0	1	3:00 PM	13	31	6	27	19	58
3:15 AM	0		0		0		3:15 PM	3		7		10	
3:30 AM	0		0		0		3:30 PM	6		8		14	
3:45 AM	1		0		1		3:45 PM	9		6		15	
4:00 AM	1	1	0	0	1	1	4:00 PM	8	31	4	15	12	46
4:15 AM	0		0		0		4:15 PM	3		1		4	
4:30 AM	0		0		0		4:30 PM	10		5		15	
4:45 AM	0		0		0		4:45 PM	10		5		15	
5:00 AM	0	1	1	5	1	6	5:00 PM	6	22	4	32	10	54
5:15 AM	0		1		1		5:15 PM	5		10		15	
5:30 AM	1		2		3		5:30 PM	6		6		12	
5:45 AM	0		1		1		5:45 PM	5		12		17	
6:00 AM	1	4	1	3	2	7	6:00 PM	6	17	6	21	12	38
6:15 AM	0		0		0		6:15 PM	4		7		11	
6:30 AM	1		0		1		6:30 PM	2		4		6	
6:45 AM	2		2		4		6:45 PM	5		4		9	
7:00 AM	1	23	4	52	5	75	7:00 PM	5	12	7	14	12	26
7:15 AM	4		6		10		7:15 PM	4		2		6	
7:30 AM	8		15		23		7:30 PM	2		2		4	
7:45 AM	10		27		37		7:45 PM	1		3		4	
8:00 AM	20	43	17	52	37	95	8:00 PM	2	12	3	9	5	21
8:15 AM	10		12		22		8:15 PM	5		3		8	
8:30 AM	9		6		15		8:30 PM	4		1		5	
8:45 AM	4		17		21		8:45 PM	1		2		3	
9:00 AM	6	19	14	43	20	62	9:00 PM	1	4	2	4	3	8
9:15 AM	6		14		20		9:15 PM	2		2		4	
9:30 AM	5		8		13		9:30 PM	1		0		1	
9:45 AM	2		7		9		9:45 PM	0		0		0	
10:00 AM	6	19	8	18	14	37	10:00 PM	1	3	1	3	2	6
10:15 AM	3		5		8		10:15 PM	2		1		3	
10:30 AM	1		1		2		10:30 PM	0		0		0	
10:45 AM	9		4		13		10:45 PM	0		1		1	
11:00 AM	7	18	3	15	10	33	11:00 PM	0	0	0	0	0	0
11:15 AM	7		6		13		11:15 PM	0		0		0	
11:30 AM	1		1		2		11:30 PM	0		0		0	
11:45 AM	3		5		8		11:45 PM	0		0		0	

	Westbou nd	Eastbou nd	Combined
24 Hour Volume	325 (46.8%)	370 (53.2%)	695

	12:00 AM - 12:00 PM			12:00 PM - 12:00 AM		
	Westbou nd	Eastbou nd	Combined	Westbou nd	Eastbou nd	Combined
Count	129	188	317	196	182	378
	40.7 %	59.3 %		51.9 %	48.1 %	
Peak Hour	7:45 AM	7:30 AM	7:30 AM	2:15 PM	5:15 PM	2:45 PM
Volume	49	71	119	33	34	64
Factor	0.61	0.66	0.80	0.63	0.71	0.76

Laurie :
San Mateo :
Description 3 :

Site: 000000000000
Date: 5/20/2008
Tuesday

24 Hour Volume

Begin	Eastbou nd		Westbou nd		Combined		Begin	Eastbou nd		Westbou nd		Combined	
12:00 AM	0	0	0	1	0	1	12:00 PM	7	21	10	32	17	53
12:15 AM	0		0		0		12:15 PM	3		4		7	
12:30 AM	0		0		0		12:30 PM	6		13		19	
12:45 AM	0		1		1		12:45 PM	5		5		10	
1:00 AM	0	0	0	0	0	0	1:00 PM	4	26	12	28	16	54
1:15 AM	0		0		0		1:15 PM	7		6		13	
1:30 AM	0		0		0		1:30 PM	7		6		13	
1:45 AM	0		0		0		1:45 PM	8		4		12	
2:00 AM	0	0	0	0	0	0	2:00 PM	9	41	5	36	14	77
2:15 AM	0		0		0		2:15 PM	5		8		13	
2:30 AM	0		0		0		2:30 PM	13		8		21	
2:45 AM	0		0		0		2:45 PM	14		15		29	
3:00 AM	0	0	0	0	0	0	3:00 PM	8	30	15	41	23	71
3:15 AM	0		0		0		3:15 PM	5		5		10	
3:30 AM	0		0		0		3:30 PM	11		9		20	
3:45 AM	0		0		0		3:45 PM	6		12		18	
4:00 AM	3	3	0	0	3	3	4:00 PM	7	27	9	45	16	72
4:15 AM	0		0		0		4:15 PM	6		8		14	
4:30 AM	0		0		0		4:30 PM	8		13		21	
4:45 AM	0		0		0		4:45 PM	6		15		21	
5:00 AM	0	7	0	2	0	9	5:00 PM	6	35	7	41	13	76
5:15 AM	1		1		2		5:15 PM	10		12		22	
5:30 AM	3		1		4		5:30 PM	8		11		19	
5:45 AM	3		0		3		5:45 PM	11		11		22	
6:00 AM	4	8	1	4	5	12	6:00 PM	7	35	10	41	17	76
6:15 AM	1		0		1		6:15 PM	12		9		21	
6:30 AM	1		0		1		6:30 PM	10		6		16	
6:45 AM	2		3		5		6:45 PM	6		16		22	
7:00 AM	7	62	1	19	8	81	7:00 PM	10	20	6	20	16	40
7:15 AM	4		5		9		7:15 PM	4		11		15	
7:30 AM	19		6		25		7:30 PM	2		2		4	
7:45 AM	32		7		39		7:45 PM	4		1		5	
8:00 AM	21	65	16	30	37	95	8:00 PM	5	12	7	24	12	36
8:15 AM	13		6		19		8:15 PM	1		6		7	
8:30 AM	10		6		16		8:30 PM	2		7		9	
8:45 AM	21		2		23		8:45 PM	4		4		8	
9:00 AM	16	54	7	23	23	77	9:00 PM	1	3	3	13	4	16
9:15 AM	16		8		24		9:15 PM	2		6		8	
9:30 AM	10		6		16		9:30 PM	0		3		3	
9:45 AM	12		2		14		9:45 PM	0		1		1	
10:00 AM	6	20	8	22	14	42	10:00 PM	2	5	3	8	5	13
10:15 AM	4		2		6		10:15 PM	2		4		6	
10:30 AM	4		6		10		10:30 PM	0		0		0	
10:45 AM	6		6		12		10:45 PM	1		1		2	
11:00 AM	3	22	7	25	10	47	11:00 PM	0	0	0	2	0	2
11:15 AM	7		5		12		11:15 PM	0		0		0	
11:30 AM	5		5		10		11:30 PM	0		1		1	
11:45 AM	7		8		15		11:45 PM	0		1		1	

	Eastbou nd	Westbou nd	Combined
24 Hour Volume	496 (52.0%)	457 (48.0%)	953

	12:00 AM - 12:00 PM			12:00 PM - 12:00 AM		
	Eastbou nd	Westbou nd	Combined	Eastbou nd	Westbou nd	Combined
Count	241	126	367	255	331	586
	65.7 %	34.3 %		43.5 %	56.5 %	
Peak Hour	7:30 AM	7:30 AM	7:30 AM	2:00 PM	4:30 PM	2:15 PM
Volume	85	35	120	41	47	86
Factor	0.66	0.55	0.77	0.73	0.78	0.74

Parrot Drive :
San Mateo :
Description 3 :

Site: 000000000000
Date: 5/20/2008
Tuesday

24 Hour Volume

Begin	Northbo und		Southbo und		Combined		Begin	Northbo und		Southbo und		Combined	
12:00 AM	2	4	0	1	2	5	12:00 PM	14	72	13	50	27	122
12:15 AM	0		0		0		12:15 PM	11		14		25	
12:30 AM	1		1		2		12:30 PM	30		10		40	
12:45 AM	1		0		1		12:45 PM	17		13		30	
1:00 AM	2	3	0	1	2	4	1:00 PM	20	65	13	67	33	132
1:15 AM	0		0		0		1:15 PM	18		15		33	
1:30 AM	0		1		1		1:30 PM	16		20		36	
1:45 AM	1		0		1		1:45 PM	11		19		30	
2:00 AM	0	1	0	0	0	1	2:00 PM	19	66	20	70	39	136
2:15 AM	0		0		0		2:15 PM	16		14		30	
2:30 AM	0		0		0		2:30 PM	12		13		25	
2:45 AM	1		0		1		2:45 PM	19		23		42	
3:00 AM	1	2	0	0	1	2	3:00 PM	26	81	15	61	41	142
3:15 AM	0		0		0		3:15 PM	15		12		27	
3:30 AM	1		0		1		3:30 PM	20		18		38	
3:45 AM	0		0		0		3:45 PM	20		16		36	
4:00 AM	0	3	2	3	2	6	4:00 PM	13	92	12	64	25	156
4:15 AM	1		0		1		4:15 PM	22		23		45	
4:30 AM	1		0		1		4:30 PM	30		15		45	
4:45 AM	1		1		2		4:45 PM	27		14		41	
5:00 AM	0	4	2	15	2	19	5:00 PM	15	98	15	84	30	182
5:15 AM	2		2		4		5:15 PM	32		25		57	
5:30 AM	0		5		5		5:30 PM	19		15		34	
5:45 AM	2		6		8		5:45 PM	32		29		61	
6:00 AM	0	8	5	26	5	34	6:00 PM	26	105	22	76	48	181
6:15 AM	1		3		4		6:15 PM	23		25		48	
6:30 AM	1		6		7		6:30 PM	22		11		33	
6:45 AM	6		12		18		6:45 PM	34		18		52	
7:00 AM	11	68	16	96	27	164	7:00 PM	18	68	16	47	34	115
7:15 AM	11		15		26		7:15 PM	26		11		37	
7:30 AM	35		21		56		7:30 PM	14		9		23	
7:45 AM	11		44		55		7:45 PM	10		11		21	
8:00 AM	14	66	46	125	60	191	8:00 PM	9	42	5	19	14	61
8:15 AM	23		24		47		8:15 PM	16		1		17	
8:30 AM	18		23		41		8:30 PM	8		6		14	
8:45 AM	11		32		43		8:45 PM	9		7		16	
9:00 AM	12	62	30	104	42	166	9:00 PM	12	46	3	21	15	67
9:15 AM	22		24		46		9:15 PM	16		6		22	
9:30 AM	17		22		39		9:30 PM	10		8		18	
9:45 AM	11		28		39		9:45 PM	8		4		12	
10:00 AM	15	41	12	53	27	94	10:00 PM	9	23	4	12	13	35
10:15 AM	5		15		20		10:15 PM	6		2		8	
10:30 AM	11		11		22		10:30 PM	3		2		5	
10:45 AM	10		15		25		10:45 PM	5		4		9	
11:00 AM	19	61	12	58	31	119	11:00 PM	2	9	0	2	2	11
11:15 AM	10		16		26		11:15 PM	4		2		6	
11:30 AM	18		11		29		11:30 PM	3		0		3	
11:45 AM	14		19		33		11:45 PM	0		0		0	

	Northbo und	Southbo und	Combined
24 Hour Volume	1090 (50.8%)	1055 (49.2%)	2145

12:00 AM - 12:00 PM	Northbo und	Southbo und	Combined
Count	323	482	805
	40.1 %	59.9 %	
Peak Hour	7:30 AM	7:45 AM	7:30 AM
Volume	83	137	218
Factor	0.59	0.74	0.91

12:00 PM - 12:00 AM	Northbo und	Southbo und	Combined
Count	767	573	1340
	57.2 %	42.8 %	
Peak Hour	5:15 PM	5:15 PM	5:15 PM
Volume	109	91	200
Factor	0.85	0.78	0.82

CSM :
San Mateo :
Description 3 :

Site: 000000000000
Date: 5/20/2008
Tuesday

24 Hour Volume

Begin	Southbo und		Northbo und		Combined	
12:00 AM	2	4	0	2	2	6
12:15 AM	0		1		1	
12:30 AM	1		1		2	
12:45 AM	1		0		1	
1:00 AM	2	3	0	2	2	5
1:15 AM	0		1		1	
1:30 AM	0		1		1	
1:45 AM	1		0		1	
2:00 AM	0	1	0	0	0	1
2:15 AM	0		0		0	
2:30 AM	0		0		0	
2:45 AM	1		0		1	
3:00 AM	1	2	0	0	1	2
3:15 AM	0		0		0	
3:30 AM	0		0		0	
3:45 AM	1		0		1	
4:00 AM	0	2	2	4	2	6
4:15 AM	0		1		1	
4:30 AM	2		0		2	
4:45 AM	0		1		1	
5:00 AM	1	16	2	15	3	31
5:15 AM	5		1		6	
5:30 AM	8		5		13	
5:45 AM	2		7		9	
6:00 AM	2	17	6	44	8	61
6:15 AM	6		14		20	
6:30 AM	3		11		14	
6:45 AM	6		13		19	
7:00 AM	1	33	18	121	19	154
7:15 AM	11		19		30	
7:30 AM	10		33		43	
7:45 AM	11		51		62	
8:00 AM	9	56	54	153	63	209
8:15 AM	21		34		55	
8:30 AM	13		23		36	
8:45 AM	13		42		55	
9:00 AM	15	65	33	147	48	212
9:15 AM	23		37		60	
9:30 AM	17		47		64	
9:45 AM	10		30		40	
10:00 AM	17	57	14	73	31	130
10:15 AM	5		15		20	
10:30 AM	15		16		31	
10:45 AM	20		28		48	
11:00 AM	25	84	20	79	45	163
11:15 AM	18		11		29	
11:30 AM	21		18		39	
11:45 AM	20		30		50	

Begin	Southbo und		Northbo und		Combined	
12:00 PM	20	99	21	81	41	180
12:15 PM	21		22		43	
12:30 PM	35		17		52	
12:45 PM	23		21		44	
1:00 PM	23	87	18	79	41	166
1:15 PM	22		18		40	
1:30 PM	26		25		51	
1:45 PM	16		18		34	
2:00 PM	22	69	23	82	45	151
2:15 PM	18		12		30	
2:30 PM	15		21		36	
2:45 PM	14		26		40	
3:00 PM	26	90	15	57	41	147
3:15 PM	20		10		30	
3:30 PM	21		15		36	
3:45 PM	23		17		40	
4:00 PM	18	105	14	70	32	175
4:15 PM	27		19		46	
4:30 PM	34		21		55	
4:45 PM	26		16		42	
5:00 PM	18	103	19	83	37	186
5:15 PM	32		22		54	
5:30 PM	19		23		42	
5:45 PM	34		19		53	
6:00 PM	30	119	26	99	56	218
6:15 PM	33		35		68	
6:30 PM	24		12		36	
6:45 PM	32		26		58	
7:00 PM	28	95	15	42	43	137
7:15 PM	31		10		41	
7:30 PM	19		9		28	
7:45 PM	17		8		25	
8:00 PM	14	52	9	27	23	79
8:15 PM	15		5		20	
8:30 PM	10		7		17	
8:45 PM	13		6		19	
9:00 PM	12	53	6	17	18	70
9:15 PM	18		6		24	
9:30 PM	11		4		15	
9:45 PM	12		1		13	
10:00 PM	9	29	5	14	14	43
10:15 PM	11		2		13	
10:30 PM	3		3		6	
10:45 PM	6		4		10	
11:00 PM	2	8	1	5	3	13
11:15 PM	3		2		5	
11:30 PM	3		2		5	
11:45 PM	0		0		0	

	Southbo und	Northbo und	Combined
24 Hour Volume	1249 (49.1%)	1296 (50.9%)	2545

12:00 AM - 12:00 PM

	Southbo und	Northbo und	Combined
Count	340	640	980
	34.7 %	65.3 %	
Peak Hour	10:45 AM	7:30 AM	8:45 AM
Volume	84	172	227
Factor	0.84	0.80	0.89

12:00 PM - 12:00 AM

	Southbo und	Northbo und	Combined
Count	909	656	1565
	58.1 %	41.9 %	
Peak Hour	5:45 PM	5:30 PM	5:30 PM
Volume	121	103	219
Factor	0.89	0.74	0.81

<u>Appendix B</u>

TIRE Index

Appendix C

TIRE Index

Table 1
TIRE Index Values

Existing Volume Range (Vehicles Per Day)	TIRE Index	Minimum Daily Volume increase to produce: .1 Change in the TIRE Index	.2 Change in the TIRE Index
29-35	1.5	+6	+15
36-44	1.6	+8	+20
45-56	1.7	+10	+25
57-70	1.8	+13	+35
71-89	1.9	+17	+41
90-110	2.0	+22	+52
111-140	2.1	+29	+65
141-180	2.2	+40	+80
181-220	2.3	+52	+100
221-280	2.4	+65	+125
281-350	2.5	+79	+160
351-450	2.6	+94	+205
451-560	2.7	+114	+260
561-710	2.8	+140	+330
711-890	2.9	+170	+415
891-1,100	3.0	+220	+520
1,101-1,400	3.1	+290	+650
1,401-1,800	3.2	+380	+800
1,801-2,200	3.3	+500	+1,000
2,201-2,800	3.4	+650	+1,300
2,801-3,500	3.5	+825	+1,700
3,501-4,500	3.6	+1,025	+2,200
4,501-5,600	3.7	+1,250	+2,800
5,601-7,100	3.8	+1,500	+3,500
7,101-8,900	3.9	+1,800	+4,300
8,901-11,000	4.0	+2,300	+5,300
11,001-14,000	4.1	+3,000	+6,500
14,001-18,000	4.2	+4,000	+8,000
18,001-22,000	4.3	+5,200	+10,000
22,001-28,000	4.4	+6,600	+13,000
28,001-35,000	4.5	+8,200	+17,000
35,001-45,000	4.6	+10,000	+22,000
45,001-56,000	4.7	+12,200	+28,000
56,001-71,000	4.8	+14,800	+35,000
71,001-89,000	4.9	+18,000	+43,000

Source: Goodrich Traffic Group