FINAL

December 2007

Sierra Meadows Estates Subdivision (S2001-03) Environmental Impact Report Appendices

Lead Agency:
County of Madera

Prepared by:
RBF Consulting

Administrative Draft EIR Completed:	October 12, 2004
Preliminary Draft EIR Completed:	March 22, 2005
Draft EIR Completed:	May 17, 2005
Administrative Final EIR Completed:	May 30, 2006

FINAL
ENVIRONMENTAL IMPACT REPORT
APPENDICES

SIERRA MEADOWS ESTATES SUBDIVISION
(S2001-03)

SCH NO. 2002061001

Lead Agency:

MADERA COUNTY PLANNING DEPARTMENT
2037 W. Cleveland
Madera, California 93637
Contact: Mr. Tom Navarro
559.675.7821

Prepared by:

RBF CONSULTING
14725 Alton Parkway
Irvine, California 92618-2069
Contact: Mr. Glenn Lajoie, AICP
949.472.3505

December 2007

JN 10-102469

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Section 15.0: Appendices

15.1 Notice of Preparation

NOTICE OF PREPARATION
DRAFT ENVIRONMENTAL IMPACT REPORT

TO: Reviewing Agencies

(Address)

FROM: Madera County Planning

135 West Yosemite Avenue
(Address)

Madera, CA 93637

SUBJECT: **Notice of Preparation of a Draft Environmental Document for the Sierra Meadows Estates Subdivision (S2001-03), Bard Investment Company, L.P.**

The Madera County Planning Department will be the Lead Agency and will prepare a draft environmental impact report for the proposed subdivision described below. Prior to the preparation of this document, we need to know your agency's views regarding the scope and content of the environmental information which should be incorporated within the document. These comments should focus on your agency's statutory responsibilities in connection with the proposed project.

The project description, location, and the probable environmental effects are contained in the attached materials. A copy of the Initial Study ☐ is, ☒ is not, attached.

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

Please send your response to Steven L. Greer, Madera County Planning Department, at the address shown above. We will need the name of a contact person for your agency.

Project Title: **S2001-03, Sierra Meadows Estates Subdivision**

Project Description: **The project consists of a 304 lot subdivision on 442 acres. Lots will vary in size from approximately 7,000 s.f. to more than 6 acres, with an average density of 1.45 acres.**

Project Location: **The project site is located in unincorporated Madera County on Opah Drive, approximately 0.75 miles north of its intersection with Harmony Lane, Oakhurst (portion of Sections 4, 5, 31 and 32, T6s and T7s, R21e, MDB&M).**

DATE: May 23, 2002

Signature

Title: Planner

Telephone: (559) 675-7821

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

S2001-03, Sierra Meadows Estates Subdivision
Potential Environmental Impact

The following information is a summary of the potential environmental impacts which may be generated by the development of the Sierra Meadows Estates Subdivision. This summary is not intended to serve as an initial study for the project.

Project Description: The project consists of a 304 lot subdivision on 442 acres. Lots will vary in size from approximately 7,000 s.f. to more than 6 acres, with an average density of 1.45 acres.

Project Location: The project site is located in unincorporated Madera County on Opah Drive, approximately 0.75 miles north of its intersection with Harmony Lane, Oakhurst (portion of Sections 4, 5, 31 and 32, T6s and T7s, R21e, MDB&M)..

Setting: The subject properties are located within a rural residential and agricultural (grazing) area of the County. This includes a redivision of an existing outlot of a previously approved subdivision. The properties are designated as VLDR (Very Low Density Residential), LDR (Low Density Residential) RR (Rural Residential) and OS (Open Space) in the general plan and are currently zoned -RM (Rural Mountain), RRS-2 ½ (Residential, Rural, Single Family), OS (Open Space), and ARE-40 (Agricultural, Rural, Exclusive - 40 Acre) Districts. To the northeast of the proposal lies the Ahwahnee Country Club Estates Subdivision, which has been subdivided into rural residential lots similar to those proposed in the current project. Additional rural residential lots exist to the west, southwest and southeast of the proposal. The project site itself contains moderate to steep slopes, intermediate and dense vegetation, at least one identified water body, and intermittent drainages.

Potential Impacts:

Biology. The project site includes intermediate to dense vegetation, water bodies, and several natural intermittent drainages. The site and surrounding area may serve as habitat for sensitive or special status species, including habitat associated with riparian features, or as part of a wildlife migration corridor.

Traffic. The project site contains moderate to steep slopes, including slopes in excess of 30 percent with dense tree cover. The County Road Department has indicated that it is possible that the proposed internal road system cannot be built to adopted standards. Potential traffic hazards resulting from roadway design features, including steep slopes and minimal curve radii, may be generated.

The area's primary access is to State Route 49, which is also utilized by other residential developments within the vicinity. The County Road Department has indicated that increased levels of traffic generated by the development could impact the highway and Harmony Drive, as well as local roads within the adjacent subdivisions. The road system required will also affect emergency services to the site.

Geology/Erosion/Grading. The geologic risks in the area where the project is located generally focus on slope stability and erosion. The project would require grading and earthwork to accommodate the internal road network, building pads, individual driveways, etc. The steep slopes which exist on the site will be affected and the opportunity for slope failure to occur will be generated. The erosion occurring in conjunction with cut and fills may impact existing drainages.

Sewage Disposal. The project proposes to provide an on-site sewage disposal plant. Several options regarding use of the effluent from the treatment plant must be evaluated in light of the constraints which exist for the parcels (slope, vegetation, drainages, well locations, etc.).

Water Quality. The use of spray fields or other dispersion methods in an area containing natural drainage and ponds presents an opportunity for environmental impacts to surface and groundwater supplies. Current plans would call for more than 300 lots to be developed for the project. Potential impacts generated from storm water run-off and discharge should also be evaluated.

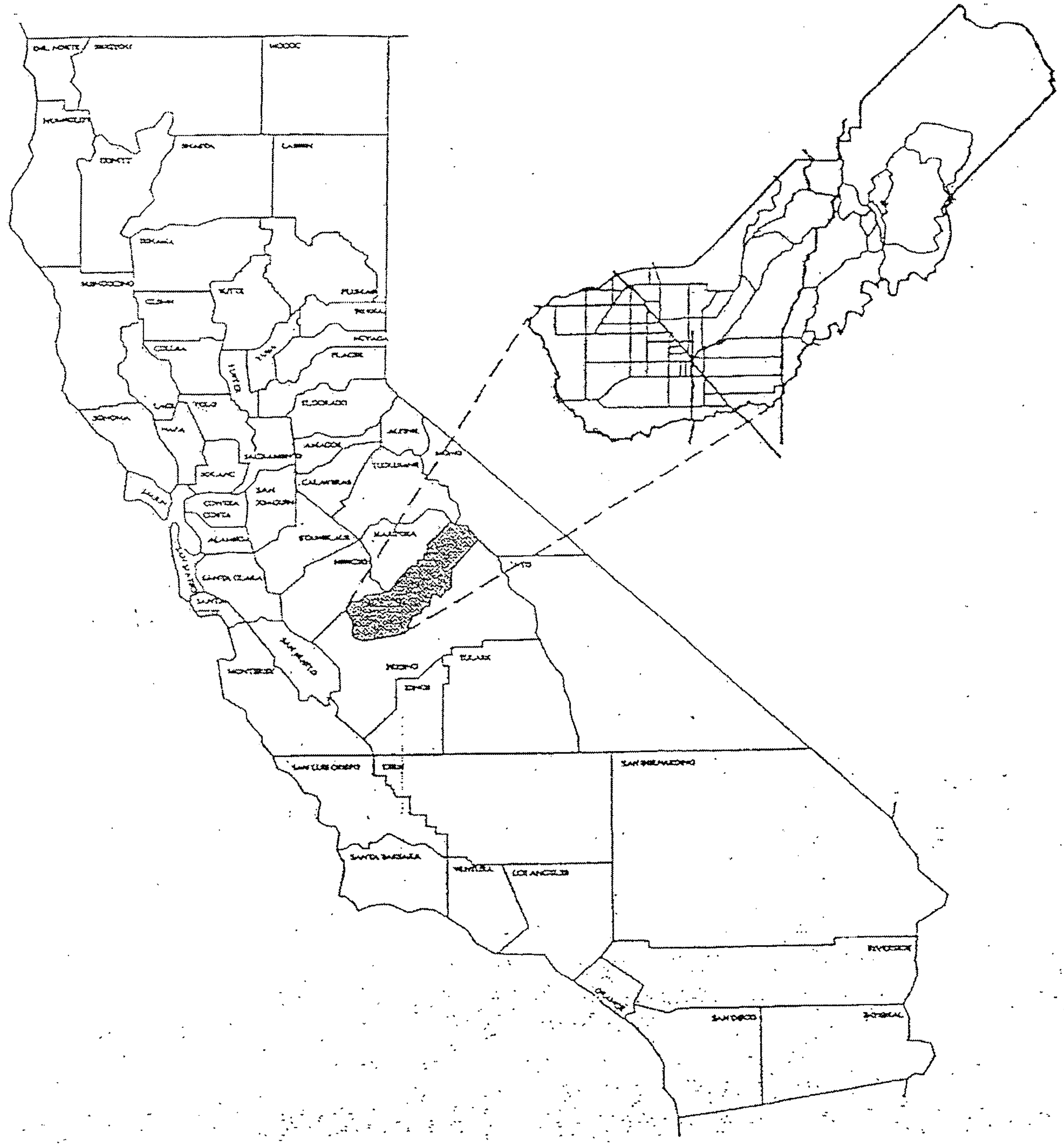
Domestic Water. The project proposes to utilize a community water system for both domestic and fire-flow water use. Concerns have been expressed by area residences that the proposal might impact water supplies in the area. The ability of the project to find a permanent, verifiable source of domestic water that will not generate significant detrimental effects on surrounding properties should be analyzed.

Growth Inducing Impacts. The project would have the capacity of introducing more than 300 homes and 1000 individuals into an area which is generally without supporting services. The project presents the opportunity to function as a catalyst for additional development and conversion of land for supporting services, etc.

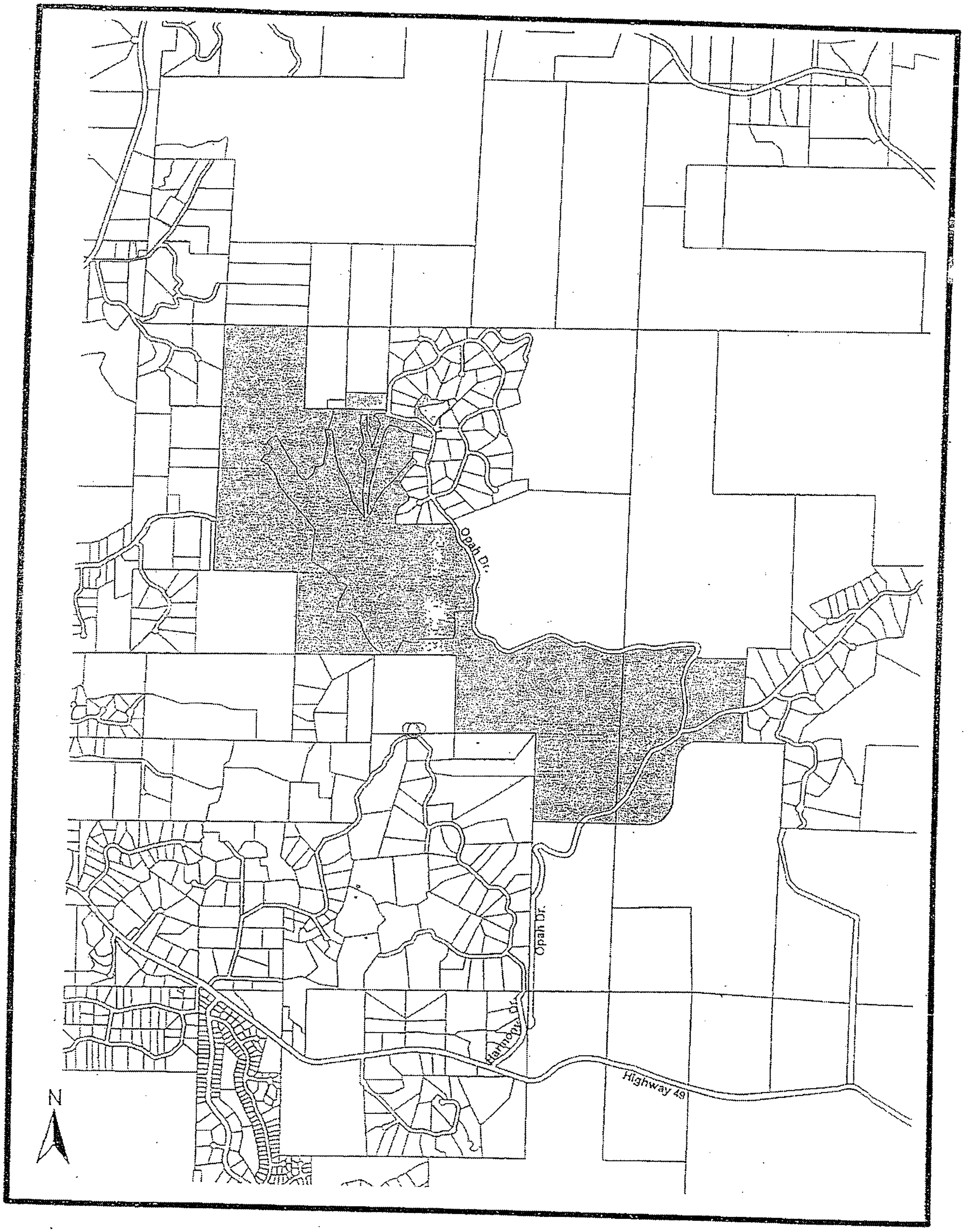
Cumulative Impacts. Ahwahnee Country Club Estates is located within the vicinity of the proposal and may cause the proposal to generate cumulatively significant impacts. Cumulative impacts could include air, traffic, water, water quality, etc.

Land Use Compatibility. Potential impacts may be generated by introducing the project into an existing agricultural area.

MADERA COUNTY LOCATION

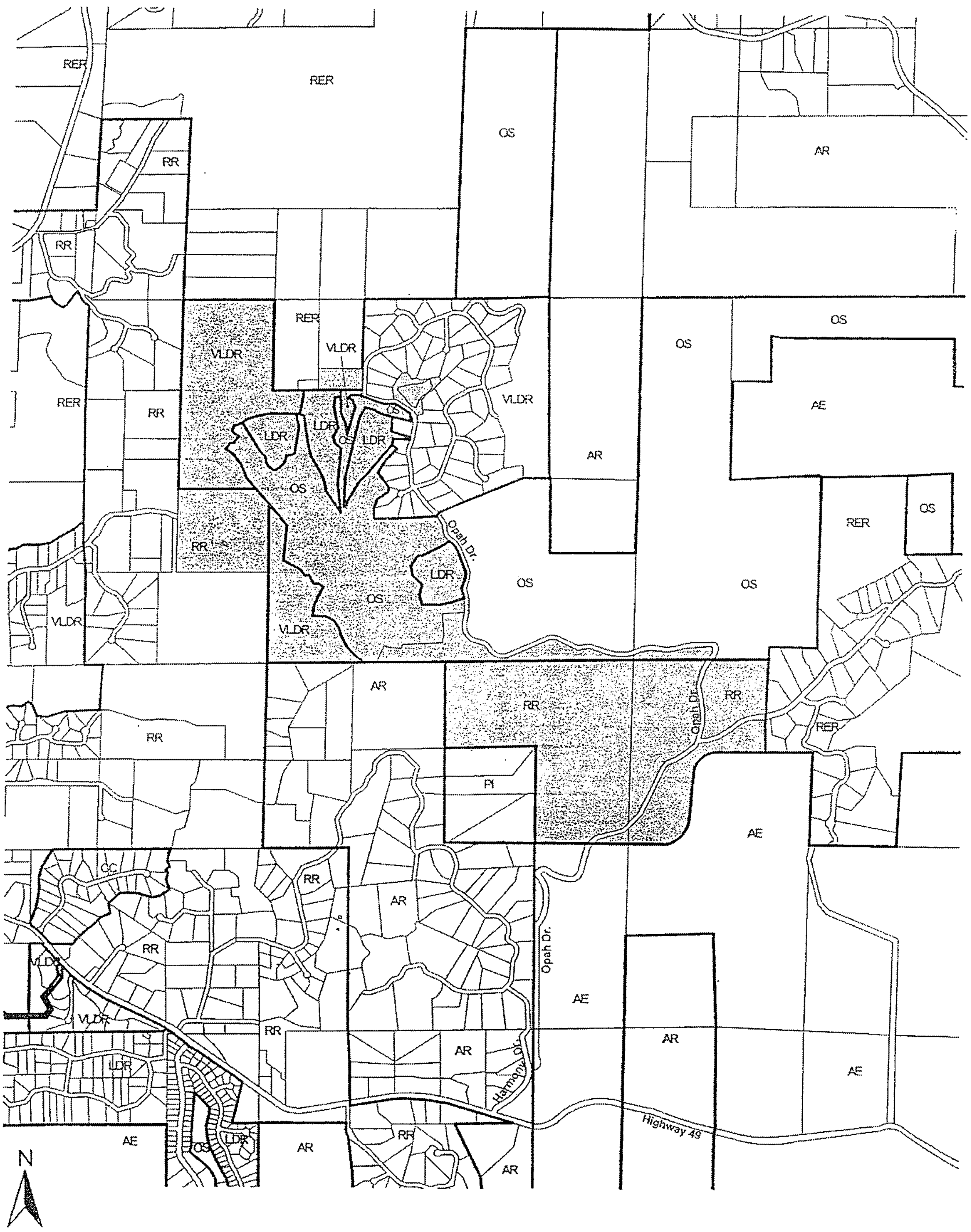


NOTICE
AREA MAP



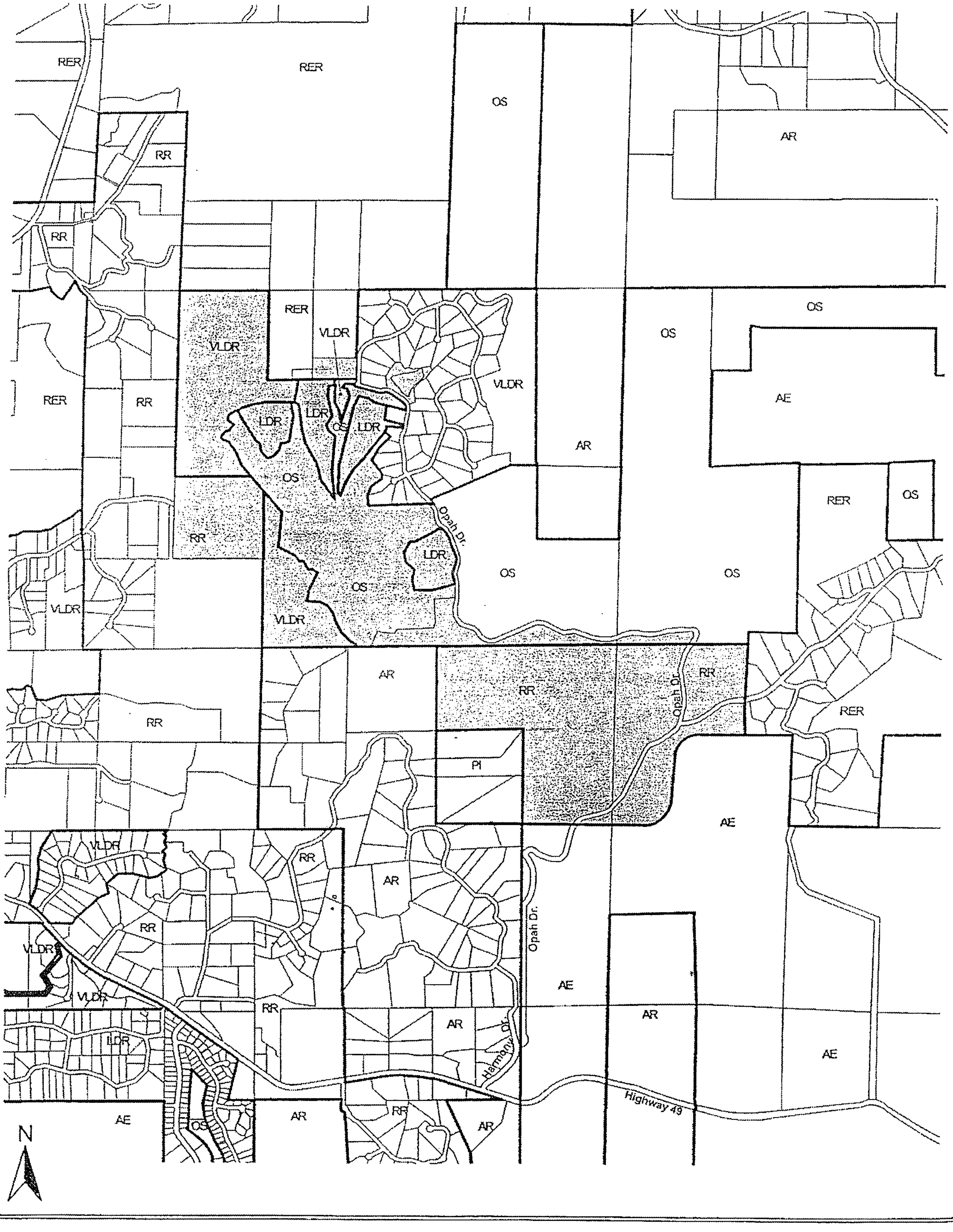
PLEASE TURN THIS PAGE OVER FOR INFORMATION CONCERNING THIS REQUEST

EXHIBIT A-1



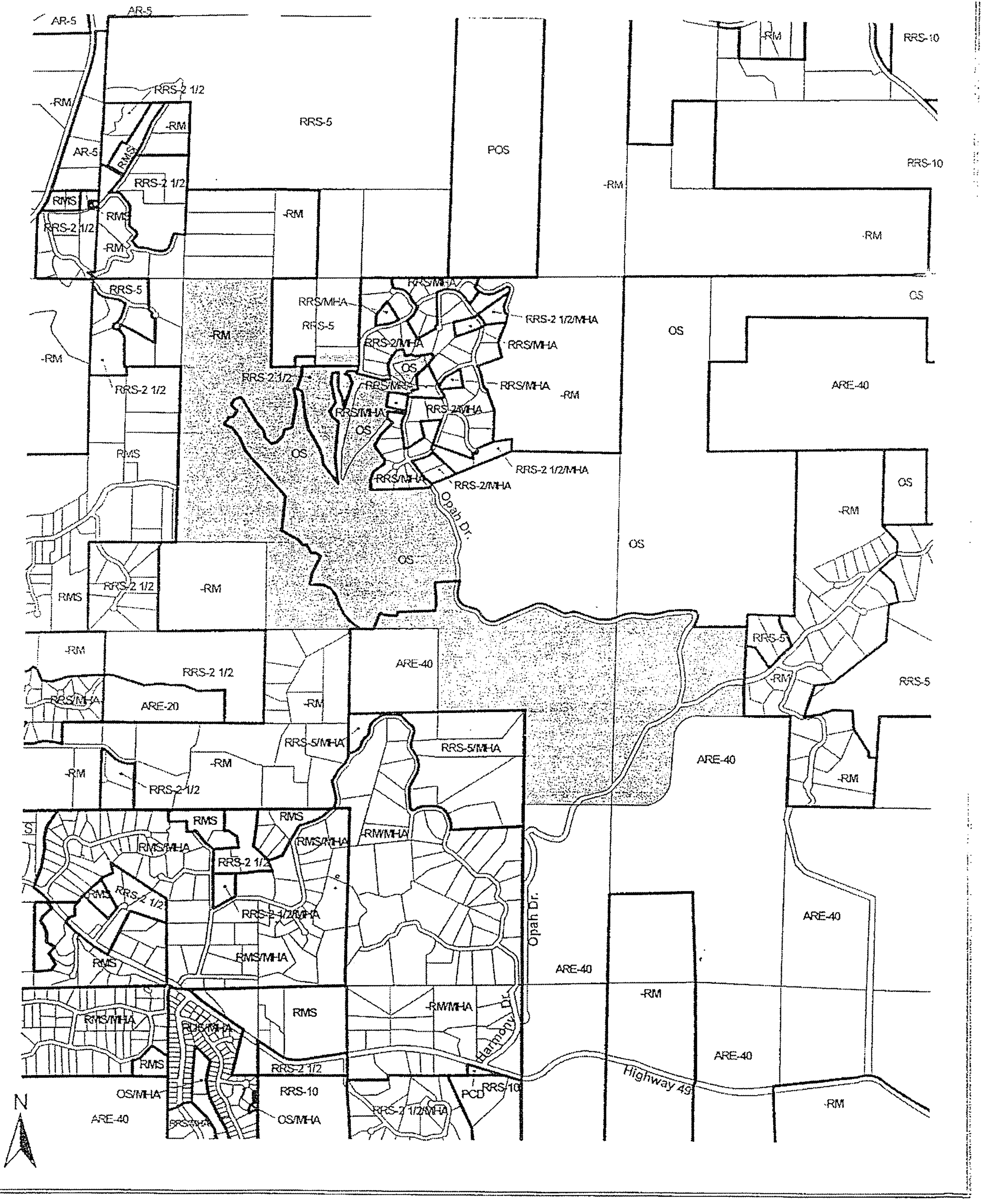
1995 GENERAL PLAN MAP

EXHIBIT A-2



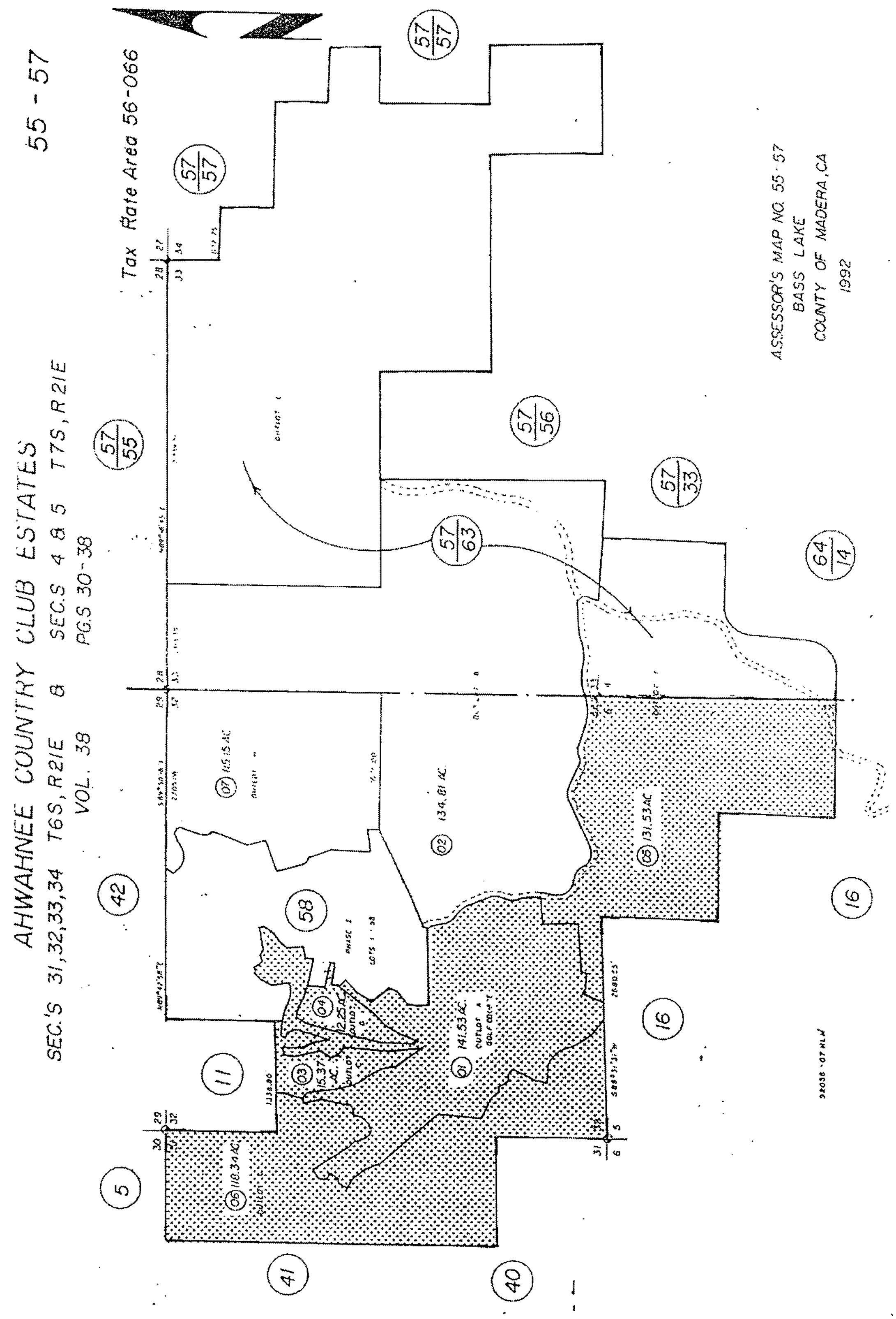
AHWAHNEE/NIPINNAWASEE AREA PLAN

EXHIBIT B



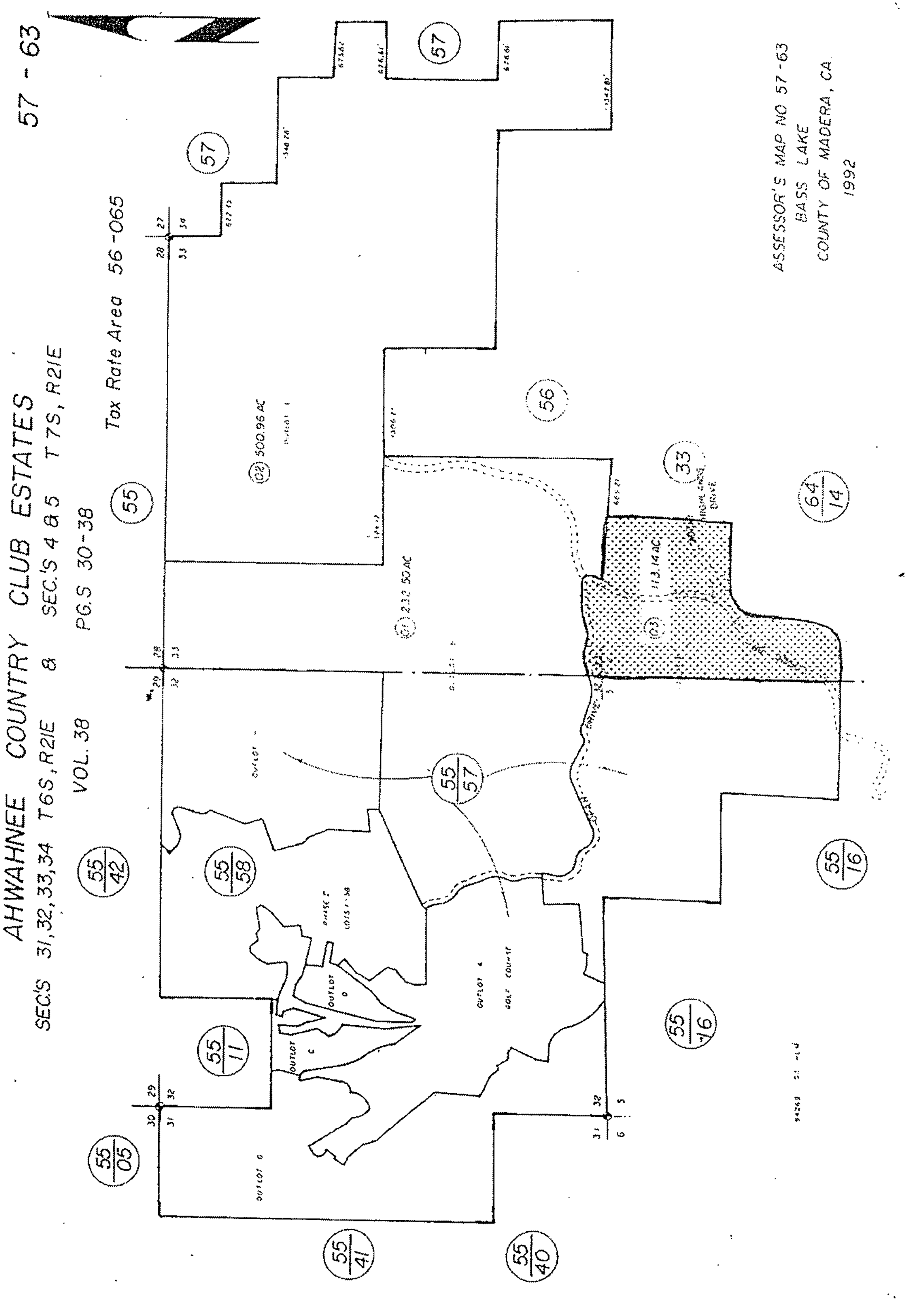
ZONING MAP

EXHIBIT C-1



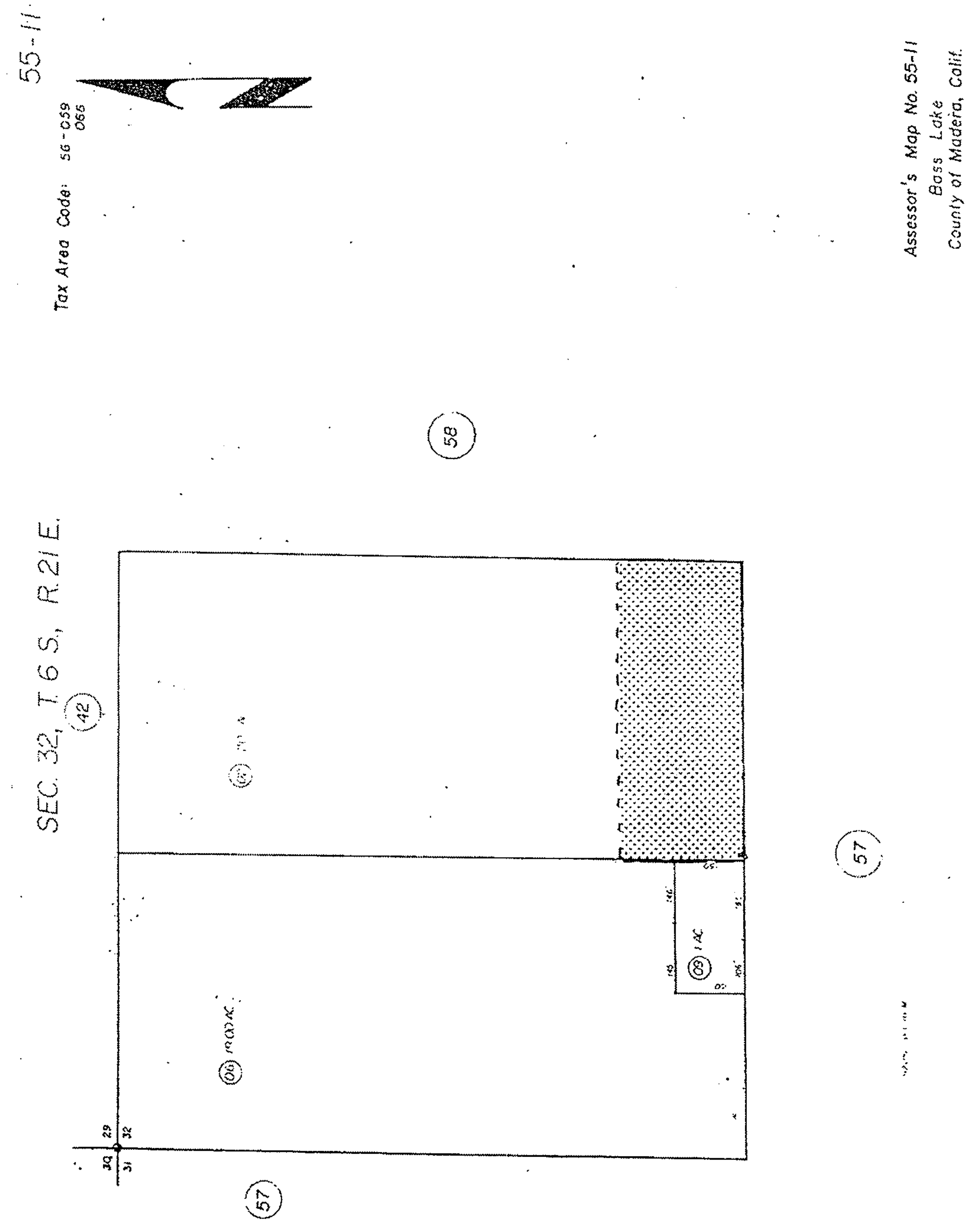
ASSESSOR'S MAP

EXHIBIT C-2



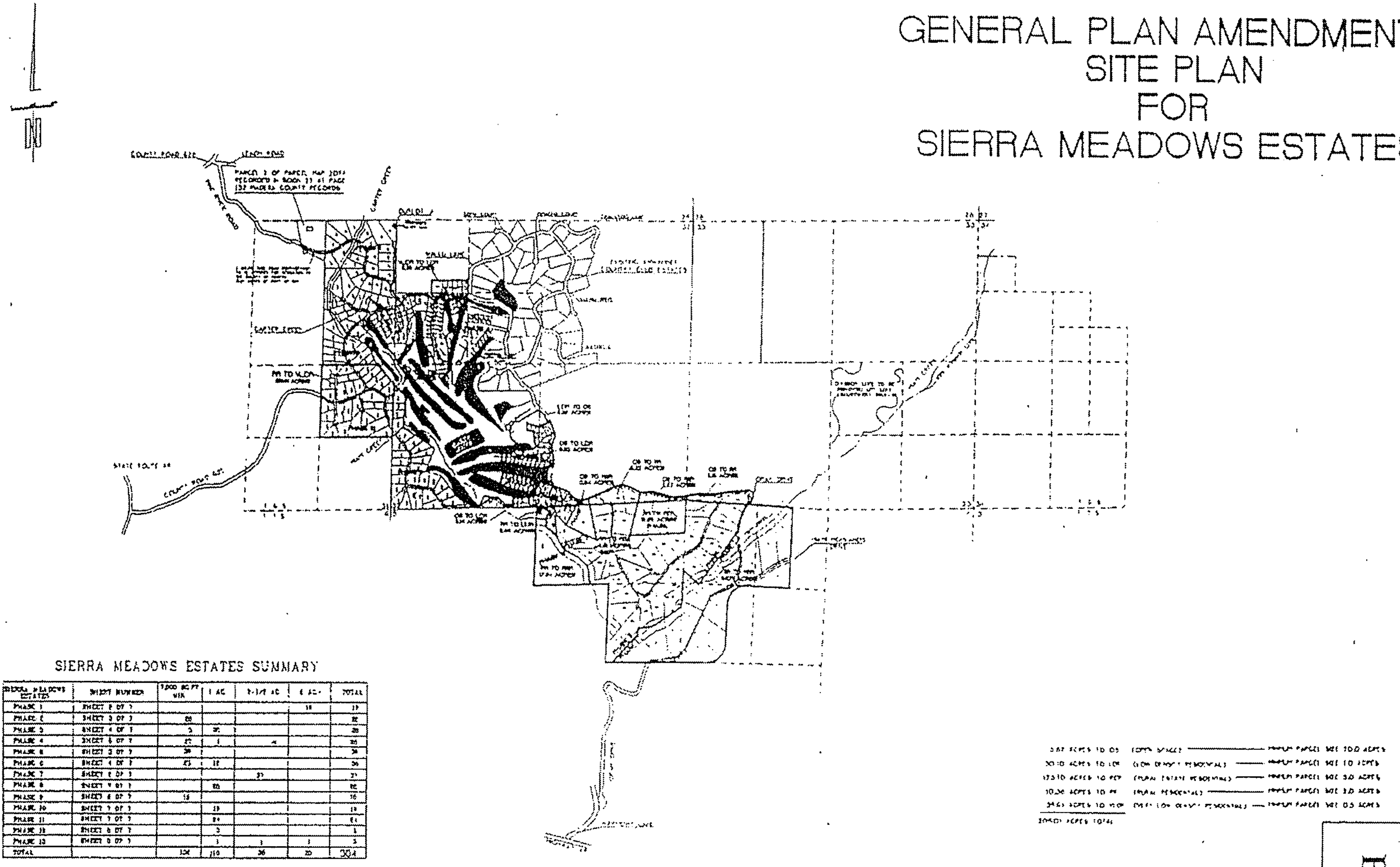
ASSESSOR'S MAP

EXHIBIT C-3



ASSESSOR'S MAP

GENERAL PLAN AMENDMENT
SITE PLAN
FOR
SIERRA MEADOWS ESTATES



SIERRA MEADOWS ESTATES SUMMARY

SIERRA MEADOWS ESTATES	SHEET NUMBER	7,000 SQ FT MIN	1 AC	2-1/2 AC	5 AC+	TOTAL
PHASE 1	SHEET [illegible] OF 7				[illegible]	[illegible]
PHASE 2	SHEET [illegible] OF 7	[illegible]				[illegible]
PHASE 3	SHEET 4 OF 7	[illegible]	[illegible]			[illegible]
PHASE 4	SHEET [illegible] OF 7	[illegible]	[illegible]	[illegible]		[illegible]
PHASE 5	SHEET [illegible] OF 7	[illegible]				[illegible]
PHASE 6	SHEET 4 OF 7	[illegible]	[illegible]			[illegible]
PHASE 7	SHEET [illegible] OF 7			[illegible]		[illegible]
PHASE 8	SHEET [illegible] OF 7		[illegible]			[illegible]
PHASE 9	SHEET [illegible] OF 7	[illegible]				[illegible]
PHASE 10	SHEET 7 OF 7		19			19
PHASE 11	SHEET 7 OF 7		[illegible]			[illegible]
PHASE 12	SHEET [illegible] OF 7		3			3
PHASE 13	SHEET [illegible] OF 7		1	1	1	[illegible]
TOTAL		[illegible]	110	36	20	[illegible]

EXHIBIT D

SITE PLAN / MAPS

15.2 Public Agency Correspondence/ NOP Correspondence

MEMORANDUM

TO: LEONARD GAROUPA, PLANNING DIRECTOR

FROM: DICK WYATT, ROAD COMMISSIONER R.D. Wyatt

DATE: 12/11/97

RE: RV 97-01 (PM 3725)

The applicant has requested a "variance" from road standards. Variances are usually for zoning related issues. Developers who wish a "design exception" to road standards request this in writing to me. The reason that we ask for such a letter is that county code specifies it.

The Road Department does not consider that dirt roads are adequate to serve rural residential properties. They are muddy and rutted in the winter. They are dusty and full of washboards in the summer. Dirt roads engender a disproportionate number of citizen complaints for our department. We see no reason to create more.

Nor do we see any advantage to lowering road surfacing standards. Roads that serve new development should be constructed with asphalt concrete or portland cement concrete over a proper base course on a prepared subgrade. The County still suffers the agony of having allowed substandard streets to be built in areas like Madera Acres, Madera Ranchos, and Bonadelle Ranchos. We get telephone complaints each day questioning our abilities and credibility because the streets are and always have been so inadequate.

Attached you will find a high-lighted photo copy of PM-1 and MCC 17.72.290A16 which seems to apply to this request. Let Larry Lihosit know what you think about this.

ENVIROMENTAL HEALTH DEPARTMENT

216 W 6TH STREET
MADERA, CALIFORNIA 93637

(559) 675-7823
FAX (559) 675-7[illegible]

Jill S. Nishi, Director Environmental Health
envhealth@thegrid.net

MEMORANDUM

TO: Steve Landucci
FROM: Glenn Allen
DATE: November 28, 2001
RE: S2001-03, Sierra Meadows Ranch Estates Subdivision

The Environmental Health Department has reviewed the captioned map for the above noted subdivision and has the following comments regarding the project:

1. Water quality, quantity and long-term sustainability within this region of Madera County is of great concern and in itself represents the need to conduct an EIR for this proposed subdivision. A comprehensive study of the water for this entire area is necessary to understand the existing water supply, recharge, quality and demand.

   The proposed subdivision is within Maintenance District 46 (MD #46) and will be required to connect to the existing water system. The current water system does not have adequate water to serve new connections. The applicant must demonstrate an ability to develop new approved sources of water for the proposed subdivision that provides a minimum of 2.4 gallons per connection. The 2.4-gallon per connection requirement is based on an average of existing peak use by local water systems or alternately derived using the formula contained within Madera County Code, Section 13.12.050. All new water sources must be tested for quantity utilizing a 10-day continuous pump test approved by the Environmental Health Department. The applicant must also demonstrate that water meets all water quality standards. A Technical, Managerial, and Financial Report (TMF) will be required prior to approval of the system and its connection to Maintenance District 46. With the continued development proposed for this area the number of connections to Maintenance District 46 would exceed 200, which mandates that the water system be regulated by the State Department of Health Services. All correspondence pertaining to the provision of water to the proposed subdivision and Maintenance District 46 should be provided to the State Department of Health Services for review and comment.

2. The captioned map indicates the applicant will provide a community sewer treatment system for the proposed subdivision. The applicant must provide a comprehensive engineering analysis of the soils in the areas proposed for treatment and disposal. The engineering also must provide all design specifications and details for required operation and maintenance of the proposed treatment system. Approvals and permit(s) for the sewage treatment system must be obtained from the Regional Water Quality Control Board. Requirements for said approval and permits include comprehensive site evaluations, design for proposed sewage treatment plant, design of collection system and necessary easements, proposed disposal method of accumulated biosolids, and compliance with all applicable laws, rules, regulations, and ordinances. All approvals must be provided to the Environmental Health Department.

In summary, due to concerns regarding the ability to provide sustainable high quality water to the proposed subdivision and adequate area for safe disposal of effluent from a proposed community sewer treatment system it is felt that an EIR or supplemental EIR must be completed to fully address these concerns. If you have questions or comments regarding the above conditions, please contact me at the above listed number.

ROAD DEPARTMENT
COUNTY OF MADERA
201 W. ALMOND AVENUE / MADERA, CALIFORNIA 93637
(559) 675-7811 / FAX (559) 675-7631

ROBERT E. TOWNSEND
Road Commissioner

MEMORANDUM

TO: TOM NAVARRO, SENIOR PLANNER, PLANNING DEPARTMENT

FROM: LAWRENCE F. LIHOSIT, DEVELOPMENT SERVICES, ROAD DEPT.

DATE: DECEMBER 3, 2001

RE: **SUB. 2001-03 SIERRA MEADOWS ESTATES- PRELIMINARY**

The Road Department staff has reviewed the Preliminary Subdivision Map for Sierra Meadows Estates which we received on November 16, 2001. We find that the project could have a significant impact on traffic and circulation and recommend that a traffic study be prepared by a California registered traffic engineer. The scope of the traffic study will be as follows:

1. Trip generation for single family detached home will be calculated in accordance with the Road Commissioner approved study for the Oakhurst area (Brian. Kangas Foulk. 1997) The average daily trip generation rate for single family detached homes will be 7.36 trip ends per dwelling unit. The A.M. peak hour trip generation rate will be .54 trip ends per dwelling unit (38% in / 62% out). The P.M. peak hour trip generation rate will be .55 trip ends per dwelling unit (55% in / 45% out). A copy of this study is on file in the Road Department. All other land use trip generation (golf course, etc.) will be based upon the most recent edition of the Institute of Transportation Engineer's Guide.

2. Aside from the proposal itself, the study will assume build-out of those lands within the Shadow Ridge and Miami Creek Estates Subdivision areas (see maps 1 and 2).

3. Scenarios will be based upon the most up-to-date Regional Transportation Model which is available at the Madera County Transportation Commission. Scenarios will include:
   - A. 2001 no project
   - B. 2015 no project
   - C. 2015 project
   - D. 2015 project with mitigation

4. Analysis will include turning movements, geometrics, and Level of Service (L.O.S.) For these intersections:
   - A. Harmony Lane / State Route 49
   - B. Road 621 / State Route 49
   - C. Pine River Road / State Route 49
   - D. Opah Drive / Harmony Lane
   - E. Opah Drive / unnamed offer leading to the existing Outlot E
   - F. Opah Drive / Miami Highlands Drive

5. Analysis will include proposed mitigation (if necessary). In the event that intersection

improvement is proposed, geometrics will be considered. In the event that traffic control measures are proposed based upon traffic volumes, the appropriate warrants will be included.

Review of the Preliminary Map revealed a series of concerns that may require redesign prior to the submittal of the Tentative Map. We recommend that these concerns be studied by the applicant and addressed with road redesign (if necessary) prior to the preparation of the traffic study.

According to the general plan, the county must provide "for the long-range planning and development of the county's roadway system (Policy Document, p 25,Goal 2.A) in such a manner that "existing and new streets and roads shall be dedicated, widened, and constructed according to the roadway design and access standards". (Policy Document, p 25, policy 2.A.2). The county "shall not approve new development where existing facilities are inadequate..." (Policy Document, p37, policy 3.A.1). At least two curves on Opah Drive do not meet the minimum standards. For reasons of public safety and welfare, redesign and reconstruct to meet the minimum standards must be required(see map 3, # 2, 15).

In addition, the proposed local streets, in several cases, do not intersect Opah Drive at a ninety degree angle (see map 3, # 5,10,14,15,17). Intersections are located on curves, not tangents (see map 3, # 7,15,16, 18), and some proposed local roads exceed the maximum allowable length for a cul-de-sac (see map 3, # 8, 9,11). Redesign to accommodate code and policy could affect the number of lots.

The plans have several inaccuracies and/or omissions which should be rectified on the proposed Tentative Map. The boundary of existing Outlot B does not match pending Lot Line Adjustment 2001-18 (see map 1). Centerline curve radius for all existing and proposed roads should be included. Proposed Outlot A appears to have no proposed access (sheet 4 / 8). Several odd shaped parcels are not numbered and do not appear to meet code and policy (Sheets 4/8, 5/8, 8/8).

Given that the existing Opah Drive is so important to the proposal, it is worth mentioning that the majority of this road was built approximately fifteen years ago under a discarded set of standards as a local road to serve the Ahwahnee Golg Course (C.U.P. 84-69). Later, the road was lengthened to accommodate a RV Park (1992, Ahwahnee County Club Estates, S88-11, phase 1). Apparently, these projects were based upon the Shadow Ridge Estates environmental Impact Report (1980), which mentioned access to both Road 620 and Road 621 (p 56, mitigation measures). Likewise, conditions of approval required the extension of Opah Drive to Road 621 (#16) and the reservation of right-of-way for the extension of Miami Highlands Drive to Road 620 (#38, b and c). In 1997, the Ahwahnee Golf Course and Resort manager met with the Road Commissioner and agreed to pave the connection of Opah Drive to Road 621 as a prerequisite to further development. About one mile of this road includes curves which do not meet current minimum standards. Likewise, road grade might surpass the maximum acceptable just west of the intersection of Opah Drive and Wallu Lane.

In 1999, Madera County adopted the Ahwahnee Area Plan which includes proposed connections from Pine River Road to Opah Drive and, from Miami Highlands Drive to Road 620. In the case of Opah Drive, the mile east of Road 621 is unpaved. During the winter months, it often is not easily passable for an automobile. It is very doubtful that the road could support a 40,000 pound load at any time of year in accordance with current code (MCC 17.72.300,17.32.010, PM-2).

The original conditions of approval for Miami Creek Estates (S90-20), phase I, included the requirement to make an offer of dedication through the project (p6, #346). This was accomplished in phase III. Today an offer exists to the northeastern property line. The abutting property was a part of the Shadow Ridge Subdivision (see map 1). According to the California Subdivision Map Act, (66473.5) "a subdivision must be consistent with the general plan or specific plan". The adopted Ahwahnee Area Plan includes a proposed connection between Miami Highlands Drive to Road 620. In addition, the Shadow Ridge Subdivision (S 78-13) Environmental Impact Report (p 56, Mitigating Measures) mentioned an additional point of emergency access from the northeast portion of the project to Road 620. The Conditions of Ahwahnee County Club (p 5, item 38, a, b, & c) mention that when Outlot C (Outlot E, Recorded Map of Ahwahnee County Club Estates) is developed, the road will continue. Future development of Outlot C will require an offer of dedication to the easterly boundary of Outlot C on an alignment acceptable to Madera County Road Department. In the event Madera County wishes to provide a transportation corridor to Road 620 prior to development of Outlot C, the present owner or their successors in interest agree to offer for dedication an 80.00 foot wide right-of-way to the easterly boundary of Outlot C. This outlot included what is proposed as Miami Creek Associates II Subdivision. ***We recommend that this project E.I.R. analyze the possible extension of Miami Highlands Drive.***

The proposed Sierra Meadows Subdivision includes extending Opah Drive to Road 621, as has been discussed and. extending a new road to intersect Pine River Road with Opah Drive, as mentioned in the recently adopted Ahwahnee Area Plan.

The entire proposed subdivision is included in Maintenance District # 49. Opah Drive was constructed to a Class IV Structural standard from Harmony Lane to the intersection with Miami Highlands Drive. From that intersection to the intersection with Wallu Lane, it was built to a Class III structural section. From Wallu Lane west to Road 621. Opah Drive is unpaved. Chalatoo Lane is also unpaved. All other existing roads are paved and were built to a Class III standard. The proposal includes several phases with lots of less than one acre. According to code (MCC 17.72.300. 17.32.010. PM-1), these roads are required to be constructed to a Class V standard. while the others are to be built to a Class III standard (see map 4).

Following are comments upon each sheet. Many of our concerns are summarize on Map 3.

Sheet 1/8

1. Boundary does not match pending LLA 01-18.
2. On Tentative Map, show existing offer of dedication which intersects Opah Drive.

Sheet 2/8

3. On Tentative Map, show centerline curve data of all roads.
4. Centerline curve radius does not meet AASHTO standard.
5. Roads must end in a cul-de-sac.
6. The existing intersection of Opah Drive and Miami Highlands Drive will require special attention due to sight distance concerns..
7. Driveways near this intersection will require special attention.
8. Must intersect Opah Drive at 90 degree angle.
9. The proposed roads will be constructed to a Class III standard.
10. Sight distance concerns.

Sheet 3/8

11. On the Tentative Map. show all centerline curve data.
12. Proposed roads are required to intersect on a tangent.
13. Exceeds allowable dead end road length (800 feet Maximum).
14. Lot 138 has no frontage along proposed road.
15. Proposed roads must intersect Opah Drive at 90 degree angles.
16. Proposed Cart Path must cross at a tangent with adequate sight distance.

Sheet 4/8

17. Proposed roads must intersect Opah Drive at 90 degree angle.
18. Centerline curve radius must meet AASHTO standards (Minimum of 120 feet).
19. On Tentative Map, show all centerline curve data for all roads.
20. Outlot A has no access.
21. The riparian corridor note is incomplete.
22. Opah Drive to be constructed to a Class III standard from existing edge of pavement to existing edge of pavement on Pine River Road.
23. Proposed roads to be constructed to Class III standards.
24. Parcel is not numbered or labeled.
25. Proposed roads are required to intersect on a tangent adequate sight distance.

Sheet 5/8

26. Proposed roads must intersect Opah Drive at 90 degree angle.
27. Exceeds the allowable dead end road length (800 feet maximum).
28. On Tentative Map, show all centerline curve data for all roads.
29. Proposed Maintenance and Emergency access road must be a 60 foot wide offer of dedication and paved to a Class III standard.
30. Proposed roads to be constructed to a Class V standard.
31. Opah Drive is to be constructed to a Class III standard starting at the existing edge of pavement at Wallu Lane.
32. Parcel is not numbered or labeled.

Sheet 6/8

33. Proposed road must intersect on a tangent, adequate sight distance, not a curve.
34. Proposed roads to be constructed to a Class III standard.
35. Configuration of Phase 5 does not match Sheet 3/8.
36. On Tentative Map, show all centerline curve data for all roads.

Sheet 7/8

37. Exceeds the allowable dead end road length (800 feet maximum).
38. On Tentative Map, show all centerline curve data for all roads.

39. Proposed roads to be constructed to a Class V standard.

Sheet 8/8

40. Parcel is not numbered or labeled.
41. On Tentative Map, show all centerline curve data for all roads.
42. All proposed roads must intersect on a tangent adequate sight distance.
43. All proposed roads must intersect Opah Drive at ninety degree angle.
44. The proposed roads will be constructed to a Class III standard.
45. Opah Drive will be constructed to a Class III standard to existing end of pavement on Road 621.

F:\ENG\HOLIDAY\Sub\01-03.wpd

MADERA COUNTY FIRE DEPARTMENT

IN COOPERATION WITH
CALIFORNIA DEPARTMENT OF FORESTRY AND FIRE PROTECTION

14225 ROAD 28
MADERA, CALIFORNIA 93638-5715
(559) 675-7799
FAX: (559) 673-2085

STAN CRAIG
MADERA COUNTY FIRE CHIEF

April 4, 2002

TO: Planning Department

FROM: Stan Craig, Fire Chief
By: Paul Helm, Division Chief

SUBJECT: Sierra Meadows Estates Subdivision
S2001-03

The Fire Department staff has reviewed the preliminary subdivision map for the Sierra Meadows Estates Subdivision.

Our original conditions and memo dated September 26, 2001 is attached and still applies to the above project. The Fire Department recommends an EIR be prepared for this project.

Please submit water system and water storage plans for review prior to final map approval.

All roads shall meet county standards 60-foot wide and meet road department conditions.

Engineering and General Services

135 W. Yosemite Avenue
Madera, CA 93637

(559) 675-7817
(559) 675-7639 FAX
(559) 675-8970 TDD

Bass Lake Office
40601 Road 274
Bass Lake, CA 93604

(559) 642-3203
(559) 658-6959 FAX

Michael Kirn, County Engineer

jshields@madera-county.com

MEMORANDUM

Date: April 11, 2002

To: Tom Navarro, Planner II

From: Jim Shields, Assistant Engineer

Subject: S2001-03. Sierra Meadows estates Subdivision

The Engineering Department does not object to the revisions to the preliminary map and our comments from November 26, 2001 still apply.

ENVIROMENTAL HEALTH DEPARTMENT

216 W 6TH STREET
MADERA, CALIFORNIA 93637

(559) 675-7823
FAX (559) 675-7919

Jill S. Nishi, Director Environmental Health

envhlth@theworks.com

MEMORANDUM

TO: Steve Landucci
FROM: Glenn Allen
DATE: April 12, 2002
RE: S2001-03, Sierra Meadows Ranch Estates Subdivision

The Environmental Health Department has reviewed the captioned map for the above noted subdivision and has the following comments regarding the project:

1. Water quality, quantity and long-term sustainability within this region of Madera County is of great concern and in itself represents the need to conduct an EIR for this proposed subdivision. A comprehensive study of the water for this entire area is necessary to understand the existing water supply, recharge, quality and demand.

   The proposed subdivision is within Maintenance District 46 (MD #46) and will be required to connect to the existing water system. The current water system does not have adequate water to serve new connections. The applicant must demonstrate an ability to develop new approved sources of water for the proposed subdivision that provides a minimum of 2.4 gallons per connection. The 2.4-gallon per connection requirement is based on an average of existing peak use by local water systems or alternately derived using the formula contained within Madera County Code, Section 13.12.050. All new water sources must be tested for quantity utilizing a 10-day continuous pump test approved by the Environmental Health Department. The applicant must also demonstrate that water meets all water quality standards. A Technical, Managerial, and Financial Report (TMF) will be required prior to approval of the system and its connection to Maintenance District 46. With the continued development proposed for this area the number of connections to Maintenance District 46 would exceed 200, which mandates that the water system be regulated by the State Department of Health Services. All correspondence pertaining to the provision of water to the proposed subdivision and Maintenance District 46 should be provided to the State Department of Health Services for review and comment.

2. The captioned map indicates the applicant will provide a community sewer treatment system for the proposed subdivision. The applicant must provide a comprehensive engineering analysis of the soils in the areas proposed for treatment and disposal. The

engineering also must provide all design specifications and details for required operation and maintenance of the proposed treatment system. Approvals and permit(s) for the sewage treatment system must be obtained from the Regional Water Quality Control Board. Requirements for said approval and permits include comprehensive site evaluations, design for proposed sewage treatment plant, design of collection system and necessary easements, proposed disposal method of accumulated biosolids, and compliance with all applicable laws, rules, regulations, and ordinances. All approvals must be provided to the Environmental Health Department.

In summary, due to concerns regarding the ability to provide sustainable high quality water to the proposed subdivision and adequate area for safe disposal of effluent from a proposed community sewer treatment system it is felt that an EIR or supplemental EIR must be completed to fully address these concerns. If you have questions or comments regarding the above conditions, please contact me at the above listed number.

ROAD DEPARTMENT
COUNTY OF MADERA
201 W. ALMOND AVENUE / MADERA, CALIFORNIA 93637
(559) 675-7811 / FAX (559) 675-7631

ROBERT E. TOWNSEND
Road Commissioner

MEMORANDUM

TO: TOM NAVARRO, SENIOR PLANNER, PLANNING DEPARTMENT

FROM: LAWRENCE F. LIHOSIT, DEVELOPMENT SERVICES, ROAD DEPT.

DATE: APRIL 23, 2002

RE: **SUB. 2001-03 SIERRA MEADOWS ESTATES- PRELIMINARY- REVISED MAP REVISED COMMENTS**

The Road Department staff has reviewed the Revised Preliminary Subdivision Map for Sierra Meadows Estates which we received on March 27, 2002. ***Any new or changed items will be indicated by bold italics. Upon commenting on plan sheets, the number in a parenthesis refers to comments made in our February 5, 2002 memorandum.***

We find that the project could have a significant impact on traffic and circulation and recommend that a traffic study be prepared by a California registered traffic engineer. The scope of the traffic study will be as follows:

1. Trip generation for single family detached home will be calculated in accordance with the Road Commissioner approved study for the Oakhurst area (Brian, Kangas Foulk, 1997) The average daily trip generation rate for single family detached homes will be 7.36 trip ends per dwelling unit. The A.M. peak hour trip generation rate will be .54 trip ends per dwelling unit (38% in / 62% out). The P.M. peak hour trip generation rate will be .55 trip ends per dwelling unit (55% in / 45% out). A copy of this study is on file in the Road Department. All other land use trip generation (golf course, etc.) will be based upon the most recent edition of the Institute of Transportation Engineer's Guide.

2. Aside from the proposal itself, the study will assume build-out of those lands within the Shadow Ridge and Miami Creek Estates Subdivision areas (see maps 1 and 2).

3. Scenarios will be based upon the most up-to-date Regional Transportation Model which is available at the Madera County Transportation Commission. Scenarios will include:
   A. 2002 no project
   B. 2015 no project
   C. 2015 project
   D. 2015 project with mitigation

4. Analysis will include turning movements, geometrics, and Level of Service (L.O.S.) For these intersections:
   A. Harmony Lane / State Route 49
   B. Road 621 / State Route 49
   C. Pine River Road / State Route 49
   D. Opah Drive / Harmony Lane

E. Opah Drive / unnamed offer leading to the existing Outlot E
F. Opah Drive / Miami Highlands Drive

5. Analysis will include whether these existing roads meet current county standards:
    A. Pine River Road
    B. Road 621
    C. Opah Drive
    D. Harmony Lane
    E. Miami Highlands Drive

If they do not, provide necessary mitigation.

6. Based upon projected traffic generation, the consultant will recommend whether Opah Drive should form a direct loop with Road 621 or, whether Opah Drive should form a loop itself, intersecting Road 621 at a right angle.

7. Provide analysis and recommendation concerning the extension of Miami Highlands Drive to Road 620 or, an alternate route.

8. Analysis will include proposed mitigation (if necessary). In the event that intersection improvement is proposed, geometric's will be considered. In the event that traffic control measures are proposed based upon traffic volumes, the appropriate warrants will be included.

Review of the *Second* Revised Preliminary Map revealed a series of concerns that may require redesign prior to the submittal of the Tentative Map. We recommend that these concerns be studied by the applicant and addressed with road redesign (if necessary) prior to the preparation of the traffic study. ***Several proposed roads within the project appear to have been changed to private roads. In accordance with county code 17.72.180.D.1, "An offer of dedication is made to the county for <u>any</u> access from a county highway to each parcel created pursuant to the map." Staff recommends public roads or in the event of Board approval, private roads, be built to county standards. The applicant has proposed private roads which do not appear to meet our public road standard. This would require a variance. Should the Board of Supervisors decide to approve private roads, each lot will be required to pay its share of the maintenance district fees because they will use Opah Drive and Miami Highlands Drive which are part of this district. In order to facilitate emergency access to this area and ensure public safety and welfare, public access is recommend (as a minimum) on Opah Drive, the extension of Pine River road, and Nick Faldo Drive.***

According to the general plan, the county must provide "for the long-range planning and development of the county's roadway system (<u>Policy Document</u>, p 25,Goal 2:A) in such a manner that "<u>existing</u> and new streets and roads shall be dedicated, widened, and constructed according to the roadway design and access standards" (<u>Policy Document</u>, p 25, policy 2.A.2). The county "shall <u>not</u> approve new development where existing facilities are inadequate..." (<u>Policy Document</u>, p37, policy 3.A.1). For reasons of public safety and welfare, redesign and reconstruct to meet the minimum standards must be required. Prior to the recordation of Phase 1, we recommend that the applicant be required to :

a. Upgrade any deficiencies identified to the traffic report to offer intersections and, new Opah Drive is not as a through road. Revision will be required based upon the traffic report.

Likewise, the proposed loop through phases *8, 10, 11* and *12* which will connect to Opah Drive must be designed as a through road. The "T" intersection in phase 10 is unacceptable. All curves must have at least a 130 foot centerline radius.

The entire proposed subdivision is included in Maintenance District # 49. The Traffic Study shall provide an Engineers Report for a 20 year maintenance plan for the district and adjust the parcel rate to reflect needed cost. Opah Drive was constructed to a Class IV Structural standard from Harmony Lane to the intersection with Miami Highlands Drive. From that intersection to the intersection with Wallu Lane, it was built to a Class III structural section. From Wallu Lane west to Road 621, Opah Drive is unpaved. Chalatoo Lane is also unpaved. All other existing roads are paved and were built to a Class III standard. The proposal includes several phases with lots of less than one acre. According to code (MCC 17.72.300, 17.32.010, PM-1), these roads are required to be constructed to a Class V standard, while those road that serve parcels of 1 acre to 4.99 acres are to be built to a Class III standard. Corner lots that have frontage on Opah Drive and are less than 1 acre in size, will not be allowed driveway access along Opah Drive.

Following are comments upon each sheet (The numbers in parenthesis correspond to the numbers as shown the ***second revised*** submittal).

Sheet 1/7

1. *Lots having frontage on two roads - access is discouraged on more transitted roads like Opah Drive. Where corner lots have frontage on Opah Drive, access will be encouraged on less transitted road with a waiver of access.*
2. *The entire project boundary should be shown on the first sheet. The boundary does not match pending LLA 01-18.*
3. *The index page must also indicate page numbers.*
4. *(#4) On Tentative Map, show existing offer of dedication which intersects Opah Drive.*

Sheet 2/7

5. *Lots having frontage on two roads - access is discouraged on more transitted roads like Opah Drive. Where corner lots have frontage on Opah Drive, access will be encouraged on less transitted road with a waiver of access.*
6. *At intersections, the tangent should be as near to 100 feet as possible. (See curves 5,31,32)*
7. *(#7) On Tentative Map, show <u>centerline</u> curve data of all roads.*
8. *(#8) The existing intersection of Opah Drive and Miami Highlands Drive will require special attention due to sight distance concerns.*
9. *All driveways must be shown on the Tentative Map.*
10. *(#10) Driveways near this intersection will require special attention.*
11. *(#11) The proposed roads will be constructed to a Class III standard.*
12. *(#12) Sight distance concerns.*
13. *Must show the existing offer of dedication which intersects Opah Drive.*

Sheet 3/7

14. *Lots having frontage on two roads - access is discouraged on more transitted roads like Opah Drive. Where corner lots have frontage on Opah Drive, access will be encouraged on less transitted road with a waiver of access.*
15. *At intersections, the tangent should be as near to 100 feet as possible.*
16. *(#23) Proposed roads must intersect Opah Drive at 90 degree angle (See lots **26/44, 87/97).***
17. *(#25) On Tentative Map, show all centerline curve data for all roads **(curve chart has been omitted).***
18. *(#26) The riparian corridor note reads, "riparian corridor wildlife preservation easement and." Is there more to the note?*
19. *All driveways are to be shown on the Tentative Map.*
20. *Revise water storage easement note to read, "20 foot wide ingress-egress easement." Remove the words "to be offered for dedication" or, offer for dedication the minimum width required, 60 feet. However, note that such an offer would exceed the maximum allowable length.*
21. ***All right-of-ways will be a minimum width of 60 feet and be constructed to county standards.***
22. ***All roads are to be constructed to a Class III standard.***

Sheet 4/7

23. *Lots having frontage on two roads - access is discouraged on more transitted roads like Opah Drive. Where corner lots have frontage on Opah Drive, access will be encouraged on less transitted road with a waiver of access.*
24. *If public proposed roads to be constructed to a Class V standard.*
25. *All driveways are to be shown on the Tentative Map.*
26. ***All right-of-ways will be a minimum width of 60 feet and be constructed to county standards.***

Sheet 5/7

27. *Lots having frontage on two roads - access is discouraged on more transitted roads like Opah Drive. Where corner lots have frontage on Opah Drive, access will be encouraged on less transitted road with a waiver of access.*
28. *At intersections, the tangent should be as near to 100 feet as possible.*
29. *(#23) Proposed roads must intersect Opah Drive at 90 degree angle. (See lots **113/114).***
30. *On Tentative Map, show all centerline curve data for all roads.*
31. ***If public,** proposed roads to be constructed to a Class V standard.*
32. *All driveways are to be shown on the Tentative Map.*
33. ***All right-of-ways will be a minimum width of 60 feet and be constructed to county standards.***

Sheet 6/7

34. *Lots having frontage on two roads - access is discouraged on more transitted roads like Opah Drive. Where corner lots have frontage on Opah Drive, access will be encouraged on less transitted road with a waiver of access.*
35. *At intersections, the tangent should be as near to 100 feet as possible.*
36. *(#17) Proposed Cart Path must cross at a tangent with adequate sight distance.*
37. *All driveways must be shown on the Tentative Map.*
38. *If public, proposed roads to be built to a Class V standard.*
39. ***All right-of-ways will be a minimum width of 60 feet and be constructed to county standards.***
40. *On Tentative Map, show all centerline curve data for all roads.*

Sheet 7/7

41. *Lots having frontage on two roads - access is discouraged on more transitted roads like Opah Drive. Where corner lots have frontage on Opah Drive, access will be encouraged on less transitted road with a waiver of access.*
42. *(#43) Parcel is not numbered or labeled.*
43. *(#44) On Tentative Map, show all centerline curve data for all roads.*
44. *(#45) The proposed roads will be constructed to a Class III standard.*
45. *All driveways will be shown on the Tentative Map.*
46. *The intersection at curve 34 is unacceptable. A realigned Opah Drive or Road 621 must be a through road. Redesign.*
47. *Either the road connecting Opah Drive through phases 8, 10, 11, and 12, be a through road, or Road 621 will be a through road. This will depend upon the conclusions within the traffic report.*
48. ***Access for lot 243 may be unacceptable. It appears that this lot is located with its entire frontage at a 3 way intersection-redesign.***
49. ***That portion of Opah Drive, between lots 245 and 274 can either be vacated at the time this phase is recorded (along with that portion of Opah Drive between the 7th and 8th fairways) or additional right-of-way must be offered for dedication so that this portion will end in an approved turn around.***
50. *At intersections, the tangent should be as near to 100 feet as possible.*

General comments:

51. *The extension of Road 621 to Opah Drive or, the extension of Pine River Road to Opah Drive should be offered for dedication as part of phase 1.*
52. *The extension of Pine River Road or Road 621 , including off site, must be offered for dedication as part of its appropriate phase.*
53. *Prior to the recordation of the appropriate phases, the extension of Pine River Road or Road 621, will be paved.*
54. *As part of phase **10**, an offer of dedication linking Opah Drive to Road 620 will be recorded. This may be an extension of Miami Highlands Drive or an alternative route.*
55. *Prior to the recordation of phase **10**, a road linking Opah Drive to Road 620 will be constructed to a Class III standard.*

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ROAD DEPARTMENT
COUNTY OF MADERA
201 W. ALMOND AVENUE / MADERA, CALIFORNIA 93637
(559) 675-7811 / FAX (559) 675-7631

ROBERT E. TOWNSEND
Road Commissioner

MEMORANDUM

TO: STEVE LANDUCCI, SENIOR PLANNER, PLANNING DEPARTMENT

FROM: LAWRENCE F. LIHOSIT, DEVELOPEMENT SERVICES ENGINEER.

DATE: APRIL 25, 2002

RE: **SIERRA MEADOWS ESTATES / ACCESS TO ROAD 621**

At the April 24, 2002 Subdivision Committee Meeting, John Jamison who represented the applicant, claimed that the Board of Supervisors had adopted a resolution waiving access to Road 621 for new development. Staff found the attached minute orders concerning Pacific Estates and Shadow Ridge Subdivision. Staff also researched all Board resolutions between 1979 and 1981, searching for Board comment about access to Road 621. No other resolution or minute order was found.

Road 621, public right-of-way, is within the County Maintained System and recorded maps offer access to the east. Currently, Opah Drive is recorded as public right-of-way. However, the western portion which intersects Road 621 is a dirt trek which does not meet current county standards.

Minutes from this meeting state that the Preliminary map was approved. At that meeting, Mr. Jamison said that his client no longer wished to use Road 621 for access and further, that it could be an "emergency access road." I requested that the applicant withdraw the map and resubmit with these changes since they are significant. However, according to my notes, you requested that Mr. Jamison note these changes in a letter which staff would consider. Under the circumstances, it might be advantageous to continue this item to another agenda date for further review.

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JOHN O. JAMISON, OF COUNSEL
GREGORY M. CHAPPEL
DALE J. BLEA

JAMISON
CHAPPEL &
BLEA

A PROFESSIONAL
LAW PARTNERSHIP

49430 ROAD 426, SUITE F
POST OFFICE BOX 517
OAKHURST, CALIFORNIA 93[illegible]517
TELEPHONE (559) 683-2950
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April 26, 2002

Mr. Tom Navarro
Madera County Planning Department
135 West Yosemite Avenue
Madera, CA 93637

RE: Sub 2001-03 Sierra Meadows Estates

Dear Mr. Navarro:

PDE Comment

At the request of Mr. Steven Landucci, the applicant is submitting the following letter to advise staff of proposed modifications in the project and to comment on the applicability of certain staff comments as it relates to the scope of the environmental document. The modifications and/or clarifications that the applicant wishes to have staff consider are as follows:

1 First, with respect to the Planned Residential Development portion of the project, the applicant [illegible] to be requesting that rather than the standard 60 foot Offer of Dedication for right-of-way that the right-of-way be a varying width right-of-way within the P.R.D. boundaries. #2 The width of the right of way will be dependent upon the width of roadway, together with appropriate adjustments for cut and fill. The roadway width will be that of a class III road. #3 Therefore, an application for a variance will be filed requesting variances for both the road width and road classification. #1 The applicant will provide 2 off-street parking spaces per unit within the P.R.D. and does not propose to provide walkways, horse paths, or sidewalks as was suggested by one committee member. The reason for this is that the areas are surrounded by significant open space and the basic tenants of the Ahwahnee General Plan is to retain a rural atmosphere. At the current time, these roadways will either be offered for dedication and maintained under the County Maintenance District, or will be retained as private subject to the control of the Homeowners' Association. However, in either event, no gates within the roadways are proposed. In addition, rather than showing the roadways as being outlots, in the event these are determined to be private roadways, the centerline of the road will be the boundary of the property and there will be a recorded easement over and across the property sufficient to provide for the width of the roadway and the appropriate cut and fill areas.

2 With respect to the water system, what is proposed is that water for use within the residence for domestic consumption will be provided for by well water through a system operated and maintained by the Maintenance District. The amount of water will be determined in accordance with applicable standards subject to an adjustment due to the fact that the proposal is that all outside irrigation and fire flow will be provided through either surface or reclaimed waters from the sewage treatment plant.

PLC

Comments.

3 The applicant is also proposing that with respect to the roadway extending through the project at 621, that the roadway would be only for emergency access. The reason for this is prior Board action specifically limited the use of County Road 621 for emergency access; 4 meetings by the owner with various governmental officials, including the District Supervisor and Planning Commissioner, as well as members of the Ahwahnee community have identified that the preferable secondary access would be across Pine River Road. As a result thereof, with respect to Phases 5, 10 & 11, the applicant is requesting that the Madera County Fire Department allow the applicant to apply the "same practical effect" provisions of County Code and PRC 4290 regulations with respect to any roadway in which the deadend length exceeds 800 feet. The mitigation measures under the "same practical effect" being proposed by the applicant are; first, that there would be an emergency fire road which has already been approved; secondly, that we would propose that there be a fuel modification plan adopted on the parcels in which all ladder fuel would be removed and the trees would be trimmed to a height 6 feet above the ground to the drip line of the tree. In addition, all these properties will have fire protection through the water system, including fire hydrants to be installed.

4 With respect to staff comments, Mr. Lihosit of the Road Department asked that any comments regarding the memorandum dated April 23, 2002, be directed to Mr. Townsend for his comments. Our notes reflect the following items were discussed: Referring to that letter, the first item is paragraph No. 2. We believe the scope of the Environmental Impact Report should be limited to the subject property provided, however, that since Miami Creek Estates Subdivision is [illegible] entirely built, the analysis of the current conditions would reflect traffic flows. [illegible] there are 2 large parcels of property [illegible]. Because of the [illegible] County restrictions regarding development of these properties, these properties will [illegible] the foreseeable future, be developed [illegible] than their current entitlement, [illegible] family residence. Therefore, to the extent that there is any consideration of the traffic being generated from Miami Creek Estates, it should be predicated upon the existing parcels and not upon what potential zoning or general plan densities would be. With respect to Shadow [illegible], now Sierra Meadows Road, the residential portion of that consists of 58 lots. The balance of the property is zoned either open space or ag and is not a part of this proposed project. Therefore, the traffic analysis should include only the effects of the 58 parcels. 5

5 With respect to the timing of the regional transportation models, the applicant believes that because of the fact that the project would be online within a 2-year period, that the year 2005 would be the applicable or appropriate date for the transportation model. If we were to use the year 2015, that would, by necessity, include consideration of other projects not even on the drawing board and which may never be approved, and would require the applicant to construct to a standard that has no nexus to the impacts caused by his specific project. Subsequent projects which would add to the traffic would be required to address any increases in traffic relating to their project taking into consideration the traffic generated from this project. 6

6 With respect to item No. 4, subparagraph B, the applicant has had a number of discussions with representatives of the County including the Supervisor and member of the Planning Commission. It is our expressed desire and the desire of numerous citizens with whom this was discussed that the use of 621 be limited only to use in case of emergency. Therefore, item No. B should be deleted, except to the extent of an analysis it is used for emergency purposes. 7

With respect to item No. 5, again, the discussions indicated no intent to use Road 621. In addition, the owner has had discussions with Mr. Gilbert regarding Miami Highlands Drive and Mr. Gilbert has indicated that consideration of extending Miami Highlands Drive was beyond the scope of the project. As a result thereof, both items 6 and 7 should be deleted. 8

With respect to item No. 8, we would request that the Road Department provide clarification as to what it is requesting so that the consultant can determine what is to be included within the proposal. 9

Also, the applicant is going to request an Encroachment Permit for the driveways shown on the final map at the time of final map approval to eliminate any potential disputes in the future regarding these locations.

JOJ/ch

cc: Mr. Steve Greer
Mr Robert Townsend
Mr. Leonard Garoupa

[illegible]

MADERA COUNTY FIRE DEPARTMENT

IN COOPERATION WITH
CALIFORNIA DEPARTMENT OF FORESTRY AND FIRE PROTECTION

14225 ROAD 28
MADERA, CALIFORNIA 93638
(559) 675-7799
(559) 673-2085 FAX

STAN CRAIG
MADERA COUNTY FIRE CHIEF

DATE: May 23, 2002

TO: Planning Department

Re: Fire Protection Requirements

REFERENCE NO: FD ________ PLANNING NO: S2001-01 PERMIT NO:__________

APPLICANT: Sierra Meadows Ranch Estates
LOCATION: ______________________
APN NO: ______________________

The following tentative conditions apply to the referenced project:

F1 The above referenced project is protected by the Madera County Fire Department. Prior to any construction occurring on any parcel, the applicant shall contact the fire department for verification of current fire protection development requirements. All new construction shall comply with existing Uniform Fire Code requirements and all applicable statues, codes, ordinances.

F2 Water systems designed to meet the required fire flow of this development shall be approved by the fire department. The developer shall furnish the fire department with two (2) copies of the water system improvement plan for approval. Water system shall be operational and approved by the fire department prior to any framing construction occurring. Required fire flow is 1000 gallons per minute at 20 residual psi for 2 hours duration per Appendix IIIA, and 901.3 UFC. Private systems shall meet all NFPA 24 & 25 standards. (1500 gpm) for commercial lots.

F3 Prior to building permit, approved fire hydrants shall be installed. Fire hydrants shall be six (6) inch in diameter with a minimum of one (1) four and one half (4 ½) inch and one (1) two and one half (2 ½) inch connection as specified by the fire department. The design of the fire hydrant and fire hydrant pavement marker shall be approved by the fire department. In areas where snow removal occurs or non-paved roads exist, the blue reflective hydrant marker shell be posted on an approved post three feet from the hydrant. Hydrants required for this project are ________. Location to be approved by Madera County Fire Department prior to installation per UFC Appendix III B.

F4 In areas without water serving utilities, the fire protection water system shall be based on NFPA 1142 and be operational prior to framing. Location of water storage tank and hydrants if required, are to be reviewed and approved by the Madera County Fire Department prior to installation. Minimum tank size to be ______________ gallons.

Storage tanks to be installed per attached specification. The outlet ports are to be 2 ½ inch and 4 ½ inch fully gated NH outlets with protection caps.

F5 Prior to any framing construction occurring, all flammable vegetation shall be removed from each building site a minimum distance of thirty (30) feet from any flammable building material, including finished structure.

F6 Fire apparatus access roads required for this project per (UFC 901 & 902).

F7 An approved turnaround shall be provided at the end of each roadway one hundred and fifty (1500 feet or more in length. (902.2.2.2.4 UFC) Driveways and roads shall not exceed maximum 16% grade.

F8 Each development and each phase thereof shall have two (2) points of ingress and egress per UFC902 and Madera County General Plan.

F9 The street address shall be posted with a minimum of three (3) inch numbers. Posted numbers shall contrast with their background and shall be legible from the street in accordance with the Uniform Fire Code. (901 UFC) Where building setbacks exceed one hundred (100) feet from the roadway, additional contrasting three (3) inch numbers shall be displayed at the property access.

F10 Every chimney used in conjunction with any fireplace or any heating appliance in which solid or liquid fuel is used shall be maintained with an approved spark arrestor visible from the ground and as identified in the Uniform Fire Code. (1109.7 UFC)

F11 Fire extinguishers are required in accordance with Uniform Fire Code Standard 10-1.

F12 Any gated access shall be approved by the fire department and emergency access arrangements made prior to occupancy. (902 UFC)

F 13 Fire alarm system is required per UBC and installation per NFPA 72.

F 14 An automatic fire extinguishing system is required as follows:

A Commercial-type food heating or processing equipment (UFC 1003)

B Spray paint booths or rooms (UFC 4502)

C Entire building (UFC 1003)

All fire extinguishing systems, including automatic sprinkler systems, Class I, II, and III combined standpipes, clean agent systems, and other special automatic extinguishing systems, and basement pipe inlets shall be approved by both the fire department and the Office of Building and Safety prior to installation. Said systems shall meet the appropriate standard whether NFPA or UBC. The fire department shall witness all systems tests. Systems shall be operational prior to occupancy.

F15 Exit doors, exit signs and elevator requirements are to be installed per UBC.

F16 The requirements and conditions of approval noted above have been established based on the information submitted for review. Additional and/or modified conditions may be applied at such time as final development plans (including construction drawings for building permits) are submitted, or if any changes are made to the project. Please submit construction plans and final plot plans to ensure the proper application of codes.

F17 All created parcels shall have written certification that driveways can be constructed in compliance with Madera County Ordinance 542.

F18 Building construction on these lots that are less than one acre may not be able to meet fire safe setback requirements in accordance with PRC 4290, Title 14 and ORD 542. All buildings that do not meet the required 30-foot setbacks shall obtain and "Exception to 4290 PRC".

(a) A Class A roof is required.
(b) All flammable vegetation must be removed 30 feet from all structures on the property.

F19 Submit a fuel modification plan by a licensed forester.

F20 This subdivision, driveway, roads, and building shall comply with the provisions of PRC 4290, Title 14, and Madera County ORD 542.

Additional non-standard requirements shall be required as noted:

If you have any questions or need more information regarding the above listed Fire Department conditions please contact **Patti Cline** at (559) 675-7799.

Sincerely,

STAN CRAIG
MADERA COUNTY FIRE CHIEF

BY: PW Cline
Paul Helm
Division Chief

PH/pwc

ROAD DEPARTMENT
COUNTY OF MADERA
201 W. ALMOND AVENUE / MADERA, CALIFORNIA 93637
(559) 675-7811 / FAX (559) 675-7631

ROBERT E. TOWNSEND
Road Commissioner

MEMORANDUM

TO: TOM NAVARRO, PLANNER II

FROM: LAWRENCE F. LIHOSIT, DEV. SERVICES ENGINEER

DATE: 5/24/02

RE: RESPONSE TO JAMISON LETTER/S 01-03, SIERRA MEADOWS ESTATES

We have read Mr. John O. Jamison's letter dated April 26 which we received on May 13. Our comments follow. Mr. Jamison's letter is attached with those sections which we commented upon marked.

1. **Request for variance** (p 1, par 2, L 6-7) Madera County Code specifies that a request for design exceptions be made in writing to the Road Commissioner (MCC 17.32.010, 17.72.290.16). The request must be made by a California registered civil engineer and based upon sound engineering analysis. Construction cost alone shall not be considered a compelling reason. In addition, staff is commenting upon a Preliminary Map. Such a request is most applicable at the time of Tentative Map submission at which time a more detailed analysis by the applicant is available.

2. **Road right-of-way** (p 1, par 2, L 1-5) Madera County Code requires access to parcels be offers of dedication (MCC 17.32.180, 17.72.180D.1) and that all offers of dedication be a *minimum* of 60 feet wide (MCC 17.76.050). Actual width of right-of-way will depend upon the amount of cut and fill required (MCC 17.32.010, 17.72.290.A.7). In this particular case, the topography will probably require more than a 60 foot width. However, without a specific road design, it is not possible to analyze this. When the project engineer submits his request for a variance, he should include a design to refer to.

3. **Class III road** (p 1, par 2, L 5) Madera County Code specifies road types depending upon lot sizes and the number of lots served (MCC 17.32.010, 17.72.300). In this particular case, some of the proposed lot sizes require a Class V standard. When the project engineer submits his request for a variance, he should submit a sound engineering analysis of why a lesser standard is preferable.

4. **Emergency access/Road 621** (p 2, par 3) The portion of Opah Drive from Road 621 to near its intersection with Wallu Lane is a dirt trek, impassable during the rainy season and with a series of sharp curves. The road does not meet current minimum design standards. The road may have been approved previously, however the past development proposal has since expired and never included

any vested documents. Mr. Jamison appears to make an argument that a road previously approved twelve years ago must be accepted today. The minimum standards have since changed.

Mr. Jamison also mentioned "limited use of County Road 621." The Board of Supervisors took action on a subdivision in 1990 which has since expired (res 90-34). The Board of Supervisors may wish to reevaluate access.

Our recommendation is that Opah Drive be extended west to State Route 49 in order to create a safe and efficient circulation system in accordance with the general plan (General Plan Policy Document, p 25, goal 2A, policies 2.A.1 & 2.A.2). The applicant's team has proposed two such access points; the connection of Opah Drive to Road 621 and the extension of Pine River Road. In both cases, they proposed road improvements to meet or surpass the county's minimum standards. Mr. Jamison implies that he wishes to use an unimproved Opah Drive to connect with Road 621. This road does not meet current standards.

We have no objections to a project redesign which includes the extension of Pine River Road to Opah Drive in such a manner that it forms one continuous road meeting our minimum design standards (see attached map). We have no objections to a project redesign which prohibits through traffic from passing west onto Road 621, so long as the proposed new roads are paved to the appropriate standard, meet or surpass the minimum design standards, meet the maximum permitted cul-de-sac length, and include a CDF approved gate to be installed on the property line where Road 621 stops and the new proposed road begins. Note however, that such a design change would require the construction of Nich Faldo Drive in Phase I to facilitate a looped circulation system. We have objections to the use of the existing substandard road.

5. **Traffic study scope: traffic generation** (#2) Mr. Jamison referred to the area of study. State law specifically outlines a general plan as a "probably future project" (Guidelines for California Environmental Quality Act, p 131, 15130 B.2). Any officially designated open space will be discounted from the traffic generation figure.

6. **Traffic study scope: scenarios** (#3) It is permissible to study cumulative effects of a project (Ibid) and to use a general plan or a similar plan. Madera County has adopted a traffic model as a compliment to the circulation plan. Cumulative effect of the project would not be reflected with projected traffic for the year 2005.

7. **Traffic study: off-site locations** (#4) If the applicant decides to use only the extension of Pine River Road, while prohibiting through traffic onto Road 621 as we outlined in number four above, we could remove the study of the Road 621/SR 49 intersection.

8. **Traffic study: existing road standards** (#5) If the applicant decides to use only the extension of Pine River Road, while prohibiting through traffic onto Road 621 as we outlined in number four above, we could remove the study of Road 621.

9. **Traffic study: mitigation** (#8) This is standard wording. If the contracted consultant needs further direction, it will be given.

California Regional Water Quality Control Board
Central Valley Region
Robert Schneider, Chair

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

Fresno Branch Office
Internet Address: http://www.swrcb.ca.gov/~rwqcb5
3614 East Ashlan Avenue, Fresno, California 93726
Phone (559) 445-5116 • FAX (559) 445-5910

20 June 2002

Mr. Seven L. Greer
Madera County Planning
135 West Yosemite Avenue
Madera, CA 93637

NOTICE OF PREPARATION, SIERRA MEADOWS ESTATES SUBDIVISION (S2001-03), BARD INVESTMENT COMPANY, L.P. MADERA COUNTY

We reviewed your *Notice of Preparation* (hereafter Notice), dated 23 May 2002, of a draft environmental impact report (DEIR) for the development of the Sierra Meadows Estates Subdivision. The Notice describes a project consisting of a 304-lot subdivision on 442 acres. The lots will vary in size from 7,000 square feet to over 6 acres. The project is within the upper Fresno River watershed on Opah Drive approximately 0.75 mile north of its intersection with Harmony Lane in Oakhurst. The Notice indicates that sewage service will be provided by an onsite wastewater treatment facility (WWTF). The Notice also indicates, that due to site constraints (e.g., slope, vegetation, drainages, well location, etc.), the DEIR will evaluate several options for the WWTF location.

The Regional Board adopted a *Water Quality Control Plan for the Sacramento River Basin and San Joaquin River Basin, Fourth Edition,* (hereafter Basin Plan), which designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for waters of the Basin. Downstream from the project vicinity is Hensley Lake, a flood control reservoir operated by the Army Corps of Engineers. Each summer, Hensley Lake experiences massive growths of algae, called algae blooms. This growth is stimulated by nutrients in the water entering the lake, primarily phosphorus and nitrogen. The major source is land runoff, that is, storm water runoff from the watershed. Another source is the underground flow of water leaching from thousands of individual septic systems regulated by the County.

Accordingly, during the preparation of the DEIR, the County must include sufficient information to evaluate the extent to which, if any, the proposed WWTF and its discharge will impact surface water and groundwater quality. The DEIR should, at a minimum, thoroughly describe the following:

1. The existing quality of the receiving water (surface and groundwaters);

2. The proposed WWTF's components;

3. What entity will operate the WWTF;

4. How and where wastes, such as grit, biosolids, and wastewater are contained or discharged (e.g., disposal ponds, sprayfields, sludge beds, etc.) and the management thereof;

5. The quality of the wastewater discharge;

6. The risks (health and environmental) involved of applying domestic wastewater to land; and

7. The impact on the quality of the receiving water (both surface and groundwaters) as a result of discharges to land of treated domestic wastewater and biosolids.

If adverse impacts to water quality are identified, the DEIR must also specifically identify and discuss what mitigation measure(s) the applicant will implement to reduce these adverse impacts to less than significant levels. An overriding statement(s) in the document that compliance with existing laws and regulations will mitigate any identified adverse impacts is not sufficient and does not constituent a mitigation measure. In addition to specifying specific mitigation measures, the document must also thoroughly discuss how the applicant will monitor the effectiveness of the mitigation measure(s).

Due to existing impacts from poor quality groundwater and wastewater from septic systems indirectly or directly discharging to the Fresno River and its tributaries, the Fresno River has no assimilative capacity for additional nutrients, such as nitrogen. We recommend the DEIR evaluate an alternative in which the project applicant incorporates treatment technology (e.g., sequencing batch reactor, oxidization ditch) that will achieve low effluent BOD, which will significantly reduce nitrogen concentrations in effluent discharged to land and subsequently to the Fresno River.

We also advise Madera County to require the project applicant to submit a complete Report of Waste Discharge (RWD) to the Regional Board pursuant to section 13260 of the California Water Code at least 120 days prior to initiating discharge. The RWD will likely contain or reference information in the DEIR but also must include, in part, a technical report that thoroughly describes the proposed manner in which the waste disposal will be conducted and include the information described in the enclosed *Information Needs For Liquid Waste Disposal.*

As part of the RWD and environmental review process, a complete Antidegradation Analysis must also be performed to satisfy the antidegradation provisions of State Water Resource Control Board Resolution No. 68-16, *Statement of Policy with Respect to Maintaining High Quality of Water in California*. The Antidegradation Analysis should be part of the environmental review process. We encourage the County, as lead agency, to include it in the DEIR. If the Antidegradation Analysis shows that the discharge will degrade receiving water quality, the Analysis, to be complete, must describe how the proposed wastewater treatment and disposal system reflects the implementation of best practicable treatment and control and why the resulting degradation is to the maximum benefit of the people of the State of California.

In the Notice discussion, you identify that the proposed project will disturb more than five acres, therefore, compliance with the National Pollutant Discharge Elimination System General Permit No. CAS000002 for Discharges of Storm Water Associated with Construction Activity (Waste Discharge Requirements, Order No. 99-08-DWQ) will be required. Before construction begins, a Notice of Intent to comply with the Order must be submitted to the State Water Resources Control Board and a Storm Water Pollution Prevention Plan must be prepared. If you have any questions regarding the storm water permitting process, please call Ms. Lisa Gymer at (559) 445-6046 or check the State Water Quality Control Board's website at http://www.swrcb.ca.gov for more information.

If the project will involve the discharge of dredged or fill material into navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the US Army Corps of Engineers. If a Section 404 permit is required by the Corps, the Regional Board will review the permit application to ensure that discharge will not violate water quality standards. For more information, contact the Sacramento District of the Corps of Engineers at (916) 557-5250.

We appreciate the opportunity to comment on the NOP and look forward to reviewing and commenting on the project's DEIR. If you have any questions regarding this matter, please call Alexis R. Phillips-Dowell at (559) 445-5500.

Jo Anne Kipps

JO ANNE KIPPS
Senior Engineer
RCE No. 49278

Enclosure: Information Needs For Liquid Waste Disposal

ARP:CEQA/SierrameadowsNOP.doc

California Regional Water Quality Control Board
Central Valley Region
Robert Schneider, Chair

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

Fresno Branch Office
Internet Address: http://www.swrcb.ca.gov/~rwqcb5
3614 East Ashlan Avenue, Fresno, California 93726
Phone (559) 445-5116 • FAX (559) 445-5910

Information Needs For Liquid Waste Disposal

1. Waste Characteristics. Describe the quality of the waste stream(s). The description should include maximum and average concentrations of BOD, suspended matter, total nitrogen, general minerals, and electrical conductivity. It should also indicate any chemicals that are added in the process that could appear in the waste stream.

2. Volume of Waste Discharge. State the average and maximum volumes of wastes discharged (million gallons per day) from each waste stream and describe any daily or seasonal variations in volume. Include the period of the year the discharge occurs.

3. Liquid Waste Facilities. Show location and provide supporting calculations for the design of all treatment and holding units and disposal and/or reclamation areas.

4. Land Disposal/Reclamation. Provide a scale map showing the location and area (acres) of land to be used for disposal. The map must indicate all topographical features, all domestic and irrigation wells within 500 feet of the site, and all residences within 1/2-mile of the site.

5. Treatment and Holding Ponds. Indicate the size, depth, and location of ponds, and show the ponds to scale on the scale map discussed in item 3 above.

6. Soils. Provide information on soil types underlying the disposal site, from ground surface to the saturated zone. Soils information should include soil percolation rates; data from onsite borings, logged by a California registered geologist or civil engineer; and may include referenced data from published sources.

7. Groundwater. Provide information on the depth to groundwater and its gradient and direction of flow, based on data from wells of known construction that are perforated in the upper aquifer. If such data is not available, provide an estimate based on referenced data from published sources.

8. Wastewater Management Plan. Provide a wastewater management plan that describes the acreage of various crops to be grown and harvested annually, and which includes crop water use and nitrogen uptake data. The plan must include a monthly water balance using a rainfall return period of 100 years, with storage requirements, and a nitrogen balance. Storage ponds must be designed to contain total annual precipitation using a rainfall return period of 100 years. The plan must demonstrate that disposal and reclamation of the design flow can be accomplished in accordance with accepted irrigation practices, and without contributing additional nitrogen to groundwater. The plan must also describe methods to prevent runoff of tail water into streams, drainage courses, and/or onto properties owned by others, and to prevent the occurrence of nuisance vectors and odors.

9. Provide the name, address, and phone number of the person responsible for operating and maintaining the disposal and/or reclamation facilities so he/she may be contacted by Board staff members for inspection of the facilities.

20 June 2002

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

DEPARTMENT OF TRANSPORTATION
1352 WEST OLIVE AVENUE
P. O. BOX 12616
FRESNO, CA 93778-2616
PHONE (559) 445-5868
FAX (559) 488-4088
TTY (559) 488-4066

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	Date # of pages ▸
To Steve Greer	From M. Navarro
Co./Dept. Planning	Co. Caltrans
Phone #	Phone # 445-5868
Fax # 675-6573	Fax #

July 1, 2002

2134-IGR/CEQA
6-MAD-49-2.53
S 2001-03
SIERRA MEADOWS

Mr. Steve Greer
Madera County Planning Dept.
135 W. Yosemite Avenue
Madera, CA 93637

Dear Mr. Greer

We have reviewed the proposal to develop a 304-lot subdivision on 442 acres. The site is located on Opah Drive, north of State Route (SR) 49. Caltrans has the following comments:

The proposed project could generate a significant number of trips that would impact the SR 49/Harmony Lane intersection. A Traffic Impact Study (TIS) is needed to assess the project-related impacts on the State highway system and the pro-rata share towards area-wide circulation improvements. Please reference the Caltrans Guide for the Preparation of Traffic Impact Studies, dated June 2001, and send the scope of the TIS to Caltrans before the traffic study is conducted.

Please send a response to our comments prior to staff's recommendations to the Planning Commission and the Board of Supervisors. If you have any questions, please call me at (559) 445-5868.

Sincerely,

MICHAEL NAVARRO
Office of Transporting Planning
District 6

C: Larry Lihosit, Roads Department

Enclosure

"Caltrans improves mobility across California"

State of California - The Resources Agency
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
San Joaquin Valley and Southern Sierra Region
1234 East Shaw Avenue
Fresno, California 93710
(559) 243-4014

July 3, 2002

Please FAX TO
Madera Co
when Signed
D
675-6573

Mr. Steven L. Greer, Planner
Madera County Planning Department
135 West Yosemite Avenue
Madera, California, 93637

Dear Mr. Greer:

S2001-03, Sierra Meadows Estates Subdivision
Notice of Preparation (NOP) of a Draft Environmental Impact Report (EIR)
SCH # 2002061001

We have reviewed the NOP for the Project referenced above. The Project includes development of a 304 lot subdivision on a 442 acre site located north of Highway 49 on Opah Drive approximately 0.75 miles north of its intersection with Harmony Lane (Township 6 South, Range 21 East, Sections 31 and 32, and Township 7 South, Range 21 East Sections 4 and 5). Wildlife resources occur on the site and will be impacted by its development. Our specific comments follow:

DEPARTMENT JURISDICTION

Responsible Agency Authority: The Department of Fish and Game (Department) has regulatory authority with regard to activities occurring in streams and or lakes that could adversely affect any fish or wildlife resource. According to the Project description, Miami Creek, unnamed streams and drainages, and several ponds occur on the site. These features could be affected by site improvements and if so the Department will need to enter into a Stream Alteration Agreement for this Project, pursuant to Fish and Game Code Sections 1600 et seq.

Additionally, the Department has regulatory authority with regard to the "take" of any State-listed threatened or endangered species and candidate species under the California Endangered Species Act (CESA). Should the Project result in the "take" of a State- listed species, we may need to issue an Incidental Take Permit pursuant to Fish and Game Code 2081.

We will need to use the environmental document prepared for the Project in order to determine conditions necessary to include in any permit or agreement we prepare for the Project. We will also need to use the environmental document developed by Madera County to prepare Responsible Agency Notices of Determination and the California Environmental Quality Act (CEQA) findings for said permits or agreements.

Trustee Agency Authority: In addition to our Responsible Agency status regarding any Stream Alteration Agreements and Incidental Take Permits we prepare for this Project, the Department is also a Trustee Agency with responsibility under (CEQA) for commenting on projects such as this one that could significantly impact plant and wildlife resources. Pursuant to Fish and Game Code Section 1802, the Department has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biological sustainable populations of those species. As a trustee agency for fish and wildlife resources we are responsible for providing, as available, biological expertise to review and comment on environmental documents and impacts arising from project activities as those terms are used in CEQA.

Bird Protection: The Department has jurisdiction over actions which may result in the disturbance or destruction of active nest sites or the unauthorized "take" of birds. Fish and Game Code Sections that protect birds, their eggs and nests include Section 3503 (regarding unlawful take, possession or needless destruction of the nest or eggs of any bird), 3503.5 (regarding the take, possession or destruction of any birds-of-prey or their nests or eggs), and 3513 (regarding unlawful take of any migratory non-game bird). Should trees or vegetation be removed as part of this Project take of birds, active nests, or eggs could result.

Fully Protected Species: The Department has jurisdiction over fully protected species of birds, mammals, amphibians and reptiles, and fish pursuant to Fish and Game Code Sections 3511, 4700, 5050, and 5515. Take of any fully protected species is prohibited and the Department cannot authorize their take for development. Fully protected species that could use the Project site include southern bald eagle, golden eagle, and ring-tailed cat.

Unlisted Species: Species of plants and animals need not be officially listed as Endangered, Rare, or Threatened (E, R, or T) on any state or federal list to be considered E, R, or T under CEQA. If a species can be shown to meet the criteria for E, R, or T as specified in the CEQA Guidelines (California Code of Regulations, Title 14, Chapter 3, Section 15380) it should be fully considered in the environmental analysis for the Project. A number of sensitive unlisted species could use the Project site and could be affected by its development. These could include but are not limited to:

The Fully protected species listed above.

Raptors

Western pond turtle *Clemmys marmorata*	Species of Special Concern
California tiger salamander *Ambystoma californiense*	Species of Special Concern
California red-legged frog *Rana aurora draytonii*	Federally-listed Threatened
Foothill yellow-legged frog *Rana boylii*	CaliforniaSpecial Concern Species
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	Federally-listed Threatened
Mariposa Pussypaws *Calyptridium Pulchellum*	Federally-listed Threatened
Small's southern clarkia *Clarkia Australis*	CNPS list 1B

Water Pollution: Pursuant to Fish and Game Code Section 5650, it is unlawful to deposit in, permit to pass into, or place where it can pass in the "Waters of the State" any substance or material deleterious to fish, plant life, or bird life. Additionally, Fish and Game Code Section 5652 prohibits the deposition of any cans, bottles, garbage, motor vehicle or parts thereof, or rubbish, within 150 of the high water mark of the "Waters of the State" (or where they can pass in to any "Waters of the State").

The Regional Water Quality Control Board (Board) also has jurisdiction over discharge and pollution of "Waters of the State". Whenever it is determined by the Department that a continuing and chronic condition of pollution exists, the Department shall report that condition to the appropriate Board, and shall cooperate with the Board in obtaining correction or abatement in accordance with any laws administered by the Board for the control of practices for sewage and industrial waste disposal pursuant to Fish and Game Code Section 5651. It is possible that without mitigation measures this Project could result in pollution of "Waters of the State" from increased road runoff, parking runoff, wastewater disposal, and construction activities.

Wetland Policy: The Department's practices and comments reflect policies adopted by the Fish and Game Commission regarding wetland resources. These encompass the areas of wetland definition, mitigation strategies, and habitat value assessment methodology. Wetlands are of extreme importance to a wide variety of fish and wildlife species. We consider projects that impact wetlands as damaging to fish and wildlife resources if they result in a net loss of wetland acreage of habitat value.

Riparian Habitat: Approximately two percent of California's pre-settlement riparian habitat currently remains in the State. A disproportionately large variety of animal species including many specifically protected plants and animals rely on riparian habitat. We therefore regard any loss or degradation of riparian resources as a significant impact to wildlife.

PROJECT IMPACTS

The Project could result in:

1) Loss or degradation of stream, lake, wetland, and riparian habitat.
2) Take of state or federally-listed threatened or endangered species.
3) Loss or degradation of wildlife habitat.
4) Water pollution.

5) Interference with daily and seasonal animal movement, migration, and foraging patterns.

6) Increased disturbance to wildlife from people, pets, and feral pets.

7) Increased human wildlife confrontations.

INFORMATION TO INCLUDE IN THE EIR

We recommend that the following information be included in the EIR.

1) Results of biological site surveys including type, extent, and quality of the various habitat types on the site. Biological information should be identified on a site map. Streams, seasonal streams, lakes, ponds, wet meadows, springs, seeps and other wetlands, elderberry plants, and valley oak trees should be specifically identified. Depending on results of initial surveys and locations of project-related disturbance, additional surveys for listed and otherwise sensitive plants and animals may be necessary.

2) A formal wetland delineation verified by the United States Army Corps of Engineers (ACOE).

3) An analysis of the water supply and how water use will affect streams and wetlands on the site.

4) An analysis of the wastewater disposal system and how its construction and operation will affect wildlife resources.

5) Locations of all Project features.

6) An alternatives analysis that includes density reduction and clustering of development away from sensitive resources.

SUGGESTED MITIGATION MEASURES

Mitigation measures should generally include:

1) Avoidance of sensitive habitats and appropriate buffer areas.

2) Management of particularly sensitive areas for their wildlife benefit. The EIR should disclose how any avoided and managed areas will be protected over time (how will this be funded and who is responsible for monitoring).

3) Limiting outdoor lighting.

4) Avoiding disturbance within the drip line of any valley oak.

5) Public education to inform residents of the community about living with wildlife. This could be in the form of a brochure given to all owners of record and made readily available to all residents of the subdivision.

6) Compensation habitat for resources lost or disturbed by the Project.

7) Enforceable pet restrictions and on-going management and monitoring of feral pets.

We look forward to reviewing the EIR for this Project. If you have any questions regarding these comments, please contact Ms. Donna Daniels, Environmental Scientist, at the address or telephone number (extension 222) provided on this letterhead.

Sincerely,

W. E. Loudermilk
Regional Manager

cc: See Page Seven

cc: United State Army
  Corps of Engineers
Central Valley Office
1325 J Street
Sacramento, California 95814-2922

California Regional Water
  Quality Control Board
Central Valley Region
3614 East Ashlan Avenue
Fresno, California 93726

United States Fish and
  Wildlife Service
2800 Cottage Way, W-2605
Sacramento, California 95825

Ms. Donna Daniels
Department of Fish and Game

State of California • The Resources Agency
Gray Davis, *Governor*
DEPARTMENT OF PARKS AND RECREATION
Ruth G. Coleman, *Acting Director*
The Central Valley District
22708 Broadway Street
Columbia, CA 95310

RECEIVED
JUN 13 2003
RBF CONSULTING

June 10, 2003

Mike Harden, Project Manager
RBS Consulting
14725 Alton Park Way
Irvine, CA 92618-2027

Re.: Residential Development, 442-acres, Madera County

Dear Mr. Harden:

We are writing in response to a letter to Mr. Jay Johnson regarding a proposed residential development southeast of Wassama State Historic Park. Mr. Johnson gave us a copy of the letter and requested that we comment on the project as well. We called Mr. Peter M. Jensen this morning to find out more about the project and he gave us a few details and your name and address. He did not know the phase of the environmental review process, but since he has not completed his cultural resources study, we assume that you have not completed a Draft Environmental Impact Report.

Please add us to the notification mailing list for the DEIR and public hearings concerning this project and send us a copy of the project description and plan map.

As the regional representatives of a trustee agency, we are concerned about the direct, indirect and cumulative impacts of a high-density development near the Traditional Cultural Property of Wassama. The current land uses surrounding Wassama allow for the continuation of the Southern Sierra Miwok cultural heritage. Significant increases in the number of people living in the area can be expected to have negative traffic, noise, visual, air, water, and social impacts. That is why a proposed 340-lot subdivision adjacent to the park to the southeast most concerns us. Of course, cultural resources located within the 442 acres need to be fully considered and avoided as much as possible too.

We are pleased that Mr. Jensen contacted the Native American Heritage Commission and Mr. Jay Johnson to request comments and information concerning prehistoric sites and traditional use areas within the proposed 442-acre development boundary. We encourage him to contact Mr. Johnson and the Native caretakers of Wassama in person to consult further regarding their concerns.

We are compiling the records of previous research conducted at Wassama, some of which are not on file at the OHP Information Center or NAHC. Mr. Jensen is welcome to contact us for further information so that his study will adequately address potential impacts.

Sincerely,

James S. Wassmund
(Scott) James S. Wassmund
District Superintendent
(209) 532-0150

and

Linda Dick B
Linda Dick Bissonnette, Ph.D.
Heritage Resources Associate
(209) 694-0305

cc. DPR Env. Rev. section

SHERIFF'S DEPARTMENT

**Madera
County**

John P. Anderson, Sheriff-Coroner

14143 Road 28
Madera, CA 93638
Phone: (559) 675-7770
Fax: (559) 675-8413
E-Mail: sheriff@madera-county.com

To: Mike Harden, RBF Consulting **June 23, 2003**

Phone: 949 472 3447

FAX: 949-837-4122

From: Lieutenant M. Gauthier

FAX: 559-683-2763

Subject: Sierra Meadows Estates Police Information Request.

---

1. **Presently the Sheriff's Substation, which serves the area of your project, is located at Bass Lake however we are presently in a planning stage for a substation in Oakhurst. Approx 3 ½ miles from your development.**
2. **The geographical area served by the Substation which serves your project area is commonly referred to as Eastern Madera County and the resident population is approximately 35,000 with an increase during the summer months to approximately 60,000.**
3. **At present the uniform patrol section numbers 21 personnel.**
4. **Average response time in the Mountain Division is 20 minutes.**
5. **I would anticipate a significant increase in the amount of calls we would have to respond to. I would also question the ability of the existing narrow road system to accommodate the increase in traffic generated by the development of 400 plus lots.**
6. **I would anticipate that when complete this project could add as much as 25% to the activity in this beat area of the Mountain Division. I would also expect that as the majority of these residences would be purchases by working homeowners the traffic entering Hwy 49 from this road-system would significantly increase the congestion at the Hwy 41/Hwy 49 intersections in Oakhurst.**
7. **No comment.**
8. **Refer Madera Co.**

POLICE SERVICE QUESTIONNAIRE
SIERRA MEADOWS ESTATES
ENVIRONMENTAL IMPACT REPORT

Please respond to the following questions on your agency letterhead and provide maps to illustrate facility locations.

1. Please indicate the location of the police or sheriff stations that would serve the Sierra Meadows Estates project area.

2. What is the geographical area and total population that is served by the station(s)?

3. Approximately, how many law enforcement officers and patrol vehicles presently serve the project area vicinity?

4. What is the approximate response time to the project area?

5. Do you anticipate any significant impacts from the project on current service around the project area, such as increasing service calls or the need for additional manpower or patrol cars? Please provide generation factors if it is determined that additional manpower or patrol cars are required?

6. Do you anticipate that project implementation would result in the need for physical additions to your agency (i.e., construction of new police stations)?

7. Is there any other relevant information regarding significant project impacts?

8. Do you have any required or recommended mitigation measures for significant impacts of the project?

Pacific Gas and
Electric Company

South Valley Land Services

650 "O" Street, Third Floor
Fresno, CA 93760-0001

559.263.7297
Internal 821.7297
Fax 559.263.7399

June 27, 2003

RECEIVED
JUL - 2 2003
RBF CONSULTING

Mr. Mike Harden
Environmental Analyst
RBF Consulting
14725 Alton Parkway
Irvine, CA 92618-2027

RE: Environmental Impact Report for the Sierra Meadows Estates Project (Gas & Electric)

Dear Mr. Harden:

Thank you for the opportunity to comment on the Environmental Impact Report (EIR) for the proposed Sierra Meadows Estates project in Madera County. Pacific Gas and Electric Company (PG&E) has no gas facilities located within the unincorporated area of eastern Madera County. PG&E would like to make the following comments addressing the electric facilities within this area.

PG&E owns and operates several electric distribution lines located within the proposed project's boundaries. To promote the safe and reliable maintenance and operation of utility facilities, the California Public Utilities Commission (CPUC) has mandated specific clearance requirements between utility facilities and surrounding objects or construction activities. To ensure compliance with these standards, project proponents should coordinate with PG&E early in the development of their project plans. Any proposed development plans should provide for unrestricted utility access and prevent easement encroachments that might impair the safe and reliable maintenance and operation of PG&E's facilities.

Some examples of activities that could have an impact upon our facilities include permanent/temporary changes in grade under our facilities; construction of structures within or adjacent to PG&E's easements; and planting of certain types of vegetation under our electric facilities.

Developers will be responsible for the costs associated with the relocation of existing PG&E facilities to accommodate their proposed development. Because facility relocation's require long lead times and are not always feasible, developers should be encouraged to consult with PG&E as early in their planning stages as possible.

Expansion of distribution and transmission lines and related facilities are a necessary consequence of growth and development. In addition to adding new distribution feeders, the range of electric system improvements needed to accommodate growth may include upgrading existing substation and transmission line equipment, expanding existing substations to their ultimate buildout capacity, and building new substations and interconnecting transmission lines.

PG&E remains committed to working with the County of Madera to provide timely, reliable and cost effective electric service. Please contact me at (559) 263-7374 if you have any questions regarding our comments. We would also appreciate being copied on future correspondence regarding this development.

Sincerely,

Tom Johnson/dkj

Tom Johnson
Land Agent

TJJ:dkj

RECEIVED
JUL - 3 2003
RBF CONSULTING

40096 Indian Springs Road
Oakhurst, CA 93644
(559) 642-1555

Bass Lake Joint Union Elementary School District

June 30, 2003

Mike Harden
RBF Consulting
14725 Alton Parkway
Irvine, CA 92618-20276

Dear Mr. Harden:

The proposed Sierra Meadows Estates project lies within two school districts. The High School District is the Yosemite Joint Union High School District and the students would also attend the Bass Lake Joint Union Elementary School District. The school of residence for this area would be Wasuma Elementary School. It is a K-8 school. The only other elementary school within a reasonable distance would be Oakhurst Elementary School. I will attempt to answer the questions listed in your request for our school district only. Mr. Bill McCabe is the appropriate contact for the high school district. I have spoken to him and he is addressing the questions in a similar missive.

1. **Please list the name and address of all elementary, junior high and high schools that are available to serve the project area?**

   The elementary school is Wasuma Elementary School. 43109 Hwy 49, Ahwahnee, CA 93601. The alternative site would be Oakhurst Elementary School. 49495 Road 427, Oakhurst, CA 93644.

Every Child . . . . A Promise

2. **What is the current enrollment of each school in the vicinity of the project and what is the maximum capacity of each school.**

   The current enrollment of Wasuma School is approximately 380. The capacity of that site is 375. The current enrollment of Oakhurst Elementary is approximately 375 and the capacity is approximate 395. Each of these capacities is based upon students entering in relatively even distributions over the grade levels. Higher numbers of younger children require more facilities due to California's Class Size Reduction program.

3. **What is the distance of each school to the project area?**

   The distance to each school is approximately 4 miles.

4. **What are the average student generation rates per dwelling unit for the proposed project at each school level? Will new facilities be required?**

   Estimates on student generation rates for Kindergarten through 8th grade vary from .3 students to .4 students per dwelling. Given the size of the development, with over 300 dwellings, a conservative estimate would indicate the minimum increase in student population would exceed 90 additional students.

5. **Do you anticipate that project implementation would result in the need for physical additions to your school district (i.e., construction of new school facilities)?**

   There is no question that additional facilities will have to be constructed to handle the increased enrollment.

6. **Is there any other relevant information regarding significant project impacts?**

The area of the proposed development is in steep terrain. That gives us substantive transportation issues. Serious consideration would have to be given to the width and degree of slope of all roads. I am no expert in the field and there are probably regulations regarding this but it would seem that the maximum pitch of a road would have to be no greater than 9%, and that would only be for short distances. Longer climbs would necessitate lesser slopes. The width of roads should be considered in order to allow safe bus access and turnaround. Secondary exits and or wide turnarounds (at the end of dead end streets) should be available in the planning of the road system. If the road system is set up as a private road, then consideration must be given to snow plows and sanding during inclement weather conditions (ice and snow) and who would bear the responsibility for providing this service. As you can see, we have significant concerns regarding transportation.

7. Are there any assessment fees or other required or recommended mitigation measures for the project? If so, please explain.

We have developer fees in place to help mitigate some building costs.

I hope this has been of some assistance.

Sincerely,

Michael MacChesney

Dr. Michael MacChesney
Superintendent.

SCHOOL FACILITIES QUESTIONNAIRE
SIERRA MEADOWS ESTATES
ENVIRONMENTAL IMPACT REPORT

Please respond to the following questions, as applicable, on your agency letterhead and provide maps to illustrate facility locations.

1. Please list the name and address of all elementary, junior high and high schools that are available to serve the project area.

2. What is the current enrollment of each school in the vicinity of the project, and what is the maximum capacity of each school?

3. What is the distance of each school to the project area?

4. What are the average student generation rates per dwelling unit for the proposed project at each school level?

5. Do you anticipate that project implementation would result in the need for physical additions to your school district (i.e., construction of new school facilities)?

6. Is there any other relevant information regarding significant project impacts?

7. Are there any assessment fees or other required or recommended mitigation measures for the project? If so, please explain.

United States Department of Agriculture
Forest Service
Bass Lake Ranger District

57003 Road 225
North Fork, CA 93643
(559) 877-2218
(559) 877-3108 FAX

File Code: 5500
Date: July 1, 2003

RECEIVED
JUL - 7 2003
RBF CONSULTING

Mike Harden
Environmental Analyst
RBF Consulting
14725 Alton Parkway
Irvine, CA 92618-2027

Regarding: Sierra Meadows Estates Project Proposal

Dear Mr. Harden:

The proposed project is not located adjacent to National Forest System lands or facilities, and is not likely to affect National Forest System lands, therefore the Forest Service is not in a position to provide comment on the project. If however during further development it is determined an encroachment onto the Sierra National Forest is needed, please contact Gayne Sears, District Lands Officer at this office.

For reference: the proposed Sierra Meadows Estates would develop approximately 442 acres for single-family lots in parts of sections 31, 32, 33, and 34 of Township 6S, Range 21E and Sections 4 and 5 of Township 7S, Range 21E, MDB&M. Generally the area lies in Madera County between State Routes 49 and 41, east of Ahwannee, CA.

Thank you for the opportunity to comment.

Sincerely,

DAVID W. MARTIN
District Ranger

MADERA COUNTY

RESOURCE MANAGEMENT AGENCY
Road Department

Robert E. Townsend, Road Commissioner

- 201 West Almond Avenue
- Madera, CA 93637
- (559) 675-7811
- FAX (559) 675-7631
- TDD (559) 675-8970

July 09, 2003

TO: R.B.F. Consulting

FROM: Everett Rose, Special Districts Engineering Assistant

REF: Sierra Meadows Estates Project, Roadway Maintenance Questionnaire

Listed below are my responses to your Road Maintenance Questionnaire dated June 18, 2003

1. Yes - 303 single-family residential lots will generate 303 X 9.55 trip ends per dwelling unit = 2,894 trip ends per week day.

2. (a) Overlay Opah Drive to provide the additional structural strength required.

   (b) A engineering study shall be requested of the Road Department for all of Maintenance District No. 46 to determine the maintenance assessment per lot required for proper road maintenance, and a election requested per the requirements of proposition 218 to adjust the annual road maintenance assessment as required, adjusted annually for inflation based on the construction cost index.

   (c) Reconstruction of areas of Opah Drive may be required to improve horizontal and vertical site distance.

3. No.

Post-it® Fax Note 7671	Date	# of pages ▸
To MIKE HARDEN	From Mitch Hemaidan	
Co./Dept. RBF	Co. MADERA ROADS	
Phone #	Phone #	
Fax # 949-837-4122	Fax #	

Sincerely, Everett Rose

Everett Rose

Special Districts Engineering Assistant

CC: Mitch Hemaidan

C:\My Documents\MD Letters\MD046SierraMeadowsEst.wpd

ROADWAY MAINTENANCE QUESTIONNAIRE

Please respond to the following questions on your agency/company letterhead and provide maps to illustrate facility locations.

1. Do you anticipate any significant impacts from the project on current roadway maintenance around the project area?

2. Do you have any required or recommended mitigation measures for significant impacts?

3. Is there any other relevant information regarding potential impacts of the project that you can provide for use in the environmental analysis?

MADERA COUNTY FIRE DEPARTMENT
14225 ROAD 28
MADERA, CA 93638
559-675-7799

FACSIMILE TRANSMITTAL SHEET

TO: Mike Harden
FROM: Patti Cline
COMPANY:
DATE:
FAX NUMBER: 949. 837. 4122
TOTAL NO. OF PAGES INCLUDING COVER:
PHONE NUMBER:
SENDER'S REFERENCE NUMBER:
RE:
YOUR REFERENCE NUMBER:

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

NOTES/COMMENTS:

Mike, attached are the answers to your EIR questions for Sierra Meadows

Patti @ 675. 7799
(559)

FIRE SERVICE QUESTIONNAIRE
SIERRA MEADOWS ESTATES
ENVIRONMENTAL IMPACT REPORT

1. Please indicate the name and location of the fire stations that serve the Sierra Meadows Estates project area. Also, indicate, the equipment, personnel and emergency medical services available at each station.

   Oakhurst Station 12 49015 Civic Circle Dr., 1 Engine, 1 Squad, 1 Reserve Engine and one paid staff person.

   Ahwahnee Station 16, 42300 Highway 49, 1 Engine, 1 Water Tender, all-volunteer. 1 staff person at CDF Ahwahnee Station.

2. What are the Fire Department's requirements for fire flow and water necessity/availability for proposed project? Also, we welcome any input on water sources, availability, issues, etc.

   Please refer to items F2 and F3 of attached original comments of September 26, 2001.

3. What is the average response time to areas within the Project area?

   10-20 minutes weather permitting.

4. Please indicate any assessment fees required for the project.

   $431.00 per single-family dwelling

5. Do you anticipate that required fees and taxes proviede by the project will adequately mitigate the expected ncrease in fire and emergency medical service demand? No

6. Please indicate the ISO rating of the project area and any fire hazard impacts of the project (will the ISO rating remain the same)?

   The ISO rating most likely will be a 6. The chief may request the ISO to make a site inspection and set the ISO rating.

7. Do you anticipate that project implementation would result in the need for physical additions to your agency (i.e., construction of new fire stations)?

   Yes.

8. Is there any other relevant information regarding potential significant project Impacts?
9. Do you require or recommend any additional mitigation measures?

   This subdivision will impact the Madera County Fire Department by placing additional demands for the protection of an additional 303 residences, and increased population, and dynamics of volunteerism in California. It will be necessary to employ an additional permanent, full-time career firefighter at the Ahwahnee Fire Station. This will ensure adequate Fire Department staffing.

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State of California – The Resources Agency
GRAY DAVIS, Governor

DEPARTMENT OF FISH AND GAME
San Joaquin Valley and Southern Sierra Region
1234 East Shaw Avenue
Fresno, California 93710
(559) 243-4005

Flex your Power

August 15, 2003

Mr. Robert Bard
Sierra Meadows, Inc.
11661 San Vicente Blvd., Suite 305
Los Angeles, California 90049

Mr. Kaz Kwiecinski
46516 Opah Dr., Suite 101
Oakhurst, California 93644

Dear Messrs. Bard and Kwiecinski:

Follow Up to Our On-site Meeting on Friday, June 20, 2003

On June 11, 2003, Judge Wieland of the Bass lake Municipal Court, directed our Department to work cooperatively with you to try to develop agreement on measures that would reasonably address the fishery-associated public trust needs of Miami Creek, Madera County. He specifically emphasized the need for a long-term solution that would enable settlement of the Fish and Game Code Section 5937 issue, by properly addressing the stream's needs in a way that will avoid subsequent issues relating to Section 5937 being raised.

In response to that guidance, we agreed to meet on-site, to initiate discussions about remedial measures. We originally proposed to meet on June 13, 2003, however, I needed to cancel that appointment, due to a personal emergency (ruptured irrigation pipe, flooding neighbor's property). I apologize again for that inconvenience. We rescheduled and actually did meet at the Sierra Meadows site on June 20, 2003. This letter will serve to document my perspectives regarding that on-site tour and meeting, and further explain the basis for our concerns about Miami Creek.

Mr. Robert Tibstra and I represented the Department of Fish and Game (Department). Mr. Tibstra is one of our on-staff fishery biologists with particular expertise on native foothill fishes and amphibians. I am also a fishery biologist by training. I have more than 30 years experience with foothill fishes and aquatic ecosystems. I am now the Program Manager for the Aquatic Resource Conservation Program within the nine-county San Joaquin Valley Southern Sierra Region of the Department. Mr Tibstra and I met with you and your biological consultant, Dr. Mark Jennings, at the Sierra Meadows Golf Course Clubhouse, from which you provided a tour of the site and facilities.

We very much appreciated the effort and expense on your part to provide us with a fairly comprehensive guided tour of your facilities and waterworks, and to have Dr. Jennings participate. We also appreciated your willingness to openly respond to our questions. The tour improved our understanding of: (i) your facilities, (ii) the Fish and Game Code Section 5937 violation filed against you, (iii) your past and planned future water uses, (iv) the instream flows in Miami Creek, within and below your property and parameters affecting it, and (v) your needs and degree of willingness to provide mitigating measures of various kinds. All of these are pertinent to carrying out the direction which we received from Judge Wieland.

Attendant Water Rights and Operations:

The following summary is only intended to be a cursory summary of our understanding of your water rights and uses, as you represented them to us. I have purposefully omitted some details of your pond-to-pond operations and conveyance, choosing to focus here on those features of your operation that pertain to the potential remedies for Miami Creek which we discussed during our meeting.

You stated that you possess several different water rights which permit you to divert and then beneficially and reasonably use the waters from Miami Creek. Only one of those water rights, an Appropriative Right (Permit Number 21028), permits you to seasonally store diverted water in any of several storage reservoirs. The other two rights, a Pre-1914 Prescriptive Right and Riparian Right, have no such storage entitlements. Because the above Appropriative Right limits your diversion season (i.e., for all purposes, including storage) to the period from December 1 through April 1 of each year, your operation has necessarily been to divert and/or store water in a manner which assures the connected ponds are full as of April 1of each year. This collective storage amounts to enough water volume to supply your beneficial purposes (irrigation of a golf course and other incidental beneficial uses) for a period of about 45 to 60 days, depending on air temperatures, pond evaporation rates and golf course transpiration rates. Generally, this would mean that the ponds would be exhausted of storage in most years prior to the beginning of June, if irrigation was reliant only upon water volumes stored under the Appropriative Right. This necessitates subsequent direct-diversion of additional water, usually in the months between April and September, pursuant to your Riparian and Pre-1914 Prescriptive Right, in order to supply that portion of your use for which your Appropriative Right storage entitlement is inadequate. You indicated that in water-short years, you implement water conservation measures, such as not watering the driving range, in order to reserve all available water for the golf course.

Records of the State Water Resources Control Board (SWRCB) indicate that the Board staff has reviewed the above uses of water, in the process of investigating past Water Rights Complaints, and has determined that the above program of diversions, storage, inter-pond transfers and beneficial uses is compliant with your various water rights, to the extent pond outflow equals or exceeds inflow during the direct diversion (summer) period when you are direct-diverting but not storing water, pursuant to your Riparian and/or Pre-1914 Rights. The Board staff noted only that measuring devices were non-compliant, and they required that situation to be corrected. In resolving the complaint, they stated that they lacked biological information and/or pertinent determinations from our Department. As such, they were unable to determine which public trust elements existed and/or if they were damaged within Miami Creek.

Miami Creek Stream Flows:

The above understanding is germane to our joint consideration of potential remedies pertaining to the Section 5937 Issue. The crux issue involves your need to directly divert water during the summer months, when the natural flow within Miami Creek is normally very low. At our meeting, I provided you with a summary of the recorded flows of Miami Creek, at the United States Geological Survey (USGS) stream gauge, located a distance of four to five miles upstream from your point of diversion. That summary is attached here for reference purposes.

The USGS maintained the above gauge for a 20-year period from October, 1960 to October, 1980. During that period of record, the stream was entirely without flow during only two seasons (92 days in the summer of the 1961-62 water years, and 105 days in the summer of the 1977-78 water years). Both of these periods coincided with extreme multi-year drought conditions throughout California, and particularly within the various San Joaquin Valley watersheds. Page 1 of the attachment shows an additional total of only 28 days, occurring within six years over the 20-year record, when Miami Creek flow dropped below 0.1 ft^3/sec., and additional 340 days, over thirteen years of the 20-year record, when the flow dropped below 0.5 ft^3/sec. The driest season is usually the July 1 to October 15 period. On the basis of this record, it is apparent to us that Miami Creek normally retains a level of discharge that is capable of supporting fish and other aquatic life throughout the dry season. This may not be the case in the most extreme drought years, which comprised about ten percent of the years of record. We acknowledge that flows would be naturally seasonally low (i.e., greater than zero flow, but possibly less than 0.1 ft^3/sec), even without your diversion in operation, during at least a short period of the summer, in about 40 percent of the years of record. These low flows would challenge, but not necessarily eliminate the resident fish or amphibian populations due to seeps, bank storage, ponding along the stream, rainfall events, localized geology, etc. The level of impact would depend upon the level and duration of low flow and other localized conditions, on a case-by-case basis.

Public Trust Considerations:

It is our position that the diversion of all or nearly all of the flow of Miami Creek during the warm summer months is deleteriously affecting the fish populations within Miami Creek. While fish of a variety of species are present at times and in limited numbers, the lack of adequate passage of naturally available flows during the critical summer months constitutes a material change which reduces the standing populations, and impedes individual fish growth, health and survival. By increasing the frequency of years and duration within years in which these extremely dry conditions occur, the diversion affects the overall viability of most if not all aquatic species along the stream gradient.

In prior cases, the courts have supported the Department's definition of "good condition" as related to the Fish and Game Code requirement within Section 5937, for the owners of a dam to keep fish in good condition below dams. In general, our definition includes the following parameters: (i) Presence of the full array of natural species diversity which is normal and predictable for unimpaired, regionally similar examples of particular stream types in question, (ii) Presence of numerically viable and self-sustaining species populations of California's flora and fauna, (iii) Presence of normal and healthy individual organisms with unimpaired growth, condition and reproductive capability, and (v) Intact physical and biological processes which support the above biological considerations. We have found these conditions not to be satisfactorily met in Miami Creek below your diversion under the summertime diverted conditions described above.

When our staff originally surveyed Miami Creek, last year during August, at the time the Section 5937 violation was originally investigated, we found fish (bluegill sunfish) dying and dead in pools near Opah Lane, downstream fo your diversion. At that time, our wardens reported the undiverted natural flow above your diversion to be substantially more than the bypass flows allowed to pass downstream. Above the diversion, they estimated the flow to be at least 0.3 cubic feet per second, while below the diversion dam, they found a much lesser quantity of flow, comprised only of seepage through the dam. We concluded from this that public trust resources (i.e., fish) were present in Miami Creek, and that they were not being kept in good condition below the diversion dam.

This year, with guidance from the court and with your permissive access, we made additional field observations. These included our tour on June 20, 2003, and more detailed surveys on July 10 and July 16, 2003. All of these were in the company of your consultant, Dr. Mark Jennings. In these surveys, we did not observe dead or dying fish, but we did reconfirm that public trust resources exist within Miami Creek. During our brief tour on June 20, 2003, the observed public trust features included a well-developed corridor of stream-dependent riparian vegetation, and evident populations of aquatic organisms, some of which (bullfrogs, sunfishes and potentially others) require multiple years to mature. On your property, we observed Pacific tree frogs, western toads, western pond turtle, crayfish, and evidence of aquatic-associated mammals, such as beaver (dams and drag marks observed) and raccoon (tracks observed). Downstream of your property at the Highway 49 crossing, we had earlier (on June 11, 2003) observed green sunfish and mosquitofish. The presence of fish and amphibians of mature ages suggests either: (i) their survival over sequential years within Miami Creek, or (ii) their unobstructed ability to migrate upstream from the Fresno River and reinvade Miami Creek, after the situation that we observed in 2002. If that happened, the migrations would likely have taken place during the spring high-flow period.

On July 10, and July 16, 2003, we conducted more thorough biological inventory work, in order to determine the species and condition of fishes present within stream reaches that are affected by your diversion, and also to evaluate the upstream migratory access and habitat features of other native species which may have been eliminated due to historical or recent operation of the water diversions. These determinations were needed in order to evaluate and develop remedial actions.

In these surveys, we observed additional public trust species within two surveyed reaches of Miami Creek. These sites consisted of an approximately 100-meter sampling site at Opah Lane, and another 100-meter site within the Golf Course reach. In these samples, we observed bullfrogs, Pacific tree frogs, western pond turtle (shell), larvae of California newts, bluegill sunfish, green sunfish, and adult and juvenile rainbow trout and non-native brown trout. Some of these species, such as the two trout species, are migratory species. In this survey, we did not attempt to determine if the individuals encountered had resided continuously within Miami Creek, or had migrated upstream in the recent past. Regardless, it is evident that both adults and juveniles of these species are present at least at times. The presence of both adult and juvenile trout at this time of year, suggests that successful spawning of these species likely occurred within Miami Creek, during this past spring period. The spawning adult fish may have been upstream migrant fish from the Fresno River.

Few if any historical descriptions exist concerning Miami Creek's historical public trust resources. However, there is a substantial body of present-day physical evidence, described below, in support of the notion that a number of native fish species, besides the observed rainbow trout, were likely historically present and/or more abundant within Miami Creek, prior to the development of water diversions. Such diversions, by seasonally materially reducing the stream flow, can limit the survival, condition and/or upstream passage of native fish and amphibian species. The evidence inferring probable historical native fish use of Miami Creek is as follows.

1.) Populations of several native minnow species (all year), trout (all year or seasonally), other fishes and amphibians (all year) still exist today within the Fresno River at, and in the immediate vicinity of that stream's confluence with Miami Creek. 2.) There are no notable natural waterfalls or other upstream fish movement barriers that would preclude those fish ascending into at least lower Miami Creek. Generally these movements would occur in the spring, when stream flows are at their peak levels. 3.) Summer water temperatures appear to be acceptable for at least the native minnow species and amphibians. 4.) The trout observed in mid July of this year constitute evidence either that the surface stream temperatures were acceptable for trout, or that sub-surface flow seeps or springs are present and capable of sustaining these cold-water species, as long as sufficient surface flow is also present.

Today, most of the historical fish and amphibian populations could be recovered, given restoration of adequate stream flows below your diversion dam, and protection of said stream flows from downstream diversion. For clarification, we submit that the mere lack of present-day populations of historically present fishes (i.e., eliminated due to human-induced stream changes) does not erase those fishes as a part of the legitimate public trust, reserved for the people of the State at the time of California's statehood.

Offsite Compensating Measures (i.e., Reservoirs):

You submitted that the aquatic resources present within the reservoirs (we observed largemouth bass, Pacific tree frogs, western toads, western pond turtle, bullfrogs, etc.), should be in some way credited as partial or full replacement for resources which are damaged in Miami Creek, as a result of your diversions. As we discussed with you, while we recognize that aquatic resources of value do exist in the storage facilities, we do not agree that they effectively replace the stream-associated fishes (which are typically different species) and/or other public trust features that are damaged by direct diverting all, or at least a substantial fraction, of available natural stream flow during the summer period. Out-of-kind and off-site mitigation, such as the reservoirs, does have some value, if permanent public access and use entitlements are provided for. However, the presence of biological attributes at the ponds will still not alleviate the issues within Miami Creek, and therefore will not prevent future claims of damage to the public trust aspects of Miami Creek, attendant to Section 5937. As such, our collective charge from Judge Wieland would not be properly satisfied by identification of the reservoirs and their attendant resources as full compensation for the Miami Creek losses.

Miami Creek Native Species Considerations:

It is important to understand the ecology of fish and amphibian populations within transition zone foothill streams, like Miami Creek, as a basis for contemplating remedial actions and stream flow prescriptions. Foothill transition zone streams should generally not be regarded as isolated ecosystems with isolated populations of fish and/or amphibians. Rather, most of these should be considered as dynamic habitats which articulate with other similar habitats on a watershed-wide basis, and which have populations of fishes and amphibians which at least historically articulated both genetically and behaviorally with downstream and adjacent tributary populations. This connectivity is an important part of the long-term survival of the fish and amphibians both within the tributary stream, and within the downstream watershed.

At the very least, tributary habitats commonly provide important reproductive areas, in which progeny of trout and many other species have a greater chance of survival than in larger downstream waterways. The tributary habitats are normally smaller in size and have warmer temperatures earlier in the year (which allows for enhanced juvenile growth). They also commonly have lush stands of riparian vegetation, which provide an expanded insect food array, and slow-flowing, weedy edges that provide nearly optimal nursery habitat for many fishes and amphibians.

Larger tributaries, like Miami Creek, generally have perennial or nearly perennial flow, but with a high degree of seasonal flow variation. Some of the native fishes and amphibians which are adapted to live within these habitats typically have life history strategies that enable them to survive within a broad range of seasonal water temperature and water quality conditions, and therefore to endure periods of reduced water volumes, although significant individual fish and population stress occurs during extended dry periods. Most of these species are also seasonally migratory, which enables them to exit and reinvade habitats that are only seasonally available.

Typically, within tributaries like Miami Creek, trout and native minnow species make upstream spawning runs during the high flow events of springtime. One to two months later, as the native minnow species' eggs hatch, many of the tiny, feebly swimming fry are immediately washed downstream, into downstream larger waterways, such as the Fresno River. These mix with the larger downstream populations. They gradually grow and mature, before returning in subsequent years, as spawning adults. As stream flow decreases in summer months, the fishes and amphibians which were not washed out, and remained in the tributary habitat become confined within deeper pool systems, which they co-inhabit with other species. These concentrated conditions normally last until greater flow resumes in the fall. Substantial predation and cannibalism takes place; however in most years there is enough pool volume or connecting flow between pools to afford some escape cover, and sufficient numbers of individuals generally survive under those conditions to carry on continuing populations of each species.

In most cases, many trout that are captured by the receding flows and subjected to warm summer conditions, succumb to the elevated temperatures and reduced dissolved oxygen levels. Exceptions occur where substantial sub-surface flow seeps or springs occur, and in those cases, even trout can endure the warmth of summer. These rare temperature conditions appear to exist within Miami Creek, in at least some years, and trout appear to survive there whenever adequate surface flow is present to provide for their spatial habitat and food production needs.

During the rare years when flow ceases entirely within a particular tributary, the confined fishes and amphibians generally perish if surface water is absent. Stranded in drying pools, they become prey for raccoons, birds, humans, or other predators. But when higher flows resume in the following spring, any fish or other organisms remaining plus adult fish (including some past surviving offspring from the same tributary, as well as other tributaries) migrate upstream from the larger downstream waterways, to spawn and re-colonize the tributary habitats. Because the fish progeny from various tributaries are seasonally mixed in the downstream populations, important gene pool mixing occurs, which at least theoretically, strengthens the genetic stocks throughout the watershed.

Reciprocally, tributaries like Miami Creek also provide population refugia against catastrophic loss situations in the downstream waters. In all but the worst drought years, at least some individuals of the tributary populations survive. They provide an important re-colonization source for the downstream population, should it be lost due to a catastrophic event, such as ash pollution from fires within other areas of the watershed. It is probable that the seasonal and cyclic environmental challenges, both within the tributaries and the larger downstream habitats, historically selectively eliminated individual fish which could not tolerate low-flows and high temperatures, and/or which tended not to migrate.

The above-described diversity of survival options and general inter-population connectivity are important factors in the persistence of transition-zone stream fish and amphibian populations. To the extent that population survival options are eliminated within tributaries (e.g., in the case of water diversions causing more frequent critical stream flow reductions with associated elimination of the tributary fish populations), the likelihood increases that the other connected populations will also be affected or lost, across the entire watershed.

As more and more out-of-stream water uses have become established, the frequency of years in which streams become completely dry has greatly increased. This has decreased the number of watersheds statewide where these foothill fishes can survive, and adversely affected their overall population numbers and distributions. These changes have cumulatively moved the species toward gradual extinction. Today, according to Dr. Peter Moyle, a noted authority on native fish ecology, foothill fishes are present in only about 15 to 20 percent of the San Joaquin Valley waters where he found them as regular inhabitants as recently as the mid 1970's.

In addition to brown and rainbow trout, four species of native minnow are still present within the Fresno River watershed at or near the confluence of Miami Creek. One of these species (hardhead) is now officially designated as a "Fish Species of Special Concern (FSSC)," by the Department of Fish and Game, based on the above alarmingly rapid observed decline in their statewide ranges and/or populations. (*Fish Species of Special Concern* are those species whose status is carefully monitored, in consideration of potential need for listing as "threatened" or "endangered," under either the State or Federal Endangered Species Act). A second of these species, Sacramento hitch, is under serious consideration for FSSC designation, based on declines in statewide populations and range. A third of these native fish species, Western roach, displays significant genetic uniqueness between localized populations, across its range; therefore the risk of potential extinction of its small and localized populations is a serious public trust concern.

Prospective Remedial Actions:

In Miami Creek, based on the 20-year hydrological record, it appears the summertime flows are seasonally low in about 50 percent of the years such that it would be difficult for you to make any consequential water diversions during most summer months without virtually taking the last available surface water and therefore damaging any fish or other aquatic life present at the time; not consistent with Section 5937 in our view. This would have the above range of natural consequences, and would also incur risk of recurrent claims of public trust damage, which Judge Wieland states he wishes to prevent. From the standpoint of your golf course, it is apparent from the record that in about ten percent of years, Miami Creek would be without any natural flow during at least a brief summer period, and in another 30 percent of years, the available flow, even if entirely diverted, would be insufficient for your golf course needs. So your present reliance on direct diversion during the summer period would seem neither to properly serve the purposes of your out-of-stream beneficial uses nor the instream public trust values.

If the ponds have mitigating value to the stream, it is probably a function of their storage capacity and timing. They essentially enable water to be stored in the water-rich spring period, which thus reduces demand for direct diversion to be made later in the season when water in Miami Creek becomes scarce. On June, 11, after our session in Judge Wieland's court, we advanced the concept of potentially increasing your storage capability, in order to relieve your need to directly divert water during the low flow season. At that time, you stated your belief that there was no physical site where that could be accomplished. But then on our June 20 tour, you indicated that you had re-examined the property, and had identified an off-stream ravine where about 100 acre-feet of additional storage could be constructed in a series of sequential small size dams. You believed this could be done within reasonable cost and with only minor environmental impacts. We examined the site, and we agree that such storage should be considered as a remedial option. We were very encouraged by this discussion.

On June 20, we discussed several issues relating to the development of such storage, including need for your water rights to be amended to include that additional diverted volume and specified season of diversion. We agreed to follow up with our own management and determine if they consider this concept supportable, both: (i) as an acceptable means to settle the pending Section 5937 issue, and (ii) in the context of our Department supporting the amendment of your appropriative water storage right, before the SWRCB.

Following our meeting, our attorneys clarified that rather than directly support your application before the SWRCB to amend your storage right, The department would file a timely Protest to your Application, to assure the Department's standing in that proceeding. We would simultaneously submit a set of conditions, previously agreed with you (e.g., concerning period of diversion, divertible quantity, instream flow bypass requirements, etc.) as the basis for the relief of said Protest. In this way, key conditions implemented in the settlement process before the Municipal Court would also be reiterated by specific conditions on the water right amendment, subject to the SWRCB authorities. This would provide administrative accountability and enforceability in a manner that would prevent issues of future compliance having to be administered or decided before the court.

During August you visited me in my office, and we had an opportunity to discuss the storage options for remediation of the summer diversion issues. You showed me that more precise calculations indicate a larger volume of stored water will be necessary in order to avoid your need of diverting water during the summer. The revised storage volume totals about 300 acre-feet, including the storage that is already developed. This amounts to roughly 200 acre-feet of new storage. You provided me with a map detailing the locations, volumes and design criteria for the prospective new reservoirs. We examined the 20-year hydrological record for Miami Creek, and determined that diversion of that amount of additional water would be possible during the springtime of most years, without significantly affecting the stream's aquatic life.

We briefly discussed a process for determining a reasonable instream bypass flow requirement for the diversion, during the summer months. You advanced the 0.5 cubic-foot-per-second quantity that I had provided to you for discussion purposes on June 11, following our court appearance. I committed to give the proposal a more thorough review. You stated that you could not accept an absolute prohibition against your diversion of any water, during specific (i.e., summer) months, which you believe would essentially negate or override part of the entitlements of your pre-1914 and riparian water rights. Instead, you indicated willingness (paraphrased here) to accept a reasonable instream flow bypass requirement that is a condition placed upon your action to divert water. This would be a determinable quantity of water to be allowed to pass over, around or through the diversion structure and into the stream at the location and time of diversion, which amount is agreed to be satisfactory to keep the fish in good condition, pursuant to Fish and Game Code section 5937. You stated preference for the instream flow requirement to be narrowly linked to the amendment of your appropriative right (i.e., your additional right to effect the additional storage). As such, if either you or your successors do not divert the additional water to storage, the right to direct divert under the pre-1914 and riparian rights would remain unaffected. That may be procedurally acceptable to us, provided there is a clear understanding and enforced obligation that future diversions under any of your water rights would still need to be in compliance with Fish and Game Code Section 5937, as applicable. In practice, therefore, the agreed-upon instream flow at and below your diversion would still be necessary at any time water is diverted. Absent such an agreed provision, it is likely that the present violation-complaint scenario (which Judge Wieland expressed the court's desire to avoid) would potentially be repeated.

In general, we believe it will be possible to agree upon an instream flow bypass schedule and storage amount and season, which will be adequate to keep the fish and other aquatic life below your diversion in good condition, while still allowing you to enjoy your beneficial out-of-stream uses. We should engage in discussions toward that end as soon as possible. We will advise the Department's representatives in the upcoming pre-trial proceedings of the likelihood of agreement being reached, and will await your contact to proceed with negotiations in the near future. When you activate your application for amendment to your appropriative water right, we will Protest the application and work proactively with you to relieve said protest in the manner described above.

Thank you again for providing the tour of your facilities, access for our biological survey work, and for cooperating with us toward development of a solution to the problem. We look forward to meeting with you in the near future to further explore the proposed increased storage, as a settlement option. If you have any questions or need to consult with us about any aspect of the above discussion, please do not hesitate to contact me at your convenience. I can be reached at the above address and/or telephone number, or by e-mail at dfmitchell@dfg.ca.gov.

Sincerely,

Dale Mitchell

Dale Mitchell
Aquatic Resource Conservation
Program Manager

Attachment

cc: Ms. Jane Crue, Special Prosecutor
California State Attorney General's Office

Dr. Mark Jennings
Rana Resources, 39913 Sharon Ave., Davis, CA 95616-9456

Mr. Robert Tibstra
California Department of Fish & Game, SJVSSR

Mr. Harlee Branch
California Department of Fish & Game, Office of Legal Affairs

Mr. W.E. Loudermilk
California Department of Fish & Game, SJVSSR

OAKHURST COMMUNITY PARK

C/O DAVID A. LINN
PO BOX 2347
OAKHURST, CA 93644
(559) 683-7333

RECEIVED
AUG 2 2 2003
RBF CONSULTING

August 20, 2003

Mr. Mike Harden
Environmental Analyst
RBF Consulting
14725 Alton Parkway
Irvin, CA 92618-2027

Dear Mr. Harden:

As we discussed telephonically I am Chairman of the Oakhurst Community Park Committee and President of the Oakhurst Community Fund, Inc. which is the funding source for the park. In response to the seven questions which you provided me please be advised of the following:

Responses to Questions 1-7:

1. The Oakhurst Community Park is the only park facility in the Oakhurst/Ahwahnee area. It is comprised of approximately 4 ½ acres, and contains hiking trails of approximately 3/8 of a mile.

2. Oakhurst Community Park is totally funded through community contributions. The Park Committee itself, comprised of approximately eight individuals, makes determinations concerning new equipment and maintenance of the park facility. The costs of running the park are approximately $40,000 annually, and the park has recently been receiving donations in the area of around $60,000 per year. Occasionally the Oakhurst Community Park also obtains non-governmental grants. The park is open to the entire community, and certain facilities within the park are available to large groups on a reservation basis.

3. The park is in a constant state of growth and change. At the present time we are replacing a portion of the playground equipment particularly designed for young children. This year we also plan on the construction of an additional large picnic pavilion on the park grounds.

4. As stated above, the only source of funds for the park are monies contributed to the park through the Oakhurst Community Fund, or monies raised by the community fund and park committee at the Elegant Action held each year.

5. The usage of the Oakhurst Community Park is significant and somewhat continuous. Obviously, during the summer months it is used more heavily exceeding several thousand in park attendance during the months of June, July, August, and September. During the winter months the park continues to be used by the area residents for exercise and recreational activities, however the usage level is significantly lower than in the summer months.

6. Our primary goal for the Oakhurst Community Park is to make it available to as many residents of the Oakhurst/Ahwahnee area as possible. Obviously, safety is an on going concern, and with that in mind we continually strive to upgrade our facilities.

7. I do not anticipate that the buildout of the Sierra Meadows Project will result in the need for any physical additions to the Oakhurst Community Park.

Should you have any further questions, please feel free to contact me.

Very truly yours,

David A. Linn
Oakhurst Community Park

DAL:smw

PARK AND RECREATIONAL QUESTIONNAIRE
SIERRA MEADOWS ESTATES
ENVIRONMENTAL IMPACT REPORT

Please respond to the following questions on your agency letterhead and provide maps to illustrate facility locations.

1. Please list the names, acreage and types of facilities of each of the parks that serve the Ahwahnee/Oakhurst area. Also, include the number and length of hiking, riding and bicycle trails.

2. How are park needs determined by your agency (e.g., x acres/population)? Are existing resources adequate or deficient for the community's recreational needs? Are these needs in particular sections of the community?

3. Are there any planned additions to existing park and/or recreational facilities?

4. What are the current sources of revenue for parks and recreation needs/requirtements? Are new developments assessed parks fees and/or required to dedicate park acreage, and, if so, in what amount?

5. What are the current trends in parks and recreational facilities in the community? To the best of your knowledge, has parks and recreational facilities usage changed? Has the level of need increased, decreased or stayed the same in recent years? If there have been changes, please, provide us with information about those changes, known causes of the changes and timeframe in which these changes have occurred.

6. What issues are important to your agency regarding parks and recreation? If there are particular concerns, what do you recommend to alleviate those concerns?

7. Do you anticipate that buildout of the Sierra Meadows Project would result in the need for physical additions to your agency (i.e., construction of new park and recreational facilities)?

To: Mike Harden

Page: 2

Srini

RBF CONSULTING

FAX COVER SHEET

TO: Bill McCabe, Superintendent

FAX: 559-683-4160

COMPANY: YOSEMITE JOINT UNION HIGH SCHOOL DISTRICT

PHONE: 559-683-8801

DATE: AUGUST 13, 2003

FROM: MIKE HARDEN

PHONE: 949.472-3447

CALL

FAX: 949.837.4122

JN: 10-102469

PAGES: 7 (INCLDING COVER SHEET)

SUBJECT: SIERRA MEADOWS ESTATES (SCHOOL) – INFORMATION REQUEST

MESSAGE:

PLEASE REVIEW THE ATTACHED PROJECT INFORMATION AND RETURN COMPLETED QUESTIONNAIRE TO MY ATTENTION. YOU MAY FAX YOUR RESPONSE TO ME AT 949.837.4122.

PLEASE NOTE THAT THIS INFORMATION WAS SENT TO YOUR ATTENTION ON JUNE 18, 2003. HOWEVER, NO RESPONSE HAS BEEN PROVIDED. ALSO, NUMEROUS PHONE CALLS HAVE BEEN MADE TO THE DISTRICT WITH NO RETURNED CALLS. AS THE DRAFT EIR WILL SOON BE SUBMITTED TO THE COUNTY, WE NEED TO INCORPORATE YOUR DISTRICT'S COMMENTS INTO THE ENVIRONMETAL ANALYSIS. THUS, IF YOU HAVE ANY QUESTIONS, COMMENTS OR WOULD RATHER DISCUSS THE PROJECT OVER THE PHONE, PLEASE FEEL FREE TO CALL ME AT 949.472.3447.

THANK YOU.

Mike

See attached questionnaire.

Any questions, please call

Srini Vasan

Director of Business

559-683-8801 x378.

EIR

If there are any questions, or if you do not receive all documents, please call us.

SCHOOL FACILITIES QUESTIONNAIRE
SIERRA MEADOWS ESTATES
ENVIRONMENTAL IMPACT REPORT

Please respond to the following questions, as applicable, on your agency letterhead and provide maps to illustrate facility locations.

* 1. Please list the name and address of all elementary, junior high and high schools that are available to serve the project area.

WASUMA

YHS —

2. What is the current enrollment of each school in the vicinity of the project, and what is the maximum capacity of each school?

WASUMA 385 400

YHS 1250 1500

3. What is the distance of each school to the project area?

4 mi. EACH Approx

4. What are the average student generation rates per dwelling unit for the proposed project at each school level?

Estimated at 0.28 per Family Refer to study

5. Do you anticipate that project implementation would result in the need for physical additions to your school district (i.e., construction of new school facilities)? NO

6. Is there any other relevant information regarding significant project impacts?

Impact transportation school to home

7. Are there any assessment fees or other required or recommended mitigation measures for the project? If so, please explain.

Developer fees 2.14

RAISE JAN 04

E Res. 2.24

* WASUMA ELEMENTARY
43109 HWY 49
AHWAHNEE, CA 93601

YOSEMITE HIGH SCHOOL
50200 ROAD 427
OAKHURST, CA 93644

15.3 Traffic Data

SIERRA MEADOWS ESTATES TRAFFIC IMPACT ANALYSIS

County of Madera

Prepared for

County of Madera

Prepared by

RBF
CONSULTING

14725 ALTON PARKWAY, IRVINE, CALIFORNIA 92618-2027
CONTACT: BOB MATSON 949.472.3505 bobmatson@rbf.com

June 28, 2004

JN 10-102469

TABLE OF CONTENTS

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LIST OF EXHIBITS

EXECUTIVE SUMMARY

This study analyzes the forecast traffic impacts associated with the proposed Sierra Meadows Estates project. The proposed project consists of 315 single-family dwelling units on 442 acres. The project site is located along Opah Drive east of State Route 49 (SR-49) in the unincorporated Ahwahnee/Nipinnawasee area of Madera County. The existing roadway circulation system provides three access routes for the proposed project. Opah Drive, via Harmony Lane, provides primary access at SR-49. In addition, County Road 621 provides access at SR-49 westerly of the primary access location. A third point of access is provided at County Road 628 and Pine River Road.

All study intersections are currently operating at an acceptable LOS (LOS D or better) during the a.m. and p.m. peak hours according to County of Madera performance criteria.

All study intersections are forecast to continue operating at an acceptable LOS (LOS D or better) according to County of Madera performance criteria for forecast year 2025 without project conditions.

The proposed project is forecast to generate approximately 2,318 daily trips, which includes approximately 170 a.m. peak hour trips, and approximately 173 p.m. peak hour trips.

One study intersection is forecast to operate at an unacceptable LOS (LOS E or worse) according to County of Madera performance criteria for forecast year 2025 with project conditions:

- Harmony Lane/SR-49 (a.m. and p.m. peak hours).

To eliminate the forecast year 2025 with project conditions deficiency at the Harmony Lane/SR-49 study intersection, the following improvement is recommended:

- **Harmony Lane/SR-49** - Modify eastbound SR-49 approach from one left-turn lane and one through lane to consist of one left-turn lane and two through lanes.

Assuming implementation of the recommended improvement, the Harmony Lane/SR-49 study intersection is forecast to operate at an acceptable LOS (LOS D or better) during the a.m. and p.m. peak hours for forecast year 2025 with project conditions.

To mitigate project traffic impacts to a level considered less than significant, the project applicant shall make a fair share contribution for modifying the eastbound SR-49 approach at Harmony Lane from one left-turn lane and one through lane to consist of one left-turn lane and two through lanes.

INTRODUCTION

This study analyzes the forecast traffic impacts associated with the proposed Sierra Meadows Estates project. The proposed project consists of 315 single-family dwelling units on 442 acres. The project site is located along Opah Drive east of State Route 49 (SR-49) in the unincorporated Ahwahnee/Nipinnawasee area of Madera County. The existing roadway circulation system provides three access routes for the proposed project. Opah Drive, via Harmony Lane, provides primary access at SR-49. In addition, County Road 621 provides access at SR-49 westerly of the primary access location. A third point of access is provided at County Road 628 and Pine River Road. Exhibit 1 shows the regional project location. Exhibit 2 shows the project site location.

Study Area

County of Madera staff identified the following five intersections for analysis in this study:

- Harmony Lane/SR-49 (1-way stop-controlled);
- SR-49/County Road 621 (1-way stop-controlled);
- SR-49/County Road 628 (1-way stop-controlled);
- Opah Drive/Harmony Lane (3-way stop-controlled); and
- Opah Drive/Miami Highlands Drive (1-way stop-controlled).

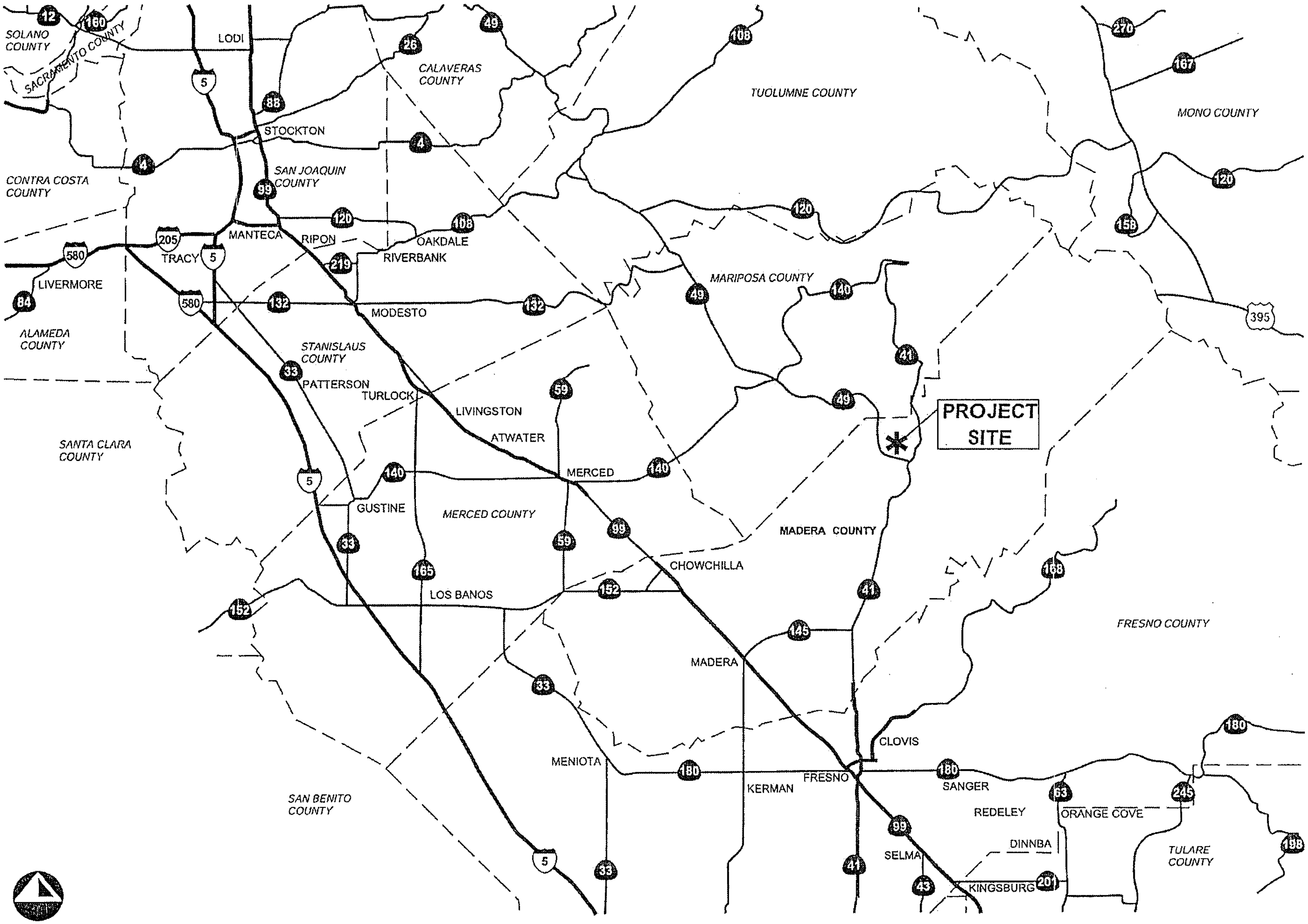
Exhibit 3 shows the location of the study intersections, which are analyzed for the following study scenarios:

- Existing Conditions;
- Forecast Year 2025 Without Project Conditions; and
- Forecast Year 2025 With Project Conditions.

Analysis Methodology

Level of service (LOS) is commonly used as a qualitative description of intersection operation and is based on the type of traffic control and delay experienced at the intersection. The Highway Capacity Manual (HCM) analysis methodology for *Unsignalized Intersections* is utilized to determine the operating LOS of the study intersections.

The HCM analysis methodology describes the operation of an intersection using a range of LOS from LOS A (free-flow conditions) to LOS F (severely congested conditions), based on corresponding ranges of stopped delay experienced per vehicle for unsignalized intersections as shown in Table 1.



NOT TO SCALE

KEY:
– – – COUNTY BOUNDARY

RBF

Regional Project Location

Exhibit 1

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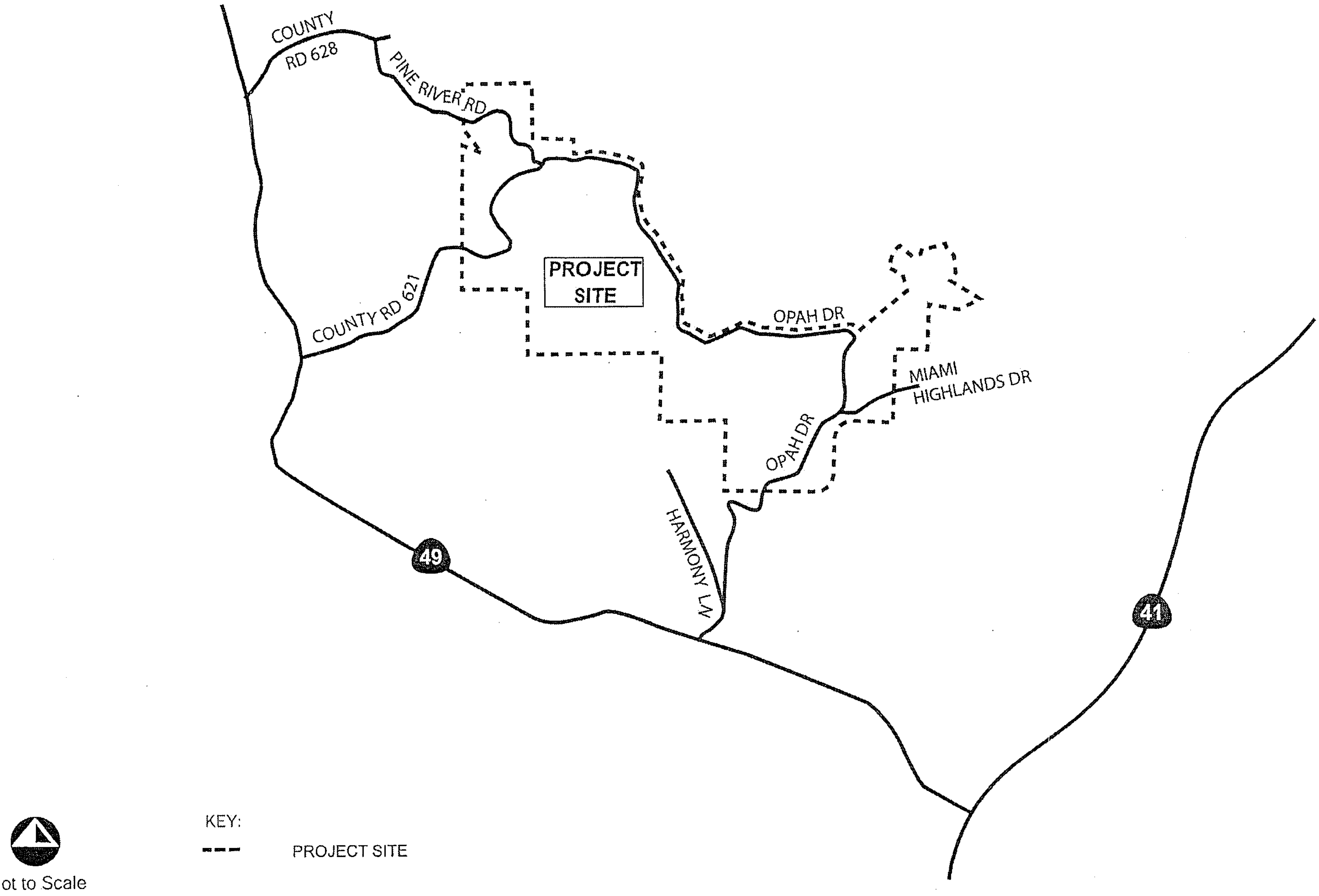
JAN/2004



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Project Site Location

Exhibit 2

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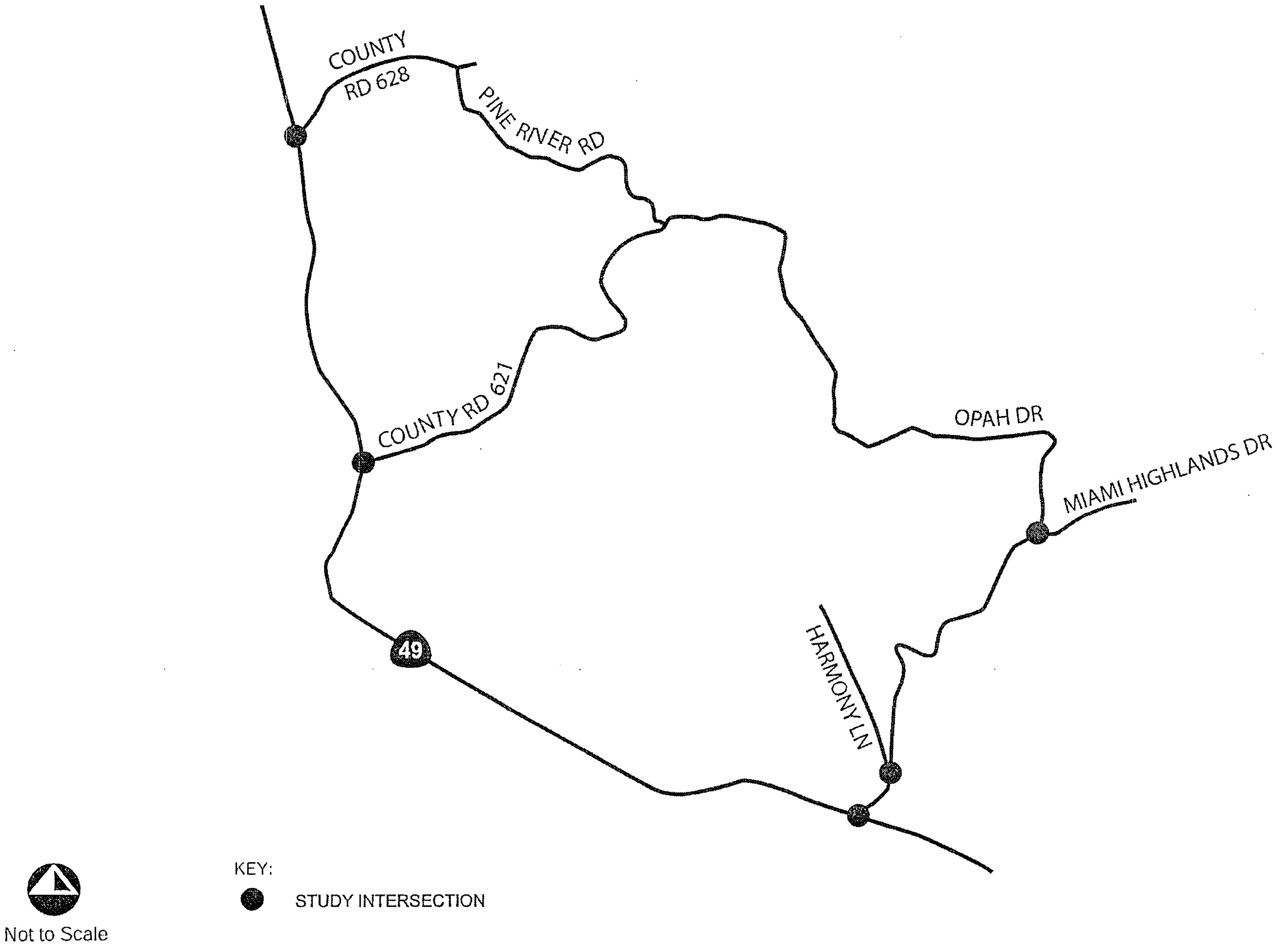
JUN/2004



RBF

Study Intersection Locations

Exhibit 3

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JUL/2003

Table 1
LOS & Delay Ranges

LOS	Delay (seconds/vehicle)
	Unsignalized Intersections
A	≤ 10.0
B	> 10.0 to ≤ 15.0
C	> 15.0 to ≤ 25.0
D	> 25.0 to ≤ 35.0
E	> 35.0 to ≤ 50.0
F	> 50.0

Source: Transportation Research Board, *Highway Capacity Manual*, "HCM 2000" Edition (Washington D.C., 2000).

Performance Criteria

The County of Madera goal for peak hour intersection operation is LOS D or better.

Threshold of Significance

To determine whether the addition of project-generated trips results in a significant impact at a study intersection, the County of Madera has established the following threshold of significance:

- At intersections operating at LOS D or better, a significant project impact occurs when the addition of project-generated trips causes the intersection to operate at LOS E or worse during the peak hour.

EXISTING CONDITIONS

Roadway Descriptions

The characteristics of the roadway system in the vicinity of the project site are described below:

SR-99 provides regional access for the project site as a four-lane freeway/expressway facility, traversing the County of Madera in a northwest-southeast orientation.

SR-49 provides regional access for the project site as a two-lane, undivided highway facility, trending in a northwest-southeast orientation.

SR-41 provides regional access for the project site as a two-lane, undivided highway facility, trending in a north-south direction.

Harmony Lane is a two-lane, undivided roadway, trending in a north-south direction. Both shoulders on Harmony lane are graded without curbs.

County Road 621 is a two-lane, undivided roadway, trending in an east-west direction. Both shoulders on County Road 621 are graded without curbs.

County Road 628 is a two-lane, undivided roadway, trending in an east-west direction. County Road 628 intersects with Pine River Road to provide access to SR-49 from the project site. Both shoulders on County Road 628 are graded without curbs.

Pine River Road is a two-lane, undivided roadway, trending in an east-west direction. Pine River Road intersects with County Road 628 to provide access to SR-49 from the project site. Both shoulders on Pine River Road are graded without curbs.

Opah Drive is a two-lane, undivided roadway, trending in a north-south direction between the intersections with Harmony Lane and Miami Highlands Drive, and a northwest-southeast orientation from Miami Highlands Drive to Pine River Road. Opah Drive is the main arterial through the proposed Sierra Meadows Estates project. The majority of Opah Drive was constructed approximately 15 years ago as a local road to serve the Sierra Meadows Golf Course and Ahwahnee Country Club Estates Subdivision. Currently, Opah Drive is paved to a point just west of Wallu Lane. Both shoulders on Opah Drive are graded without curbs.

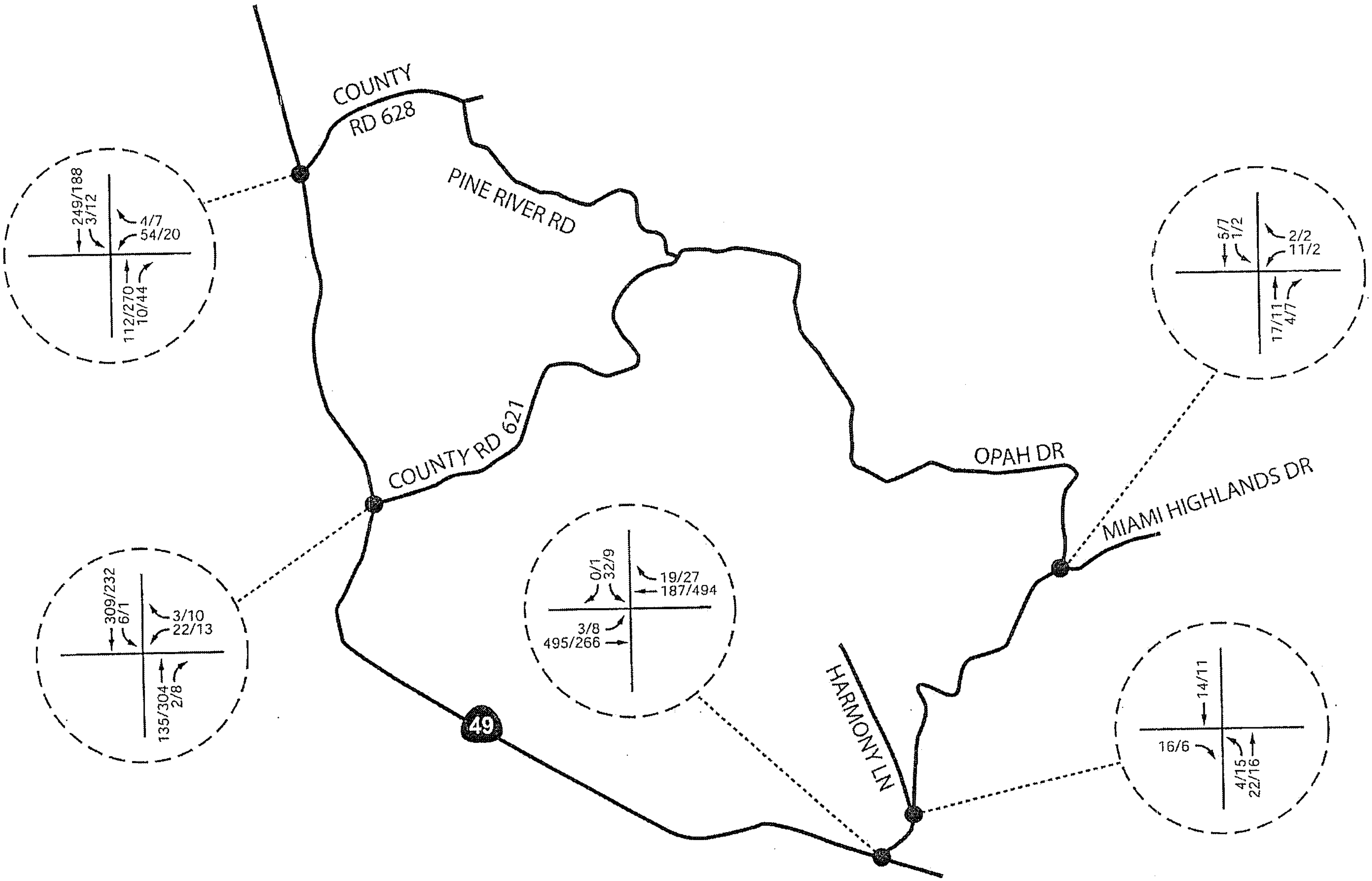
Miami Highlands Drive is a two-lane, undivided roadway, trending in an east-west direction. Both shoulders on Miami Highlands Drive are graded without curbs.

Existing Peak Hour Traffic Volumes

To determine the existing operation of the study intersections, a.m. and p.m. peak hour intersection movement counts were taken in December 2003. Exhibit 4 shows existing a.m. and p.m. peak hour volumes at the study intersections. Detailed peak hour traffic count data is included in Appendix A. Exhibit 5 shows existing study intersection geometry.

Existing Peak Hour Level of Service

Table 2 summarizes existing a.m. and p.m. peak hour average stopped delay per vehicle and corresponding LOS of the study intersections based on existing peak hour intersection volumes shown in Exhibit 4; detailed HCM analysis sheets are provided in Appendix B.



KEY:

XX/XX AM/PM Peak Hour Volumes

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Existing Conditions AM/PM Peak Hour Volumes

Exhibit 4

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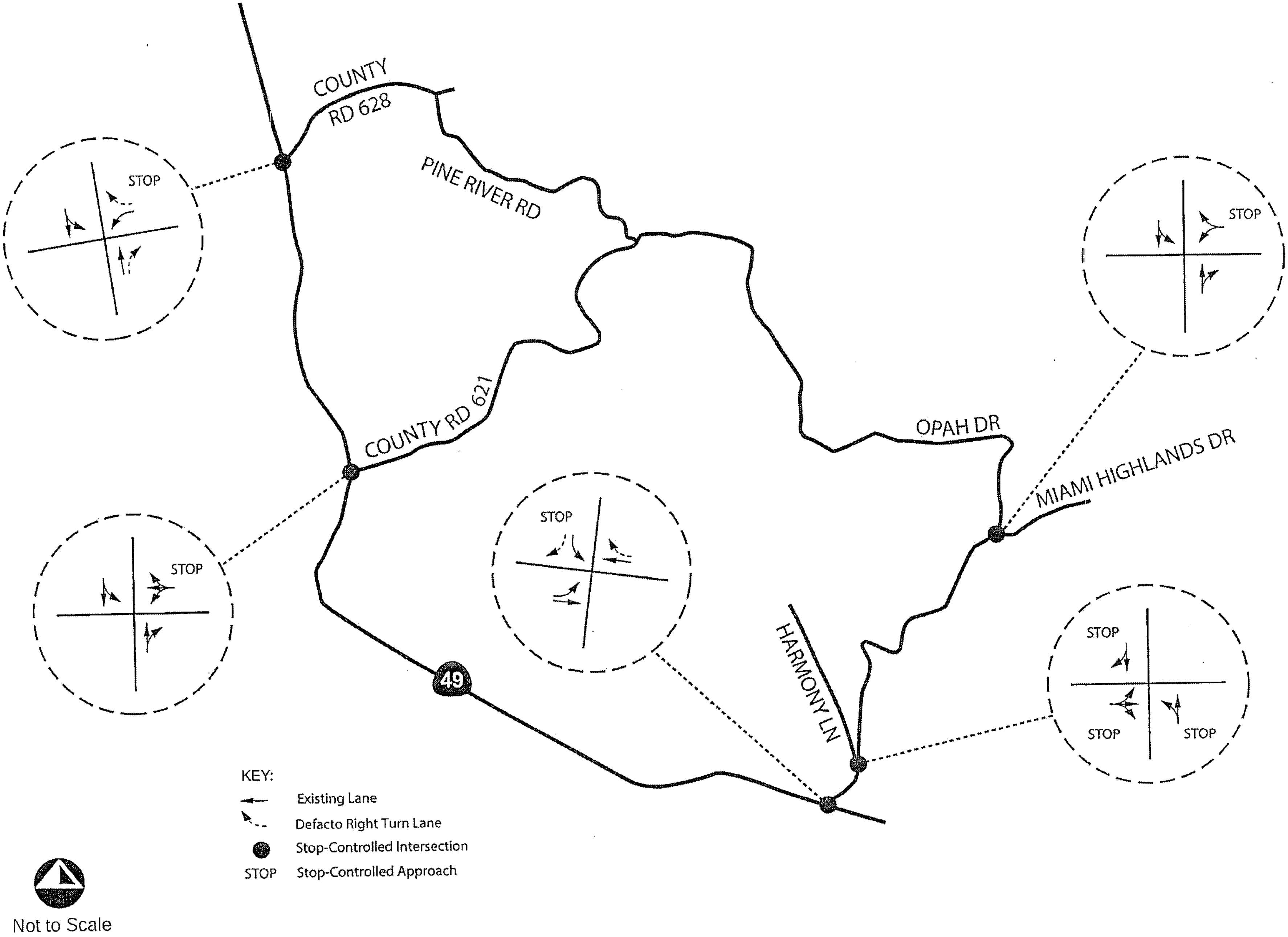
May/2004



RBF

Existing Study Intersection Geometry

Exhibit 5

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MAY/2004

Table 2
Existing Conditions Peak Hour LOS

Study Intersection	AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS
SR-49/County Rd 628 (Stop)	11.0	B	11.3	B
SR-49/County Rd 621 (Stop)	11.4	B	11.4	B
Harmony Ln/SR-49 (Stop)	14.4	B	14.7	B
Opah Dr-Harmony Ln/Harmony Ln (Stop)	6.9	A	7.0	A
Opah Dr/Miami Highlands Dr (Stop)	8.6	A	8.5	A

As shown in Table 2, all study intersections are currently operating at an acceptable LOS (LOS D or better) during the a.m. and p.m. peak hours according to County of Madera performance criteria.

FORECAST YEAR 2025 WITHOUT PROJECT CONDITIONS

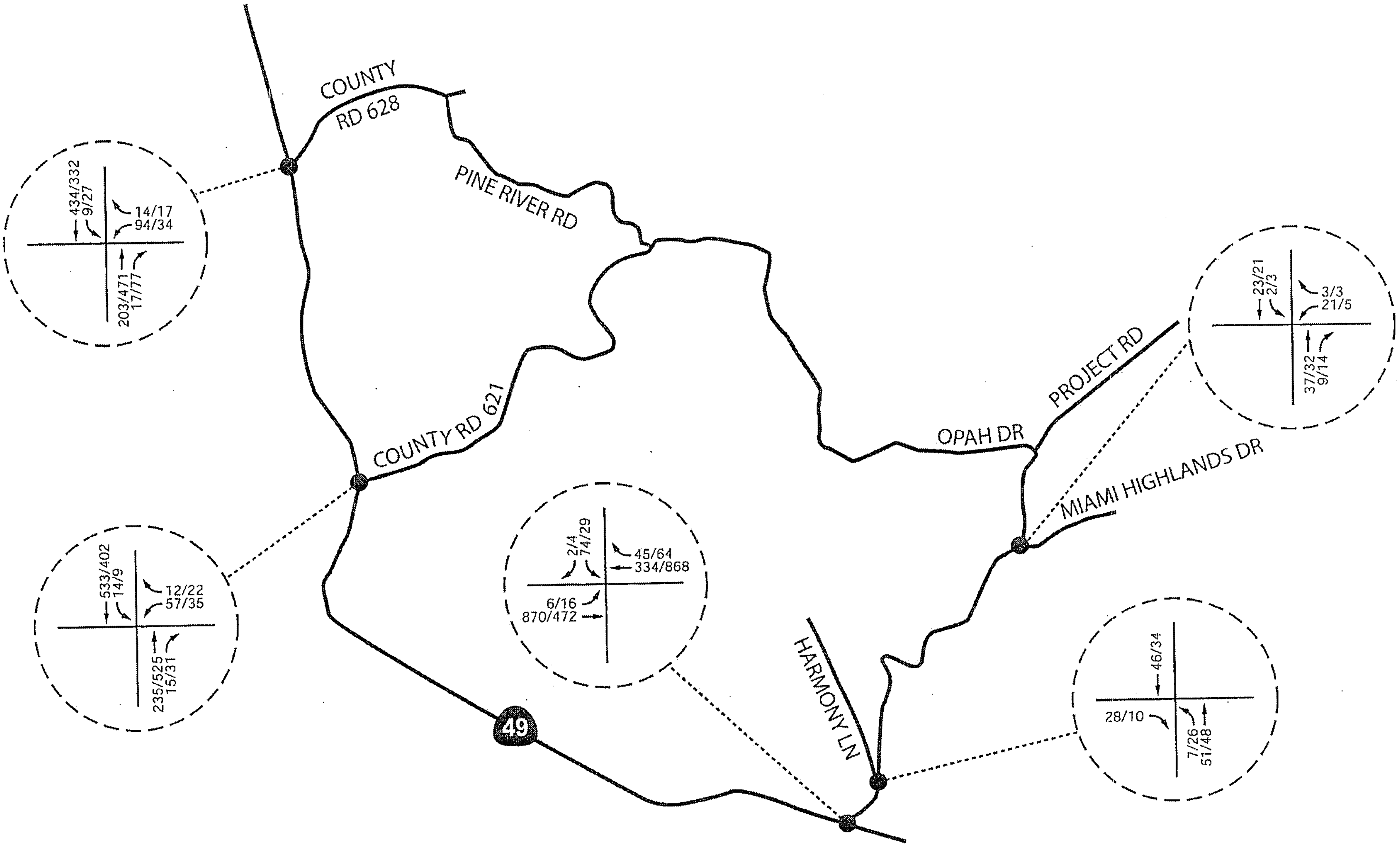
This analysis scenario examines the study area assuming the project site is built out according to the existing County General Plan and zoning (not according to the proposed project).

Forecast year 2025 without project conditions traffic volumes were derived by applying an annual growth rate factor 2.5 percent to existing traffic volumes, and then adding the current zoning land use trips within the project site associated with 89 dwelling units. The growth rate factor was determined by comparing forecast traffic volumes from the Madera County Transportation Commission (MCTC) regional traffic model in the project vicinity for year 2000 and forecast year 2025 in accordance with County transportation staff direction. A growth rate factor of 1.72, which was applied to existing volumes, equates to an annual traffic growth of 2.5 percent for twenty-two years (traffic count year 2003 to forecast year 2025) to account for ambient traffic growth.

Exhibit 6 shows the forecast assignment of the adjusted MCTC regional traffic model-generated a.m. and p.m. peak hour trips for forecast year 2025 without project conditions. Forecast year 2025 without project conditions intersection geometry remains unchanged from existing conditions.

Forecast Year 2025 Without Project Conditions Peak Hour Level of Service

Table 3 summarizes forecast year 2025 without project conditions a.m. and p.m. peak hour average stopped delay per vehicle and corresponding LOS of the study intersections; detailed HCM analysis sheets are provided in Appendix B.



Not to Scale

KEY:

XX/XX AM/PM Peak Hour Volumes

RBF

Forecast Year 2025 Without Project AM/PM Peak Hour Volumes

Exhibit 6

H:\pdata\10102469\Traffic\Exhibits\Ex06.ai

JUNE/2004

Table 3
Forecast Year 2025 Without Project Peak Hour LOS

Study Intersection	AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS
SR-49/County Rd 628 (Stop)	14.8	B	15.4	C
SR-49/County Rd 621 (Stop)	16.2	C	17.3	C
Harmony Ln/SR-49 (Stop)	32.4	D	30.6	D
Opah Dr-Harmony Ln/Harmony Ln (Stop)	7.1	A	7.2	A
Opah Dr/Miami Highlands Dr (Stop)	8.9	A	8.7	A

Note: Deficient intersection operation shown in bold.

As shown in Table 3, all study intersections are forecast to operate at an acceptable LOS (LOS D or better) according to County of Madera performance criteria for forecast year 2025 without project conditions.

PROPOSED PROJECT

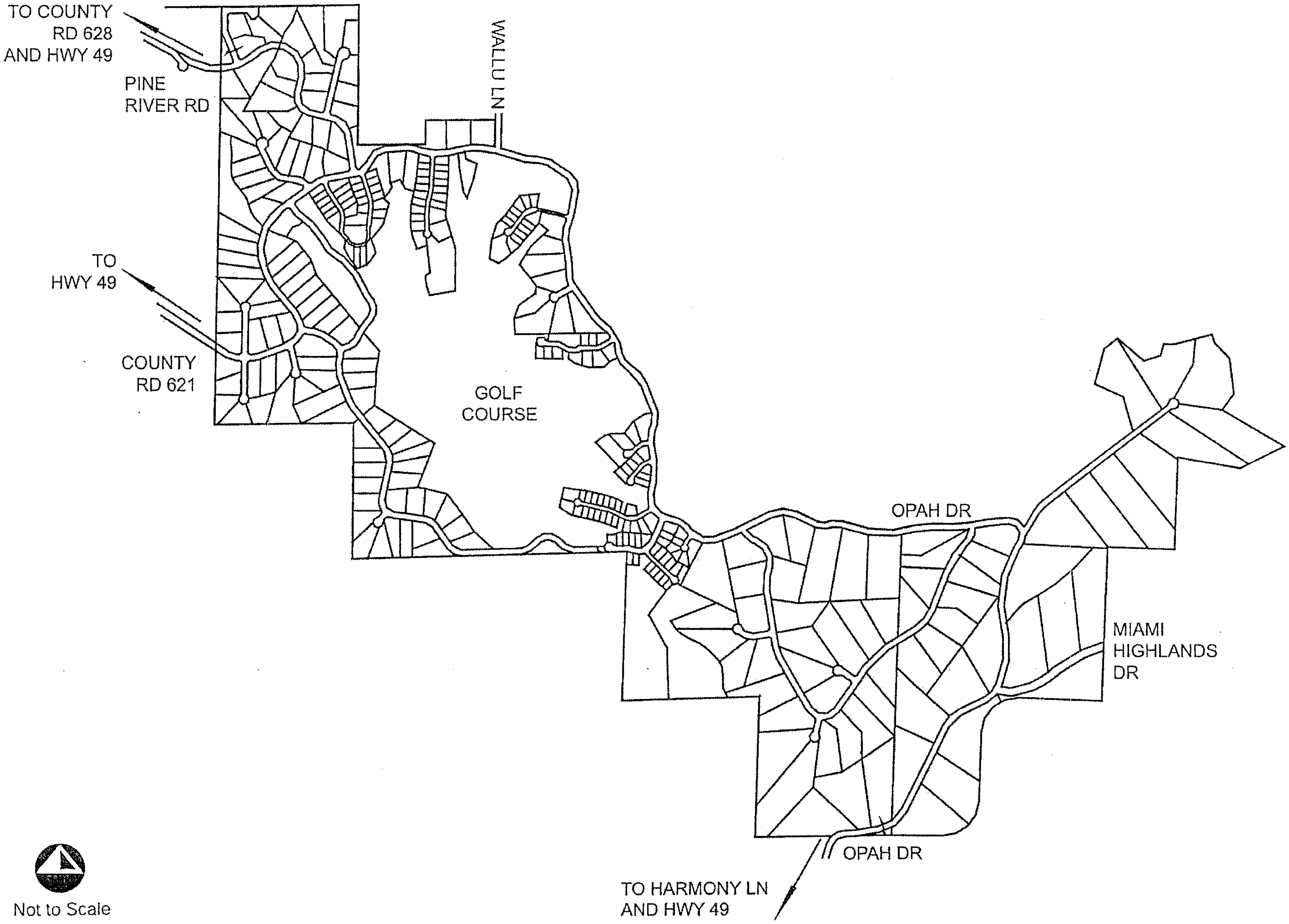
This study analyzes the forecast traffic impacts associated with the proposed Sierra Meadows Estates project. The proposed project consists of 315 single-family dwelling units on 442 acres. The project site is located along Opah Drive east of State Route 49 (SR-49) in the unincorporated Ahwahnee/Nipinnawasee area of Madera County. The existing roadway circulation system provides three access routes for the proposed project. Opah Drive, via Harmony Lane, provides primary access at SR-49. In addition, County Road 621 provides access at SR-49 westerly of the primary access location. A third point of access is provided at County Road 628 and Pine River Road.

Exhibit 7 shows the project site plan with planned access primarily at Opah Drive, County Road 621, and Pine River Road.

As part of the proposed project, the following improvements are planned for Opah Drive:

- Opah Drive will be extended to connect with Pine River Road, which is a county road that terminates just west of the proposed project; and
- Opah Drive will be paved to County Road 621.

Additionally, based on forecast trip generation, it is recommended that Opah Drive be extended to form a direct loop with County Road 621 and should not intersect County Road 621 at a right angle. This would result in a right angle intersection of Pine River Road with Opah Drive. This is consistent with the County staff recommendation that Opah Drive be extended west to State Route 49 in order to create a safe and efficient circulation system in accordance with the County General Plan.



RBF

Sierra Meadows Proposed Project Site Plan

Exhibit 7

H:\pdata\10102469\Traffic\Exhibits\Ex07.ai JUN/2004

Based upon the forecast percent distribution of project-generated trips as shown in Exhibit 8, the analysis provides no basis for the extension of Miami Highlands Drive to Road 620, or an alternative route.

Project Trip Generation

Table 4 summarizes the trip generation rates used to calculate the number of trips forecast to be generated by the proposed project contained in *Oakhurst Area Study, by Brian, Kangas Foulk, 1997.*

Table 4
Proposed Project Trip Rates

Land Use	AM Peak Hour Rates			PM Peak Hour Rates			Daily Trip Rate
	In	Out	Total	In	Out	Total	
Single-Family Detached Housing	0.21	0.33	0.54	0.30	0.25	0.55	7.36

Source: *Oakhurst Area Study, Brian, Kangas Foulk, 1997.*

Table 5 summarizes trips forecast to be generated by the proposed project utilizing the trip generation rates shown in Table 4.

Table 5
Forecast Project Trip Generation

Land Use	AM Peak Hour Trips			PM Peak Hour Trips			Daily Trips
	In	Out	Total	In	Out	Total	
315 Single-Family Dwelling Units	66	104	170	94	79	173	2,318

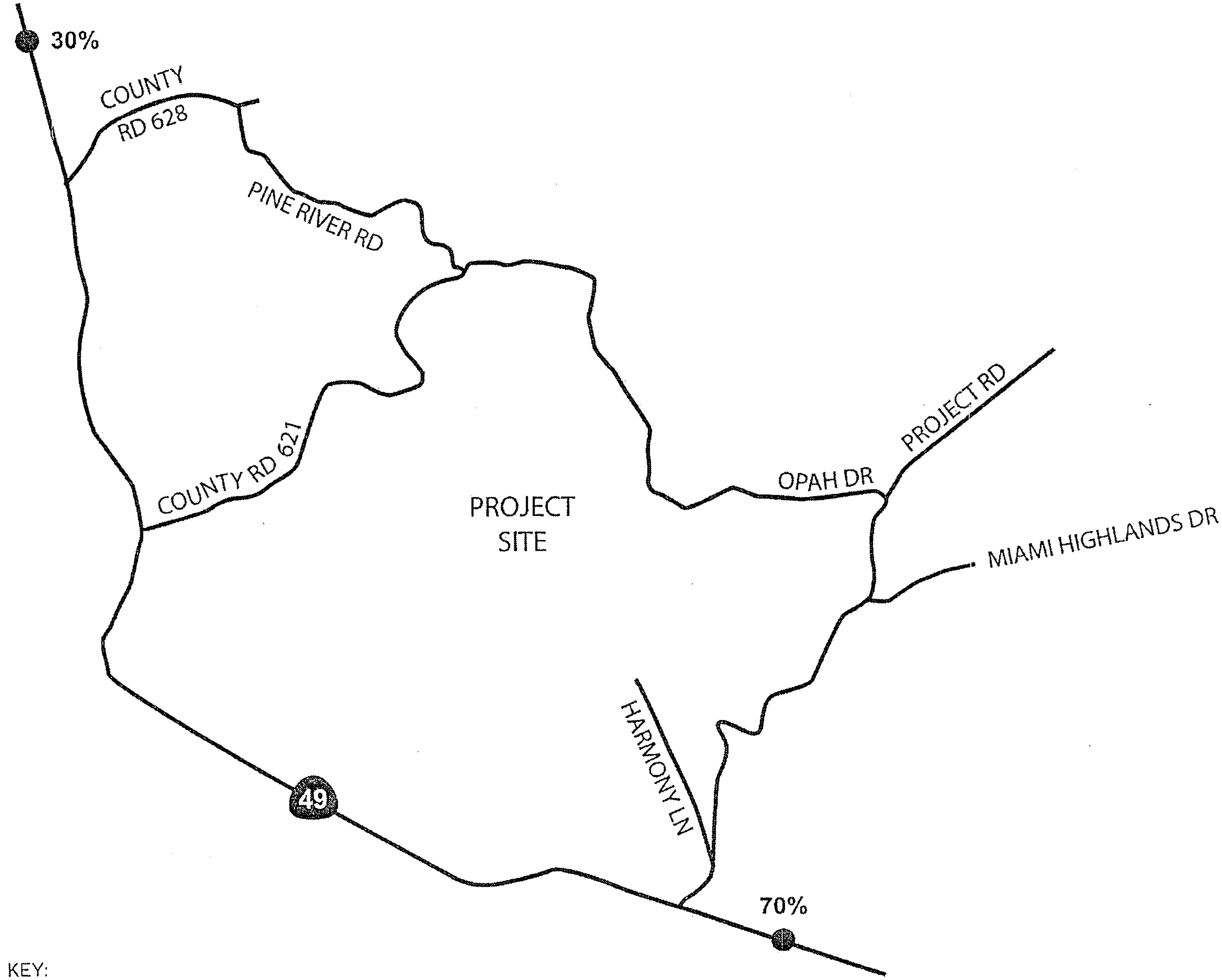
As shown in Table 5, the proposed project is forecast to generate approximately 2,318 daily trips, which includes approximately 170 a.m. peak hour trips, and approximately 173 p.m. peak hour trips.

Project Trip Distribution

Exhibit 8 shows the forecast trip percent distribution of project-generated peak hour trips reviewed and approved by County transportation staff for use in this analysis.

Project Trip Assignment

Exhibit 9 shows the corresponding assignment of project-generated trips assuming the trip percent distribution shown in Exhibit 8.



KEY:

XX% TRIP PERCENT DISTRIBUTION

Not to Scale

RBF

Forecast Project Trip Percent Distribution

Exhibit 8

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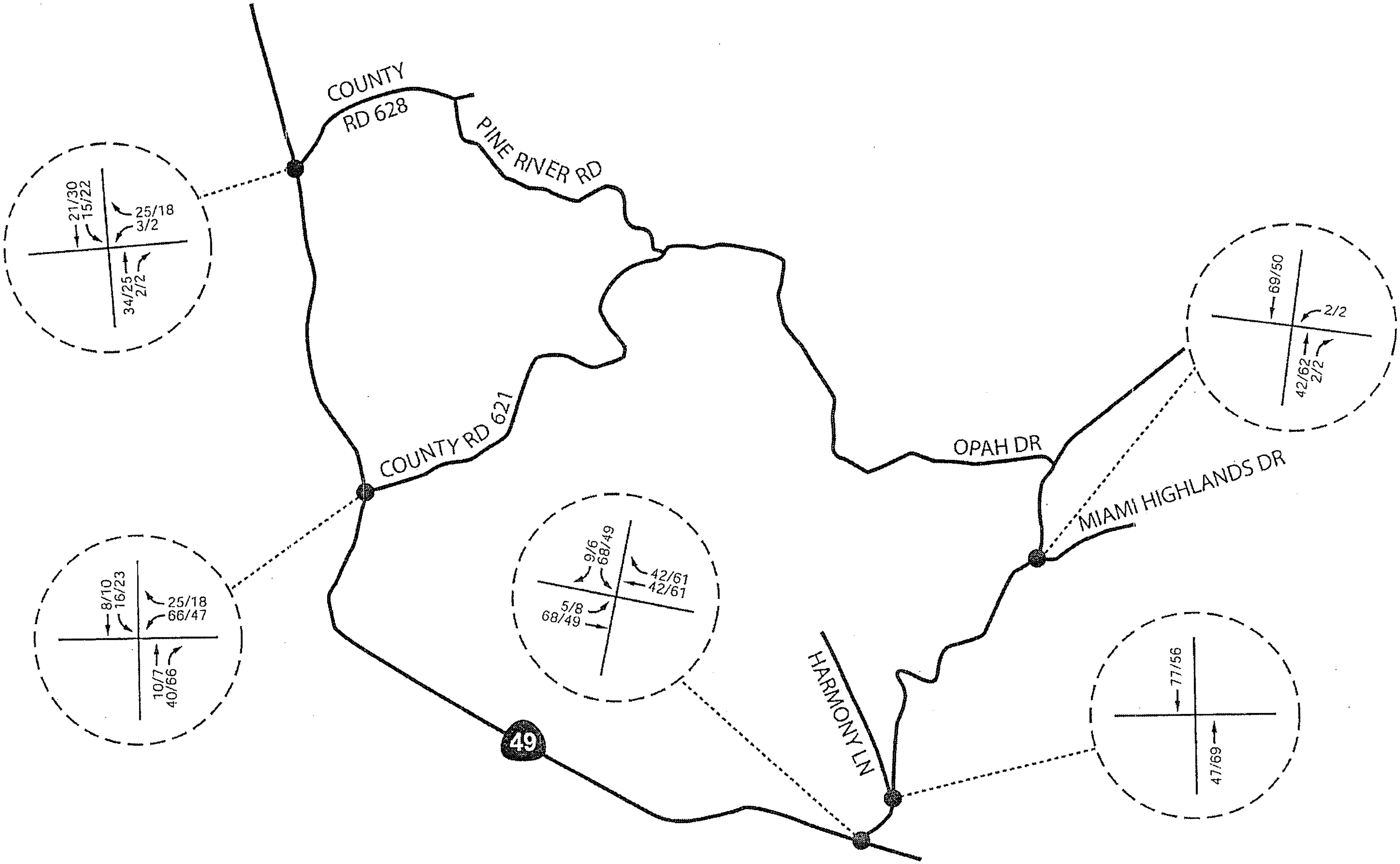
JAN/2004



Not to Scale

KEY:

XX/XX AM/PM Peak Hour Volumes

Forecast Project-Generated AM/PM Peak Hour Trip Assignment

Exhibit 9

RBF

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JUNE/2004

FORECAST YEAR 2025 WITH PROJECT CONDITIONS

This analysis scenario examines the study area assuming the project site is built out according to the proposed project (not according to the existing County General Plan and zoning).

Forecast year 2025 with project conditions traffic volumes were derived by applying an annual growth rate factor of 2.5 percent to existing traffic volumes. The growth rate factor of 1.72, equating to an annual traffic growth rate of 2.5 percent to account for twenty-two years of ambient traffic growth, was determined by comparing highway traffic volumes in the project vicinity from the Madera County Transportation Commission (MCTC) regional traffic models for year 2000 and forecast year 2025 in accordance with County transportation staff direction. Project-generated trips were then added to the existing growth rate adjusted traffic volumes. Exhibit 10 shows forecast year 2025 with project a.m. and p.m. peak hour traffic volumes at the study intersections.

Forecast Year 2025 With Project Conditions Peak Hour Level of Service

Table 6 summarizes the forecast year 2025 with project conditions a.m. and p.m. peak hour average stopped delay per vehicle and corresponding LOS of the study intersections; detailed HCM analysis sheets are provided in Appendix B.

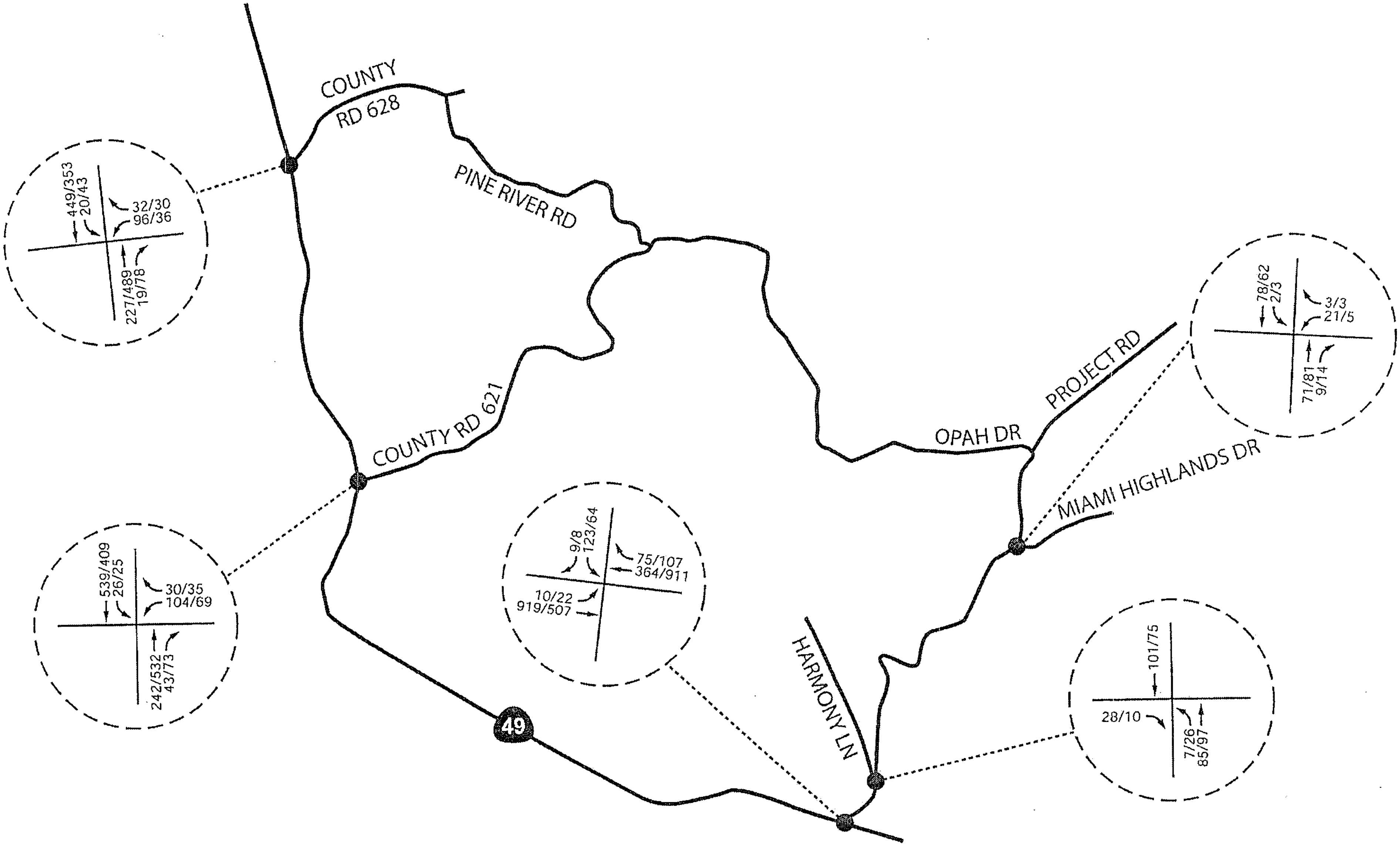
Table 6
Forecast Year 2025 With Project Peak Hour LOS

Study Intersection	Forecast Year 2025 Without Project				Forecast Year 2025 With Project			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
SR-49/County Rd 628 (Stop)	14.8	B	15.4	C	15.2	C	15.7	C
SR-49/County Rd 621 (Stop)	16.2	C	17.3	C	19.9	C	22.4	C
Harmony Ln/SR-49 (Stop)	32.4	D	30.6	D	**58.0**	**F**	**47.2**	**E**
Opah Dr-Harmony Ln/Harmony Ln (Stop)	7.1	A	7.2	A	7.4	A	7.5	A
Opah Dr/Miami Highlands Dr (Stop)	8.9	A	8.7	A	9.3	A	9.1	A

Note: Deficient intersection operation shown in bold.

As shown in Table 6, one study intersection is forecast to operate at an unacceptable LOS (LOS E or worse) according to County of Madera performance criteria for forecast year 2025 with project conditions:

- Harmony Lane/SR-49 (a.m. and p.m. peak hours).



Not to Scale

KEY:

XX/XX AM/PM Peak Hour Volumes

RBF

Forecast Year 2025 With Project AM/PM Peak Hour Volumes

Exhibit 10

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JUNE/2004

SIGNAL WARRANT ANALYSIS

A *Caltrans Traffic Manual* signal warrant analysis was prepared to determine if signalization would be warranted at the Harmony Lane/SR-49 intersection for forecast year 2025 with project conditions.

Table 7 summarizes the results of the signal warrant analysis for the Harmony Lane/SR-49 intersection for forecast year 2025 with project conditions; detailed traffic signal warrant calculation sheets are contained in Appendix C.

Table 7
Forecast Year 2025 With Project Conditions
Harmony Lane/SR-49 Signal Warrant Analysis

Warrant Type	Warrant Required SR-49 Daily Volume (2 directions)	Forecast SR-49 Daily Volume (2 directions)	SR-49 Warrant Satisfied? (% Satisfied)	Warrant Required Harmony Lane Daily Volume (1 direction)	Forecast Harmony Lane Daily Volume (1 direction)	Harmony Lane Warrant Satisfied? (% Satisfied)	Signalization of Intersection Warranted?
Minimum Vehicular	6,720	15,350	Yes (100%)	2,240	1,020	No (46%)	**No**
Interruption of Continuous Traffic	10,080	15,350	Yes (100%)	1,120	1,020	No (91%)	**No**

As seen in Table 7, the neither the *Minimum Vehicular*, the nor the *Interruption of Continuous Traffic* signal warrant is satisfied for the Harmony Lane/SR-49 intersection for forecast year 2025 with project conditions. The *Combination Warrant* is not satisfied either as both of the above warrants are not satisfied to the extent of 80 percent or more.

To eliminate the forecast year 2025 with project conditions deficiency at the Harmony Lane/SR-49 study intersection, the following improvement is recommended:

- **Harmony Lane/SR-49** - Modify eastbound SR-49 approach from one left-turn lane and one through lane to consist of one left-turn lane and two through lanes.

Assuming implementation of the recommended improvement, Table 8 shows the forecast LOS of the Harmony Lane/SR-49 study intersection for forecast improved year 2025 with project conditions; detailed HCM analysis sheets are provided in Appendix B.

Table 8
Forecast Improved Year 2025 With Project Peak Hour LOS

Study Intersection	Existing Geometry				Improved Geometry			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Harmony Ln/SR-49 (Stop)	**58.0**	**F**	**47.2**	**E**	21.1	C	29.8	D

Note: Deficient intersection operation shown in bold.

As shown in Table 8, assuming implementation of the recommended improvement, the Harmony Lane/SR-49 study intersection is forecast to operate at an acceptable LOS (LOS D or better) during the a.m. and p.m. peak hours for forecast improved year 2025 with project conditions.

Exhibit 11 shows the forecast improved year 2025 with project conditions study intersection geometry.

MITIGATION MEASURES

The project applicant shall make a fair share contribution for the following recommended improvement:

- **Harmony Lane/SR-49** - Modify eastbound SR-49 approach from one left-turn lane and one through lane to consist of one left-turn lane and two through lanes.

The identified mitigation measure will reduce project traffic impacts to a level considered less than significant.

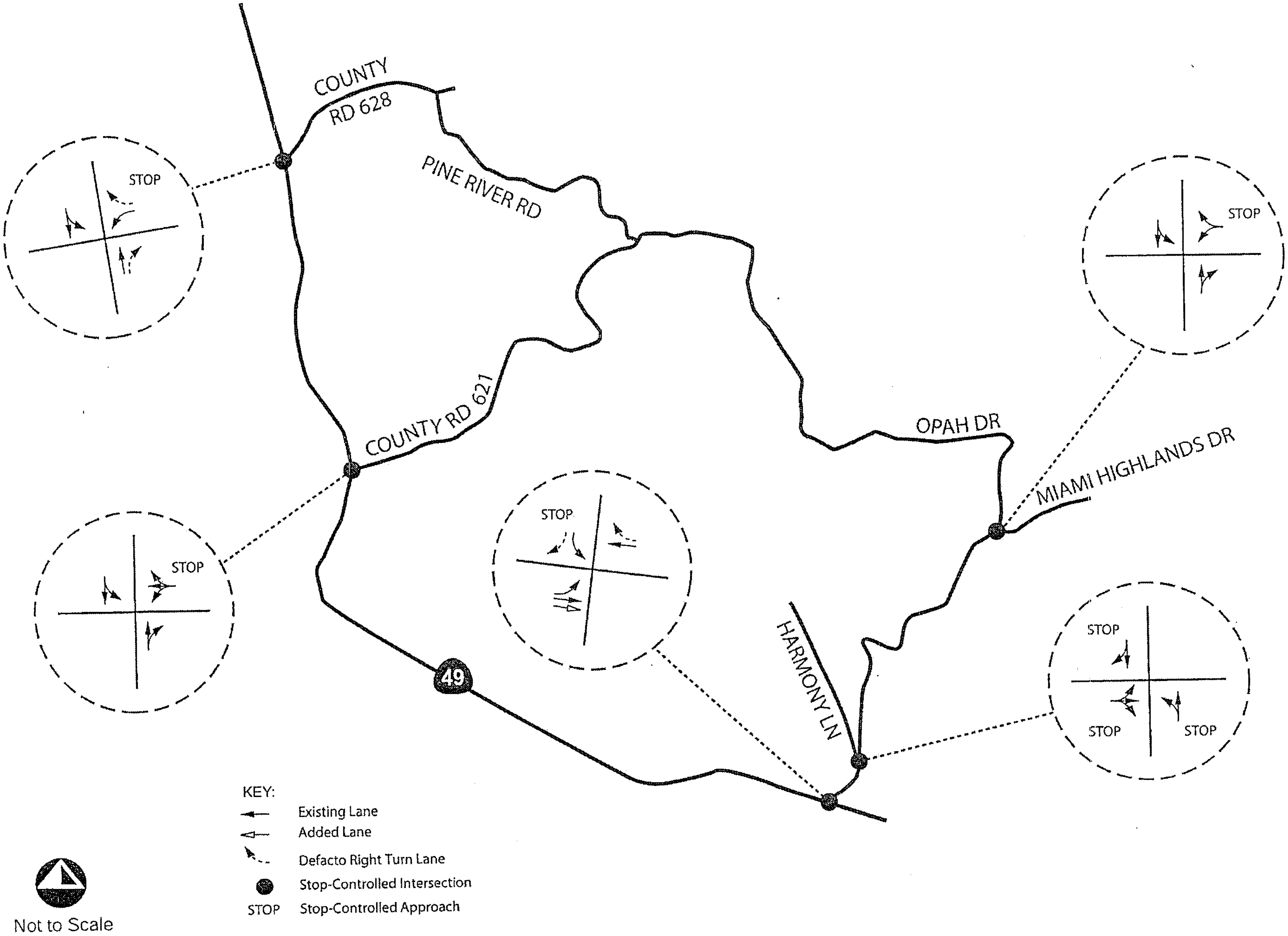
CONCLUSIONS

All study intersections are currently operating at an acceptable LOS (LOS D or better) during the a.m. and p.m. peak hours according to County of Madera performance criteria.

All study intersections are forecast to continue operating at an acceptable LOS (LOS D or better) according to County of Madera performance criteria for forecast year 2025 without project conditions.

The proposed project is forecast to generate approximately 2,318 daily trips, which includes approximately 170 a.m. peak hour trips, and approximately 173 p.m. peak hour trips.

One study intersection is forecast to operate at an unacceptable LOS (LOS E or worse) according to County of Madera performance criteria for forecast year 2025 with project conditions:



Forecast Improved Year 2025 With Project Intersection Geometry

Exhibit 11

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JUN/2004

- Harmony Lane/SR-49 (a.m. and p.m. peak hours).

To eliminate the forecast year 2025 with project conditions deficiency at the Harmony Lane/SR-49 study intersection, the following improvement is recommended:

- **Harmony Lane/SR-49** - Modify eastbound SR-49 approach from one left-turn lane and one through lane to consist of one left-turn lane and two through lanes.

Assuming implementation of the recommended improvement, the Harmony Lane/SR-49 study intersection is forecast to operate at an acceptable LOS (LOS D or better) during the a.m. and p.m. peak hours for forecast year 2025 with project conditions.

To mitigate project traffic impacts to a level considered less than significant, the project applicant shall make a fair share contribution for modifying the eastbound SR-49 approach at Harmony Lane from one left-turn lane and one through lane to consist of one left-turn lane and two through lanes.

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APPENDIX A

Existing Peak Hour Count Data

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: SR-49 DATE: 6/26/2003 LOCATION: City of Ahwanee

E-W STREET: Country rd 628 (Pine River) DAY: THURSDAY PROJECT# 03-1047-001

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:		1	1	0	1					1		1	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM		24	4	0	54					14		0	96
7:15 AM		14	2	0	53					12		1	82
7:30 AM		48	2	2	79					12		2	145
7:45 AM		26	2	1	63					16		1	109
8:00 AM		31	3	1	44					7		1	87
8:15 AM		26	4	0	52					7		0	89
8:30 AM		25	2	0	55					13		3	98
8:45 AM		19	1	0	46					6		2	74
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
VOLUMES =	0	213	20	4	446	0	0	0	0	87	0	10	780

AM Peak Hr Begins at: 700 AM

PEAK VOLUMES =	0	112	10	3	249	0	0	0	0	54	0	4	432
PEAK HR. FACTOR:		0.610			0.778			0.000			0.853		0.745

CONTROL: 1-Way Stop, West

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: SR-49
DATE: 6/26/2003
LOCATION: City of Ahwanee

E-W STREET: Country rd 628
(Pine River)
DAY: THURSDAY
PROJECT# 03-1047-001

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:		1	1	0	1					1		1	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM		58	4	2	41					4		1	110
4:15 PM		63	6	3	47					7		2	128
4:30 PM		60	9	2	69					4		1	145
4:45 PM		53	14	1	35					3		1	107
5:00 PM		72	11	4	43					5		2	137
5:15 PM		85	10	5	41					8		3	152
5:30 PM		70	8	2	39					5		4	128
5:45 PM		50	9	1	36					4		6	106
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
VOLUMES =	0	511	71	20	351	0	0	0	0	40	0	20	1013

PM Peak Hr Begins at: 430 PM

PEAK VOLUMES =	0	270	44	12	188	0	0	0	0	20	0	7	541
PEAK HR. FACTOR:		0.826			0.704			0.000			0.614		0.890

CONTROL: 1-Way Stop, West

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: SR-49 DATE: 6/26/2003 LOCATION: City of Ahwanee

E-W STREET: County Road 621 DAY: THURSDAY PROJECT# 03-1047-002

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:		1	0	0	1					0	1	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM		20	1	3	67					5		1	97
7:15 AM		29	1	1	74					6		2	113
7:30 AM		45	0	0	86					3		0	134
7:45 AM		41	0	2	82					8		0	133
8:00 AM		33	5	1	48					6		3	96
8:15 AM		30	1	0	58					5		2	96
8:30 AM		28	2	1	67					6		1	105
8:45 AM		22	1	0	53					3		1	80
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
VOLUMES =	0	248	11	8	535	0	0	0	0	42	0	10	854

AM Peak Hr Begins at: 700 AM

PEAK VOLUMES =	0	135	2	6	309	0	0	0	0	22	0	3	477
PEAK HR. FACTOR:		0.761			0.916			0.000			0.781		0.890

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: SR-49

DATE: 6/26/2003

LOCATION: City of Ahwanee

E-W STREET: County Road 621

DAY: THURSDAY

PROJECT# 03-1047-002

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:		1	0	0	1					0	1	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM		72	2	0	48					3		4	129
4:15 PM		81	1	0	62					2		3	149
4:30 PM		78	0	1	79					3		2	163
4:45 PM		73	5	0	43					5		1	127
5:00 PM		65	8	0	34					6		1	114
5:15 PM		71	6	1	47					3		2	130
5:30 PM		79	7	0	51					4		0	141
5:45 PM		68	5	1	45					3		1	123
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
VOLUMES =	0	587	34	3	409	0	0	0	0	29	0	14	1076

PM Peak Hr Begins at: 400 PM

PEAK VOLUMES =	0	304	8	1	232	0	0	0	0	13	0	10	568
PEAK HR. FACTOR:		0.951			0.728			0.000			0.821		0.871

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Harmony Ln.
DATE: 6/26/2003
LOCATION: City of Ahwanee

E-W STREET: SR-49
DAY: THURSDAY
PROJECT# 03-1047-003

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:				0	1	0	0	1			1	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM				6		0	0	76			25	1	108
7:15 AM				6		0	0	102			39	2	149
7:30 AM				5		0	1	129			42	6	183
7:45 AM				12		0	2	143			50	6	213
8:00 AM				9		0	0	121			56	5	191
8:15 AM				5		1	3	85			49	3	146
8:30 AM				8		1	0	97			51	5	162
8:45 AM				11		0	2	114			43	3	173
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
VOLUMES =	0	0	0	62	0	2	8	867	0	0	355	31	1325

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES =	0	0	0	32	0	0	3	495	0	0	187	19	736
PEAK HR. FACTOR:		0.000			0.667			0.000			0.844		0.864

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Harmony Ln.
DATE: 6/26/2003
LOCATION: City of Ahwanee

E-W STREET: SR-49
DAY: THURSDAY
PROJECT# 03-1047-003

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:				0	1	0	0	1			1	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM				5		0	0	81			88	2	176
4:15 PM				10		0	0	92			115	9	226
4:30 PM				2		2	0	78			99	4	185
4:45 PM				2		0	0	54			100	6	162
5:00 PM				1		0	2	60			123	6	192
5:15 PM				3		1	3	68			144	13	232
5:30 PM				2		0	1	65			121	5	194
5:45 PM				3		0	2	73			106	3	187
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
VOLUMES =	0	0	0	28	0	3	8	571	0	0	896	48	1554

PM Peak Hr Begins at: 500 PM

PEAK VOLUMES =	0	0	0	9	0	1	8	266	0	0	494	27	805
PEAK HR. FACTOR:		0.000			0.625			0.000			0.830		0.867

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Opah/Harmony Ln.
DATE: 6/26/2003
LOCATION: City of Ahwanee

E-W STREET: Harmony Ln.
DAY: THURSDAY
PROJECT# 03-1047-004

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1			1	0	0	1	0				
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	0	1			2	0	0		3				6
7:15 AM	1	5			3	0	0		2				11
7:30 AM	0	9			3	0	0		4				16
7:45 AM	1	6			4	0	0		5				16
8:00 AM	2	2			3	0	0		3				10
8:15 AM	1	5			4	0	0		4				14
8:30 AM	0	8			0	1	0		2				11
8:45 AM	0	4			0	0	0		4				8
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
VOLUMES =	5	40	0	0	19	1	0	0	27	0	0	0	92

AM Peak Hr Begins at: 730 AM

PEAK VOLUMES =	4	22	0	0	14	0	0	0	16	0	0	0	56
PEAK HR. FACTOR:		0.722			0.875			0.800			0.000		0.875

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Opah/Harmony Ln.　DATE: 6/26/2003　LOCATION: City of Ahwanee

E-W STREET: Harmony Ln.　DAY: THURSDAY　PROJECT# 03-1047-004

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1			1	0	0	1	0				
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	3	4			1		0		1				9
4:15 PM	2	2			2		0		1				7
4:30 PM	4	2			1		0		3				10
4:45 PM	3	2			1		0		0				6
5:00 PM	4	5			4		0		2				15
5:15 PM	3	6			2		0		1				12
5:30 PM	4	3			4		0		2				13
5:45 PM	4	2			1		0		1				8
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													
TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
VOLUMES =	27	26	0	0	16	0	0	0	11	0	0	0	80

PM Peak Hr Begins at: 500 PM

PEAK VOLUMES =	15	16	0	0	11	0	0	0	6	0	0	0	48
PEAK HR. FACTOR:		0.861			0.688			0.750			0.000		0.800

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Opah Rd.
DATE: 6/26/2003
LOCATION: City of Ahwanee

E-W STREET: Miami Highlands Dr.
DAY: THURSDAY
PROJECT# 03-1047-005

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:		1	0	0	1					0	1	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM		3	0	0	1					1		0	5
7:15 AM		0	2	0	2					2		0	6
7:30 AM		7	2	0	1					2		0	12
7:45 AM		7	0	0	1					3		0	11
8:00 AM		3	1	0	0					1		1	6
8:15 AM		1	1	0	2					4		0	8
8:30 AM		6	2	1	2					3		1	15
8:45 AM		2	2	0	3					3		0	10
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
VOLUMES =	0	29	10	1	12	0	0	0	0	19	0	2	73

AM Peak Hr Begins at: 745 AM

PEAK VOLUMES =	0	17	4	1	5	0	0	0	0	11	0	2	40
PEAK HR. FACTOR:		0.656			0.500			0.000			0.813		0.667

CONTROL: Signalized;

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Opah Rd.
DATE: 6/26/2003
LOCATION: City of Ahwanee

E-W STREET: Miami Highlands Dr.
DAY: THURSDAY
PROJECT# 03-1047-005

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:		1	0	0	1					0	1	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM		2	1	0	1					1		0	5
4:15 PM		4	2	0	1					1		1	9
4:30 PM		2	2	1	2					0		0	7
4:45 PM		3	3	0	1					1		1	9
5:00 PM		2	0	1	3					0		0	6
5:15 PM		3	1	0	1					2		0	7
5:30 PM		2	2	0	2					1		0	7
5:45 PM		2	1	0	3					0		0	6
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
VOLUMES =	0	20	12	2	14	0	0	0	0	6	0	2	56

PM Peak Hr Begins at: 415 PM

PEAK VOLUMES =	0	11	7	2	7	0	0	0	0	2	0	2	31
PEAK HR. FACTOR:		0.750			0.563			0.000			0.500		0.861

CONTROL: Signalized;

APPENDIX B

HCM Analysis Sheets

```
EX-AM                     Mon Jun 28, 2004 16:24:21                  Page 1-1
-----------------------------------------------------------------------------
                  MADERA COUNTY - SIERRA MEADOWS ESTATES
                          EXISTING CONDITIONS
                             AM PEAK HOUR
-----------------------------------------------------------------------------
                             Scenario Report
Scenario:             EX-AM

Command:              EX-AM
Volume:               EX-AM
Geometry:             EX
Impact Fee:           Default Impact Fee
Trip Generation:      Default Trip Generation
Trip Distribution:    Default Trip Distribution
Paths:                Default Paths
Routes:               Default Routes
Configuration:        EX-AM
```

```
EX-AM                     Mon Jun 28, 2004 16:24:21                  Page 2-1
-----------------------------------------------------------------------------
                  MADERA COUNTY - SIERRA MEADOWS ESTATES
                          EXISTING CONDITIONS
                             AM PEAK HOUR
-----------------------------------------------------------------------------
                          Impact Analysis Report
                             Level Of Service

Intersection                              Base           Future        Change
                                       Del/   V/      Del/   V/         in
                                   LOS Veh     C  LOS Veh     C
# 1 SR-49/ROAD 628                  B  11.0 0.000  B  11.0 0.000  + 0.000 D/V

# 2 SR-49/ROAD 621                  B  11.4 0.000  B  11.4 0.000  + 0.000 D/V

# 3 HARMONY LANE/SR-49              B  14.4 0.000  B  14.4 0.000  + 0.000 D/V

# 4 OPAH RD-HARMONY LN/HARMONY LN   A   6.9 0.029  A   6.9 0.029  + 0.000 V/C

# 5 OPAH RD/MIAMI HIGHLANDS DR      A   8.6 0.000  A   8.6 0.000  + 0.000 D/V
```

```
EX-AM                     Mon Jun 28, 2004 16:24:21                  Page 3-1
------------------------------------------------------------------------------
                    MADERA COUNTY - SIERRA MEADOWS ESTATES
                            EXISTING CONDITIONS
                               AM PEAK HOUR
------------------------------------------------------------------------------

                       Level Of Service Computation Report
           2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #1 SR-49/ROAD 628
******************************************************************************
Average Delay (sec/veh):       1.5    Worst Case Level Of Service:     B[ 11.0]
******************************************************************************
Approach:     North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       0  0  1  0  1    0  1  0  0  0    0  0  0  0  0    1  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  112   10      3  249    0      0    0    0     54    0    4
Growth Adj:  1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Initial Bse:    0  112   10      3  249    0      0    0    0     54    0    4
User Adj:    1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Volume:     0  112   10      3  249    0      0    0    0     54    0    4
Reduct Vol:     0    0    0      0    0    0      0    0    0      0    0    0
Final Vol.:     0  112   10      3  249    0      0    0    0     54    0    4
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx    4.1 xxxx xxxxx xxxxx xxxx xxxxx    6.4 xxxx  6.2
FollowUpTim:xxxxx xxxx xxxxx    2.2 xxxx xxxxx xxxxx xxxx xxxxx    3.5 xxxx  3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    122 xxxx xxxxx  xxxx xxxx xxxxx    367 xxxx  112
Potent Cap.: xxxx xxxx xxxxx   1478 xxxx xxxxx  xxxx xxxx xxxxx    637 xxxx  947
Move Cap.:   xxxx xxxx xxxxx   1478 xxxx xxxxx  xxxx xxxx xxxxx    636 xxxx  947
Volume/Cap:  xxxx xxxx  xxxx   0.00 xxxx  xxxx  xxxx xxxx  xxxx   0.08 xxxx 0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx    0.0 xxxx xxxxx xxxxx xxxx xxxxx    0.3 xxxx  0.0
Stopped Del:xxxxx xxxx xxxxx    7.4 xxxx xxxxx xxxxx xxxx xxxxx   11.2 xxxx  8.8
LOS by Move:    *    *    *      A    *    *      *    *    *      B    *    A
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx    0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx    7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *    *      A    *    *      *    *    *      *    *    *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx            11.0
ApproachLOS:         *                *                *                B
```

```
EX-AM                     Mon Jun 28, 2004 16:24:21                  Page 4-1
------------------------------------------------------------------------------
                    MADERA COUNTY - SIERRA MEADOWS ESTATES
                            EXISTING CONDITIONS
                               AM PEAK HOUR
------------------------------------------------------------------------------

                       Level Of Service Computation Report
           2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #2 SR-49/ROAD 621
******************************************************************************
Average Delay (sec/veh):       0.7    Worst Case Level Of Service:     B[ 11.4]
******************************************************************************
Approach:     North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       0  0  0  1  0    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  135    2      6  309    0      0    0    0     22    0    3
Growth Adj:  1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Initial Bse:    0  135    2      6  309    0      0    0    0     22    0    3
User Adj:    1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Volume:     0  135    2      6  309    0      0    0    0     22    0    3
Reduct Vol:     0    0    0      0    0    0      0    0    0      0    0    0
Final Vol.:     0  135    2      6  309    0      0    0    0     22    0    3
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx    4.1 xxxx xxxxx xxxxx xxxx xxxxx    6.4 xxxx  6.2
FollowUpTim:xxxxx xxxx xxxxx    2.2 xxxx xxxxx xxxxx xxxx xxxxx    3.5 xxxx  3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    137 xxxx xxxxx  xxxx xxxx xxxxx    457 xxxx  136
Potent Cap.: xxxx xxxx xxxxx   1459 xxxx xxxxx  xxxx xxxx xxxxx    565 xxxx  918
Move Cap.:   xxxx xxxx xxxxx   1459 xxxx xxxxx  xxxx xxxx xxxxx    564 xxxx  918
Volume/Cap:  xxxx xxxx  xxxx   0.00 xxxx  xxxx  xxxx xxxx  xxxx   0.04 xxxx 0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx    0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx    7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *    *      A    *    *      *    *    *      *    *    *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  591 xxxxx
SharedQueue:xxxxx xxxx xxxxx    0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.1 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx    7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 11.4 xxxxx
Shared LOS:     *    *    *      A    *    *      *    *    *      *    B    *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx            11.4
ApproachLOS:         *                *                *                B
```

```
EX-AM                   Mon Jun 28, 2004 16:24:21                   Page 5-1
-------------------------------------------------------------------------------
                  MADERA COUNTY - SIERRA MEADOWS ESTATES
                           EXISTING CONDITIONS
                              AM PEAK HOUR
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #3 HARMONY LANE/SR-49
*******************************************************************************
Average Delay (sec/veh):       0.7   Worst Case Level Of Service:       B[ 14.4]
*******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  0  0   1  0  0  0  1   1  0  1  0  0   0  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0     0     0    32     0     0     3   495     0     0   187    19
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:    0     0     0    32     0     0     3   495     0     0   187    19
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Volume:     0     0     0    32     0     0     3   495     0     0   187    19
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Final Vol.:     0     0     0    32     0     0     3   495     0     0   187    19
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   688 xxxx xxxxx   206 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   415 xxxx xxxxx  1377 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   414 xxxx xxxxx  1377 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.08 xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.2 xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx  14.4 xxxx xxxxx   7.6 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     B    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx            14.4            xxxxxx           xxxxxx
ApproachLOS:        *                B                *                *
```

```
EX-AM                   Mon Jun 28, 2004 16:24:21                   Page 6-1
-------------------------------------------------------------------------------
                  MADERA COUNTY - SIERRA MEADOWS ESTATES
                           EXISTING CONDITIONS
                              AM PEAK HOUR
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
            2000 HCM 4-Way Stop Method (Base Volume Alternative)
*******************************************************************************
Intersection #4 OPAH RD-HARMONY LN/HARMONY LN
*******************************************************************************
Cycle (sec):         100              Critical Vol./Cap. (X):         0.029
Loss Time (sec):       0 (Y+R =  4 sec) Average Delay (sec/veh):        6.9
Optimal Cycle:         0              Level Of Service:                   A
*******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:     0     0     0     0     0     0     0     0     0     0     0     0
Lanes:        0  1  0  0  0   0  0  1  0  0   0  0  0  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       4    22     0     0    14     0     0     0    16     0     0     0
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:    4    22     0     0    14     0     0     0    16     0     0     0
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Volume:     4    22     0     0    14     0     0     0    16     0     0     0
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:    4    22     0     0    14     0     0     0    16     0     0     0
PCE Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Final Vol.:     4    22     0     0    14     0     0     0    16     0     0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Lanes:       0.15  0.85  0.00  0.00  1.00  0.00  0.00  0.00  1.00  0.00  0.00  0.00
Final Sat.:   139   764     0     0   906     0     0     0  1053     0     0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.03  0.03  xxxx  xxxx  0.02  xxxx  xxxx  xxxx  0.02  xxxx  xxxx  xxxx
Crit Moves:        ****              ****                    ****
Delay/Veh:    7.1   7.1   0.0   0.0   7.0   0.0   0.0   0.0   6.4   0.0   0.0   0.0
Delay Adj:   1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:   7.1   7.1   0.0   0.0   7.0   0.0   0.0   0.0   6.4   0.0   0.0   0.0
LOS by Move:    A     A     *     *     A     *     *     *     A     *     *     *
ApproachDel:        7.1              7.0              6.4            xxxxxx
Delay Adj:         1.00             1.00             1.00             xxxxx
ApprAdjDel:         7.1              7.0              6.4            xxxxxx
LOS by Appr:          A                A                A                 *
*******************************************************************************
```

```
EX-AM                    Mon Jun 28, 2004 16:24:21                  Page 7-1
------------------------------------------------------------------------------
                   MADERA COUNTY - SIERRA MEADOWS ESTATES
                            EXISTING CONDITIONS
                               AM PEAK HOUR
------------------------------------------------------------------------------

                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #5 OPAH RD/MIAMI HIGHLANDS DR
******************************************************************************
Average Delay (sec/veh):        3.0    Worst Case Level Of Service:      A[  8.6]
******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include         Include          Include
Lanes:        0  0  0  1  0    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   17    4     1    5    0     0    0    0    11    0    2
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:    0   17    4     1    5    0     0    0    0    11    0    2
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:     0   17    4     1    5    0     0    0    0    11    0    2
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:     0   17    4     1    5    0     0    0    0    11    0    2
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    21 xxxx xxxxx  xxxx xxxx xxxxx    26 xxxx    19
Potent Cap.: xxxx xxxx xxxxx  1608 xxxx xxxxx  xxxx xxxx xxxxx   995 xxxx  1065
Move Cap.:   xxxx xxxx xxxxx  1608 xxxx xxxxx  xxxx xxxx xxxxx   994 xxxx  1065
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.01 xxxx  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *    *     A    *    *     *    *    *     *    *    *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx 1004 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx   7.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  8.6 xxxxx
Shared LOS:     *    *    *     A    *    *     *    *    *     *    A    *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx             8.6
ApproachLOS:        *                *                *                A
```

```
EX-PM                      Mon Jun 28, 2004 16:25:05                   Page 1-1
-------------------------------------------------------------------------------
                     MADERA COUNTY - SIERRA MEADOWS ESTATES
                              EXISTING CONDITIONS
                                 PM PEAK HOUR
-------------------------------------------------------------------------------
                                Scenario Report
Scenario:             EX-PM

Command:              EX-PM
Volume:               EX-PM
Geometry:             EX
Impact Fee:           Default Impact Fee
Trip Generation:      Default Trip Generation
Trip Distribution:    Default Trip Distribution
Paths:                Default Paths
Routes:               Default Routes
Configuration:        EX-PM
```

```
EX-PM                      Mon Jun 28, 2004 16:25:05                   Page 2-1
-------------------------------------------------------------------------------
                     MADERA COUNTY - SIERRA MEADOWS ESTATES
                              EXISTING CONDITIONS
                                 PM PEAK HOUR
-------------------------------------------------------------------------------
                            Impact Analysis Report
                               Level Of Service

Intersection                          Base            Future         Change
                                    Del/   V/       Del/   V/          in
                                 LOS Veh    C    LOS Veh    C
# 1 SR-49/ROAD 628               B  11.3 0.000   B  11.3 0.000   + 0.000 D/V

# 2 SR-49/ROAD 621               B  11.4 0.000   B  11.4 0.000   + 0.000 D/V

# 3 HARMONY LANE/SR-49           B  14.7 0.000   B  14.7 0.000   + 0.000 D/V

# 4 OPAH RD-HARMONY LN/HARMONY LN  A   7.0 0.035   A   7.0 0.035   + 0.000 V/C

# 5 OPAH RD/MIAMI HIGHLANDS DR   A   8.5 0.000   A   8.5 0.000   + 0.000 D/V
```

```
EX-PM                      Mon Jun 28, 2004 16:25:05                 Page 3-1
-------------------------------------------------------------------------------
                   MADERA COUNTY - SIERRA MEADOWS ESTATES
                           EXISTING CONDITIONS
                              PM PEAK HOUR
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #1 SR-49/ROAD 628
*******************************************************************************
Average Delay (sec/veh):       0.7    Worst Case Level Of Service:      B[ 11.3]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       0  0  1  0  1    0  1  0  0  0    0  0  0  0  0    1  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  270    44     12  188     0      0    0     0     20    0     7
Growth Adj:  1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00
Initial Bse:    0  270    44     12  188     0      0    0     0     20    0     7
User Adj:    1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00
PHF Volume:     0  270    44     12  188     0      0    0     0     20    0     7
Reduct Vol:     0    0     0      0    0     0      0    0     0      0    0     0
Final Vol.:     0  270    44     12  188     0      0    0     0     20    0     7
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx    4.1 xxxx xxxxx xxxxx xxxx xxxxx    6.4 xxxx    6.2
FollowUpTim:xxxxx xxxx xxxxx    2.2 xxxx xxxxx xxxxx xxxx xxxxx    3.5 xxxx    3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    314 xxxx xxxxx   xxxx xxxx xxxxx    482 xxxx   270
Potent Cap.: xxxx xxxx xxxxx   1258 xxxx xxxxx   xxxx xxxx xxxxx    547 xxxx   774
Move Cap.:   xxxx xxxx xxxxx   1258 xxxx xxxxx   xxxx xxxx xxxxx    543 xxxx   774
Volume/Cap:  xxxx xxxx  xxxx   0.01 xxxx  xxxx   xxxx xxxx  xxxx   0.04 xxxx  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx    0.0 xxxx xxxxx xxxxx xxxx xxxxx    0.1 xxxx   0.0
Stopped Del:xxxxx xxxx xxxxx    7.9 xxxx xxxxx xxxxx xxxx xxxxx   11.9 xxxx   9.7
LOS by Move:    *    *     *      A    *     *      *    *     *      B    *     A
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx   xxxx xxxx xxxxx   xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx    0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx    7.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *      A    *     *      *    *     *      *    *     *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx             11.3
ApproachLOS:         *                *                *                 B
```

```
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-------------------------------------------------------------------------------
                   MADERA COUNTY - SIERRA MEADOWS ESTATES
                           EXISTING CONDITIONS
                              PM PEAK HOUR
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #2 SR-49/ROAD 621
*******************************************************************************
Average Delay (sec/veh):       0.5    Worst Case Level Of Service:      B[ 11.4]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       0  0  0  1  0    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  304     8      1  232     0      0    0     0     13    0    10
Growth Adj:  1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00
Initial Bse:    0  304     8      1  232     0      0    0     0     13    0    10
User Adj:    1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00
PHF Volume:     0  304     8      1  232     0      0    0     0     13    0    10
Reduct Vol:     0    0     0      0    0     0      0    0     0      0    0     0
Final Vol.:     0  304     8      1  232     0      0    0     0     13    0    10
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx    4.1 xxxx xxxxx xxxxx xxxx xxxxx    6.4 xxxx    6.2
FollowUpTim:xxxxx xxxx xxxxx    2.2 xxxx xxxxx xxxxx xxxx xxxxx    3.5 xxxx    3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    312 xxxx xxxxx   xxxx xxxx xxxxx    542 xxxx   308
Potent Cap.: xxxx xxxx xxxxx   1260 xxxx xxxxx   xxxx xxxx xxxxx    505 xxxx   737
Move Cap.:   xxxx xxxx xxxxx   1260 xxxx xxxxx   xxxx xxxx xxxxx    505 xxxx   737
Volume/Cap:  xxxx xxxx  xxxx   0.00 xxxx  xxxx   xxxx xxxx  xxxx   0.03 xxxx  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx    0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx    7.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *      A    *     *      *    *     *      *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx   xxxx xxxx xxxxx   xxxx  585 xxxxx
SharedQueue:xxxxx xxxx xxxxx    0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.1 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx    7.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 11.4 xxxxx
Shared LOS:     *    *     *      A    *     *      *    *     *      *    B     *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx             11.4
ApproachLOS:         *                *                *                 B
```

```
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-------------------------------------------------------------------------------
                  MADERA COUNTY - SIERRA MEADOWS ESTATES
                           EXISTING CONDITIONS
                              PM PEAK HOUR
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
             2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #3 HARMONY LANE/SR-49
*******************************************************************************
Average Delay (sec/veh):        0.3    Worst Case Level Of Service:      B[ 14.7]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  0  0    1  0  0  0  1    1  0  1  0  0    0  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0     9    0     1     8  266     0     0  494    27
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0     9    0     1     8  266     0     0  494    27
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0     9    0     1     8  266     0     0  494    27
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0    0     0     9    0     1     8  266     0     0  494    27
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   776 xxxx   494   521 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   369 xxxx   579  1056 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   367 xxxx   579  1056 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.02 xxxx  0.00  0.01 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.1 xxxx   0.0   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx  15.1 xxxx  11.2   8.4 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     C    *     B     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx            14.7            xxxxxx            xxxxxx
ApproachLOS:        *                B                *                 *
```

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                  MADERA COUNTY - SIERRA MEADOWS ESTATES
                           EXISTING CONDITIONS
                              PM PEAK HOUR
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
             2000 HCM 4-Way Stop Method (Base Volume Alternative)
*******************************************************************************
Intersection #4 OPAH RD-HARMONY LN/HARMONY LN
*******************************************************************************
Cycle (sec):         100              Critical Vol./Cap. (X):         0.035
Loss Time (sec):       0 (Y+R =  4 sec) Average Delay (sec/veh):        7.0
Optimal Cycle:         0              Level Of Service:                 A
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
Lanes:        0  1  0  0  0    0  0  1  0  0    0  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      15   16     0     0   11     0     0    0     6     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   15   16     0     0   11     0     0    0     6     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    15   16     0     0   11     0     0    0     6     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   15   16     0     0   11     0     0    0     6     0    0     0
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:    15   16     0     0   11     0     0    0     6     0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.48 0.52  0.00  0.00 1.00  0.00  0.00 0.00  1.00  0.00 0.00  0.00
Final Sat.:   433  462     0     0  912     0     0    0  1051     0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.03 0.03  xxxx  xxxx 0.01  xxxx  xxxx xxxx  0.01  xxxx xxxx  xxxx
Crit Moves:       ****             ****                   ****
Delay/Veh:    7.2  7.2   0.0   0.0  7.0   0.0   0.0  0.0   6.4   0.0  0.0   0.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   7.2  7.2   0.0   0.0  7.0   0.0   0.0  0.0   6.4   0.0  0.0   0.0
LOS by Move:    A    A     *     *    A     *     *    *     A     *    *     *
ApproachDel:        7.2              7.0              6.4            xxxxxx
Delay Adj:         1.00             1.00             1.00             xxxxx
ApprAdjDel:         7.2              7.0              6.4            xxxxxx
LOS by Appr:         A                A                A                *
*******************************************************************************
```

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                  MADERA COUNTY - SIERRA MEADOWS ESTATES
                           EXISTING CONDITIONS
                              PM PEAK HOUR
------------------------------------------------------------------------------

                    Level Of Service Computation Report
              2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #5 OPAH RD/MIAMI HIGHLANDS DR
******************************************************************************
Average Delay (sec/veh):       1.6    Worst Case Level Of Service:      A[  8.5]
******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  1  0    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   11    7     2    7    0     0    0    0     2    0    2
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1:00 1.00 1.00
Initial Bse:    0   11    7     2    7    0     0    0    0     2    0    2
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:     0   11    7     2    7    0     0    0    0     2    0    2
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:     0   11    7     2    7    0     0    0    0     2    0    2
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    18 xxxx xxxxx  xxxx xxxx xxxxx    25 xxxx    15
Potent Cap.: xxxx xxxx xxxxx  1612 xxxx xxxxx  xxxx xxxx xxxxx   995 xxxx  1071
Move Cap.:   xxxx xxxx xxxxx  1612 xxxx xxxxx  xxxx xxxx xxxxx   994 xxxx  1071
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.00 xxxx  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *    *     A    *    *     *    *    *     *    *    *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx 1031 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx   7.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  8.5 xxxxx
Shared LOS:     *    *    *     A    *    *     *    *    *     *    A    *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx             8.5
ApproachLOS:        *                *                *                A



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------------------------------------------------------------------------------
                  MADERA COUNTY - SIERRA MEADOWS ESTATES
                FORECAST YEAR 2025 WITHOUT PROJECT CONDITIONS
                               AM PEAK HOUR
------------------------------------------------------------------------------
                        Trip Distribution Report

                   Percent Of Trips PROJECT DISTRIBUTION

          To Gates
             1     2
Zone       ----- -----

   1        30.0  70.0
   2        30.0  70.0
   3        30.0  70.0
   4        30.0  70.0
   5        30.0  70.0
   6        30.0  70.0
   7        30.0  70.0
   8        30.0  70.0
```

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------------------------------------------------------------------------------
                  MADERA COUNTY - SIERRA MEADOWS ESTATES
                FORECAST YEAR 2025 WITHOUT PROJECT CONDITIONS
                               AM PEAK HOUR
------------------------------------------------------------------------------
                          Impact Analysis Report
                             Level Of Service

Intersection                            Base           Future        Change
                                     Del/   V/      Del/   V/          in
                                 LOS Veh    C   LOS Veh    C
#  1 SR-49/ROAD 628              B  14.8 0.000  B  14.8 0.000   + 0.080 D/V

#  2 SR-49/ROAD 621              C  15.5 0.000  C  16.2 0.000   + 0.748 D/V

#  3 HARMONY LANE/SR-49          D  28.0 0.000  D  32.4 0.000   + 4.351 D/V

#  4 OPAH RD-HARMONY LN/HARMONY LN   A   7.0 0.050  A   7.1 0.065   + 0.015 V/C

#  5 OPAH RD/MIAMI HIGHLANDS DR  A   8.8 0.000  A   8.9 0.000   + 0.119 D/V
```

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                  MADERA COUNTY - SIERRA MEADOWS ESTATES
                FORECAST YEAR 2025 WITHOUT PROJECT CONDITIONS
                               AM PEAK HOUR
---------------------------------------------------------------------------

                     Level Of Service Computation Report
            2000 HCM Unsignalized Method (Future Volume Alternative)
***************************************************************************
Intersection #1 SR-49/ROAD 628
***************************************************************************
Average Delay (sec/veh):       2.2    Worst Case Level Of Service:    B[ 14.8]
***************************************************************************
Approach:     North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       0  0  1  0  1    0  1  0  0  0    0  0  0  0  0    1  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  112    10     3  249     0     0    0     0    54    0     4
Growth Adj:  1.72 1.72  1.72  1.72 1.72  1.72  1.72 1.72  1.72  1.72 1.72  1.72
Initial Bse:    0  193    17     5  428     0     0    0     0    93    0     7
Added Vol:      0   10     0     4    6     0     0    0     0     1    0     7
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  203    17     9  434     0     0    0     0    94    0    14
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  203    17     9  434     0     0    0     0    94    0    14
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0  203    17     9  434     0     0    0     0    94    0    14
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   220 xxxx xxxxx  xxxx xxxx xxxxx   655 xxxx   203
Potent Cap.: xxxx xxxx xxxxx  1361 xxxx xxxxx  xxxx xxxx xxxxx   434 xxxx   843
Move Cap.:   xxxx xxxx xxxxx  1361 xxxx xxxxx  xxxx xxxx xxxxx   432 xxxx   843
Volume/Cap:  xxxx xxxx  xxxx  0.01 xxxx  xxxx  xxxx xxxx  xxxx  0.22 xxxx  0.02
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx   0.8 xxxx   0.1
Stopped Del:xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx  15.6 xxxx   9.3
LOS by Move:    *    *     *     A    *     *     *    *     *     C    *     A
Movement:    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     A    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx            14.8
ApproachLOS:        *                *                *                B
```

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                  MADERA COUNTY - SIERRA MEADOWS ESTATES
                FORECAST YEAR 2025 WITHOUT PROJECT CONDITIONS
                               AM PEAK HOUR
---------------------------------------------------------------------------

                     Level Of Service Computation Report
            2000 HCM Unsignalized Method (Future Volume Alternative)
***************************************************************************
Intersection #2 SR-49/ROAD 621
***************************************************************************
Average Delay (sec/veh):       1.4    Worst Case Level Of Service:    C[ 16.2]
***************************************************************************
Approach:     North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       0  0  0  1  0    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  135     2     6  309     0     0    0     0    22    0     3
Growth Adj:  1.72 1.72  1.72  1.72 1.72  1:72  1.72 1.72  1.72  1.72 1.72  1.72
Initial Bse:    0  232     3    10  531     0     0    0     0    38    0     5
Added Vol:      0    3    12     4    2     0     0    0     0    19    0     7
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  235    15    14  533     0     0    0     0    57    0    12
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  235    15    14  533     0     0    0     0    57    0    12
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0  235    15    14  533     0     0    0     0    57    0    12
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   251 xxxx xxxxx  xxxx xxxx xxxxx   805 xxxx   243
Potent Cap.: xxxx xxxx xxxxx  1327 xxxx xxxxx  xxxx xxxx xxxxx   354 xxxx   801
Move Cap.:   xxxx xxxx xxxxx  1327 xxxx xxxxx  xxxx xxxx xxxxx   352 xxxx   801
Volume/Cap:  xxxx xxxx  xxxx  0.01 xxxx  xxxx  xxxx xxxx  xxxx  0.16 xxxx  0.02
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  390 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.6 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx   7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 16.2 xxxxx
Shared LOS:     *    *     *     A    *     *     *    *     *     *    C     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx            16.2
ApproachLOS:        *                *                *                C
```

```
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                   MADERA COUNTY - SIERRA MEADOWS ESTATES
               FORECAST YEAR 2025 WITHOUT PROJECT CONDITIONS
                                AM PEAK HOUR
--------------------------------------------------------------------------------
                       Level Of Service Computation Report
            2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #3 HARMONY LANE/SR-49
********************************************************************************
Average Delay (sec/veh):       1.9   Worst Case Level Of Service:        D[ 32.4]
********************************************************************************
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Stop Sign         Stop Sign       Uncontrolled     Uncontrolled
Rights:            Include           Include          Include          Include
Lanes:         0  0  0  0  0   1  0  0  0  1   1  0  1  0  0   0  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0    0     0    32    0     0     3  495     0     0  187    19
Growth Adj:   1.72 1.72  1.72  1.72 1.72  1.72  1.72 1.72  1.72  1.72 1.72  1.72
Initial Bse:     0    0     0    55    0     0     5  851     0     0  322    33
Added Vol:       0    0     0    19    0     2     1   19     0     0   12    12
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0    0     0    74    0     2     6  870     0     0  334    45
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0    0     0    74    0     2     6  870     0     0  334    45
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      0    0     0    74    0     2     6  870     0     0  334    45
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  1216 xxxx   334   378 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   202 xxxx   713  1191 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   201 xxxx   713  1191 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.37 xxxx  0.00  0.01 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   1.6 xxxx   0.0   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx  33.0 xxxx  10.1   8.0 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *    *     *     D    *     B     A    *     *     *    *     *
Movement:      LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx             32.4            xxxxxx           xxxxxx
ApproachLOS:        *                 D                *                *
```

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                   MADERA COUNTY - SIERRA MEADOWS ESTATES
               FORECAST YEAR 2025 WITHOUT PROJECT CONDITIONS
                                AM PEAK HOUR
--------------------------------------------------------------------------------
                       Level Of Service Computation Report
             2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #4 OPAH RD-HARMONY LN/HARMONY LN
********************************************************************************
Cycle (sec):         100               Critical Vol./Cap. (X):        0.065
Loss Time (sec):       0 (Y+R =  4 sec) Average Delay (sec/veh):        7.1
Optimal Cycle:         0               Level Of Service:                 A
********************************************************************************
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Stop Sign         Stop Sign        Stop Sign        Stop Sign
Rights:            Include           Include          Include          Include
Min. Green:      0    0     0     0    0     0     0    0     0     0    0     0
Lanes:         0  1  0  0  0   0  0  1  0  0   0  0  0  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        4   22     0     0   14     0     0    0    16     0    0     0
Growth Adj:   1.72 1.72  1.72  1.72 1.72  1.72  1.72 1.72  1.72  1.72 1.72  1.72
Initial Bse:     7   38     0     0   24     0     0    0    28     0    0     0
Added Vol:       0   13     0     0   22     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     7   51     0     0   46     0     0    0    28     0    0     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      7   51     0     0   46     0     0    0    28     0    0     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:     7   51     0     0   46     0     0    0    28     0    0     0
PCE Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Final Vol.:      7   51     0     0   46     0     0    0    28     0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:        0.12 0.88  0.00  0.00 1.00  0.00  0.00 0.00  1.00  0.00 0.00  0.00
Final Sat.:    106  784     0     0  891     0     0    0   999     0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:      0.06 0.06  xxxx  xxxx 0.05  xxxx  xxxx xxxx  0.03  xxxx xxxx  xxxx
Crit Moves:        ****              ****                  ****
Delay/Veh:     7.3  7.3   0.0   0.0  7.2   0.0   0.0  0.0   6.6   0.0  0.0   0.0
Delay Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:    7.3  7.3   0.0   0.0  7.2   0.0   0.0  0.0   6.6   0.0  0.0   0.0
LOS by Move:     A    A     *     *    A     *     *    *     A     *    *     *
ApproachDel:        7.3               7.2              6.6           xxxxxx
Delay Adj:         1.00              1.00             1.00            xxxxx
ApprAdjDel:         7.3               7.2              6.6           xxxxxx
LOS by Appr:          A                 A                A                *
********************************************************************************
```

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                      MADERA COUNTY - SIERRA MEADOWS ESTATES
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                                   AM PEAK HOUR
---------------------------------------------------------------------------------

                       Level Of Service Computation Report
              2000 HCM Unsignalized Method (Future Volume Alternative)
*********************************************************************************
Intersection #5 OPAH RD/MIAMI HIGHLANDS DR
*********************************************************************************
Average Delay (sec/veh):        2.4     Worst Case Level Of Service:        A[  8.9]
*********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  1  0    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   17    4     1    5    0     0    0    0    11    0    2
Growth Adj:  1.72 1.72 1.72  1.72 1.72 1.72  1.72 1.72 1.72  1.72 1.72 1.72
Initial Bse:    0   29    7     2    9    0     0    0    0    19    0    3
Added Vol:      0    8    2     0   14    0     0    0    0     2    0    0
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:    0   37    9     2   23    0     0    0    0    21    0    3
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:     0   37    9     2   23    0     0    0    0    21    0    3
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:     0   37    9     2   23    0     0    0    0    21    0    3
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4 xxxx  6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5 xxxx  3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    46 xxxx xxxxx  xxxx xxxx xxxxx    68 xxxx   42
Potent Cap.: xxxx xxxx xxxxx  1575 xxxx xxxxx  xxxx xxxx xxxxx   942 xxxx 1035
Move Cap.:   xxxx xxxx xxxxx  1575 xxxx xxxxx  xxxx xxxx xxxxx   941 xxxx 1035
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.02 xxxx 0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *    *     A    *    *     *    *    *     *    *    *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  954 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.1 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  8.9 xxxxx
Shared LOS:     *    *    *     A    *    *     *    *    *     *    A    *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx             8.9
ApproachLOS:        *                *                *                A


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-------------------------------------------------------------------------------
                  MADERA COUNTY - SIERRA MEADOWS ESTATES
                FORECAST YEAR 2025 WITHOUT PROJECT CONDITIONS
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-------------------------------------------------------------------------------
                        Trip Distribution Report

                    Percent Of Trips PROJECT DISTRIBUTION

          To Gates
             1     2
Zone      ----- -----

   1       30.0  70.0
   2       30.0  70.0
   3       30.0  70.0
   4       30.0  70.0
   5       30.0  70.0
   6       30.0  70.0
   7       30.0  70.0
   8       30.0  70.0
```

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-------------------------------------------------------------------------------
                  MADERA COUNTY - SIERRA MEADOWS ESTATES
                FORECAST YEAR 2025 WITHOUT PROJECT CONDITIONS
                              PM PEAK HOUR
-------------------------------------------------------------------------------
                          Impact Analysis Report
                             Level Of Service

Intersection                        Base            Future          Change
                                 Del/   V/       Del/   V/           in
                             LOS Veh     C   LOS Veh     C
# 1 SR-49/ROAD 628            C  15.4 0.000   C  15.4 0.000   + 0.009 D/V

# 2 SR-49/ROAD 621            C  15.8 0.000   C  17.3 0.000   + 1.507 D/V

# 3 HARMONY LANE/SR-49        D  27.1 0.000   D  30.6 0.000   + 3.437 D/V

# 4 OPAH RD-HARMONY LN/HARMONY LN  A   7.1 0.060   A   7.2 0.082   + 0.022 V/C

# 5 OPAH RD/MIAMI HIGHLANDS DR     A   8.6 0.000   A   8.7 0.000   + 0.136 D/V
```

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                  MADERA COUNTY - SIERRA MEADOWS ESTATES
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---------------------------------------------------------------------------

                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
***************************************************************************
Intersection #1 SR-49/ROAD 628
***************************************************************************
Average Delay (sec/veh):      1.1    Worst Case Level Of Service:    C[ 15.4]
***************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  1  0  1    0  1  0  0  0    0  0  0  0  0    1  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  270    44     12  188     0      0    0     0     20    0     7
Growth Adj:   1.72 1.72  1.72   1.72 1.72  1.72   1.72 1.72  1.72   1.72 1.72  1.72
Initial Bse:     0  464    76     21  323     0      0    0     0     34    0    12
Added Vol:       0    7     1      6    9     0      0    0     0      0    0     5
PasserByVol:     0    0     0      0    0     0      0    0     0      0    0     0
Initial Fut:     0  471    77     27  332     0      0    0     0     34    0    17
User Adj:     1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00
PHF Volume:      0  471    77     27  332     0      0    0     0     34    0    17
Reduct Vol:      0    0     0      0    0     0      0    0     0      0    0     0
Final Vol.:      0  471    77     27  332     0      0    0     0     34    0    17
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx    4.1 xxxx xxxxx xxxxx xxxx xxxxx    6.4 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx    2.2 xxxx xxxxx xxxxx xxxx xxxxx    3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    548 xxxx xxxxx  xxxx xxxx xxxxx    857 xxxx   471
Potent Cap.: xxxx xxxx xxxxx   1032 xxxx xxxxx  xxxx xxxx xxxxx    330 xxxx   597
Move Cap.:   xxxx xxxx xxxxx   1032 xxxx xxxxx  xxxx xxxx xxxxx    324 xxxx   597
Volume/Cap:  xxxx xxxx  xxxx   0.03 xxxx  xxxx  xxxx xxxx  xxxx   0.11 xxxx  0.03
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx    0.1 xxxx xxxxx xxxxx xxxx xxxxx    0.4 xxxx   0.1
Stopped Del:xxxxx xxxx xxxxx    8.6 xxxx xxxxx xxxxx xxxx xxxxx   17.4 xxxx  11.2
LOS by Move:    *    *     *      A    *     *      *    *     *      C    *     B
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx   xxxx xxxx xxxxx  xxxx xxxx xxxxx   xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx    0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx    8.6 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *      A    *     *      *    *     *      *    *     *
ApproachDel:     xxxxxx           xxxxxx            xxxxxx             15.4
ApproachLOS:        *                *                 *                 C
```

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                  MADERA COUNTY - SIERRA MEADOWS ESTATES
               FORECAST YEAR 2025 WITHOUT PROJECT CONDITIONS
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---------------------------------------------------------------------------

                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
***************************************************************************
Intersection #2 SR-49/ROAD 621
***************************************************************************
Average Delay (sec/veh):      1.0    Worst Case Level Of Service:    C[ 17.3]
***************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  1  0    0  1  0  0  0    0  0  0  0  0    0  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  304     8      1  232     0      0    0     0     13    0    10
Growth Adj:   1.72 1.72  1.72   1.72 1.72  1.72   1.72 1.72  1.72   1.72 1.72  1.72
Initial Bse:     0  523    14      2  399     0      0    0     0     22    0    17
Added Vol:       0    2    17      7    3     0      0    0     0     13    0     5
PasserByVol:     0    0     0      0    0     0      0    0     0      0    0     0
Initial Fut:     0  525    31      9  402     0      0    0     0     35    0    22
User Adj:     1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00
PHF Volume:      0  525    31      9  402     0      0    0     0     35    0    22
Reduct Vol:      0    0     0      0    0     0      0    0     0      0    0     0
Final Vol.:      0  525    31      9  402     0      0    0     0     35    0    22
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx    4.1 xxxx xxxxx xxxxx xxxx xxxxx    6.4 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx    2.2 xxxx xxxxx xxxxx xxxx xxxxx    3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    556 xxxx xxxxx  xxxx xxxx xxxxx    960 xxxx   540
Potent Cap.: xxxx xxxx xxxxx   1025 xxxx xxxxx  xxxx xxxx xxxxx    287 xxxx   546
Move Cap.:   xxxx xxxx xxxxx   1025 xxxx xxxxx  xxxx xxxx xxxxx    285 xxxx   546
Volume/Cap:  xxxx xxxx  xxxx   0.01 xxxx  xxxx  xxxx xxxx  xxxx   0.12 xxxx  0.04
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx    0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx    8.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *      A    *     *      *    *     *      *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx   xxxx xxxx xxxxx  xxxx xxxx xxxxx   xxxx  350 xxxxx
SharedQueue:xxxxx xxxx xxxxx    0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.6 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx    8.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 17.3 xxxxx
Shared LOS:     *    *     *      A    *     *      *    *     *      *    C     *
ApproachDel:     xxxxxx           xxxxxx            xxxxxx             17.3
ApproachLOS:        *                *                 *                 C
```

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                    MADERA COUNTY - SIERRA MEADOWS ESTATES
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                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #3 HARMONY LANE/SR-49
*******************************************************************************
Average Delay (sec/veh):      0.8    Worst Case Level Of Service:      D[ 30.6]
*******************************************************************************
Approach:     North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:       0  0  0  0  0    1  0  0  0  1    1  0  1  0  0    0  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0    0      9    0    1      8  266    0      0  494   27
Growth Adj:  1.72 1.72 1.72   1.72 1.72 1.72   1.72 1.72 1.72   1.72 1.72 1.72
Initial Bse:    0    0    0     15    0    2     14  458    0      0  850   46
Added Vol:      0    0    0     14    0    2      2   14    0      0   18   18
PasserByVol:    0    0    0      0    0    0      0    0    0      0    0    0
Initial Fut:    0    0    0     29    0    4     16  472    0      0  868   64
User Adj:    1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Volume:     0    0    0     29    0    4     16  472    0      0  868   64
Reduct Vol:     0    0    0      0    0    0      0    0    0      0    0    0
Final Vol.:     0    0    0     29    0    4     16  472    0      0  868   64
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx  6.2    4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx  3.3    2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  1371 xxxx  868    932 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   163 xxxx  355    742 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   160 xxxx  355    742 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.18 xxxx 0.01   0.02 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx   0.7 xxxx  0.0    0.1 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx  32.5 xxxx 15.3   10.0 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *    *      D    *    C      A    *    *      *    *    *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *    *      *    *    *      *    *    *      *    *    *
ApproachDel:     xxxxxx            30.6             xxxxxx           xxxxxx
ApproachLOS:        *                D                 *                *
```

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                    MADERA COUNTY - SIERRA MEADOWS ESTATES
                  FORECAST YEAR 2025 WITHOUT PROJECT CONDITIONS
                                  PM PEAK HOUR
-------------------------------------------------------------------------------

                     Level Of Service Computation Report
           2000 HCM 4-Way Stop Method (Future Volume Alternative)
*******************************************************************************
Intersection #4 OPAH RD-HARMONY LN/HARMONY LN
*******************************************************************************
Cycle (sec):        100              Critical Vol./Cap. (X):         0.082
Loss Time (sec):      0 (Y+R =  4 sec) Average Delay (sec/veh):         7.2
Optimal Cycle:        0              Level Of Service:                  A
*******************************************************************************
Approach:     North Bound      South Bound       East Bound       West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:     0    0    0      0    0    0      0    0    0      0    0    0
Lanes:       0  1  0  0  0    0  0  1  0  0    0  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      15   16    0      0   11    0      0    0    6      0    0    0
Growth Adj:  1.72 1.72 1.72   1.72 1.72 1.72   1.72 1.72 1.72   1.72 1.72 1.72
Initial Bse:   26   28    0      0   19    0      0    0   10      0    0    0
Added Vol:      0   20    0      0   15    0      0    0    0      0    0    0
PasserByVol:    0    0    0      0    0    0      0    0    0      0    0    0
Initial Fut:   26   48    0      0   34    0      0    0   10      0    0    0
User Adj:    1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
PHF Volume:    26   48    0      0   34    0      0    0   10      0    0    0
Reduct Vol:     0    0    0      0    0    0      0    0    0      0    0    0
Reduced Vol:   26   48    0      0   34    0      0    0   10      0    0    0
PCE Adj:     1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Final Vol.:    26   48    0      0   34    0      0    0   10      0    0    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
Lanes:       0.35 0.65 0.00   0.00 1.00 0.00   0.00 0.00 1.00   0.00 0.00 0.00
Final Sat.:   314  578    0      0  899    0      0    0  997      0    0    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.08 0.08 xxxx   xxxx 0.04 xxxx   xxxx xxxx 0.01   xxxx xxxx xxxx
Crit Moves:       ****              ****                  ****
Delay/Veh:    7.4  7.4  0.0    0.0  7.1  0.0    0.0  0.0  6.5    0.0  0.0  0.0
Delay Adj:   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00   1.00 1.00 1.00
AdjDel/Veh:   7.4  7.4  0.0    0.0  7.1  0.0    0.0  0.0  6.5    0.0  0.0  0.0
LOS by Move:    A    A    *      *    A    *      *    *    A      *    *    *
ApproachDel:        7.4              7.1              6.5           xxxxxx
Delay Adj:         1.00             1.00             1.00            xxxxx
ApprAdjDel:         7.4              7.1              6.5           xxxxxx
LOS by Appr:         A                A                A                *
*******************************************************************************
```

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                    MADERA COUNTY - SIERRA MEADOWS ESTATES
                 FORECAST YEAR 2025 WITHOUT PROJECT CONDITIONS
                                 PM PEAK HOUR
-----------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
*****************************************************************************
Intersection #5 OPAH RD/MIAMI HIGHLANDS DR
*****************************************************************************
Average Delay (sec/veh):        1.3   Worst Case Level Of Service:       A[ 8.7]
*****************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled       Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       0  0  0  1  0   0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   11     7    2    7     0     0    0     0     2    0     2
Growth Adj:  1.72 1.72  1.72 1.72 1.72  1.72  1.72 1.72  1.72  1.72 1.72  1.72
Initial Bse:    0   19    12    3   12     0     0    0     0     3    0     3
Added Vol:      0   13     2    0    9     0     0    0     0     2    0     0
PasserByVol:    0    0     0    0    0     0     0    0     0     0    0     0
Initial Fut:    0   32    14    3   21     0     0    0     0     5    0     3
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0   32    14    3   21     0     0    0     0     5    0     3
Reduct Vol:     0    0     0    0    0     0     0    0     0     0    0     0
Final Vol.:     0   32    14    3   21     0     0    0     0     5    0     3
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    46 xxxx xxxxx  xxxx xxxx xxxxx    67 xxxx    39
Potent Cap.: xxxx xxxx xxxxx  1575 xxxx xxxxx  xxxx xxxx xxxxx   943 xxxx  1038
Move Cap.:   xxxx xxxx xxxxx  1575 xxxx xxxxx  xxxx xxxx xxxxx   942 xxxx  1038
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.01 xxxx  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  977 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  8.7 xxxxx
Shared LOS:     *    *     *     A    *     *     *    *     *     *    A     *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx              8.7
ApproachLOS:         *                *                *                 A
```

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                  MADERA COUNTY - SIERRA MEADOWS ESTATES
                FORECAST YEAR 2025 WITH PROJECT CONDITIONS
                               AM PEAK HOUR
---------------------------------------------------------------------------
                         Trip Distribution Report

                  Percent Of Trips PROJECT DISTRIBUTION

         To Gates
           1     2
Zone     ----- -----

  1       30.0  70.0
  2       30.0  70.0
  3       30.0  70.0
  4       30.0  70.0
  5       30.0  70.0
  6       30.0  70.0
  7       30.0  70.0
```

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                  MADERA COUNTY - SIERRA MEADOWS ESTATES
                FORECAST YEAR 2025 WITH PROJECT CONDITIONS
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                          Impact Analysis Report
                             Level Of Service

Intersection                            Base           Future        Change
                                     Del/   V/      Del/   V/         in
                                 LOS Veh    C   LOS Veh    C
# 1 SR-49/ROAD 628               B  14.8 0.000  C  15.2 0.000    + 0.404 D/V

# 2 SR-49/ROAD 621               C  15.5 0.000  C  19.9 0.000    + 4.410 D/V

# 3 HARMONY LANE/SR-49           D  28.0 0.000  F  58.0 0.000    +29.959 D/V

# 4 OPAH RD-HARMONY LN/HARMONY LN A   7.0 0.050  A   7.4 0.114    + 0.064 V/C

# 5 OPAH RD/MIAMI HIGHLANDS DR   A   8.8 0.000  A   9.3 0.000    + 0.567 D/V
```

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                  MADERA COUNTY - SIERRA MEADOWS ESTATES
                FORECAST YEAR 2025 WITH PROJECT CONDITIONS
                               AM PEAK HOUR
-----------------------------------------------------------------------------

                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*****************************************************************************
Intersection #1 SR-49/ROAD 628
*****************************************************************************
Average Delay (sec/veh):        2.5    Worst Case Level Of Service:     C[ 15.2]
*****************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:         0  0  1  0  1    0  1  0  0  0    0  0  0  0  0    1  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  112    10     3  249     0     0    0     0    54    0     4
Growth Adj:   1.72 1.72  1.72  1.72 1.72  1.72  1.72 1.72  1.72  1.72 1.72  1.72
Initial Bse:     0  193    17     5  428     0     0    0     0    93    0     7
Added Vol:       0   34     2    15   21     0     0    0     0     3    0    25
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0  227    19    20  449     0     0    0     0    96    0    32
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0  227    19    20  449     0     0    0     0    96    0    32
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      0  227    19    20  449     0     0    0     0    96    0    32
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx    4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx    2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    246 xxxx xxxxx  xxxx xxxx xxxxx   716 xxxx   227
Potent Cap.: xxxx xxxx xxxxx   1332 xxxx xxxxx  xxxx xxxx xxxxx   400 xxxx   818
Move Cap.:   xxxx xxxx xxxxx   1332 xxxx xxxxx  xxxx xxxx xxxxx   395 xxxx   818
Volume/Cap:  xxxx xxxx  xxxx   0.02 xxxx  xxxx  xxxx xxxx  xxxx  0.24 xxxx  0.04
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:        xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx   0.9 xxxx   0.1
Stopped Del:xxxxx xxxx xxxxx    7.7 xxxx xxxxx xxxxx xxxx xxxxx  17.0 xxxx   9.6
LOS by Move:     *    *     *     A    *     *     *    *     *     C    *     A
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx    0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx    7.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *     *     A    *     *     *    *     *     *    *     *
ApproachDel:       xxxxxx           xxxxxx           xxxxxx            15.2
ApproachLOS:          *                *                *                C
```

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                  MADERA COUNTY - SIERRA MEADOWS ESTATES
                FORECAST YEAR 2025 WITH PROJECT CONDITIONS
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                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*****************************************************************************
Intersection #2 SR-49/ROAD 621
*****************************************************************************
Average Delay (sec/veh):        2.9    Worst Case Level Of Service:     C[ 19.9]
*****************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:         0  0  0  1  0    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  135     2     6  309     0     0    0     0    22    0     3
Growth Adj:   1.72 1.72  1.72  1.72 1.72  1.72  1.72 1.72  1.72  1.72 1.72  1.72
Initial Bse:     0  232     3    10  531     0     0    0     0    38    0     5
Added Vol:       0   10    40    16    8     0     0    0     0    66    0    25
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     0  242    43    26  539     0     0    0     0   104    0    30
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0  242    43    26  539     0     0    0     0   104    0    30
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      0  242    43    26  539     0     0    0     0   104    0    30
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx    4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx    2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    286 xxxx xxxxx  xxxx xxxx xxxxx   856 xxxx   264
Potent Cap.: xxxx xxxx xxxxx   1288 xxxx xxxxx  xxxx xxxx xxxxx   331 xxxx   780
Move Cap.:   xxxx xxxx xxxxx   1288 xxxx xxxxx  xxxx xxxx xxxxx   326 xxxx   780
Volume/Cap:  xxxx xxxx  xxxx   0.02 xxxx  xxxx  xxxx xxxx  xxxx  0.32 xxxx  0.04
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:        xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx    7.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *    *     *     A    *     *     *    *     *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  375 xxxxx
SharedQueue:xxxxx xxxx xxxxx    0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  1.6 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx    7.9 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 19.9 xxxxx
Shared LOS:      *    *     *     A    *     *     *    *     *     *    C     *
ApproachDel:       xxxxxx           xxxxxx           xxxxxx            19.9
ApproachLOS:          *                *                *                C
```

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                  MADERA COUNTY - SIERRA MEADOWS ESTATES
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                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
***************************************************************************
Intersection #3 HARMONY LANE/SR-49
***************************************************************************
Average Delay (sec/veh):        5.2     Worst Case Level Of Service:   F[ 58.0]
***************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0    1  0  0  0  1    1  0  1  0  0    0  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0    0     0     32    0     0      3  495     0      0 . 187   19
Growth Adj:   1.72 1.72  1.72   1.72 1.72  1.72   1.72 1.72  1.72   1.72 1.72  1.72
Initial Bse:     0    0     0     55    0     0      5  851     0      0  322    33
Added Vol:       0    0     0     68    0     9      5   68     0      0   42    42
PasserByVol:     0    0     0      0    0     0      0    0     0      0    0     0
Initial Fut:     0    0     0    123    0     9     10  919     0      0  364    75
User Adj:     1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00
PHF Volume:      0    0     0    123    0     9     10  919     0      0  364    75
Reduct Vol:      0    0     0      0    0     0      0    0     0      0    0     0
Final Vol.:      0    0     0    123    0     9     10  919     0      0  364    75
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx    6.4 xxxx   6.2    4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx    3.5 xxxx   3.3    2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   1303 xxxx   364    438 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx    179 xxxx   686   1132 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx    178 xxxx   686   1132 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx   0.69 xxxx  0.01   0.01 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx    4.2 xxxx   0.0    0.0 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   61.5 xxxx  10.3    8.2 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *    *     *      F    *     B      A    *     *      *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *     *      *    *     *      *    *     *      *    *     *
ApproachDel:     xxxxxx              58.0             xxxxxx            xxxxxx
ApproachLOS:        *                  F                 *                 *
```

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                  MADERA COUNTY - SIERRA MEADOWS ESTATES
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                     Level Of Service Computation Report
            2000 HCM 4-Way Stop Method (Future Volume Alternative)
***************************************************************************
Intersection #4 OPAH RD-HARMONY LN/HARMONY LN
***************************************************************************
Cycle (sec):         100             Critical Vol./Cap. (X):        0.114
Loss Time (sec):       0 (Y+R =  4 sec) Average Delay (sec/veh):      7.4
Optimal Cycle:         0             Level Of Service:                  A
***************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:      0    0     0      0    0     0      0    0     0      0    0     0
Lanes:        0  1  0  0  0    0  0  1  0  0    0  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        4   22     0      0   14     0      0    0    16      0    0     0
Growth Adj:   1.72 1.72  1.72   1.72 1.72  1.72   1.72 1.72  1.72   1.72 1.72  1.72
Initial Bse:     7   38     0      0   24     0      0    0    28      0    0     0
Added Vol:       0   47     0      0   77     0      0    0     0      0    0     0
PasserByVol:     0    0     0      0    0     0      0    0     0      0    0     0
Initial Fut:     7   85     0      0  101     0      0    0    28      0    0     0
User Adj:     1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00
PHF Volume:      7   85     0      0  101     0      0    0    28      0    0     0
Reduct Vol:      0    0     0      0    0     0      0    0     0      0    0     0
Reduced Vol:     7   85     0      0  101     0      0    0    28      0    0     0
PCE Adj:      1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00
MLF Adj:      1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00
Final Vol.:      7   85     0      0  101     0      0    0    28      0    0     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:   1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00
Lanes:        0.08 0.92  0.00   0.00 1.00  0.00   0.00 0.00  1.00   0.00 0.00  0.00
Final Sat.:     66  812     0      0  885     0      0    0   933      0    0     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:      0.10 0.10  xxxx   xxxx 0.11  xxxx   xxxx xxxx  0.03   xxxx xxxx  xxxx
Crit Moves:   ****                   ****                    ****
Delay/Veh:     7.5  7.5   0.0    0.0  7.5   0.0    0.0  0.0   6.8    0.0  0.0   0.0
Delay Adj:    1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00   1.00 1.00  1.00
AdjDel/Veh:    7.5  7.5   0.0    0.0  7.5   0.0    0.0  0.0   6.8    0.0  0.0   0.0
LOS by Move:     A    A     *      *    A     *      *    *     A      *    *     *
ApproachDel:        7.5              7.5              6.8            xxxxxx
Delay Adj:         1.00             1.00             1.00             xxxxx
ApprAdjDel:         7.5              7.5              6.8            xxxxxx
LOS by Appr:          A                A                A                 *
***************************************************************************
```

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-----------------------------------------------------------------------------
                   MADERA COUNTY - SIERRA MEADOWS ESTATES
                 FORECAST YEAR 2025 WITH PROJECT CONDITIONS
                                AM PEAK HOUR
-----------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*****************************************************************************
Intersection #5 OPAH RD/MIAMI HIGHLANDS DR
*****************************************************************************
Average Delay (sec/veh):        1.3   Worst Case Level Of Service:      A[  9.3]
*****************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  1  0   0  1  0  0  0   0  0  0  0  0   0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   17    4     1    5    0     0    0    0    11    0    2
Growth Adj:  1.72 1.72  1.72  1.72 1.72  1.72  1.72 1.72  1.72  1.72 1.72  1.72
Initial Bse:    0   29    7     2    9    0     0    0    0    19    0    3
Added Vol:      0   42    2     0   69    0     0    0    0     2    0    0
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:    0   71    9     2   78    0     0    0    0    21    0    3
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0   71    9     2   78    0     0    0    0    21    0    3
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:     0   71    9     2   78    0     0    0    0    21    0    3
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    80 xxxx xxxxx  xxxx xxxx xxxxx   157 xxxx    76
Potent Cap.: xxxx xxxx xxxxx  1531 xxxx xxxxx  xxxx xxxx xxxxx   839 xxxx   991
Move Cap.:   xxxx xxxx xxxxx  1531 xxxx xxxxx  xxxx xxxx xxxxx   839 xxxx   991
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.02 xxxx  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *    *     A    *    *     *    *    *     *    *    *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  857 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.1 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  9.3 xxxxx
Shared LOS:     *    *    *     A    *    *     *    *    *     *    A    *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx            9.3
ApproachLOS:         *                *                *               A
```

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-------------------------------------------------------------------------------
                   MADERA COUNTY - SIERRA MEADOWS ESTATES
                 FORECAST YEAR 2025 WITH PROJECT CONDITIONS
                                PM PEAK HOUR
-------------------------------------------------------------------------------
                          Trip Distribution Report

                     Percent Of Trips PROJECT DISTRIBUTION

          To Gates
             1     2
Zone       ----- -----

   1        30.0  70.0
   2        30.0  70.0
   3        30.0  70.0
   4        30.0  70.0
   5        30.0  70.0
   6        30.0  70.0
   7        30.0  70.0
```

```
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-------------------------------------------------------------------------------
                   MADERA COUNTY - SIERRA MEADOWS ESTATES
                 FORECAST YEAR 2025 WITH PROJECT CONDITIONS
                                PM PEAK HOUR
-------------------------------------------------------------------------------
                           Impact Analysis Report
                              Level Of Service

Intersection                        Base          Future        Change
                                 Del/   V/      Del/   V/        in
                              LOS Veh    C   LOS Veh    C
# 1 SR-49/ROAD 628            C  15.4 0.000  C  15.7 0.000  + 0.349 D/V

# 2 SR-49/ROAD 621            C  15.8 0.000  C  22.4 0.000  + 6.571 D/V

# 3 HARMONY LANE/SR-49        D  27.1 0.000  E  47.2 0.000  +20.092 D/V

# 4 OPAH RD-HARMONY LN/HARMONY LN  A   7.1 0.060  A   7.5 0.138  + 0.078 V/C

# 5 OPAH RD/MIAMI HIGHLANDS DR     A   8.6 0.000  A   9.1 0.000  + 0.521 D/V
```

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                   MADERA COUNTY - SIERRA MEADOWS ESTATES
                 FORECAST YEAR 2025 WITH PROJECT CONDITIONS
                               PM PEAK HOUR
-------------------------------------------------------------------------------

                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #1 SR-49/ROAD 628
*******************************************************************************
Average Delay (sec/veh):       1.4   Worst Case Level Of Service:      C[ 15.7]
*******************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include         Include          Include
Lanes:        0  0  1  0  1    0  1  0  0  0    0  0  0  0  0    1  0  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  270   44    12  188    0     0    0    0    20    0    7
Growth Adj:   1.72 1.72 1.72  1.72 1.72 1.72  1.72 1.72 1.72  1.72 1.72 1.72
Initial Bse:     0  464   76    21  323    0     0    0    0    34    0   12
Added Vol:       0   25    2    22   30    0     0    0    0     2    0   18
PasserByVol:     0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:     0  489   78    43  353    0     0    0    0    36    0   30
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:      0  489   78    43  353    0     0    0    0    36    0   30
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:      0  489   78    43  353    0     0    0    0    36    0   30
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   567 xxxx xxxxx  xxxx xxxx xxxxx   928 xxxx   489
Potent Cap.: xxxx xxxx xxxxx  1015 xxxx xxxxx  xxxx xxxx xxxxx   300 xxxx   583
Move Cap.:   xxxx xxxx xxxxx  1015 xxxx xxxxx  xxxx xxxx xxxxx   290 xxxx   583
Volume/Cap:  xxxx xxxx  xxxx  0.04 xxxx  xxxx  xxxx xxxx  xxxx  0.13 xxxx  0.05
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx   0.4 xxxx   0.2
Stopped Del:xxxxx xxxx xxxxx   8.7 xxxx xxxxx xxxxx xxxx xxxxx  19.2 xxxx  11.5
LOS by Move:     *    *    *     A    *    *     *    *    *     C    *     B
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx   8.7 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *    *    *     A    *    *     *    *    *     *    *     *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx            15.7
ApproachLOS:        *                *                *                C
```

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                   MADERA COUNTY - SIERRA MEADOWS ESTATES
                 FORECAST YEAR 2025 WITH PROJECT CONDITIONS
                               PM PEAK HOUR
-------------------------------------------------------------------------------

                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #2 SR-49/ROAD 621
*******************************************************************************
Average Delay (sec/veh):       2.2   Worst Case Level Of Service:      C[ 22.4]
*******************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include         Include          Include
Lanes:        0  0  0  1  0    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  304    8     1  232    0     0    0    0    13    0   10
Growth Adj:   1.72 1.72 1.72  1.72 1.72 1.72  1.72 1.72 1.72  1.72 1.72 1.72
Initial Bse:     0  523   14     2  399    0     0    0    0    22    0   17
Added Vol:       0    9   59    23   10    0     0    0    0    47    0   18
PasserByVol:     0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:     0  532   73    25  409    0     0    0    0    69    0   35
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:      0  532   73    25  409    0     0    0    0    69    0   35
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:      0  532   73    25  409    0     0    0    0    69    0   35
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   605 xxxx xxxxx  xxxx xxxx xxxxx  1027 xxxx   568
Potent Cap.: xxxx xxxx xxxxx   983 xxxx xxxxx  xxxx xxxx xxxxx   262 xxxx   526
Move Cap.:   xxxx xxxx xxxxx   983 xxxx xxxxx  xxxx xxxx xxxxx   257 xxxx   526
Volume/Cap:  xxxx xxxx  xxxx  0.03 xxxx  xxxx  xxxx xxxx  xxxx  0.27 xxxx  0.07
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   8.8 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *    *    *     A    *    *     *    *    *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  310 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  1.4 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx   8.8 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 22.4 xxxxx
Shared LOS:      *    *    *     A    *    *     *    *    *     *    C     *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx            22.4
ApproachLOS:        *                *                *                C
```

```
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-----------------------------------------------------------------------------
                  MADERA COUNTY - SIERRA MEADOWS ESTATES
               FORECAST YEAR 2025 WITH PROJECT CONDITIONS
                              PM PEAK HOUR
-----------------------------------------------------------------------------
                   Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*****************************************************************************
Intersection #3 HARMONY LANE/SR-49
*****************************************************************************
Average Delay (sec/veh):      2.2   Worst Case Level Of Service:     E[ 47.2]
*****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  0  0    1  0  0  0  1    1  0  1  0  0    0  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0    0    0     9    0    1     8  266    0     0  494   27
Growth Adj:   1.72 1.72 1.72  1.72 1.72 1.72  1.72 1.72 1.72  1.72 1.72 1.72
Initial Bse:     0    0    0    15    0    2    14  458    0     0  850   46
Added Vol:       0    0    0    49    0    6     8   49    0     0   61   61
PasserByVol:     0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:     0    0    0    64    0    8    22  507    0     0  911  107
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:      0    0    0    64    0    8    22  507    0     0  911  107
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:      0    0    0    64    0    8    22  507    0     0  911  107
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx  6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx  3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  1461 xxxx  911  1018 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   144 xxxx  335   689 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   140 xxxx  335   689 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.46 xxxx 0.02  0.03 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx   2.1 xxxx  0.1   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx  50.9 xxxx 16.0  10.4 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *    *     F    *    C     B    *    *     *    *    *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *    *     *    *    *     *    *    *     *    *    *
ApproachDel:     xxxxxx            47.2            xxxxxx           xxxxxx
ApproachLOS:        *                E                *                *
```

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                  MADERA COUNTY - SIERRA MEADOWS ESTATES
               FORECAST YEAR 2025 WITH PROJECT CONDITIONS
                              PM PEAK HOUR
-----------------------------------------------------------------------------
                   Level Of Service Computation Report
         2000 HCM 4-Way Stop Method (Future Volume Alternative)
*****************************************************************************
Intersection #4 OPAH RD-HARMONY LN/HARMONY LN
*****************************************************************************
Cycle (sec):         100             Critical Vol./Cap. (X):         0.138
Loss Time (sec):       0 (Y+R =  4 sec) Average Delay (sec/veh):       7.5
Optimal Cycle:         0             Level Of Service:                   A
*****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:      0    0    0     0    0    0     0    0    0     0    0    0
Lanes:        0  1  0  0  0    0  0  1  0  0    0  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       15   16    0     0   11    0     0    0    6     0    0    0
Growth Adj:   1.72 1.72 1.72  1.72 1.72 1.72  1.72 1.72 1.72  1.72 1.72 1.72
Initial Bse:    26   28    0     0   19    0     0    0   10     0    0    0
Added Vol:       0   69    0     0   56    0     0    0    0     0    0    0
PasserByVol:     0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:    26   97    0     0   75    0     0    0   10     0    0    0
User Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:     26   97    0     0   75    0     0    0   10     0    0    0
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:    26   97    0     0   75    0     0    0   10     0    0    0
PCE Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:      1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Final Vol.:     26   97    0     0   75    0     0    0   10     0    0    0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:        0.21 0.79 0.00  0.00 1.00 0.00  0.00 0.00 1.00  0.00 0.00 0.00
Final Sat.:    188  702    0     0  887    0     0    0  930     0    0    0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:      0.14 0.14 xxxx  xxxx 0.08 xxxx  xxxx xxxx 0.01  xxxx xxxx xxxx
Crit Moves:        ****            ****                 ****
Delay/Veh:     7.7  7.7  0.0   0.0  7.4  0.0   0.0  0.0  6.7   0.0  0.0  0.0
Delay Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:    7.7  7.7  0.0   0.0  7.4  0.0   0.0  0.0  6.7   0.0  0.0  0.0
LOS by Move:     A    A    *     *    A    *     *    *    A     *    *    *
ApproachDel:        7.7              7.4              6.7           xxxxxx
Delay Adj:         1.00             1.00             1.00            xxxxx
ApprAdjDel:         7.7              7.4              6.7           xxxxxx
LOS by Appr:         A                A                A                *
*****************************************************************************
```

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                    MADERA COUNTY - SIERRA MEADOWS ESTATES
                  FORECAST YEAR 2025 WITH PROJECT CONDITIONS
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-----------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM Unsignalized Method (Future Volume Alternative)
*****************************************************************************
Intersection #5 OPAH RD/MIAMI HIGHLANDS DR
*****************************************************************************
Average Delay (sec/veh):        0.6   Worst Case Level Of Service:       A[  9.1]
*****************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Lanes:       0  0  0  1  0    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    11     7     2     7     0     0     0     0     2     0     2
Growth Adj:  1.72  1.72  1.72  1.72  1.72  1.72  1.72  1.72  1.72  1.72  1.72  1.72
Initial Bse:    0    19    12     3    12     0     0     0     0     3     0     3
Added Vol:      0    62     2     0    50     0     0     0     0     2     0     0
PasserByVol:    0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:    0    81    14     3    62     0     0     0     0     5     0     3
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Volume:     0    81    14     3    62     0     0     0     0     5     0     3
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Final Vol.:     0    81    14     3    62     0     0     0     0     5     0     3
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    95 xxxx xxxxx  xxxx xxxx xxxxx   157 xxxx    88
Potent Cap.: xxxx xxxx xxxxx  1512 xxxx xxxxx  xxxx xxxx xxxxx   839 xxxx   976
Move Cap.:   xxxx xxxx xxxxx  1512 xxxx xxxxx  xxxx xxxx xxxxx   838 xxxx   976
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.01 xxxx  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *     *     *     A     *     *     *     *     *     *     *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  886 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  9.1 xxxxx
Shared LOS:     *     *     *     A     *     *     *     *     *     *     A     *
ApproachDel:     xxxxxx            xxxxxx            xxxxxx              9.1
ApproachLOS:        *                 *                 *                 A
```

```
25WPAMi                      Wed Jun 2, 2004 16:28:58                Page 3-1
------------------------------------------------------------------------------
                    MADERA COUNTY - SIERRA MEADOWS ESTATES
               FORECAST IMPROVED YEAR 2025 WITH PROJECT CONDITIONS
                                 AM PEAK HOUR
------------------------------------------------------------------------------
                          Trip Distribution Report

                     Percent Of Trips PROJECT DISTRIBUTION

         To Gates
           1     2
 Zone    ----- -----

   1      30.0  70.0
   2      30.0  70.0
   3      30.0  70.0
   4      30.0  70.0
   5      30.0  70.0
   6      30.0  70.0
   7      30.0  70.0
```

```
25WPAMi                      Wed Jun 2, 2004 16:28:58                Page 4-1
------------------------------------------------------------------------------
                    MADERA COUNTY - SIERRA MEADOWS ESTATES
               FORECAST IMPROVED YEAR 2025 WITH PROJECT CONDITIONS
                                 AM PEAK HOUR
------------------------------------------------------------------------------
                           Impact Analysis Report
                              Level Of Service

Intersection                         Base           Future        Change
                                  Del/   V/       Del/   V/         in
                               LOS Veh    C    LOS Veh    C
#  3 HARMONY LANE/SR-49         C  16.2 0.000   C  21.1 0.000  + 4.949 D/V
```

```
25WPAMi                    Wed Jun 2, 2004 16:28:58                 Page 5-1
----------------------------------------------------------------------------
                   MADERA COUNTY - SIERRA MEADOWS ESTATES
             FORECAST IMPROVED YEAR 2025 WITH PROJECT CONDITIONS
                                AM PEAK HOUR
----------------------------------------------------------------------------

                      Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
****************************************************************************
Intersection #3 HARMONY LANE/SR-49
****************************************************************************
Average Delay (sec/veh):       1.9   Worst Case Level Of Service:      C[ 21.1]
****************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  0  0    1  0  0  0  1    1  0  2  0  0    0  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0    32    0     0     3  495     0     0  187    19
Growth Adj:  1.72 1.72  1.72  1.72 1.72  1.72  1.72 1.72  1.72  1.72 1.72  1.72
Initial Bse:    0    0     0    55    0     0     5  851     0     0  322    33
Added Vol:      0    0     0    68    0     9     5   68     0     0   42    42
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0   123    0     9    10  919     0     0  364    75
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0   123    0     9    10  919     0     0  364    75
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0    0     0   123    0     9    10  919     0     0  364    75
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   844 xxxx   364   438 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   336 xxxx   686  1132 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   334 xxxx   686  1132 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.37 xxxx  0.01  0.01 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   1.6 xxxx   0.0   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx  21.9 xxxx  10.3   8.2 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     C    *     B     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx            21.1             xxxxxx           xxxxxx
ApproachLOS:       *                C                 *                *




  Traffix 7.6.0115 (c) 2004 Dowling Assoc. Licensed to RBF CONSULTING, IRVINE
```

```
25WPPMi                     Wed Jun 2, 2004 16:29:50                     Page 3-1
---------------------------------------------------------------------------------
                    MADERA COUNTY - SIERRA MEADOWS ESTATES
              FORECAST IMPROVED YEAR 2025 WITH PROJECT CONDITIONS
                                 PM PEAK HOUR
---------------------------------------------------------------------------------
                           Trip Distribution Report

                     Percent Of Trips PROJECT DISTRIBUTION

          To Gates
             1     2
Zone      ----- -----

   1       30.0  70.0
   2       30.0  70.0
   3       30.0  70.0
   4       30.0  70.0
   5       30.0  70.0
   6       30.0  70.0
   7       30.0  70.0
```

```
25WPPMi                     Wed Jun 2, 2004 16:29:51                     Page 4-1
---------------------------------------------------------------------------------
                    MADERA COUNTY - SIERRA MEADOWS ESTATES
              FORECAST IMPROVED YEAR 2025 WITH PROJECT CONDITIONS
                                 PM PEAK HOUR
---------------------------------------------------------------------------------
                            Impact Analysis Report
                               Level Of Service

Intersection                                 Base          Future         Change
                                          Del/   V/      Del/   V/         in
                                       LOS Veh    C   LOS Veh    C
#  3 HARMONY LANE/SR-49                 C  21.0 0.000  D  29.8 0.000  + 8.834 D/V
```

```
25WPPMi                      Wed Jun 2, 2004 16:29:51                    Page 5-1
---------------------------------------------------------------------------------
                   MADERA COUNTY - SIERRA MEADOWS ESTATES
             FORECAST IMPROVED YEAR 2025 WITH PROJECT CONDITIONS
                                PM PEAK HOUR
---------------------------------------------------------------------------------

                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Future Volume Alternative)
*********************************************************************************
Intersection #3 HARMONY LANE/SR-49
*********************************************************************************
Average Delay (sec/veh):       1.5   Worst Case Level Of Service:      D[ 29.8]
*********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  0  0    1  0  0  0  1    1  0  2  0  0    0  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0     9    0     1     8  266     0     0  494    27
Growth Adj:  1.72 1.72  1.72  1.72 1.72  1.72  1.72 1.72  1.72  1.72 1.72  1.72
Initial Bse:    0    0     0    15    0     2    14  458     0     0  850    46
Added Vol:      0    0     0    49    0     6     8   49     0     0   61    61
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0    64    0     8    22  507     0     0  911   107
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0    64    0     8    22  507     0     0  911   107
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0    0     0    64    0     8    22  507     0     0  911   107
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4 xxxx   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5 xxxx   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  1207 xxxx   911  1018 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   204 xxxx   335   689 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   199 xxxx   335   689 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.32 xxxx  0.02  0.03 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:       xxxxx xxxx xxxxx   1.3 xxxx   0.1   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx  31.5 xxxx  16.0  10.4 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     D    *     C     B    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:      xxxxxx            29.8            xxxxxx           xxxxxx
ApproachLOS:         *                D                *                *
```

APPENDIX C

Signal Warrant Analysis Sheets

Figure 9-4

TRAFFIC SIGNAL WARRANTS

(Based on Estimated Average Daily Traffic - See Note)

URBAN ______ RURAL X

Minimum Requirements
EADT

				SR-49		Harmony Lane	
1. Minimum Vehicular							
Satisfied		Not Satisfied	X	Vehicles per day on major Street (total of both approaches)		Vehicles per day on higher-volume minor street approach **(one direction only)**	
Number of lanes for moving traffic on each approach				**Major Street Volume**		**Minor Street Volume**	
				15,350		**1,020**	
Major Street		Minor Street		**Urban**	**Rural**	**Urban**	**Rural**
1		1		8,000	5,600	2,400	1,680
2 or more		1		9,600	6,720	2,400	1,680
2 or more	100%	**2 or more**	46%	9,600	**6,720**	3,200	**2,240**
1		2 or more		8,000	5,600	3,200	2,240
2. Interuption of Continuous Traffic							
Satisfied		Not Satisfied	X	Vehicles per day on major Street (total of both **approaches)**		Vehicles per day on higher-volume minor street approach **(one direction only)**	
Number of lanes for moving traffic on each approach				**Major Street Volume**		**Minor Street Volume**	
				15,350		**1,020**	
Major Street		Minor Street		**Urban**	**Rural**	**Urban**	**Rural**
1		1		12,000	8,400	1,200	850
2 or more		1		14,400	10,080	1,200	850
2 or more	100%	**2 or more**	91%	14,400	**10,080**	1,600	**1,120**
1		2 or more		12,000	8,400	1,600	1,120
3. Combination							
Satisfied		Not Satisfied	X	**2 Warrants**		**2 Warrants**	
No one warrant satisfied, but the following warrants fulfilled 80% or more.............			X				
		1	2				

NOTE : To be used only for NEW INTERSECTION or other locations where it is not reasonable to count actual traffic volumes

RBF
CONSULTING

Forecast Year 2025 With Project
State Route 49/Harmony Lane

15.4 Air Quality Data

Parenthetical URBEMIS2002 Assumptions
For: Sierra Meadows
Date: August 18, 2004

LAND USES

Amount	Land Use Type	Trip Rate	Unit Type
315	Single Family Residential	7.36	Dwelling units

CONSTRUCTION SOURCES

Phase	Year	Duration	Development
1, 2 and 3	2006-2007	18 months	81 units/450,000 cy reservoir/water and sewer treatment plant
4 and 6	2007-2008	12 months	54 units
7, 8 and 9	2008-2009	12 months	100 units
11 and 12	2009-2010	12 months	43 units
5 and 10	2010-2011	12 months	37 units

Phase 1 - Demolition:

None

Phase 2 - Site Grading:

Phase	Year	Total Acreage Disturbed	Acreage Disturbed Daily	Duration	Fugitive Dust	Soil Hauling
1, 2 and 3	2006-2007	27.32	4.5	10 months	Default	None
4 and 6	2007-2008	12.2	3.5	6 months	Default	None
7, 8 and 9	2008-2009	29.27	4.5	6 months	Default	None
11 and 12	2009-2010	15.04	3.5	6 months	Default	None
5 and 10	2010-2011	12.9	3.5	6 months	Default	None

Equipment Exhaust:

Phase	Year	Grader	Off-Highway Tractor	Off-Highway Truck	Rubber Tired Loader	Scraper
1, 2 and 3	2006-2007	2	1	2	2	2
4 and 6	2007-2008	1	1	2	1	2
7, 8 and 9	2008-2009	1	1	2	1	2
11 and 12	2009-2010	1	1	2	1	2
5 and 10	2010-2011	1	1	2	1	2

Phase 3 – Building Equipment:

Phase	Year	Duration	Other Equipment	Rough Terrain Forklift	Tractor/Loader/ Backhoe
1, 2 and 3	2006-2007	6 Months	1	1	1
4 and 6	2007-2008	4 Months	1	1	1
7, 8 and 9	2008-2009	4 Months	1	1	1
11 and 12	2009-2010	4 Months	1	1	1
5 and 10	2010-2011	4 Months	1	1	1

Phase 3 – Architectural Coatings:

Off

Phase 3 – Asphalt

Phase	Year	Duration	Acres Paved	Paver	Paving Equipment	Roller	Scraper	Surfacing Equipment
1, 2 and 3	2006-2007	2 Months	6.4	1	1	1	1	1
4 and 6	2007-2008	2 Months	4.6	1	1	1	1	1
7, 8 and 9	2008-2009	2 Months	7.9	1	1	1	1	1
11 and 12	2009-2010	2 Months	3.4	1	1	1	1	1
5 and 10	2010-2011	2 Months	3.0	1	1	1	1	1

Phase 3 - Worker Commute

(URBEMIS2002 default all phases)

Construction Mitigation:

Refer to URBEMIS2002 file output.

AREA SOURCES

Natural Gas Fuel Combustion:

(URBEMIS2002 default all phases)

Wood Stoves Fuel Combustion:

Off

Fireplaces:

Off

Landscape Maintenance Equipment:

Year of Completion	Summer Days
2015	180

Consumer Products:

(URBEMIS2002 default all phases)

Area Source Mitigation:

Refer to URBEMIS2002 file output.

OPERATIONAL SOURCES

Vehicle Fleet %:

(URBEMIS2002 default all phases)

Year:

Year of Completion – 2015

Trip Characteristics:

(URBEMIS2002 Default all phases)

Temperature Data:

40 to 90 degrees Fahrenheit

Variable Starts:

(URBEMIS2002 default all phases)

Road Dust:

Paved – 100%
Unpaved – 0%

Pass By Trips (On/Off):

On

Double-Counting(On/Off):

Off

Operational Mitigation Measures:

Refer to URBEMIS 2002 file output.

```
               URBEMIS 2002 For Windows   7.4.2

File Name:                     I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows.urb
Project Name:                  Sierra Meadows Operations
Project Location:              San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                       SUMMARY REPORT
                    (Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES
                                    ROG       NOx        CO       SO2      PM10
 TOTALS (lbs/day,unmitigated)      15.89      3.99      3.49      0.06      0.01


OPERATIONAL (VEHICLE) EMISSION ESTIMATES
                                    ROG       NOx        CO       SO2      PM10
 TOTALS (lbs/day,unmitigated)      15.72     14.99    173.69      0.22     32.82
 TOTALS (lbs/day, mitigated)       15.72     14.99    173.69      0.22     32.82

SUM OF AREA AND OPERATIONAL EMISSION ESTIMATES
                                    ROG       NOx        CO       SO2      PM10
 TOTALS (lbs/day,unmitigated)      31.61     18.98    177.19      0.28     32.83
 Both Area and Operational Mitigation must be turned on to get a combined mitigated total.
```

```
               URBEMIS 2002 For Windows   7.4.2

File Name:                      I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows.urb
Project Name:                   Sierra Meadows Operations
Project Location:               San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                       SUMMARY REPORT
                    (Pounds/Day - Winter)

AREA SOURCE EMISSION ESTIMATES
                                    ROG        NOx         CO         SO2        PM10
 TOTALS (lbs/day,unmitigated)      15.72       3.95       1.68       0.00       0.01


OPERATIONAL (VEHICLE) EMISSION ESTIMATES
                                    ROG        NOx         CO         SO2        PM10
 TOTALS (lbs/day,unmitigated)      14.84      23.54     167.74       0.19      32.82
 TOTALS (lbs/day, mitigated)       14.84      23.54     167.74       0.19      32.82

SUM OF AREA AND OPERATIONAL EMISSION ESTIMATES
                                    ROG        NOx         CO         SO2        PM10
 TOTALS (lbs/day,unmitigated)      30.55      27.49     169.41       0.19      32.83
 Both Area and Operational Mitigation must be turned on to get a combined mitigated total.
```

```
               URBEMIS 2002 For Windows   7.4.2

File Name:                      I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows.urb
Project Name:                   Sierra Meadows Operations
Project Location:               San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                       SUMMARY REPORT
                         (Tons/Year)

AREA SOURCE EMISSION ESTIMATES
                                 ROG       NOx        CO       SO2      PM10
 TOTALS (tpy, unmitigated)      2.88      0.72      0.47      0.01      0.00


OPERATIONAL (VEHICLE) EMISSION ESTIMATES
                                 ROG       NOx        CO       SO2      PM10
 TOTALS (tpy, unmitigated)      2.82      3.26     31.34      0.04      5.99
 TOTALS (tpy, mitigated)        2.82      3.26     31.34      0.04      5.99

SUM OF AREA AND OPERATIONAL EMISSION ESTIMATES
                                 ROG       NOx        CO       SO2      PM10
 TOTALS (tpy, unmitigated)      5.70      3.98     31.81      0.04      5.99
 Both Area and Operational Mitigation must be turned on to get a combined mitigated total.
```

```
               URBEMIS 2002 For Windows   7.4.2

File Name:                      I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows.urb
Project Name:                   Sierra Meadows Operations
Project Location:               San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                        DETAIL REPORT
                    (Pounds/Day - Winter)

AREA SOURCE EMISSION ESTIMATES (Winter Pounds per Day, Unmitigated)
    Source                         ROG       NOx       CO       SO2      PM10
 Natural Gas                      0.30      3.95      1.68         -      0.01
 Wood Stoves                      0.00      0.00      0.00      0.00      0.00
 Fireplaces                       0.00      0.00      0.00      0.00      0.00
 Landscaping - No winter emissions
 Consumer Prdcts                 15.41         -         -         -         -
 TOTALS(lbs/day,unmitigated)     15.72      3.95      1.68      0.00      0.01
```

```
                 UNMITIGATED OPERATIONAL EMISSIONS

                                    ROG       NOx        CO        SO2       PM10
Single family housing              14.84     23.54     167.74      0.19      32.82

TOTAL EMISSIONS (lbs/day)          14.84     23.54     167.74      0.19      32.82

Includes correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2015  Temperature (F): 40   Season: Winter

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type                       Trip Rate                  Size    Total Trips

Single family housing       7.36 trips / dwelling units     315.00     2,318.40

Vehicle Assumptions:

Fleet Mix:

Vehicle Type               Percent Type    Non-Catalyst      Catalyst          Diesel
Light Auto                     54.40           0.40           99.40             0.20
Light Truck < 3,750   lbs      15.30           0.70           98.00             1.30
Light Truck  3,751- 5,750      16.40           0.60           98.80             0.60
Med Truck    5,751- 8,500       7.30           0.00           98.60             1.40
Lite-Heavy   8,501-10,000       1.10           0.00           81.80            18.20
Lite-Heavy  10,001-14,000       0.30           0.00           66.70            33.30
Med-Heavy   14,001-33,000       1.00           0.00           20.00            80.00
Heavy-Heavy 33,001-60,000       0.80           0.00            0.00           100.00
Line Haul > 60,000    lbs       0.00           0.00            0.00           100.00
Urban Bus                       0.20           0.00           50.00            50.00
Motorcycle                      1.60          50.00           50.00             0.00
School Bus                      0.10           0.00            0.00           100.00
Motor Home                      1.50           0.00           93.30             6.70

Travel Conditions
                                   Residential                    Commercial
                         Home-     Home-     Home-
                         Work      Shop      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
```

```
                MITIGATED OPERATIONAL EMISSIONS

                                   ROG       NOx        CO       SO2      PM10
Single family housing             14.84     23.54    167.74      0.19     32.82

TOTAL EMISSIONS (lbs/day)         14.84     23.54    167.74      0.19     32.82

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2015  Temperature (F): 40   Season: Winter

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type                       Trip Rate                  Size    Total Trips

Single family housing      7.36 trips / dwelling units    315.00     2,318.40

Vehicle Assumptions:

Fleet Mix:

Vehicle Type              Percent Type    Non-Catalyst     Catalyst        Diesel
Light Auto                    54.40           0.40           99.40           0.20
Light Truck < 3,750    lbs    15.30           0.70           98.00           1.30
Light Truck  3,751- 5,750     16.40           0.60           98.80           0.60
Med Truck    5,751- 8,500      7.30           0.00           98.60           1.40
Lite-Heavy   8,501-10,000      1.10           0.00           81.80          18.20
Lite-Heavy  10,001-14,000      0.30           0.00           66.70          33.30
Med-Heavy   14,001-33,000      1.00           0.00           20.00          80.00
Heavy-Heavy 33,001-60,000      0.80           0.00            0.00         100.00
Line Haul > 60,000     lbs     0.00           0.00            0.00         100.00
Urban Bus                      0.20           0.00           50.00          50.00
Motorcycle                     1.60          50.00           50.00           0.00
School Bus                     0.10           0.00            0.00         100.00
Motor Home                     1.50           0.00           93.30           6.70

Travel Conditions
                                       Residential               Commercial
                          Home-       Home-      Home-
                          Work        Shop       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
```

```
ENVIRONMENTAL FACTORS APPLICABLE TO THE PROJECT

Pedestrian Environment

 0.0            Side Walks/Paths: No Sidewalks
 0.0            Street Trees Provide Shade: No Coverage
 0.0            Pedestrian Circulation Access: No Destinations
 0.0            Visually Interesting Uses: No Uses Within Walking Distance
 0.0            Street System Enhances Safety: No Streets
 0.0            Pedestrian Safety from Crime: No Degree of Safety
 0.0            Visually Interesting Walking Routes: No Visual Interest

 0.0    <- Pedestrian Environmental Credit
 0.0   /19 =  0.0    <- Pedestrian Effectiveness Factor

Transit Service

 0.0            Transit Service: Dial-A-Ride or No Transit Service

 0.0    <- Transit Effectiveness Credit
 0.0    <- Pedestrian Factor
 0.0    <-Total
 0.0    /110 =  0.0     <-Transit Effectiveness Factor

Bicycle Environment

 0.0            Interconnected Bikeways: No Bikeway Coverage
 0.0            Bike Routes Provide Paved Shoulders: No Routes
 0.0            Safe Vehicle Speed Limits: No Routes Provided
 0.0            Safe School Routes: No Schools
 0.0            Uses w/in Cycling Distance: No Uses w/in Cycling Distance
 0.0            Bike Parking Ordinance: No Ordinance or Unenforceable

 0.0    <- Bike Environmental Credit
 0.0  /20 =  0.0    <- Bike Effectiveness Factor
```

```
MITIGATION MEASURES SELECTED FOR THIS PROJECT
(All mitigation measures are printed, even if
 the selected land uses do not constitute a mixed use.)

Transit Infrastructure Measures

% Trips Reduced             Measure
15.0        Credit for Existing or Planned Community Transit Service
15.0    <- Totals

Pedestrian Enhancing Infrastructure Measures (Residential)

% Trips Reduced             Measure
 2.0        Credit for Surrounding Pedestrian Environment
 2.0    <- Totals

Pedestrian Enhancing Infrastructure Measures (Non-Residential)

% Trips Reduced             Measure
 2.0        Credit for Surrounding Pedestrian Environment
 2.0    <- Totals

Bicycle Enhancing Infratructure Measures (Residential)

% Trips Reduced             Measure
 7.0        Credit for Surrounding Bicycle Environment
 7.0    <- Totals

Bike Enhancing Infrastructure Measures (Non-Residential)

% Trips Reduced             Measure
 5.0        Credit for Surrounding Area Bike Environment
 5.0    <- Totals

Operational Measures (Applying to Commute Trips)

% Trips Reduced             Measure
 0.0    <- Totals
Operational Measures (Applying to Employee Non-Commute Trips)

% Trips Reduced             Measure
 0.0    <- Totals

Operational Measures (Applying to Customer Trips)

% Trips Reduced             Measure
 0.0    <- Totals

Measures Reducing VMT (Non-Residential)

VMT Reduced             Measure
       0.0          Park and Ride Lots
       0.0    <- Totals

Measures Reducing VMT (Residential)

VMT Reduced             Measure
       0.0    <- Totals
```

```
                  Total Percentage Trip Reduction
         with Environmental Factors and Mitigation Measures
Travel Mode  Home-Work Trips  Home-Shop Trips Home-Other Trips
Pedestrian              0.00             0.00             0.00
Transit                 0.00             0.00             0.00
Bicycle                 0.00             0.00             0.00
Totals                  0.00             0.00             0.00
Travel Mode   Work Trips   Employee Trips       Customer Trips
Pedestrian              0.00             0.00             0.00
Transit                 0.00             0.00             0.00
Bicycle                 0.00             0.00             0.00
Other                   0.00             0.00             0.00
Totals                  0.00             0.00             0.00
```

```
Changes made to the default values for Land Use Trip Percentages


Changes made to the default values for Area

The wood stove option switch changed from on to off.
The fireplcase option switch changed from on to off.
The landscape year changed from 2004 to 2015.

Changes made to the default values for Operations

The pass by trips option switch changed from off to on.
The operational emission year changed from 2004 to 2015.
The operational winter selection item changed from  2 to 1.
The operational summer temperature changed from  85 to 90.
The travel mode environment settings changed from  both to: residential
```

```
               URBEMIS 2002 For Windows   7.4.2

File Name:                      I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows.urb
Project Name:                   Sierra Meadows Operations
Project Location:               San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                        DETAIL REPORT
                     (Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)
    Source                             ROG        NOx         CO        SO2       PM10
 Natural Gas                          0.30       3.95       1.68          -       0.01
 Wood Stoves - No summer emissions
 Fireplaces - No summer emissions
 Landscaping                          0.17       0.04       1.81       0.06       0.00
 Consumer Prdcts                     15.41          -          -          -          -
 TOTALS(lbs/day,unmitigated)         15.89       3.99       3.49       0.06       0.01
```

```
                UNMITIGATED OPERATIONAL EMISSIONS

                                   ROG       NOx        CO        SO2      PM10
Single family housing            15.72     14.99    173.69       0.22     32.82

TOTAL EMISSIONS (lbs/day)        15.72     14.99    173.69       0.22     32.82

Includes correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2015  Temperature (F): 90   Season: Summer

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type                     Trip Rate                   Size     Total Trips

Single family housing      7.36 trips / dwelling units     315.00      2,318.40

Vehicle Assumptions:

Fleet Mix:

Vehicle Type               Percent Type     Non-Catalyst      Catalyst         Diesel
Light Auto                      54.40            0.40           99.40            0.20
Light Truck < 3,750   lbs       15.30            0.70           98.00            1.30
Light Truck  3,751- 5,750       16.40            0.60           98.80            0.60
Med Truck    5,751- 8,500        7.30            0.00           98.60            1.40
Lite-Heavy   8,501-10,000        1.10            0.00           81.80           18.20
Lite-Heavy  10,001-14,000        0.30            0.00           66.70           33.30
Med-Heavy   14,001-33,000        1.00            0.00           20.00           80.00
Heavy-Heavy 33,001-60,000        0.80            0.00            0.00          100.00
Line Haul > 60,000    lbs        0.00            0.00            0.00          100.00
Urban Bus                        0.20            0.00           50.00           50.00
Motorcycle                       1.60           50.00           50.00            0.00
School Bus                       0.10            0.00            0.00          100.00
Motor Home                       1.50            0.00           93.30            6.70

Travel Conditions
                                      Residential                 Commercial
                           Home-      Home-      Home-
                           Work       Shop       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
```

```
                  MITIGATED OPERATIONAL EMISSIONS

                                   ROG       NOx        CO       SO2      PM10
Single family housing             15.72     14.99    173.69     0.22     32.82

TOTAL EMISSIONS (lbs/day)         15.72     14.99    173.69     0.22     32.82

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2015  Temperature (F): 90   Season: Summer

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type                    Trip Rate                  Size    Total Trips

Single family housing      7.36 trips / dwelling units    315.00     2,318.40

Vehicle Assumptions:

Fleet Mix:

Vehicle Type                Percent Type   Non-Catalyst     Catalyst         Diesel
Light Auto                     54.40           0.40           99.40            0.20
Light Truck < 3,750   lbs      15.30           0.70           98.00            1.30
Light Truck  3,751- 5,750      16.40           0.60           98.80            0.60
Med Truck    5,751- 8,500       7.30           0.00           98.60            1.40
Lite-Heavy   8,501-10,000       1.10           0.00           81.80           18.20
Lite-Heavy  10,001-14,000       0.30           0.00           66.70           33.30
Med-Heavy   14,001-33,000       1.00           0.00           20.00           80.00
Heavy-Heavy 33,001-60,000       0.80           0.00            0.00          100.00
Line Haul > 60,000    lbs       0.00           0.00            0.00          100.00
Urban Bus                       0.20           0.00           50.00           50.00
Motorcycle                      1.60          50.00           50.00            0.00
School Bus                      0.10           0.00            0.00          100.00
Motor Home                      1.50           0.00           93.30            6.70

Travel Conditions
                                       Residential                Commercial
                           Home-     Home-      Home-
                           Work      Shop       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
```

```
ENVIRONMENTAL FACTORS APPLICABLE TO THE PROJECT

Pedestrian Environment

 0.0           Side Walks/Paths: No Sidewalks
 0.0           Street Trees Provide Shade: No Coverage
 0.0           Pedestrian Circulation Access: No Destinations
 0.0           Visually Interesting Uses: No Uses Within Walking Distance
 0.0           Street System Enhances Safety: No Streets
 0.0           Pedestrian Safety from Crime: No Degree of Safety
 0.0           Visually Interesting Walking Routes: No Visual Interest

 0.0    <- Pedestrian Environmental Credit
 0.0   /19 =  0.0    <- Pedestrian Effectiveness Factor

Transit Service

 0.0           Transit Service: Dial-A-Ride or No Transit Service

 0.0    <- Transit Effectiveness Credit
 0.0    <- Pedestrian Factor
 0.0    <-Total
 0.0    /110 =  0.0     <-Transit Effectiveness Factor

Bicycle Environment

 0.0           Interconnected Bikeways: No Bikeway Coverage
 0.0           Bike Routes Provide Paved Shoulders: No Routes
 0.0           Safe Vehicle Speed Limits: No Routes Provided
 0.0           Safe School Routes: No Schools
 0.0           Uses w/in Cycling Distance: No Uses w/in Cycling Distance
 0.0           Bike Parking Ordinance: No Ordinance or Unenforceable

 0.0    <- Bike Environmental Credit
 0.0  /20 =  0.0    <- Bike Effectiveness Factor
```

```
MITIGATION MEASURES SELECTED FOR THIS PROJECT
(All mitigation measures are printed, even if
 the selected land uses do not constitute a mixed use.)

Transit Infrastructure Measures

% Trips Reduced             Measure
15.0            Credit for Existing or Planned Community Transit Service
15.0    <- Totals

Pedestrian Enhancing Infrastructure Measures (Residential)

% Trips Reduced             Measure
 2.0            Credit for Surrounding Pedestrian Environment
 2.0    <- Totals

Pedestrian Enhancing Infrastructure Measures (Non-Residential)

% Trips Reduced             Measure
 2.0            Credit for Surrounding Pedestrian Environment
 2.0    <- Totals

Bicycle Enhancing Infratructure Measures (Residential)

% Trips Reduced             Measure
 7.0            Credit for Surrounding Bicycle Environment
 7.0    <- Totals

Bike Enhancing Infrastructure Measures (Non-Residential)

% Trips Reduced             Measure
 5.0            Credit for Surrounding Area Bike Environment
 5.0    <- Totals

Operational Measures (Applying to Commute Trips)

% Trips Reduced             Measure
 0.0    <- Totals
Operational Measures (Applying to Employee Non-Commute Trips)

% Trips Reduced             Measure
 0.0    <- Totals

Operational Measures (Applying to Customer Trips)

% Trips Reduced             Measure
 0.0    <- Totals

Measures Reducing VMT (Non-Residential)

VMT Reduced             Measure
       0.0            Park and Ride Lots
       0.0    <- Totals

Measures Reducing VMT (Residential)

VMT Reduced             Measure
       0.0    <- Totals
```

```
                  Total Percentage Trip Reduction
         with Environmental Factors and Mitigation Measures
Travel Mode  Home-Work Trips  Home-Shop Trips Home-Other Trips
Pedestrian              0.00             0.00             0.00
Transit                 0.00             0.00             0.00
Bicycle                 0.00             0.00             0.00
Totals                  0.00             0.00             0.00
Travel Mode   Work Trips   Employee Trips      Customer Trips
Pedestrian              0.00             0.00             0.00
Transit                 0.00             0.00             0.00
Bicycle                 0.00             0.00             0.00
Other                   0.00             0.00             0.00
Totals                  0.00             0.00             0.00
```

```
Changes made to the default values for Land Use Trip Percentages


Changes made to the default values for Area

The wood stove option switch changed from on to off.
The fireplcase option switch changed from on to off.
The landscape year changed from 2004 to 2015.

Changes made to the default values for Operations

The pass by trips option switch changed from off to on.
The operational emission year changed from 2004 to 2015.
The operational winter selection item changed from  2 to 1.
The operational summer temperature changed from  85 to 90.
The travel mode environment settings changed from  both to: residential
```

```
               URBEMIS 2002 For Windows   7.4.2

File Name:                      I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows.urb
Project Name:                   Sierra Meadows Operations
Project Location:               San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                        DETAIL REPORT
                         (Tons/Year)

AREA SOURCE EMISSION ESTIMATES
    Source                      ROG       NOx        CO       SO2      PM10
 Natural Gas                   0.06      0.72      0.31         -      0.00
 Wood Stoves                   0.00      0.00      0.00      0.00      0.00
 Fireplaces                    0.00      0.00      0.00      0.00      0.00
 Landscaping                   0.02      0.00      0.16      0.01      0.00
 Consumer Prdcts               2.81         -         -         -         -
 TOTALS (tpy, unmitigated)     2.88      0.72      0.47      0.01      0.00
```

```
              UNMITIGATED OPERATIONAL EMISSIONS

                                  ROG        NOx         CO        SO2       PM10
Single family housing             2.82       3.26      31.34       0.04       5.99

TOTAL EMISSIONS (tons/yr)         2.82       3.26      31.34       0.04       5.99

Includes correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2015  Temperature (F): 90   Season: Annual

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type                       Trip Rate                    Size    Total Trips

Single family housing       7.36 trips / dwelling units     315.00     2,318.40

Vehicle Assumptions:

Fleet Mix:

Vehicle Type               Percent Type    Non-Catalyst      Catalyst          Diesel
Light Auto                     54.40            0.40            99.40             0.20
Light Truck < 3,750   lbs      15.30            0.70            98.00             1.30
Light Truck  3,751- 5,750      16.40            0.60            98.80             0.60
Med Truck    5,751- 8,500       7.30            0.00            98.60             1.40
Lite-Heavy   8,501-10,000       1.10            0.00            81.80            18.20
Lite-Heavy  10,001-14,000       0.30            0.00            66.70            33.30
Med-Heavy   14,001-33,000       1.00            0.00            20.00            80.00
Heavy-Heavy 33,001-60,000       0.80            0.00             0.00           100.00
Line Haul > 60,000    lbs       0.00            0.00             0.00           100.00
Urban Bus                       0.20            0.00            50.00            50.00
Motorcycle                      1.60           50.00            50.00             0.00
School Bus                      0.10            0.00             0.00           100.00
Motor Home                      1.50            0.00            93.30             6.70

Travel Conditions
                                   Residential                Commercial
                          Home-     Home-      Home-
                          Work      Shop       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
```

```
                 MITIGATED OPERATIONAL EMISSIONS

                                  ROG        NOx        CO         SO2        PM10
Single family housing             2.82       3.26      31.34       0.04       5.99

TOTAL EMISSIONS (tons/yr)         2.82       3.26      31.34       0.04       5.99

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2015  Temperature (F): 90   Season: Annual

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type                       Trip Rate                    Size     Total Trips

Single family housing       7.36 trips / dwelling units     315.00     2,318.40

Vehicle Assumptions:

Fleet Mix:

Vehicle Type                Percent Type    Non-Catalyst      Catalyst          Diesel
Light Auto                     54.40            0.40            99.40             0.20
Light Truck < 3,750   lbs      15.30            0.70            98.00             1.30
Light Truck  3,751- 5,750      16.40            0.60            98.80             0.60
Med Truck    5,751- 8,500       7.30            0.00            98.60             1.40
Lite-Heavy   8,501-10,000       1.10            0.00            81.80            18.20
Lite-Heavy  10,001-14,000       0.30            0.00            66.70            33.30
Med-Heavy   14,001-33,000       1.00            0.00            20.00            80.00
Heavy-Heavy 33,001-60,000       0.80            0.00             0.00           100.00
Line Haul > 60,000    lbs       0.00            0.00             0.00           100.00
Urban Bus                       0.20            0.00            50.00            50.00
Motorcycle                      1.60           50.00            50.00             0.00
School Bus                      0.10            0.00             0.00           100.00
Motor Home                      1.50            0.00            93.30             6.70

Travel Conditions
                                      Residential                   Commercial
                          Home-      Home-      Home-
                          Work       Shop       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
```

```
ENVIRONMENTAL FACTORS APPLICABLE TO THE PROJECT

Pedestrian Environment

 0.0           Side Walks/Paths: No Sidewalks
 0.0           Street Trees Provide Shade: No Coverage
 0.0           Pedestrian Circulation Access: No Destinations
 0.0           Visually Interesting Uses: No Uses Within Walking Distance
 0.0           Street System Enhances Safety: No Streets
 0.0           Pedestrian Safety from Crime: No Degree of Safety
 0.0           Visually Interesting Walking Routes: No Visual Interest

 0.0    <- Pedestrian Environmental Credit
 0.0   /19 =  0.0    <- Pedestrian Effectiveness Factor

Transit Service

 0.0           Transit Service: Dial-A-Ride or No Transit Service

 0.0    <- Transit Effectiveness Credit
 0.0    <- Pedestrian Factor
 0.0    <-Total
 0.0    /110 =  0.0     <-Transit Effectiveness Factor

Bicycle Environment

 0.0           Interconnected Bikeways: No Bikeway Coverage
 0.0           Bike Routes Provide Paved Shoulders: No Routes
 0.0           Safe Vehicle Speed Limits: No Routes Provided
 0.0           Safe School Routes: No Schools
 0.0           Uses w/in Cycling Distance: No Uses w/in Cycling Distance
 0.0           Bike Parking Ordinance: No Ordinance or Unenforceable

 0.0    <- Bike Environmental Credit
 0.0  /20 =  0.0    <- Bike Effectiveness Factor
```

```
MITIGATION MEASURES SELECTED FOR THIS PROJECT
(All mitigation measures are printed, even if
 the selected land uses do not constitute a mixed use.)

Transit Infrastructure Measures

% Trips Reduced             Measure
15.0           Credit for Existing or Planned Community Transit Service
15.0     <- Totals

Pedestrian Enhancing Infrastructure Measures (Residential)

% Trips Reduced             Measure
 2.0           Credit for Surrounding Pedestrian Environment
 2.0     <- Totals

Pedestrian Enhancing Infrastructure Measures (Non-Residential)

% Trips Reduced             Measure
 2.0           Credit for Surrounding Pedestrian Environment
 2.0     <- Totals

Bicycle Enhancing Infratructure Measures (Residential)

% Trips Reduced             Measure
 7.0           Credit for Surrounding Bicycle Environment
 7.0     <- Totals

Bike Enhancing Infrastructure Measures (Non-Residential)

% Trips Reduced             Measure
 5.0           Credit for Surrounding Area Bike Environment
 5.0     <- Totals

Operational Measures (Applying to Commute Trips)

% Trips Reduced             Measure
 0.0     <- Totals
Operational Measures (Applying to Employee Non-Commute Trips)

% Trips Reduced             Measure
 0.0     <- Totals

Operational Measures (Applying to Customer Trips)

% Trips Reduced             Measure
 0.0     <- Totals

Measures Reducing VMT (Non-Residential)

VMT Reduced             Measure
       0.0             Park and Ride Lots
       0.0     <- Totals

Measures Reducing VMT (Residential)

VMT Reduced             Measure
       0.0     <- Totals
```

```
                  Total Percentage Trip Reduction
         with Environmental Factors and Mitigation Measures
Travel Mode  Home-Work Trips  Home-Shop Trips Home-Other Trips
Pedestrian              0.00            0.00            0.00
Transit                 0.00            0.00            0.00
Bicycle                 0.00            0.00            0.00
Totals                  0.00            0.00            0.00
Travel Mode   Work Trips   Employee Trips      Customer Trips
Pedestrian              0.00            0.00            0.00
Transit                 0.00            0.00            0.00
Bicycle                 0.00            0.00            0.00
Other                   0.00            0.00            0.00
Totals                  0.00            0.00            0.00
```

```
Changes made to the default values for Land Use Trip Percentages


Changes made to the default values for Area

The wood stove option switch changed from on to off.
The fireplcase option switch changed from on to off.
The landscape year changed from 2004 to 2015.

Changes made to the default values for Operations

The pass by trips option switch changed from off to on.
The operational emission year changed from 2004 to 2015.
The operational winter selection item changed from  2 to 1.
The operational summer temperature changed from  85 to 90.
The travel mode environment settings changed from  both to: residential
```

```
                 URBEMIS 2002 For Windows   7.4.2

File Name:                       I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase 1.urb
Project Name:                    Sierra Meadows - Phase 1, 2 and 3
Project Location:                San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                        SUMMARY REPORT
                     (Pounds/Day - Summer)

CONSTRUCTION EMISSION ESTIMATES
                                                                          PM10      PM10      PM10
 *** 2006 ***                     ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
 TOTALS (lbs/day,unmitigated)   22.78    147.83    191.96      0.00     51.28      6.26     45.02
 TOTALS (lbs/day, mitigated)    22.78    147.83    191.96      0.00     15.59      6.26      9.33

                                                                          PM10      PM10      PM10
 *** 2007 ***                     ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
 TOTALS (lbs/day,unmitigated)   11.21     74.65     86.35      0.00      3.15      3.06      0.09
 TOTALS (lbs/day, mitigated)    11.21     74.65     86.35      0.00      3.15      3.06      0.09
```

```
                URBEMIS 2002 For Windows   7.4.2

File Name:                        I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase 1.urb
Project Name:                     Sierra Meadows - Phase 1, 2 and 3
Project Location:                 San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                        SUMMARY REPORT
                     (Pounds/Day - Winter)

CONSTRUCTION EMISSION ESTIMATES
                                                                               PM10      PM10      PM10
 *** 2006 ***                         ROG       NOx        CO       SO2      TOTAL   EXHAUST      DUST
 TOTALS (lbs/day,unmitigated)       22.78    147.83    191.96      0.00      51.28      6.26     45.02
 TOTALS (lbs/day, mitigated)        22.78    147.83    191.96      0.00      15.59      6.26      9.33

                                                                               PM10      PM10      PM10
 *** 2007 ***                         ROG       NOx        CO       SO2      TOTAL   EXHAUST      DUST
 TOTALS (lbs/day,unmitigated)       11.21     74.65     86.35      0.00       3.15      3.06      0.09
 TOTALS (lbs/day, mitigated)        11.21     74.65     86.35      0.00       3.15      3.06      0.09
```

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               URBEMIS 2002 For Windows   7.4.2

File Name:                      I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase 1.urb
Project Name:                   Sierra Meadows - Phase 1, 2 and 3
Project Location:               San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                       SUMMARY REPORT
                         (Tons/Year)

CONSTRUCTION EMISSION ESTIMATES
                                                                        PM10     PM10       PM10
 *** 2006 ***                    ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
 TOTALS (tpy, unmitigated)      2.58     16.88     21.77      0.00     22.26     0.72       5.00
 TOTALS (tpy, mitigated)        2.58     16.88     21.77      0.00      6.38     0.72       1.03

                                                                        PM10     PM10       PM10
 *** 2007 ***                    ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
 TOTALS (tpy, unmitigated)      0.40      2.76      3.27      0.00      0.50     0.10       0.00
 TOTALS (tpy, mitigated)        0.40      2.76      3.27      0.00      0.50     0.10       0.00
```

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                URBEMIS 2002 For Windows    7.4.2

File Name:                         I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase 1.urb
Project Name:                      Sierra Meadows - Phase 1, 2 and 3
Project Location:                  San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                        DETAIL REPORT
                     (Pounds/Day - Winter)

Construction Start Month and Year: January, 2006
Construction Duration: 18
Total Land Use Area to be Developed: 27.32 acres
Maximum Acreage Disturbed Per Day: 4.5 acres
Single Family Units: 81 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)
                                                                   PM10     PM10        PM10
    Source                       ROG       NOx        CO        SO2    TOTAL   EXHAUST       DUST
 *** 2006***
Phase 1 - Demolition Emissions
Fugitive Dust                      -         -         -          -     0.00        -        0.00
Off-Road Diesel                 0.00      0.00      0.00          -     0.00      0.00       0.00
On-Road Diesel                  0.00      0.00      0.00       0.00     0.00      0.00       0.00
Worker Trips                    0.00      0.00      0.00       0.00     0.00      0.00       0.00
  Maximum lbs/day               0.00      0.00      0.00       0.00     0.00      0.00       0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                      -         -         -          -    45.00        -       45.00
Off-Road Diesel                22.55    147.26    186.47          -     6.25      6.25       0.00
On-Road Diesel                  0.00      0.00      0.00       0.00     0.00      0.00       0.00
Worker Trips                    0.23      0.57      5.49       0.00     0.03      0.01       0.02
  Maximum lbs/day              22.78    147.83    191.96       0.00    51.28      6.26      45.02

Phase 3 - Building Construction
Bldg Const Off-Road Diesel      3.51     26.57     26.08          -     1.18      1.18       0.00
Bldg Const Worker Trips         0.38      0.23      4.85       0.00     0.09      0.00       0.09
Arch Coatings Off-Gas           0.00         -         -          -        -         -          -
Arch Coatings Worker Trips      0.00      0.00      0.00       0.00     0.00      0.00       0.00
Asphalt Off-Gas                 0.00         -         -          -        -         -          -
Asphalt Off-Road Diesel         0.00      0.00      0.00          -     0.00      0.00       0.00
Asphalt On-Road Diesel          0.00      0.00      0.00       0.00     0.00      0.00       0.00
Asphalt Worker Trips            0.00      0.00      0.00       0.00     0.00      0.00       0.00
  Maximum lbs/day               3.89     26.80     30.93       0.00     1.27      1.18       0.09

  Max lbs/day all phases       22.78    147.83    191.96       0.00    51.28      6.26      45.02


 *** 2007***
Phase 1 - Demolition Emissions
Fugitive Dust                      -         -         -          -     0.00        -        0.00
Off-Road Diesel                 0.00      0.00      0.00          -     0.00      0.00       0.00
On-Road Diesel                  0.00      0.00      0.00       0.00     0.00      0.00       0.00
Worker Trips                    0.00      0.00      0.00       0.00     0.00      0.00       0.00
  Maximum lbs/day               0.00      0.00      0.00       0.00     0.00      0.00       0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                      -         -         -          -     0.00        -        0.00
Off-Road Diesel                 0.00      0.00      0.00          -     0.00      0.00       0.00
On-Road Diesel                  0.00      0.00      0.00       0.00     0.00      0.00       0.00
Worker Trips                    0.00      0.00      0.00       0.00     0.00      0.00       0.00
  Maximum lbs/day               0.00      0.00      0.00       0.00     0.00      0.00       0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel      3.51     25.45     26.84          -     1.08      1.08       0.00
Bldg Const Worker Trips         0.35      0.22      4.56       0.00     0.09      0.00       0.09
Arch Coatings Off-Gas           0.00         -         -          -        -         -          -
Arch Coatings Worker Trips      0.00      0.00      0.00       0.00     0.00      0.00       0.00
Asphalt Off-Gas                 0.38         -         -          -        -         -          -
Asphalt Off-Road Diesel        10.69     72.77     85.54          -     3.01      3.01       0.00
Asphalt On-Road Diesel          0.11      1.86      0.42       0.00     0.05      0.05       0.00
Asphalt Worker Trips            0.03      0.02      0.39       0.00     0.01      0.00       0.01
  Maximum lbs/day              11.21     74.65     86.35       0.00     3.15      3.06       0.09

  Max lbs/day all phases       11.21     74.65     86.35       0.00     3.15      3.06       0.09
```

```
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jan '06
Phase 2 Duration: 10 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                                   Horsepower     Load Factor     Hours/Day
     2    Graders                                    174          0.575            8.0
     1    Off Highway Tractors                       255          0.410            8.0
     2    Off Highway Trucks                         417          0.490            8.0
     2    Rubber Tired Loaders                       165          0.465            8.0
     2    Scrapers                                   313          0.660            8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Nov '06
Phase 3 Duration: 8 months
  Start Month/Year for SubPhase Building: Nov '06
  SubPhase Building Duration: 6 months
  Off-Road Equipment
  No.     Type                                   Horsepower     Load Factor     Hours/Day
     1    Other Equipment                            190          0.620            8.0
     1    Rough Terrain Forklifts                     94          0.475            8.0
     1    Tractor/Loaders/Backhoes                    79          0.465            8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: May '07
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 6.4
  Off-Road Equipment
  No.     Type                                   Horsepower     Load Factor     Hours/Day
     1    Pavers                                     132          0.590            8.0
     1    Paving Equipment                           111          0.530            8.0
     1    Rollers                                    114          0.430            8.0
     1    Scrapers                                   313          0.660            8.0
     1    Surfacing Equipment                        437          0.490            8.0

CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)
                                                                          PM10       PM10        PM10
    Source                        ROG       NOx        CO        SO2     TOTAL     EXHAUST       DUST
 *** 2006***
Phase 1 - Demolition Emissions
Fugitive Dust                      -         -          -          -      0.00         -         0.00
Off-Road Diesel                  0.00      0.00       0.00         -      0.00       0.00        0.00
On-Road Diesel                   0.00      0.00       0.00       0.00     0.00       0.00        0.00
Worker Trips                     0.00      0.00       0.00       0.00     0.00       0.00        0.00
  Maximum lbs/day                0.00      0.00       0.00       0.00     0.00       0.00        0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                      -         -          -          -      9.31         -         9.31
Off-Road Diesel                 22.55    147.26     186.47         -      6.25       6.25        0.00
On-Road Diesel                   0.00      0.00       0.00       0.00     0.00       0.00        0.00
Worker Trips                     0.23      0.57       5.49       0.00     0.03       0.01        0.02
  Maximum lbs/day               22.78    147.83     191.96       0.00    15.59       6.26        9.33

Phase 3 - Building Construction
Bldg Const Off-Road Diesel       3.51     26.57      26.08         -      1.18       1.18        0.00
Bldg Const Worker Trips          0.38      0.23       4.85       0.00     0.09       0.00        0.09
Arch Coatings Off-Gas            0.00        -          -          -        -          -           -
Arch Coatings Worker Trips       0.00      0.00       0.00       0.00     0.00       0.00        0.00
Asphalt Off-Gas                  0.00        -          -          -        -          -           -
Asphalt Off-Road Diesel          0.00      0.00       0.00         -      0.00       0.00        0.00
Asphalt On-Road Diesel           0.00      0.00       0.00       0.00     0.00       0.00        0.00
Asphalt Worker Trips             0.00      0.00       0.00       0.00     0.00       0.00        0.00
  Maximum lbs/day                3.89     26.80      30.93       0.00     1.27       1.18        0.09

  Max lbs/day all phases        22.78    147.83     191.96       0.00    15.59       6.26        9.33


 *** 2007***
Phase 1 - Demolition Emissions
Fugitive Dust                      -         -          -          -      0.00         -         0.00
Off-Road Diesel                  0.00      0.00       0.00         -      0.00       0.00        0.00
On-Road Diesel                   0.00      0.00       0.00       0.00     0.00       0.00        0.00
Worker Trips                     0.00      0.00       0.00       0.00     0.00       0.00        0.00
  Maximum lbs/day                0.00      0.00       0.00       0.00     0.00       0.00        0.00

Phase 2 - Site Grading Emissions
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Fugitive Dust                      -         -         -         -       0.00        -       0.00
Off-Road Diesel                  0.00      0.00      0.00        -       0.00      0.00      0.00
On-Road Diesel                   0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                     0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Maximum lbs/day                0.00      0.00      0.00      0.00      0.00      0.00      0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel       3.51     25.45     26.84        -       1.08      1.08      0.00
Bldg Const Worker Trips          0.35      0.22      4.56      0.00      0.09      0.00      0.09
Arch Coatings Off-Gas            0.00        -         -         -         -         -         -
Arch Coatings Worker Trips       0.00      0.00      0.00      0.00      0.00      0.00      0.00
Asphalt Off-Gas                  0.38        -         -         -         -         -         -
Asphalt Off-Road Diesel         10.69     72.77     85.54        -       3.01      3.01      0.00
Asphalt On-Road Diesel           0.11      1.86      0.42      0.00      0.05      0.05      0.00
Asphalt Worker Trips             0.03      0.02      0.39      0.00      0.01      0.00      0.01
  Maximum lbs/day               11.21     74.65     86.35      0.00      3.15      3.06      0.09

  Max lbs/day all phases        11.21     74.65     86.35      0.00      3.15      3.06      0.09


Construction-Related Mitigation Measures

 Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
 Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
 Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 34.0%)
 Phase 2: Stockpiles: Cover all stock piles with tarps
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
 Phase 2: Unpaved Roads: Water all haul roads 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 3.0%)
 Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jan '06
Phase 2 Duration: 10 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.      Type                                 Horsepower    Load Factor     Hours/Day
     2     Graders                                 174           0.575           8.0
     1     Off Highway Tractors                    255           0.410           8.0
     2     Off Highway Trucks                      417           0.490           8.0
     2     Rubber Tired Loaders                    165           0.465           8.0
     2     Scrapers                                313           0.660           8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Nov '06
Phase 3 Duration: 8 months
  Start Month/Year for SubPhase Building: Nov '06
  SubPhase Building Duration: 6 months
  Off-Road Equipment
  No.      Type                                 Horsepower    Load Factor     Hours/Day
     1     Other Equipment                         190           0.620           8.0
     1     Rough Terrain Forklifts                  94           0.475           8.0
     1     Tractor/Loaders/Backhoes                 79           0.465           8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: May '07
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 6.4
  Off-Road Equipment
  No.      Type                                 Horsepower    Load Factor     Hours/Day
     1     Pavers                                  132           0.590           8.0
     1     Paving Equipment                        111           0.530           8.0
     1     Rollers                                 114           0.430           8.0
     1     Scrapers                                313           0.660           8.0
     1     Surfacing Equipment                     437           0.490           8.0
```

```
Changes made to the default values for Land Use Trip Percentages


Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 2 mitigation measure Soil Disturbance: Apply soil stabilizers to inactive areas
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Replace ground cover in disturbed areas quickly
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Water exposed surfaces - 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Stockpiles: Cover all stock piles with tarps
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Water all haul roads 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
     has been changed from off to on.
```

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               URBEMIS 2002 For Windows   7.4.2

File Name:                     I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase 1.urb
Project Name:                  Sierra Meadows - Phase 1, 2 and 3
Project Location:              San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                        DETAIL REPORT
                     (Pounds/Day - Summer)

Construction Start Month and Year: January, 2006
Construction Duration: 18
Total Land Use Area to be Developed: 27.32 acres
Maximum Acreage Disturbed Per Day: 4.5 acres
Single Family Units: 81 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)
                                                                  PM10      PM10       PM10
    Source                      ROG        NOx        CO     SO2   TOTAL   EXHAUST      DUST
 *** 2006***
Phase 1 - Demolition Emissions
Fugitive Dust                     -          -          -       -    0.00         -      0.00
Off-Road Diesel                0.00       0.00       0.00       -    0.00      0.00      0.00
On-Road Diesel                 0.00       0.00       0.00    0.00    0.00      0.00      0.00
Worker Trips                   0.00       0.00       0.00    0.00    0.00      0.00      0.00
  Maximum lbs/day              0.00       0.00       0.00    0.00    0.00      0.00      0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                     -          -          -       -   45.00         -     45.00
Off-Road Diesel               22.55     147.26     186.47       -    6.25      6.25      0.00
On-Road Diesel                 0.00       0.00       0.00    0.00    0.00      0.00      0.00
Worker Trips                   0.23       0.57       5.49    0.00    0.03      0.01      0.02
  Maximum lbs/day             22.78     147.83     191.96    0.00   51.28      6.26     45.02

Phase 3 - Building Construction
Bldg Const Off-Road Diesel     3.51      26.57      26.08       -    1.18      1.18      0.00
Bldg Const Worker Trips        0.38       0.23       4.85    0.00    0.09      0.00      0.09
Arch Coatings Off-Gas          0.00          -          -       -       -         -         -
Arch Coatings Worker Trips     0.00       0.00       0.00    0.00    0.00      0.00      0.00
Asphalt Off-Gas                0.00          -          -       -       -         -         -
Asphalt Off-Road Diesel        0.00       0.00       0.00       -    0.00      0.00      0.00
Asphalt On-Road Diesel         0.00       0.00       0.00    0.00    0.00      0.00      0.00
Asphalt Worker Trips           0.00       0.00       0.00    0.00    0.00      0.00      0.00
  Maximum lbs/day              3.89      26.80      30.93    0.00    1.27      1.18      0.09

  Max lbs/day all phases      22.78     147.83     191.96    0.00   51.28      6.26     45.02


 *** 2007***
Phase 1 - Demolition Emissions
Fugitive Dust                     -          -          -       -    0.00         -      0.00
Off-Road Diesel                0.00       0.00       0.00       -    0.00      0.00      0.00
On-Road Diesel                 0.00       0.00       0.00    0.00    0.00      0.00      0.00
Worker Trips                   0.00       0.00       0.00    0.00    0.00      0.00      0.00
  Maximum lbs/day              0.00       0.00       0.00    0.00    0.00      0.00      0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                     -          -          -       -    0.00         -      0.00
Off-Road Diesel                0.00       0.00       0.00       -    0.00      0.00      0.00
On-Road Diesel                 0.00       0.00       0.00    0.00    0.00      0.00      0.00
Worker Trips                   0.00       0.00       0.00    0.00    0.00      0.00      0.00
  Maximum lbs/day              0.00       0.00       0.00    0.00    0.00      0.00      0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel     3.51      25.45      26.84       -    1.08      1.08      0.00
Bldg Const Worker Trips        0.35       0.22       4.56    0.00    0.09      0.00      0.09
Arch Coatings Off-Gas          0.00          -          -       -       -         -         -
Arch Coatings Worker Trips     0.00       0.00       0.00    0.00    0.00      0.00      0.00
Asphalt Off-Gas                0.38          -          -       -       -         -         -
Asphalt Off-Road Diesel       10.69      72.77      85.54       -    3.01      3.01      0.00
Asphalt On-Road Diesel         0.11       1.86       0.42    0.00    0.05      0.05      0.00
Asphalt Worker Trips           0.03       0.02       0.39    0.00    0.01      0.00      0.01
  Maximum lbs/day             11.21      74.65      86.35    0.00    3.15      3.06      0.09

  Max lbs/day all phases      11.21      74.65      86.35    0.00    3.15      3.06      0.09
```

```
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jan '06
Phase 2 Duration: 10 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                               Horsepower    Load Factor     Hours/Day
     2    Graders                               174           0.575            8.0
     1    Off Highway Tractors                  255           0.410            8.0
     2    Off Highway Trucks                    417           0.490            8.0
     2    Rubber Tired Loaders                  165           0.465            8.0
     2    Scrapers                              313           0.660            8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Nov '06
Phase 3 Duration: 8 months
  Start Month/Year for SubPhase Building: Nov '06
  SubPhase Building Duration: 6 months
  Off-Road Equipment
  No.     Type                               Horsepower    Load Factor     Hours/Day
     1    Other Equipment                       190           0.620            8.0
     1    Rough Terrain Forklifts                94           0.475            8.0
     1    Tractor/Loaders/Backhoes               79           0.465            8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: May '07
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 6.4
  Off-Road Equipment
  No.     Type                               Horsepower    Load Factor     Hours/Day
     1    Pavers                                132           0.590            8.0
     1    Paving Equipment                      111           0.530            8.0
     1    Rollers                               114           0.430            8.0
     1    Scrapers                              313           0.660            8.0
     1    Surfacing Equipment                   437           0.490            8.0

CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)
                                                                           PM10      PM10          PM10
    Source                         ROG        NOx        CO        SO2     TOTAL    EXHAUST         DUST
 *** 2006***
Phase 1 - Demolition Emissions
Fugitive Dust                        -          -          -          -     0.00         -          0.00
Off-Road Diesel                   0.00       0.00       0.00          -     0.00      0.00          0.00
On-Road Diesel                    0.00       0.00       0.00       0.00     0.00      0.00          0.00
Worker Trips                      0.00       0.00       0.00       0.00     0.00      0.00          0.00
  Maximum lbs/day                 0.00       0.00       0.00       0.00     0.00      0.00          0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                        -          -          -          -     9.31         -          9.31
Off-Road Diesel                  22.55     147.26     186.47          -     6.25      6.25          0.00
On-Road Diesel                    0.00       0.00       0.00       0.00     0.00      0.00          0.00
Worker Trips                      0.23       0.57       5.49       0.00     0.03      0.01          0.02
  Maximum lbs/day                22.78     147.83     191.96       0.00    15.59      6.26          9.33

Phase 3 - Building Construction
Bldg Const Off-Road Diesel        3.51      26.57      26.08          -     1.18      1.18          0.00
Bldg Const Worker Trips           0.38       0.23       4.85       0.00     0.09      0.00          0.09
Arch Coatings Off-Gas             0.00          -          -          -        -         -             -
Arch Coatings Worker Trips        0.00       0.00       0.00       0.00     0.00      0.00          0.00
Asphalt Off-Gas                   0.00          -          -          -        -         -             -
Asphalt Off-Road Diesel           0.00       0.00       0.00          -     0.00      0.00          0.00
Asphalt On-Road Diesel            0.00       0.00       0.00       0.00     0.00      0.00          0.00
Asphalt Worker Trips              0.00       0.00       0.00       0.00     0.00      0.00          0.00
  Maximum lbs/day                 3.89      26.80      30.93       0.00     1.27      1.18          0.09

  Max lbs/day all phases         22.78     147.83     191.96       0.00    15.59      6.26          9.33


 *** 2007***
Phase 1 - Demolition Emissions
Fugitive Dust                        -          -          -          -     0.00         -          0.00
Off-Road Diesel                   0.00       0.00       0.00          -     0.00      0.00          0.00
On-Road Diesel                    0.00       0.00       0.00       0.00     0.00      0.00          0.00
Worker Trips                      0.00       0.00       0.00       0.00     0.00      0.00          0.00
  Maximum lbs/day                 0.00       0.00       0.00       0.00     0.00      0.00          0.00

Phase 2 - Site Grading Emissions
```

```
Fugitive Dust                      -         -         -         -        0.00        -        0.00
Off-Road Diesel                 0.00      0.00      0.00         -        0.00      0.00       0.00
On-Road Diesel                  0.00      0.00      0.00      0.00        0.00      0.00       0.00
Worker Trips                    0.00      0.00      0.00      0.00        0.00      0.00       0.00
  Maximum lbs/day               0.00      0.00      0.00      0.00        0.00      0.00       0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel      3.51     25.45     26.84         -        1.08      1.08       0.00
Bldg Const Worker Trips         0.35      0.22      4.56      0.00        0.09      0.00       0.09
Arch Coatings Off-Gas           0.00         -         -         -           -         -          -
Arch Coatings Worker Trips      0.00      0.00      0.00      0.00        0.00      0.00       0.00
Asphalt Off-Gas                 0.38         -         -         -           -         -          -
Asphalt Off-Road Diesel        10.69     72.77     85.54         -        3.01      3.01       0.00
Asphalt On-Road Diesel          0.11      1.86      0.42      0.00        0.05      0.05       0.00
Asphalt Worker Trips            0.03      0.02      0.39      0.00        0.01      0.00       0.01
  Maximum lbs/day              11.21     74.65     86.35      0.00        3.15      3.06       0.09

  Max lbs/day all phases       11.21     74.65     86.35      0.00        3.15      3.06       0.09


Construction-Related Mitigation Measures

 Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
 Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
 Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 34.0%)
 Phase 2: Stockpiles: Cover all stock piles with tarps
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
 Phase 2: Unpaved Roads: Water all haul roads 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 3.0%)
 Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jan '06
Phase 2 Duration: 10 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                             Horsepower    Load Factor    Hours/Day
     2    Graders                             174           0.575          8.0
     1    Off Highway Tractors                255           0.410          8.0
     2    Off Highway Trucks                  417           0.490          8.0
     2    Rubber Tired Loaders                165           0.465          8.0
     2    Scrapers                            313           0.660          8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Nov '06
Phase 3 Duration: 8 months
  Start Month/Year for SubPhase Building: Nov '06
  SubPhase Building Duration: 6 months
  Off-Road Equipment
  No.     Type                             Horsepower    Load Factor    Hours/Day
     1    Other Equipment                     190           0.620          8.0
     1    Rough Terrain Forklifts              94           0.475          8.0
     1    Tractor/Loaders/Backhoes             79           0.465          8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: May '07
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 6.4
  Off-Road Equipment
  No.     Type                             Horsepower    Load Factor    Hours/Day
     1    Pavers                              132           0.590          8.0
     1    Paving Equipment                    111           0.530          8.0
     1    Rollers                             114           0.430          8.0
     1    Scrapers                            313           0.660          8.0
     1    Surfacing Equipment                 437           0.490          8.0
```

```
Changes made to the default values for Land Use Trip Percentages


Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 2 mitigation measure Soil Disturbance: Apply soil stabilizers to inactive areas
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Replace ground cover in disturbed areas quickly
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Water exposed surfaces - 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Stockpiles: Cover all stock piles with tarps
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Water all haul roads 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
     has been changed from off to on.
```

```
              URBEMIS 2002 For Windows   7.4.2

File Name:                    I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase 1.urb
Project Name:                 Sierra Meadows - Phase 1, 2 and 3
Project Location:             San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                    DETAIL REPORT
                     (Tons/Year)

Construction Start Month and Year: January, 2006
Construction Duration: 18
Total Land Use Area to be Developed: 27.32 acres
Maximum Acreage Disturbed Per Day: 4.5 acres
Single Family Units: 81 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (tons/year)
                                                                 PM10     PM10        PM10
   Source                     ROG       NOx        CO       SO2   TOTAL   EXHAUST      DUST
 *** 2006***
Phase 1 - Demolition Emissions
Fugitive Dust                   -         -         -         -    0.00         -      0.00
Off-Road Diesel              0.00      0.00      0.00         -    0.00      0.00      0.00
On-Road Diesel               0.00      0.00      0.00      0.00    0.00      0.00      0.00
Worker Trips                 0.00      0.00      0.00      0.00    0.00      0.00      0.00
  Total tons/year            0.00      0.00      0.00      0.00    0.00      0.00      0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                   -         -         -         -    5.00         -      5.00
Off-Road Diesel              2.50     16.20     20.50         -    0.70      0.70      0.00
On-Road Diesel               0.00      0.00      0.00      0.00    0.00      0.00      0.00
Worker Trips                 0.00      0.10      0.59      0.00    0.00      0.00      0.00
  Total tons/year            2.50     16.30     21.09      0.00   22.10      0.70      5.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel   0.08      0.58      0.58         -    0.02      0.02      0.00
Bldg Const Worker Trips      0.00      0.00      0.10      0.00    0.00      0.00      0.00
Arch Coatings Off-Gas        0.00         -         -         -       -         -         -
Arch Coatings Worker Trips   0.00      0.00      0.00      0.00    0.00      0.00      0.00
Asphalt Off-Gas              0.00         -         -         -       -         -         -
Asphalt Off-Road Diesel      0.00      0.00      0.00         -    0.00      0.00      0.00
Asphalt On-Road Diesel       0.00      0.00      0.00      0.00    0.00      0.00      0.00
Asphalt Worker Trips         0.00      0.00      0.00      0.00    0.00      0.00      0.00
  Total tons/year            0.08      0.58      0.68      0.00    0.16      0.02      0.00

  Total all phases tons/yr   2.58     16.88     21.77      0.00   22.26      0.72      5.00


 *** 2007***
Phase 1 - Demolition Emissions
Fugitive Dust                   -         -         -         -    0.00         -      0.00
Off-Road Diesel              0.00      0.00      0.00         -    0.00      0.00      0.00
On-Road Diesel               0.00      0.00      0.00      0.00    0.00      0.00      0.00
Worker Trips                 0.00      0.00      0.00      0.00    0.00      0.00      0.00
  Total tons/year            0.00      0.00      0.00      0.00    0.00      0.00      0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                   -         -         -         -    0.00         -      0.00
Off-Road Diesel              0.00      0.00      0.00         -    0.00      0.00      0.00
On-Road Diesel               0.00      0.00      0.00      0.00    0.00      0.00      0.00
Worker Trips                 0.00      0.00      0.00      0.00    0.00      0.00      0.00
  Total tons/year            0.00      0.00      0.00      0.00    0.00      0.00      0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel   0.16      1.12      1.20         -    0.04      0.04      0.00
Bldg Const Worker Trips      0.00      0.00      0.19      0.00    0.00      0.00      0.00
Arch Coatings Off-Gas        0.00         -         -         -       -         -         -
Arch Coatings Worker Trips   0.00      0.00      0.00      0.00    0.00      0.00      0.00
Asphalt Off-Gas              0.00         -         -         -       -         -         -
Asphalt Off-Road Diesel      0.24      1.60      1.88         -    0.06      0.06      0.00
Asphalt On-Road Diesel       0.00      0.04      0.00      0.00    0.00      0.00      0.00
Asphalt Worker Trips         0.00      0.00      0.00      0.00    0.00      0.00      0.00
  Total tons/year            0.40      2.76      3.27      0.00    0.50      0.10      0.00

  Total all phases tons/yr   0.40      2.76      3.27      0.00    0.50      0.10      0.00
```

```
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jan '06
Phase 2 Duration: 10 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                                  Horsepower     Load Factor      Hours/Day
     2    Graders                                  174            0.575            8.0
     1    Off Highway Tractors                     255            0.410            8.0
     2    Off Highway Trucks                       417            0.490            8.0
     2    Rubber Tired Loaders                     165            0.465            8.0
     2    Scrapers                                 313            0.660            8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Nov '06
Phase 3 Duration: 8 months
  Start Month/Year for SubPhase Building: Nov '06
  SubPhase Building Duration: 6 months
  Off-Road Equipment
  No.     Type                                  Horsepower     Load Factor      Hours/Day
     1    Other Equipment                          190            0.620            8.0
     1    Rough Terrain Forklifts                   94            0.475            8.0
     1    Tractor/Loaders/Backhoes                  79            0.465            8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: May '07
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 6.4
  Off-Road Equipment
  No.     Type                                  Horsepower     Load Factor      Hours/Day
     1    Pavers                                   132            0.590            8.0
     1    Paving Equipment                         111            0.530            8.0
     1    Rollers                                  114            0.430            8.0
     1    Scrapers                                 313            0.660            8.0
     1    Surfacing Equipment                      437            0.490            8.0


CONSTRUCTION EMISSION ESTIMATES MITIGATED (tons/year)
                                                                           PM10       PM10        PM10
    Source                         ROG       NOx        CO        SO2     TOTAL    EXHAUST        DUST
 *** 2006***
Phase 1 - Demolition Emissions
Fugitive Dust                        -         -         -          -      0.00          -        0.00
Off-Road Diesel                   0.00      0.00      0.00          -      0.00       0.00        0.00
On-Road Diesel                    0.00      0.00      0.00       0.00      0.00       0.00        0.00
Worker Trips                      0.00      0.00      0.00       0.00      0.00       0.00        0.00
  Total tons/year                 0.00      0.00      0.00       0.00      0.00       0.00        0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                        -         -         -          -      1.03          -        1.03
Off-Road Diesel                   2.50     16.20     20.50          -      0.70       0.70        0.00
On-Road Diesel                    0.00      0.00      0.00       0.00      0.00       0.00        0.00
Worker Trips                      0.00      0.10      0.59       0.00      0.00       0.00        0.00
  Total tons/year                 2.50     16.30     21.09       0.00      6.22       0.70        1.03

Phase 3 - Building Construction
Bldg Const Off-Road Diesel        0.08      0.58      0.58          -      0.02       0.02        0.00
Bldg Const Worker Trips           0.00      0.00      0.10       0.00      0.00       0.00        0.00
Arch Coatings Off-Gas             0.00         -         -          -         -          -           -
Arch Coatings Worker Trips        0.00      0.00      0.00       0.00      0.00       0.00        0.00
Asphalt Off-Gas                   0.00         -         -          -         -          -           -
Asphalt Off-Road Diesel           0.00      0.00      0.00          -      0.00       0.00        0.00
Asphalt On-Road Diesel            0.00      0.00      0.00       0.00      0.00       0.00        0.00
Asphalt Worker Trips              0.00      0.00      0.00       0.00      0.00       0.00        0.00
  Total tons/year                 0.08      0.58      0.68       0.00      0.16       0.02        0.00

  Total all phases tons/yr        2.58     16.88     21.77       0.00      6.38       0.72        1.03


 *** 2007***
Phase 1 - Demolition Emissions
Fugitive Dust                        -         -         -          -      0.00          -        0.00
Off-Road Diesel                   0.00      0.00      0.00          -      0.00       0.00        0.00
On-Road Diesel                    0.00      0.00      0.00       0.00      0.00       0.00        0.00
Worker Trips                      0.00      0.00      0.00       0.00      0.00       0.00        0.00
  Total tons/year                 0.00      0.00      0.00       0.00      0.00       0.00        0.00

Phase 2 - Site Grading Emissions
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Fugitive Dust                    -          -          -          -        0.00         -        0.00
Off-Road Diesel                0.00       0.00       0.00         -        0.00       0.00       0.00
On-Road Diesel                 0.00       0.00       0.00       0.00       0.00       0.00       0.00
Worker Trips                   0.00       0.00       0.00       0.00       0.00       0.00       0.00
  Total tons/year              0.00       0.00       0.00       0.00       0.00       0.00       0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel     0.16       1.12       1.20         -        0.04       0.04       0.00
Bldg Const Worker Trips        0.00       0.00       0.19       0.00       0.00       0.00       0.00
Arch Coatings Off-Gas          0.00         -          -          -          -          -          -
Arch Coatings Worker Trips     0.00       0.00       0.00       0.00       0.00       0.00       0.00
Asphalt Off-Gas                0.00         -          -          -          -          -          -
Asphalt Off-Road Diesel        0.24       1.60       1.88         -        0.06       0.06       0.00
Asphalt On-Road Diesel         0.00       0.04       0.00       0.00       0.00       0.00       0.00
Asphalt Worker Trips           0.00       0.00       0.00       0.00       0.00       0.00       0.00
  Total tons/year              0.40       2.76       3.27       0.00       0.50       0.10       0.00

  Total all phases tons/yr     0.40       2.76       3.27       0.00       0.50       0.10       0.00


Construction-Related Mitigation Measures

 Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
 Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
 Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 34.0%)
 Phase 2: Stockpiles: Cover all stock piles with tarps
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
 Phase 2: Unpaved Roads: Water all haul roads 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 3.0%)
 Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jan '06
Phase 2 Duration: 10 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                                Horsepower    Load Factor     Hours/Day
     2    Graders                                174          0.575           8.0
     1    Off Highway Tractors                   255          0.410           8.0
     2    Off Highway Trucks                     417          0.490           8.0
     2    Rubber Tired Loaders                   165          0.465           8.0
     2    Scrapers                               313          0.660           8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Nov '06
Phase 3 Duration: 8 months
  Start Month/Year for SubPhase Building: Nov '06
  SubPhase Building Duration: 6 months
  Off-Road Equipment
  No.     Type                                Horsepower    Load Factor     Hours/Day
     1    Other Equipment                        190          0.620           8.0
     1    Rough Terrain Forklifts                 94          0.475           8.0
     1    Tractor/Loaders/Backhoes                79          0.465           8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: May '07
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 6.4
  Off-Road Equipment
  No.     Type                                Horsepower    Load Factor     Hours/Day
     1    Pavers                                 132          0.590           8.0
     1    Paving Equipment                       111          0.530           8.0
     1    Rollers                                114          0.430           8.0
     1    Scrapers                               313          0.660           8.0
     1    Surfacing Equipment                    437          0.490           8.0
```

```
Changes made to the default values for Land Use Trip Percentages


Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 2 mitigation measure Soil Disturbance: Apply soil stabilizers to inactive areas
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Replace ground cover in disturbed areas quickly
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Water exposed surfaces - 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Stockpiles: Cover all stock piles with tarps
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Water all haul roads 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
     has been changed from off to on.
```

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                URBEMIS 2002 For Windows   7.4.2

File Name:                      I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase II.urb
Project Name:                   Sierra Meadows - Phase 4 and 6
Project Location:               San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                        SUMMARY REPORT
                     (Pounds/Day - Summer)

CONSTRUCTION EMISSION ESTIMATES
                                                                       PM10      PM10      PM10
 *** 2007 ***                       ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
 TOTALS (lbs/day,unmitigated)     19.62    122.88    167.82      0.00     39.86      4.85     35.01
 TOTALS (lbs/day, mitigated)      19.62    122.88    167.82      0.00     12.10      4.85      7.25

                                                                       PM10      PM10      PM10
 *** 2008 ***                       ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
 TOTALS (lbs/day,unmitigated)     11.04     71.50     87.46      0.00      2.81      2.75      0.06
 TOTALS (lbs/day, mitigated)      11.04     71.50     87.46      0.00      2.81      2.75      0.06
```

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                URBEMIS 2002 For Windows   7.4.2

File Name:                    I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase II.urb
Project Name:                 Sierra Meadows - Phase 4 and 6
Project Location:             San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                     SUMMARY REPORT
                   (Pounds/Day - Winter)

CONSTRUCTION EMISSION ESTIMATES
                                                                        PM10      PM10      PM10
 *** 2007 ***                     ROG       NOx        CO       SO2    TOTAL   EXHAUST      DUST
 TOTALS (lbs/day,unmitigated)   19.62    122.88    167.82      0.00    39.86      4.85     35.01
 TOTALS (lbs/day, mitigated)    19.62    122.88    167.82      0.00    12.10      4.85      7.25

                                                                        PM10      PM10      PM10
 *** 2008 ***                     ROG       NOx        CO       SO2    TOTAL   EXHAUST      DUST
 TOTALS (lbs/day,unmitigated)   11.04     71.50     87.46      0.00     2.81      2.75      0.06
 TOTALS (lbs/day, mitigated)    11.04     71.50     87.46      0.00     2.81      2.75      0.06
```

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               URBEMIS 2002 For Windows   7.4.2

File Name:                      I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase II.urb
Project Name:                   Sierra Meadows - Phase 4 and 6
Project Location:               San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                       SUMMARY REPORT
                         (Tons/Year)

CONSTRUCTION EMISSION ESTIMATES
                                                                        PM10      PM10      PM10
 *** 2007 ***                    ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
 TOTALS (tpy, unmitigated)      1.30      8.38     11.42      0.00     10.10      0.31      2.28
 TOTALS (tpy, mitigated)        1.30      8.38     11.42      0.00      2.86      0.31      0.47

                                                                        PM10      PM10      PM10
 *** 2008 ***                    ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
 TOTALS (tpy, unmitigated)      0.36      2.37      2.91      0.00      0.42      0.09      0.00
 TOTALS (tpy, mitigated)        0.36      2.37      2.91      0.00      0.42      0.09      0.00
```

```
              URBEMIS 2002 For Windows    7.4.2

File Name:                      I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase II.urb
Project Name:                   Sierra Meadows - Phase 4 and 6
Project Location:               San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                         DETAIL REPORT
                      (Pounds/Day - Winter)

Construction Start Month and Year: June, 2007
Construction Duration: 12
Total Land Use Area to be Developed: 12.2 acres
Maximum Acreage Disturbed Per Day: 3.5 acres
Single Family Units: 54 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)
                                                                   PM10     PM10       PM10
    Source                      ROG       NOx        CO       SO2  TOTAL   EXHAUST     DUST
 *** 2007***
Phase 1 - Demolition Emissions
Fugitive Dust                     -         -         -         -   0.00        -      0.00
Off-Road Diesel                0.00      0.00      0.00         -   0.00     0.00      0.00
On-Road Diesel                 0.00      0.00      0.00      0.00   0.00     0.00      0.00
Worker Trips                   0.00      0.00      0.00      0.00   0.00     0.00      0.00
  Maximum lbs/day              0.00      0.00      0.00      0.00   0.00     0.00      0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                     -         -         -         -  35.00        -     35.00
Off-Road Diesel               19.44    122.61    163.20         -   4.84     4.84      0.00
On-Road Diesel                 0.00      0.00      0.00      0.00   0.00     0.00      0.00
Worker Trips                   0.18      0.27      4.62      0.00   0.02     0.01      0.01
  Maximum lbs/day             19.62    122.88    167.82      0.00  39.86     4.85     35.01

Phase 3 - Building Construction
Bldg Const Off-Road Diesel     3.51     25.45     26.84         -   1.08     1.08      0.00
Bldg Const Worker Trips        0.24      0.14      3.04      0.00   0.06     0.00      0.06
Arch Coatings Off-Gas          0.00         -         -         -      -        -         -
Arch Coatings Worker Trips     0.00      0.00      0.00      0.00   0.00     0.00      0.00
Asphalt Off-Gas                0.00         -         -         -      -        -         -
Asphalt Off-Road Diesel        0.00      0.00      0.00         -   0.00     0.00      0.00
Asphalt On-Road Diesel         0.00      0.00      0.00      0.00   0.00     0.00      0.00
Asphalt Worker Trips           0.00      0.00      0.00      0.00   0.00     0.00      0.00
  Maximum lbs/day              3.75     25.59     29.88      0.00   1.14     1.08      0.06

  Max lbs/day all phases      19.62    122.88    167.82      0.00  39.86     4.85     35.01


 *** 2008***
Phase 1 - Demolition Emissions
Fugitive Dust                     -         -         -         -   0.00        -      0.00
Off-Road Diesel                0.00      0.00      0.00         -   0.00     0.00      0.00
On-Road Diesel                 0.00      0.00      0.00      0.00   0.00     0.00      0.00
Worker Trips                   0.00      0.00      0.00      0.00   0.00     0.00      0.00
  Maximum lbs/day              0.00      0.00      0.00      0.00   0.00     0.00      0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                     -         -         -         -   0.00        -      0.00
Off-Road Diesel                0.00      0.00      0.00         -   0.00     0.00      0.00
On-Road Diesel                 0.00      0.00      0.00      0.00   0.00     0.00      0.00
Worker Trips                   0.00      0.00      0.00      0.00   0.00     0.00      0.00
  Maximum lbs/day              0.00      0.00      0.00      0.00   0.00     0.00      0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel     3.51     24.33     27.57         -   0.97     0.97      0.00
Bldg Const Worker Trips        0.22      0.13      2.83      0.00   0.06     0.00      0.06
Arch Coatings Off-Gas          0.00         -         -         -      -        -         -
Arch Coatings Worker Trips     0.00      0.00      0.00      0.00   0.00     0.00      0.00
Asphalt Off-Gas                0.26         -         -         -      -        -         -
Asphalt Off-Road Diesel       10.69     70.35     86.84         -   2.72     2.72      0.00
Asphalt On-Road Diesel         0.07      1.14      0.26      0.00   0.03     0.03      0.00
Asphalt Worker Trips           0.03      0.01      0.36      0.00   0.01     0.00      0.01
  Maximum lbs/day             11.04     71.50     87.46      0.00   2.81     2.75      0.06

  Max lbs/day all phases      11.04     71.50     87.46      0.00   2.81     2.75      0.06
```

```
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '07
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                             Horsepower    Load Factor     Hours/Day
     1    Graders                              174          0.575           8.0
     1    Off Highway Tractors                 255          0.410           8.0
     2    Off Highway Trucks                   417          0.490           8.0
     1    Rubber Tired Loaders                 165          0.465           8.0
     2    Scrapers                             313          0.660           8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '07
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '07
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                             Horsepower    Load Factor     Hours/Day
     1    Other Equipment                      190          0.620           8.0
     1    Rough Terrain Forklifts               94          0.475           8.0
     1    Tractor/Loaders/Backhoes              79          0.465           8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '08
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 4.3
  Off-Road Equipment
  No.     Type                             Horsepower    Load Factor     Hours/Day
     1    Pavers                               132          0.590           8.0
     1    Paving Equipment                     111          0.530           8.0
     1    Rollers                              114          0.430           8.0
     1    Scrapers                             313          0.660           8.0
     1    Surfacing Equipment                  437          0.490           8.0

CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)
                                                                      PM10     PM10        PM10
    Source                        ROG       NOx        CO       SO2   TOTAL   EXHAUST      DUST
 *** 2007***
Phase 1 - Demolition Emissions
Fugitive Dust                       -         -         -         -    0.00        -       0.00
Off-Road Diesel                  0.00      0.00      0.00         -    0.00     0.00       0.00
On-Road Diesel                   0.00      0.00      0.00      0.00    0.00     0.00       0.00
Worker Trips                     0.00      0.00      0.00      0.00    0.00     0.00       0.00
  Maximum lbs/day                0.00      0.00      0.00      0.00    0.00     0.00       0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                       -         -         -         -    7.24        -       7.24
Off-Road Diesel                 19.44    122.61    163.20         -    4.84     4.84       0.00
On-Road Diesel                   0.00      0.00      0.00      0.00    0.00     0.00       0.00
Worker Trips                     0.18      0.27      4.62      0.00    0.02     0.01       0.01
  Maximum lbs/day               19.62    122.88    167.82      0.00   12.10     4.85       7.25

Phase 3 - Building Construction
Bldg Const Off-Road Diesel       3.51     25.45     26.84         -    1.08     1.08       0.00
Bldg Const Worker Trips          0.24      0.14      3.04      0.00    0.06     0.00       0.06
Arch Coatings Off-Gas            0.00         -         -         -       -        -          -
Arch Coatings Worker Trips       0.00      0.00      0.00      0.00    0.00     0.00       0.00
Asphalt Off-Gas                  0.00         -         -         -       -        -          -
Asphalt Off-Road Diesel          0.00      0.00      0.00         -    0.00     0.00       0.00
Asphalt On-Road Diesel           0.00      0.00      0.00      0.00    0.00     0.00       0.00
Asphalt Worker Trips             0.00      0.00      0.00      0.00    0.00     0.00       0.00
  Maximum lbs/day                3.75     25.59     29.88      0.00    1.14     1.08       0.06

  Max lbs/day all phases        19.62    122.88    167.82      0.00   12.10     4.85       7.25


 *** 2008***
Phase 1 - Demolition Emissions
Fugitive Dust                       -         -         -         -    0.00        -       0.00
Off-Road Diesel                  0.00      0.00      0.00         -    0.00     0.00       0.00
On-Road Diesel                   0.00      0.00      0.00      0.00    0.00     0.00       0.00
Worker Trips                     0.00      0.00      0.00      0.00    0.00     0.00       0.00
  Maximum lbs/day                0.00      0.00      0.00      0.00    0.00     0.00       0.00

Phase 2 - Site Grading Emissions
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Fugitive Dust                     -         -         -         -       0.00        -       0.00
Off-Road Diesel                 0.00      0.00      0.00        -       0.00      0.00      0.00
On-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel      3.51     24.33     27.57        -       0.97      0.97      0.00
Bldg Const Worker Trips         0.22      0.13      2.83      0.00      0.06      0.00      0.06
Arch Coatings Off-Gas           0.00        -         -         -         -         -         -
Arch Coatings Worker Trips      0.00      0.00      0.00      0.00      0.00      0.00      0.00
Asphalt Off-Gas                 0.26        -         -         -         -         -         -
Asphalt Off-Road Diesel        10.69     70.35     86.84        -       2.72      2.72      0.00
Asphalt On-Road Diesel          0.07      1.14      0.26      0.00      0.03      0.03      0.00
Asphalt Worker Trips            0.03      0.01      0.36      0.00      0.01      0.00      0.01
  Maximum lbs/day              11.04     71.50     87.46      0.00      2.81      2.75      0.06

  Max lbs/day all phases       11.04     71.50     87.46      0.00      2.81      2.75      0.06


Construction-Related Mitigation Measures

 Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
 Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
 Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 34.0%)
 Phase 2: Stockpiles: Cover all stock piles with tarps
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
 Phase 2: Unpaved Roads: Water all haul roads 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 3.0%)
 Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '07
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                                Horsepower    Load Factor    Hours/Day
     1    Graders                                174          0.575          8.0
     1    Off Highway Tractors                   255          0.410          8.0
     2    Off Highway Trucks                     417          0.490          8.0
     1    Rubber Tired Loaders                   165          0.465          8.0
     2    Scrapers                               313          0.660          8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '07
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '07
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                                Horsepower    Load Factor    Hours/Day
     1    Other Equipment                        190          0.620          8.0
     1    Rough Terrain Forklifts                 94          0.475          8.0
     1    Tractor/Loaders/Backhoes                79          0.465          8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '08
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 4.3
  Off-Road Equipment
  No.     Type                                Horsepower    Load Factor    Hours/Day
     1    Pavers                                 132          0.590          8.0
     1    Paving Equipment                       111          0.530          8.0
     1    Rollers                                114          0.430          8.0
     1    Scrapers                               313          0.660          8.0
     1    Surfacing Equipment                    437          0.490          8.0
```

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Changes made to the default values for Land Use Trip Percentages


Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 2 mitigation measure Soil Disturbance: Apply soil stabilizers to inactive areas
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Replace ground cover in disturbed areas quickly
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Water exposed surfaces - 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Stockpiles: Cover all stock piles with tarps
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Water all haul roads 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
     has been changed from off to on.
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                URBEMIS 2002 For Windows    7.4.2

File Name:                         I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase II.urb
Project Name:                      Sierra Meadows - Phase 4 and 6
Project Location:                  San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                        DETAIL REPORT
                     (Pounds/Day - Summer)

Construction Start Month and Year: June, 2007
Construction Duration: 12
Total Land Use Area to be Developed: 12.2 acres
Maximum Acreage Disturbed Per Day: 3.5 acres
Single Family Units: 54 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)
                                                                           PM10      PM10       PM10
   Source                        ROG        NOx        CO        SO2      TOTAL   EXHAUST       DUST
 *** 2007***
Phase 1 - Demolition Emissions
Fugitive Dust                      -          -          -          -      0.00         -       0.00
Off-Road Diesel                 0.00       0.00       0.00          -      0.00      0.00       0.00
On-Road Diesel                  0.00       0.00       0.00       0.00      0.00      0.00       0.00
Worker Trips                    0.00       0.00       0.00       0.00      0.00      0.00       0.00
  Maximum lbs/day               0.00       0.00       0.00       0.00      0.00      0.00       0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                      -          -          -          -     35.00         -      35.00
Off-Road Diesel                19.44     122.61     163.20          -      4.84      4.84       0.00
On-Road Diesel                  0.00       0.00       0.00       0.00      0.00      0.00       0.00
Worker Trips                    0.18       0.27       4.62       0.00      0.02      0.01       0.01
  Maximum lbs/day              19.62     122.88     167.82       0.00     39.86      4.85      35.01

Phase 3 - Building Construction
Bldg Const Off-Road Diesel      3.51      25.45      26.84          -      1.08      1.08       0.00
Bldg Const Worker Trips         0.24       0.14       3.04       0.00      0.06      0.00       0.06
Arch Coatings Off-Gas           0.00          -          -          -         -         -          -
Arch Coatings Worker Trips      0.00       0.00       0.00       0.00      0.00      0.00       0.00
Asphalt Off-Gas                 0.00          -          -          -         -         -          -
Asphalt Off-Road Diesel         0.00       0.00       0.00          -      0.00      0.00       0.00
Asphalt On-Road Diesel          0.00       0.00       0.00       0.00      0.00      0.00       0.00
Asphalt Worker Trips            0.00       0.00       0.00       0.00      0.00      0.00       0.00
  Maximum lbs/day               3.75      25.59      29.88       0.00      1.14      1.08       0.06

  Max lbs/day all phases       19.62     122.88     167.82       0.00     39.86      4.85      35.01


 *** 2008***
Phase 1 - Demolition Emissions
Fugitive Dust                      -          -          -          -      0.00         -       0.00
Off-Road Diesel                 0.00       0.00       0.00          -      0.00      0.00       0.00
On-Road Diesel                  0.00       0.00       0.00       0.00      0.00      0.00       0.00
Worker Trips                    0.00       0.00       0.00       0.00      0.00      0.00       0.00
  Maximum lbs/day               0.00       0.00       0.00       0.00      0.00      0.00       0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                      -          -          -          -      0.00         -       0.00
Off-Road Diesel                 0.00       0.00       0.00          -      0.00      0.00       0.00
On-Road Diesel                  0.00       0.00       0.00       0.00      0.00      0.00       0.00
Worker Trips                    0.00       0.00       0.00       0.00      0.00      0.00       0.00
  Maximum lbs/day               0.00       0.00       0.00       0.00      0.00      0.00       0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel      3.51      24.33      27.57          -      0.97      0.97       0.00
Bldg Const Worker Trips         0.22       0.13       2.83       0.00      0.06      0.00       0.06
Arch Coatings Off-Gas           0.00          -          -          -         -         -          -
Arch Coatings Worker Trips      0.00       0.00       0.00       0.00      0.00      0.00       0.00
Asphalt Off-Gas                 0.26          -          -          -         -         -          -
Asphalt Off-Road Diesel        10.69      70.35      86.84          -      2.72      2.72       0.00
Asphalt On-Road Diesel          0.07       1.14       0.26       0.00      0.03      0.03       0.00
Asphalt Worker Trips            0.03       0.01       0.36       0.00      0.01      0.00       0.01
  Maximum lbs/day              11.04      71.50      87.46       0.00      2.81      2.75       0.06

  Max lbs/day all phases       11.04      71.50      87.46       0.00      2.81      2.75       0.06
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Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '07
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                                 Horsepower    Load Factor     Hours/Day
    1     Graders                                 174          0.575            8.0
    1     Off Highway Tractors                    255          0.410            8.0
    2     Off Highway Trucks                      417          0.490            8.0
    1     Rubber Tired Loaders                    165          0.465            8.0
    2     Scrapers                                313          0.660            8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '07
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '07
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                                 Horsepower    Load Factor     Hours/Day
    1     Other Equipment                         190          0.620            8.0
    1     Rough Terrain Forklifts                  94          0.475            8.0
    1     Tractor/Loaders/Backhoes                 79          0.465            8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '08
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 4.3
  Off-Road Equipment
  No.     Type                                 Horsepower    Load Factor     Hours/Day
    1     Pavers                                  132          0.590            8.0
    1     Paving Equipment                        111          0.530            8.0
    1     Rollers                                 114          0.430            8.0
    1     Scrapers                                313          0.660            8.0
    1     Surfacing Equipment                     437          0.490            8.0

CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)
                                                                          PM10      PM10        PM10
    Source                        ROG        NOx        CO         SO2    TOTAL   EXHAUST       DUST
 *** 2007***
Phase 1 - Demolition Emissions
Fugitive Dust                       -          -          -          -     0.00         -       0.00
Off-Road Diesel                  0.00       0.00       0.00          -     0.00      0.00       0.00
On-Road Diesel                   0.00       0.00       0.00       0.00     0.00      0.00       0.00
Worker Trips                     0.00       0.00       0.00       0.00     0.00      0.00       0.00
  Maximum lbs/day                0.00       0.00       0.00       0.00     0.00      0.00       0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                       -          -          -          -     7.24         -       7.24
Off-Road Diesel                 19.44     122.61     163.20          -     4.84      4.84       0.00
On-Road Diesel                   0.00       0.00       0.00       0.00     0.00      0.00       0.00
Worker Trips                     0.18       0.27       4.62       0.00     0.02      0.01       0.01
  Maximum lbs/day               19.62     122.88     167.82       0.00    12.10      4.85       7.25

Phase 3 - Building Construction
Bldg Const Off-Road Diesel       3.51      25.45      26.84          -     1.08      1.08       0.00
Bldg Const Worker Trips          0.24       0.14       3.04       0.00     0.06      0.00       0.06
Arch Coatings Off-Gas            0.00          -          -          -        -         -          -
Arch Coatings Worker Trips       0.00       0.00       0.00       0.00     0.00      0.00       0.00
Asphalt Off-Gas                  0.00          -          -          -        -         -          -
Asphalt Off-Road Diesel          0.00       0.00       0.00          -     0.00      0.00       0.00
Asphalt On-Road Diesel           0.00       0.00       0.00       0.00     0.00      0.00       0.00
Asphalt Worker Trips             0.00       0.00       0.00       0.00     0.00      0.00       0.00
  Maximum lbs/day                3.75      25.59      29.88       0.00     1.14      1.08       0.06

  Max lbs/day all phases        19.62     122.88     167.82       0.00    12.10      4.85       7.25

 *** 2008***
Phase 1 - Demolition Emissions
Fugitive Dust                       -          -          -          -     0.00         -       0.00
Off-Road Diesel                  0.00       0.00       0.00          -     0.00      0.00       0.00
On-Road Diesel                   0.00       0.00       0.00       0.00     0.00      0.00       0.00
Worker Trips                     0.00       0.00       0.00       0.00     0.00      0.00       0.00
  Maximum lbs/day                0.00       0.00       0.00       0.00     0.00      0.00       0.00

Phase 2 - Site Grading Emissions
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Fugitive Dust                      -         -         -         -      0.00         -      0.00
Off-Road Diesel                 0.00      0.00      0.00         -      0.00      0.00      0.00
On-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel      3.51     24.33     27.57         -      0.97      0.97      0.00
Bldg Const Worker Trips         0.22      0.13      2.83      0.00      0.06      0.00      0.06
Arch Coatings Off-Gas           0.00         -         -         -         -         -         -
Arch Coatings Worker Trips      0.00      0.00      0.00      0.00      0.00      0.00      0.00
Asphalt Off-Gas                 0.26         -         -         -         -         -         -
Asphalt Off-Road Diesel        10.69     70.35     86.84         -      2.72      2.72      0.00
Asphalt On-Road Diesel          0.07      1.14      0.26      0.00      0.03      0.03      0.00
Asphalt Worker Trips            0.03      0.01      0.36      0.00      0.01      0.00      0.01
  Maximum lbs/day              11.04     71.50     87.46      0.00      2.81      2.75      0.06

  Max lbs/day all phases       11.04     71.50     87.46      0.00      2.81      2.75      0.06


Construction-Related Mitigation Measures

 Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
 Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
 Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 34.0%)
 Phase 2: Stockpiles: Cover all stock piles with tarps
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
 Phase 2: Unpaved Roads: Water all haul roads 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 3.0%)
 Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '07
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                                Horsepower    Load Factor     Hours/Day
     1    Graders                                174          0.575           8.0
     1    Off Highway Tractors                   255          0.410           8.0
     2    Off Highway Trucks                     417          0.490           8.0
     1    Rubber Tired Loaders                   165          0.465           8.0
     2    Scrapers                               313          0.660           8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '07
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '07
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                                Horsepower    Load Factor     Hours/Day
     1    Other Equipment                        190          0.620           8.0
     1    Rough Terrain Forklifts                 94          0.475           8.0
     1    Tractor/Loaders/Backhoes                79          0.465           8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '08
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 4.3
  Off-Road Equipment
  No.     Type                                Horsepower    Load Factor     Hours/Day
     1    Pavers                                 132          0.590           8.0
     1    Paving Equipment                       111          0.530           8.0
     1    Rollers                                114          0.430           8.0
     1    Scrapers                               313          0.660           8.0
     1    Surfacing Equipment                    437          0.490           8.0
```

```
Changes made to the default values for Land Use Trip Percentages


Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 2 mitigation measure Soil Disturbance: Apply soil stabilizers to inactive areas
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Replace ground cover in disturbed areas quickly
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Water exposed surfaces - 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Stockpiles: Cover all stock piles with tarps
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Water all haul roads 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
     has been changed from off to on.
```

```
               URBEMIS 2002 For Windows   7.4.2

File Name:                        I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase II.urb
Project Name:                     Sierra Meadows - Phase 4 and 6
Project Location:                 San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                          DETAIL REPORT
                           (Tons/Year)

Construction Start Month and Year: June, 2007
Construction Duration: 12
Total Land Use Area to be Developed: 12.2 acres
Maximum Acreage Disturbed Per Day: 3.5 acres
Single Family Units: 54 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (tons/year)
                                                                    PM10     PM10        PM10
    Source                       ROG       NOx       CO       SO2   TOTAL   EXHAUST      DUST
 *** 2007***
Phase 1 - Demolition Emissions
Fugitive Dust                      -         -        -         -    0.00        -       0.00
Off-Road Diesel                 0.00      0.00     0.00         -    0.00     0.00       0.00
On-Road Diesel                  0.00      0.00     0.00      0.00    0.00     0.00       0.00
Worker Trips                    0.00      0.00     0.00      0.00    0.00     0.00       0.00
  Total tons/year               0.00      0.00     0.00      0.00    0.00     0.00       0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                      -         -        -         -    2.28        -       2.28
Off-Road Diesel                 1.26      8.10    10.80         -    0.30     0.30       0.00
On-Road Diesel                  0.00      0.00     0.00      0.00    0.00     0.00       0.00
Worker Trips                    0.00      0.00     0.29      0.00    0.00     0.00       0.00
  Total tons/year               1.26      8.10    11.09      0.00   10.02     0.30       2.28

Phase 3 - Building Construction
Bldg Const Off-Road Diesel      0.04      0.28     0.30         -    0.01     0.01       0.00
Bldg Const Worker Trips         0.00      0.00     0.03      0.00    0.00     0.00       0.00
Arch Coatings Off-Gas           0.00         -        -         -       -        -          -
Arch Coatings Worker Trips      0.00      0.00     0.00      0.00    0.00     0.00       0.00
Asphalt Off-Gas                 0.00         -        -         -       -        -          -
Asphalt Off-Road Diesel         0.00      0.00     0.00         -    0.00     0.00       0.00
Asphalt On-Road Diesel          0.00      0.00     0.00      0.00    0.00     0.00       0.00
Asphalt Worker Trips            0.00      0.00     0.00      0.00    0.00     0.00       0.00
  Total tons/year               0.04      0.28     0.33      0.00    0.08     0.01       0.00

  Total all phases tons/yr      1.30      8.38    11.42      0.00   10.10     0.31       2.28


 *** 2008***
Phase 1 - Demolition Emissions
Fugitive Dust                      -         -        -         -    0.00        -       0.00
Off-Road Diesel                 0.00      0.00     0.00         -    0.00     0.00       0.00
On-Road Diesel                  0.00      0.00     0.00      0.00    0.00     0.00       0.00
Worker Trips                    0.00      0.00     0.00      0.00    0.00     0.00       0.00
  Total tons/year               0.00      0.00     0.00      0.00    0.00     0.00       0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                      -         -        -         -    0.00        -       0.00
Off-Road Diesel                 0.00      0.00     0.00         -    0.00     0.00       0.00
On-Road Diesel                  0.00      0.00     0.00      0.00    0.00     0.00       0.00
Worker Trips                    0.00      0.00     0.00      0.00    0.00     0.00       0.00
  Total tons/year               0.00      0.00     0.00      0.00    0.00     0.00       0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel      0.12      0.81     0.90         -    0.03     0.03       0.00
Bldg Const Worker Trips         0.00      0.00     0.09      0.00    0.00     0.00       0.00
Arch Coatings Off-Gas           0.00         -        -         -       -        -          -
Arch Coatings Worker Trips      0.00      0.00     0.00      0.00    0.00     0.00       0.00
Asphalt Off-Gas                 0.00         -        -         -       -        -          -
Asphalt Off-Road Diesel         0.24      1.54     1.92         -    0.06     0.06       0.00
Asphalt On-Road Diesel          0.00      0.02     0.00      0.00    0.00     0.00       0.00
Asphalt Worker Trips            0.00      0.00     0.00      0.00    0.00     0.00       0.00
  Total tons/year               0.36      2.37     2.91      0.00    0.42     0.09       0.00

  Total all phases tons/yr      0.36      2.37     2.91      0.00    0.42     0.09       0.00
```

```
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '07
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                                 Horsepower     Load Factor      Hours/Day
     1    Graders                                 174            0.575            8.0
     1    Off Highway Tractors                    255            0.410            8.0
     2    Off Highway Trucks                      417            0.490            8.0
     1    Rubber Tired Loaders                    165            0.465            8.0
     2    Scrapers                                313            0.660            8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '07
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '07
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                                 Horsepower     Load Factor      Hours/Day
     1    Other Equipment                         190            0.620            8.0
     1    Rough Terrain Forklifts                  94            0.475            8.0
     1    Tractor/Loaders/Backhoes                 79            0.465            8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '08
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 4.3
  Off-Road Equipment
  No.     Type                                 Horsepower     Load Factor      Hours/Day
     1    Pavers                                  132            0.590            8.0
     1    Paving Equipment                        111            0.530            8.0
     1    Rollers                                 114            0.430            8.0
     1    Scrapers                                313            0.660            8.0
     1    Surfacing Equipment                     437            0.490            8.0

CONSTRUCTION EMISSION ESTIMATES MITIGATED (tons/year)
                                                                         PM10      PM10        PM10
    Source                      ROG        NOx        CO        SO2     TOTAL    EXHAUST       DUST
 *** 2007***
Phase 1 - Demolition Emissions
Fugitive Dust                    -          -          -          -      0.00        -         0.00
Off-Road Diesel                0.00       0.00       0.00         -      0.00       0.00       0.00
On-Road Diesel                 0.00       0.00       0.00       0.00     0.00       0.00       0.00
Worker Trips                   0.00       0.00       0.00       0.00     0.00       0.00       0.00
  Total tons/year              0.00       0.00       0.00       0.00     0.00       0.00       0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                    -          -          -          -      0.47        -         0.47
Off-Road Diesel                1.26       8.10      10.80         -      0.30       0.30       0.00
On-Road Diesel                 0.00       0.00       0.00       0.00     0.00       0.00       0.00
Worker Trips                   0.00       0.00       0.29       0.00     0.00       0.00       0.00
  Total tons/year              1.26       8.10      11.09       0.00     2.78       0.30       0.47

Phase 3 - Building Construction
Bldg Const Off-Road Diesel     0.04       0.28       0.30         -      0.01       0.01       0.00
Bldg Const Worker Trips        0.00       0.00       0.03       0.00     0.00       0.00       0.00
Arch Coatings Off-Gas          0.00         -          -          -        -          -          -
Arch Coatings Worker Trips     0.00       0.00       0.00       0.00     0.00       0.00       0.00
Asphalt Off-Gas                0.00         -          -          -        -          -          -
Asphalt Off-Road Diesel        0.00       0.00       0.00         -      0.00       0.00       0.00
Asphalt On-Road Diesel         0.00       0.00       0.00       0.00     0.00       0.00       0.00
Asphalt Worker Trips           0.00       0.00       0.00       0.00     0.00       0.00       0.00
  Total tons/year              0.04       0.28       0.33       0.00     0.08       0.01       0.00

  Total all phases tons/yr     1.30       8.38      11.42       0.00     2.86       0.31       0.47


 *** 2008***
Phase 1 - Demolition Emissions
Fugitive Dust                    -          -          -          -      0.00        -         0.00
Off-Road Diesel                0.00       0.00       0.00         -      0.00       0.00       0.00
On-Road Diesel                 0.00       0.00       0.00       0.00     0.00       0.00       0.00
Worker Trips                   0.00       0.00       0.00       0.00     0.00       0.00       0.00
  Total tons/year              0.00       0.00       0.00       0.00     0.00       0.00       0.00

Phase 2 - Site Grading Emissions
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Fugitive Dust                   -         -         -         -        0.00       -        0.00
Off-Road Diesel               0.00      0.00      0.00        -        0.00      0.00      0.00
On-Road Diesel                0.00      0.00      0.00      0.00       0.00      0.00      0.00
Worker Trips                  0.00      0.00      0.00      0.00       0.00      0.00      0.00
  Total tons/year             0.00      0.00      0.00      0.00       0.00      0.00      0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel    0.12      0.81      0.90        -        0.03      0.03      0.00
Bldg Const Worker Trips       0.00      0.00      0.09      0.00       0.00      0.00      0.00
Arch Coatings Off-Gas         0.00        -         -         -          -         -         -
Arch Coatings Worker Trips    0.00      0.00      0.00      0.00       0.00      0.00      0.00
Asphalt Off-Gas               0.00        -         -         -          -         -         -
Asphalt Off-Road Diesel       0.24      1.54      1.92        -        0.06      0.06      0.00
Asphalt On-Road Diesel        0.00      0.02      0.00      0.00       0.00      0.00      0.00
Asphalt Worker Trips          0.00      0.00      0.00      0.00       0.00      0.00      0.00
  Total tons/year             0.36      2.37      2.91      0.00       0.42      0.09      0.00

  Total all phases tons/yr    0.36      2.37      2.91      0.00       0.42      0.09      0.00


Construction-Related Mitigation Measures

 Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
 Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
 Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 34.0%)
 Phase 2: Stockpiles: Cover all stock piles with tarps
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
 Phase 2: Unpaved Roads: Water all haul roads 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 3.0%)
 Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '07
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                               Horsepower    Load Factor     Hours/Day
     1    Graders                                174          0.575            8.0
     1    Off Highway Tractors                   255          0.410            8.0
     2    Off Highway Trucks                     417          0.490            8.0
     1    Rubber Tired Loaders                   165          0.465            8.0
     2    Scrapers                               313          0.660            8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '07
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '07
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                               Horsepower    Load Factor     Hours/Day
     1    Other Equipment                        190          0.620            8.0
     1    Rough Terrain Forklifts                 94          0.475            8.0
     1    Tractor/Loaders/Backhoes                79          0.465            8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '08
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 4.3
  Off-Road Equipment
  No.     Type                               Horsepower    Load Factor     Hours/Day
     1    Pavers                                 132          0.590            8.0
     1    Paving Equipment                       111          0.530            8.0
     1    Rollers                                114          0.430            8.0
     1    Scrapers                               313          0.660            8.0
     1    Surfacing Equipment                    437          0.490            8.0
```

```
Changes made to the default values for Land Use Trip Percentages


Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 2 mitigation measure Soil Disturbance: Apply soil stabilizers to inactive areas
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Replace ground cover in disturbed areas quickly
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Water exposed surfaces - 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Stockpiles: Cover all stock piles with tarps
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Water all haul roads 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
     has been changed from off to on.
```

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                URBEMIS 2002 For Windows   7.4.2

File Name:                      I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase IIIurb.urb
Project Name:                   Sierra Meadows - Phase 7, 8 and 9
Project Location:               San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                        SUMMARY REPORT
                     (Pounds/Day - Summer)

CONSTRUCTION EMISSION ESTIMATES
                                                                      PM10      PM10      PM10
 *** 2008 ***                       ROG       NOx        CO       SO2    TOTAL   EXHAUST      DUST
 TOTALS (lbs/day,unmitigated)     21.38    130.98    183.43      0.00    49.82      4.80     45.02
 TOTALS (lbs/day, mitigated)      21.38    130.98    183.43      0.00    14.13      4.80      9.33

                                                                      PM10      PM10      PM10
 *** 2009 ***                       ROG       NOx        CO       SO2    TOTAL   EXHAUST      DUST
 TOTALS (lbs/day,unmitigated)     11.30     70.11     88.96      0.00     2.71      2.60      0.11
 TOTALS (lbs/day, mitigated)      11.30     70.11     88.96      0.00     2.71      2.60      0.11
```

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                URBEMIS 2002 For Windows   7.4.2

File Name:                      I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase IIIurb.urb
Project Name:                   Sierra Meadows - Phase 7, 8 and 9
Project Location:               San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                        SUMMARY REPORT
                     (Pounds/Day - Winter)

CONSTRUCTION EMISSION ESTIMATES
                                                                        PM10      PM10      PM10
 *** 2008 ***                      ROG       NOx        CO       SO2    TOTAL   EXHAUST     DUST
 TOTALS (lbs/day,unmitigated)    21.38    130.98    183.43      0.00    49.82      4.80    45.02
 TOTALS (lbs/day, mitigated)     21.38    130.98    183.43      0.00    14.13      4.80     9.33

                                                                        PM10      PM10      PM10
 *** 2009 ***                      ROG       NOx        CO       SO2    TOTAL   EXHAUST     DUST
 TOTALS (lbs/day,unmitigated)    11.30     70.11     88.96      0.00     2.71      2.60     0.11
 TOTALS (lbs/day, mitigated)     11.30     70.11     88.96      0.00     2.71      2.60     0.11
```

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               URBEMIS 2002 For Windows   7.4.2

File Name:                      I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase IIIurb.urb
Project Name:                   Sierra Meadows - Phase 7, 8 and 9
Project Location:               San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                       SUMMARY REPORT
                         (Tons/Year)

CONSTRUCTION EMISSION ESTIMATES
                                                                        PM10      PM10      PM10
 *** 2008 ***                    ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
 TOTALS (tpy, unmitigated)      1.42      8.91     12.47      0.00     12.98      0.31      3.00
 TOTALS (tpy, mitigated)        1.42      8.91     12.47      0.00      3.46      0.31      0.62

                                                                        PM10      PM10      PM10
 *** 2009 ***                    ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
 TOTALS (tpy, unmitigated)      0.38      2.32      3.02      0.00      0.42      0.09      0.00
 TOTALS (tpy, mitigated)        0.38      2.32      3.02      0.00      0.42      0.09      0.00
```

```
                URBEMIS 2002 For Windows   7.4.2

File Name:                      I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase IIIurb.urb
Project Name:                   Sierra Meadows - Phase 7, 8 and 9
Project Location:               San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                         DETAIL REPORT
                      (Pounds/Day - Winter)

Construction Start Month and Year: June, 2008
Construction Duration: 12
Total Land Use Area to be Developed: 29.27 acres
Maximum Acreage Disturbed Per Day: 4.5 acres
Single Family Units: 100 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)
                                                                         PM10      PM10      PM10
    Source                        ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
 *** 2008***
Phase 1 - Demolition Emissions
Fugitive Dust                       -         -         -         -      0.00         -      0.00
Off-Road Diesel                  0.00      0.00      0.00         -      0.00      0.00      0.00
On-Road Diesel                   0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                     0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Maximum lbs/day                0.00      0.00      0.00      0.00      0.00      0.00      0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                       -         -         -         -     45.00         -     45.00
Off-Road Diesel                 21.20    130.71    178.69         -      4.79      4.79      0.00
On-Road Diesel                   0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                     0.18      0.27      4.74      0.00      0.03      0.01      0.02
  Maximum lbs/day               21.38    130.98    183.43      0.00     49.82      4.80     45.02

Phase 3 - Building Construction
Bldg Const Off-Road Diesel       3.51     24.33     27.57         -      0.97      0.97      0.00
Bldg Const Worker Trips          0.40      0.25      5.24      0.00      0.11      0.00      0.11
Arch Coatings Off-Gas            0.00         -         -         -         -         -         -
Arch Coatings Worker Trips       0.00      0.00      0.00      0.00      0.00      0.00      0.00
Asphalt Off-Gas                  0.00         -         -         -         -         -         -
Asphalt Off-Road Diesel          0.00      0.00      0.00         -      0.00      0.00      0.00
Asphalt On-Road Diesel           0.00      0.00      0.00      0.00      0.00      0.00      0.00
Asphalt Worker Trips             0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Maximum lbs/day                3.91     24.58     32.82      0.00      1.08      0.97      0.11

  Max lbs/day all phases        21.38    130.98    183.43      0.00     49.82      4.80     45.02


 *** 2009***
Phase 1 - Demolition Emissions
Fugitive Dust                       -         -         -         -      0.00         -      0.00
Off-Road Diesel                  0.00      0.00      0.00         -      0.00      0.00      0.00
On-Road Diesel                   0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                     0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Maximum lbs/day                0.00      0.00      0.00      0.00      0.00      0.00      0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                       -         -         -         -      0.00         -      0.00
Off-Road Diesel                  0.00      0.00      0.00         -      0.00      0.00      0.00
On-Road Diesel                   0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                     0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Maximum lbs/day                0.00      0.00      0.00      0.00      0.00      0.00      0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel       3.51     23.30     28.34         -      0.92      0.92      0.00
Bldg Const Worker Trips          0.37      0.23      4.84      0.00      0.11      0.00      0.11
Arch Coatings Off-Gas            0.00         -         -         -         -         -         -
Arch Coatings Worker Trips       0.00      0.00      0.00      0.00      0.00      0.00      0.00
Asphalt Off-Gas                  0.47         -         -         -         -         -         -
Asphalt Off-Road Diesel         10.69     68.19     88.19         -      2.55      2.55      0.00
Asphalt On-Road Diesel           0.12      1.90      0.44      0.00      0.05      0.05      0.00
Asphalt Worker Trips             0.03      0.01      0.33      0.00      0.01      0.00      0.01
  Maximum lbs/day               11.30     70.11     88.96      0.00      2.71      2.60      0.11

  Max lbs/day all phases        11.30     70.11     88.96      0.00      2.71      2.60      0.11
```

```
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '08
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                           Horsepower    Load Factor     Hours/Day
     2    Graders                           174          0.575            8.0
     1    Off Highway Tractors              255          0.410            8.0
     2    Off Highway Trucks                417          0.490            8.0
     1    Rubber Tired Loaders              165          0.465            8.0
     2    Scrapers                          313          0.660            8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '08
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '08
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                           Horsepower    Load Factor     Hours/Day
     1    Other Equipment                   190          0.620            8.0
     1    Rough Terrain Forklifts            94          0.475            8.0
     1    Tractor/Loaders/Backhoes           79          0.465            8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '09
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 7.9
  Off-Road Equipment
  No.     Type                           Horsepower    Load Factor     Hours/Day
     1    Pavers                            132          0.590            8.0
     1    Paving Equipment                  111          0.530            8.0
     1    Rollers                           114          0.430            8.0
     1    Scrapers                          313          0.660            8.0
     1    Surfacing Equipment               437          0.490            8.0

CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)
                                                                          PM10      PM10        PM10
    Source                        ROG       NOx        CO        SO2     TOTAL   EXHAUST        DUST
 *** 2008***
Phase 1 - Demolition Emissions
Fugitive Dust                       -         -         -          -      0.00         -        0.00
Off-Road Diesel                  0.00      0.00      0.00          -      0.00      0.00        0.00
On-Road Diesel                   0.00      0.00      0.00       0.00      0.00      0.00        0.00
Worker Trips                     0.00      0.00      0.00       0.00      0.00      0.00        0.00
  Maximum lbs/day                0.00      0.00      0.00       0.00      0.00      0.00        0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                       -         -         -          -      9.31         -        9.31
Off-Road Diesel                 21.20    130.71    178.69          -      4.79      4.79        0.00
On-Road Diesel                   0.00      0.00      0.00       0.00      0.00      0.00        0.00
Worker Trips                     0.18      0.27      4.74       0.00      0.03      0.01        0.02
  Maximum lbs/day               21.38    130.98    183.43       0.00     14.13      4.80        9.33

Phase 3 - Building Construction
Bldg Const Off-Road Diesel       3.51     24.33     27.57          -      0.97      0.97        0.00
Bldg Const Worker Trips          0.40      0.25      5.24       0.00      0.11      0.00        0.11
Arch Coatings Off-Gas            0.00         -         -          -         -         -           -
Arch Coatings Worker Trips       0.00      0.00      0.00       0.00      0.00      0.00        0.00
Asphalt Off-Gas                  0.00         -         -          -         -         -           -
Asphalt Off-Road Diesel          0.00      0.00      0.00          -      0.00      0.00        0.00
Asphalt On-Road Diesel           0.00      0.00      0.00       0.00      0.00      0.00        0.00
Asphalt Worker Trips             0.00      0.00      0.00       0.00      0.00      0.00        0.00
  Maximum lbs/day                3.91     24.58     32.82       0.00      1.08      0.97        0.11

  Max lbs/day all phases        21.38    130.98    183.43       0.00     14.13      4.80        9.33


 *** 2009***
Phase 1 - Demolition Emissions
Fugitive Dust                       -         -         -          -      0.00         -        0.00
Off-Road Diesel                  0.00      0.00      0.00          -      0.00      0.00        0.00
On-Road Diesel                   0.00      0.00      0.00       0.00      0.00      0.00        0.00
Worker Trips                     0.00      0.00      0.00       0.00      0.00      0.00        0.00
  Maximum lbs/day                0.00      0.00      0.00       0.00      0.00      0.00        0.00

Phase 2 - Site Grading Emissions
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Fugitive Dust                      -         -         -         -      0.00         -      0.00
Off-Road Diesel                 0.00      0.00      0.00         -      0.00      0.00      0.00
On-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel      3.51     23.30     28.34         -      0.92      0.92      0.00
Bldg Const Worker Trips         0.37      0.23      4.84      0.00      0.11      0.00      0.11
Arch Coatings Off-Gas           0.00         -         -         -         -         -         -
Arch Coatings Worker Trips      0.00      0.00      0.00      0.00      0.00      0.00      0.00
Asphalt Off-Gas                 0.47         -         -         -         -         -         -
Asphalt Off-Road Diesel        10.69     68.19     88.19         -      2.55      2.55      0.00
Asphalt On-Road Diesel          0.12      1.90      0.44      0.00      0.05      0.05      0.00
Asphalt Worker Trips            0.03      0.01      0.33      0.00      0.01      0.00      0.01
  Maximum lbs/day              11.30     70.11     88.96      0.00      2.71      2.60      0.11

  Max lbs/day all phases       11.30     70.11     88.96      0.00      2.71      2.60      0.11


Construction-Related Mitigation Measures

 Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
 Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
 Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 34.0%)
 Phase 2: Stockpiles: Cover all stock piles with tarps
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
 Phase 2: Unpaved Roads: Water all haul roads 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 3.0%)
 Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '08
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                               Horsepower    Load Factor     Hours/Day
     2    Graders                               174          0.575           8.0
     1    Off Highway Tractors                  255          0.410           8.0
     2    Off Highway Trucks                    417          0.490           8.0
     1    Rubber Tired Loaders                  165          0.465           8.0
     2    Scrapers                              313          0.660           8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '08
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '08
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                               Horsepower    Load Factor     Hours/Day
     1    Other Equipment                       190          0.620           8.0
     1    Rough Terrain Forklifts                94          0.475           8.0
     1    Tractor/Loaders/Backhoes               79          0.465           8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '09
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 7.9
  Off-Road Equipment
  No.     Type                               Horsepower    Load Factor     Hours/Day
     1    Pavers                                132          0.590           8.0
     1    Paving Equipment                      111          0.530           8.0
     1    Rollers                               114          0.430           8.0
     1    Scrapers                              313          0.660           8.0
     1    Surfacing Equipment                   437          0.490           8.0
```

```
Changes made to the default values for Land Use Trip Percentages


Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 2 mitigation measure Soil Disturbance: Apply soil stabilizers to inactive areas
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Replace ground cover in disturbed areas quickly
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Water exposed surfaces - 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Stockpiles: Cover all stock piles with tarps
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Water all haul roads 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
     has been changed from off to on.
```

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                URBEMIS 2002 For Windows   7.4.2

File Name:                       I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase IIIurb.urb
Project Name:                    Sierra Meadows - Phase 7, 8 and 9
Project Location:                San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                             DETAIL REPORT
                          (Pounds/Day - Summer)

Construction Start Month and Year: June, 2008
Construction Duration: 12
Total Land Use Area to be Developed: 29.27 acres
Maximum Acreage Disturbed Per Day: 4.5 acres
Single Family Units: 100 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)
                                                                    PM10      PM10        PM10
    Source                     ROG        NOx         CO        SO2     TOTAL   EXHAUST        DUST
 *** 2008***
Phase 1 - Demolition Emissions
Fugitive Dust                    -          -          -          -      0.00         -        0.00
Off-Road Diesel               0.00       0.00       0.00          -      0.00      0.00        0.00
On-Road Diesel                0.00       0.00       0.00       0.00      0.00      0.00        0.00
Worker Trips                  0.00       0.00       0.00       0.00      0.00      0.00        0.00
  Maximum lbs/day             0.00       0.00       0.00       0.00      0.00      0.00        0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                    -          -          -          -     45.00         -       45.00
Off-Road Diesel              21.20     130.71     178.69          -      4.79      4.79        0.00
On-Road Diesel                0.00       0.00       0.00       0.00      0.00      0.00        0.00
Worker Trips                  0.18       0.27       4.74       0.00      0.03      0.01        0.02
  Maximum lbs/day            21.38     130.98     183.43       0.00     49.82      4.80       45.02

Phase 3 - Building Construction
Bldg Const Off-Road Diesel    3.51      24.33      27.57          -      0.97      0.97        0.00
Bldg Const Worker Trips       0.40       0.25       5.24       0.00      0.11      0.00        0.11
Arch Coatings Off-Gas         0.00          -          -          -         -         -           -
Arch Coatings Worker Trips    0.00       0.00       0.00       0.00      0.00      0.00        0.00
Asphalt Off-Gas               0.00          -          -          -         -         -           -
Asphalt Off-Road Diesel       0.00       0.00       0.00          -      0.00      0.00        0.00
Asphalt On-Road Diesel        0.00       0.00       0.00       0.00      0.00      0.00        0.00
Asphalt Worker Trips          0.00       0.00       0.00       0.00      0.00      0.00        0.00
  Maximum lbs/day             3.91      24.58      32.82       0.00      1.08      0.97        0.11

  Max lbs/day all phases     21.38     130.98     183.43       0.00     49.82      4.80       45.02


 *** 2009***
Phase 1 - Demolition Emissions
Fugitive Dust                    -          -          -          -      0.00         -        0.00
Off-Road Diesel               0.00       0.00       0.00          -      0.00      0.00        0.00
On-Road Diesel                0.00       0.00       0.00       0.00      0.00      0.00        0.00
Worker Trips                  0.00       0.00       0.00       0.00      0.00      0.00        0.00
  Maximum lbs/day             0.00       0.00       0.00       0.00      0.00      0.00        0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                    -          -          -          -      0.00         -        0.00
Off-Road Diesel               0.00       0.00       0.00          -      0.00      0.00        0.00
On-Road Diesel                0.00       0.00       0.00       0.00      0.00      0.00        0.00
Worker Trips                  0.00       0.00       0.00       0.00      0.00      0.00        0.00
  Maximum lbs/day             0.00       0.00       0.00       0.00      0.00      0.00        0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel    3.51      23.30      28.34          -      0.92      0.92        0.00
Bldg Const Worker Trips       0.37       0.23       4.84       0.00      0.11      0.00        0.11
Arch Coatings Off-Gas         0.00          -          -          -         -         -           -
Arch Coatings Worker Trips    0.00       0.00       0.00       0.00      0.00      0.00        0.00
Asphalt Off-Gas               0.47          -          -          -         -         -           -
Asphalt Off-Road Diesel      10.69      68.19      88.19          -      2.55      2.55        0.00
Asphalt On-Road Diesel        0.12       1.90       0.44       0.00      0.05      0.05        0.00
Asphalt Worker Trips          0.03       0.01       0.33       0.00      0.01      0.00        0.01
  Maximum lbs/day            11.30      70.11      88.96       0.00      2.71      2.60        0.11

  Max lbs/day all phases     11.30      70.11      88.96       0.00      2.71      2.60        0.11
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Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '08
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                              Horsepower    Load Factor      Hours/Day
     2    Graders                              174          0.575             8.0
     1    Off Highway Tractors                 255          0.410             8.0
     2    Off Highway Trucks                   417          0.490             8.0
     1    Rubber Tired Loaders                 165          0.465             8.0
     2    Scrapers                             313          0.660             8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '08
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '08
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                              Horsepower    Load Factor      Hours/Day
     1    Other Equipment                      190          0.620             8.0
     1    Rough Terrain Forklifts               94          0.475             8.0
     1    Tractor/Loaders/Backhoes              79          0.465             8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '09
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 7.9
  Off-Road Equipment
  No.     Type                              Horsepower    Load Factor      Hours/Day
     1    Pavers                               132          0.590             8.0
     1    Paving Equipment                     111          0.530             8.0
     1    Rollers                              114          0.430             8.0
     1    Scrapers                             313          0.660             8.0
     1    Surfacing Equipment                  437          0.490             8.0

CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)
                                                                    PM10      PM10          PM10
    Source                      ROG        NOx         CO       SO2     TOTAL   EXHAUST          DUST
 *** 2008***
Phase 1 - Demolition Emissions
Fugitive Dust                     -          -          -         -      0.00         -          0.00
Off-Road Diesel                0.00       0.00       0.00         -      0.00      0.00          0.00
On-Road Diesel                 0.00       0.00       0.00      0.00      0.00      0.00          0.00
Worker Trips                   0.00       0.00       0.00      0.00      0.00      0.00          0.00
  Maximum lbs/day              0.00       0.00       0.00      0.00      0.00      0.00          0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                     -          -          -         -      9.31         -          9.31
Off-Road Diesel               21.20     130.71     178.69         -      4.79      4.79          0.00
On-Road Diesel                 0.00       0.00       0.00      0.00      0.00      0.00          0.00
Worker Trips                   0.18       0.27       4.74      0.00      0.03      0.01          0.02
  Maximum lbs/day             21.38     130.98     183.43      0.00     14.13      4.80          9.33

Phase 3 - Building Construction
Bldg Const Off-Road Diesel     3.51      24.33      27.57         -      0.97      0.97          0.00
Bldg Const Worker Trips        0.40       0.25       5.24      0.00      0.11      0.00          0.11
Arch Coatings Off-Gas          0.00          -          -         -         -         -             -
Arch Coatings Worker Trips     0.00       0.00       0.00      0.00      0.00      0.00          0.00
Asphalt Off-Gas                0.00          -          -         -         -         -             -
Asphalt Off-Road Diesel        0.00       0.00       0.00         -      0.00      0.00          0.00
Asphalt On-Road Diesel         0.00       0.00       0.00      0.00      0.00      0.00          0.00
Asphalt Worker Trips           0.00       0.00       0.00      0.00      0.00      0.00          0.00
  Maximum lbs/day              3.91      24.58      32.82      0.00      1.08      0.97          0.11

  Max lbs/day all phases      21.38     130.98     183.43      0.00     14.13      4.80          9.33


 *** 2009***
Phase 1 - Demolition Emissions
Fugitive Dust                     -          -          -         -      0.00         -          0.00
Off-Road Diesel                0.00       0.00       0.00         -      0.00      0.00          0.00
On-Road Diesel                 0.00       0.00       0.00      0.00      0.00      0.00          0.00
Worker Trips                   0.00       0.00       0.00      0.00      0.00      0.00          0.00
  Maximum lbs/day              0.00       0.00       0.00      0.00      0.00      0.00          0.00

Phase 2 - Site Grading Emissions
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Fugitive Dust                     -         -         -         -       0.00        -       0.00
Off-Road Diesel                 0.00      0.00      0.00        -       0.00      0.00      0.00
On-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel      3.51     23.30     28.34        -       0.92      0.92      0.00
Bldg Const Worker Trips         0.37      0.23      4.84      0.00      0.11      0.00      0.11
Arch Coatings Off-Gas           0.00        -         -         -         -         -         -
Arch Coatings Worker Trips      0.00      0.00      0.00      0.00      0.00      0.00      0.00
Asphalt Off-Gas                 0.47        -         -         -         -         -         -
Asphalt Off-Road Diesel        10.69     68.19     88.19        -       2.55      2.55      0.00
Asphalt On-Road Diesel          0.12      1.90      0.44      0.00      0.05      0.05      0.00
Asphalt Worker Trips            0.03      0.01      0.33      0.00      0.01      0.00      0.01
  Maximum lbs/day              11.30     70.11     88.96      0.00      2.71      2.60      0.11

  Max lbs/day all phases       11.30     70.11     88.96      0.00      2.71      2.60      0.11


Construction-Related Mitigation Measures

 Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
 Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
 Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 34.0%)
 Phase 2: Stockpiles: Cover all stock piles with tarps
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
 Phase 2: Unpaved Roads: Water all haul roads 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 3.0%)
 Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '08
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                                Horsepower    Load Factor     Hours/Day
     2    Graders                                174          0.575           8.0
     1    Off Highway Tractors                   255          0.410           8.0
     2    Off Highway Trucks                     417          0.490           8.0
     1    Rubber Tired Loaders                   165          0.465           8.0
     2    Scrapers                               313          0.660           8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '08
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '08
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                                Horsepower    Load Factor     Hours/Day
     1    Other Equipment                        190          0.620           8.0
     1    Rough Terrain Forklifts                 94          0.475           8.0
     1    Tractor/Loaders/Backhoes                79          0.465           8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '09
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 7.9
  Off-Road Equipment
  No.     Type                                Horsepower    Load Factor     Hours/Day
     1    Pavers                                 132          0.590           8.0
     1    Paving Equipment                       111          0.530           8.0
     1    Rollers                                114          0.430           8.0
     1    Scrapers                               313          0.660           8.0
     1    Surfacing Equipment                    437          0.490           8.0
```

```
Changes made to the default values for Land Use Trip Percentages


Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 2 mitigation measure Soil Disturbance: Apply soil stabilizers to inactive areas
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Replace ground cover in disturbed areas quickly
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Water exposed surfaces - 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Stockpiles: Cover all stock piles with tarps
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Water all haul roads 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
     has been changed from off to on.
```

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                URBEMIS 2002 For Windows    7.4.2

File Name:                      I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase IIIurb.urb
Project Name:                   Sierra Meadows - Phase 7, 8 and 9
Project Location:               San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                       DETAIL REPORT
                        (Tons/Year)

Construction Start Month and Year: June, 2008
Construction Duration: 12
Total Land Use Area to be Developed: 29.27 acres
Maximum Acreage Disturbed Per Day: 4.5 acres
Single Family Units: 100 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (tons/year)
                                                                       PM10     PM10        PM10
    Source                       ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
 *** 2008***
Phase 1 - Demolition Emissions
Fugitive Dust                      -         -         -         -      0.00         -      0.00
Off-Road Diesel                 0.00      0.00      0.00         -      0.00      0.00      0.00
On-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Total tons/year               0.00      0.00      0.00      0.00      0.00      0.00      0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                      -         -         -         -      3.00         -      3.00
Off-Road Diesel                 1.38      8.64     11.82         -      0.30      0.30      0.00
On-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                    0.00      0.00      0.29      0.00      0.00      0.00      0.00
  Total tons/year               1.38      8.64     12.11      0.00     12.90      0.30      3.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel      0.04      0.27      0.30         -      0.01      0.01      0.00
Bldg Const Worker Trips         0.00      0.00      0.06      0.00      0.00      0.00      0.00
Arch Coatings Off-Gas           0.00         -         -         -         -         -         -
Arch Coatings Worker Trips      0.00      0.00      0.00      0.00      0.00      0.00      0.00
Asphalt Off-Gas                 0.00         -         -         -         -         -         -
Asphalt Off-Road Diesel         0.00      0.00      0.00         -      0.00      0.00      0.00
Asphalt On-Road Diesel          0.00      0.00      0.00      0.00      0.00      0.00      0.00
Asphalt Worker Trips            0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Total tons/year               0.04      0.27      0.36      0.00      0.08      0.01      0.00

  Total all phases tons/yr      1.42      8.91     12.47      0.00     12.98      0.31      3.00


 *** 2009***
Phase 1 - Demolition Emissions
Fugitive Dust                      -         -         -         -      0.00         -      0.00
Off-Road Diesel                 0.00      0.00      0.00         -      0.00      0.00      0.00
On-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Total tons/year               0.00      0.00      0.00      0.00      0.00      0.00      0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                      -         -         -         -      0.00         -      0.00
Off-Road Diesel                 0.00      0.00      0.00         -      0.00      0.00      0.00
On-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Total tons/year               0.00      0.00      0.00      0.00      0.00      0.00      0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel      0.12      0.78      0.93         -      0.03      0.03      0.00
Bldg Const Worker Trips         0.00      0.00      0.15      0.00      0.00      0.00      0.00
Arch Coatings Off-Gas           0.00         -         -         -         -         -         -
Arch Coatings Worker Trips      0.00      0.00      0.00      0.00      0.00      0.00      0.00
Asphalt Off-Gas                 0.02         -         -         -         -         -         -
Asphalt Off-Road Diesel         0.24      1.50      1.94         -      0.06      0.06      0.00
Asphalt On-Road Diesel          0.00      0.04      0.00      0.00      0.00      0.00      0.00
Asphalt Worker Trips            0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Total tons/year               0.38      2.32      3.02      0.00      0.42      0.09      0.00

  Total all phases tons/yr      0.38      2.32      3.02      0.00      0.42      0.09      0.00
```

```
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '08
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                                Horsepower    Load Factor     Hours/Day
     2    Graders                                174           0.575           8.0
     1    Off Highway Tractors                   255           0.410           8.0
     2    Off Highway Trucks                     417           0.490           8.0
     1    Rubber Tired Loaders                   165           0.465           8.0
     2    Scrapers                               313           0.660           8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '08
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '08
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                                Horsepower    Load Factor     Hours/Day
    1     Other Equipment                        190           0.620           8.0
    1     Rough Terrain Forklifts                 94           0.475           8.0
    1     Tractor/Loaders/Backhoes                79           0.465           8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '09
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 7.9
  Off-Road Equipment
  No.     Type                                Horsepower    Load Factor     Hours/Day
    1     Pavers                                 132           0.590           8.0
    1     Paving Equipment                       111           0.530           8.0
    1     Rollers                                114           0.430           8.0
    1     Scrapers                               313           0.660           8.0
    1     Surfacing Equipment                    437           0.490           8.0

CONSTRUCTION EMISSION ESTIMATES MITIGATED (tons/year)
                                                                          PM10      PM10        PM10
    Source                       ROG        NOx        CO         SO2     TOTAL    EXHAUST      DUST
 *** 2008***
Phase 1 - Demolition Emissions
Fugitive Dust                     -          -          -          -       0.00       -         0.00
Off-Road Diesel                 0.00       0.00       0.00         -       0.00      0.00       0.00
On-Road Diesel                  0.00       0.00       0.00       0.00      0.00      0.00       0.00
Worker Trips                    0.00       0.00       0.00       0.00      0.00      0.00       0.00
  Total tons/year               0.00       0.00       0.00       0.00      0.00      0.00       0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                     -          -          -          -       0.62       -         0.62
Off-Road Diesel                 1.38       8.64      11.82         -       0.30      0.30       0.00
On-Road Diesel                  0.00       0.00       0.00       0.00      0.00      0.00       0.00
Worker Trips                    0.00       0.00       0.29       0.00      0.00      0.00       0.00
  Total tons/year               1.38       8.64      12.11       0.00      3.38      0.30       0.62

Phase 3 - Building Construction
Bldg Const Off-Road Diesel      0.04       0.27       0.30         -       0.01      0.01       0.00
Bldg Const Worker Trips         0.00       0.00       0.06       0.00      0.00      0.00       0.00
Arch Coatings Off-Gas           0.00         -          -          -         -         -          -
Arch Coatings Worker Trips      0.00       0.00       0.00       0.00      0.00      0.00       0.00
Asphalt Off-Gas                 0.00         -          -          -         -         -          -
Asphalt Off-Road Diesel         0.00       0.00       0.00         -       0.00      0.00       0.00
Asphalt On-Road Diesel          0.00       0.00       0.00       0.00      0.00      0.00       0.00
Asphalt Worker Trips            0.00       0.00       0.00       0.00      0.00      0.00       0.00
  Total tons/year               0.04       0.27       0.36       0.00      0.08      0.01       0.00

  Total all phases tons/yr      1.42       8.91      12.47       0.00      3.46      0.31       0.62


 *** 2009***
Phase 1 - Demolition Emissions
Fugitive Dust                     -          -          -          -       0.00       -         0.00
Off-Road Diesel                 0.00       0.00       0.00         -       0.00      0.00       0.00
On-Road Diesel                  0.00       0.00       0.00       0.00      0.00      0.00       0.00
Worker Trips                    0.00       0.00       0.00       0.00      0.00      0.00       0.00
  Total tons/year               0.00       0.00       0.00       0.00      0.00      0.00       0.00

Phase 2 - Site Grading Emissions
```

```
Fugitive Dust                      -         -         -         -       0.00        -       0.00
Off-Road Diesel                  0.00      0.00      0.00        -       0.00      0.00      0.00
On-Road Diesel                   0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                     0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Total tons/year                0.00      0.00      0.00      0.00      0.00      0.00      0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel       0.12      0.78      0.93        -       0.03      0.03      0.00
Bldg Const Worker Trips          0.00      0.00      0.15      0.00      0.00      0.00      0.00
Arch Coatings Off-Gas            0.00        -         -         -         -         -         -
Arch Coatings Worker Trips       0.00      0.00      0.00      0.00      0.00      0.00      0.00
Asphalt Off-Gas                  0.02        -         -         -         -         -         -
Asphalt Off-Road Diesel          0.24      1.50      1.94        -       0.06      0.06      0.00
Asphalt On-Road Diesel           0.00      0.04      0.00      0.00      0.00      0.00      0.00
Asphalt Worker Trips             0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Total tons/year                0.38      2.32      3.02      0.00      0.42      0.09      0.00

  Total all phases tons/yr       0.38      2.32      3.02      0.00      0.42      0.09      0.00


Construction-Related Mitigation Measures

 Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
 Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
 Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 34.0%)
 Phase 2: Stockpiles: Cover all stock piles with tarps
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
 Phase 2: Unpaved Roads: Water all haul roads 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 3.0%)
 Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '08
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.      Type                               Horsepower    Load Factor     Hours/Day
     2     Graders                               174           0.575           8.0
     1     Off Highway Tractors                  255           0.410           8.0
     2     Off Highway Trucks                    417           0.490           8.0
     1     Rubber Tired Loaders                  165           0.465           8.0
     2     Scrapers                              313           0.660           8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '08
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '08
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.      Type                               Horsepower    Load Factor     Hours/Day
     1     Other Equipment                       190           0.620           8.0
     1     Rough Terrain Forklifts                94           0.475           8.0
     1     Tractor/Loaders/Backhoes               79           0.465           8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '09
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 7.9
  Off-Road Equipment
  No.      Type                               Horsepower    Load Factor     Hours/Day
     1     Pavers                                132           0.590           8.0
     1     Paving Equipment                      111           0.530           8.0
     1     Rollers                               114           0.430           8.0
     1     Scrapers                              313           0.660           8.0
     1     Surfacing Equipment                   437           0.490           8.0
```

```
Changes made to the default values for Land Use Trip Percentages


Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 2 mitigation measure Soil Disturbance: Apply soil stabilizers to inactive areas
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Replace ground cover in disturbed areas quickly
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Water exposed surfaces - 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Stockpiles: Cover all stock piles with tarps
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Water all haul roads 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
     has been changed from off to on.
```

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               URBEMIS 2002 For Windows    7.4.2

File Name:                      I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase IV.urb
Project Name:                   Sierra Meadows - Phase 11 and 12
Project Location:               San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                       SUMMARY REPORT
                    (Pounds/Day - Summer)

CONSTRUCTION EMISSION ESTIMATES
                                                                            PM10      PM10      PM10
 *** 2009 ***                        ROG       NOx        CO       SO2     TOTAL    EXHAUST     DUST
 TOTALS (lbs/day,unmitigated)      19.59    117.98    168.12      0.00     38.99       3.98    35.01
 TOTALS (lbs/day, mitigated)       19.59    117.98    168.12      0.00     11.23       3.98     7.25

                                                                            PM10      PM10      PM10
 *** 2010 ***                        ROG       NOx        CO       SO2     TOTAL    EXHAUST     DUST
 TOTALS (lbs/day,unmitigated)      10.96     66.78     89.96      0.00      2.41      2.36      0.05
 TOTALS (lbs/day, mitigated)       10.96     66.78     89.96      0.00      2.41      2.36      0.05
```

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               URBEMIS 2002 For Windows   7.4.2

File Name:                      I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase IV.urb
Project Name:                   Sierra Meadows - Phase 11 and 12
Project Location:               San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                        SUMMARY REPORT
                     (Pounds/Day - Winter)

CONSTRUCTION EMISSION ESTIMATES
                                                                                PM10      PM10      PM10
 *** 2009 ***                        ROG       NOx        CO       SO2       TOTAL   EXHAUST      DUST
 TOTALS (lbs/day,unmitigated)      19.59    117.98    168.12      0.00       38.99      3.98     35.01
 TOTALS (lbs/day, mitigated)       19.59    117.98    168.12      0.00       11.23      3.98      7.25

                                                                                PM10      PM10      PM10
 *** 2010 ***                        ROG       NOx        CO       SO2       TOTAL   EXHAUST      DUST
 TOTALS (lbs/day,unmitigated)      10.96     66.78     89.96      0.00        2.41      2.36      0.05
 TOTALS (lbs/day, mitigated)       10.96     66.78     89.96      0.00        2.41      2.36      0.05
```

```
               URBEMIS 2002 For Windows   7.4.2

File Name:                      I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase IV.urb
Project Name:                   Sierra Meadows - Phase 11 and 12
Project Location:               San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                       SUMMARY REPORT
                         (Tons/Year)

CONSTRUCTION EMISSION ESTIMATES
                                                                        PM10      PM10      PM10
 *** 2009 ***                     ROG       NOx        CO       SO2     TOTAL    EXHAUST    DUST
 TOTALS (tpy, unmitigated)        1.30      8.06     11.43      0.00     9.92      0.25     2.28
 TOTALS (tpy, mitigated)          1.30      8.06     11.43      0.00     2.68      0.25     0.47

                                                                        PM10      PM10      PM10
 *** 2010 ***                     ROG       NOx        CO       SO2     TOTAL    EXHAUST    DUST
 TOTALS (tpy, unmitigated)        0.36      2.23      2.98      0.00     0.42      0.09     0.00
 TOTALS (tpy, mitigated)          0.36      2.23      2.98      0.00     0.42      0.09     0.00
```

```
                URBEMIS 2002 For Windows    7.4.2

File Name:                        I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase IV.urb
Project Name:                     Sierra Meadows - Phase 11 and 12
Project Location:                 San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                          DETAIL REPORT
                       (Pounds/Day - Winter)

Construction Start Month and Year: June, 2009
Construction Duration: 12
Total Land Use Area to be Developed: 15.04 acres
Maximum Acreage Disturbed Per Day: 3.5 acres
Single Family Units: 43 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)
                                                                         PM10     PM10        PM10
    Source                        ROG       NOx       CO        SO2      TOTAL    EXHAUST     DUST
 *** 2009***
Phase 1 - Demolition Emissions
Fugitive Dust                       -         -         -         -       0.00       -        0.00
Off-Road Diesel                   0.00      0.00      0.00        -       0.00      0.00      0.00
On-Road Diesel                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                      0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Maximum lbs/day                 0.00      0.00      0.00      0.00      0.00      0.00      0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                       -         -         -         -      35.00       -       35.00
Off-Road Diesel                  19.44    117.76    164.22        -       3.97      3.97      0.00
On-Road Diesel                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                      0.15      0.22      3.90      0.00      0.02      0.01      0.01
  Maximum lbs/day                19.59    117.98    168.12      0.00     38.99      3.98     35.01

Phase 3 - Building Construction
Bldg Const Off-Road Diesel        3.51     23.30     28.34        -       0.92      0.92      0.00
Bldg Const Worker Trips           0.16      0.10      2.08      0.00      0.05      0.00      0.05
Arch Coatings Off-Gas             0.00        -         -         -         -         -         -
Arch Coatings Worker Trips        0.00      0.00      0.00      0.00      0.00      0.00      0.00
Asphalt Off-Gas                   0.00        -         -         -         -         -         -
Asphalt Off-Road Diesel           0.00      0.00      0.00        -       0.00      0.00      0.00
Asphalt On-Road Diesel            0.00      0.00      0.00      0.00      0.00      0.00      0.00
Asphalt Worker Trips              0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Maximum lbs/day                 3.67     23.40     30.42      0.00      0.97      0.92      0.05

  Max lbs/day all phases         19.59    117.98    168.12      0.00     38.99      3.98     35.01


 *** 2010***
Phase 1 - Demolition Emissions
Fugitive Dust                       -         -         -         -       0.00       -        0.00
Off-Road Diesel                   0.00      0.00      0.00        -       0.00      0.00      0.00
On-Road Diesel                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                      0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Maximum lbs/day                 0.00      0.00      0.00      0.00      0.00      0.00      0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                       -         -         -         -       0.00       -        0.00
Off-Road Diesel                   0.00      0.00      0.00        -       0.00      0.00      0.00
On-Road Diesel                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                      0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Maximum lbs/day                 0.00      0.00      0.00      0.00      0.00      0.00      0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel        3.51     22.29     29.07        -       0.83      0.83      0.00
Bldg Const Worker Trips           0.14      0.09      1.91      0.00      0.05      0.00      0.05
Arch Coatings Off-Gas             0.00        -         -         -         -         -         -
Arch Coatings Worker Trips        0.00      0.00      0.00      0.00      0.00      0.00      0.00
Asphalt Off-Gas                   0.20        -         -         -         -         -         -
Asphalt Off-Road Diesel          10.69     66.05     89.49        -       2.34      2.34      0.00
Asphalt On-Road Diesel            0.05      0.72      0.17      0.00      0.02      0.02      0.00
Asphalt Worker Trips              0.02      0.01      0.30      0.00      0.01      0.00      0.01
  Maximum lbs/day                10.96     66.78     89.96      0.00      2.41      2.36      0.05

  Max lbs/day all phases         10.96     66.78     89.96      0.00      2.41      2.36      0.05
```

```
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '09
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                          Horsepower    Load Factor    Hours/Day
     1    Graders                          174           0.575          8.0
     1    Off Highway Tractors             255           0.410          8.0
     2    Off Highway Trucks               417           0.490          8.0
     1    Rubber Tired Loaders             165           0.465          8.0
     2    Scrapers                         313           0.660          8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '09
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '09
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                          Horsepower    Load Factor    Hours/Day
     1    Other Equipment                  190           0.620          8.0
     1    Rough Terrain Forklifts           94           0.475          8.0
     1    Tractor/Loaders/Backhoes          79           0.465          8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '10
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 3.4
  Off-Road Equipment
  No.     Type                          Horsepower    Load Factor    Hours/Day
     1    Pavers                           132           0.590          8.0
     1    Paving Equipment                 111           0.530          8.0
     1    Rollers                          114           0.430          8.0
     1    Scrapers                         313           0.660          8.0
     1    Surfacing Equipment              437           0.490          8.0

CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)
                                                                    PM10      PM10        PM10
    Source                      ROG       NOx        CO       SO2    TOTAL   EXHAUST       DUST
 *** 2009***
Phase 1 - Demolition Emissions
Fugitive Dust                     -         -         -         -     0.00         -       0.00
Off-Road Diesel                0.00      0.00      0.00         -     0.00      0.00       0.00
On-Road Diesel                 0.00      0.00      0.00      0.00     0.00      0.00       0.00
Worker Trips                   0.00      0.00      0.00      0.00     0.00      0.00       0.00
  Maximum lbs/day              0.00      0.00      0.00      0.00     0.00      0.00       0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                     -         -         -         -     7.24         -       7.24
Off-Road Diesel               19.44    117.76    164.22         -     3.97      3.97       0.00
On-Road Diesel                 0.00      0.00      0.00      0.00     0.00      0.00       0.00
Worker Trips                   0.15      0.22      3.90      0.00     0.02      0.01       0.01
  Maximum lbs/day             19.59    117.98    168.12      0.00    11.23      3.98       7.25

Phase 3 - Building Construction
Bldg Const Off-Road Diesel     3.51     23.30     28.34         -     0.92      0.92       0.00
Bldg Const Worker Trips        0.16      0.10      2.08      0.00     0.05      0.00       0.05
Arch Coatings Off-Gas          0.00         -         -         -        -         -          -
Arch Coatings Worker Trips     0.00      0.00      0.00      0.00     0.00      0.00       0.00
Asphalt Off-Gas                0.00         -         -         -        -         -          -
Asphalt Off-Road Diesel        0.00      0.00      0.00         -     0.00      0.00       0.00
Asphalt On-Road Diesel         0.00      0.00      0.00      0.00     0.00      0.00       0.00
Asphalt Worker Trips           0.00      0.00      0.00      0.00     0.00      0.00       0.00
  Maximum lbs/day              3.67     23.40     30.42      0.00     0.97      0.92       0.05

  Max lbs/day all phases      19.59    117.98    168.12      0.00    11.23      3.98       7.25


 *** 2010***
Phase 1 - Demolition Emissions
Fugitive Dust                     -         -         -         -     0.00         -       0.00
Off-Road Diesel                0.00      0.00      0.00         -     0.00      0.00       0.00
On-Road Diesel                 0.00      0.00      0.00      0.00     0.00      0.00       0.00
Worker Trips                   0.00      0.00      0.00      0.00     0.00      0.00       0.00
  Maximum lbs/day              0.00      0.00      0.00      0.00     0.00      0.00       0.00

Phase 2 - Site Grading Emissions
```

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Fugitive Dust                      -          -          -          -       0.00          -       0.00
Off-Road Diesel                 0.00       0.00       0.00          -       0.00       0.00       0.00
On-Road Diesel                  0.00       0.00       0.00       0.00       0.00       0.00       0.00
Worker Trips                    0.00       0.00       0.00       0.00       0.00       0.00       0.00
  Maximum lbs/day               0.00       0.00       0.00       0.00       0.00       0.00       0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel      3.51      22.29      29.07          -       0.83       0.83       0.00
Bldg Const Worker Trips         0.14       0.09       1.91       0.00       0.05       0.00       0.05
Arch Coatings Off-Gas           0.00          -          -          -          -          -          -
Arch Coatings Worker Trips      0.00       0.00       0.00       0.00       0.00       0.00       0.00
Asphalt Off-Gas                 0.20          -          -          -          -          -          -
Asphalt Off-Road Diesel        10.69      66.05      89.49          -       2.34       2.34       0.00
Asphalt On-Road Diesel          0.05       0.72       0.17       0.00       0.02       0.02       0.00
Asphalt Worker Trips            0.02       0.01       0.30       0.00       0.01       0.00       0.01
  Maximum lbs/day              10.96      66.78      89.96       0.00       2.41       2.36       0.05

  Max lbs/day all phases       10.96      66.78      89.96       0.00       2.41       2.36       0.05


Construction-Related Mitigation Measures

 Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
 Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
 Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 34.0%)
 Phase 2: Stockpiles: Cover all stock piles with tarps
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
 Phase 2: Unpaved Roads: Water all haul roads 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 3.0%)
 Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '09
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                                Horsepower     Load Factor      Hours/Day
     1    Graders                                 174           0.575            8.0
     1    Off Highway Tractors                    255           0.410            8.0
     2    Off Highway Trucks                      417           0.490            8.0
     1    Rubber Tired Loaders                    165           0.465            8.0
     2    Scrapers                                313           0.660            8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '09
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '09
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                                Horsepower     Load Factor      Hours/Day
     1    Other Equipment                         190           0.620            8.0
     1    Rough Terrain Forklifts                  94           0.475            8.0
     1    Tractor/Loaders/Backhoes                 79           0.465            8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '10
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 3.4
  Off-Road Equipment
  No.     Type                                Horsepower     Load Factor      Hours/Day
     1    Pavers                                  132           0.590            8.0
     1    Paving Equipment                        111           0.530            8.0
     1    Rollers                                 114           0.430            8.0
     1    Scrapers                                313           0.660            8.0
     1    Surfacing Equipment                     437           0.490            8.0
```

```
Changes made to the default values for Land Use Trip Percentages


Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 2 mitigation measure Soil Disturbance: Apply soil stabilizers to inactive areas
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Replace ground cover in disturbed areas quickly
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Water exposed surfaces - 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Stockpiles: Cover all stock piles with tarps
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Water all haul roads 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
     has been changed from off to on.
```

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               URBEMIS 2002 For Windows    7.4.2

File Name:                        I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase IV.urb
Project Name:                     Sierra Meadows - Phase 11 and 12
Project Location:                 San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                         DETAIL REPORT
                      (Pounds/Day - Summer)

Construction Start Month and Year: June, 2009
Construction Duration: 12
Total Land Use Area to be Developed: 15.04 acres
Maximum Acreage Disturbed Per Day: 3.5 acres
Single Family Units: 43 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)
                                                                         PM10      PM10        PM10
    Source                        ROG        NOx         CO        SO2   TOTAL   EXHAUST       DUST
 *** 2009***
Phase 1 - Demolition Emissions
Fugitive Dust                       -          -          -          -    0.00         -       0.00
Off-Road Diesel                  0.00       0.00       0.00          -    0.00      0.00       0.00
On-Road Diesel                   0.00       0.00       0.00       0.00    0.00      0.00       0.00
Worker Trips                     0.00       0.00       0.00       0.00    0.00      0.00       0.00
  Maximum lbs/day                0.00       0.00       0.00       0.00    0.00      0.00       0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                       -          -          -          -   35.00         -      35.00
Off-Road Diesel                 19.44     117.76     164.22          -    3.97      3.97       0.00
On-Road Diesel                   0.00       0.00       0.00       0.00    0.00      0.00       0.00
Worker Trips                     0.15       0.22       3.90       0.00    0.02      0.01       0.01
  Maximum lbs/day               19.59     117.98     168.12       0.00   38.99      3.98      35.01

Phase 3 - Building Construction
Bldg Const Off-Road Diesel       3.51      23.30      28.34          -    0.92      0.92       0.00
Bldg Const Worker Trips          0.16       0.10       2.08       0.00    0.05      0.00       0.05
Arch Coatings Off-Gas            0.00          -          -          -       -         -          -
Arch Coatings Worker Trips       0.00       0.00       0.00       0.00    0.00      0.00       0.00
Asphalt Off-Gas                  0.00          -          -          -       -         -          -
Asphalt Off-Road Diesel          0.00       0.00       0.00          -    0.00      0.00       0.00
Asphalt On-Road Diesel           0.00       0.00       0.00       0.00    0.00      0.00       0.00
Asphalt Worker Trips             0.00       0.00       0.00       0.00    0.00      0.00       0.00
  Maximum lbs/day                3.67      23.40      30.42       0.00    0.97      0.92       0.05

  Max lbs/day all phases        19.59     117.98     168.12       0.00   38.99      3.98      35.01


 *** 2010***
Phase 1 - Demolition Emissions
Fugitive Dust                       -          -          -          -    0.00         -       0.00
Off-Road Diesel                  0.00       0.00       0.00          -    0.00      0.00       0.00
On-Road Diesel                   0.00       0.00       0.00       0.00    0.00      0.00       0.00
Worker Trips                     0.00       0.00       0.00       0.00    0.00      0.00       0.00
  Maximum lbs/day                0.00       0.00       0.00       0.00    0.00      0.00       0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                       -          -          -          -    0.00         -       0.00
Off-Road Diesel                  0.00       0.00       0.00          -    0.00      0.00       0.00
On-Road Diesel                   0.00       0.00       0.00       0.00    0.00      0.00       0.00
Worker Trips                     0.00       0.00       0.00       0.00    0.00      0.00       0.00
  Maximum lbs/day                0.00       0.00       0.00       0.00    0.00      0.00       0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel       3.51      22.29      29.07          -    0.83      0.83       0.00
Bldg Const Worker Trips          0.14       0.09       1.91       0.00    0.05      0.00       0.05
Arch Coatings Off-Gas            0.00          -          -          -       -         -          -
Arch Coatings Worker Trips       0.00       0.00       0.00       0.00    0.00      0.00       0.00
Asphalt Off-Gas                  0.20          -          -          -       -         -          -
Asphalt Off-Road Diesel         10.69      66.05      89.49          -    2.34      2.34       0.00
Asphalt On-Road Diesel           0.05       0.72       0.17       0.00    0.02      0.02       0.00
Asphalt Worker Trips             0.02       0.01       0.30       0.00    0.01      0.00       0.01
  Maximum lbs/day               10.96      66.78      89.96       0.00    2.41      2.36       0.05

  Max lbs/day all phases        10.96      66.78      89.96       0.00    2.41      2.36       0.05
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Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '09
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                            Horsepower    Load Factor     Hours/Day
     1    Graders                            174           0.575           8.0
     1    Off Highway Tractors               255           0.410           8.0
     2    Off Highway Trucks                 417           0.490           8.0
     1    Rubber Tired Loaders               165           0.465           8.0
     2    Scrapers                           313           0.660           8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '09
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '09
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                            Horsepower    Load Factor     Hours/Day
     1    Other Equipment                    190           0.620           8.0
     1    Rough Terrain Forklifts             94           0.475           8.0
     1    Tractor/Loaders/Backhoes            79           0.465           8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '10
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 3.4
  Off-Road Equipment
  No.     Type                            Horsepower    Load Factor     Hours/Day
     1    Pavers                             132           0.590           8.0
     1    Paving Equipment                   111           0.530           8.0
     1    Rollers                            114           0.430           8.0
     1    Scrapers                           313           0.660           8.0
     1    Surfacing Equipment                437           0.490           8.0


CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)
                                                                    PM10      PM10        PM10
    Source                     ROG        NOx        CO       SO2    TOTAL   EXHAUST      DUST
 *** 2009***
Phase 1 - Demolition Emissions
Fugitive Dust                    -          -         -         -     0.00        -        0.00
Off-Road Diesel               0.00       0.00      0.00         -     0.00      0.00       0.00
On-Road Diesel                0.00       0.00      0.00      0.00     0.00      0.00       0.00
Worker Trips                  0.00       0.00      0.00      0.00     0.00      0.00       0.00
  Maximum lbs/day             0.00       0.00      0.00      0.00     0.00      0.00       0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                    -          -         -         -     7.24        -        7.24
Off-Road Diesel              19.44     117.76    164.22         -     3.97      3.97       0.00
On-Road Diesel                0.00       0.00      0.00      0.00     0.00      0.00       0.00
Worker Trips                  0.15       0.22      3.90      0.00     0.02      0.01       0.01
  Maximum lbs/day            19.59     117.98    168.12      0.00    11.23      3.98       7.25

Phase 3 - Building Construction
Bldg Const Off-Road Diesel    3.51      23.30     28.34         -     0.92      0.92       0.00
Bldg Const Worker Trips       0.16       0.10      2.08      0.00     0.05      0.00       0.05
Arch Coatings Off-Gas         0.00          -         -         -        -        -           -
Arch Coatings Worker Trips    0.00       0.00      0.00      0.00     0.00      0.00       0.00
Asphalt Off-Gas               0.00          -         -         -        -        -           -
Asphalt Off-Road Diesel       0.00       0.00      0.00         -     0.00      0.00       0.00
Asphalt On-Road Diesel        0.00       0.00      0.00      0.00     0.00      0.00       0.00
Asphalt Worker Trips          0.00       0.00      0.00      0.00     0.00      0.00       0.00
  Maximum lbs/day             3.67      23.40     30.42      0.00     0.97      0.92       0.05

  Max lbs/day all phases     19.59     117.98    168.12      0.00    11.23      3.98       7.25


 *** 2010***
Phase 1 - Demolition Emissions
Fugitive Dust                    -          -         -         -     0.00        -        0.00
Off-Road Diesel               0.00       0.00      0.00         -     0.00      0.00       0.00
On-Road Diesel                0.00       0.00      0.00      0.00     0.00      0.00       0.00
Worker Trips                  0.00       0.00      0.00      0.00     0.00      0.00       0.00
  Maximum lbs/day             0.00       0.00      0.00      0.00     0.00      0.00       0.00

Phase 2 - Site Grading Emissions
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Fugitive Dust                    -         -         -         -        0.00        -        0.00
Off-Road Diesel                0.00      0.00      0.00        -        0.00      0.00      0.00
On-Road Diesel                 0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                   0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Maximum lbs/day              0.00      0.00      0.00      0.00      0.00      0.00      0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel     3.51     22.29     29.07        -        0.83      0.83      0.00
Bldg Const Worker Trips        0.14      0.09      1.91      0.00      0.05      0.00      0.05
Arch Coatings Off-Gas          0.00        -         -         -         -         -         -
Arch Coatings Worker Trips     0.00      0.00      0.00      0.00      0.00      0.00      0.00
Asphalt Off-Gas                0.20        -         -         -         -         -         -
Asphalt Off-Road Diesel       10.69     66.05     89.49        -        2.34      2.34      0.00
Asphalt On-Road Diesel         0.05      0.72      0.17      0.00      0.02      0.02      0.00
Asphalt Worker Trips           0.02      0.01      0.30      0.00      0.01      0.00      0.01
  Maximum lbs/day             10.96     66.78     89.96      0.00      2.41      2.36      0.05

  Max lbs/day all phases      10.96     66.78     89.96      0.00      2.41      2.36      0.05


Construction-Related Mitigation Measures

 Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
 Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
 Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 34.0%)
 Phase 2: Stockpiles: Cover all stock piles with tarps
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
 Phase 2: Unpaved Roads: Water all haul roads 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 3.0%)
 Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '09
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.    Type                           Horsepower    Load Factor     Hours/Day
     1   Graders                           174          0.575            8.0
     1   Off Highway Tractors              255          0.410            8.0
     2   Off Highway Trucks                417          0.490            8.0
     1   Rubber Tired Loaders              165          0.465            8.0
     2   Scrapers                          313          0.660            8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '09
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '09
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.    Type                           Horsepower    Load Factor     Hours/Day
     1   Other Equipment                   190          0.620            8.0
     1   Rough Terrain Forklifts            94          0.475            8.0
     1   Tractor/Loaders/Backhoes           79          0.465            8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '10
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 3.4
  Off-Road Equipment
  No.    Type                           Horsepower    Load Factor     Hours/Day
     1   Pavers                            132          0.590            8.0
     1   Paving Equipment                  111          0.530            8.0
     1   Rollers                           114          0.430            8.0
     1   Scrapers                          313          0.660            8.0
     1   Surfacing Equipment               437          0.490            8.0
```

```
Changes made to the default values for Land Use Trip Percentages


Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 2 mitigation measure Soil Disturbance: Apply soil stabilizers to inactive areas
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Replace ground cover in disturbed areas quickly
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Water exposed surfaces - 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Stockpiles: Cover all stock piles with tarps
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Water all haul roads 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
     has been changed from off to on.
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                URBEMIS 2002 For Windows    7.4.2

File Name:                    I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase IV.urb
Project Name:                 Sierra Meadows - Phase 11 and 12
Project Location:             San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                       DETAIL REPORT
                        (Tons/Year)

Construction Start Month and Year: June, 2009
Construction Duration: 12
Total Land Use Area to be Developed: 15.04 acres
Maximum Acreage Disturbed Per Day: 3.5 acres
Single Family Units: 43 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (tons/year)
                                                                PM10     PM10        PM10
    Source                     ROG       NOx       CO       SO2     TOTAL   EXHAUST      DUST
 *** 2009***
Phase 1 - Demolition Emissions
Fugitive Dust                    -         -         -         -     0.00         -      0.00
Off-Road Diesel               0.00      0.00      0.00         -     0.00      0.00      0.00
On-Road Diesel                0.00      0.00      0.00      0.00     0.00      0.00      0.00
Worker Trips                  0.00      0.00      0.00      0.00     0.00      0.00      0.00
  Total tons/year             0.00      0.00      0.00      0.00     0.00      0.00      0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                    -         -         -         -     2.28         -      2.28
Off-Road Diesel               1.26      7.80     10.86         -     0.24      0.24      0.00
On-Road Diesel                0.00      0.00      0.00      0.00     0.00      0.00      0.00
Worker Trips                  0.00      0.00      0.24      0.00     0.00      0.00      0.00
  Total tons/year             1.26      7.80     11.10      0.00     9.84      0.24      2.28

Phase 3 - Building Construction
Bldg Const Off-Road Diesel    0.04      0.26      0.31         -     0.01      0.01      0.00
Bldg Const Worker Trips       0.00      0.00      0.02      0.00     0.00      0.00      0.00
Arch Coatings Off-Gas         0.00         -         -         -        -         -         -
Arch Coatings Worker Trips    0.00      0.00      0.00      0.00     0.00      0.00      0.00
Asphalt Off-Gas               0.00         -         -         -        -         -         -
Asphalt Off-Road Diesel       0.00      0.00      0.00         -     0.00      0.00      0.00
Asphalt On-Road Diesel        0.00      0.00      0.00      0.00     0.00      0.00      0.00
Asphalt Worker Trips          0.00      0.00      0.00      0.00     0.00      0.00      0.00
  Total tons/year             0.04      0.26      0.33      0.00     0.08      0.01      0.00

  Total all phases tons/yr    1.30      8.06     11.43      0.00     9.92      0.25      2.28


 *** 2010***
Phase 1 - Demolition Emissions
Fugitive Dust                    -         -         -         -     0.00         -      0.00
Off-Road Diesel               0.00      0.00      0.00         -     0.00      0.00      0.00
On-Road Diesel                0.00      0.00      0.00      0.00     0.00      0.00      0.00
Worker Trips                  0.00      0.00      0.00      0.00     0.00      0.00      0.00
  Total tons/year             0.00      0.00      0.00      0.00     0.00      0.00      0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                    -         -         -         -     0.00         -      0.00
Off-Road Diesel               0.00      0.00      0.00         -     0.00      0.00      0.00
On-Road Diesel                0.00      0.00      0.00      0.00     0.00      0.00      0.00
Worker Trips                  0.00      0.00      0.00      0.00     0.00      0.00      0.00
  Total tons/year             0.00      0.00      0.00      0.00     0.00      0.00      0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel    0.12      0.75      0.96         -     0.03      0.03      0.00
Bldg Const Worker Trips       0.00      0.00      0.06      0.00     0.00      0.00      0.00
Arch Coatings Off-Gas         0.00         -         -         -        -         -         -
Arch Coatings Worker Trips    0.00      0.00      0.00      0.00     0.00      0.00      0.00
Asphalt Off-Gas               0.00         -         -         -        -         -         -
Asphalt Off-Road Diesel       0.24      1.46      1.96         -     0.06      0.06      0.00
Asphalt On-Road Diesel        0.00      0.02      0.00      0.00     0.00      0.00      0.00
Asphalt Worker Trips          0.00      0.00      0.00      0.00     0.00      0.00      0.00
  Total tons/year             0.36      2.23      2.98      0.00     0.42      0.09      0.00

  Total all phases tons/yr    0.36      2.23      2.98      0.00     0.42      0.09      0.00
```

```
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '09
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                                Horsepower     Load Factor     Hours/Day
     1    Graders                                174           0.575           8.0
     1    Off Highway Tractors                   255           0.410           8.0
     2    Off Highway Trucks                     417           0.490           8.0
     1    Rubber Tired Loaders                   165           0.465           8.0
     2    Scrapers                               313           0.660           8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '09
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '09
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                                Horsepower     Load Factor     Hours/Day
     1    Other Equipment                        190           0.620           8.0
     1    Rough Terrain Forklifts                 94           0.475           8.0
     1    Tractor/Loaders/Backhoes                79           0.465           8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '10
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 3.4
  Off-Road Equipment
  No.     Type                                Horsepower     Load Factor     Hours/Day
     1    Pavers                                 132           0.590           8.0
     1    Paving Equipment                       111           0.530           8.0
     1    Rollers                                114           0.430           8.0
     1    Scrapers                               313           0.660           8.0
     1    Surfacing Equipment                    437           0.490           8.0


CONSTRUCTION EMISSION ESTIMATES MITIGATED (tons/year)
                                                                       PM10      PM10          PM10
    Source                         ROG        NOx         CO        SO2     TOTAL   EXHAUST          DUST
 *** 2009***
Phase 1 - Demolition Emissions
Fugitive Dust                        -          -          -          -       0.00         -         0.00
Off-Road Diesel                    0.00       0.00       0.00         -       0.00       0.00        0.00
On-Road Diesel                     0.00       0.00       0.00       0.00      0.00       0.00        0.00
Worker Trips                       0.00       0.00       0.00       0.00      0.00       0.00        0.00
  Total tons/year                  0.00       0.00       0.00       0.00      0.00       0.00        0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                        -          -          -          -       0.47         -         0.47
Off-Road Diesel                    1.26       7.80      10.86         -       0.24       0.24        0.00
On-Road Diesel                     0.00       0.00       0.00       0.00      0.00       0.00        0.00
Worker Trips                       0.00       0.00       0.24       0.00      0.00       0.00        0.00
  Total tons/year                  1.26       7.80      11.10       0.00      2.60       0.24        0.47

Phase 3 - Building Construction
Bldg Const Off-Road Diesel         0.04       0.26       0.31         -       0.01       0.01        0.00
Bldg Const Worker Trips            0.00       0.00       0.02       0.00      0.00       0.00        0.00
Arch Coatings Off-Gas              0.00         -          -          -         -          -           -
Arch Coatings Worker Trips         0.00       0.00       0.00       0.00      0.00       0.00        0.00
Asphalt Off-Gas                    0.00         -          -          -         -          -           -
Asphalt Off-Road Diesel            0.00       0.00       0.00         -       0.00       0.00        0.00
Asphalt On-Road Diesel             0.00       0.00       0.00       0.00      0.00       0.00        0.00
Asphalt Worker Trips               0.00       0.00       0.00       0.00      0.00       0.00        0.00
  Total tons/year                  0.04       0.26       0.33       0.00      0.08       0.01        0.00

  Total all phases tons/yr         1.30       8.06      11.43       0.00      2.68       0.25        0.47


 *** 2010***
Phase 1 - Demolition Emissions
Fugitive Dust                        -          -          -          -       0.00         -         0.00
Off-Road Diesel                    0.00       0.00       0.00         -       0.00       0.00        0.00
On-Road Diesel                     0.00       0.00       0.00       0.00      0.00       0.00        0.00
Worker Trips                       0.00       0.00       0.00       0.00      0.00       0.00        0.00
  Total tons/year                  0.00       0.00       0.00       0.00      0.00       0.00        0.00

Phase 2 - Site Grading Emissions
```

```
Fugitive Dust                      -         -         -         -      0.00         -      0.00
Off-Road Diesel                 0.00      0.00      0.00         -      0.00      0.00      0.00
On-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Total tons/year               0.00      0.00      0.00      0.00      0.00      0.00      0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel      0.12      0.75      0.96         -      0.03      0.03      0.00
Bldg Const Worker Trips         0.00      0.00      0.06      0.00      0.00      0.00      0.00
Arch Coatings Off-Gas           0.00         -         -         -         -         -         -
Arch Coatings Worker Trips      0.00      0.00      0.00      0.00      0.00      0.00      0.00
Asphalt Off-Gas                 0.00         -         -         -         -         -         -
Asphalt Off-Road Diesel         0.24      1.46      1.96         -      0.06      0.06      0.00
Asphalt On-Road Diesel          0.00      0.02      0.00      0.00      0.00      0.00      0.00
Asphalt Worker Trips            0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Total tons/year               0.36      2.23      2.98      0.00      0.42      0.09      0.00

  Total all phases tons/yr      0.36      2.23      2.98      0.00      0.42      0.09      0.00


Construction-Related Mitigation Measures

 Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
 Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
 Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 34.0%)
 Phase 2: Stockpiles: Cover all stock piles with tarps
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
 Phase 2: Unpaved Roads: Water all haul roads 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 3.0%)
 Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '09
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                                 Horsepower    Load Factor     Hours/Day
     1    Graders                                 174          0.575            8.0
     1    Off Highway Tractors                    255          0.410            8.0
     2    Off Highway Trucks                      417          0.490            8.0
     1    Rubber Tired Loaders                    165          0.465            8.0
     2    Scrapers                                313          0.660            8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '09
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '09
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                                 Horsepower    Load Factor     Hours/Day
     1    Other Equipment                         190          0.620            8.0
     1    Rough Terrain Forklifts                  94          0.475            8.0
     1    Tractor/Loaders/Backhoes                 79          0.465            8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '10
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 3.4
  Off-Road Equipment
  No.     Type                                 Horsepower    Load Factor     Hours/Day
     1    Pavers                                  132          0.590            8.0
     1    Paving Equipment                        111          0.530            8.0
     1    Rollers                                 114          0.430            8.0
     1    Scrapers                                313          0.660            8.0
     1    Surfacing Equipment                     437          0.490            8.0
```

```
Changes made to the default values for Land Use Trip Percentages


Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 2 mitigation measure Soil Disturbance: Apply soil stabilizers to inactive areas
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Replace ground cover in disturbed areas quickly
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Water exposed surfaces - 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Stockpiles: Cover all stock piles with tarps
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Water all haul roads 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
     has been changed from off to on.
```

```
                URBEMIS 2002 For Windows   7.4.2

File Name:                     I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase V.urb
Project Name:                  Sierra Meadows - Phase 5 and 10
Project Location:              San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                        SUMMARY REPORT
                    (Pounds/Day - Summer)

CONSTRUCTION EMISSION ESTIMATES
                                                                                PM10      PM10      PM10
 *** 2010 ***                        ROG       NOx        CO       SO2       TOTAL   EXHAUST      DUST
 TOTALS (lbs/day,unmitigated)      19.57    115.56    168.27      0.00       38.61      3.60     35.01
 TOTALS (lbs/day, mitigated)       19.57    115.56    168.27      0.00       10.85      3.60      7.25

                                                                                PM10      PM10      PM10
 *** 2011 ***                        ROG       NOx        CO       SO2       TOTAL   EXHAUST      DUST
 TOTALS (lbs/day,unmitigated)      10.93     66.70     89.94      0.00        2.39      2.35      0.04
 TOTALS (lbs/day, mitigated)       10.93     66.70     89.94      0.00        2.39      2.35      0.04
```

```
                URBEMIS 2002 For Windows   7.4.2

File Name:                       I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase V.urb
Project Name:                    Sierra Meadows - Phase 5 and 10
Project Location:                San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                        SUMMARY REPORT
                     (Pounds/Day - Winter)

CONSTRUCTION EMISSION ESTIMATES
                                                                              PM10       PM10       PM10
 *** 2010 ***                         ROG        NOx         CO        SO2   TOTAL    EXHAUST       DUST
 TOTALS (lbs/day,unmitigated)        19.57     115.56     168.27       0.00   38.61       3.60      35.01
 TOTALS (lbs/day, mitigated)         19.57     115.56     168.27       0.00   10.85       3.60       7.25

                                                                              PM10       PM10       PM10
 *** 2011 ***                         ROG        NOx         CO        SO2   TOTAL    EXHAUST       DUST
 TOTALS (lbs/day,unmitigated)        10.93      66.70      89.94       0.00    2.39       2.35       0.04
 TOTALS (lbs/day, mitigated)         10.93      66.70      89.94       0.00    2.39       2.35       0.04
```

```
                URBEMIS 2002 For Windows   7.4.2

File Name:                      I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase V.urb
Project Name:                   Sierra Meadows - Phase 5 and 10
Project Location:               San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                        SUMMARY REPORT
                          (Tons/Year)

CONSTRUCTION EMISSION ESTIMATES
                                                                        PM10      PM10      PM10
 *** 2010 ***                    ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
 TOTALS (tpy, unmitigated)      1.30      7.87     11.43      0.00      9.92      0.25      2.28
 TOTALS (tpy, mitigated)        1.30      7.87     11.43      0.00      2.68      0.25      0.47

                                                                        PM10      PM10      PM10
 *** 2011 ***                    ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
 TOTALS (tpy, unmitigated)      0.36      2.23      2.98      0.00      0.42      0.09      0.00
 TOTALS (tpy, mitigated)        0.36      2.23      2.98      0.00      0.42      0.09      0.00
```

```
                URBEMIS 2002 For Windows    7.4.2

File Name:                      I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase V.urb
Project Name:                   Sierra Meadows - Phase 5 and 10
Project Location:               San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                         DETAIL REPORT
                     (Pounds/Day - Winter)

Construction Start Month and Year: June, 2010
Construction Duration: 12
Total Land Use Area to be Developed: 12.9 acres
Maximum Acreage Disturbed Per Day: 3.5 acres
Single Family Units: 37 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)
                                                                      PM10     PM10       PM10
    Source                        ROG       NOx       CO       SO2    TOTAL    EXHAUST    DUST
 *** 2010***
Phase 1 - Demolition Emissions
Fugitive Dust                      -         -         -         -     0.00       -        0.00
Off-Road Diesel                  0.00      0.00      0.00        -     0.00     0.00       0.00
On-Road Diesel                   0.00      0.00      0.00      0.00    0.00     0.00       0.00
Worker Trips                     0.00      0.00      0.00      0.00    0.00     0.00       0.00
  Maximum lbs/day                0.00      0.00      0.00      0.00    0.00     0.00       0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                      -         -         -         -    35.00       -       35.00
Off-Road Diesel                 19.44    115.36    164.71        -     3.59     3.59       0.00
On-Road Diesel                   0.00      0.00      0.00      0.00    0.00     0.00       0.00
Worker Trips                     0.13      0.20      3.56      0.00    0.02     0.01       0.01
  Maximum lbs/day               19.57    115.56    168.27      0.00   38.61     3.60      35.01

Phase 3 - Building Construction
Bldg Const Off-Road Diesel       3.51     22.29     29.07        -     0.83     0.83       0.00
Bldg Const Worker Trips          0.12      0.08      1.65      0.00    0.04     0.00       0.04
Arch Coatings Off-Gas            0.00        -         -         -       -        -          -
Arch Coatings Worker Trips       0.00      0.00      0.00      0.00    0.00     0.00       0.00
Asphalt Off-Gas                  0.00        -         -         -       -        -          -
Asphalt Off-Road Diesel          0.00      0.00      0.00        -     0.00     0.00       0.00
Asphalt On-Road Diesel           0.00      0.00      0.00      0.00    0.00     0.00       0.00
Asphalt Worker Trips             0.00      0.00      0.00      0.00    0.00     0.00       0.00
  Maximum lbs/day                3.63     22.37     30.72      0.00    0.88     0.84       0.04

  Max lbs/day all phases        19.57    115.56    168.27      0.00   38.61     3.60      35.01


 *** 2011***
Phase 1 - Demolition Emissions
Fugitive Dust                      -         -         -         -     0.00       -        0.00
Off-Road Diesel                  0.00      0.00      0.00        -     0.00     0.00       0.00
On-Road Diesel                   0.00      0.00      0.00      0.00    0.00     0.00       0.00
Worker Trips                     0.00      0.00      0.00      0.00    0.00     0.00       0.00
  Maximum lbs/day                0.00      0.00      0.00      0.00    0.00     0.00       0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                      -         -         -         -     0.00       -        0.00
Off-Road Diesel                  0.00      0.00      0.00        -     0.00     0.00       0.00
On-Road Diesel                   0.00      0.00      0.00      0.00    0.00     0.00       0.00
Worker Trips                     0.00      0.00      0.00      0.00    0.00     0.00       0.00
  Maximum lbs/day                0.00      0.00      0.00      0.00    0.00     0.00       0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel       3.51     22.29     29.07        -     0.83     0.83       0.00
Bldg Const Worker Trips          0.12      0.08      1.65      0.00    0.04     0.00       0.04
Arch Coatings Off-Gas            0.00        -         -         -       -        -          -
Arch Coatings Worker Trips       0.00      0.00      0.00      0.00    0.00     0.00       0.00
Asphalt Off-Gas                  0.18        -         -         -       -        -          -
Asphalt Off-Road Diesel         10.69     66.05     89.49        -     2.34     2.34       0.00
Asphalt On-Road Diesel           0.04      0.63      0.15      0.00    0.02     0.02       0.00
Asphalt Worker Trips             0.02      0.01      0.30      0.00    0.01     0.00       0.01
  Maximum lbs/day               10.93     66.70     89.94      0.00    2.39     2.35       0.04

  Max lbs/day all phases        10.93     66.70     89.94      0.00    2.39     2.35       0.04
```

```
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '10
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                                 Horsepower     Load Factor     Hours/Day
     1     Graders                                174           0.575           8.0
     1     Off Highway Tractors                   255           0.410           8.0
     2     Off Highway Trucks                     417           0.490           8.0
     1     Rubber Tired Loaders                   165           0.465           8.0
     2     Scrapers                               313           0.660           8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '10
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '10
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                                 Horsepower     Load Factor     Hours/Day
     1     Other Equipment                        190           0.620           8.0
     1     Rough Terrain Forklifts                 94           0.475           8.0
     1     Tractor/Loaders/Backhoes                79           0.465           8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '11
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 3.0
  Off-Road Equipment
  No.     Type                                 Horsepower     Load Factor     Hours/Day
     1     Pavers                                 132           0.590           8.0
     1     Paving Equipment                       111           0.530           8.0
     1     Rollers                                114           0.430           8.0
     1     Scrapers                               313           0.660           8.0
     1     Surfacing Equipment                    437           0.490           8.0

CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)
                                                                        PM10      PM10          PM10
    Source                       ROG        NOx         CO        SO2    TOTAL    EXHAUST        DUST
 *** 2010***
Phase 1 - Demolition Emissions
Fugitive Dust                      -          -          -          -     0.00         -         0.00
Off-Road Diesel                 0.00       0.00       0.00          -     0.00      0.00         0.00
On-Road Diesel                  0.00       0.00       0.00       0.00     0.00      0.00         0.00
Worker Trips                    0.00       0.00       0.00       0.00     0.00      0.00         0.00
  Maximum lbs/day               0.00       0.00       0.00       0.00     0.00      0.00         0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                      -          -          -          -     7.24         -         7.24
Off-Road Diesel                19.44     115.36     164.71          -     3.59      3.59         0.00
On-Road Diesel                  0.00       0.00       0.00       0.00     0.00      0.00         0.00
Worker Trips                    0.13       0.20       3.56       0.00     0.02      0.01         0.01
  Maximum lbs/day              19.57     115.56     168.27       0.00    10.85      3.60         7.25

Phase 3 - Building Construction
Bldg Const Off-Road Diesel      3.51      22.29      29.07          -     0.83      0.83         0.00
Bldg Const Worker Trips         0.12       0.08       1.65       0.00     0.04      0.00         0.04
Arch Coatings Off-Gas           0.00          -          -          -        -         -            -
Arch Coatings Worker Trips      0.00       0.00       0.00       0.00     0.00      0.00         0.00
Asphalt Off-Gas                 0.00          -          -          -        -         -            -
Asphalt Off-Road Diesel         0.00       0.00       0.00          -     0.00      0.00         0.00
Asphalt On-Road Diesel          0.00       0.00       0.00       0.00     0.00      0.00         0.00
Asphalt Worker Trips            0.00       0.00       0.00       0.00     0.00      0.00         0.00
  Maximum lbs/day               3.63      22.37      30.72       0.00     0.88      0.84         0.04

  Max lbs/day all phases       19.57     115.56     168.27       0.00    10.85      3.60         7.25


 *** 2011***
Phase 1 - Demolition Emissions
Fugitive Dust                      -          -          -          -     0.00         -         0.00
Off-Road Diesel                 0.00       0.00       0.00          -     0.00      0.00         0.00
On-Road Diesel                  0.00       0.00       0.00       0.00     0.00      0.00         0.00
Worker Trips                    0.00       0.00       0.00       0.00     0.00      0.00         0.00
  Maximum lbs/day               0.00       0.00       0.00       0.00     0.00      0.00         0.00

Phase 2 - Site Grading Emissions
```

```
Fugitive Dust                      -        -        -        -      0.00       -      0.00
Off-Road Diesel                 0.00     0.00     0.00        -      0.00     0.00     0.00
On-Road Diesel                  0.00     0.00     0.00     0.00      0.00     0.00     0.00
Worker Trips                    0.00     0.00     0.00     0.00      0.00     0.00     0.00
  Maximum lbs/day               0.00     0.00     0.00     0.00      0.00     0.00     0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel      3.51    22.29    29.07        -      0.83     0.83     0.00
Bldg Const Worker Trips         0.12     0.08     1.65     0.00      0.04     0.00     0.04
Arch Coatings Off-Gas           0.00        -        -        -         -        -        -
Arch Coatings Worker Trips      0.00     0.00     0.00     0.00      0.00     0.00     0.00
Asphalt Off-Gas                 0.18        -        -        -         -        -        -
Asphalt Off-Road Diesel        10.69    66.05    89.49        -      2.34     2.34     0.00
Asphalt On-Road Diesel          0.04     0.63     0.15     0.00      0.02     0.02     0.00
Asphalt Worker Trips            0.02     0.01     0.30     0.00      0.01     0.00     0.01
  Maximum lbs/day              10.93    66.70    89.94     0.00      2.39     2.35     0.04

  Max lbs/day all phases       10.93    66.70    89.94     0.00      2.39     2.35     0.04


Construction-Related Mitigation Measures

 Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
 Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
 Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 34.0%)
 Phase 2: Stockpiles: Cover all stock piles with tarps
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
 Phase 2: Unpaved Roads: Water all haul roads 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 3.0%)
 Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '10
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                                Horsepower     Load Factor     Hours/Day
     1    Graders                                174           0.575           8.0
     1    Off Highway Tractors                   255           0.410           8.0
     2    Off Highway Trucks                     417           0.490           8.0
     1    Rubber Tired Loaders                   165           0.465           8.0
     2    Scrapers                               313           0.660           8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '10
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '10
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                                Horsepower     Load Factor     Hours/Day
     1    Other Equipment                        190           0.620           8.0
     1    Rough Terrain Forklifts                 94           0.475           8.0
     1    Tractor/Loaders/Backhoes                79           0.465           8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '11
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 3.0
  Off-Road Equipment
  No.     Type                                Horsepower     Load Factor     Hours/Day
     1    Pavers                                 132           0.590           8.0
     1    Paving Equipment                       111           0.530           8.0
     1    Rollers                                114           0.430           8.0
     1    Scrapers                               313           0.660           8.0
     1    Surfacing Equipment                    437           0.490           8.0
```

```
Changes made to the default values for Land Use Trip Percentages


Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 2 mitigation measure Soil Disturbance: Apply soil stabilizers to inactive areas
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Replace ground cover in disturbed areas quickly
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Water exposed surfaces - 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Stockpiles: Cover all stock piles with tarps
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Water all haul roads 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
     has been changed from off to on.
```

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               URBEMIS 2002 For Windows    7.4.2

 File Name:                       I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase V.urb
 Project Name:                    Sierra Meadows - Phase 5 and 10
 Project Location:                San Joaquin Valley
 On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                      DETAIL REPORT
                   (Pounds/Day - Summer)

 Construction Start Month and Year: June, 2010
 Construction Duration: 12
 Total Land Use Area to be Developed: 12.9 acres
 Maximum Acreage Disturbed Per Day: 3.5 acres
 Single Family Units: 37 Multi-Family Units: 0
 Retail/Office/Institutional/Industrial Square Footage: 0

 CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)
                                                                    PM10      PM10        PM10
     Source                     ROG        NOx        CO       SO2      TOTAL   EXHAUST       DUST
  *** 2010***
 Phase 1 - Demolition Emissions
 Fugitive Dust                    -          -          -         -      0.00         -        0.00
 Off-Road Diesel               0.00       0.00       0.00         -      0.00      0.00        0.00
 On-Road Diesel                0.00       0.00       0.00      0.00      0.00      0.00        0.00
 Worker Trips                  0.00       0.00       0.00      0.00      0.00      0.00        0.00
   Maximum lbs/day             0.00       0.00       0.00      0.00      0.00      0.00        0.00

 Phase 2 - Site Grading Emissions
 Fugitive Dust                    -          -          -         -     35.00         -       35.00
 Off-Road Diesel              19.44     115.36     164.71         -      3.59      3.59        0.00
 On-Road Diesel                0.00       0.00       0.00      0.00      0.00      0.00        0.00
 Worker Trips                  0.13       0.20       3.56      0.00      0.02      0.01        0.01
   Maximum lbs/day            19.57     115.56     168.27      0.00     38.61      3.60       35.01

 Phase 3 - Building Construction
 Bldg Const Off-Road Diesel    3.51      22.29      29.07         -      0.83      0.83        0.00
 Bldg Const Worker Trips       0.12       0.08       1.65      0.00      0.04      0.00        0.04
 Arch Coatings Off-Gas         0.00          -          -         -         -         -           -
 Arch Coatings Worker Trips    0.00       0.00       0.00      0.00      0.00      0.00        0.00
 Asphalt Off-Gas               0.00          -          -         -         -         -           -
 Asphalt Off-Road Diesel       0.00       0.00       0.00         -      0.00      0.00        0.00
 Asphalt On-Road Diesel        0.00       0.00       0.00      0.00      0.00      0.00        0.00
 Asphalt Worker Trips          0.00       0.00       0.00      0.00      0.00      0.00        0.00
   Maximum lbs/day             3.63      22.37      30.72      0.00      0.88      0.84        0.04

   Max lbs/day all phases     19.57     115.56     168.27      0.00     38.61      3.60       35.01


  *** 2011***
 Phase 1 - Demolition Emissions
 Fugitive Dust                    -          -          -         -      0.00         -        0.00
 Off-Road Diesel               0.00       0.00       0.00         -      0.00      0.00        0.00
 On-Road Diesel                0.00       0.00       0.00      0.00      0.00      0.00        0.00
 Worker Trips                  0.00       0.00       0.00      0.00      0.00      0.00        0.00
   Maximum lbs/day             0.00       0.00       0.00      0.00      0.00      0.00        0.00

 Phase 2 - Site Grading Emissions
 Fugitive Dust                    -          -          -         -      0.00         -        0.00
 Off-Road Diesel               0.00       0.00       0.00         -      0.00      0.00        0.00
 On-Road Diesel                0.00       0.00       0.00      0.00      0.00      0.00        0.00
 Worker Trips                  0.00       0.00       0.00      0.00      0.00      0.00        0.00
   Maximum lbs/day             0.00       0.00       0.00      0.00      0.00      0.00        0.00

 Phase 3 - Building Construction
 Bldg Const Off-Road Diesel    3.51      22.29      29.07         -      0.83      0.83        0.00
 Bldg Const Worker Trips       0.12       0.08       1.65      0.00      0.04      0.00        0.04
 Arch Coatings Off-Gas         0.00          -          -         -         -         -           -
 Arch Coatings Worker Trips    0.00       0.00       0.00      0.00      0.00      0.00        0.00
 Asphalt Off-Gas               0.18          -          -         -         -         -           -
 Asphalt Off-Road Diesel      10.69      66.05      89.49         -      2.34      2.34        0.00
 Asphalt On-Road Diesel        0.04       0.63       0.15      0.00      0.02      0.02        0.00
 Asphalt Worker Trips          0.02       0.01       0.30      0.00      0.01      0.00        0.01
   Maximum lbs/day            10.93      66.70      89.94      0.00      2.39      2.35        0.04

   Max lbs/day all phases     10.93      66.70      89.94      0.00      2.39      2.35        0.04
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Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '10
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                                Horsepower     Load Factor      Hours/Day
     1     Graders                                174           0.575            8.0
     1     Off Highway Tractors                   255           0.410            8.0
     2     Off Highway Trucks                     417           0.490            8.0
     1     Rubber Tired Loaders                   165           0.465            8.0
     2     Scrapers                               313           0.660            8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '10
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '10
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                                Horsepower     Load Factor      Hours/Day
     1     Other Equipment                        190           0.620            8.0
     1     Rough Terrain Forklifts                 94           0.475            8.0
     1     Tractor/Loaders/Backhoes                79           0.465            8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '11
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 3.0
  Off-Road Equipment
  No.     Type                                Horsepower     Load Factor      Hours/Day
     1     Pavers                                 132           0.590            8.0
     1     Paving Equipment                       111           0.530            8.0
     1     Rollers                                114           0.430            8.0
     1     Scrapers                               313           0.660            8.0
     1     Surfacing Equipment                    437           0.490            8.0

CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)
                                                                            PM10      PM10        PM10
    Source                         ROG        NOx         CO         SO2    TOTAL    EXHAUST      DUST
 *** 2010***
Phase 1 - Demolition Emissions
Fugitive Dust                        -          -          -           -     0.00         -        0.00
Off-Road Diesel                   0.00       0.00       0.00           -     0.00      0.00        0.00
On-Road Diesel                    0.00       0.00       0.00        0.00     0.00      0.00        0.00
Worker Trips                      0.00       0.00       0.00        0.00     0.00      0.00        0.00
  Maximum lbs/day                 0.00       0.00       0.00        0.00     0.00      0.00        0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                        -          -          -           -     7.24         -        7.24
Off-Road Diesel                  19.44     115.36     164.71           -     3.59      3.59        0.00
On-Road Diesel                    0.00       0.00       0.00        0.00     0.00      0.00        0.00
Worker Trips                      0.13       0.20       3.56        0.00     0.02      0.01        0.01
  Maximum lbs/day                19.57     115.56     168.27        0.00    10.85      3.60        7.25

Phase 3 - Building Construction
Bldg Const Off-Road Diesel        3.51      22.29      29.07           -     0.83      0.83        0.00
Bldg Const Worker Trips           0.12       0.08       1.65        0.00     0.04      0.00        0.04
Arch Coatings Off-Gas             0.00          -          -           -        -         -           -
Arch Coatings Worker Trips        0.00       0.00       0.00        0.00     0.00      0.00        0.00
Asphalt Off-Gas                   0.00          -          -           -        -         -           -
Asphalt Off-Road Diesel           0.00       0.00       0.00           -     0.00      0.00        0.00
Asphalt On-Road Diesel            0.00       0.00       0.00        0.00     0.00      0.00        0.00
Asphalt Worker Trips              0.00       0.00       0.00        0.00     0.00      0.00        0.00
  Maximum lbs/day                 3.63      22.37      30.72        0.00     0.88      0.84        0.04

  Max lbs/day all phases         19.57     115.56     168.27        0.00    10.85      3.60        7.25


 *** 2011***
Phase 1 - Demolition Emissions
Fugitive Dust                        -          -          -           -     0.00         -        0.00
Off-Road Diesel                   0.00       0.00       0.00           -     0.00      0.00        0.00
On-Road Diesel                    0.00       0.00       0.00        0.00     0.00      0.00        0.00
Worker Trips                      0.00       0.00       0.00        0.00     0.00      0.00        0.00
  Maximum lbs/day                 0.00       0.00       0.00        0.00     0.00      0.00        0.00

Phase 2 - Site Grading Emissions
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Fugitive Dust                      -         -         -         -       0.00        -       0.00
Off-Road Diesel                  0.00      0.00      0.00        -       0.00      0.00      0.00
On-Road Diesel                   0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                     0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Maximum lbs/day                0.00      0.00      0.00      0.00      0.00      0.00      0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel       3.51     22.29     29.07        -       0.83      0.83      0.00
Bldg Const Worker Trips          0.12      0.08      1.65      0.00      0.04      0.00      0.04
Arch Coatings Off-Gas            0.00        -         -         -         -         -         -
Arch Coatings Worker Trips       0.00      0.00      0.00      0.00      0.00      0.00      0.00
Asphalt Off-Gas                  0.18        -         -         -         -         -         -
Asphalt Off-Road Diesel         10.69     66.05     89.49        -       2.34      2.34      0.00
Asphalt On-Road Diesel           0.04      0.63      0.15      0.00      0.02      0.02      0.00
Asphalt Worker Trips             0.02      0.01      0.30      0.00      0.01      0.00      0.01
  Maximum lbs/day               10.93     66.70     89.94      0.00      2.39      2.35      0.04

  Max lbs/day all phases        10.93     66.70     89.94      0.00      2.39      2.35      0.04


Construction-Related Mitigation Measures

 Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
 Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
 Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 34.0%)
 Phase 2: Stockpiles: Cover all stock piles with tarps
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
 Phase 2: Unpaved Roads: Water all haul roads 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 3.0%)
 Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '10
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
 No.      Type                                Horsepower    Load Factor     Hours/Day
    1     Graders                                174           0.575           8.0
    1     Off Highway Tractors                   255           0.410           8.0
    2     Off Highway Trucks                     417           0.490           8.0
    1     Rubber Tired Loaders                   165           0.465           8.0
    2     Scrapers                               313           0.660           8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '10
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '10
  SubPhase Building Duration: 4 months
  Off-Road Equipment
 No.      Type                                Horsepower    Load Factor     Hours/Day
    1     Other Equipment                        190           0.620           8.0
    1     Rough Terrain Forklifts                 94           0.475           8.0
    1     Tractor/Loaders/Backhoes                79           0.465           8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '11
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 3.0
  Off-Road Equipment
 No.      Type                                Horsepower    Load Factor     Hours/Day
    1     Pavers                                 132           0.590           8.0
    1     Paving Equipment                       111           0.530           8.0
    1     Rollers                                114           0.430           8.0
    1     Scrapers                               313           0.660           8.0
    1     Surfacing Equipment                    437           0.490           8.0
```

```
Changes made to the default values for Land Use Trip Percentages


Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 2 mitigation measure Soil Disturbance: Apply soil stabilizers to inactive areas
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Replace ground cover in disturbed areas quickly
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Water exposed surfaces - 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Stockpiles: Cover all stock piles with tarps
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Water all haul roads 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
     has been changed from off to on.
```

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               URBEMIS 2002 For Windows    7.4.2

 File Name:                        I:\pdata\00000100\10P\WPWIN\EddieT\URBEMIS\URBEMIS2002\Sierra Meadows Phase V.urb
 Project Name:                     Sierra Meadows - Phase 5 and 10
 Project Location:                 San Joaquin Valley
 On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                         DETAIL REPORT
                          (Tons/Year)

 Construction Start Month and Year: June, 2010
 Construction Duration: 12
 Total Land Use Area to be Developed: 12.9 acres
 Maximum Acreage Disturbed Per Day: 3.5 acres
 Single Family Units: 37 Multi-Family Units: 0
 Retail/Office/Institutional/Industrial Square Footage: 0

 CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (tons/year)
                                                                     PM10     PM10        PM10
    Source                      ROG       NOx       CO       SO2    TOTAL   EXHAUST       DUST
 *** 2010***
 Phase 1 - Demolition Emissions
 Fugitive Dust                    -         -        -         -     0.00        -        0.00
 Off-Road Diesel               0.00      0.00     0.00         -     0.00      0.00       0.00
 On-Road Diesel                0.00      0.00     0.00      0.00     0.00      0.00       0.00
 Worker Trips                  0.00      0.00     0.00      0.00     0.00      0.00       0.00
   Total tons/year             0.00      0.00     0.00      0.00     0.00      0.00       0.00

 Phase 2 - Site Grading Emissions
 Fugitive Dust                    -         -        -         -     2.28        -        2.28
 Off-Road Diesel               1.26      7.62    10.86         -     0.24      0.24       0.00
 On-Road Diesel                0.00      0.00     0.00      0.00     0.00      0.00       0.00
 Worker Trips                  0.00      0.00     0.23      0.00     0.00      0.00       0.00
   Total tons/year             1.26      7.62    11.09      0.00     9.84      0.24       2.28

 Phase 3 - Building Construction
 Bldg Const Off-Road Diesel    0.04      0.25     0.32         -     0.01      0.01       0.00
 Bldg Const Worker Trips       0.00      0.00     0.02      0.00     0.00      0.00       0.00
 Arch Coatings Off-Gas         0.00         -        -         -        -         -          -
 Arch Coatings Worker Trips    0.00      0.00     0.00      0.00     0.00      0.00       0.00
 Asphalt Off-Gas               0.00         -        -         -        -         -          -
 Asphalt Off-Road Diesel       0.00      0.00     0.00         -     0.00      0.00       0.00
 Asphalt On-Road Diesel        0.00      0.00     0.00      0.00     0.00      0.00       0.00
 Asphalt Worker Trips          0.00      0.00     0.00      0.00     0.00      0.00       0.00
   Total tons/year             0.04      0.25     0.34      0.00     0.08      0.01       0.00

   Total all phases tons/yr    1.30      7.87    11.43      0.00     9.92      0.25       2.28


 *** 2011***
 Phase 1 - Demolition Emissions
 Fugitive Dust                    -         -        -         -     0.00        -        0.00
 Off-Road Diesel               0.00      0.00     0.00         -     0.00      0.00       0.00
 On-Road Diesel                0.00      0.00     0.00      0.00     0.00      0.00       0.00
 Worker Trips                  0.00      0.00     0.00      0.00     0.00      0.00       0.00
   Total tons/year             0.00      0.00     0.00      0.00     0.00      0.00       0.00

 Phase 2 - Site Grading Emissions
 Fugitive Dust                    -         -        -         -     0.00        -        0.00
 Off-Road Diesel               0.00      0.00     0.00         -     0.00      0.00       0.00
 On-Road Diesel                0.00      0.00     0.00      0.00     0.00      0.00       0.00
 Worker Trips                  0.00      0.00     0.00      0.00     0.00      0.00       0.00
   Total tons/year             0.00      0.00     0.00      0.00     0.00      0.00       0.00

 Phase 3 - Building Construction
 Bldg Const Off-Road Diesel    0.12      0.75     0.96         -     0.03      0.03       0.00
 Bldg Const Worker Trips       0.00      0.00     0.06      0.00     0.00      0.00       0.00
 Arch Coatings Off-Gas         0.00         -        -         -        -         -          -
 Arch Coatings Worker Trips    0.00      0.00     0.00      0.00     0.00      0.00       0.00
 Asphalt Off-Gas               0.00         -        -         -        -         -          -
 Asphalt Off-Road Diesel       0.24      1.46     1.96         -     0.06      0.06       0.00
 Asphalt On-Road Diesel        0.00      0.02     0.00      0.00     0.00      0.00       0.00
 Asphalt Worker Trips          0.00      0.00     0.00      0.00     0.00      0.00       0.00
   Total tons/year             0.36      2.23     2.98      0.00     0.42      0.09       0.00

   Total all phases tons/yr    0.36      2.23     2.98      0.00     0.42      0.09       0.00
```

```
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '10
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                                Horsepower    Load Factor     Hours/Day
     1     Graders                                174          0.575          8.0
     1     Off Highway Tractors                   255          0.410          8.0
     2     Off Highway Trucks                     417          0.490          8.0
     1     Rubber Tired Loaders                   165          0.465          8.0
     2     Scrapers                               313          0.660          8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '10
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '10
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                                Horsepower    Load Factor     Hours/Day
     1     Other Equipment                        190          0.620          8.0
     1     Rough Terrain Forklifts                 94          0.475          8.0
     1     Tractor/Loaders/Backhoes                79          0.465          8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '11
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 3.0
  Off-Road Equipment
  No.     Type                                Horsepower    Load Factor     Hours/Day
     1     Pavers                                 132          0.590          8.0
     1     Paving Equipment                       111          0.530          8.0
     1     Rollers                                114          0.430          8.0
     1     Scrapers                               313          0.660          8.0
     1     Surfacing Equipment                    437          0.490          8.0

CONSTRUCTION EMISSION ESTIMATES MITIGATED (tons/year)
                                                                       PM10     PM10        PM10
    Source                        ROG       NOx       CO       SO2     TOTAL   EXHAUST      DUST
 *** 2010***
Phase 1 - Demolition Emissions
Fugitive Dust                      -         -         -         -      0.00       -        0.00
Off-Road Diesel                   0.00      0.00      0.00       -      0.00      0.00      0.00
On-Road Diesel                    0.00      0.00      0.00      0.00    0.00      0.00      0.00
Worker Trips                      0.00      0.00      0.00      0.00    0.00      0.00      0.00
  Total tons/year                 0.00      0.00      0.00      0.00    0.00      0.00      0.00

Phase 2 - Site Grading Emissions
Fugitive Dust                      -         -         -         -      0.47       -        0.47
Off-Road Diesel                   1.26      7.62     10.86       -      0.24      0.24      0.00
On-Road Diesel                    0.00      0.00      0.00      0.00    0.00      0.00      0.00
Worker Trips                      0.00      0.00      0.23      0.00    0.00      0.00      0.00
  Total tons/year                 1.26      7.62     11.09      0.00    2.60      0.24      0.47

Phase 3 - Building Construction
Bldg Const Off-Road Diesel        0.04      0.25      0.32       -      0.01      0.01      0.00
Bldg Const Worker Trips           0.00      0.00      0.02      0.00    0.00      0.00      0.00
Arch Coatings Off-Gas             0.00       -         -         -       -         -         -
Arch Coatings Worker Trips        0.00      0.00      0.00      0.00    0.00      0.00      0.00
Asphalt Off-Gas                   0.00       -         -         -       -         -         -
Asphalt Off-Road Diesel           0.00      0.00      0.00       -      0.00      0.00      0.00
Asphalt On-Road Diesel            0.00      0.00      0.00      0.00    0.00      0.00      0.00
Asphalt Worker Trips              0.00      0.00      0.00      0.00    0.00      0.00      0.00
  Total tons/year                 0.04      0.25      0.34      0.00    0.08      0.01      0.00

  Total all phases tons/yr        1.30      7.87     11.43      0.00    2.68      0.25      0.47


 *** 2011***
Phase 1 - Demolition Emissions
Fugitive Dust                      -         -         -         -      0.00       -        0.00
Off-Road Diesel                   0.00      0.00      0.00       -      0.00      0.00      0.00
On-Road Diesel                    0.00      0.00      0.00      0.00    0.00      0.00      0.00
Worker Trips                      0.00      0.00      0.00      0.00    0.00      0.00      0.00
  Total tons/year                 0.00      0.00      0.00      0.00    0.00      0.00      0.00

Phase 2 - Site Grading Emissions
```

```
Fugitive Dust                        -         -         -         -      0.00         -      0.00
Off-Road Diesel                 0.00      0.00      0.00         -      0.00      0.00      0.00
On-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
Worker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Total tons/year               0.00      0.00      0.00      0.00      0.00      0.00      0.00

Phase 3 - Building Construction
Bldg Const Off-Road Diesel      0.12      0.75      0.96         -      0.03      0.03      0.00
Bldg Const Worker Trips         0.00      0.00      0.06      0.00      0.00      0.00      0.00
Arch Coatings Off-Gas           0.00         -         -         -         -         -         -
Arch Coatings Worker Trips      0.00      0.00      0.00      0.00      0.00      0.00      0.00
Asphalt Off-Gas                 0.00         -         -         -         -         -         -
Asphalt Off-Road Diesel         0.24      1.46      1.96         -      0.06      0.06      0.00
Asphalt On-Road Diesel          0.00      0.02      0.00      0.00      0.00      0.00      0.00
Asphalt Worker Trips            0.00      0.00      0.00      0.00      0.00      0.00      0.00
  Total tons/year               0.36      2.23      2.98      0.00      0.42      0.09      0.00

  Total all phases tons/yr      0.36      2.23      2.98      0.00      0.42      0.09      0.00


Construction-Related Mitigation Measures

 Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
 Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
 Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 34.0%)
 Phase 2: Stockpiles: Cover all stock piles with tarps
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
 Phase 2: Unpaved Roads: Water all haul roads 2x daily
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 3.0%)
 Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
   Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)
Phase 1 - Demolition Assumptions:  Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '10
Phase 2 Duration: 6 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment
  No.     Type                               Horsepower    Load Factor     Hours/Day
     1    Graders                               174          0.575            8.0
     1    Off Highway Tractors                  255          0.410            8.0
     2    Off Highway Trucks                    417          0.490            8.0
     1    Rubber Tired Loaders                  165          0.465            8.0
     2    Scrapers                              313          0.660            8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '10
Phase 3 Duration: 6 months
  Start Month/Year for SubPhase Building: Dec '10
  SubPhase Building Duration: 4 months
  Off-Road Equipment
  No.     Type                               Horsepower    Load Factor     Hours/Day
     1    Other Equipment                       190          0.620            8.0
     1    Rough Terrain Forklifts                94          0.475            8.0
     1    Tractor/Loaders/Backhoes               79          0.465            8.0
  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: Apr '11
  SubPhase Asphalt Duration: 2 months
  Acres to be Paved: 3.0
  Off-Road Equipment
  No.     Type                               Horsepower    Load Factor     Hours/Day
     1    Pavers                                132          0.590            8.0
     1    Paving Equipment                      111          0.530            8.0
     1    Rollers                               114          0.430            8.0
     1    Scrapers                              313          0.660            8.0
     1    Surfacing Equipment                   437          0.490            8.0
```

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Changes made to the default values for Land Use Trip Percentages


Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 2 mitigation measure Soil Disturbance: Apply soil stabilizers to inactive areas
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Replace ground cover in disturbed areas quickly
     has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Water exposed surfaces - 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Stockpiles: Cover all stock piles with tarps
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Water all haul roads 2x daily
     has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
     has been changed from off to on.
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                   JUNE 1989 VERSION
                   PAGE   1

              JOB: Harmony_SR-49
              RUN: Hour 1            (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide

    I.  SITE VARIABLES

         U=    .5 M/S            Z0= 100. CM           ALT=      0. (M)
       BRG= WORST CASE           VD=   .0 CM/S
      CLAS=     7 (G)            VS=   .0 CM/S
      MIXH= 1000. M             AMB=  5.0 PPM
     SIGTH=    5. DEGREES      TEMP= -1.1 DEGREE (C)

   II.  LINK VARIABLES

        LINK      *  LINK COORDINATES (M)   *                  EF     H     W
     DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH    (G/MI)  (M)   (M)
   ---------------*-------------------------*---------------------------------
   A. Link A      *  6284  -181  6285  -247 *  AG    529    1.0     .0   9.8
   B. Link B      *  6285  -247  6285  -300 *  AG    507    2.1     .0   9.8
   C. Link C      *  6285  -300  6280  -453 *  AG    571    1.0     .0   9.8
   D. Link D      *  6297  -461  6299  -378 *  AG   1018    1.0     .0   9.8
   E. Link E      *  6299  -378  6298  -319 *  AG   1018    2.1     .0   9.8
   F. Link F      *  6298  -319  6298  -177 *  AG    919    1.0     .0   9.8
   G. Link G      *  6285  -266  6300  -315 *  AG     22    2.1     .0   9.8
   H. Link H      *  6300  -315  6462  -325 *  AG    129    1.0     .0   9.8
   I. Link I      *  6523  -314  6381  -311 *  AG     72    1.0     .0   9.8
   J. Link J      *  6381  -311  6298  -301 *  AG      8    2.1     .0   9.8
   K. Link K      *  6370  -310  6284  -326 *  AG     64    2.1     .0   9.8

   III.  RECEPTOR LOCATIONS

                 *    COORDINATES (M)
     RECEPTOR    *   X       Y       Z
   --------------*--------------------
   1. Recpt 1    *  6326    -281    1.7
   2. Recpt 2    *  6315    -340    1.7
   3. Recpt 3    *  6243    -327    1.7
   4. Recpt 4    *  6246    -277    1.7

  □□

          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                   JUNE 1989 VERSION
```

```
                    PAGE   2

                 JOB: Harmony_SR-49
                 RUN: Hour 1          (WORST CASE ANGLE)
           POLLUTANT: Carbon Monoxide

   IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

                *       * PRED  *                 CONC/LINK
                *  BRG  * CONC  *                   (PPM)
    RECEPTOR    * (DEG) * (PPM) *  A    B    C    D    E    F    G    H
  --------------*-------*-------*---------------------------------------
   1. Recpt 1   *  202. *   5.1 *  .0   .0   .0   .0   .0   .0   .0   .0
   2. Recpt 2   *  211. *   5.1 *  .0   .0   .0   .0   .1   .0   .0   .0
   3. Recpt 3   *   86. *   5.1 *  .0   .0   .0   .0   .0   .0   .0   .0
   4. Recpt 4   *  143. *   5.1 *  .0   .0   .0   .0   .0   .0   .0   .0


                *    CONC/LINK
                *      (PPM)
    RECEPTOR    *   I    J    K
   -------------*---------------
   1. Recpt 1   *   .0   .0   .0
   2. Recpt 2   *   .0   .0   .0
   3. Recpt 3   *   .0   .0   .0
   4. Recpt 4   *   .0   .0   .0

□□
```

```
Title    : San Joaquin Valley Air Basin Avg 2025 Winter Default Title
Version  : Emfac2002 V2.2 Sept 23 2002
Run Date : 06/22/04 17:19:12
Scen Year: 2025 -- Model Years: 1980 to 2025
Season   : Winter
Area     : San Joaquin Valley  AB
*************************************************************************************
*****
     Year:2025 -- Model Years 1980 to 2025 Inclusive --  Winter
     Emfac2002 Emission Factors: V2.2 Sept 23 2002

     San Joaquin Valley  A               Basin Average                    Basin
Average

                              Table   1:  Running Exhaust Emissions (grams/mile)


     Pollutant Name: Total Organic Gases       Temperature:  50F  Relative Humidity:
 0%

     Speed
      MPH       LDA       LDT       MDT       HDT       UBUS       MCY       ALL

       5       0.101     0.164     0.232     0.659     4.643     5.351     0.216
      35       0.017     0.030     0.047     0.198     0.767     2.187     0.050


     Pollutant Name: Carbon Monoxide           Temperature:  50F  Relative Humidity:
 0%

     Speed
      MPH       LDA       LDT       MDT       HDT       UBUS       MCY       ALL

       5       1.177     1.963     2.329     5.668    22.420    26.167     2.103
      35       0.687     1.101     1.170     1.182     4.239    17.021     0.986


     Pollutant Name: Oxides of Nitrogen        Temperature:  50F  Relative Humidity:
 0%

     Speed
      MPH       LDA       LDT       MDT       HDT       UBUS       MCY       ALL

       5       0.130     0.267     0.471     2.509    12.069     1.523     0.460
      35       0.073     0.144     0.280     1.460     6.495     1.401     0.263


     Pollutant Name: Carbon Dioxide            Temperature:  50F  Relative Humidity:
 0%

     Speed
      MPH       LDA       LDT       MDT       HDT       UBUS       MCY       ALL

       5     944.428  1188.452  1726.422  2078.734  2465.374   265.743  1200.385
      35     307.234   386.953   519.931  1802.091  1440.020   139.534   486.318


     Pollutant Name: Sulfur Dioxide            Temperature:  50F  Relative Humidity:
 0%
```

```
   Speed
    MPH        LDA       LDT       MDT       HDT       UBUS      MCY       ALL

     5        0.009     0.011     0.017     0.020     0.024     0.003     0.012
    35        0.003     0.004     0.005     0.017     0.014     0.002     0.005


   Pollutant Name: PM10                      Temperature:  50F  Relative Humidity:
0%

   Speed
    MPH        LDA       LDT       MDT       HDT       UBUS      MCY       ALL

     5        0.062     0.100     0.120     0.216     0.323     0.031     0.094
    35        0.010     0.016     0.020     0.070     0.075     0.014     0.019


   Pollutant Name: PM10  - Tire Wear         Temperature:  50F  Relative Humidity:
0%

   Speed
    MPH        LDA       LDT       MDT       HDT       UBUS      MCY       ALL

     5        0.008     0.008     0.009     0.028     0.010     0.004     0.010
    35        0.008     0.008     0.009     0.028     0.010     0.004     0.010


   Pollutant Name: PM10  - Break Wear        Temperature:  50F  Relative Humidity:
0%

   Speed
    MPH        LDA       LDT       MDT       HDT       UBUS      MCY       ALL

     5        0.013     0.013     0.013     0.013     0.013     0.013     0.013
    35        0.013     0.013     0.013     0.013     0.013     0.013     0.013


   Pollutant Name: Gasoline - mi/gal         Temperature:  50F  Relative Humidity:
0%

   Speed
    MPH        LDA       LDT       MDT       HDT       UBUS      MCY       ALL

     5        9.358     7.423     5.007     3.496     3.390    26.192     8.195
    35       28.732    22.785    16.969    17.672    17.204    49.503    25.290


   Pollutant Name: Diesel - mi/gal           Temperature:  50F  Relative Humidity:
0%

   Speed
    MPH        LDA       LDT       MDT       HDT       UBUS      MCY       ALL

     5       28.736    29.039    19.729     5.146     4.173     0.000     6.433
    35       28.736    29.039    19.729     5.146     4.173     0.000     6.433
```

```
Title    : San Joaquin Valley Air Basin Avg 2025 Winter Default Title
Version  : Emfac2002 V2.2 Sept 23 2002
Run Date : 06/22/04 17:19:12
Scen Year: 2025 -- Model Years: 1980 to 2025
Season   : Winter
Area     : San Joaquin Valley  AB
****************************************************************************
*****
      Year:2025 -- Model Years 1980 to 2025 Inclusive --  Winter
      Emfac2002 Emission Factors: V2.2 Sept 23 2002

      San Joaquin Valley  A                Basin Average                 Basin
Average

                                Table   2:  Starting Emissions (grams/trip)


      Pollutant Name: Total Organic Gases       Temperature:  50F  Relative Humidity:
ALL

      Time
       min        LDA       LDT       MDT       HDT       UBUS      MCY       ALL

        5        0.019     0.028     0.077     0.110     0.428     1.278     0.043
       10        0.036     0.056     0.151     0.215     0.833     1.526     0.079
       20        0.070     0.107     0.292     0.407     1.580     2.007     0.149
       30        0.101     0.154     0.424     0.577     2.240     2.468     0.212
       40        0.129     0.197     0.546     0.725     2.813     2.911     0.269
       50        0.154     0.236     0.659     0.850     3.299     3.335     0.320
       60        0.176     0.270     0.761     0.953     3.698     3.637     0.365
      120        0.237     0.351     1.054     0.737     2.780     3.340     0.442
      180        0.148     0.225     0.797     0.782     2.950     2.726     0.326
      240        0.157     0.239     0.846     0.826     3.115     2.902     0.345
      300        0.165     0.252     0.895     0.868     3.274     3.074     0.364
      360        0.174     0.265     0.943     0.909     3.427     3.243     0.383
      420        0.183     0.278     0.991     0.948     3.576     3.409     0.402
      480        0.191     0.291     1.038     0.986     3.718     3.571     0.420
      540        0.199     0.303     1.085     1.022     3.856     3.730     0.438
      600        0.207     0.315     1.131     1.057     3.988     3.886     0.456
      660        0.215     0.327     1.177     1.091     4.115     4.039     0.473
      720        0.223     0.339     1.222     1.123     4.236     4.188     0.490


      Pollutant Name: Carbon Monoxide           Temperature:  50F  Relative Humidity:
ALL

      Time
       min        LDA       LDT       MDT       HDT       UBUS      MCY       ALL

        5        0.262     0.411     0.947     2.210     5.623     3.965     0.575
       10        0.516     0.809     1.870     4.330    11.018     5.404     1.121
       20        1.002     1.569     3.641     8.301    21.123     8.129     2.159
       30        1.456     2.277     5.314    11.913    30.313    10.646     3.124
       40        1.881     2.936     6.889    15.165    38.590    12.955     4.016
       50        2.275     3.544     8.367    18.059    45.952    15.057     4.835
       60        2.638     4.102     9.746    20.593    52.401    16.952     5.581
      120        3.774     5.572    13.775    12.136    29.803    21.315     6.507
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  180        2.221      3.388      7.779     12.491     30.674     12.449      4.234
  240        2.380      3.616      8.404     12.857     31.574     13.692      4.502
  300        2.523      3.822      8.959     13.236     32.503     14.830      4.747
  360        2.649      4.006      9.443     13.625     33.460     15.862      4.967
  420        2.759      4.168      9.856     14.027     34.446     16.789      5.163
  480        2.853      4.308     10.200     14.440     35.461     17.611      5.335
  540        2.931      4.426     10.473     14.865     36.505     18.327      5.484
  600        2.992      4.522     10.675     15.302     37.577     18.938      5.608
  660        3.037      4.596     10.808     15.750     38.678     19.444      5.708
  720        3.066      4.648     10.870     16.210     39.808     19.844      5.784


      Pollutant Name: Oxides of Nitrogen        Temperature:  50F  Relative Humidity:
ALL

      Time
       min         LDA        LDT        MDT        HDT       UBUS        MCY        ALL

        5        0.061      0.107      0.817      0.287      1.174      0.180      0.201
       10        0.068      0.120      0.878      0.432      1.769      0.224      0.228
       20        0.080      0.143      0.987      0.687      2.814      0.301      0.276
       30        0.090      0.162      1.079      0.895      3.665      0.366      0.317
       40        0.098      0.178      1.154      1.055      4.323      0.416      0.349
       50        0.104      0.189      1.214      1.169      4.788      0.454      0.373
       60        0.108      0.197      1.256      1.235      5.059      0.478      0.388
      120        0.116      0.211      1.361      1.263      5.174      0.486      0.413
      180        0.124      0.225      1.384      1.258      5.155      0.486      0.425
      240        0.124      0.223      1.374      1.251      5.126      0.478      0.422
      300        0.122      0.221      1.357      1.242      5.087      0.468      0.417
      360        0.120      0.217      1.335      1.230      5.038      0.456      0.411
      420        0.118      0.213      1.306      1.215      4.979      0.442      0.403
      480        0.115      0.208      1.270      1.198      4.910      0.426      0.394
      540        0.112      0.202      1.229      1.179      4.830      0.407      0.383
      600        0.108      0.195      1.181      1.157      4.741      0.387      0.371
      660        0.103      0.188      1.127      1.133      4.642      0.365      0.357
      720        0.098      0.179      1.067      1.106      4.532      0.340      0.341


      Pollutant Name: Carbon Dioxide            Temperature:  50F  Relative Humidity:
ALL

      Time
       min         LDA        LDT        MDT        HDT       UBUS        MCY        ALL

        5       12.096     15.050     21.203      2.703      4.856     13.805     13.668
       10       13.647     17.052     24.335      5.391      9.686     16.022     15.685
       20       17.241     21.661     31.432     10.723     19.265     20.373     20.253
       30       21.490     27.079     39.640     15.994     28.736     24.613     25.534
       40       26.393     33.305     48.960     21.206     38.099     28.744     31.528
       50       31.951     40.339     59.390     26.358     47.355     32.764     38.235
       60       38.163     48.181     70.931     31.450     56.504     36.673     45.655
      120       88.357    110.964    160.815     53.492     96.103     54.258    103.410
      180      100.365    126.118    183.098     63.196    113.539     58.394    117.722
      240      112.337    141.211    205.219     72.328    129.945     62.287    131.929
      300      124.274    156.243    227.180     80.887    145.322     65.938    146.033
      360      136.177    171.214    248.979     88.874    159.671     69.346    160.033
      420      148.043    186.124    270.617     96.287    172.990     72.512    173.930
      480      159.875    200.973    292.093    103.128    185.280     75.435    187.722
      540      171.671    215.761    313.409    109.396    196.541     78.115    201.411
      600      183.432    230.488    334.563    115.091    206.773     80.553    214.995
      660      195.158    245.154    355.555    120.213    215.976     82.748    228.476
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   720     206.849  259.759  376.387  124.763  224.149   84.700  241.854


     Pollutant Name: Sulfur Dioxide          Temperature:  50F  Relative Humidity:
ALL

     Time
      min       LDA        LDT        MDT        HDT        UBUS        MCY        ALL

        5      0.000      0.000      0.000      0.000      0.000      0.000      0.000
       10      0.000      0.000      0.000      0.000      0.000      0.000      0.000
       20      0.000      0.000      0.000      0.000      0.001      0.000      0.000
       30      0.000      0.000      0.000      0.000      0.001      0.001      0.000
       40      0.000      0.000      0.001      0.000      0.001      0.001      0.000
       50      0.000      0.000      0.001      0.001      0.001      0.001      0.000
       60      0.000      0.001      0.001      0.001      0.002      0.001      0.001
      120      0.001      0.001      0.002      0.001      0.002      0.001      0.001
      180      0.001      0.001      0.002      0.001      0.002      0.001      0.001
      240      0.001      0.001      0.002      0.001      0.002      0.001      0.001
      300      0.001      0.002      0.002      0.001      0.002      0.001      0.001
      360      0.001      0.002      0.003      0.001      0.002      0.001      0.002
      420      0.001      0.002      0.003      0.001      0.002      0.001      0.002
      480      0.002      0.002      0.003      0.001      0.003      0.001      0.002
      540      0.002      0.002      0.003      0.001      0.003      0.001      0.002
      600      0.002      0.002      0.003      0.001      0.003      0.001      0.002
      660      0.002      0.002      0.004      0.001      0.003      0.001      0.002
      720      0.002      0.003      0.004      0.002      0.003      0.001      0.002


     Pollutant Name: PM10                    Temperature:  50F  Relative Humidity:
ALL

     Time
      min       LDA        LDT        MDT        HDT        UBUS        MCY        ALL

        5      0.001      0.001      0.001      0.000      0.001      0.007      0.001
       10      0.001      0.002      0.002      0.001      0.002      0.006      0.002
       20      0.002      0.004      0.004      0.001      0.003      0.005      0.003
       30      0.003      0.006      0.006      0.002      0.004      0.004      0.004
       40      0.004      0.007      0.008      0.003      0.006      0.004      0.006
       50      0.005      0.009      0.009      0.003      0.007      0.003      0.007
       60      0.006      0.010      0.011      0.004      0.008      0.003      0.008
      120      0.010      0.017      0.018      0.005      0.010      0.006      0.013
      180      0.012      0.019      0.020      0.005      0.011      0.009      0.015
      240      0.013      0.020      0.021      0.005      0.011      0.011      0.016
      300      0.014      0.022      0.023      0.005      0.011      0.013      0.017
      360      0.014      0.023      0.024      0.005      0.012      0.015      0.018
      420      0.015      0.024      0.025      0.006      0.012      0.016      0.019
      480      0.016      0.025      0.026      0.006      0.012      0.018      0.020
      540      0.016      0.026      0.027      0.006      0.013      0.019      0.020
      600      0.016      0.026      0.027      0.006      0.013      0.019      0.020
      660      0.016      0.026      0.028      0.006      0.013      0.020      0.021
      720      0.016      0.026      0.028      0.006      0.014      0.020      0.021
```

```
Version   : Emfac2002 V2.2 Sept 23 2002
Run Date : 06/22/04 17:19:12
Scen Year: 2025 -- Model Years: 1980 to 2025
Season    : Winter
Area      : San Joaquin Valley  AB
*************************************************************************************
*****
     Year:2025 -- Model Years 1980 to 2025 Inclusive --  Winter
     Emfac2002 Emission Factors: V2.2 Sept 23 2002

     San Joaquin Valley  A               Basin Average                    Basin
Average

                                      Table   4:  Hot Soak Emissions (grams/trip)


     Pollutant Name: Total Organic Gases       Temperature:  50F  Relative Humidity:
ALL

     Time
      min        LDA       LDT       MDT       HDT       UBUS      MCY       ALL

        5       0.009     0.015     0.011     0.003     0.035     0.046     0.011
       10       0.018     0.028     0.021     0.005     0.067     0.088     0.021
       20       0.033     0.053     0.041     0.011     0.119     0.165     0.040
       30       0.046     0.074     0.059     0.016     0.162     0.233     0.056
       40       0.053     0.084     0.068     0.018     0.180     0.265     0.064

Hot soak results are scaled to reflect zero emissions for trip lengths of less than
5 minutes (about 25% of in-use trips).




Title     : San Joaquin Valley Air Basin Avg 2025 Winter Default Title
Version   : Emfac2002 V2.2 Sept 23 2002
Run Date : 06/22/04 17:19:12
Scen Year: 2025 -- Model Years: 1980 to 2025
Season    : Winter
Area      : San Joaquin Valley  AB
*************************************************************************************
*****
     Year:2025 -- Model Years 1980 to 2025 Inclusive --  Winter
     Emfac2002 Emission Factors: V2.2 Sept 23 2002

     San Joaquin Valley  A               Basin Average                    Basin
Average

                                      Table  5a:  Partial Day Diurnal Loss Emissions
(grams/hour)

     Pollutant Name: Total Organic Gases       Temperature: ALL   Relative Humidity:
ALL

     Temp
     degF        LDA       LDT       MDT       HDT       UBUS      MCY       ALL

       50       0.000     0.000     0.000     0.000     0.000     0.000     0.000
```

```
Title    : San Joaquin Valley Air Basin Avg 2025 Winter Default Title
Version  : Emfac2002 V2.2 Sept 23 2002
Run Date : 06/22/04 17:19:12
Scen Year: 2025 -- Model Years: 1980 to 2025
Season   : Winter
Area     : San Joaquin Valley  AB
************************************************************************************
*****
     Year:2025 -- Model Years 1980 to 2025 Inclusive --  Winter
     Emfac2002 Emission Factors: V2.2 Sept 23 2002

     San Joaquin Valley  A                Basin Average                  Basin
Average

                              Table  5b:  Multi-Day Diurnal Loss Emissions
(grams/hour)

     Pollutant Name: Total Organic Gases       Temperature: ALL   Relative Humidity:
ALL

     Temp
     degF       LDA      LDT      MDT      HDT      UBUS     MCY      ALL

       50      0.000    0.000    0.000    0.000    0.000    0.000    0.000
```

```
Title    : San Joaquin Valley Air Basin Avg 2025 Winter Default Title
Version  : Emfac2002 V2.2 Sept 23 2002
Run Date : 06/22/04 17:19:12
Scen Year: 2025 -- Model Years: 1980 to 2025
Season   : Winter
Area     : San Joaquin Valley  AB
************************************************************************************
*****
     Year:2025 -- Model Years 1980 to 2025 Inclusive --  Winter
     Emfac2002 Emission Factors: V2.2 Sept 23 2002

     San Joaquin Valley  A                Basin Average                  Basin
Average

                              Table  6a:  Partial Day Resting Loss Emissions
(grams/hour)

     Pollutant Name: Total Organic Gases       Temperature: ALL   Relative Humidity:
ALL

     Temp
     degF       LDA      LDT      MDT      HDT      UBUS     MCY      ALL

       50      0.006    0.010    0.011    0.000    0.000    0.011    0.007
```

```
Title     : San Joaquin Valley Air Basin Avg 2025 Winter Default Title
Version   : Emfac2002 V2.2 Sept 23 2002
Run Date : 06/22/04 17:19:12
Scen Year: 2025 -- Model Years: 1980 to 2025
Season    : Winter
Area      : San Joaquin Valley  AB
************************************************************************************
*****
     Year:2025 -- Model Years 1980 to 2025 Inclusive --  Winter
     Emfac2002 Emission Factors: V2.2 Sept 23 2002

     San Joaquin Valley  A                Basin Average                    Basin
Average

                              Table  6b:  Multi-Day Resting Loss Emissions
(grams/hour)

     Pollutant Name: Total Organic Gases       Temperature: ALL   Relative Humidity:
ALL

     Temp
     degF      LDA       LDT       MDT       HDT       UBUS      MCY       ALL

       50      0.000     0.001     0.001     0.000     0.000     0.001     0.001
```

```
Title     : San Joaquin Valley Air Basin Avg 2025 Winter Default Title
Version   : Emfac2002 V2.2 Sept 23 2002
Run Date : 06/22/04 17:19:12
Scen Year: 2025 -- Model Years: 1980 to 2025
Season    : Winter
Area      : San Joaquin Valley  AB
************************************************************************************
*****
     Year:2025 -- Model Years 1980 to 2025 Inclusive --  Winter
     Emfac2002 Emission Factors: V2.2 Sept 23 2002

     San Joaquin Valley  A                Basin Average                    Basin
Average

                              Table   7:  Estimated Travel Fractions


     Pollutant Name:                                Temperature: ALL   Relative Humidity:
ALL


               LDA       LDT       MDT       HDT       UBUS      MCY       ALL

    %VMT       0.462     0.359     0.086     0.086     0.004     0.003     1.000
    %TRIP      0.438     0.342     0.139     0.076     0.001     0.004     1.000
    %VEH       0.475     0.376     0.085     0.048     0.001     0.015     1.000
```

```
Title    : San Joaquin Valley Air Basin Avg 2025 Winter Default Title
Version  : Emfac2002 V2.2 Sept 23 2002
Run Date : 06/22/04 17:19:12
Scen Year: 2025 -- Model Years: 1980 to 2025
Season   : Winter
Area     : San Joaquin Valley  AB
*************************************************************************************
*****
     Year:2025 -- Model Years 1980 to 2025 Inclusive --  Winter
     Emfac2002 Emission Factors: V2.2 Sept 23 2002

     San Joaquin Valley  A                Basin Average                    Basin
Average

                              Table   8:  Evaporative Running Loss Emissions
(grams/minute)

     Pollutant Name: Total Organic Gases       Temperature:  50F  Relative Humidity:
ALL

     Time
      min      LDA      LDT      MDT      HDT      UBUS      MCY      ALL

       1      0.009    0.256    0.347    0.181    0.996    0.005    0.145
       2      0.008    0.133    0.180    0.093    0.516    0.039    0.077
       3      0.008    0.095    0.127    0.064    0.358    0.059    0.056
       4      0.010    0.076    0.102    0.050    0.280    0.071    0.046
       5      0.011    0.066    0.087    0.042    0.233    0.080    0.041
      10      0.015    0.047    0.060    0.025    0.144    0.104    0.032
      15      0.017    0.043    0.054    0.020    0.118    0.118    0.031
      20      0.019    0.043    0.053    0.018    0.108    0.130    0.031
      25      0.020    0.044    0.054    0.017    0.104    0.141    0.032
      30      0.021    0.047    0.056    0.017    0.109    0.149    0.034
      35      0.023    0.049    0.058    0.017    0.114    0.157    0.036
      40      0.024    0.052    0.060    0.018    0.119    0.164    0.037
      45      0.025    0.054    0.062    0.018    0.123    0.171    0.039
      50      0.025    0.056    0.064    0.018    0.127    0.178    0.040
      55      0.026    0.058    0.066    0.018    0.131    0.184    0.041
      60      0.027    0.060    0.068    0.019    0.135    0.190    0.043
```

15.5 Noise Data

Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name: Sierra Meadows
Analyst: Eddie Torres
Roadway: State Route 49
Road Segment: North of County Road 628

Scenario: Future
Job #: 10-102469

PROJECT DATA

Centerline Dist to Barrier:	0
Barrier (0=wall, 1= berm):	0
Receiver Barrier Dist:	0
Centerline Dist. To Observer:	100
Barrier Near Lane CL Dist:	0
Barrier Far lane CL Dist:	0
Pad Elevation:	**0.5**
Road Elevation:	0
Observer Height (above grade):	**5.5**
Barrier Height:	0

Rt View: **90** Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	8

SITE DATA

Road Grade:	0
Average Daily Traffic:	7535
Peak Hour Traffic:	**753.5**
Vehicle Speed:	45
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

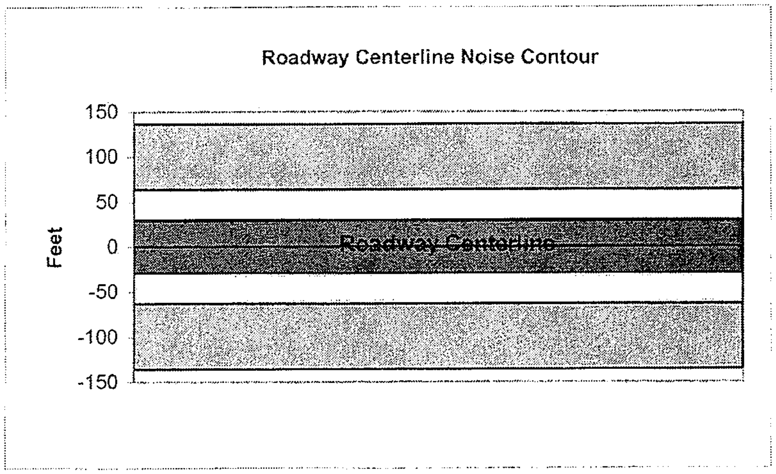
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	49.3	57.8	56.0	49.9	58.6	59.2
Medium Trucks:	57.5	55.3	48.9	47.3	55.8	56.1
Heavy Trucks:	62.1	51.4	42.4	43.6	53.1	53.3
Vehicle Noise:	**64.4**	**60.5**	**57.0**	**52.6**	**61.2**	**61.6**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-136	136
65 dBA	-63	63
70 dBA	-29	29
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Future
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	State Route 49		
Road Segment:	Between County Road 628 and County Road 621		

PROJECT DATA

Centerline Dist to Barrier:	0
Barrier (0=wall, 1= berm):	0
Receiver Barrier Dist:	0
Centerline Dist. To Observer:	100
Barrier Near Lane CL Dist:	0
Barrier Far lane CL Dist:	0
Pad Elevation:	**0.5**
Road Elevation:	0
Observer Height (above grade):	**5.5**
Barrier Height:	0
Rt View: **90** Lft View:	-90

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	8

SITE DATA

Road Grade:	0
Average Daily Traffic:	8535
Peak Hour Traffic:	**853.5**
Vehicle Speed:	45
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

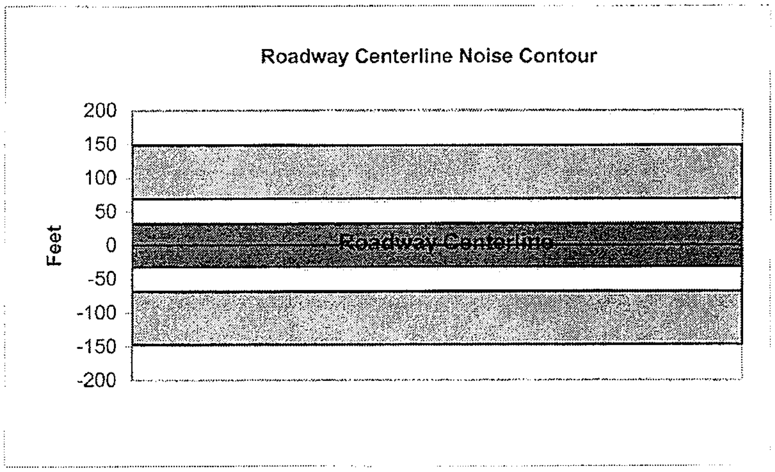
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	49.8	58.3	56.6	50.5	59.1	59.7
Medium Trucks:	58.1	55.8	49.4	47.9	56.4	56.6
Heavy Trucks:	62.6	52.0	42.9	44.1	53.7	53.8
Vehicle Noise:	**64.9**	**61.0**	**57.5**	**53.2**	**61.7**	**62.1**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-148	148
65 dBA	-69	69
70 dBA	-32	32
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Future
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	State Route 49		
Road Segment:	Between County Road 621 and Opah Drive		

PROJECT DATA

Centerline Dist to Barrier:	0
Barrier (0=wall, 1= berm):	0
Receiver Barrier Dist:	0
Centerline Dist. To Observer:	100
Barrier Near Lane CL Dist:	0
Barrier Far lane CL Dist:	0
Pad Elevation:	**0.5**
Road Elevation:	0
Observer Height (above grade):	**5.5**
Barrier Height:	0

Rt View: **90** Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	2.3
Heavy Trucks:	8

SITE DATA

Road Grade:	0
Average Daily Traffic:	11010
Peak Hour Traffic:	**1101**
Vehicle Speed:	45
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

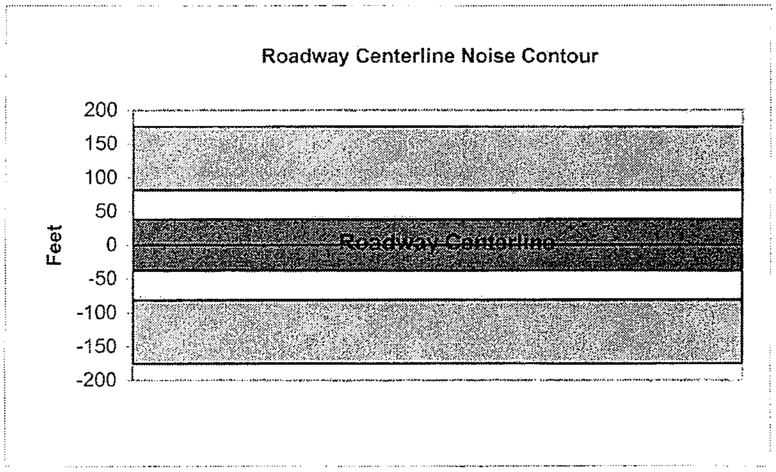
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	50.9	59.5	57.7	51.6	60.2	60.8
Medium Trucks:	59.2	56.9	50.5	49.0	57.5	57.7
Heavy Trucks:	63.7	53.1	44.0	45.3	54.8	54.9
Vehicle Noise:	**66.1**	**62.1**	**58.6**	**54.3**	**62.8**	**63.2**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-176	176
65 dBA	-82	82
70 dBA	-38	38
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Future
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	State Route 49		
Road Segment:	South of Opah Drive		

PROJECT DATA

Centerline Dist to Barrier:	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	100
Barrier Near Lane CL Dist:	0
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**5.5**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	13780
Peak Hour Traffic:	**1378**
Vehicle Speed:	45
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

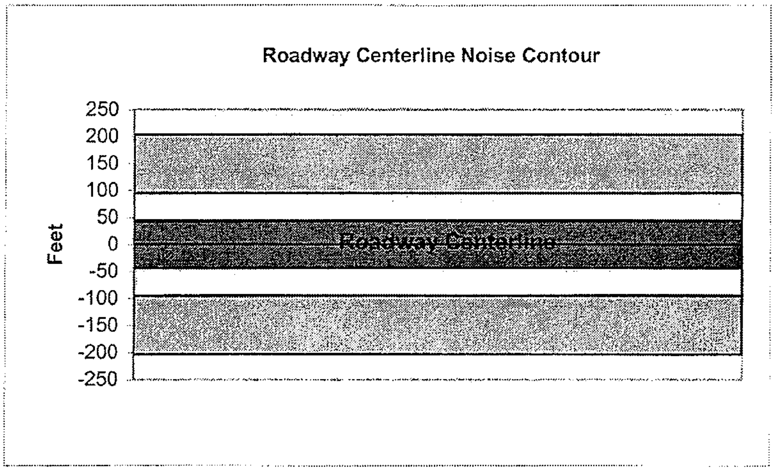
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	51.9	60.4	58.6	52.6	61.2	61.8
Medium Trucks:	60.2	57.9	51.5	50.0	58.4	58.7
Heavy Trucks:	64.7	54.1	45.0	46.2	55.8	55.9
Vehicle Noise:	**67.0**	**63.1**	**59.6**	**55.2**	**63.8**	**64.2**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-204	204
65 dBA	-95	95
70 dBA	-44	44
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Future
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	Opah Drive		
Road Segment:	Between SR 49 and Harmony Lane		

PROJECT DATA

Centerline Dist to Barrier:			0
Barrier (0=wall, 1= berm):			0
Receiver Barrier Dist:			0
Centerline Dist. To Observer:			100
Barrier Near Lane CL Dist:			0
Barrier Far lane CL Dist:			0
Pad Elevation:			**0.5**
Road Elevation:			0
Observer Height (above grade):			**5.5**
Barrier Height:			0
Rt View:	**90**	Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	1200
Peak Hour Traffic:	**120**
Vehicle Speed:	30
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

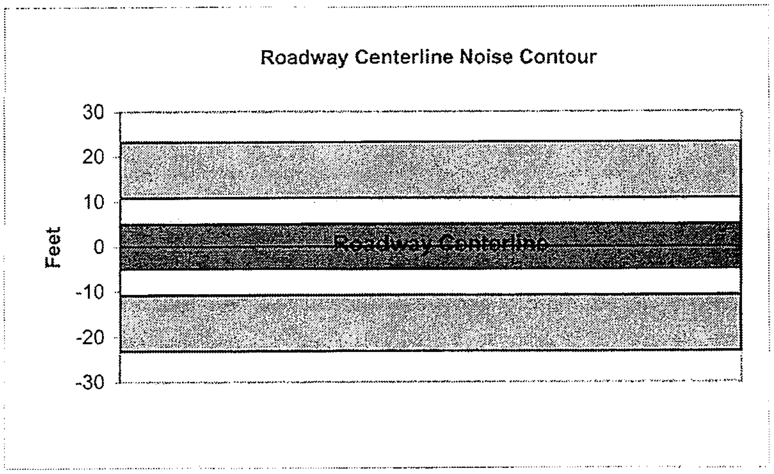
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	36.2	44.8	43.0	36.9	45.5	46.1
Medium Trucks:	46.8	44.6	38.2	36.6	45.1	45.3
Heavy Trucks:	52.5	41.8	32.8	34.0	44.1	44.3
Vehicle Noise:	**55.0**	**49.1**	**44.7**	**41.2**	**49.7**	**50.1**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-23	23
65 dBA	-11	11
70 dBA	-5	5
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Future
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	Opah Drive		
Road Segment:	Between Harmony Lane and Miami Highlands Drive		

PROJECT DATA

Centerline Dist to Barrier:			0
Barrier (0=wall, 1= berm):			0
Receiver Barrier Dist:			0
Centerline Dist. To Observer:			100
Barrier Near Lane CL Dist:			0
Barrier Far lane CL Dist:			0
Pad Elevation:			0.5
Road Elevation:			0
Observer Height (above grade):			5.5
Barrier Height:			0
Rt View:	90	Lft View:	-90

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	2.3
Heavy Trucks:	8

SITE DATA

Road Grade:	0
Average Daily Traffic:	850
Peak Hour Traffic:	85
Vehicle Speed:	30
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

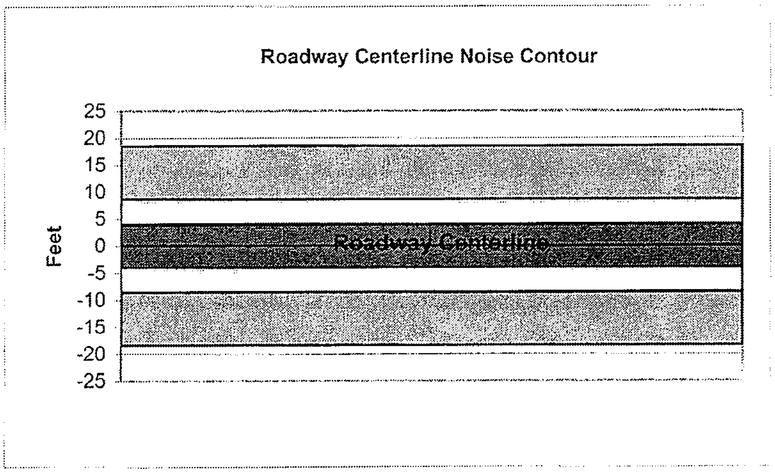
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	34.7	43.3	41.5	35.4	44.0	44.6
Medium Trucks:	45.3	43.1	36.7	35.1	43.6	43.8
Heavy Trucks:	51.0	40.3	31.3	32.5	42.6	42.8
Vehicle Noise:	**53.5**	**47.6**	**43.2**	**39.7**	**48.2**	**48.6**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-19	19
65 dBA	-9	9
70 dBA	-4	4
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name: Sierra Meadows
Scenario: Future
Analyst: Eddie Torres
Job #: 10-102469
Roadway: Opah Drive
Road Segment: Between Miami Highlands Drive and County Road 621

PROJECT DATA

Centerline Dist to Barrier:	0
Barrier (0=wall, 1= berm):	0
Receiver Barrier Dist:	0
Centerline Dist. To Observer:	100
Barrier Near Lane CL Dist:	0
Barrier Far lane CL Dist:	0
Pad Elevation:	**0.5**
Road Elevation:	0
Observer Height (above grade):	**5.5**
Barrier Height:	0
Rt View: **90** Lft View:	-90

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	2.3
Heavy Trucks:	8

SITE DATA

Road Grade:	0
Average Daily Traffic:	620
Peak Hour Traffic:	**62**
Vehicle Speed:	30
Centerline Separation:	14

NOISE INPUTS

Site conditions: **SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

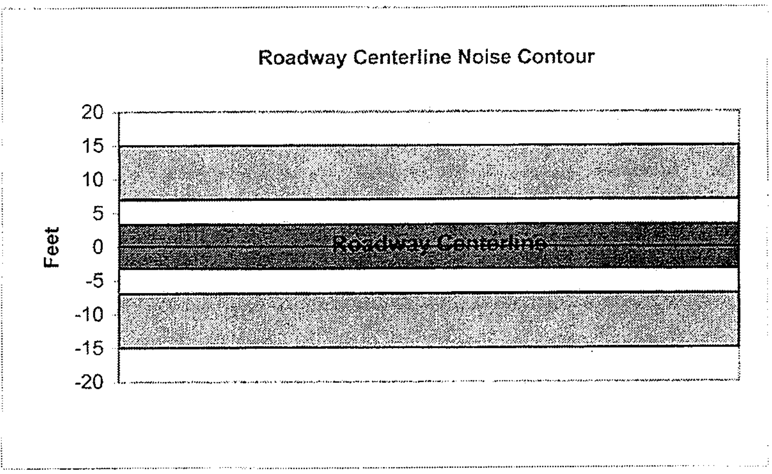
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	33.4	41.9	40.1	34.0	42.7	43.3
Medium Trucks:	44.0	41.7	35.3	33.7	42.2	42.5
Heavy Trucks:	49.6	39.0	29.9	31.1	41.3	41.4
Vehicle Noise:	**52.1**	**46.2**	**41.8**	**38.3**	**46.9**	**47.2**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-15	15
65 dBA	-7	7
70 dBA	-3	3
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Future
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	Opah Drive		
Road Segment:	Between County Road 621 and County Road 628		

PROJECT DATA

Centerline Dist to Barrier:	0
Barrier (0=wall, 1= berm):	0
Receiver Barrier Dist:	0
Centerline Dist. To Observer:	100
Barrier Near Lane CL Dist:	0
Barrier Far lane CL Dist:	0
Pad Elevation:	**0.5**
Road Elevation:	0
Observer Height (above grade):	**5.5**
Barrier Height:	0
Rt View: **90** Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	1445
Peak Hour Traffic:	**144.5**
Vehicle Speed:	30
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

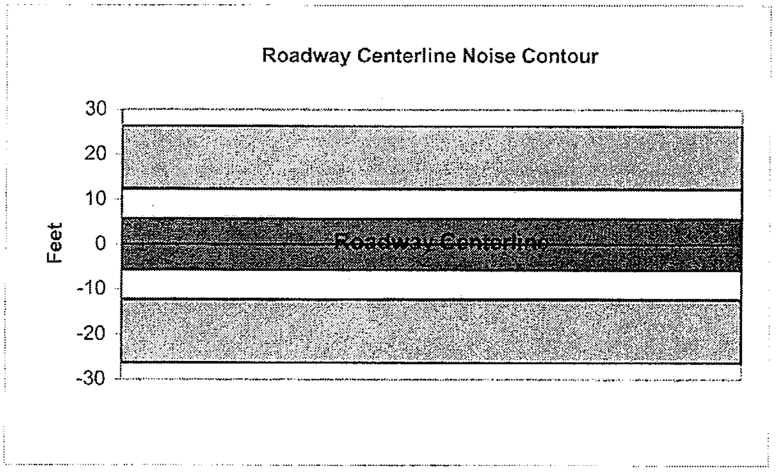
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	37.0	45.6	43.8	37.7	46.3	46.9
Medium Trucks:	47.6	45.4	39.0	37.4	45.9	46.1
Heavy Trucks:	53.3	42.6	33.6	34.8	44.9	45.1
Vehicle Noise:	**55.8**	**49.9**	**45.5**	**42.0**	**50.5**	**50.9**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-26	26
65 dBA	-12	12
70 dBA	-6	6
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Future
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	Miami Highland Drive		
Road Segment:	East of Opah Road		

PROJECT DATA

Centerline Dist to Barrier:	0
Barrier (0=wall, 1= berm):	0
Receiver Barrier Dist:	0
Centerline Dist. To Observer:	100
Barrier Near Lane CL Dist:	0
Barrier Far lane CL Dist:	0
Pad Elevation:	**0.5**
Road Elevation:	0
Observer Height (above grade):	**5.5**
Barrier Height:	0

Rt View: **90** Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	300
Peak Hour Traffic:	**30**
Vehicle Speed:	30
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

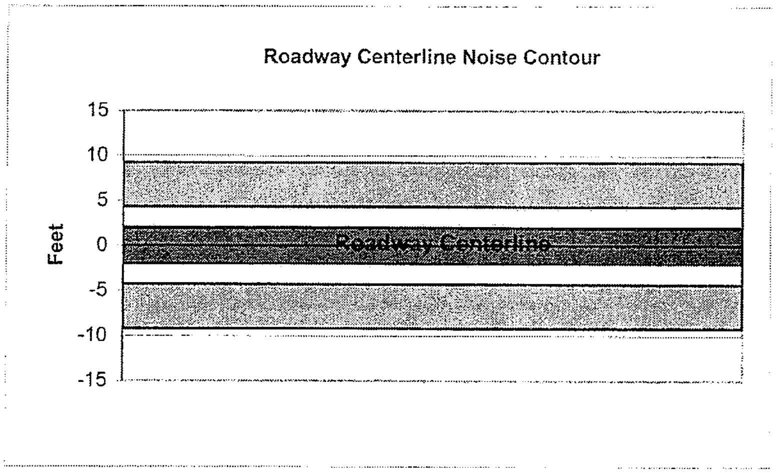
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	30.2	38.7	36.9	30.9	39.5	40.1
Medium Trucks:	40.8	38.5	32.2	30.6	39.1	39.3
Heavy Trucks:	46.4	35.8	26.8	28.0	38.1	38.2
Vehicle Noise:	**49.0**	**43.1**	**38.6**	**35.2**	**43.7**	**44.1**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-9	9
65 dBA	-4	4
70 dBA	-2	2
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Future
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	County Road 621		
Road Segment:	Between SR 49 and Opah Road		

PROJECT DATA

Centerline Dist to Barrier:			0
Barrier (0=wall, 1= berm):			0
Receiver Barrier Dist:			0
Centerline Dist. To Observer:			100
Barrier Near Lane CL Dist:			0
Barrier Far lane CL Dist:			0
Pad Elevation:			**0.5**
Road Elevation:			0
Observer Height (above grade):			**5.5**
Barrier Height:			0
Rt View:	**90**	Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	975
Peak Hour Traffic:	**97.5**
Vehicle Speed:	30
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

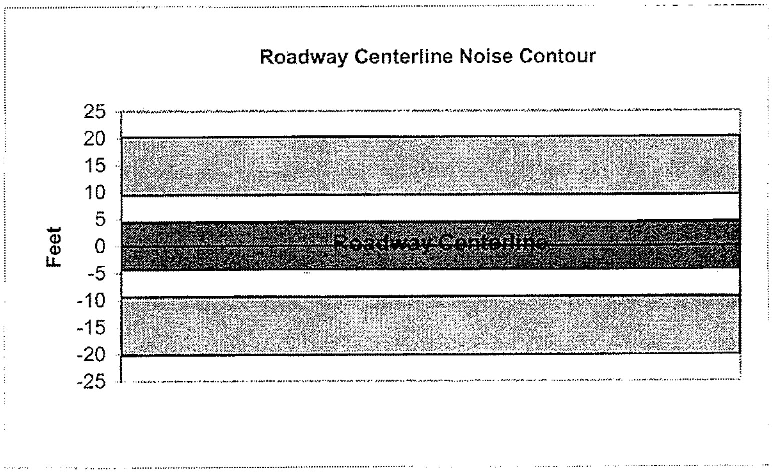
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	35.3	43.9	42.1	36.0	44.6	45.2
Medium Trucks:	45.9	43.7	37.3	35.7	44.2	44.4
Heavy Trucks:	51.6	40.9	31.9	33.1	43.2	43.4
Vehicle Noise:	**54.1**	**48.2**	**43.8**	**40.3**	**48.8**	**49.2**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-20	20
65 dBA	-9	9
70 dBA	-4	4
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Future Plus Project
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	State Route 49		
Road Segment:	North of County Road 628		

PROJECT DATA			
Centerline Dist to Barrier:			0
Barrier (0=wall, 1= berm):			0
Receiver Barrier Dist:			0
Centerline Dist. To Observer:			100
Barrier Near Lane CL Dist:			0
Barrier Far lane CL Dist:			0
Pad Elevation:			**0.5**
Road Elevation:			0
Observer Height (above grade):			**5.5**
Barrier Height:			0
Rt View:	**90**	Lft View:	-90

NOISE SOURCE ELEVATIONS (Feet)	
Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA	
Road Grade:	0
Average Daily Traffic:	8215
Peak Hour Traffic:	**821.5**
Vehicle Speed:	45
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX				
Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

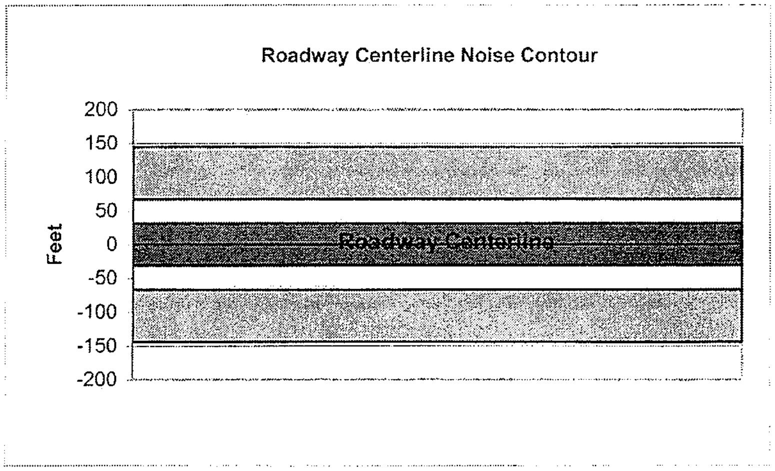
UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	49.6	58.2	56.4	50.3	59.0	59.6
Medium Trucks:	57.9	55.7	49.3	47.7	56.2	56.4
Heavy Trucks:	62.4	51.8	42.8	44.0	53.5	53.7
Vehicle Noise:	**64.8**	**60.9**	**57.4**	**53.0**	**61.5**	**62.0**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL		
Unmitigated		
60 dBA	-144	144
65 dBA	-67	67
70 dBA	-31	31
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Future Plus Project
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	State Route 49		
Road Segment:	Between County Road 628 and County Road 621		

PROJECT DATA

Centerline Dist to Barrier:			0
Barrier (0=wall, 1= berm):			0
Receiver Barrier Dist:			0
Centerline Dist. To Observer:			100
Barrier Near Lane CL Dist:			0
Barrier Far lane CL Dist:			0
Pad Elevation:			**0.5**
Road Elevation:			0
Observer Height (above grade):			**5.5**
Barrier Height:			0
Rt View:	90	Lft View:	-90

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	8965
Peak Hour Traffic:	**896.5**
Vehicle Speed:	45
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

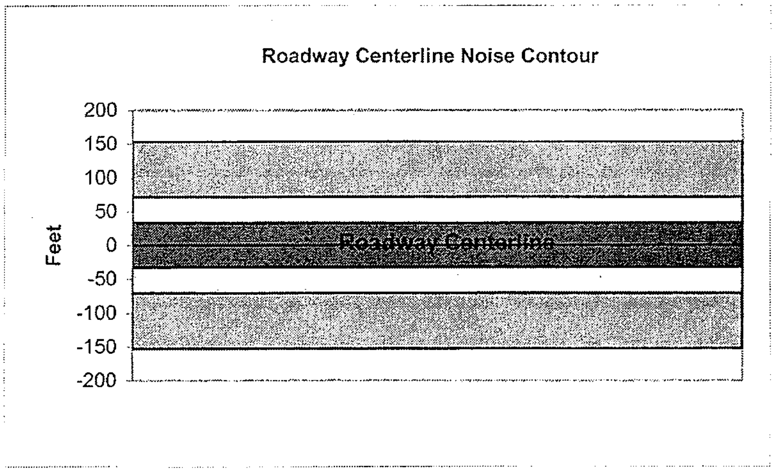
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	50.0	58.6	56.8	50.7	59.3	59.9
Medium Trucks:	58.3	56.0	49.7	48.1	56.6	56.8
Heavy Trucks:	62.8	52.2	43.1	44.4	53.9	54.0
Vehicle Noise:	**65.2**	**61.3**	**57.7**	**53.4**	**61.9**	**62.4**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-153	153
65 dBA	-71	71
70 dBA	-33	33
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Future Plus Project
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	State Route 49		
Road Segment:	Between County Road 621 and Opah Drive		

PROJECT DATA

Centerline Dist to Barrier:	0
Barrier (0=wall, 1= berm):	0
Receiver Barrier Dist:	0
Centerline Dist. To Observer:	100
Barrier Near Lane CL Dist:	0
Barrier Far lane CL Dist:	0
Pad Elevation:	**0.5**
Road Elevation:	0
Observer Height (above grade):	**5.5**
Barrier Height:	0
Rt View: **90** Lft View:	**-90**

SITE DATA

Road Grade:	0
Average Daily Traffic:	11905
Peak Hour Traffic:	**1190.5**
Vehicle Speed:	45
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	8

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

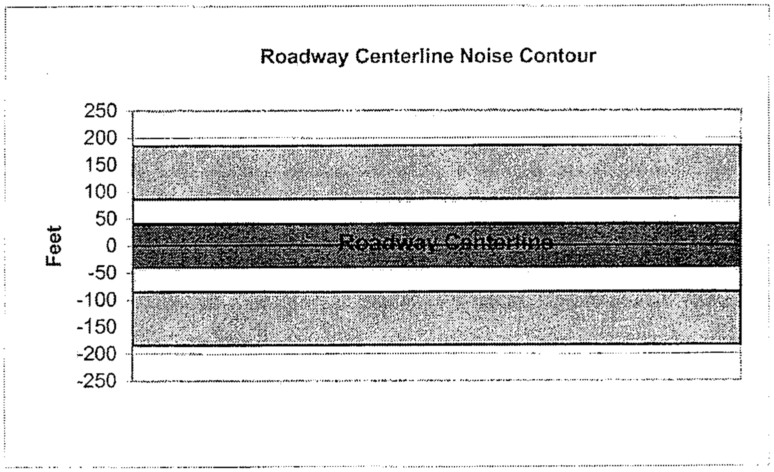
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	51.3	59.8	58.0	51.9	60.6	61.2
Medium Trucks:	59.5	57.3	50.9	49.3	57.8	58.0
Heavy Trucks:	64.1	53.4	44.4	45.6	55.1	55.3
Vehicle Noise:	**66.4**	**62.5**	**59.0**	**54.6**	**63.2**	**63.6**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-185	185
65 dBA	-86	86
70 dBA	-40	40
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Future Plus Project
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	State Route 49		
Road Segment:	South of Opah Drive		

PROJECT DATA

Centerline Dist to Barrier:	0
Barrier (0=wall, 1= berm):	0
Receiver Barrier Dist:	0
Centerline Dist. To Observer:	100
Barrier Near Lane CL Dist:	0
Barrier Far lane CL Dist:	0
Pad Elevation:	**0.5**
Road Elevation:	0
Observer Height (above grade):	**5.5**
Barrier Height:	0
Rt View: **90** Lft View:	**-90**

SITE DATA

Road Grade:	0
Average Daily Traffic:	15350
Peak Hour Traffic:	**1535**
Vehicle Speed:	45
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	8

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

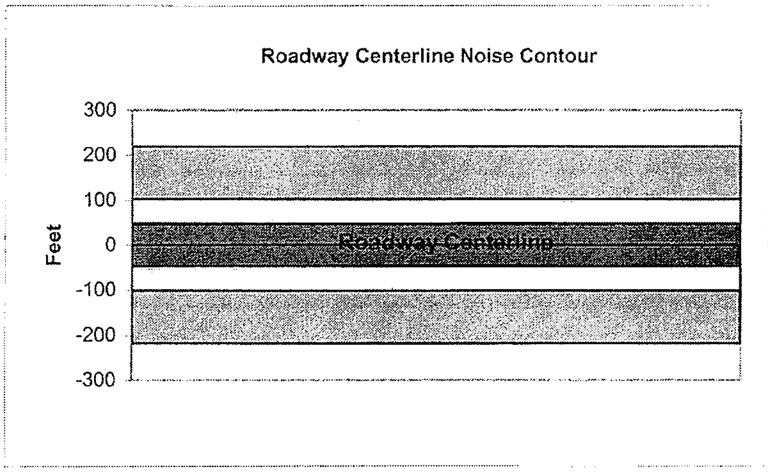
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	52.4	60.9	59.1	53.0	61.7	62.3
Medium Trucks:	60.6	58.4	52.0	50.4	58.9	59.1
Heavy Trucks:	65.2	54.5	45.5	46.7	56.2	56.4
Vehicle Noise:	**67.5**	**63.6**	**60.1**	**55.7**	**64.3**	**64.7**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-219	219
65 dBA	-102	102
70 dBA	-47	47
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Future Plus Project
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	Opah Drive		
Road Segment:	Between SR 49 and Harmony Lane		

PROJECT DATA

Centerline Dist to Barrier:	0
Barrier (0=wall, 1= berm):	0
Receiver Barrier Dist:	0
Centerline Dist. To Observer:	100
Barrier Near Lane CL Dist:	0
Barrier Far lane CL Dist:	0
Pad Elevation:	**0.5**
Road Elevation:	0
Observer Height (above grade):	**5.5**
Barrier Height:	0

Rt View: **90** Lft View: **-90**

SITE DATA

Road Grade:	0
Average Daily Traffic:	2120
Peak Hour Traffic:	**212**
Vehicle Speed:	30
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

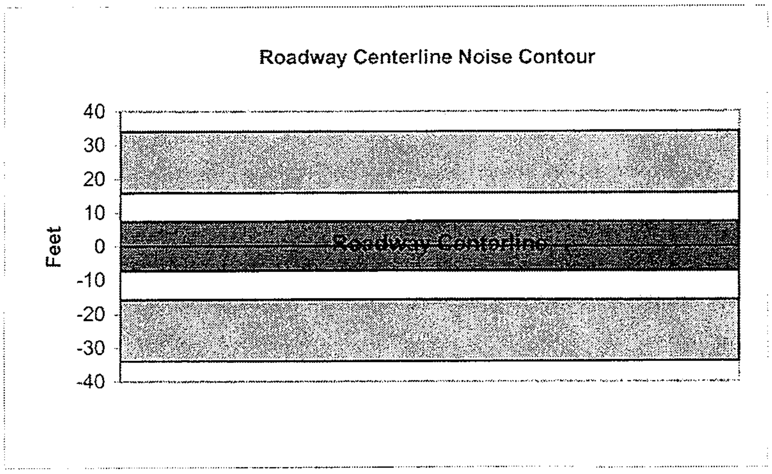
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	38.7	47.2	45.4	39.4	48.0	48.6
Medium Trucks:	49.3	47.0	40.6	39.1	47.6	47.8
Heavy Trucks:	54.9	44.3	35.3	36.5	46.6	46.7
Vehicle Noise:	**57.5**	**51.6**	**47.1**	**43.7**	**52.2**	**52.6**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-34	34
65 dBA	-16	16
70 dBA	-7	7
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Future Plus Project
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	Opah Drive		
Road Segment:	Between Harmony Lane and Miami Highlands Drive		

PROJECT DATA

Centerline Dist to Barrier:	0
Barrier (0=wall, 1= berm):	0
Receiver Barrier Dist:	0
Centerline Dist. To Observer:	100
Barrier Near Lane CL Dist:	0
Barrier Far lane CL Dist:	0
Pad Elevation:	**0.5**
Road Elevation:	0
Observer Height (above grade):	**5.5**
Barrier Height:	0

Rt View: **90** Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	1750
Peak Hour Traffic:	**175**
Vehicle Speed:	30
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

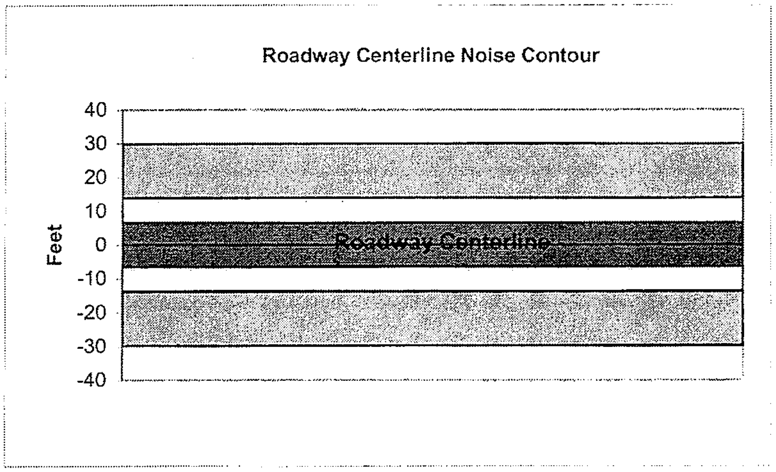
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	37.9	46.4	44.6	38.5	47.2	47.8
Medium Trucks:	48.5	46.2	39.8	38.2	46.7	47.0
Heavy Trucks:	54.1	43.5	34.4	35.6	45.8	45.9
Vehicle Noise:	**56.6**	**50.7**	**46.3**	**42.8**	**51.4**	**51.7**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-30	30
65 dBA	-14	14
70 dBA	-6	6
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name: Sierra Meadows
Analyst: Eddie Torres
Roadway: Opah Drive
Road Segment: Between Miami Highlands Drive and County Road 621
Scenario: Future Plus Project
Job #: 10-102469

PROJECT DATA

Centerline Dist to Barrier:	0
Barrier (0=wall, 1= berm):	0
Receiver Barrier Dist:	0
Centerline Dist. To Observer:	100
Barrier Near Lane CL Dist:	0
Barrier Far lane CL Dist:	0
Pad Elevation:	**0.5**
Road Elevation:	0
Observer Height (above grade):	**5.5**
Barrier Height:	0

Rt View: **90** Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	1515
Peak Hour Traffic:	**151.5**
Vehicle Speed:	30
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

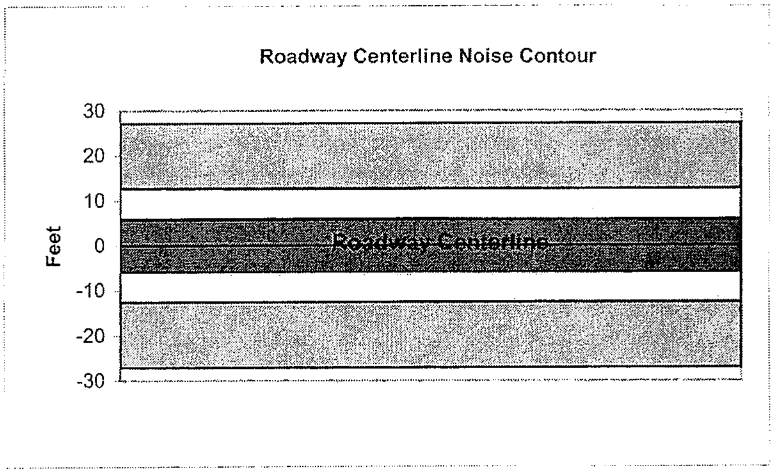
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	37.2	45.8	44.0	37.9	46.5	47.2
Medium Trucks:	47.8	45.6	39.2	37.6	46.1	46.3
Heavy Trucks:	53.5	42.9	33.8	35.0	45.1	45.3
Vehicle Noise:	**56.0**	**50.1**	**45.7**	**42.2**	**50.7**	**51.1**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-27	27
65 dBA	-13	13
70 dBA	-6	6
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Future Plus Project
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	Opah Drive		
Road Segment:	Between County Road 621 and County Road 628		

PROJECT DATA

Centerline Dist to Barrier:	0
Barrier (0=wall, 1= berm):	0
Receiver Barrier Dist:	0
Centerline Dist. To Observer:	100
Barrier Near Lane CL Dist:	0
Barrier Far lane CL Dist:	0
Pad Elevation:	**0.5**
Road Elevation:	0
Observer Height (above grade):	**5.5**
Barrier Height:	0

Rt View: **90** Lft View: **-90**

SITE DATA

Road Grade:	0
Average Daily Traffic:	1770
Peak Hour Traffic:	**177**
Vehicle Speed:	30
Centerline Separation:	14

NOISE INPUTS

Site conditions: **SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

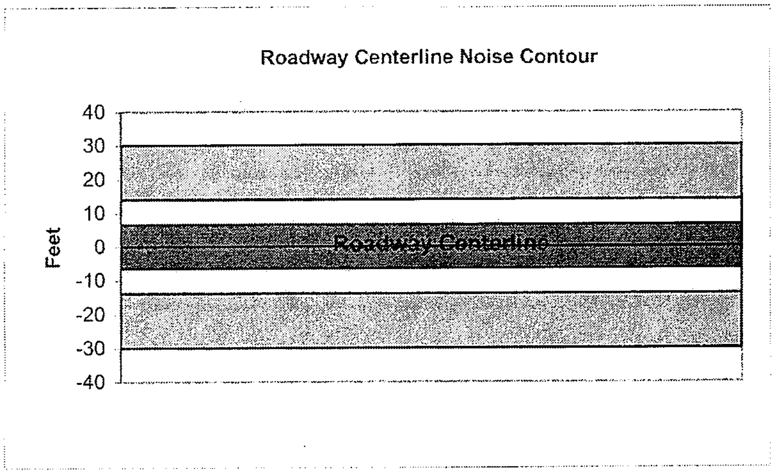
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	37.9	46.4	44.7	38.6	47.2	47.8
Medium Trucks:	48.5	46.2	39.9	38.3	46.8	47.0
Heavy Trucks:	54.2	43.5	34.5	35.7	45.8	45.9
Vehicle Noise:	**56.7**	**50.8**	**46.3**	**42.9**	**51.4**	**51.8**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-30	30
65 dBA	-14	14
70 dBA	-6	6
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Future Plus Project
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	Miami Highland Drive		
Road Segment:	East of Opah Road		

PROJECT DATA

Centerline Dist to Barrier:	0
Barrier (0=wall, 1= berm):	0
Receiver Barrier Dist:	0
Centerline Dist. To Observer:	100
Barrier Near Lane CL Dist:	0
Barrier Far lane CL Dist:	0
Pad Elevation:	**0.5**
Road Elevation:	0
Observer Height (above grade):	**5.5**
Barrier Height:	0
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	300
Peak Hour Traffic:	**30**
Vehicle Speed:	30
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

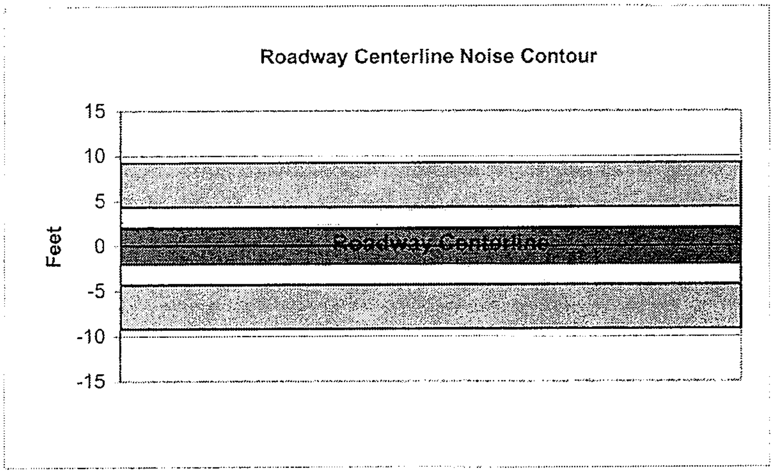
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	30.2	38.7	36.9	30.9	39.5	40.1
Medium Trucks:	40.8	38.5	32.2	30.6	39.1	39.3
Heavy Trucks:	46.4	35.8	26.8	28.0	38.1	38.2
Vehicle Noise:	**49.0**	**43.1**	**38.6**	**35.2**	**43.7**	**44.1**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-9	9
65 dBA	-4	4
70 dBA	-2	2
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Future Plus Project
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	County Road 621		
Road Segment:	Between SR 49 and Opah Road		

PROJECT DATA

Centerline Dist to Barrier:			0
Barrier (0=wall, 1= berm):			0
Receiver Barrier Dist:			0
Centerline Dist. To Observer:			100
Barrier Near Lane CL Dist:			0
Barrier Far lane CL Dist:			0
Pad Elevation:			**0.5**
Road Elevation:			0
Observer Height (above grade):			**5.5**
Barrier Height:			0
Rt View:	**90**	Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	2025
Peak Hour Traffic:	**202.5**
Vehicle Speed:	30
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	38.5	47.0	45.2	39.2	47.8	48.4
Medium Trucks:	49.1	46.8	40.4	38.9	47.4	47.6
Heavy Trucks:	54.7	44.1	35.1	36.3	46.4	46.5
Vehicle Noise:	**57.3**	**51.4**	**46.9**	**43.5**	**52.0**	**52.4**

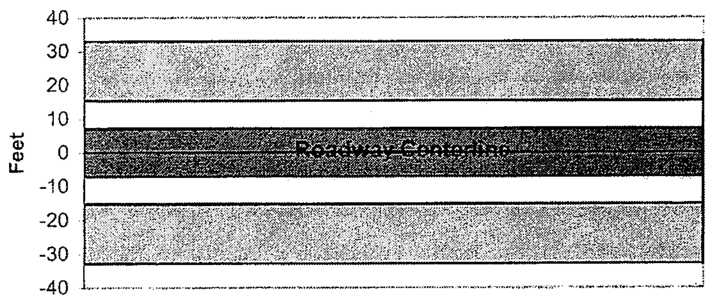
MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-33	33
65 dBA	-15	15
70 dBA	-7	7
Mitigated		
60 dBA		
65 dBA		
70 dBA		

Roadway Centerline Noise Contour



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name: Sierra Meadows
Analyst: Eddie Torres
Roadway: State Route 49
Road Segment: North of County Road 628
Scenario: Existing
Job #: 10-102469

PROJECT DATA

Centerline Dist to Barrier:	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	100
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**5.5**
Barrier Height:	**0**
Rt View:	**90**
Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	4225
Peak Hour Traffic:	**422.5**
Vehicle Speed:	45
Centerline Separation:	14

NOISE INPUTS

Site conditions: **SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

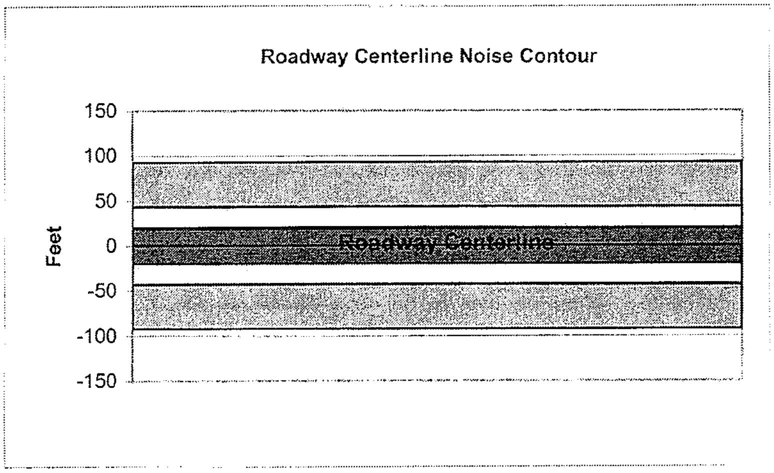
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	46.8	55.3	53.5	47.4	56.1	56.7
Medium Trucks:	55.0	52.8	46.4	44.8	53.3	53.5
Heavy Trucks:	59.6	48.9	39.9	41.1	50.6	50.8
Vehicle Noise:	**61.9**	**58.0**	**54.5**	**50.1**	**58.7**	**59.1**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-93	93
65 dBA	-43	43
70 dBA	-20	20
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Existing
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	State Route 49		
Road Segment:	Between County Road 628 and County Road 621		

PROJECT DATA

Centerline Dist to Barrier:	0
Barrier (0=wall, 1= berm):	0
Receiver Barrier Dist:	0
Centerline Dist. To Observer:	. 100
Barrier Near Lane CL Dist:	0
Barrier Far lane CL Dist:	0
Pad Elevation:	**0.5**
Road Elevation:	0
Observer Height (above grade):	**5.5**
Barrier Height:	0
Rt View: 90	Lft View: -90

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	8

SITE DATA

Road Grade:	0
Average Daily Traffic:	4843
Peak Hour Traffic:	**484.3**
Vehicle Speed:	45
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

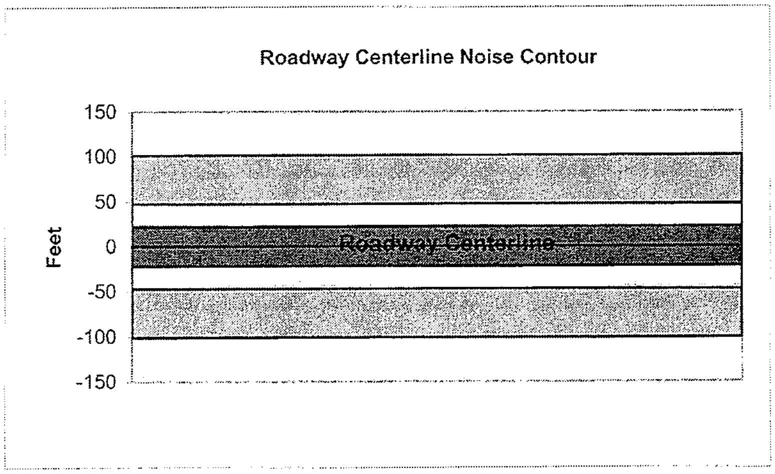
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	47.4	55.9	54.1	48.0	56.7	57.3
Medium Trucks:	55.6	53.4	47.0	45.4	53.9	54.1
Heavy Trucks:	60.1	49.5	40.5	41.7	51.2	51.4
Vehicle Noise:	**62.5**	**58.6**	**55.1**	**50.7**	**59.3**	**59.7**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-102	102
65 dBA	-47	47
70 dBA	-22	22
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Existing
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	State Route 49		
Road Segment:	Between County Road 621 and Opah Drive		

PROJECT DATA

Centerline Dist to Barrier:			0
Barrier (0=wall, 1= berm):			0
Receiver Barrier Dist:			0
Centerline Dist. To Observer:			100
Barrier Near Lane CL Dist:			0
Barrier Far lane CL Dist:			0
Pad Elevation:			**0.5**
Road Elevation:			0
Observer Height (above grade):			**5.5**
Barrier Height:			0
Rt View:	**90**	Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	6198
Peak Hour Traffic:	**619.8**
Vehicle Speed:	45
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

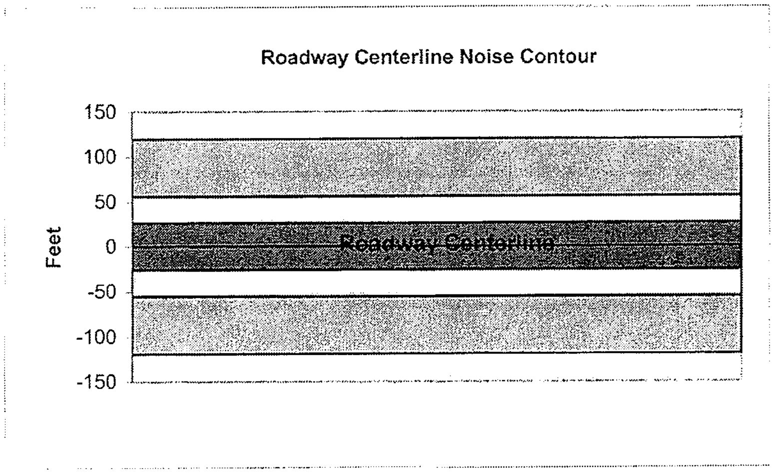
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	48.4	57.0	55.2	49.1	57.7	58.3
Medium Trucks:	56.7	54.4	48.1	46.5	55.0	55.2
Heavy Trucks:	61.2	50.6	41.5	42.8	52.3	52.4
Vehicle Noise:	**63.6**	**59.7**	**56.1**	**51.8**	**60.3**	**60.8**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-120	120
65 dBA	-56	56
70 dBA	-26	26
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Existing
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	State Route 49		
Road Segment:	South of Opah Drive		

PROJECT DATA

Centerline Dist to Barrier:			0
Barrier (0=wall, 1= berm):			0
Receiver Barrier Dist:			0
Centerline Dist. To Observer:			100
Barrier Near Lane CL Dist:			0
Barrier Far lane CL Dist:			0
Pad Elevation:			**0.5**
Road Elevation:			0
Observer Height (above grade):			**5.5**
Barrier Height:			0
Rt View:	**90**	Lft View:	-90

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	8

SITE DATA

Road Grade:	0
Average Daily Traffic:	7645
Peak Hour Traffic:	**764.5**
Vehicle Speed:	45
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

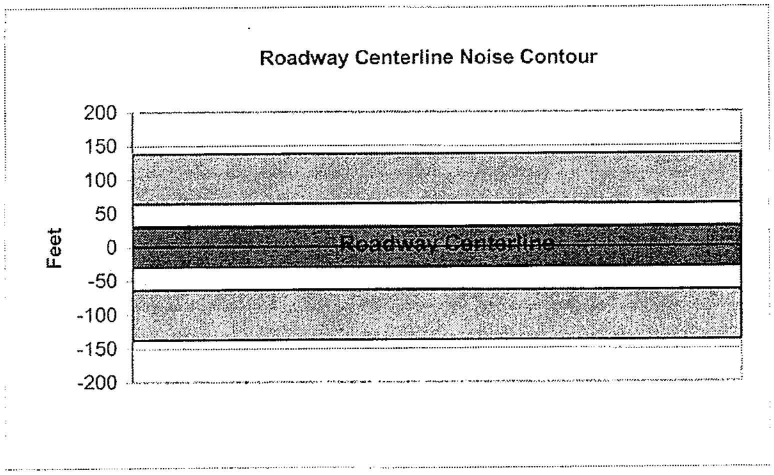
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	49.3	57.9	56.1	50.0	58.6	59.3
Medium Trucks:	57.6	55.3	49.0	47.4	55.9	56.1
Heavy Trucks:	62.1	51.5	42.4	43.7	53.2	53.3
Vehicle Noise:	**64.5**	**60.6**	**57.1**	**52.7**	**61.2**	**61.7**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-138	138
65 dBA	-64	64
70 dBA	-30	30
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name: Sierra Meadows
Analyst: Eddie Torres
Roadway: Opah Drive
Road Segment: Between SR 49 and Harmony Lane
Scenario: Existing
Job #: 10-102469

PROJECT DATA	
Centerline Dist to Barrier:	0
Barrier (0=wall, 1= berm):	0
Receiver Barrier Dist:	0
Centerline Dist. To Observer:	100
Barrier Near Lane CL Dist:	0
Barrier Far lane CL Dist:	0
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**5.5**
Barrier Height:	0
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)	
Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA	
Road Grade:	0
Average Daily Traffic:	508
Peak Hour Traffic:	**50.8**
Vehicle Speed:	30
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

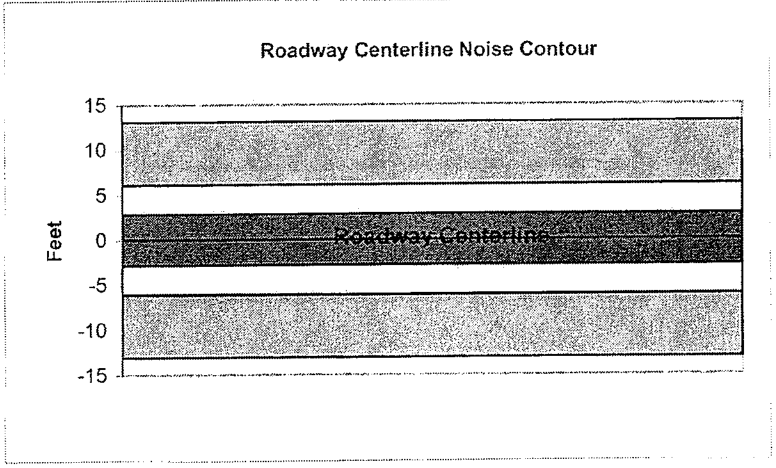
UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	32.5	41.0	39.2	33.1	41.8	42.4
Medium Trucks:	43.1	40.8	34.4	32.9	41.4	41.6
Heavy Trucks:	48.7	38.1	29.1	30.3	40.4	40.5
Vehicle Noise:	**51.3**	**45.4**	**40.9**	**37.5**	**46.0**	**46.3**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL		
Unmitigated		
60 dBA	-13	13
65 dBA	-6	6
70 dBA	-3	3
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name: Sierra Meadows
Analyst: Eddie Torres
Roadway: Opah Drive
Road Segment: Between Harmony Lane and Miami Highlands Drive
Scenario: Existing
Job #: 10-102469

PROJECT DATA	
Centerline Dist to Barrier:	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	0
Centerline Dist. To Observer:	100
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**5.5**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)	
Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA	
Road Grade:	0
Average Daily Traffic:	465
Peak Hour Traffic:	**46.5**
Vehicle Speed:	30
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

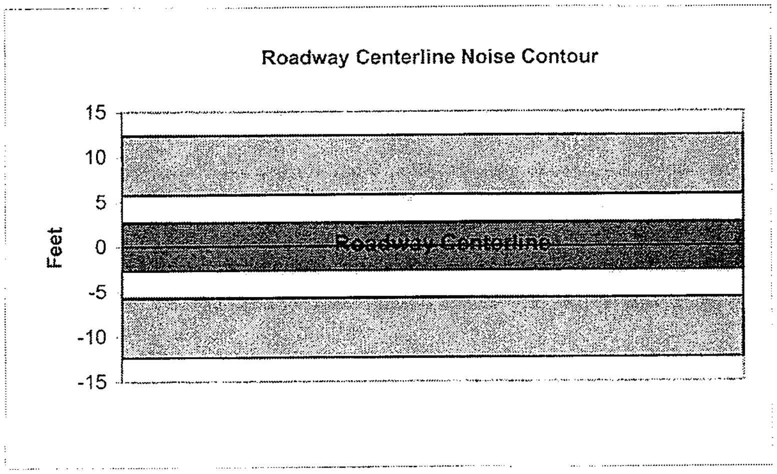
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	32.1	40.6	38.8	32.8	41.4	42.0
Medium Trucks:	42.7	40.4	34.1	32.5	41.0	41.2
Heavy Trucks:	48.4	37.7	28.7	29.9	40.0	40.1
Vehicle Noise:	**50.9**	**45.0**	**40.5**	**37.1**	**45.6**	**46.0**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-12	12
65 dBA	-6	6
70 dBA	-3	3
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Existing
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	Opah Drive		
Road Segment:	Between Miami Highlands Drive and County Road 621		

PROJECT DATA

Centerline Dist to Barrier:			0
Barrier (0=wall, 1= berm):			0
Receiver Barrier Dist:			0
Centerline Dist. To Observer:			100
Barrier Near Lane CL Dist:			0
Barrier Far lane CL Dist:			0
Pad Elevation:			**0.5**
Road Elevation:			0
Observer Height (above grade):			**5.5**
Barrier Height:			0
Rt View:	**90**	Lft View:	-90

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	235
Peak Hour Traffic:	**23.5**
Vehicle Speed:	30
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

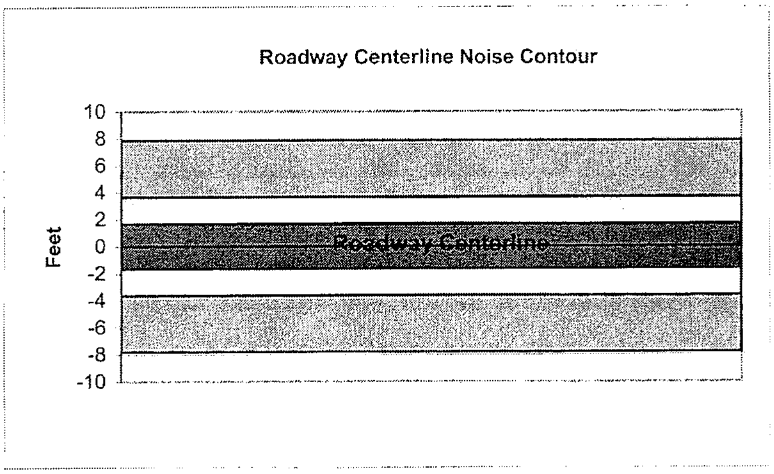
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	29.1	37.7	35.9	29.8	38.5	39.1
Medium Trucks:	39.7	37.5	31.1	29.5	38.0	38.2
Heavy Trucks:	45.4	34.8	25.7	26.9	37.0	37.2
Vehicle Noise:	**47.9**	**42.0**	**37.6**	**34.1**	**42.6**	**43.0**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-8	8
65 dBA	-4	4
70 dBA	-2	2
Mitigated		
60 dBA		
65 dBA		
70 dBA		


Roadway Centerline Noise Contour

Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Existing
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	Opah Drive		
Road Segment:	Between County Road 621 and County Road 628		

PROJECT DATA			
Centerline Dist to Barrier:			0
Barrier (0=wall, 1= berm):			0
Receiver Barrier Dist:			0
Centerline Dist. To Observer:			100
Barrier Near Lane CL Dist:			0
Barrier Far lane CL Dist:			0
Pad Elevation:			0.5
Road Elevation:			0
Observer Height (above grade):			5.5
Barrier Height:			0
Rt View:	90	Lft View:	-90

NOISE SOURCE ELEVATIONS (Feet)	
Autos:	0
Medium Trucks:	2.3
Heavy Trucks:	8

SITE DATA	
Road Grade:	0
Average Daily Traffic:	770
Peak Hour Traffic:	77
Vehicle Speed:	30
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX				
Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

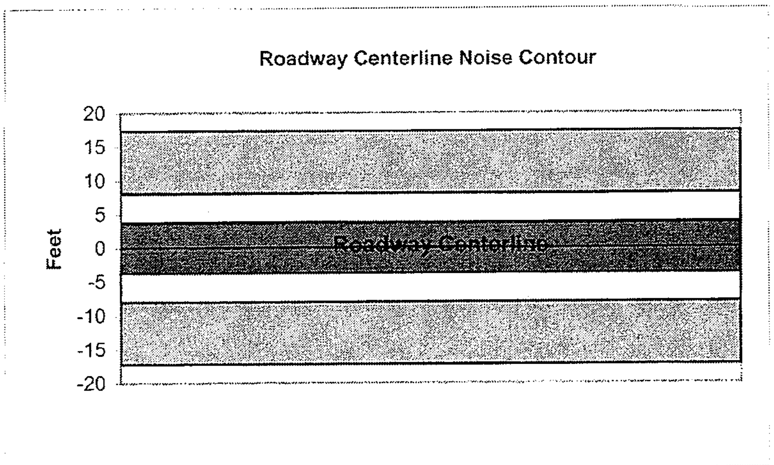
UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	34.3	42.8	41.0	35.0	43.6	44.2
Medium Trucks:	44.9	42.6	36.2	34.7	43.2	43.4
Heavy Trucks:	50.5	39.9	30.9	32.1	42.2	42.3
Vehicle Noise:	**53.1**	**47.2**	**42.7**	**39.3**	**47.8**	**48.2**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL		
Unmitigated		
60 dBA	-17	17
65 dBA	-8	8
70 dBA	-4	4
Mitigated		
60 dBA		
65 dBA		
70 dBA		



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	Sierra Meadows	Scenario:	Existing
Analyst:	Eddie Torres	Job #:	10-102469
Roadway:	Miami Highland Drive		
Road Segment:	East of Opah Road		

PROJECT DATA

Centerline Dist to Barrier:			0
Barrier (0=wall, 1= berm):			0
Receiver Barrier Dist:			0
Centerline Dist. To Observer:			100
Barrier Near Lane CL Dist:			0
Barrier Far lane CL Dist:			0
Pad Elevation:			**0.5**
Road Elevation:			0
Observer Height (above grade):			**5.5**
Barrier Height:			0
Rt View:	**90**	Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	**2.3**
Heavy Trucks:	8

SITE DATA

Road Grade:	0
Average Daily Traffic:	155
Peak Hour Traffic:	**15.5**
Vehicle Speed:	30
Centerline Separation:	14

NOISE INPUTS

Site conditions:**SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

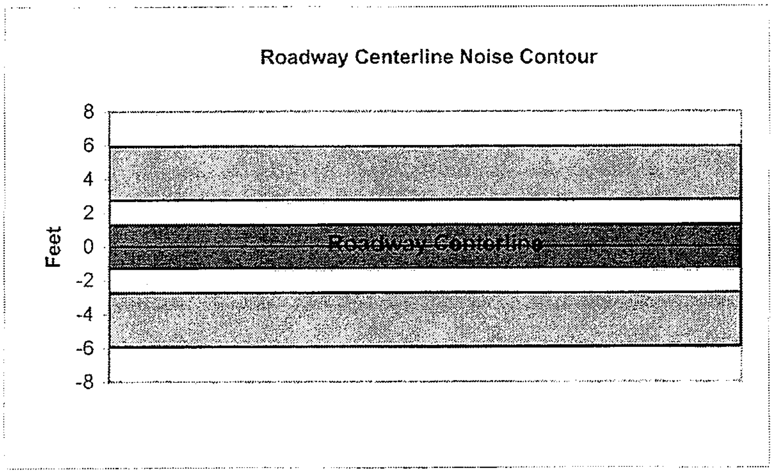
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	27.3	35.9	34.1	28.0	36.6	37.2
Medium Trucks:	37.9	35.7	29.3	27.7	36.2	36.4
Heavy Trucks:	43.6	33.0	23.9	25.1	35.2	35.4
Vehicle Noise:	**46.1**	**40.2**	**35.8**	**32.3**	**40.8**	**41.2**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-6	6
65 dBA	-3	3
70 dBA	-1	1
Mitigated		
60 dBA		
65 dBA		
70 dBA		


Roadway Centerline Noise Contour

Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name: Sierra Meadows
Scenario: Existing
Analyst: Eddie Torres
Job #: 10-102469
Roadway: County Road 621
Road Segment: Between SR 49 and Opah Road

PROJECT DATA

Centerline Dist to Barrier:	0
Barrier (0=wall, 1= berm):	0
Receiver Barrier Dist:	0
Centerline Dist. To Observer:	100
Barrier Near Lane CL Dist:	0
Barrier Far lane CL Dist:	0
Pad Elevation:	**0.5**
Road Elevation:	0
Observer Height (above grade):	**5.5**
Barrier Height:	0

Rt View: **90** Lft View: -90

NOISE SOURCE ELEVATIONS (Feet)

Autos:	0
Medium Trucks:	2.3
Heavy Trucks:	8

SITE DATA

Road Grade:	0
Average Daily Traffic:	325
Peak Hour Traffic:	**32.5**
Vehicle Speed:	30
Centerline Separation:	14

NOISE INPUTS

Site conditions: **SOFT SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.92
Med. Truck	0.848	0.049	0.103	0.07
Heavy Truck	0.865	0.027	0.108	0.01

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

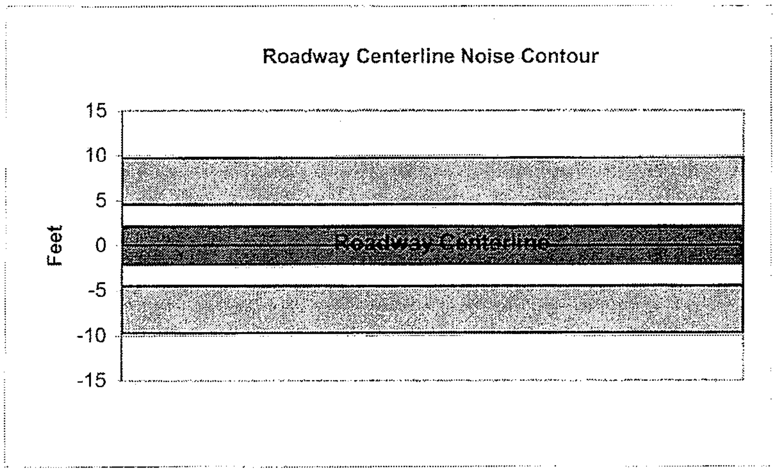
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	30.5	39.1	37.3	31.2	39.9	40.5
Medium Trucks:	41.2	38.9	32.5	30.9	39.4	39.7
Heavy Trucks:	46.8	36.2	27.1	28.3	38.5	38.6
Vehicle Noise:	**49.3**	**43.4**	**39.0**	**35.5**	**44.1**	**44.4**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR - CNEL

Unmitigated		
60 dBA	-10	10
65 dBA	-5	5
70 dBA	-2	2
Mitigated		
60 dBA		
65 dBA		
70 dBA		



15.6 Biological Technical Report

APPENDIX A

Plants and Wildlife Observed or Known to Occur on the Project Site

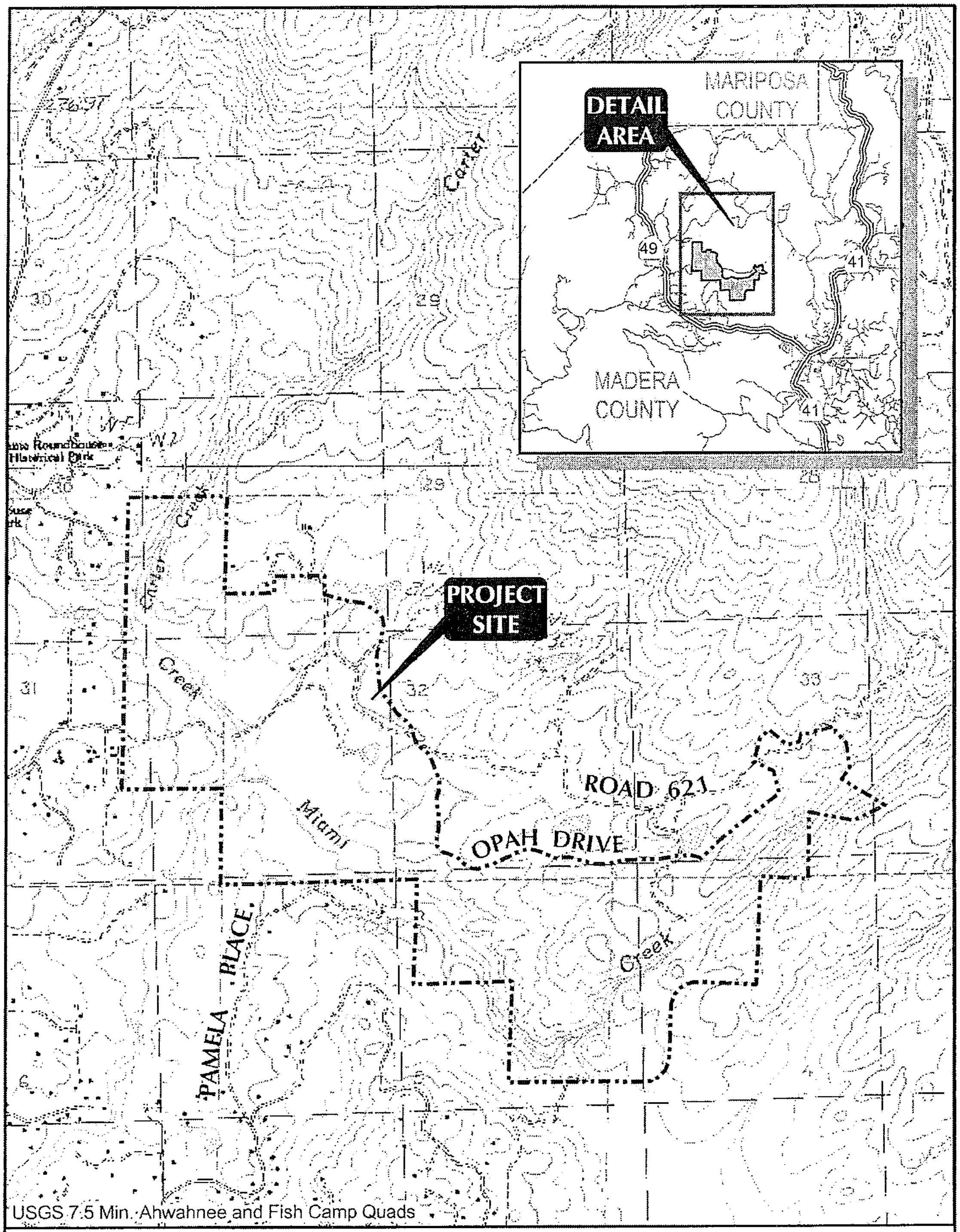
Common Name	**Scientific Name**
Plants	
Annual ryegrass	*Lolium multiflorum*
Arroyo willow	*Salix lasiolepis*
Baltic rush	*Juncus balticus*
Black oak	*Quercus kelloggii*
Blue oak	*Quercus douglasii*
Blue wildrye	*Elymus glaucus*
Bog rush	*Juncus effusus*
Broad-leafed cattail	*Typha latifolia*
Bush mallow	*Malcothammus fremontii*
California bay	*Umbellularia californica*
California buckeye	*Aesculus califonica*
California coffeeberry	*Rhamnus californica*
California sycamore	*Platanus racemosa*
California wild grape	*Vitis californica*
California wild rose	*Rosa californica*
Chaparral whitethorn	*Ceanothus leucodermis*
Common monkey flower	*Mimulus guttatus*
Common mullein	*Verbascum thapsus*
Common vetch	*Vicia sativa*
Curly dock	*Rumex crispus*
Deerbrush ceanothus	*Ceanothus integerrimus*
Elderberry	*Sambucus* sp.
Flannel bush	*Fremontia californica*
Flowering ash	*Fraximus dipetala*

Foothill pine	*Pinus sabiniana*
Fremont cottonwood	*Populus fremonti*
Himalayan blackberry	*Rubus discolor*
Interior live oak	*Quercus wislizenii*
Lupine	*Lupinus* sp.
Manzanita	*Arctostaphylos viscida*
Mediterranean barley	*Hordeum marinum*
Miner's lettuce	*Claytonia perfoliata*
Mugwort	*Artemisia douglasiana*
Mule's ears	*Wyethia mollis*
Narrow-leafed cattail	*Typha angustifolia*
Narrow-leaved willow	*Salix exigua*
Oregon ash	*Fraxinus latifolia*
Perennial ryegrass	*Lolium perenne*
Phacelia	*Phacelia* sp.
Ponderosa pine	*Pinus ponderosa*
Poison oak	*Toxicodendron diversilobum*
Quaking grass	*Briza minor*
Rabbitsfoot grass	*Polypogon monspeliensis*
Ripgut brome	*Bromus diandrus*
Rose clover	*Trifolium hirtum*
Rush	*Juncus tenuis*
Scarlet pimpernel	*Anagallis arvensis*
Sedge	*Carex densa*
Slender wooly marbles	*Psilocarphus tenellus*
Soft chess	*Bromus hordeaceus*
Spikerush	*Eleocharis* spp.
Squaw bush	*Rhus trilobata*
Stinging nettle	*Urtica dioica*

Valley oak	*Quercus lobata*
Wedgeleaf ceanothus	*Ceanothus cuneatus*
White alder	*Alnus rhombifolia*
Wild oats	*Avena fatua*
Yellow star thistle	*Centaurea solstialis*
Yerba santa	*Eriodictyon californicum*
Fish	
Bluegill	*Lepomis macrochirus*
Catfish	*Ictalurus* sp.
Largemouth bass	*Micropterus salmoides*
Trout	*Salmo* sp.
Amphibians/Reptiles	
Bullfrog	*Rana catesbeiana*
Western fence lizard	*Sceloporus occidentalis*
Western toad	*Bufo boreas*
Birds	
Acorn woodpecker	*Melanerpes formicivorous*
American crow	*Corvus brachyrhynchos*
American kestrel	*Falco sparverius*
American robin	*Turdus migratorius*
Anna's hummingbird	*Calypte anna*
Band-tailed pigeon	*Columba fasciata*
Black phoebe	*Sayornis nigricans*
Belted kingfisher	*Ceryle alcyon*
Brown-headed cowbird	*Molothrus ater*
California quail	*Callipepla californicus*
Common raven	*Corvus corax*
Copper's hawk	*Accipiter cooperii*
Dark-eyed junco	*Junco phaeonotus*

Great egret	*Ardea alba*
Great blue heron	*Ardea herodias*
Great horned owl	*Bubo virginianus*
Housefinch	*Carpodacus mexicanus*
Killdeer	*Charadrius vociferus*
Lesser goldfinch	*Carduelis psaltria*
Mallard	*Anas platyrhynchos*
Mountain chickadee	*Parus gambeli*
Mourning dove	*Zenaida macroura*
Northern flicker	*Colaptes auritus*
Plain titmouse	*Parus inornatus*
Red-winged blackbird	*Agelaius phoeniceus*
Red-tailed hawk	*Buteo jamaicensis*
Rock dove	*Columba livia*
Rufous-sided towhee	*Pipilo erythrophthalmus*
Savannah sparrow	*Passerculus sandwichensis*
Scrub jay	*Aphelocoma coerulescens*
Song sparrow	*Melospiza melodia*
Spotted towhee	*Pipilio erythrophthalmus*
Turkey vulture	*Cathartes aura*
White crowned sparrow	*Zonotrichia leucophrys*
Mammals	
Black-tailed jackrabbit	*Lepus californicus*
Bobcat	*Felis rufus*
Brush rabbit	*Sylvilagus bachmani*
California ground squirrel	*Spermophilus beecheyi*
Coyote	*Canis latrans*
Deer mouse	*Peromyscus maniculatus*
Grey fox	*Urocyon cinereoargenteus*

Mountain Lion	*Felis concolor*
Mule deer	*Odocoileus hemionus*
Opossum	*Dedelphis marsupialis*
Raccoon	*Procyon lotor*
Striped skunk	*Mephittis mephittis*
Western gray squirrel	*Sciurus griseus*



USGS 7.5 Min. Ahwahnee and Fish Camp Quads

SITE AND VICINITY

FOOTHILL ASSOCIATES
ENVIRONMENTAL CONSULTING • PLANNING
LANDSCAPE ARCHITECTURE

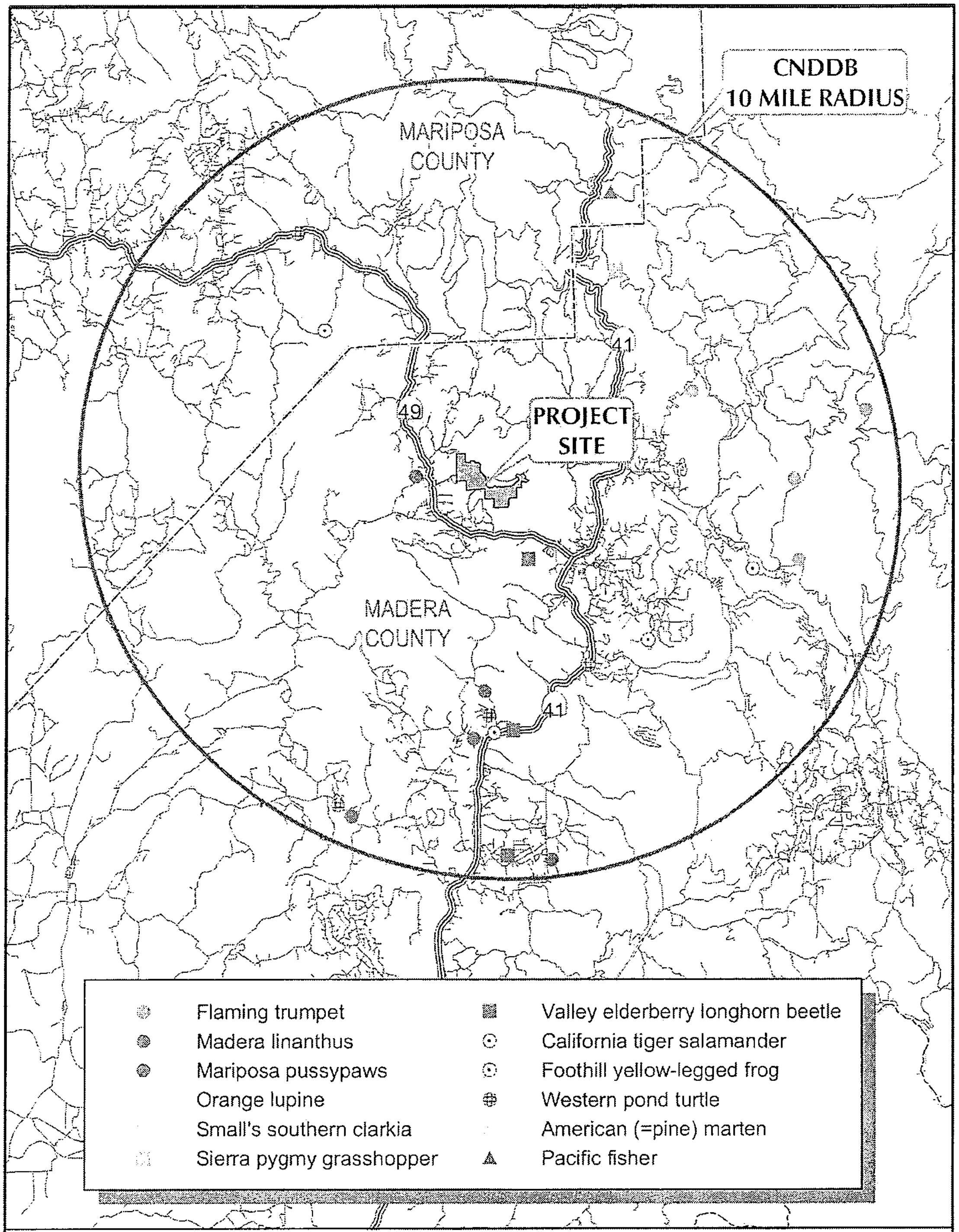
N

0 1000 2000
SCALE IN FEET

FIGURE 1

SIERRA MEADOWS ESTATES

site_and_vicinity.mxd
© 2004



CNDDB

FOOTHILL ASSOCIATES
ENVIRONMENTAL CONSULTING • PLANNING
LANDSCAPE ARCHITECTURE

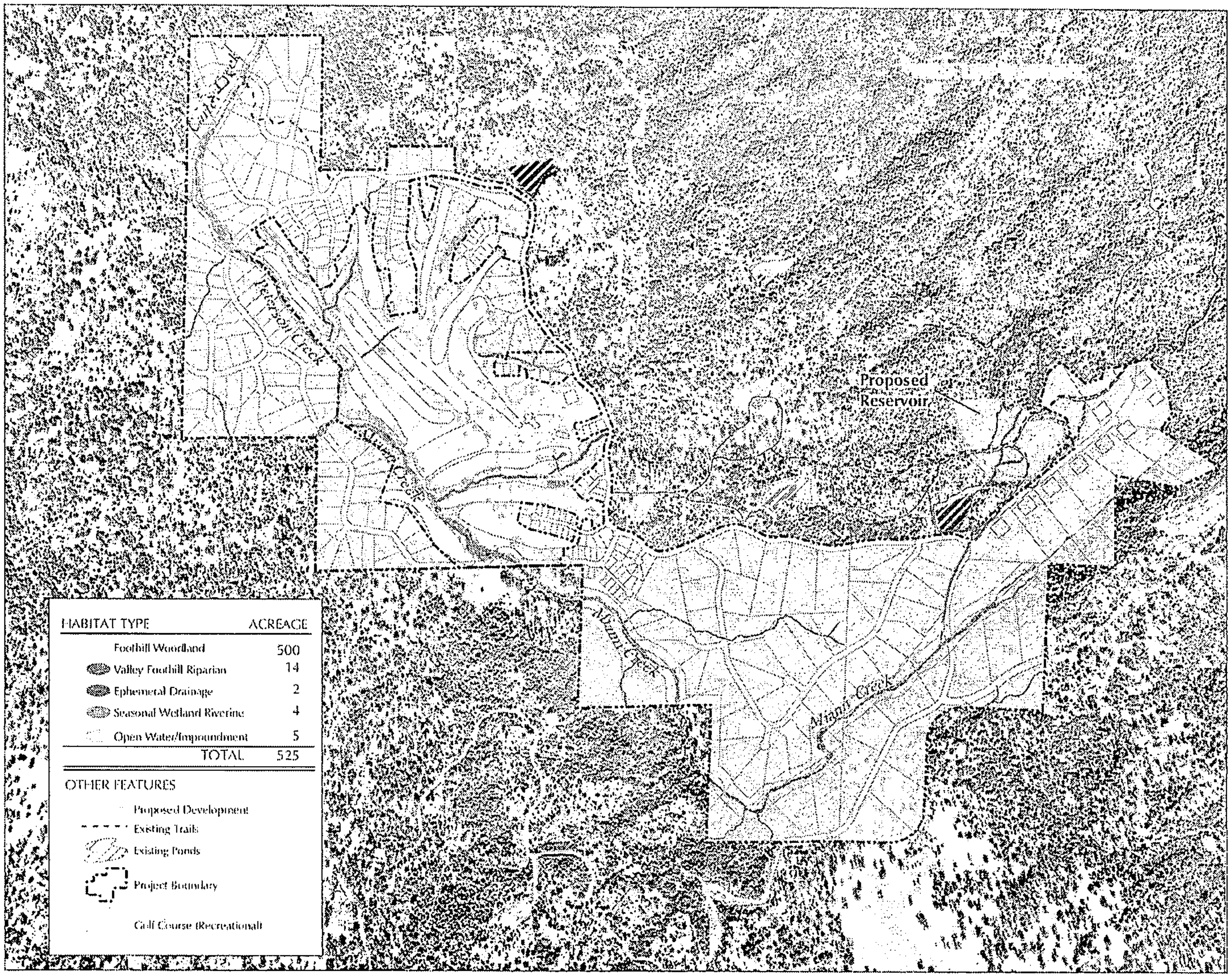
N

0 4
SCALE IN MILES

FIGURE 2

SIERRA MEADOWS ESTATES

SOURCE: CNDDB, 2/5/04



HABITAT TYPE	ACREAGE
Foothill Woodland	500
▨ Valley Foothill Riparian	14
▨ Ephemeral Drainage	2
▨ Seasonal Wetland Riverine	4
▨ Open Water/Impoundment	5
TOTAL	525

OTHER FEATURES

- Proposed Development
- - - - - Existing Trails
- Existing Ponds
- Project Boundary
- Golf Course (Recreational)

Digital base data and wetland survey provided by NOLTE Associates, Inc and RBF Consulting.
Aerial photo of Fish Camp, SW and Awahnee, NW, 6/17/03 provided by Geoimagery.

HABITAT TYPES

SIERRA MEADOWS ESTATES

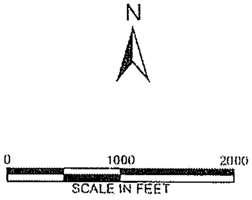
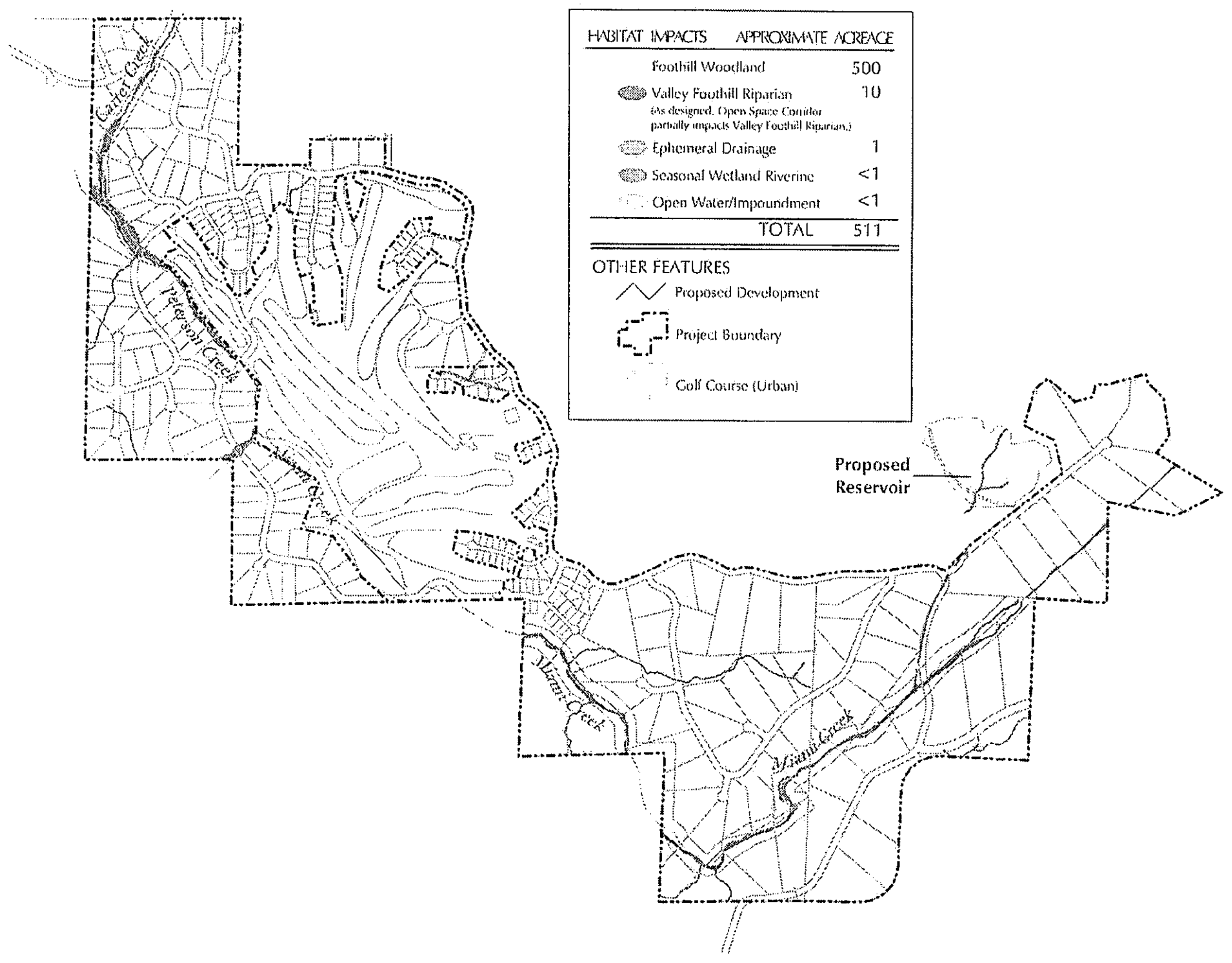


FIGURE 3

FOOTHILL ASSOCIATES

Habitats.mxd



Digital base data and wetland survey provided by NOLTE Associates, Inc and RBF Consulting.
Aerial photo of Fish Camp, SW and Awahnee, NW, 6/17/03 provided by Geoimagery.

HABITAT IMPACTS

SIERRA MEADOWS ESTATES

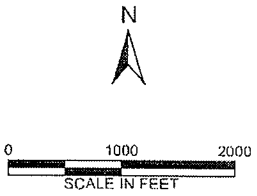


FIGURE 4

FOOTHILL ASSOCIATES

Impacts.mxd

APPENDIX A: VASCULAR PLANTS OF THE STUDY AREA

The plants species listed below have been observed on the study area during surveys conducted by Live Oak Associates on May 9, 12, 13, 14, 21 and 28, July 15, October 15, 17, 22, 27, 28, 29, 30, and November 3, 4, and 7 of 2003. The U.S. Fish and Wildlife Service wetland indicator status of each plant has been shown following its common name.

OBL - Obligate
FACW - Facultative Wetland
FAC - Facultative
FACU - Facultative Upland
UPL - Upland
+/- - Higher/lower end of category
NR - No review
NA - No agreement
NI - No investigation

ANACARDIACEAE — Sumac Family		
Rhus trilobata	Skunkbrush	NI
Toxicodendron diversilobum	Poison Oak	UPL
APIACEAE - Carrot Family		
Daucus pusillus	Queen Anne's Lace	UPL
Lomatium utriculatum	Lomatium	UPL
Sanicula bipinnatifida	Purple Sanicle	UPL
Torilis arvensis	Torilis	UPL
Torilis nodosa	Torilis	UPL
APOCYNACEAE – Dogbane Family		
Vinca minor	Periwinkle	UPL
ARISTOLOCHIACEAE – Pipevine Family		
Asarum lemmonnii	Lemon's Wild Ginger	OBL
ASCLEPIADACEAE - Milkweed Family		
Asclepias fascicularis	Narrow-leaved Milkweed	FAC
Asclepias speciosa	Showy Milkweed	FAC
ASTERACEAE - Sunflower Family		
Achillea millefolium	Yarrow	UPL
Achyrachaena mollis	Blow-wives	UPL
Anaphalis margaritacea	Common Yarrow	FACU
Artemesia douglasiana	Mugwort	FACW
Balsamorhiza macrolepis ssp. *macrolepis*	Balsam Root	UPL
Carduus pycnocephalous	Italian Thistle	UPL
Centauria solstitialis	Yellow Star Thistle	UPL
Chamomilla suaveolens	Rayless Pineapple Weed	UPL
Cirsium vulgare	Bull Thistle	FACU
Conyza canadensis	Canada Horseweed	FAC
Eriophyllum confertiflorum	Golden Yarrow	UPL
Filago californica	Herba Impia	UPL
Gnaphalium canescens ssp. *beneolens*	Cudweed	UPL
Hemizonia kelloggii	Kellogg's Tarweed	UPL
Holocarpha heermanii	Heerman's Tarweed	UPL

Hypochaeris glabra	Smooth Cat's Ear	UPL
Lactuca serriola	Prickly Lettuce	FAC
Madia elegans	Tarweed	UPL
Matricaria matricarioides	Pineapple Weed	FACU
Micropus californicus ssp. *californicus*	Slender Cottonweed	UPL
Picris echioides	Prickly Oxe-Tongue	FAC
Pseudobahiia heermanii	Heerman's Sunburst	UPL
Senecio vulgaris	Common Groundsel	FACU
Silybum marianum	Milk Thistle	UPL
Sonchus oleraceus	Common Sow Thistle	NI
Sonchus asper	Prickly Sow Thistle	FAC
Xanthium strumarium	Rough Cocklebur	FAC*
Wyethia angustifolia	Mule's Ears	UPL
BETULACEAE – Birch Family		
Alnus rhombifolia	White Alder	FACW
BLECHNACEAE – Deer Fern Family		
Woodwardia fimbriata	Giant Chain Fern	FACW+
BORAGINACEAE - Borage Family		
Amsinckia eastwoodiae	Eastwood's Fiddleneck	UPL
Amsinckia menziesii ssp. *intermedia*	Rancher's Fireweed	UPL
Plagiobothrys nothofulvus	Rusty Popcornflower	UPL
BRASSICACEAE - Mustard Family		
Brassica nigra	Black Mustard	UPL
Capsella bursa-pastoris	Shepherds Purse	FAC-
Erysimum capitatum ssp. *capitatum*	Western Wallflower	UPL
Lepidium nitidum ssp. *nitidum*	Peppergrass	UPL
Thlaspi arvense	Field Penny Cress	NI
Thysanocarpus curvipes	Fringepod	UPL
Raphanus sativus	Wild Radish	UPL
Rorippa nasturtium-aquatica	Water Cress	OBL
Tropidocarpum gracile	Tropidocarpum	UPL
CALLITRICHACEAE - Water-Starwort Family		
Callitriche marginata	Winged Water-Starwort	OBL
CAPRIFOLIACEAE — Honeysuckle Family		
Sambucus mexicana	Blue Elderberry	FAC
Symphoricarpus rotundifolius ssp. *rotundifolius*	Snowberry	UPL
Symphoricarpus mollis	Creeping Snowberry	UPL
CARYOPHYLLACEAE - Pink Family		
Minuartia douglasii	Douglas' Sandwort	UPL
Petrorhagia dubia	Petrorhagia	UPL
Silene californica	Catchfly	UPL
Silene gallica	Common Catchfly	UPL
Spergularia rubra	Purple Sand-Spurrey	FAC-
Stellaria media	Common Chickweed	FACU
CRASSULACEAE – Stonecrop Family		
Crassula connata	Stonecrop	UPL
CUCURBITACEAE – Cucumber Family		
Marrah horridus	Man-root	UPL
CYPERACEAE - Nutsedge Family		
Carex praegracilis	Clustered Field Sedge	FACW-
Carex sp.	Sedge	NR

Cyperus eragrostis	Flatsedge	FACW
Eleocharis macrostachya	Creeping Spikerush	OBL
DRYOPTERIDACEAE – Wood Fern Family		
Athyrium felix-femina	Lady Fern	FAC
ERICACEAE – Heath Family		
Arctostaphylos viscida ssp. *mariposa*	Mariposa Manzanita	UPL
Rhododendron occidentale	Western Azalea	FAC
EUPHORBIACEAE - Spurge Family		
Eremocarpus setigerus	Turkey Mullein	UPL
FABACEAE - Pea Family		
Lathyrus latifolius	Broad Leaf Peavine	UPL
Lotus nevadensis ssp. *nevadensis*	Prostrate Clover	UP:
Lotus purshianus	Spanish Clover	UPL
Lotus wrangeleanus	Prostrate clover	UPL
Lupinus albicaulis	Lupine	UPL
Lupinus benthamii	Spider Lupine	UPL
Lupinus bicolor	Miniature Lupine	UPL
Lupinus microcarpus ssp. *densiflorus*	Whorled Lupine	UPL
Lupinus stiversii	Harlequin Lupine	UPL
Medicago lupulina	Black Medic	FAC
Medicagò polymorpha	California Burclover	UPL
Melilotus indica	Indian Sweetclover	FAC
Trifolium ciliolatum	Clover	UPL
Trifolium hirtum	Rose Clover	UPL
Trifolium microcephalum	Small-head Clover	FACU
Trifolium obtusiflorum	Clammy Clover	FAC*
Trifolium repens	White Clover	FACU*
Trifolium subterraneum	Subterranean Clover	UPL
Trifolium variegatum	White-tip Clover	FACW-
Trifolium wildenovii	Tomcat Clover	UPL
Vicia sativa	Vetch	UPL
Vicia villosa ssp. *villosa*	Vetch	UPL
FAGACEAE - Oak Family		
Quercus chrysolepis	Canyon Live Oak	UPL
Quercus douglasii	Blue Oak	UPL
Quercus kelloggii	Black Oak	UPL
Quercus lobata	Valley Oak	FAC*
Quercus wislizenii	Interior Live Oak	UPL
GENTIANACEAE - Gentian Family		
Centaurium venustum	Canchalagua	UPL
GERANIACEAE - Geranium Family		
Erodium botrys	Broad-leaf Filaree	UPL
Erodium cicutarium	Red-stemmed Filaree	UPL
Erodium moschatum	Filaree	UPL
Geranium dissectum	Geranium	UPL
Geranium molle	Geranium	UPL
GROSSULARIACEAE - Gooseberry Family		
Ribes nevadense	Sierra Current	UPL
Ribes quercitorium	Oak Gooseberry	UPL
HIPPOCASTANACEAE - Buckeye Family		
Aesculus californica	California Buckeye	UPL

HYDROPHYLLACEAE - Waterleaf Family		
Eriodictyon californicum	Yerba Santa	UPL
Hydrophyllum occidentale	Western Waterleaf	FACW
Nemophilla heterophylla	Nemophilla	UPL
Nemophilla maculata	Fivespot	UPL
Nemophilla menziesii	Baby Blue Eyes	UPL
Nemophilla parviflora	Small-flowered Nemophilla	UPL
Phacelia ciliata	Phacelia	UPL
Phacelia cicutaria	Caterpillar Phacelia	UPL
Pholistoma auratum ssp. *auratum*	Fiesta Flower	UPL
HYPERICACEAE – St. John's Wort Family		
Hypericum anagalloides	Tinker's Penny	OBL
Hypericum perforatum	St. John's Wort	UPL
JUNCACEAE - Rush Family		
Juncus balticus	Baltic Rush	OBL
Juncus bufonius	Toad Rush	FACW
Juncus dubius	Mariposa Rush	FACW*
Juncus xiphioides	Iris leaved Rush	OBL
Luzula comosa	Hairy Woodrush	NI
LAMIACEAE - Mint Family		
Lamium amplexicaule	Henbit	UPL
Marrubium vulgare	Common Horehound	FAC
Mentha arvensis	Field Mint	FACW
Stachys albens	Hedgenettle	OBL
Stachys ajugoides ssp. *rigida*	Bugle Hedge Nettle	OBL
Trichostemma lanceolatum	Vinegar Weed	UPL
LAURACEAE – Laurel Family		
Umbellularia california	California Bay Laurel	FAC
LILIACEAE - Lily Family		
Brodiaea elegans ssp. *elegans*	Harvest Brodiaea	FACU
Brodiaea laxa	Itherials Spear	UPL
Chlorogalum pomeridianum	Soap Plant	UPL
Dichelostemma capitatum	Blue Dicks	UPL
Dichelostemma volubile	Twining Dichelostemma	UPL
Fritillaria micrantha	Stinkbells	UPL
Sisyrinchium bellum	Blue Eyed Grass	UPL
Triteleia ixioides ssp. *scabra*	Pretty Face	UPL
Zigadenus vininosus ssp. *vininosus*	Meadow Death Camas	FAC
LYTHRACEAE - Loosestrife Family		
Lythrum hyssopifolium	California Loosestrife	FACW
MALVACEAE – Mallow Family		
Malacothamnus fremontii	Fremont's Globe Mallow	UPL
ONAGRACEAE - Evening Primrose Family		
Camissonia sierrae	Sierra Suncups	UPL
Clarkia affinis	Farewell-to-Spring	UPL
Clarkia unguiculata	Farewell-to-Spring	UPL
Epilobium brachycarpum	Willow Herb	UPL
Epilobium ciliatum ssp. *ciliatum*	Willow Herb	FACW
OXALIDACEAE - Oxalis Family		
Oxalis laxa	Oxalis	UPL

PAPAVERACEAE – Poppy Family		
Dicentra formosa	Bleeding Heart	UPL
Eschscholzia californica	California Poppy	UPL
Eschscholzia lobii	Frying Pans	UPL
Platystemon californica	Cream Cups	UPL
PINACEAE – Pine Family		
Abies concolor	White Fir	UPL
Pinus ponderosa	Ponderosa Pine	UPL
Pinus sabiniana	Foothill Pine	UPL
POACEAE - Grass Family		
Aira caryophyllea	Silver European Hairgrass	UPL
Avena fatua	Wild Oat	UPL
Alopecurus saccatus	Pacific Foxtail	OBL
Avena barbata	Slender Wild Oat	UPL
Briza minor	Little Quaking Grass	FACW-
Bromus diandrus	Ripgut	UPL
Bromus hordeaceous	Soft Chess	FACU
Bromus madritensis ssp. *rubens*	Red Brome	UPL
Cynodon dactylon	Bermuda Grass	FAC
Cynoserus echinatus	Hedgehog Dogtail	UPL
Dactylis glomerata	Orchard Grass	FACU
Deschampsia danthonoides	Annual Hairgrass	FACW
Festuca rubra	Fescue	UPL
Hordeum brachyantherum	Meadow Barley	FACW
Hordeum marinum ssp. *gussonianum*	Mediterranean Barley	FACW
Hordeum murinum ssp. *leporinum*	Barley	FACU
Lolium multiflorum	Italian Ryegrass	UPL
Lolium perenne	Perennial Ryegrass	FAC
Melica imperfecta	Oniongrass	UPL
Muhlenbergia rigens	Deergrass	UPL
Nesella pulchra	Needlegrass	UPL
Phalaris arundinacea	Reed Canary Grass	OBL
Poa annua	Annual Bluegrass	FACW-
Poa secunda	Perennial Bluegrass	UPL
Polypogon monspeliensis	Annual Rabbitfoot Grass	FACW+
Taeniatherum caput-madusae	Medusa Head	UPL
Vulpia bromoides	Six-weeks Brome Grass	FACW
Vulpia myuros	Rat-tail Fescue	FACU
POLEMONIACEAE - Phlox Family		
Gilia capitatum	White-topped Gilia	UPL
Gilia tricolor	Bird's Eye Gilia	UPL
Linanthus ciliatus	Whisker Brush	UPL
Linanthus dichotomous	Linanthus	UPL
Navarretia intertexta ssp. *intertexta*	Needleleaf Navarretia	OBL
Navarretia tagetina	Marigold Navarretia	UPL
POLYGONACEAE - Buckwheat Family		
Eriogonum luteolum ssp. *luteolum*	Buckwheat	UPL
Pterostegia drymarioides	Pterostegia	UPL
Rumex acetosella	Sheep Sorrel	FAC-
Rumex crispus	Curley Dock	FACW
Rumex occidentalis	Western Dock	OBL

PORTULACACEAE — Purslane Family		
Calandrinia ciliata	Red Maids	UPL
Calyptridium monospermum	Pussypaws	UPL
Claytonia perfoliata	Miner's Lettuce	UPL
PLANTAGINACEAE – Plantain Family		
Plantago lanceolata	English Plantain	FAC-
PRIMULACEAE - Primrose Family		
Anagallis arvensis	Scarlet Pimpernel	FAC
Dodecatheon hendersonii	Mosquito Bills	UPL
PTERIDACEAE — Brake Family		
Cheilanthes gracillima	Lip Fern	UPL
Pellaea andromedifolia	Coffee Fern	UPL
Pentagramma triangularis ssp. *triangularis*	Golden-back Fern	UPL
Pteridium aquilinum	Bracken Fern	UPL
RANUNCULACEAE — Buttercup Family		
Delphinium hansenii	Hansen's Larkspur	UPL
Ranunculus aquatilis	White-water Buttercup	OBL
Ranunculus californicus	California Buttercup	FAC
Ranunculus occidentalis	Western Buttercup	FACW
RHAMNACEAE — Buckthorn Family		
Ceanothus cuneatus	Wedgeleaf Ceanothus	UPL
Ceonothus integerrimus	Deerbrush	UPL
Ceonothus leucodermis	Chapparal Whitethorn	UPL
Rhamnus californica ssp. *occidentalis*	California Coffeeberry	UPL
ROSACEAE - Rose Family		
Physocarpus capitatus	Shredding Ninebark	FACW
Potentilla glandulosa	Sticky Cinquefoil	UPL
Prunus sp.	Flowering Apple	UPL
Prunus virginiana ssp. *demissa*	Western Chokecherry	FAC-
Rosa californica	California Rose	FAC+
Rosa gymnocarpa	Wood Rose	NI
Rubus discolor	Himalayan Blackberry	FACW
Rubus ursinus	California Blackberry	FACW*
RUBIACEAE - Madder Family		
Galium aparine	Catchweed Bedstraw	FACU
Galium parisiense	Wall Bedstraw	FACU
Galium porrigens	Bedstraw	UPL
SALICACEAE - Willow Family		
Populus fremontii ssp. *fremontii*	Fremont Cottonwood	FACW
Salix laevigata	Red Willow	FACW
SAXIFRAGACEAE – Saxifrag Family		
Lithophragma bolanderi	Woodland Star	UPL
SCROPHULARIACEAE - Figwort Family		
Castilleja attenuata	Valley Tassles	UPL
Castilleja exserta ssp. *exserta*	Purple Owl's Clover	UPL
Collinsia heterophylla	Chinese Houses	UPL
Collinsia tinctoria	Chinese Houses	UPL
Gratiola ebracteata	Bractless Hedge-hyssop	OBL
Mimulus guttatus	Common Monkeyflower	OBL
Mimulus floribundus	Floriferous Monkeyflower	OBL
Mimulus tricolor	Tricolor Monkeyflower	OBL

Pedicularis densiflora	Indian Warrior	UPL
Scrophularia californica	California Bee Plant	UPL
Verbascum thapsus	Common Mullein	UPL
Veronica anagallis-aquatica	Water Speedwell	OBL
Veronica peregrina ssp. *xalapensis*	Purslane Speedwell	OBL
SOLANACEAE – Nightshade Family		
Solanum xantii	Nightshade	UPL
STERCULIACEAE – Flannelbush Family		
Fremontodendron californica	Flannelbush	UPL
TYPHACEAE - Cattail Family		
Typha latifolia	Broad-leaved Cattail	OBL
VERBENACEAE - Vervain Family		
Plectritis ciliosa ssp. *ciliosa*	Plectritis	UPL
Verbena hastate	Blue Vervain	FACW
Verbena litoralis	Vervain	FACW
VISCACEAE - Mistletoe Family		
Phoradendron villosum	Oak Mistletoe	UPL
VITACEAE - Grape Family		
Vitis californica	California Wild Grape	UPL
VIOLACEAE – Violet Family		
Viola pinetorium ssp. *pinetorium*	Pine Violet	UPL

APPENDIX B: TERRESTRIAL VERTEBRATE SPECIES WHICH POTENTIALLY OCCUR ON THE STUDY AREA

The species listed below are those that may reasonably be expected to use the habitats of the study area. The list was not intended to include birds that are vagrants or occasional transients. Its purpose was rather to include those species that may be expected to routinely and predictably use the planning area during some or all of the year. An asterisk denotes a species observed on the project site during the survey conducted in 2003.

CLASS: AMPHIBIA
 ORDER: CAUDATA (Salamanders)
  FAMILY: SALAMANDRIDAE (Newts)
   California Newt (*Taricha torosa*)
  FAMILY: PLETHODONTIDAE (Lungless Salamanders)
   Ensatina (*Ensatina eschscholtzii*)
   Black-bellied Slender Salamander (*Batrachoseps nigriventris*)
   Pacific Slender Salamander (*Batrachoseps pacificus*)
 ORDER: ANURA (Frogs and Toads)
  FAMILY: BUFONIDAE (True Toads)
   Western Toad (*Bufo boreas*)
  FAMILY: HYLIDAE (Tree frogs and Relatives)
   Pacific Treefrog (*Pseudacris regilla*)
  FAMILY: RANADAE (True frogs)
   *Bullfrog (*Rana catesbeiana*)

CLASS: REPTILIA
 ORDER: TESTUDINES (Turtles)
  FAMILY: EMYDIDAE (Box and Water Turtles)
   *Western Pond Turtle (*Clemmys marmorata*)
 ORDER: SQUAMATA (Lizards and Snakes)
  SUBORDER: SAURIA (Lizards)
   FAMILY: IGUANIDAE (Iguanids)
    Western Fence Lizard (*Sceloporus occidentalis*)
    Sagebrush Lizard (*Sceloporus graciosus*)
   FAMILY: SCINCIDAE (Skinks)
    Gilbert Skink (*Eumeces gilberti*)
   FAMILY: ANGUIDAE (Alligator Lizards and Relatives)
    Southern Alligator Lizard (*Gerrhonotus multicarinatus*)
  SUBORDER: SERPENTES (Snakes)
   FAMILY: BOIDAE (Boas)
    Rubber Boa (*Charina bottae*)
   FAMILY: COLUBRIDAE (Colubrids)
    Ring-necked Snake (*Diadophis punctatus*)
    Racer (*Coluber constrictor*)
    Striped Racer (*Masticophis flagellum*)
    Gopher Snake (*Pituophis melanoleucus*)

Common Kingsnake (*Lampropeltis getulus*)
Common Garter Snake (*Thamnophis sirtalis*)
Western Terrestrial Garter Snake (*Thamnophis elegans*)
Night Snake (*Hypsiglena torquata*)
FAMILY: VIPERIDAE
Western Rattlesnake (*Crotalus viridis*)

CLASS: AVES
ORDER: GAVIIFORMES (Loons)
FAMILY: PODICIPEDIDAE (Grebes)
Pied-billed Grebe (*Podilymbus podiceps*)
ORDER: CICONIIFORMES (Herons, Storks, Ibises, and relatives)
FAMILY: ARDEIDAE (Herons and Bitterns)
Great Blue Heron (*Ardea herodias*)
Great Egret (*Ardea alba*)
Snowy Egret (*Egretta thule*)
Green-backed Heron (*Butorides striatus*)
FAMILY: CATHARTIDAE (New World Vultures)
*Turkey Vulture (*Cathartes aura*)
ORDER: ANSERIFORMES (Screamers, Ducks, and relatives)
FAMILY: ANATIDAE (Swans, Geese and Ducks)
Tundra Swan (*Cygnus columbinaus*)
Snow Goose (*Chen caerulescens*)
Canada Goose (*Branta canadensis*)
Wood Duck (*Aix sponsa*)
Green-winged Teal (*Anas crecca*)
*Mallard (*Anas platyrhyncyhos*)
Northern Pintail (*Anas acuta*)
Cinnamon Teal (*Anas cyanoptera*)
Northern Shoveler (*Anas clypeata*)
Gadwall (*Anas strepera*)
American Wigeon (*Anas americana*)
Canvasback (*Aythya valisineria*)
Redhead (*Aythya americana*)
Ring-necked Duck (*Aythya collaris*)
Lesser Scaup (*Aythya affinis*)
Common Goldeneye (*Bucephala clangula*)
Bufflehead (*Bucephala albeola*)
Hooded Merganser (*Lophodytes cucullatus*)
Common Merganser (*Mergus merganser*)
Ruddy Duck (*Oxyura jamaicensis*)
ORDER: FALCONIFORMES (Vultures, Hawks, and Falcons)
FAMILY: ACCIPITRIDAE (Hawks, Old World Vultures, and Harriers)
White-tailed Kite (*Elanus caeruleus*)
*Northern Harrier (*Circus cyaneus*)
Sharp-shinned Hawk (*Accipiter striatus*)
Cooper's Hawk (*Accipiter cooperi*)
Northern Goshawk (*Accipiter gentilis*)
*Red-shouldered Hawk (*Buteo lineatus*)
*Red-tailed Hawk (*Buteo jamaicensis*)
Ferruginous Hawk (*Buteo regalis*)

Rough-legged Hawk (*Buteo lagopus*)
*Golden Eagle (*Aquila chrysaetos*)
Bald Eagle (*Haliaeetus leucocephalus*)

FAMILY: FALCONIDAE (Caracaras and Falcons)

American Kestrel (*Falco sparverius*)
Merlin (*Falco columbarius*)
Peregrine Falcon (*Falco peregrinus*)
Prairie Falcon (*Falco mexicanus*)

ORDER: GALLIFORMES (Megapodes, Currassows, Pheasants, and Relatives)

FAMILY: PHASIANIDAE (Quails, Pheasants, and Relatives)

Wild Turkey (*Melegris gallopavo*)

FAMILY: ODONTOPHORIDAE (New World Quail)

*California Quail (*Callipepla californica*)

ORDER: GRUIFORMES (Cranes, Rails, and relatives)

FAMILY: RALLIDAE (Rails, Gallinules and Coots)

American Coot (*Fulica americana*)

ORDER: CHARADRIIFORMES (Shorebirds, Gulls, and relatives)

FAMILY: CHARADRIIDAE (Plovers and relatives)

Killdeer (*Charadrius vociferus*)

FAMILY: SCOLOPACIDAE (Sandpipers and relatives)

Greater Yellowlegs (*Tringa melanoleuca*)
Spotted Sandpiper (*Actitus macularia*)
Western Sandpiper (*Calidris mauri*)
Least Sandpiper (*Calidris minutilla*)
Long-billed Dowitcher (*Limnodromus scolopaceus*)
Common Snipe (*Gallinago gallinago*)

FAMILY: LARIDAE (Skuas, Gulls, Terns and skimmers)

Ring-billed Gull (*Larus delawarensis*)
California Gull (*Larus californicus*)
Forster's Tern (*Sterna forsteri*)

ORDER: COLUMBIFORMES (Pigeons and Doves)

FAMILY: COLUMBIDAE (Pigeons and Doves)

Band-tailed Pigeon (*Columba fasciata*)
*Mourning Dove (*Zenaida macroura*)

ORDER: CUCULIFORMES (Cuckoos and relatives)

FAMILY: CUCULIDAE (Typical Cuckoos)

Greater Roadrunner (*Geococcyx californianus*)

ORDER: STRIGIFORMES (Owls)

FAMILY: TYTONIDAE (Barn Owls)

Barn Owl (*Tyto alba*)

FAMILY: STRIGIDAE (Typical Owls)

California Spotted Owl (*Strix occidentalis occidentalis*)
Western Screech Owl (*Otus kennicottii*)
*Great Horned Owl (*Bubo virginianus*)
Northern Pygmy-Owl (*Glaucidium gnoma*)
Burrowing Owl (*Athene cunicularia*)
Long-eared Owl (*Asio otus*)
Northern Saw-whet Owl (*Aegolius acadicus*)

ORDER: CAPRIMULGIFORMES (Goatsuckers and Relatives)

FAMILY: CAPRIMULGIDAE (Goatsuckers)

Common Nighthawk (*Chordeiles minor*)

Common Poorwill (*Phalaenoptilus nuttalli*)

ORDER: APODIFORMES (Swifts and Hummingbirds)

FAMILY: APODIDAE (Swifts)

Black Swift (*Cypseloides niger*)
Vaux's Swift (*Chaetura vauxi*)
White-throated Swift (*Aeronautes saxatalis*)

FAMILY: TROCHILIDAE (Hummingbirds)

Black-chinned Hummingbird (*Archilochus alexandri*)
*Anna's Hummingbird (*Calypte anna*)
Calliope Hummingbird (*Stellula calliope*)
Rufous Hummingbird (*Selasphorus rufus*)

ORDER: PICIFORMES (Woodpeckers and Relatives)

FAMILY: PICIDAE (Woodpeckers and Wrynecks)

Lewis's Woodpecker (*Melanerpes lewis*)
*Acorn Woodpecker (*Melanerpes formicivorous*)
Red-breasted Sapsucker (*Sphyrapicus ruber*)
*Nuttall's Woodpecker (*Picoides nuttallii*)
*Downy Woodpecker (*Picoides pubescens*)
Hairy Woodpecker (*Picoides villosis*)
*Northern Flicker (*Colaptes auratus*)

ORDER: PASSERIFORMES (Perching Birds)

FAMILY: TYRANNIDAE (Tyrant Flycatchers)

Olive-sided Flycatcher (*Contopus borealis*)
*Western Wood-Pewee (*Contopus sordidulus*)
Willow Flycatcher (*Empidonax traillii*)
Hammond's Flycatcher (*Empidonax hammondii*)
Dusky Flycatcher (*Empidonax oberholseri*)
Pacific Slope Flycatcher (*Empidonax difficilis*)
*Black Phoebe (*Sayornis nigricans*)
Say's Phoebe (*Sayornis saya*)
Ash-throated Flycatcher (*Myiarchus cinerascens*)
Western Kingbird (*Tyrannus verticalis*)

FAMILY: VIREONIDAE (Typical Vireos)

Solitary Vireo (*Vireo solitarius*)
Hutton's Vireo (*Vireo huttoni*)
Warbling Vireo (*Vireo gilvus*)

FAMILY: CORVIDAE (Jays, Magpies, and Crows)

Steller's Jay (*Cyanocitta stelleri*)
*Western Scrub Jay (*Aphelocoma californica*)
American Crow (*Corvus brachyrhynchos*)
*Common Raven (*Corvus corax*)

FAMILY: HIRUNDINIDAE (Swallows)

Tree Swallow (*Tachycineta bicolor*)
Violet-green Swallow (*Tachycineta thalassina*)
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)
*Cliff Swallow (*Hirundo pyrrhonota*)
Barn Swallow (*Hirundo rustica*)

FAMILY: PARIDAE (Titmice and Relatives)

Mountain Chickadee (*Poecile gambeli*)
Oak Titmouse (*Baeolophus inornatus*)

FAMILY: AEGITHALIDAE (Bushtit)

Bushtit (*Psaltriparus minimus*)

FAMILY: SITTIDAE (Nuthatches)

Red-breasted Nuthatch (*Sitta canadensis*)

White-breasted Nuthatch (*Sitta carolinensis*)

FAMILY: CERTHIIDAE (Creepers)

Brown Creeper (*Certhia americana*)

FAMILY: TROGLODYTIDAE (Wrens)

Rock Wren (*Salpinctes obsoletus*)

Canyon Wren (*Catherpes mexicanus*)

Bewick's Wren (*Thryomanes bewickii*)

*House Wren (*Troglodytes aedon*)

Winter Wren (*Troglodytes troglodytes*)

*Marsh Wren

FAMILY: CINCLIDAE (Dippers)

American Dipper (*Cinclus mexicanus*)

FAMILY: REGULIDAE (Kinglets)

Golden-crowned Kinglet (*Regulus satrapa*)

*Ruby-crowned Kinglet (*Regulus calendula*)

FAMILY: SYLVIDAE: (Old World Warblers and Gnatcatchers)

Blue-gray Gnatcatcher (*Polioptila caerulea*)

FAMILY: TURDIDAE (Thrushes)

Western Bluebird (*Sialia mexicana*)

Mountain Bluebird (*Sialia currucoides*)

Townsend's Solitaire (*Myadestes townsendi*)

Swainson's Thrush (*Catharus ustulatus*)

Hermit Thrush (*Catharus guttatus*)

*American Robin (*Turdus migratorius*)

Varied Thrush (*Ixoreus naevius*)

FAMILY: TIMALIIDAE (Babblers)

*Wrentit (*Chamaea fasciata*)

FAMILY: MIMIDAE (Mockingbirds and Thrashers)

Northern Mockingbird (*Mimus polyglottos*)

FAMILY: STURNIDAE (Starlings)

European Starling (*Sturnus vulgaris*)

FAMILY: MOTACILLIDAE (Wagtails and Pipits)

American Pipit (*Anthus rubescens*)

FAMILY: BOMBYCILLIDAE (Waxwings)

Cedar Waxwing (*Bombycilla cedrorum*)

FAMILY: PTILOGONATIDAE (Silky Flycatchers)

*Phainopepla (*Phainopepla nitens*)

FAMILY: PARULIDAE (Wood Warblers and Relatives)

Orange-crowned Warbler (*Vermivora celata*)

Nashville Warbler (*Vermivora ruficapilla*)

*Yellow Warbler (*Dendroica petechiai*)

Yellow-rumped Warbler (*Dendroica coronata*)

Black-throated Gray Warbler (*Dendroica nigrescens*)

Townsend's Warbler (*Dendroica townsendi*)

Hermit Warbler (*Dendroica occidentalis*)

MacGillivray's Warbler (*Oporornis tolmiei*)

Wilson's Warbler (*Wilsonia pusilla*)

FAMILY: THRAUPIDAE (Tanagers)

Western Tanager (*Piranga ludoviciana*)

FAMILY: EMBERIZIDAE (Emberizines)

Green-tailed Towhee (*Pipilo chlorurus*)
Spotted Towhee (*Pipilo maculatus*)
*California Towhee (*Pipilo crissalis*)
Rufous-crowned Sparrow (*Aimophila ruficeps*)
Chipping Sparrow (*Spizella passerina*)
Black-chinned Sparrow (*Spizella atrogularis*)
Vesper Sparrow (*Pooecetes gramineus*)
Lark Sparrow (*Chondestes grammacus*)
Savannah Sparrow (*Passerculus sandwichensis*)
*Fox Sparrow (*Passerella iliaca*)
*Song Sparrow (*Melospiza melodia*)
Lincoln's Sparrow (*Melospiza lincolnii*)
Golden-crowned Sparrow (*Zonotrichia atricapilla*)
White-crowned Sparrow (*Zonotrichia leucophrys*)
Dark-eyed Junco (*Junco hyemalis*)

FAMILY: CARDINALIDAE (Cardinals, Grosbeaks and Allies)

*Black-headed Grosbeak (*Pheucticus melanocephalus*)
Lazuli Bunting (*Passerina amoena*)

FAMILY: ICTERIDAE (Blackbirds, Orioles and Allies)

*Red-winged Blackbird (*Agelaius phoeniceus*)
*Brewer's Blackbird (*Euphagus cyanocephalus*)
Brown-headed Cowbird (*Molothrus ater*)
Bullock's Oriole (*Icterus bullockii*)

FAMILY: FRINGILLIDAE (Finches)

*Purple Finch (*Carpodacus purpureus*)
House Finch (*Carpodacus mexicanus*)
Pine Siskin (*Carduelis pinus*)
*Lesser Goldfinch (*Carduelis psaltria*)
Evening Grosbeak (*Coccothraustes vespertinus*)

CLASS: MAMMALIA

ORDER: DIDELPHIMORPHIA (Marsupials)

FAMILY: DIDELPHIDAE (Opossums)

Virginia Opossum (*Didelphis virginiana*)

ORDER: INSECTIVORA (Shrews and Moles)

FAMILY: SORICIDAE (Shrews)

Ornate Shrew (*Sorex ornatus*)
Trowbridge's Shrew (*Sorex trowbridgii*)

FAMILY: TALPIDAE (Moles)

Broad-footed Mole (*Scapanus latimanus*)

ORDER: CHIROPTERA (Bats)

FAMILY: VESPERTILIONIDAE (Vespertilionid Bats)

Little Brown Myotis (*Myotis lucifugus*)
Yuma Myotis (*Myotis yumanensis*)
Long-eared Myotis, (*Myotis evotis*)
Fringed Myotis (*Myotis thysanodes*)
Long-legged Myotis (*Myotis volans*)
California Myotis (*Myotis californicus*)
Small-footed Myotis (*Myotis leibii*)

Western Pipistrelle (*Pipistrellus hesperus*)
Big Brown Bat (*Eptesicus fuscus*)
Red Bat (*Lasiurus borealis*)
Hoary Bat (*Lasiurus cinereus*)
Spotted Bat (*Euderma maculatum*)
Townsend's Big-eared Bat (*Plecotus townsendii*)
Pallid Bat (*Antrozous pallidus*)
FAMILY: MOLOSSIDAE (Free-tailed Bat)
Brazilian Free-tailed Bat (*Tadarida brasiliensis*)
Western Mastiff Bat (*Eumops perotis*)
ORDER: LAGOMORPHA (Rabbits, Hares, and Pikas)
FAMILY: LEPORIDAE (Rabbits and Hares)
Brush Rabbit (*Sylvilagus bachmani*)
Desert Cottontail (*Sylvilagus audubonii*)
Black-tailed Hare (*Lepus californicus*)
ORDER: RODENTIA (Squirrels, Rats, Mice, and Relatives)
FAMILY: APLODONTIDAE (Mountain beaver)
Sierra Nevada Mountain Beaver (*Aplodontia rufa californica*)
FAMILY: SCIURIDAE (Squirrels, Chipmunks, and Marmots)
California Ground Squirrel (*Spermophilus beecheyi*)
Western Gray Squirrel (*Sciurus griseus*)
FAMILY: GEOMYIDAE (Pocket Gophers)
Botta's Pocket Gopher (*Thomomys bottae*)
FAMILY: HETEROMYIDAE (Pocket Mice and Kangaroo Rats)
California Pocket Mouse (*Perognathus californicus*)
FAMILY: CASTORIDAE (Beavers)
*American Beaver (*Castor canadensis*)
FAMILY: MURIDAE (Mice, Rats and Voles)
Western Harvest Mouse (*Reithrodontomys megalotis*
California Mouse (*Peromyscus californicus*)
Deer Mouse (*Peromyscus maniculatus*)
Brush Mouse (*Peromyscus boylii*)
Dusky-footed Wood Rat (*Neotoma fuscipes*)
California Vole (*Microtus californicus*)
ORDER: CARNIVORA (Carnivores)
FAMILY: CANIDAE (Foxes, Wolves, and Relatives)
*Feral Dog (*Canis familiaris*)
*Coyote (*Canis latrans*)
Red Fox (*Vulpes vulpes*)
Gray Fox (*Urocyon cinereoargenteus*)
FAMILY: PROCYONIDAE (Raccoons and Relatives)
Ringtail (*Bassariscus astutus*)
*Raccoon (*Procyon lotor*)
FAMILY: MUSTELIDAE (Weasels, Badgers, and Relatives)
Long-tailed Weasel (*Mustela frenata*)
American Badger (*Taxidea taxus*)
FAMILY: MEPHITIDAE (Skunks)
Western Spotted Skunk (*Spilogale gracilis*)
Striped Skunk (*Mephitis mephitis*)
FAMILY: FELIDAE (Cats)
Feral Cat (*Felis cattus*)

Mountain Lion (*Felis concolor*)
Bobcat (*Lynx rufus*)

ORDER: ARTIODACTYLA

FAMILY: CERVIDAE (Deer, Elk, and Relatives)

*Mule Deer (*Odocoileus hemionus*)

APPENDIX C. BLUE ELDERBERRY DATA COLLECTED AT SIERRA MEADOWS IN 2003

Appendix C. Blue Elderberry Data for the Sierra Meadows Project. 2003.

Original Shrub Number on Flagging	New Shrub Number from Maps	Number of Stems Between 1 and 3 Inches in Diameter	Number of Stems Between 3 and 5 Inches in Diameter	Number of Stems Greater than 5 Inches in Diameter	Occurrence in Riparian Woodland	Presence and Number of Potential VELB Exit Holes	Directly Impacted (Red)
1	19	3	0	0	No	0	
2	18	1	0	0	No	0	
3	20	1	0	0	No	0	1
4	1	1	1	0	No	0	1
5	22	7	1	0	No	0	
6	21	4	0	0	Yes	0	
7	7	0	1	1	Yes	0	
8	6	5	2	0	No	0	
9	8	0	1	0	No	0	
10	3	1	0	1	Yes	0	
11	4	0	0	2	Yes	1	
12	2	2	1	0	Yes	0	
13	5	2	0	0	No	0	
14	11	1	1	0	Yes	0	1
15	15	7	0	2	No	0	1
16	9	2	1	0	No	0	1
17	12	2	0	0	No	0	1
18	13	1	0	0	No	0	1
19	10	1	1	1	No	3	1
20	14	2	0	0	No	0	1
21	17	2	0	1	No	0	1
22	16	8	1	0	No	0	1
23	30	6	0	0	Yes	0	
24	27	3	0	0	No	0	
25	28	1	0	0	No	0	
26	29	0	0	1	No	0	
27	24	3	1	0	No	0	
28	25	0	1	2	No	0	
29	26	3	0	0	Yes	0	1
30	23	4	1	0	Yes	9	
31	61	1	0	0	Yes	0	
32	62	0	0	2	No	0	
33	63	2	0	0	Yes	0	
34	64	5	0	0	Yes	0	
35	58	2	1	1	Yes	0	
36	57	1	0	0	Yes	0	
37	59	1	0	0	No	0	
38	60	6	1	0	No	0	
39	50	8	0	0	Yes	0	
40	48	10	2	1	Yes	0	
41	49	3	0	0	Yes	0	
42	51	0	0	1	Yes	0	
43	55	3	0	0	Yes	0	1
44	54	8	0	0	Yes	0	1
45	56	1	0	0	No	0	1
46	52	1	0	0	No	0	1
47	53	4	0	0	No	0	1
48	47	6	0	0	Yes	0	
49	45	6	0	0	Yes	0	
50	40	5	0	0	Yes	0	
51	39	2	1	0	Yes	0	
52	41	2	0	0	Yes	0	
53	38	4	0	1	Yes	0	
54	37	5	0	0	Yes	0	
55	42	7	0	0	Yes	0	
56	44	1	2	0	Yes	0	
57	34	1	0	1	Yes	0	
58	32	2	0	0	No	0	
59	33	1	0	0	Yes	0	
60	35	1	0	0	Yes	0	
61	36	2	0	0	Yes	0	
62	31	2	0	0	Yes	0	
63	46	2	0	0	Yes	0	
64	65	0	4	0	No	0	
65	139	4	0	0	No	0	
66	138	3	2	0	No	0	

Appendix C. Blue Elderberry Data for the Sierra Meadows Project, 2003.

Original Shrub Number on Flagging	New Shrub Number from Maps	Number of Stems Between 1 and 3 Inches in Diameter	Number of Stems Between 3 and 5 Inches in Diameter	Number of Stems Greater than 5 Inches in Diameter	Occurrence in Riparian Woodland	Presence and Number of Potential VELB Exit Holes	Directly Impacted (Red)
67	137	5	0	0	No	0	
68	127	7	0	0	No	1	1
69	319	5	0	0	No	0	1
70	320	0	2	0	No	0	1
71	318	3	2	1	No	0	
72	370	7	2	0	No	0	
73	369	0	3	1	No	0	
74	322	5	1	1	No	0	
75	365	1	0	0	No	0	
76	364	5	2	1	No	0	
77	363	0	3	1	No	0	
78	117	5	0	0	No	0	
79	113	5	2	0	No	0	
80	112	3	1	0	No	0	
81	110	8	1	0	No	0	1
82	114	2	0	0	No	0	
83	349	4	1	0	No	0	
84	348	3	1	0	No	0	
85	347	2	0	0	No	0	
86	362	0	0	1	No	0	
87	361	3	0	0	No	0	
88	360	6	1	0	No	0	
89	352	0	1	0	No	0	
90	109	1	1	1	No	0	
91	346	1	1	0	No	0	
92	108	33	5	1	No	0	
93	111	0	0	1	No	1	
94	115	1	2	1	No	1	
95	116	2	3	1	No	0	
96	118	3	1	0	No	0	
97	120	1	1	1	No	0	
98	350	1	0	0	No	0	
99	351	2	1	0	No	0	
100	353	5	0	0	No	0	
101	358	0	1	1	No	0	
102	359	2	2	1	No	0	
103	357	6	0	0	No	0	
104	356	0	1	0	No	0	
105	355	1	0	0	No	0	1
106	321	2	0	0	No	0	
107	371	1	2	1	No	2	
108	372	0	2	1	No	0	
109	354	3	3	2	No	0	
110	378	4	0	1	No	0	
111	377	3	4	3	No	0	
112	375	0	0	2	No	6	
113	380	1	0	2	No	0	
114	376	0	2	1	No	1	
115	374	13	0	0	No	0	
116	379	2	0	1	No	1	
117	373	2	0	0	No	0	
118	392	1	1	0	No	0	
119	230	3	0	0	No	0	
120	231	10	0	1	No	3	
121	381	3	5	0	No	0	
122	382	3	0	0	No	0	
123	386	3	0	0	No	0	
124	385	4	0	0	No	1	
125	383	4	1	0	No	0	
126	384	2	2	1	No	0	
127	394	8	0	0	No	0	
128	395	1	0	0	No	0	
129	396	1	0	0	No	6	
130	343	0	1	0	No	0	
131	344	0	2	0	No	0	
132	397	6	0	0	No	4	

Appendix C. Blue Elderberry Data for the Sierra Meadows Project. 2003.

Original Shrub Number on Flagging	New Shrub Number from Maps	Number of Stems Between 1 and 3 Inches in Diameter	Number of Stems Between 3 and 5 Inches in Diameter	Number of Stems Greater than 5 Inches in Diameter	Occurrence in Riparian Woodland	Presence and Number of Potential VELB Exit Holes	Directly Impacted (Red)
133	398	3	2	2	No	24	
134	159	1	0	1	No	0	
135	160	2	1	0	No	0	
136	162	1	0	0	No	0	1
137	163	4	0	0	No	0	1
138	164	1	0	0	No	0	1
139	161	2	0	0	No	0	1
140	165	6	1	0	No	0	1
141	147	9	5	2	No	0	
142	158	2	0	0	No	0	
143	144	2	0	0	No	0	1
144	145	9	0	0	No	0	1
145	146	0	1	3	No	10	1
146	148	4	0	2	No	6	1
147	150	12	0	0	No	0	
148	149	4	0	0	No	4	1
149	135	1	0	0	No	0	
150	136	5	1	1	No	5	
151	134	5	0	0	No	0	
152	133	1	0	1	No	0	1
153	132	0	0	3	No	0	1
154	121	1	0	0	No	0	
155	126	1	0	0	No	0	
156	125	6	0	0	No	0	
157	124	4	0	0	No	0	1
158	130	5	1	0	No	0	
159	128	1	0	0	No	0	1
160	129	0	1	0	No	0	1
161	331	5	0	0	No	0	
162	300	1	0	0	No	0	
163	301	18	0	0	No	2	
164	302	4	2	1	No	2	
165	303	12	0	4	No	5	
166	299	2	0	0	No	0	
167	298	2	0	0	No	0	
168	296	6	1	0	No	1	
169	297	3	2	0	No	2	
170	295	7	0	0	No	0	
171	287	2	0	0	No	0	
172	294	1	1	0	No	3	
173	286	5	0	0	No	0	1
174	330	20	0	0	No	5	
175	281	1	0	0	No	0	1
176	279	11	0	0	No	0	1
177	280	1	2	1	No	0	1
178	282	1	0	0	No	0	
179	283	2	0	0	No	0	
180	285	1	0	0	No	0	
181	284	6	0	0	No	0	
182	271	1	0	0	No	0	
183	270	3	0	0	No	0	
184	272	3	0	1	No	0	
185	273	2	1	0	No	0	
186	269	0	2	2	No	0	
187	268	6	2	3	No	5	
188	266	4	0	0	No	0	
189	265	2	0	0	No	0	
190	275	1	0	2	No	0	
191	276	6	0	0	No	0	
192	277	3	0	1	No	2	
193	278	1	0	1	No	0	
194	264	0	0	1	No	0	
195	274	2	0	0	No	0	
196	263	3	0	0	No	0	1
197	262	3	0	0	No	0	
198	267	8	0	0	No	2	

Appendix C. Blue Elderberry Data for the Sierra Meadows Project. 2003.

Original Shrub Number on Flagging	New Shrub Number from Maps	Number of Stems Between 1 and 3 Inches in Diameter	Number of Stems Between 3 and 5 Inches in Diameter	Number of Stems Greater than 5 Inches in Diameter	Occurrence in Riparian Woodland	Presence and Number of Potential VELB Exit Holes	Directly Impacted (Red)
199	305	5	0	0	No	0	
200	306	1	0	0	No	0	
201	329	2	0	1	No	0	
202		0	0	1	No	0	
203	304	6	0	1	No	0	
204	131	2	0	1	No	0	1
205	123	8	0	1	No	0	
206	122	5	0	1	No	0	
207	336	1	0	0	No	0	1
208	337	2	2	1	No	0	1
209	340	2	0	0	No	0	1
210	339	1	2	0	No	2	
211	338	2	0	0	No	0	
212	341	1	2	0	No	0	
213	342	1	0	0	No	0	1
214	335	0	0	1	No	0	1
215	334	6	0	0	No	0	
216	308	2	0	0	No	0	
217	180	1	0	0	No	0	1
218	179	5	0	1	No	0	1
219	311	5	0	0	No	0	1
220	315	4	0	0	No	0	
221	314	5	0	1	No	3	
222	312	2	1	0	No	0	
223	316	10	3	5	No	0	
224	313	11	4	0	No	2	
225	188	5	0	1	No	0	
226	227	1	1	0	No	0	
227	224	2	0	3	No	0	
228	225	0	1	2	No	5	
229	226	2	0	0	No	0	
230	222	9	0	0	No	3	
231	182	0	0	4	No	0	
232	229	3	0	0	No	3	
233	223	2	0	0	No	0	
234	187	2	0	0	No	0	
235	151	2	0	0	No	0	1
236	152	1	0	0	No	0	1
237	327	2	0	0	No	12	1
238	166	1	0	0	No	0	1
239	155	1	0	0	No	0	1
240	186	0	1	0	No	0	
241	181	2	0	1	No	0	
242		1	0	1	No	0	
243	189	2	2	0	No	4	
244	191	3	1	1	No	0	
245	190	0	1	0	No	0	
246	192	1	1	0	No	3	
247	193	0	1	2	No	1	
248	198	2	2	0	No	0	
249	197	2	1	0	No	0	1
250	310	1	0	0	No	10	1
251	309	0	0	1	No	7	1
252	178	0	1	1	No	0	
253	177	1	1	1	No	4	
254	153	1	0	0	No	0	1
255	154	0	1	1	No	0	1
256	172	0	0	5	No	2	1
257	174	1	2	1	No	2	1
258	173	6	0	0	No	0	
259	175	0	1	2	No	8	1
260	171	3	1	3	No	0	1
261	167	1	0	1	No	1	1
262	169	2	0	0	No	1	1
263	170	0	0	1	No	2	1
264	168	0	0	1	No	9	1

Appendix C. Blue Elderberry Data for the Sierra Meadows Project. 2003.

Original Shrub Number on Flagging	New Shrub Number from Maps	Number of Stems Between 1 and 3 Inches in Diameter	Number of Stems Between 3 and 5 Inches in Diameter	Number of Stems Greater than 5 Inches in Diameter	Occurrence in Riparian Woodland	Presence and Number of Potential VELB Exit Holes	Directly Impacted (Red)
265	176	1	2	0	No	1	1
266	196	1	1	0	No	0	1
267	199	2	0	0	No	0	1
268	254	3	0	0	No	0	
269	203	0	1	0	No	0	
270	200	0	0	1	No	0	
271	202	1	0	0	No	3	
272	201	3	1	3	No	10	
273	194	0	0	2	No	11	
274	208	0	2	1	No	0	
275	210	0	0	1	No	2	
276	209	9	3	1	No	0	
277	212	4	0	0	No	6	1
278	215	1	0	0	No	3	1
279	216	2	1	0	No	0	1
280	220	0	0	2	No	0	1
281	221	1	0	0	No	0	
282	195	1	1	0	No	0	
283		2	0	1	No	9	
284	218	4	0	2	No	0	
285	217	2	0	0	No	0	1
286	207	3	0	0	No	0	1
287	291	3	0	0	No	3	1
288	206	0	0	1	No	8	
289	205	0	1	1	No	2	
290	204	1	1	1	No	0	1
291	213	1	0	1	No	5	
292	214	4	0	0	No	0	
293	211	7	2	0	No	29	
294	228	0	0	1	No	5	
295	233	0	0	1	No	4	
296	234	1	0	0	No	6	
297	232	2	0	0	No	3	
298	235	2	0	0	No	0	
299	237	9	4	2	No	13	
300	404	3	2	0	No	6	
301	403	2	2	1	No	0	
302	399	3	1	0	No	0	
303	401	0	2	2	No	0	
304	402	1	2	1	No	0	
305	405	1	1	0	No	0	
306	244	3	2	3	No	0	
307	293	4	0	0	No	0	
308	242	4	0	0	No	0	
309	243	2	1	2	No	0	
310	241	2	0	1	No	6	1
311	240	0	1	2	No	4	1
312	253	0	0	1	No	0	1
313	252	2	2	1	No	0	
314	249	0	0	3	No	4	
315	248	1	0	1	No	2	
316	247	1	0	0	No	0	
317	261	2	0	0	No	1	
318	256	1	1	3	No	6	
319	251	2	0	0	No	0	
320	257	1	0	1	No	3	
321	258	0	1	0	No	2	
322	255	0	0	1	No	2	
323	250	0	1	0	No	6	
324	259	0	0	1	No	7	
325	260	0	0	2	No	10	
326	317	0	1	2	No	9	
327	238	0	0	3	No	11	1
328	239	4	0	4	No	0	
329	292	2	0	0	No	0	
330	236	0	3	0	No	8	

Appendix C. Blue Elderberry Data for the Sierra Meadows Project. 2003.

Original Shrub Number on Flagging	New Shrub Number from Maps	Number of Stems Between 1 and 3 Inches in Diameter	Number of Stems Between 3 and 5 Inches in Diameter	Number of Stems Greater than 5 Inches in Diameter	Occurrence in Riparian Woodland	Presence and Number of Potential VELB Exit Holes	Directly Impacted (Red)
331	245	0	0	1	No	1	
332	246	0	0	1	No	4	
333	91	0	0	6	No	4	
334	415	0	0	1	No	0	1
335	414	3	0	1	No	0	1
336	416	1	0	0	No	0	1
337	418	0	0	3	No	2	
338	419	0	0	1	No	4	
339	417	1	0	0	No	0	1
340	82	5	0	1	No	6	
341	95	0	0	1	No	7	
342	105	0	1	0	No	1	
343	104	0	1	1	No	2	
344	119	1	0	0	No	0	
345	106	3	0	0	No	1	
346	107	0	1	0	No	4	
347	100	1	0	0	No	0	
348	103	0	1	0	No	0	
349	101	10	1	2	No	0	
350	102	11	0	0	No	6	
351	99	1	0	0	No	0	
352	97	4	4	3	No	5	
353	98	4	0	7	No	0	
354	96	4	2	2	No	0	
355	424	0	1	1	No	0	
356	425	1	0	1	No	6	
357	426	6	1	0	No	6	
358	427	0	1	1	No	35	
359	423	6	4	2	No	18	
360	422	0	3	1	No	0	
361	421	1	0	3	No	2	
362	430	0	0	1	No	10	
363	420	0	4	1	No	4	
364	429	1	0	0	No	0	
365	69	1	0	0	No	16	
366	413	1	1	1	No	7	
367	411	4	3	1	No	0	
368	407	0	0	1	No	11	
369	408	0	0	2	No	3	1
370	409	0	0	1	No	1	1
371	410	2	0	3	No	8	1
372	412	2	1	1	No	9	1
373	70	0	0	3	No	12	
374	73	2	4	0	No	0	1
375	71	1	0	0	No	0	
376	72	0	1	0	No	0	1
377	90	1	0	0	No	0	
378	431	0	0	1	No	0	
379	89	0	0	1	No	3	
380	88	1	1	0	No	2	
381	77	0	1	0	No	8	
382	78	0	0	1	No	8	
383	432	0	0	1	No	7	
384	80	3	1	4	No	5	1
385	81	0	0	1	No	9	1
386	79	0	0	1	No	0	1
387	406	3	0	0	No	0	
388	76	1	0	0	No	0	
389	75	3	0	1	No	1	
390	83	2	1	3	No	6	
391	143	0	1	1	No	0	
392	307	1	1	1	No	2	1
393	140	3	2	1	No	17	
394	142	2	2	0	No	10	

Appendix C. Blue Elderberry Data for the Sierra Meadows Project. 2003.

Original Shrub Number on Flagging	New Shrub Number from Maps	Number of Stems Between 1 and 3 Inches in Diameter	Number of Stems Between 3 and 5 Inches in Diameter	Number of Stems Greater than 5 Inches in Diameter	Occurrence in Riparian Woodland	Presence and Number of Potential VELB Exit Holes	Directly Impacted (Red)
395	141	0	0	1	No	4	
396	428	1	0	2	No	0	
397	345	0	0	1	No	0	
398	84	0	0	1	No	1	
399	86	3	0	0	No	0	
400	87	0	1	2	No	0	
401	85	1	0	0	No	10	
	Total	1019	242	264	35 Yes 366 No	700	98

APPENDIX D. MIGITATION REQUIREMENTS FOR IMPACTS TO VALLEY ELDERBERRY LONGHORN BEETLE HABITAT AT SIERRA MEADOWS

Appendix D. Mitigation Requirements for Impacts to Valley Elderberry Longhorn Beetle Habitat for the Sierra Meadows Project. June 2004.

Original Shrub Number on Flagging	New Shrub Number as Shown on Maps	Number of Stems between 1 and 3 Inches in Diameter	USFWS Mit. Ratio	Number of Stems between 3 and 5 Inches in Diameter	USFWS Mit. Ratio	Number of Stems Greater than 5 Inches in Diameter	USFWS Mit. Ratio	Number of Elderberry Plantings Required	Occurrence in Riparian Woodland	Presence and Number of Potential VELB Exit Holes
3	20	**1**	1 to 1	**0**	2 to 1	**0**	3 to 1	3	No	0
4	1	**1**	1 to 1	**1**	2 to 1	**0**	3 to 1	3	No	0
14	11	**1**	2 to 1	**1**	3 to 1	**0**	4 to 1	5	Yes	0
15	15	**7**	1 to 1	**0**	2 to 1	**2**	3 to 1	13	No	0
16	9	**2**	1 to 1	**1**	2 to 1	**0**	3 to 1	4	No	0
17	12	**2**	1 to 1	**0**	2 to 1	**0**	3 to 1	2	No	0
18	13	**1**	1 to 1	**0**	2 to 1	**0**	3 to 1	1	No	0
19	10	**1**	2 to 1	**1**	4 to 1	**1**	6 to 1	12	No	3
20	14	**2**	1 to 1	**0**	2 to 1	**0**	3 to 1	2	No	0
21	17	**2**	1 to 1	**0**	2 to 1	**1**	3 to 1	5	No	0
22	16	**8**	1 to 1	**1**	2 to 1	**0**	3 to 1	10	No	0
29	26	**3**	2 to 1	**0**	3 to 1	**0**	4 to 1	6	Yes	0
43	55	**3**	2 to 1	**0**	3 to 1	**0**	4 to 1	6	Yes	0
44	54	**8**	2 to 1	**0**	3 to 1	**0**	4 to 1	16	Yes	0
45	56	**1**	1 to 1	**0**	2 to 1	**0**	3 to 1	1	No	0
46	52	**1**	1 to 1	**0**	2 to 1	**0**	3 to 1	1	No	0
47	53	**4**	1 to 1	**0**	2 to 1	**0**	3 to 1	4	No	0
68	127	**7**	2 to 1	**0**	4 to 1	**0**	6 to 1	14	No	1
69	319	**5**	1 to 1	**0**	2 to 1	**0**	3 to 1	5	No	0
70	320	**0**	1 to 1	**2**	2 to 1	**0**	3 to 1	4	No	0
79	386	**0**	1 to 1	**0**	2 to 1	**1**	3 to 1	2	No	0
80	384	**3**	1 to 1	**1**	2 to 1	**4**	3 to 1	17	No	0
81	110	**8**	1 to 1	**1**	2 to 1	**0**	3 to 1	10	No	0
105	355	**1**	1 to 1	**0**	2 to 1	**0**	3 to 1	1	No	0
136	162	**1**	1 to 1	**0**	2 to 1	**0**	3 to 1	1	No	0
137	163	**4**	1 to 1	**0**	2 to 1	**0**	3 to 1	4	No	0
138	164	**1**	1 to 1	**0**	2 to 1	**0**	3 to 1	1	No	0
139	161	**2**	1 to 1	**0**	2 to 1	**0**	3 to 1	2	No	0
140	165	**6**	1 to 1	**1**	2 to 1	**0**	3 to 1	6	No	0
143	144	**2**	1 to 1	**0**	2 to 1	**0**	3 to 1	2	No	0
144	145	**9**	1 to 1	**0**	2 to 1	**0**	3 to 1	9	No	0
145	146	**0**	2 to 1	**1**	4 to 1	**3**	6 to 1	22	No	10
146	148	**4**	2 to 1	**0**	4 to 1	**2**	6 to 1	20	No	6
148	149	**4**	2 to 1	**0**	4 to 1	**0**	6 to 1	8	No	4
152	133	**1**	1 to 1	**0**	2 to 1	**1**	3 to 1	4	No	0
153	132	**0**	1 to 1	**0**	2 to 1	**3**	3 to 1	9	No	0
157	124	**4**	1 to 1	**0**	2 to 1	**0**	3 to 1	4	No	0
159	128	**1**	1 to 1	**0**	2 to 1	**0**	3 to 1	1	No	0
160	129	**0**	1 to 1	**1**	2 to 1	**0**	3 to 1	2	No	0
173	286	**5**	1 to 1	**0**	2 to 1	**0**	3 to 1	5	No	0
175	281	**1**	1 to 1	**0**	2 to 1	**0**	3 to 1	1	No	0
176	279	**11**	1 to 1	**0**	2 to 1	**0**	3 to 1	11	No	0
177	280	**1**	1 to 1	**2**	2 to 1	**1**	3 to 1	8	No	0

Appendix D. Mitigation Requirements for Impacts to Valley Elderberry Longhorn Beetle Habitat for the Sierra Meadows Project. 2003.

Original Shrub Number on Flagging	New Shrub Number as Shown on Maps	Number of Stems between 1 and 3 Inches in Diameter	USFWS Mit. Ratio	Number of Stems between 3 and 5 Inches in Diameter	USFWS Mit. Ratio	Number of Stems Greater than 5 Inches in Diameter	USFWS Mit. Ratio	Number of Elderberry Plantings Required	Occurrence in Riparian Woodland	Presence and Number of Potential VELB Exit Holes
196	263	3	1 to 1	0	2 to 1	0	3 to 1	3	No	0
207	336	1	1 to 1	0	2 to 1	0	3 to 1	1	No	0
208	337	2	1 to 1	2	2 to 1	1	3 to 1	9	No	0
209	340	2	1 to 1	0	2 to 1	0	3 to 1	2	No	0
213	342	1	1 to 1	0	2 to 1	0	3 to 1	1	No	0
214	335	0	1 to 1	0	2 to 1	1	3 to 1	3	No	0
217	180	1	1 to 1	0	2 to 1	0	3 to 1	1	No	0
218	179	5	1 to 1	0	2 to 1	1	3 to 1	8	No	0
219	311	5	1 to 1	0	2 to 1	0	3 to 1	5	No	0
235	151	2	1 to 1	0	2 to 1	0	3 to 1	2	No	0
236	152	1	1 to 1	0	2 to 1	0	3 to 1	1	No	0
237	327	2	2 to 1	0	4 to 1	0	6 to 1	4	No	12
238	166	1	1 to 1	0	2 to 1	0	3 to 1	1	No	0
239	155	1	1 to 1	0	2 to 1	0	3 to 1	1	No	0
249	197	2	1 to 1	1	2 to 1	0	3 to 1	4	No	0
250	310	1	2 to 1	0	4 to 1	0	6 to 1	2	No	10
251	309	0	2 to 1	0	4 to 1	1	6 to 1	6	No	7
254	153	1	1 to 1	0	2 to 1	0	3 to 1	1	No	0
255	154	0	1 to 1	1	2 to 1	1	3 to 1	5	No	0
256	172	0	2 to 1	0	4 to 1	5	6 to 1	30	No	2
257	174	1	2 to 1	2	4 to 1	1	6 to 1	16	No	2
259	175	0	2 to 1	1	4 to 1	2	6 to 1	16	No	8
260	171	3	1 to 1	1	2 to 1	3	3 to 1	14	No	0
261	167	1	2 to 1	0	4 to 1	1	6 to 1	8	No	1
262	169	2	2 to 1	0	4 to 1	0	6 to 1	4	No	1
263	170	0	2 to 1	0	4 to 1	1	6 to 1	6	No	2
264	168	0	2 to 1	0	4 to 1	1	6 to 1	6	No	9
265	176	1	2 to 1	2	4 to 1	0	6 to 1	10	No	1
266	196	1	1 to 1	1	2 to 1	0	3 to 1	3	No	0
267	199	2	1 to 1	0	2 to 1	0	3 to 1	2	No	0
277	212	4	2 to 1	0	4 to 1	0	6 to 1	8	No	6
278	215	1	2 to 1	0	4 to 1	0	6 to 1	2	No	3
279	216	2	1 to 1	1	2 to 1	0	3 to 1	4	No	0
280	220	0	1 to 1	0	2 to 1	2	3 to 1	6	No	0
285	217	2	1 to 1	0	2 to 1	0	3 to 1	2	No	0
286	207	3	1 to 1	0	2 to 1	0	3 to 1	3	No	0
287	291	3	2 to 1	0	4 to 1	0	6 to 1	6	No	3
290	204	1	1 to 1	1	2 to 1	1	3 to 1	6	No	0
310	241	2	2 to 1	0	4 to 1	1	6 to 1	10	No	6
311	240	0	2 to 1	1	4 to 1	2	6 to 1	16	No	4
312	253	0	1 to 1	0	2 to 1	1	3 to 1	3	No	0
327	238	0	2 to 1	0	4 to 1	3	6 to 1	18	No	11

Appendix D. Mitigation Requirements for Impacts to Valley Elderberry Longhorn Beetle Habitat for the Sierra Meadows Project. 2003.

Original Shrub Number on Flagging	New Shrub Number as Shown on Maps	Number of Stems between 1 and 3 Inches in Diameter	USFWS Mit. Ratio	Number of Stems between 3 and 5 Inches in Diameter	USFWS Mit. Ratio	Number of Stems Greater than 5 Inches in Diameter	USFWS Mit. Ratio	Number of Elderberry Plantings Required	Occurrence in Riparian Woodland	Presence and Number of Potential VELB Exit Holes
334	415	0	1 to 1	0	2 to 1	1	3 to 1	3	No	0
335	414	3	1 to 1	0	2 to 1	1	3 to 1	6	No	0
336	416	1	1 to 1	0	2 to 1	0	3 to 1	1	No	0
339	417	1	1 to 1	0	2 to 1	0	3 to 1	1	No	0
345	106	3	2 to 1	0	4 to 1	0	6 to 1	6	No	1
346	107	0	2 to 1	1	4 to 1	0	6 to 1	4	No	4
369	408	0	2 to 1	0	4 to 1	2	6 to 1	12	No	3
370	409	0	2 to 1	0	4 to 1	1	6 to 1	6	No	1
371	410	2	2 to 1	0	4 to 1	3	6 to 1	22	No	8
372	412	2	2 to 1	1	4 to 1	1	6 to 1	14	No	9
374	73	2	1 to 1	4	2 to 1	0	3 to 1	10	No	0
376	72	0	1 to 1	1	2 to 1	0	3 to 1	2	No	0
384	80	3	2 to 1	1	4 to 1	4	6 to 1	34	No	5
385	81	0	2 to 1	0	4 to 1	1	6 to 1	4	No	9
386	79	0	1 to 1	0	2 to 1	1	3 to 1	3	No	0
392	307	1	2 to 1	1	4 to 1	1	6 to 1	12	No	2
396	408	1	1 to 1	0	2 to 1	2	3 to 1	7	No	0
	Totals	208		37		66		673		154

15.7 Cultural Resources Assessment

ARCHAEOLOGICAL INVENTORY SURVEY

Sierra Meadows Estates Development Project, c. 442 Acres near Ahwahnee, Madera County, California.

CONFIDENTIAL: *This Report Contains Sensitive Information Concerning Archaeological Sites and Site Locations. For Use by Agencies, Planners, and Others with a Direct Interest in Cultural Resources, but Not For Inclusion in Publicly Distributed or Publicly Available Documents.*

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Keywords *for Information Center Use:*

Archaeological Inventory Survey, c. 442 acres, Madera County, CEQA, USGS Ahwahnee, Ca. 7.5′ Quad.

July 11, 2003

CONTENTS

1. INTRODUCTION

Project Background

This report details the results of an archaeological inventory survey of the Sierra Meadows Estates Development Project, which incorporates approximately 442 acres of land generally located along the south side of Opah Drive, along both Miami Creek and Carter Creek, approximately 3/4 mile east of State Route 49 and the community of Ahwahnee, in Madera County, California.

The proposed project would involve disturbance to ground surface and sub-surface components and would therefore have the potential to impact any cultural resources that may be located within the Area of Potential Effects (APE). In this case, the APE would consist of the 422-acres of development property itself. Evaluation of the project's potential effects to cultural resources must be undertaken in conformity with Madera County rules and regulations, and in compliance with requirements of the California Environmental Quality Act of 1970, Public Resources Code, Section 21000, et seq. (CEQA), and The California CEQA Environmental Quality Act Guidelines, California Administrative Code, Section 15000 et seq. (Guidelines as amended).

Scope of Work

At the most general level, compliance with CEQA requires completion of resource evaluations in conformity with standards contained in Section 15064.5 of the amended Guidelines. Based on this and other relevant Sections of CEQA, the following specific tasks were considered an adequate and appropriate Scope of Work for the present project:

- Conduct a records search at the South San Joaquin Valley Information Center of the California Historical Resources Information System at CSU-Bakersfield and consult with affected Native American representatives and the Wassama Roundhouse State Historical Park. Collectively, the goals of the records search and consultation are to determine (a) the extent and distribution of previous archaeological surveys, (b) the locations of known archaeological sites and any previously recorded archaeological districts, and (c) the relationship between known sites and environmental variables. The Records Search and consultation are designed to help ensure that during subsequent field survey work, all historic properties considered significant or potentially significant per CEQA are discovered, correctly identified, fully documented, and properly interpreted.

- Conduct a pedestrian field survey of the project area. Based on previous archaeological survey of the property, along with the presence of variable terrain and variable archaeological sensitivity within the project area, a complete coverage but variable-intensity pedestrian survey was considered appropriate. The purpose of the pedestrian survey is to ensure that any previously recorded sites that may have been identified during the records search and consultation are re-located and significance evaluations updated on the basis of existing site conditions. For any previously undocumented sites discovered within the project area and that meet CEQA's threshold for "historic properties", the field survey would involve formally recording these on DP 523 forms. For both previously identified and newly identified sites, the level of field work would be sufficient to develop measures to avoid, minimize or mitigate potential adverse effects of the project to any significant sites identified.

- Upon completion of the records search and pedestrian survey, prepare an archaeological inventory survey report that identifies project effects and recommends appropriate mitigation measures for sites found significant or potentially significant per CEQA and that might be affected or otherwise impacted.

The remainder of the present document constitutes the final report, providing the records search and inventory survey results as well as recommendations for treatment of sites that could be affected or directly impacted by the project. All field survey procedures followed guidelines provided by the State Historic Preservation Office (Sacramento) and conform to accepted professional standards.

Location

The Sierra Meadows Estates Development Project incorporates approximately 422 acres of land located along the south side of Opah Drive, along both Miami Creek and Carter Creek, approximately 3/4 mile east of State Route 49 and the community of Ahwahnee, in Madera County, California. Lands affected are located within a portion of Sections 31, 32, & 33 of Township 6 South, Range 21 East, and portions of Sections 4 and 5 of Township 7 South, Range 21 East, as shown on the USGS Ahwahnee, California 7.5' series quad.

While much of the land in this area of Madera County remains undeveloped for residential and similar use, residential subdivisions and commercial developments are extending into the region. As well, this area was mined during the latter part of the 19th Century, while ranching has been undertaken since the early 1860's. The early mining and ranching operations involved construction of access roads, a variety of residential and ranch structures, and additional features of various types – e.g., ponds, ditches, irrigation components, etc. Collectively, these activities have impacted many of the prehistoric and early historic sites in the region.

The project area itself incorporates a variety of terrain types, including flat mesas, ridgelines, stream courses and associated valleys, and moderately to very steep terrain along the fairly narrow canyon at the northern end of Carter Creek. Carter Creek flows southerly through the western portion of the project area, while Miami Creek flows generally westerly-northwesterly through the southern portion of the property. The confluence of the two is located just inside the western property boundary.

Portions of the margins of both creeks are relatively steep, and the bluffs flanking creek margins are well-developed at some locations. Several natural terraces have formed at curves and elsewhere along these creeks and where ephemeral tributaries enter the large valley east of the confluence of these primary stream courses, providing suitable spots for prehistoric encampments and special use sites of various types.

Overall, and based on an examination of available topographic and other maps, the project area appeared to contain lands ranging from low to high in sensitivity for both prehistoric and historic-period sites and features.

2. EXISTING CONDITIONS

Several types of information were considered relevant to evaluating the types of archaeological sites and site distribution that might be encountered within the project area. The information evaluated prior to conducting field work includes data maintained by the Southern San Joaquin Valley Information Center of the California Historical Resources Information System (CSU-Bakersfield), consultation with Southern Valley Yokuts Tribe members and the Wassama Roundhouse State Historical Park, and available published and unpublished documents relevant to regional prehistory, ethnography, and early historic developments.

Southern San Joaquin Valley Information Center

The records of the Southern San Joaquin Valley Information Center (CSU-Bakersfield) were examined for previous survey and recorded prehistoric or historic sites (Records Search conducted June 8, 2003, I.C. File # 03-162). These records document the following existing conditions for the project area:

- All of the project area has been subjected to formal archaeological inventory survey, with multiple projects having extended into the project area boundaries. The property was surveyed in 1979-1980 by Richard Ambro, Ph.D. and others (Ambro *et al.* 1980). During his survey, Ambro documented four prehistoric sites within the project area, and two prehistoric sites located close to but just outside the northeast corner of the property. Additional surveys involving portions of the property were undertaken by Hall (1992, I.C. Report # 181), Wren (1990), and Peak (1979), with the Peak project involving approximately 60% of the project area. No additional sites were added to the cultural inventory of the present project area by the Hall, Wren and Peak surveys.

- As indicated above, a total of four cultural resources have been identified and recorded within the project area, two of which are food processing stations (CA-MAD-547 and –624), with the remaining two representing habitation locales (CA-MAD-625 and –629). Additionally, two prehistoric food processing stations (CA-MAD-637 and –638) were identified and recorded by Ambro close to but just outside the northeast corner of the property.

Other Sources Consulted

In addition to examining the records of Madera County maintained by the Southern San Joaquin Valley Information Center at CSU-Bakersfield, the following additional sources were consulted:

- The National Register of Historic Places (1986, Supplements to 12/02).
- The California Inventory of Historic Resources (2002).
- The California Historical Landmarks (State of California 1990, Updates).
- The Southern Valley Yokuts Tribal Representatives.
- The District Archaeologist for the Central Valley District of the State Department of Parks and Recreation, commenting specifically in relation to nearby Wassama Roundhouse State Historical Park.
- Existing published and unpublished documents relevant to prehistory, ethnography, and early historic developments in the vicinity. These sources provided a general environmental and cultural context by means of which to assess likely site types and distribution patterns for the project area, and are summarized below.

Prehistoric Summary: The general project area, including nearby lands of the Great Central Valley, has a long and complex cultural history with distinct regional patterns extending back more than 11,000 years. The first generally agreed-upon evidence for the presence of prehistoric peoples in this general region of California is represented by the distinctive fluted spear points, termed Clovis Points, found on the margins of extinct lakes in the nearby San Joaquin Valley. Most of the Clovis points have been found on soil horizons containing the bones of extinct animals such as mammoths, sloths, and camels. Based on evidence from elsewhere, the ancient hunters who used these spear points existed during a narrow time range of 10,900 BP to 11,200 BP.

The next cultural period represented, the Western Pluvial Lakes Tradition, thought by most to be subsequent to the Clovis period, is another widespread complex that is characterized by stemmed spear points. This poorly defined early cultural tradition is regionally known from a small number of sites in the Central Coast Range, San Joaquin Valley lake margins, and Sierra Nevada foothills. The cultural tradition is dated to between 8,000 and 10,000 years ago and its practitioners may be the precursors to the subsequent cultural patterns that emerged in central California.

About 8,000 years ago, many California cultures shifted the primary focus of their subsistence strategies from hunting to seed gathering and more generalized collecting as evidenced by the increase in food-processing implements found in archeological sites dating to this period. This cultural pattern is best known for southern California, where it has been termed the Milling Stone Horizon (Wallace 1954, 1978a), but subsequent studies suggested that the horizon may be more widespread than originally described and was likely present throughout this region of California. Radiocarbon dates associated with this period vary between 8,000 and 2,000 BP, although most seem to cluster in the range of about 6,000 to 4,000 BP.

Cultural patterns as reflected in the archeological record, particularly specialized subsistence practices, became codified within the last 3,000 years. The archeological record becomes more complex, as specialized adaptations to locally available resources were developed and populations expanded. Many sites dated to this time period contain mortars and pestles and/or are associated with bedrock mortars implying increasingly intense exploitation of the acorn. The range of subsistence resources utilized, along with Native American exchange systems, expanded significantly from the previous period. Along the coast and in the Central Valley, archeological evidence of social stratification and craft specialization is indicated by well-made artifacts such as charmstornes and beads, often found as mortuary items. Ethnographic lifeways serve as good analogs for this late prehistoric time period.

Ethnographic Context: The project area is located with lands claimed by the Penutian-speaking Southern Valley Yokuts (Wallace, 1978b, Kroeber 1925) at the time of initial contact with European American populations circa AD 1850. These peoples occupied an area extending south and west to Buena Vista and Kern Lakes at the southernmost end of the Great Central Valley. While located within Yokuts territory, the project area was also visited by the Southern Miwok and Western Mono (Monache). The Yokuts and Miwok were both Penutian-speaking peoples who dominated the Central Valley, Delta and San Francisco Bay areas, but the Monache were Shoshone-speaking, culturally related to the desert dwellers east of the Sierra Nevada crest. Ethnographic and fully prehistoric sites in this area provide a unique opportunity for addressing issues of cultural interaction and regional trade.

The basic social unit for the Yokuts, as with most other California groups, was the family, although the village was also considered a social, political and economic unit. Often located on flats adjoining streams, villages were inhabited mainly in the winter because it was necessary to go out into the hills and higher elevation zones to establish temporary camps during food-gathering seasons (i.e., spring, summer, and fall). Villages typically consisted of a scattering of small structures, each containing a single family of from three to seven people. Larger villages might also contain an earth lodge, as attested by the example at nearby Wassama Roundhouse Park.

As with most California Indian groups, economic life for the Yokuts revolved around hunting, fishing, and collecting plants, with deer, acorns and avian and aquatic resources representing primary staples. The Yokuts used a wide variety of wooden, bone, and stone artifacts to collect and process their food, and were very knowledgeable of the uses of local animals and plants and the availability of raw materials that could be used to manufacture an immense array of primary and secondary tools and implements. However, only fragmentary evidence of their material culture remains, due in part to perishability and in part to the impacts to archaeological sites resulting from later (historic) land uses, particularly logging and mining.

The discussion of regional prehistory and ethnography provides insight into the types of Native American sites already known or likely to be present within the project area, with the most frequently occurring types including the following:

- Habitation sites located along the margins of permanent streams, particularly at confluences, and in the vicinity of other natural surface water sources (springs, marshes and other wetlands). Large village sites have also been documented along smaller stream courses, especially where streams merge, and particularly at the interface of ecotones.

- Surface scatters of lithic artifacts without buried cultural deposits, resulting from short-term occupation and/or specialized economic activities.
- Petroglyphs, often in the form of cupped boulders, at or close to village sites or encampments.
- Bedrock food-processing (milling) stations, including mortar holes and metate slicks.
- Trails, often associated with migratory game animals.
- Mortuary sites, often but not exclusively associated with large village complexes.
- Isolated finds of aboriginal artifacts and flakes.

Historic Context: Interior California was initially visited by Anglo-American fur trappers, Russian scientists, and Spanish-Mexican expeditions during the early part of the twentieth century. These early explorations were followed by a rapid escalation of European-American activities, which culminated in the massive influx fostered by the discovery of gold at Coloma in 1848. The influx of miners and others during the gold rush set in motion a series of major changes to the natural and cultural landscape of California that would never be reversed.

Oakhurst and Ahwahnee are located at opposite ends of the Fresno Flats, an active and lucrative placer mining area of the 1850's. With the discovery of gold in this area, large numbers of European-Americans, Hispanics, and Chinese arrived in and traveled through this region. The project vicinity became known as the Grub Gulch Mining District (Gudde 1975:148) and yielded an abundance of ore through the latter part of the 19th and the early part of the 20th Centuries. During the initial days of gold mining, Euroamericans also discovered Yosemite Valley. Although the Valley lies north of the Ahwahnee region, its discovery nevertheless affected the area (Bunnel 1911:66.77) because the two were connected by the Yosemite Stage and Turnpike Company's Turnpike Road (U.S. Bureau of Land Management 1880: Township Plat Map). This road eventually became State Highway 41 which now follows approximately the same route and which is located a short distance east of the project area. Because of its location and other factors, Oakhurst became the primary transportation and economic hub of this region.

While Highway 41 routed travelers north to Yosemite, other early roads headed northwest to Mariposa and Madera and southwest to Fresno. Out of this network emerged the community of Ahwahnee. Among the early residents of the Ahwahnee area was W. H. Crook who established the ranch known locally as "Four Tears." Crook built a fairly substantial ranching operation by purchasing the land of settlers who could not make an adequate living on their smaller Sierra farms. To assure an adequate water supply, Crook constructed a network of irrigation ditches to distribute the waters from Miami Creek, known in those days as the North Fork of the Fresno River. By 1879, Crook had constructed a dam to impound the water, and ditches and flumes to distribute it to two primary fields enclosed with fences. Crook also built a house adjacent to a wagon road which lead to the Ahwahnee Hotel (U.S. Bureau of Land Management 1880: Township Plat Map; U.S. Bureau of Land Management 1879: Surveyor's Notes).

Labor for Crook's undertakings were found in part among local Chinese although relatively little has been adequately documented of this ethnic group's role in the local community. Native American people were also recruited by Crook, along with settlers who came to the Ahwahnee region and miners who could no longer support themselves in the gold fields. Many of the local ranch workers lived at the Indian community now known as Ahwahnee, or Wassama.

Land records indicate that in the general project vicinity there were up to sixteen homestead claims filed, although apparently only six filers were able to keep up with the required improvements and thus patent their claims (U.S. Bureau of Land Management n.d.: New Public Land Records). As elsewhere in early California, many of these were taken over by others, including Crook, leading eventually to some of the larger land holdings in the region, including the Four Tears Ranch.

Additional historic themes important to the general area include the timber industry which benefited from construction of Highway 41, and water storage and distribution. Most recently, residential and recreational developments have emerged as the single most important economic industry in the region.

Collectively, the various historic activities (mining, ranching, timber, water transportation) and contemporary development (transportation, residential and golf course development) have affected many of the region's prehistoric and earliest historic-period sites and features.

3. PEDESTRIAN FIELD SURVEY

Survey Strategy

In view of variable terrain and sensitivity zones present within the project area and considering previous survey involving all of the property, a mixed survey strategy was employed.

A. *Intensive-level field re-survey* was undertaken in the highest sensitivity areas, including:

- Flats and benches along stream channels, and in the vicinity of seeps.
- In the vicinity of previously recorded resources.
- Along ridges, on the tops of knolls, and across saddles, features that are scattered throughout the project area.

Within these terrain types, estimated at approximately 50% of the overall project area, survey transects were spaced at 20-30 meter intervals.

B. *General-level field survey* was undertaken within the remaining 50% of the project area, which consists primarily of lands characterized by moderate to steep slopes located away from natural surface water sources, and within areas already developed for residential and golf course use. These areas were subjected to general-level coverage, achieved by walking non-systematic transects spaced about 50+ meters apart.

In searching for cultural resources, the surveyors took into account the results of background research, and were alert for any unusual contours, soil changes, distinctive vegetation patterns, exotic materials, artifacts, feature or feature remnants and other possible markers of cultural sites.

Field Work

Field survey for the present project was undertaken between June 17-24, 2003, by Sean M. Jensen and Peter M. Jensen. No special problems were encountered during the course of the pedestrian survey, and all survey objectives are considered to have been satisfactorily achieved.

4. FINDINGS and CULTURAL INVENTORY

General Observations

As noted in previous discussions, disturbance to the ground surface ranges from minimal to substantial within the project area. Past mining and logging activities have likely resulted in minor to moderate disturbance to isolated portions of the property. Similarly, historic ranching has likely resulted in modifications to the landscape, including surface and limited subsurface soil impacts. Much more activities, however, have resulted in substantial disturbances to substantial portions of the property. Opah Drive, a paved road, forms a portion of the northern and eastern property boundaries. As well, buried and overhead utilities are located within the project area, as are several dirt access roads, probably originally associated with ranching activities but which were improved subsequently utilized for a variety of purposes.

The most extensive disturbance has accompanied construction of an eighteen hole golf course. This facility occupies the east-central one-third of the overall project area, including the original "valley" area centered along Carter and Miami Creeks, and the confluence of these two streams with one another and with smaller ephemeral tributaries. The existing golf course facility includes a clubhouse, swimming pool, tennis courts, parking lots, maintenance buildings, storage buildings, landscaping, storm drains, overhead lights and buried utilities, tees, greens, fairways, golf cart paths, and various additional features associated with operation and maintenance of the facility. As well, portions of the property at and around the golf course have been developed for residential use.

The photograph below shows the nature and extent of land re-contour associated with golf course/residential development, which is estimated to have affected approximately 30-45% of the overall project area:

West of Carter and Miami Creeks within the northwestern portion of the property, and within the project area's southeast quadrant, minimal to only limited disturbance was observed. While these areas are likely to have been affected by past ranching and in some areas mining, the impacts appear to be relatively minor compared to the recent disturbances associated with the golf course and residential development.

Recorded Sites

Two cultural resources were identified by the Information Center as being located immediately adjacent to the property boundary (CA-MAD-637 and –638). Both sites represent prehistoric food processing stations (mortars, metate slicks, etc.). Field inspection of these sites and the surrounding lands, utilizing the existing archaeological site records and maps to relocate these sites, resulted in the following findings:

> Site CA-MAD-637 is mapped as being situated adjacent to the north end of a pond within the northeast quarter of the northwest quarter of Section 32. Field inspection of this area was conducted and the pond was found to be located completely outside of the subject property, to the north of the present project area boundary.
>
> Site CA-MAD-638 is mapped and described as being located approximately 100 meters off an access road, which road was discovered to be paved Opah Drive, forming a portion of the northern and eastern property boundaries of the present overall project area. Field work indicated that the site is located north, and therefore outside, of the present project property.

These two sites (CA-MAD-637 and –638) are not discussed further in this report, since they are not located within or immediately adjacent to the project area.

As mentioned in the Records Search section above, four cultural resources have been documented within the project area, including two food processing stations (CA-MAD-547 and –624), and two habitation locales (CA-MAD-625 and –629).

All four sites have been documented on State forms and the records filed with the Southern San Joaquin Valley Information Center at CSU-Bakersfield. Brief descriptions below are followed by evaluations of significance per CEQA and site treatment recommendations.

Site Descriptions

Site CA-MAD-547: Originally recorded by Peak (1979) and re-recorded by Ambro *et al* (1980), this site is described as a small food processing station with four distinct areas where food processing occurred. Overall, the site extends approximately 100 meters in diameter, and is situated on both sides of Carter Creek. A total of 19 bedrock mortar cups, one bedrock metate slick, one bedrock mixing trough and a single acorn cracking hole were originally described. No other cultural material, features or midden were noted. According to Ambro, the land area in and around the site boundary had been subjected to intensive farming and ranching impacts.

During the present field survey, the site was re-located. Since original recording, the site has been subjected to additional impacts. Site features located west of Carter Creek appear to have been subjected to little, if any, ground disturbing impacts. However, east of the creek, construction of golf course features, including construction of greens, fairways, golf cart paths, and underground utilities, have destroyed all evidence of the site, with the exception of one bedrock boulder containing seven cups. This particular feature (the single rock outcrop with seven remaining cups) corresponds exactly with one mapped and included in the site record. The boulder extends above the ground surface approximately 5 cm, indicating that surface and subsurface soils in this area were extensively modified during golf course construction.

Significantly, no evidence of disturbed subsurface deposit was noted anywhere in the vicinity of the remaining mortars at this site, indicating that Ambro's original contention – that the site was a food processing station only and contained no additional features or accumulated midden – was likely accurate.

Site CA-MAD-624: Originally recorded by Ambro *et al* (1980), this site is described as a small food processing locale that extends approximately 10 meters in diameter, situated near a meadow east of Miami Creek. A total of nine bedrock mortar cups were observed on two separate bedrock outcrops. Additionally, 4 pestles and one acorn cracking rock were observed and recorded. No other cultural material, features or midden were noted in the original record.

During the present field survey, the site was not re-located due to extensive, recent disturbances associated with golf course and residential construction. According to the site record and site location map, the site would have been located within an area which is now occupied by fairway #'s 11 and 12, and Lulniu Court, a paved cul-de-sac with recently graded house pads adjacent to the north and south. The area in which the site was originally recorded is shown in the photograph at the top of the next page.

Again, while the area of the site has undergone wholesale re-contour and been subjected to impacts by mechanized equipment, no evidence of subsurface deposit was noted during the present field inspection, again indicating that Ambro's original contention – that the site was a food processing station only and contained no additional features or accumulated midden – was likely correct.

Photo Below Shows Wholesale Land Re-Contour at Location of Site CA-MAD-624.

Site CA-MAD-625: Originally recorded by Ambro *et al* (1980), this site is described as a small occupation camp situated on both the west and east sides of Miami Creek. Locus A is situated west of Miami Creek and occupies an area extending approximately 50 meters in length (east-west) by 20 meters in width. Locus A contains 13 mortar cups and one acorn cracking hole situated on four separate bedrock outcrops. A sparse scatter of obsidian waste-flakes and tools, and a dark brown-black midden, are also present within the locus boundary. During initial recordation, Ambro noted a recent (1970's) bulldozer scar bisecting the site, although most of the site remained intact and undisturbed.

Locus B is situated east of Miami Creek, extends approximately 20 meters in length (north-south) by 10 meters in width, and contains two shallow bedrock mortars, a sparse scatter of obsidian lithics, and a dark brown-black midden. No other cultural material or features were noted at either locus.

During the present field survey, the site was re-located and found to be essentially as described in the original record. Locus A appears generally intact, with the exception of the aforementioned bulldozer scar. Locus B appears intact and unchanged from 1980. Midden depth at both loci was estimated at a minimum of c. 30-40 cm, based on open ground squirrel holes and trowel scrapes.

Site CA-MAD-629: Originally recorded by Ambro *et al* (1980), this site is described as a small occupation camp containing 28 mortar cups on a large granite outcrop. Also present are 2 housepit depressions and associated midden area. Overall, the site extends approximately 100 meters in length (east-west) by 20 meters in width, and is located within the southeastern portion of the property, south of Miami Creek and a short distance north of Opah Drive. Artifacts observed on the surface include a single mano fragment, one projectile point and a light-density scatter of obsidian waste-flakes. The single projectile point observed was classified as a Cottonwood (Series) Triangular, suggesting deposition sometime after about A.D. 1200. No other cultural material or features were noted.

During the present field survey the site was re-located and discovered to be essentially unchanged since original recording. Two pine trees noted on the site sketch map have died and are no longer standing, but are still present at the site. Midden depth was estimated at a minimum of 30-40 cm, based again on examination of open ground squirrel holes and trowel probes.

Table 1, below, summarizes the four project area sites in terms of primary components present.

Table 1: Summary of Recorded Sites (State Trinomial).

CA-MAD-547	Prehistoric special use, no midden/sub-surface.
CA-MAD-624	Prehistoric special use, no midden/sub-surface.
CA-MAD-625	Prehistoric occupation site with midden/subsurface.
CA-MAD-629	Prehistoric occupation site with midden/subsurface and housepit depressions (2).

5. SITE SIGNIFICANCE and TREATMENT RECOMMENDATIONS

General

Sites and features identified during the Records Search and pedestrian field survey were to be evaluated for significance in relation to CEQA significance criteria. Important cultural resources, per CEQA, are determined in relation to criteria specified in Section 15064.5 of the amended CEQA Guidelines. These criteria suggest that an "important archaeological resource" (an "historic property") is one which retains essential integrity of design, materials, workmanship, location and associative context, and which:

a) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
b) Is associated with the lives of persons important in our past.
c) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
d) Has yielded, or may be likely to yield, information important in prehistory or history.

Application of the Criteria to Project Area Sites

Specific application of the CEQA significance criteria to project area sites results in the following conclusions and recommendations.

Sites CA-MAD-547 & –624:

a) & b) Neither site is associated with events that have made significant contributions to the broad patterns of the history of California or the United States, nor are the mortars associated with people significant in California history since the individuals responsible cannot be identified. Neither one of these sites is considered significant per Criteria a and b.

c) Based on existing inventory data maintained by the Southern San Joaquin Valley Information at CSU-Bakersfield, a large number of prehistoric components generally similar to and duplicating the attributes of both of these sites are known and documented for the County, being particularly abundant along virtually all of the natural surface water sources in the area. Such prehistoric components are not, in other words, rare in the California inventory, nor do they "...embody the distinctive characteristics of a type, period, region, or method of construction, or represent the work of an important creative individual, or possess high artistic values..." Therefore, these sites are not considered significant per Criterion c.

d) Archaeological sites containing buried cultural deposits related to Native American activities typically document protracted habitation and performance of a range of domestic activities. For these reasons, further research at such sites frequently has the potential to expand our understanding and appreciation of local and regional prehistory, and such sites are therefore routinely considered significant per Criterion d. However, there is no evidence for the accumulation of buried deposits at these mortar hole sites, and as a consequence data recovery (archaeological excavation work) could not be expected to advance or further our understanding or appreciation of local or regional prehistory substantially beyond that which has been achieved in the existing site records. For these reasons, neither site is considered significant under Criterion d (i.e., for residual research or information values).

Based on these findings, both CA-MAD-547 and CA-MAD-624 are not considered significant or potentially significant resources per CEQA under any of the relevant evaluative criteria. No further treatment or consideration is warranted and none recommended in relation to potential impacts to either of these sites that might accompany continuing development of the project area.

Sites CA-MAD-625 & –629:

Archaeological sites containing buried cultural deposits related to Native American use typically document protracted habitation and performance of a fairly wide range of domestic activities. For these reasons, further research at such sites frequently has the potential to expand our understanding and appreciation of local and regional prehistory, and such sites are therefore often considered significant under Criterion d, as indicated in the following discussion and evaluation.

a) & b) These site are not associated with events which have made significant contributions to the broad patterns of the history of California or the United States, nor can the individuals involved ever be known on the basis of the data categories present at these sites. Neither one of these site is considered significant per Criteria a or b.

c) Based on existing inventory data maintained by the Southern San Joaquin Valley Information Center at CSU-Bakersfield, a large number of prehistoric components generally similar to and duplicating the attributes of these two sites are known and documented for this area of the County. Such prehistoric components are not, in other words, rare in the California inventory, nor do they represent a "... distinctive type..." or "...a distinguishable entity whose components may lack individual distinction." Neither one of these site is considered significant per Criterion c.

d) Specialized dating samples and temporally diagnostic implement types have not been demonstrated as being abundant at either of these sites, although one has yielded evidence of the latter in the form of a Cottonwood Triangular Series specimen. On the other hand, no excavation was undertaken during either the original 1980 recording or during the present field survey, so that essentially nothing is known about subsurface contents, artifact types and density, etc. Moreover, both sites appear largely intact, with very little of the original deposit having been affected by historic ranching or later development activities. If present, buried cultural materials could well yield additional important information on prehistoric patterns of resource extraction methodology and technology, technical information concerning lithic reduction strategies employed, the size of the populations involved, and further characterization of the intensity of resource use during prehistoric time periods in this area of central California. In other words, portable cultural material of research value related to prehistoric activities could very well be present in the subsurface component at both of these sites, and in fact there is a high probability for the presence of such material given the findings of excavation projects at other similar, nearby sites. Also relevant here is the fact that these sites are located within an area variously occupied by Penutian-speaking Yokuts (primarily) and Miwok, but also Shoshone-speaking Monache, with the latter culturally related to the desert dwellers east of the Sierra Nevada crest. Under these circumstances, many of the ethnographic and fully prehistoric sites in this area could provide unique opportunities for addressing issues of cultural interaction and regional trade.

For these reasons, sites C-MAD-625 and -629 are considered potentially significant under CEQA's Criterion d.

As significant/potentially significant prehistoric properties, two acceptable treatment options are generally available and acceptable.

<u>Treatment Option #1:</u> The first choice of treatment is to preserve both sites intact by means of an impact avoidance strategy. Impact avoidance and site preservation are compatible with proposed residential development since surface indicators are generally minimal and most casual passers-by would not recognize surface features at these sites as evidence that buried cultural material is also present. Preservation could be achieved by locating proposed residential structures, driveways, associated outbuildings, utilities, and access roads in such a way as to avoid directly impacting these sites. In order to ensure impact avoidance and site preservation, and to ensure that the sites are not inadvertently affected or impacted during construction, the boundaries of both should be clearly identified as **impact avoidance zones** on all project and development maps, and the sites temporarily flagged at the time of construction. If construction activity is to occur within about 25-30 feet of the mapped site boundaries, and/or if construction will involve large pieces of equipment near either site, then the preservation/site areas should also be temporarily fenced during the construction period.

Treatment Option #2: If preservation "as is" cannot be ensured by adopting the preservation plan detailed above, then those specific attributes and qualities which may render these prehistoric sites significant per CEQA should be further specified through formal archaeological data collection work. At a minimum, such data collection work (archaeological testing) should include excavation of a sample of cultural material sufficient to evaluate site and midden depth, age and make-up of the components of the sites, and characterization of artifactual and midden constituents in terms of major data categories present. The overall objectives of any such data collection work should be to identify those research questions for which the sites contain relevant information, with the research questions representing those presently being expressed by the body of professional archaeologists in the region. Any such data collection program should culminate in a professional report of findings that contains explicit recommendations for any mitigative-level data recovery work that might be justified or warranted on the basis of the specific findings of the testing program and the proposed level of project effects.

Table 2 summarizes the recorded project area sites in relation to CEQA significance criteria.

Table 2: Summary of Significance per CEQA

CRITERION	*a*	*b*	*c*	*d*
CA-MAD-547	-	-	-	-
CA-MAD-624	-	-	-	-
CA-MAD-625	-	-	-	+
CA-MAD-629	-	-	-	+
Totals	0	0	0	2

Native American and State Parks Consultation

Prior to conducting the field survey, the Native American Heritage Commission (NAHC) was contacted to determine whether or not formal Sacred Lands listings were present within or adjacent to the project area. NAHC responded in the negative on May 30, 2003 (response attached).

On June 3, 2003, Mr. Jay Johnson and the American Indian Council, representing local Yokuts interests, were contacted by letter and requested to supply any specific information which they might have concerning prehistoric sites or traditional use areas within or adjacent to the project area, or to comment more generally on the proposed residential and golf course development project.

Mr. Johnson forwarded the consultation letter to the Central Valley District of the Department of Parks and Recreation, Columbia, California. Dr. Linda Dick Bissonnette responded, on behalf of State Parks, suggesting that a range of studies be conducted, most or all of which are in fact being addressed in the EIR being prepared by RBF, Inc. (Irvine, California) and for which the present archaeological inventory constitutes one of several specific studies.

On Thursday, July 10, 2003, archaeologist Sean M. Jensen, M.A., met on site with Ms. Suzanne Ramirez, Mr. Jay Johnson, Ms. Mary Johnson, and ms. Karen S. (last name withheld) representing local Yokuts interest and the site at Wassama Roundhouse. Also present and representing State Parks was Ms. Mova Verde, the State parks Interpreter at Wassama.

During the field inspection, the four project area sites were visited and the two alternative treatment options proposed herein were reviewed with the participants. With respect to treatment for the four project area sites, neither an endorsement nor rebuttal was provided, with the representatives indicating that they would further consider with elders and other tribal members project effects and proposed treatments, and that if additional information was required they would contact the author.

In addition to project area sites, the Yokuts representatives and the State Park archaeologist expressed concern over potential effects of the project to the nearby Wassama Roundhouse State Park and the National Register-eligible prehistoric and ethnographic village site contained therein.

Several named prehistoric settlements are identified in ethnographic accounts for this area of Madera County, including villages at Wehilto, Olwia, Hitchawettah and Wasama (Kroeber 1925:444; Levy 1978:400). Unfortunately, precise locational data are lacking or problematic for most or all of these, primarily because so few knowledgeable informants were available at the turn of the Century, as a result of the devastating effects of introduced diseases, the resultant population decimation, and the nearly complete collapse of the traditional way of life.

In addition to pre-contact villages, however, are important post-contact settlements, one of which appeared at Ahwahnee, where Miwoks and others occupied a small tract of land and eventually built a ceremonial "roundhouse." This structure had fallen into substantial decay by the beginning of the 1960's-1970's, but was subsequently largely restored and is now incorporated into the State Park System of California. Beneath the restored roundhouse and other features of the built environment at what is now the Wassama Roundhouse State Park is a prehistoric and historic-period cultural deposit.

Although located approximately one-quarter mile north/northwest of the northwest corner of the present project area, Yokuts representatives and the Wassama State Park archaeologist Dr. Linda Dick Bissonnette have expressed concerns over anticipated effects of the proposed project to the State Park itself and traditional activities periodically conducted at the Roundhouse. The primary concerns and suggested mitigation measures in relation to Wassama Roundhouse State Park include the following:

1. Concern: Increased traffic on local roadways, increased noise: Mitigation: Reduce residential density in order to reduce traffic, noise, and visual impacts.
2. Concern: Increased noise resulting from private residential use: Mitigation: Eliminate swimming pools from residences located within the northern portion of the subdivision in order to reduce noise impacts to the Roundhouse from private recreational activities.

As noted above, additional concerns and mitigation measures may be forwarded to the author, or directly to the County by either the Yokuts representatives or the State Department of Parks and Recreation.

6. SUMMARY of FINDINGS & RECOMMENDATIONS

This report details the results of an archaeological inventory survey involving approximately 442 acres of land located east of State Route 49 and the community of Ahwahnee, Madera County, California. A search of existing records at the Southern San Joaquin Valley Information Center indicated a number of past archaeological surveys had been conducted within the project area. These previous investigations, combined with consultation with Ahwahnee area Southern Valley Yokuts, California State Parks, and a complete-coverage, variable-intensity pedestrian survey, resulted in identifying and documenting four prehistoric archaeological sites within the project area.

All four sites represent previously recorded resources, and include two food processing stations extensively and heavily impacted by golf course and residential construction (sites CA-MAD-547 and –624), and two habitation sites minimally impacted by historic ranching and later activities (sites CA-MAD-625, and –629). During the present field survey the two food processing sites were found to have been either substantially damaged (-547), or destroyed (-624). However, the field inspection failed to identify any evidence that buried cultural materials were present at these sites, so that the effects of existing developments are not considered adverse with respect to the scientific, research or information potentials of these sites.

For both CA-MAD-625 and –629, the presence of buried cultural material combined with the fact that most of the original deposits appear intact and generally undisturbed, has led to the recommendation that both are significant/potentially significant per CEQA significance Criterion d. In consideration of this recommendation, two acceptable treatment options are offered: preservation "as is" or data collection (archaeological testing) followed by possible mitigative-level data recovery.

Input from local Yokuts representatives including neither endorsement nor rejection of the proposed findings, significance recommendations, or recommended treatments for the four project area sites.

Yokuts representatives and the District Archaeologist for the California Department of Parks and Recreation have requested that the proponent consider effects of increased residential density, vehicular traffic and related noise to the nearby Wassama Roundhouse State Park facility and the archaeological site contained therein. While located approximately one-quarter mile from the project area and not a part of the present specific study, the proponent's representative, RBF Consulting, Inc. (Irvine, California) is responding in their EIR to concerns re. traffic, noise and other related issues.

Aside from the two specific treatment options recommended for sites CA-MAD-625 and -629, archaeological clearance is recommended for the remainder of the project area, although the following general provision is appropriate:

> The present evaluation and recommendations are based on the findings of an inventory-level surface survey only. There is always the possibility that potentially significant unidentified cultural materials could be encountered on or below the surface during the course of future development or construction activities. In such a situation, archaeological consultation should be sought immediately.

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ARCHAEOLOGICAL INVENTORY SURVEY

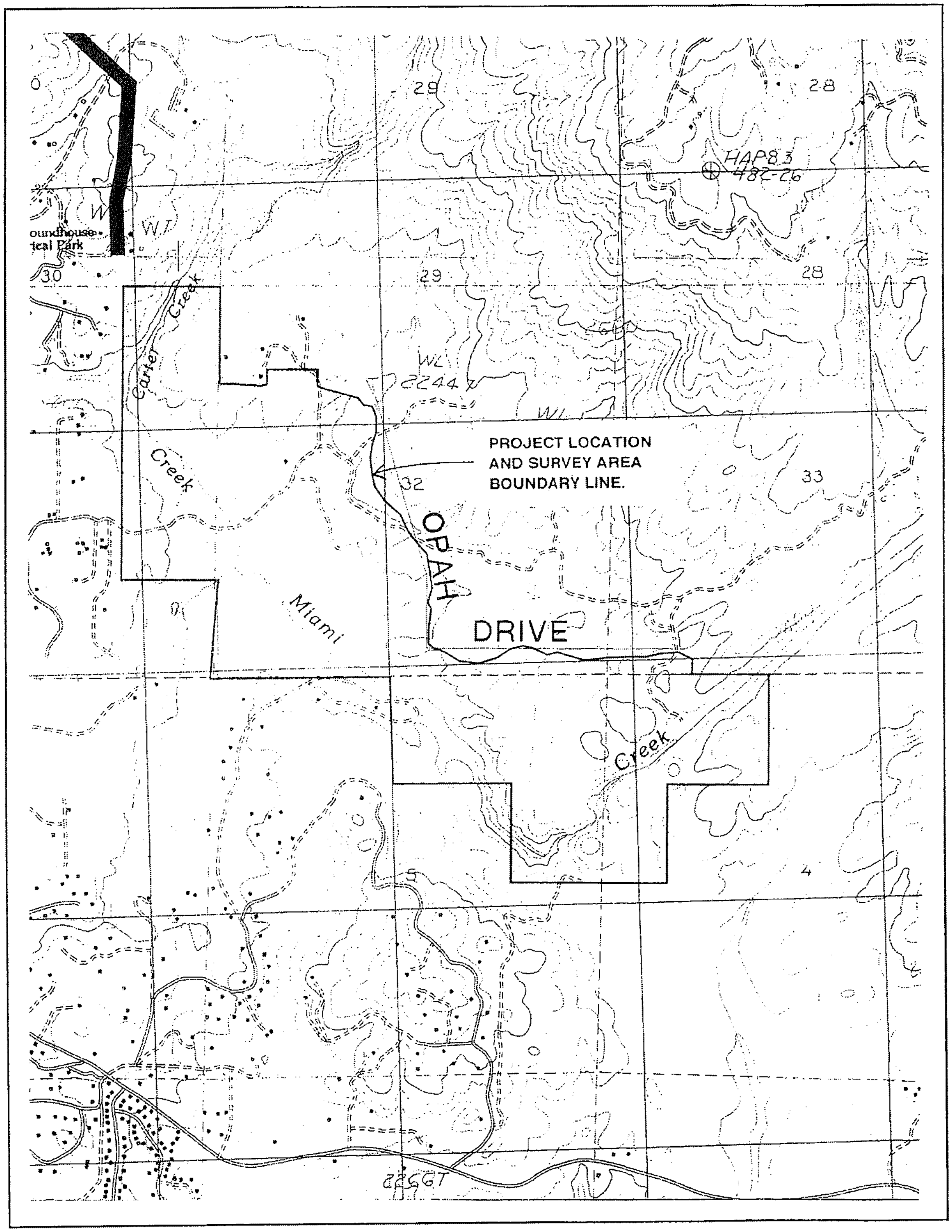
Sierra Meadows Estates Development Project,
c. 442 Acres near Ahwahnee,
Madera County, California.

ATTACHMENTS

- Project Location and Archaeological Survey Area Map.
- Records Search Text Portion from CSU-Bakersfield.
- Correspondence:
  - Mr. Jay Johnson, Mariposa.
  - American Indian Council and Mr. Bill Leonard, Mariposa.
- Response from the Native American Heritage Commission.
- Response from California Department of Parks and Recreation.
- Site Documents for Four Project Area Sites: Confidential and Therefore Restricted Use, Distribution, and Circulation.

PROJECT LOCATION AND ARCHAEOLOGICAL SURVEY AREA MAP

442-ac Sierra Meadows Estates, Madera County, Ca.
USGS Ahwahnee, California, 7.5′ Quad.



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(RS# 03-162)

DATE: June 8, 2003

RE: 442-Acre Sierra Meadows Estates Project (Formerly Pacific Estates)

County: Madera

MAP(s): Ahwahnee 7.5'

CULTURAL RESOURCES RECORDS SEARCH

The Southern San Joaquin Valley Information Center is under contract to the State Office of Historic Preservation and is responsible for the local management of the California Historical Resources Inventories. The following are the results of a search of the cultural resources files at the Southern San Joaquin Valley Archaeological Information Center. These files include known and recorded archaeological and historic sites, inventories, and excavation reports filed with this office, and properties listed on the National Register of Historic Places, the Historic Property Data File, (1/06/03), the California Historical Landmarks, the California Inventory of Historic Resources, the California Register, and the California Points of Historical Interest.

PRIOR CULTURAL RESOURCE INVENTORIES WITHIN THE PROJECT AREA AND A ½ MILE RADIUS

According to the information in our files, there have been (3) three previous cultural resource surveys conducted within the project area, MA-181, 323, & 444. There are (3) three surveys within a ½ mile radius of the project area boundary, MA-238, 268, & 438. All survey locations are plotted on the enclosed map.

KNOWN CULTURAL RESOURCES WITHIN THE PROJECT AREA AND A ½ MILE RADIUS

There are (6) six recorded cultural resources within and/or immediately adjacent to the project area, P-20-000547, 624, 625, 629, 637, & 638. There are (12) twelve recorded cultural resources within a ½ mile radius. See the enclosed map for site locations and their primary number designations.

(RS# 03-162)

There are no recorded cultural resources within the project area or a ½ mile radius that are listed in the National Register of Historic Places, the California Register, State Historic Landmarks, California Inventory of Historic Resources, or the California Points of Historical Interest.

COMMENTS

Title pages of all referenced surveys are enclosed. Primary records for all resources within the project area and immediately adjacent are also enclosed. If you have any questions or need additional information, please don't hesitate to contact me at (661) 664-2289.

By

Adele B

Adele Baldwin
Assistant Coordinator

Date: June 8, 2003

Fee: $120.00/hr.

Invoice # A2229

Peter M. Jensen

Archaeological • Historical • Cultural Resource Management Studies
P.O. Box 194 • Durham, CA 95938-0194 • (530) 345-9515 • FAX (530) 345-0651 • plm2j3@aol.com
545 Ocean View Drive • Hilo, HI 96720 • (808) 935-7551

June 3, 2003

Jay Johnson
5235 Allred Road
Mariposa, CA 95338

Subject: *Residential Development, 442-acres, Madera County.*

Dear Mr. Johnson

Private owners propose residential and related development on approximately 442 acres located in northern Madera County near the Wassama Roundhouse State Historical Park.

We have been requested to conduct the archaeological survey and since the project is located in Miwok territory, we are requesting any information you may have concerning prehistoric sites or traditional use areas in this area. Information supplied will be kept confidential and used to supplement the archaeological survey report to be prepared.

If you have any questions concerning the project or its location, please don't hesitate to contact me at (530) 345-9515, or the Durham address above.

Regards,

Peter M. Jensen

Encl.: Map showing location of proposed 442-acre Sierra Meadows Residential Development Project.

Peter M. Jensen

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545 Ocean View Drive • Hilo, HI 96720 • (808) 935-7551

June 3, 2003

American Indian Council
Bill Leonard, Chairperson
P. O. Box 1200
Mariposa, CA 95338

Subject: *Residential Development, 442-acres, Madera County.*

Dear Mr. Leonard

Private owners propose residential and related development on approximately 442 acres located in northern Madera County near the Wassama Roundhouse State Historical Park.

We have been requested to conduct the archaeological survey and since the project is located in Miwok territory, we are requesting any information you may have concerning prehistoric sites or traditional use areas in this area. Information supplied will be kept confidential and used to supplement the archaeological survey report to be prepared.

If you have any questions concerning the project or its location, please don't hesitate to contact me at (530) 345-9515, or the Durham address above.

Regards,

Peter M. Jensen

Encl.: Map showing location of proposed 442-acre Sierra Meadows Residential Development Project.

STATE OF CALIFORNIA Gray Davis, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
Fax (916) 657-5390
Web Site www.nahc.ca.gov

May 30, 2003

Peter Jensen
PO Box 194
Durham, CA 95938

Sent by Fax: 530-345-0651
No of Pages: 5

RE: Proposed 442-acre Sierra Meadows Estates, Madera County; Gas Well Lease Site, Glenn County; Bega Development Project, Plumas County.

Dear Mr. Jensen:

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend other with specific knowledge. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 653-4038.

Sincerely,

Debbie Pilas-Treadway
Environmental Specialist III

State of California • The Resources Agency
Gray Davis, *Governor*

DEPARTMENT OF PARKS AND RECREATION
Ruth G. Coleman, *Acting Director*
The Central Valley District
22708 Broadway Street
Columbia, CA 95310

RECEIVED
JUN 13 2003
RBF CONSULTING

June 10, 2003

Mike Harden, Project Manager
RBS Consulting
14725 Alton Park Way
Irvine, CA 92618-2027

Re.: Residential Development, 442-acres, Madera County

Dear Mr. Harden:

We are writing in response to a letter to Mr. Jay Johnson regarding a proposed residential development southeast of Wassama State Historic Park. Mr. Johnson gave us a copy of the letter and requested that we comment on the project as well. We called Mr. Peter M. Jensen this morning to find out more about the project and he gave us a few details and your name and address. He did not know the phase of the environmental review process, but since he has not completed his cultural resources study, we assume that you have not completed a Draft Environmental Impact Report.

Please add us to the notification mailing list for the DEIR and public hearings concerning this project and send us a copy of the project description and plan map.

As the regional representatives of a trustee agency, we are concerned about the direct, indirect and cumulative impacts of a high-density development near the Traditional Cultural Property of Wassama. The current land uses surrounding Wassama allow for the continuation of the Southern Sierra Miwok cultural heritage. Significant increases in the number of people living in the area can be expected to have negative traffic, noise, visual, air, water, and social impacts. That is why a proposed 340-lot subdivision adjacent to the park to the southeast most concerns us. Of course, cultural resources located within the 442 acres need to be fully considered and avoided as much as possible too.

We are pleased that Mr. Jensen contacted the Native American Heritage Commission and Mr. Jay Johnson to request comments and information concerning prehistoric sites and traditional use areas within the proposed 442-acre development boundary. We encourage him to contact Mr. Johnson and the Native caretakers of Wassama in person to consult further regarding their concerns.

We are compiling the records of previous research conducted at Wassama, some of which are not on file at the OHP Information Center or NAHC. Mr. Jensen is welcome to contact us for further information so that his study will adequately address potential impacts.

Sincerely,

James S. Wassmund
District Superintendent
(209) 532-0150

and

Linda Dick Bissonnette, Ph.D.
Heritage Resources Associate
(209) 694-0305

cc. DPR Env. Rev. section

ADDENDUM TO:

ARCHAEOLOGICAL INVENTORY SURVEY

Sierra Meadows Estates Development Project,
c. 442 Acres near Ahwahnee,
Madera County, California.

CONFIDENTIAL: ***This Report Contains Sensitive Information Concerning Archaeological Sites and Site Locations. For Use by Agencies, Planners, and Others with a Direct Interest in Cultural Resources, but Not For Inclusion in Publicly Distributed or Publicly Available Documents.***

Prepared for

RBF Consulting, Inc.
14725 Alton Parkway
Irvine, CA 92618-2027

Author

Peter M. Jensen
&
Sean M. Jensen

Keywords *for Information Center Use:*

Archaeological Inventory Survey, c. 300 acres, Madera County, CEQA, USGS Ahwahnee, Ca. 7.5' Quad.

January 6, 2004

JENSEN & ASSOCIATES - CHICO, CALIFORNIA

ARCHAEOLOGICAL - HISTORICAL - CULTURAL RESOURCE MANAGEMENT SERVICES

CONTENTS

1. INTRODUCTION

Background to the Addendum Archaeological Survey

In July 2003 the authors issued an archaeological survey report detailing the results of an archaeological inventory of the Sierra Meadows Estates Development Project, totaling approximately 442 acres of land generally located along the south and west sides of Opah Drive, along both Miami Creek and Carter Creek, approximately 3/4 mile east of State Route 49 and the community of Ahwahnee, in Madera County, California.

The proposed project will involve disturbance to ground surface and sub-surface components and therefore has the potential to impact cultural resources located within the Area of Potential Effect (APE). As of July 2003, the APE consisted of 442-acres whose general location is described above. Evaluation of the project's potential effects to cultural resources within the original 442 acre land area was undertaken in conformity with Madera County rules and regulations, and requirements of the California Environmental Quality Act of 1970, Public Resources Code, Section 21000, et seq. (CEQA), and The California CEQA Environmental Quality Act Guidelines, California Administrative Code, Section 15000 *et seq.* (Guidelines as amended).

In the fall of 2003, the project proponent, in consultation with Madera County, proposed to add additional lots and other features to the development property. It is the additional land area added to the original project's 442 acres which is the subject of the remainder of the present ***Addendum Archaeological Survey***.

Scope of Work

The proposed Scope of Work for the present Addendum remains the same as the original project, as detailed in the July 2003 inventory survey report – namely, compliance with CEQA and County rules and regulations. Specifically and for the present Addendum, the tasks for the ***Addendum Survey*** include the following:

- Conduct a records search at the South San Joaquin Valley Information Center of the California Historical Resources Information System at CSU-Bakersfield and consult with affected Native American representatives. Since the original Records Search covered all of the present ***Addendum*** land area, no additional search was required (a copy of the original search is appended hereto and is also available in the original survey report). Additional consultation was undertaken in order to inform the Native American representatives of the expansion of the project area into lands not previously considered.

- Conduct a pedestrian field survey of the expanded project area area. Based on previous archaeological survey of the property and in consideration of the presence of variable terrain and variable archaeological sensitivity, a complete coverage but variable-intensity pedestrian survey was considered appropriate for the ***Addendum*** project area lands. Per the original project, the purpose of the pedestrian survey is to ensure that any previously recorded sites identified during the records search and consultation are re-located and significance evaluations updated on the basis of existing site and field conditions. For any previously undocumented sites discovered within the expanded project area and that meet CEQA's threshold for "historic properties", the field survey would involve formally recording these on DP 523 forms. For both previously identified and newly identified sites, the level of field work would be sufficient to develop measures to avoid, minimize or mitigate potential adverse effects of the project to any significant sites present.

- Upon completion of the records search and pedestrian survey, prepare an ***Addendum*** to the original archaeological inventory survey report that identifies project effects and recommends appropriate mitigation measures for sites found significant or potentially significant per CEQA and that might be affected or otherwise impacted.

The remainder of the present document constitutes the ***Final Addendum Report***, providing the additional consultation and pedestrian survey results as well as recommendations for treatment of sites that could be affected or directly impacted by the project. Per the original project, all field survey procedures followed guidelines provided by the State Historic Preservation Office (Sacramento) and conform to accepted professional standards.

Location of the Present Addendum Survey

The original Sierra Meadows Estates Development Project incorporates approximately 442 acres of land located along the south and west sides of Opah Drive, along both Miami Creek and Carter Creek, approximately 3/4 mile east of State Route 49 and the community of Ahwahnee, in Madera County, California. Original project area lands are located within a portion of Sections 31, 32, & 33 of Township 6 South, Range 21 East, and portions of Sections 4 and 5 of Township 7 South, Range 21 East, as shown on the USGS Ahwahnee, California 7.5' series quad.

The Addendum land area is located generally east and northeast of the southeastern portion of the original 442-acre project area. Addendum project area lands are located within a portion of Sections 28, 32 and 33 of T6S, R21E, and Section 4 of T7S, R21E, as shown on the USGS Ahwahnee, California 7.5' series quad. Both the original 442-acre project area and the present Addendum Survey Area lands are identified on the attached ***Project Location and Archaeological Survey Area Map.***

2. EXISTING CONDITIONS, ADDENDUM AREA

Several types of information were considered relevant to evaluating the types of archaeological sites and site distribution that might be encountered within the expanded (Addendum) project area. As indicated above, the information evaluated prior to conducting field work includes data maintained by the Southern San Joaquin Valley Information Center of the California Historical Resources Information System (CSU-Bakersfield), consultation with Southern Valley Yokuts Tribe members, and available published and unpublished documents relevant to regional prehistory, ethnography, and early historic developments.

Southern San Joaquin Valley Information Center

The records of the Southern San Joaquin Valley Information Center (Records Search conducted June 8, 2003, I.C. File # 03-162) document the following existing conditions for the expanded project area:

- All of the Addendum project area has been subjected to formal archaeological inventory survey. The property was surveyed in 1979-1980 by Richard Ambro, Ph.D. and others (Ambro *et al.* 1980). During his survey, Ambro documented five prehistoric sites within or close to the Addendum project area. Additional surveys involving portions of the property were undertaken by Hall (1992, I.C. Report # 181), Wren (1990), and Peak (1979). No additional sites were added to the cultural inventory of the Addendum project area by the Hall, Wren and Peak surveys.

- As indicated above, five prehistoric cultural resources have been identified and recorded within the Addendum project area, one of which (CA-MAD-627) is a food processing station, with the remaining four representing habitation locales (CA-MAD-623, -626, -634 and -635).

Other Sources Consulted

In addition to examining Southern San Joaquin Valley Information Center at CSU-Bakersfield, the following sources were also consulted in conjunction with the original records search that involved all of the Addendum survey area:

- The National Register of Historic Places (1986, Supplements to 12/02).
- The California Inventory of Historic Resources (2002).
- The California Historical Landmarks (State of California 1990, Updates).
- The Southern Valley Yokuts Tribal Representatives.
- The District Archaeologist for the Central Valley District of the State Department of Parks and Recreation, commenting in relation to nearby Wassama Roundhouse State Historical Park but not in relation to the Addendum land area.
- Existing published and unpublished documents relevant to prehistory, ethnography, and early historic developments in the vicinity. These sources provided a general environmental and cultural context by means of which to assess likely site types and distribution patterns for the project area. This latter information is available in the original survey report but is not repeated here.

3. PEDESTRIAN FIELD SURVEY

Survey Strategy

In view of variable terrain and sensitivity zones present within the Addendum project area and considering previous survey involving all of the Addendum survey land area, a mixed survey strategy was employed.

A. ***Intensive-level field re-survey*** was undertaken in the highest sensitivity areas, including:

- Flats and benches along stream channels, especially along Miami Creek, and in the vicinity of seeps.
- In the vicinity of previously recorded resources.
- Along ridges, on the tops of knolls, and across saddles, features that are scattered throughout the project area.

Within these terrain types, estimated at approximately 50% of the Addendum land area, survey transects were spaced at 15-25 meter intervals.

B. ***General-level field survey*** was undertaken within the remaining 50% of the Addendum land area, which consists primarily of lands characterized by moderate to steep slopes located away from natural surface water sources. These areas were subjected to general-level coverage, achieved by walking non-systematic transects spaced about 35-50 meters apart.

In searching for cultural resources, the surveyors took into account the results of background research, and were alert for any unusual contours, soil changes, distinctive vegetation patterns, exotic materials, artifacts, feature or feature remnants and other possible markers of cultural sites.

Field Work

Field survey for the present project was undertaken between December 18 and 27, 2003, by Sean M. Jensen and Peter M. Jensen. No special problems were encountered during the course of the pedestrian survey, and all of the Addendum survey objectives are considered to have been satisfactorily achieved.

4. FINDINGS and CULTURAL INVENTORY

General Observations

As noted in the original report, disturbance to the ground surface ranges from minimal to substantial throughout the project area. Past mining and logging activities have likely resulted in minor to moderate disturbance to isolated portions of the property, especially segments of Miami Creek and dry stream channels or arroyos scattered throughout the project area. Similarly, historic ranching has likely resulted in modifications to the landscape, including surface and limited subsurface soil impacts, especially in conjunction with constructing small stock watering ponds and similar features.

Much more recent activities, however, have resulted in disturbances to other areas within and near the property. Opah Drive, a paved road, forms a portion of the western and southern boundaries of the Addendum land area, and use of historic through contemporary graded access roads has accompanied on-going build-out of the golf course and residential project within the original 442-acre survey area located generally west of the Addendum land area.

Recorded Sites

Five cultural resources were identified by the Information Center as being located within the Addendum land area. These sites include CA-MAD-623, -626, -627, -634 and -635. Of this total, one represents a prehistoric food processing station (mortars, metate slicks, etc.), while the remaining four represent habitation areas containing not only surface features such as mortar holes, but the accumulation of additional artifacts, waste flakes, bone, food remains and other items in a subsurface "midden" deposit.

Field inspection of these five previously recorded sites, utilizing the existing archaeological site records and site maps to relocate surface components, resulted in the following findings.

Site Descriptions

Site CA-MAD-623: Originally recorded by Ambro *et al* (1980), this site is described as a large occupation camp with three distinct midden loci, surface lithics, 56 bedrock mortars, and two metate slicks. Overall, the site extends approximately 150 meters north-south, by 100 meters east-west, and is situated adjacent to two stream courses, one perennial, the other ephemeral. Historic-era features included in the site boundary are five apple trees and a shallow irrigation ditch.

During the present field survey, the site was successfully re-located. Since original recording, the site has been subjected to additional impacts. Several temporary structures have been moved onto and immediately adjacent to the site. These structures include travel trailers and small sheds/cabins. All of these have been abandoned are in poor condition, and are not historic. Site disturbance appears limited to the surface components, and the site remains largely intact.

Site CA-MAD-626: Originally recorded by Ambro *et al* (1980), this site is described as a small occupation camp situated 35 meters east of Miami Creek. Containing both surface lithics and a buried midden, the site occupies an area extending approximately 35 meters in length (north-south) by 27 meters in width. During initial recordation, Ambro noted a wooden flume south of the site, an access road north of the site, and limited surface grading within the site boundary.

During the present field survey, the site was re-located and found to be essentially as described in the original record. Contemporary repairs to the flume sections of the Miami Creek Ditch were observed, and construction staging activities appear to have been conducted within the site boundary, as evidenced by recently cleared brush fields and brush stockpiles on site, and limited surface grading of the site and surrounding area. Overall, however, the site appears intact.

Site CA-MAD-627: Originally recorded by Ambro *et al* (1980), this site is described as a small food processing locale that extends approximately 15 meters in diameter, situated adjacent to a perennial tributary of Miami Creek. A total of 15 bedrock mortar cups were observed on a single, large bedrock outcrop. No other cultural material, features or midden were noted in the original record.

During the present field survey, the site was re-located and found to be as originally described. However, the access road depicted on the site map is an earlier (and now abandoned) alignment, situated down slope and south of the existing access road. The site retains integrity and remains intact.

Site CA-MAD-634: Originally recorded by Ambro *et al* (1980), this site is described as a small occupation camp consisting of wasteflakes and two bedrock mortars. The site is situated approximately 300 meters northwest of Miami Creek, and occupies an area approximately 25 meters in diameter.

During the present field survey, the site was re-located and found to be essentially as described in the original record. Limited surface disturbance in the form of access roads was observed within the site boundary. A buried deposit was visible within these areas of disturbance. Overall, the site appears to remain intact.

Site CA-MAD-635: Originally recorded by Ambro *et al* (1980), this site is described as an occupation locale containing both lithics and midden. The site is situated approximately 250 meters northwest of Miami Creek and occupies an area approximately 60 meters in length (north-south) by 54 meters in width. A single, temporally diagnostic projectile point (Sierra concave base) was identified during initial site recordation. During the present field survey, the site was re-located and found to be essentially as described in the original record, and overall the site appears to remain intact.

Table 1, below, summarizes the five project area sites in terms of primary components present.

Table 1: Summary of Recorded Sites within the Addendum Survey Area (State Trinomial).

CA-MAD-623	Prehistoric occupation site with midden/sub-surface.
CA-MAD-626	Prehistoric occupation site with midden/sub-surface.
CA-MAD-627	Prehistoric special use, no midden/sub-surface.
CA-MAD-634	Prehistoric occupation site with midden/sub-surface.
CA-MAD-635	Prehistoric occupation site with midden/sub-surface.

5. SITE SIGNIFICANCE and TREATMENT RECOMMENDATIONS

General

Sites and features identified during the Records Search and pedestrian field survey were to be evaluated for significance in relation to CEQA significance criteria. Important cultural resources, per CEQA, are determined in relation to criteria specified in Section 15064.5 of the amended CEQA Guidelines. These criteria suggest that an "important archaeological resource" (an "historic property") is one which retains essential integrity of design, materials, workmanship, location and associative context, and which:

a) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
b) Is associated with the lives of persons important in our past.
c) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
d) Has yielded, or may be likely to yield, information important in prehistory or history.

Application of the Criteria to Project Area Sites

Specific application of the CEQA significance criteria to project area sites results in the following conclusions and recommendations.

Site CA-MAD-627, Mortar Holes Only:

a) & b) This site is not associated with events that have made significant contributions to the broad patterns of the history of California or the United States, nor are the mortars associated with people significant in California history since the individuals responsible cannot be identified. This site is not considered significant per Criteria a and b.

c) Based on existing inventory data maintained by the Southern San Joaquin Valley Information at CSU-Bakersfield, a large number of prehistoric components generally similar to and duplicating the attributes of this site are known and documented for the County, being particularly abundant along virtually all of the natural surface water sources in the area. Such prehistoric components are not, in other words, rare in the California inventory, nor do they "...embody the distinctive characteristics of a type, period, region, or method of construction, or represent the work of an important creative individual, or possess high artistic values..." Therefore, this site is not considered significant per Criterion c.

d) Archaeological sites containing buried cultural deposits related to Native American activities typically document protracted habitation and performance of a range of domestic activities. For these reasons, further research at such sites frequently has the potential to expand our understanding and appreciation of local and regional prehistory, and such sites are therefore routinely considered significant per Criterion d. However, there is no evidence for the accumulation of buried deposits at this mortar hole site, and as a consequence data recovery (archaeological excavation work) could not be expected to advance or further our understanding or appreciation of local or regional prehistory substantially beyond that which has been achieved in the existing site record. For these reasons, this site is not considered significant under Criterion d (i.e., for residual research or information values).

Based on these findings, CA-MAD-627 is not considered a significant or potentially significant resource per CEQA under any of the relevant evaluative criteria. No further treatment or consideration is warranted and none recommended in relation to potential impacts to this site that might accompany continuing development of the project area.

Sites CA-MAD-623, -626, -634 & -635, w/ Buried Deposits:

Archaeological sites containing buried cultural deposits related to Native American use typically document protracted habitation and performance of a fairly wide range of domestic activities. For these reasons, further research at such sites frequently has the potential to expand our understanding and appreciation of local and regional prehistory, and such sites are therefore often considered significant under Criterion d, as indicated in the following discussion and evaluation.

a) & b) These sites are not associated with events which have made significant contributions to the broad patterns of the history of California or the United States, nor can the individuals involved ever be known on the basis of the data categories present at these sites. These sites are not considered significant per Criteria a or b.

c) Based on existing inventory data maintained by the Southern San Joaquin Valley Information Center at CSU-Bakersfield, a large number of prehistoric components generally similar to and duplicating the attributes of all four of these sites are known and documented for this area of the County. Such prehistoric components are not, in other words, rare in the California inventory, nor do they represent a "... distinctive type..." or "...a distinguishable entity whose components may lack individual distinction." These sites are not considered significant per Criterion c.

d) Specialized dating samples and temporally diagnostic implement types have not been demonstrated as being abundant at any of these sites because no test excavations have been undertaken and essentially nothing is known about subsurface contents, artifact types and density, etc. Moreover, all of the sites appear largely intact, with very little of the original deposit having been affected by historic ranching or later development activities. If present, buried cultural materials could well yield additional important information on prehistoric patterns of resource extraction methodology and technology, technical information concerning lithic reduction strategies employed, the size of the populations involved, and further characterization of the intensity of resource use during prehistoric time periods in this area of central California. In other words, portable cultural material of research value could very well be present in the subsurface component at all of these sites, and in fact there is a high probability for the presence of such material given the findings of excavation projects at other similar, nearby sites. Also relevant here is the fact that these sites are located within an area variously occupied by Penutian-speaking Yokuts (primarily) and Miwok, but also Shoshone-speaking Monache, with the latter culturally related to the desert dwellers east of the Sierra Nevada crest. Under these circumstances, many of the ethnographic and fully prehistoric sites in this area could provide unique opportunities for addressing issues of cultural interaction and trade.

For these reasons, sites CA-MAD-623, -626, 634 and -635 are considered potentially significant per CEQA's Criterion d.

Table 2 summarizes the five Addendum Project sites in relation to CEQA criteria.

Table 2: Summary of Significance per CEQA

CRITERION	*a*	*b*	*c*	*d*
CA-MAD-623	-	-	-	+
CA-MAD-626	-	-	-	+
CA-MAD-627	-	-	-	-
CA-MAD-634	-	-	-	+
CA-MAD-635	-	-	-	+
Totals	**0**	**0**	**0**	**4**

Recommended Treatment, CA-MAD-623, -626, -634 & -635, w/ Buried Deposits:

As significant/potentially significant prehistoric properties (per Criterion d), two acceptable treatment options are generally available and acceptable.

Treatment Option #1: The first choice of treatment is to preserve all four sites intact by means of an impact avoidance strategy. Impact avoidance and site preservation are compatible with proposed residential development since surface indicators are generally minimal to moderate (considering generally dense brush cover) and most casual passers-by would not recognize surface features at these sites as evidence that buried cultural material is also present. Preservation could be achieved by locating proposed residential structures, driveways, associated outbuildings, utilities, access roads, ponds, and any new water transportation features in such a way as to avoid directly impacting these sites.

In order to ensure impact avoidance and site preservation, and to ensure that the sites are not inadvertently affected or impacted during construction, the boundaries of all four sites should be clearly identified as ***impact avoidance zones*** on all project and development maps, and the sites temporarily flagged at the time of construction. If construction activity is to occur within about 25-30 feet of the mapped site boundaries, and/or if construction will involve large pieces of equipment near these four sites, then the preservation/site areas should also be temporarily fenced during the construction period.

Treatment Option #2: If preservation "as is" cannot be ensured by adopting the preservation plan detailed above, then those specific attributes and qualities which may render these prehistoric sites significant per CEQA should be further specified through formal archaeological data collection work. At a minimum, such data collection work (archaeological testing) should include excavation of a sample of cultural material sufficient to evaluate site and midden depth, age and make-up of the components of the sites, and characterization of artifactual and midden constituents in terms of major data categories present. The overall objectives of any such data collection work should be to identify those research questions for which these four sites contain relevant information, with the research questions representing those presently being expressed by the body of professional archaeologists in the region. Any such data collection program should culminate in a professional report of findings that contains explicit recommendations for any mitigative-level data recovery work that might be justified or warranted on the basis of the specific findings of the testing program and the proposed level of project effects.

Native American and State Parks Consultation

Prior to conducting the field survey, the Native American Heritage Commission (NAHC) was contacted to determine whether or not formal Sacred Lands listings were present within or adjacent to the project area. NAHC responded in the negative on May 30, 2003 (response attached to the original report for this project).

On December 31, 2003, Mr. Jay Johnson and the American Indian Council, representing local Yokuts interests, were contacted by letter and requested to supply specific information they might have concerning prehistoric sites or traditional use areas within or adjacent to the Addendum land area, or to comment more generally on the proposed further development of the Addendum land area. No response has been received from the group.

6. SUMMARY of FINDINGS and RECOMMENDATIONS

This report details the results of an archaeological inventory survey involving approximately 300 acres of land located adjacent to the east side of the Sierra meadows Estates Development Project, in turn located east of State Route 49 and the community of Ahwahnee, Madera County, California. The original Sierra Meadows Estates Development Project incorporates approximately 442 acres of land located along the south and west sides of Opah Drive, along both Miami Creek and Carter Creek. The present Addendum land area is located generally east and northeast of the southeastern portion of the original 442-acre project area. Addendum project area lands are located within a portion of Sections 32 and 33 of Township 6 South, Range 21 East, as shown on the USGS Ahwahnee, California 7.5' series quad. Both the original 442-acre project area and the present Addendum Survey Area lands are identified on the attached ***Project Location and Archaeological Survey Area Map***.

A search of existing records at the Southern San Joaquin Valley Information Center indicated a number of past archaeological surveys had been conducted within the project area. These previous investigations, combined with consultation with Ahwahnee area Southern Valley Yokuts, and a complete-coverage, variable-intensity pedestrian survey, resulted in identifying and documenting five prehistoric archaeological sites within the Addendum land area.

All five sites represent previously recorded resources, and include one food processing station (site CA-MAD-627) and four habitation sites minimally impacted by historic ranching and later activities (sites CA-MAD-623, -626, -634 and -635). During the present field survey all five sites were relocated, but no new sites were identified. All five sites were evaluated in the field, and recommendations re. significance per CEQA and site treatment are developed herein. The single food processing site (mortar holes, CA-MAD-627) is recommended not significant under CEQA and requires no mitigative treatment or other action. The four sites representing habitation locales (sites CA-MAD-623, -626, -634 and -635) all contain buried cultural materials. Since most of the original deposits at all four of these sites appear intact and generally undisturbed, it has been recommended that all four sites are significant/potentially significant per CEQA significance Criterion d. In consideration of this recommendation with respect to significance, two acceptable treatment options are offered: (1) preservation "as is", or (2) data collection (archaeological testing) followed by possible mitigative-level data recovery.

Input from local Yokuts representatives includes neither endorsement nor rejection of the proposed findings, significance recommendations, or recommended treatments for the five sites located within the Addendum project area.

Aside from the two specific treatment options recommended for sites CA-MAD-623, -626, -634 and -635, archaeological clearance is recommended for the remainder of the project area, although the following general provision is appropriate:

> The present evaluation and recommendations are based on the findings of an inventory-level surface survey only. There is always the possibility that potentially significant unidentified cultural materials could be encountered on or below the surface during the course of future development or construction activities. In such a situation, archaeological consultation should be sought immediately.

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15.8 Geology/Soils Analysis

GEOLOGY, SOILS AND SEISMICITY
EIR for Sierra Meadows Estates Subdivision
MADERA COUNTY, CALIFORNIA

Prepared for:

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September 29, 2004

Project No. 9076

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EIR for Sierra Meadows Estates Subdivision and Proposed Dam
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DRAFT

1.0 INTRODUCTION

The scope of work performed as part of the geology, soils and seismicity portion for the Sierra Meadows Estates Subdivision EIR included compilation and review relevant reports and maps that address geotechnical, geologic and hydrogeologic conditions for the project area, specifically geotechnical data for the proposed residential development and water storage reservoir, and reconnaissance-level geologic mapping. A list of the reports, maps and other relevant data reviewed for this study are presented in the References section at the end of this report.

The results of the EIR-level evaluation for this study, as well as pertinent impacts and mitigating measures are provided in the following report.

2.0 EXISTING CONDITIONS

2.1 GEOLOGIC SETTING

The Sierra Meadows project area is situated within a transitional area between the rolling foothills and mountain ranges of the Sierra Nevada Mountains. Bedrock exposed across the region surrounding the project site is predominately granitic rock that forms the core of the Sierra Nevada Mountains (i.e. Sierra Nevada batholith). The granitic rock that underlies the project site and surrounding region is identified as the early Cretaceous age (about 120- million years old) Bass Lake Tonalite (Bateman, 1989). Prebatholithic metamorphic rocks of the Coarsegold roof pendant are exposed across the top of Potter Ridge, located directly south of the project area; and are correlative with rocks of the Western Metamorphic Belt exposed north of Mariposa. The Coarsegold roof pendants include Jurassic age metavolcanic rocks (primarily amphibolite) and surrounding Triassic age slate and phillite with interbedded quartzite and chert (Bateman, 1989). Alluvial deposits occupy the bottoms of the major drainages that flow westerly from the Sierra Nevada Mountains.

Given the igneous nature of the bedrock, there are no paleontological (i.e. fossil) sites within or immediately adjacent to the project area.

Site Conditions

The project site occupies a small upland valley and surrounding ridgelines formed by Miami and Carter creek and a number of smaller northwest-trending tributary drainages. Elevations within the project site range from a low of about 1640 feet near the confluence of Miami and Peterson creeks, to a maximum of about 2450 feet in the northeastern portion of the site. Topographically, the majority of the project area is characterized by moderate to deeply incised drainages and relatively broad intervening ridgelines and narrow plateaus. A broad, fairly large alluviated valley associated with the Peterson and Miami creek drainage occupies a limited portion of the of the project area. Natural slopes adjacent to Miami and Carter creeks and the tributary drainages within the project area display surface gradients of about 5 to 30 percent, except along the margins of the portions of Miami and Carter creek, and the upper portions of several unnamed drainages in the area of the proposed reservoirs where slopes can vary from 30 percent to near vertical.

Potential geologic/geotechnical constraints to the proposed residential portion of the development include the following:

- Soil erosion resulting from grading for housing pads and attendant slopes.
- Potentially collapsible and liquefiable alluvial soils within the broad, marshy area of Miami Creek.
- Slope instability along steep, natural slopes adjacent to portions of Miami and Carter creek, as well as slopes created during grading for individual lots.
- Degradation of water quality due to the use of onsite sewage disposal for 5-acre (+) lots situated along Miami Creek.

Potential geotechnical and geologic constraints/hazards associated with the proposed construction of a 47-foot-high earthen dam/embankment and the attendant 227-acre-foot reservoir, as shown on Figure No. 2 in Geomatrix Consultants,'Inc.,(Geomatrix) September 2004, report "Geotechnical Feasibility Study (for) Sierra Meadows Dam," include the following;

- Availability of suitable onsite soils for construction of the dam/embankment.
- Excavatibility of the hard granitic bedrock associated with construction of the reservoir.

- Compressibility of native soils when subjected to embankment loads.
- Stability of the dam/embankment and cut slopes surrounding the reservoir.
- Dispersive nature of the soils that would be used for construction of the dam, which may be moderately susceptible to surface erosion.
- Potential leakage of water from through the dam, as well as through major fractures (i.e. joints) in the granitic bedrock in the foundation beneath the dam and within the surrounding reservoir.
- Downstream flooding and resulting inundation of a number of the proposed residential lots due to excessive discharge from the reservoir along the spillway, or a failure of the dam/ embankment.

Although the project area is located within a relatively seismically quiescent area of the State, it is surrounded by seismically active regions of southern California. Seismically-induced strong ground shaking is not anticipated within the project area due to the relatively large distance to major faults. There are no documented active or potentially active faults transecting or projecting towards the project area. Moreover, there are no documented landslides within the project area.

2.2 GEOLOGIC MATERIALS

Bedrock beneath the project area consists entirely of granite. The majority of the project area is capped by residual soils derived from weathering of the underlying granitic rocks. Recent alluvial deposits occupy the bottom of the many of the natural drainages. Scree and accumulations of large stream boulders occupy portions of the two major drainages, namely Miami and Carter creeks. The designations shown below, in parenthesis, correspond to those shown on the Geologic Map.

Topsoil and Residual Soils (not designated)

Native topsoil and the underlying residual soils are classified by the U.S Department of Agriculture Soil Conservation Service (USDA, 1962) as mostly Ahwahnee and Auberry (undifferentiated) coarse sandy loams. According to studies by J.H. Kleinfelder & Associates (Kleinfelder, 1980) and Geomatrix (2004) there are three main soil layers within the site. The uppermost topsoil layer varies in thickness from several inches to about four feet and consists of medium to dark brown silty/micaceous sand and silty sand that is moist, medium dense and considered to be moderately to highly permeable, moderately compressible and slightly to moderately erodible. The underling soil layers vary from absent to over 10 feet thick and consists of laterally continuous layers of brown to orange brown and tan, silty/ micaceous fine to coarse sand, silty sand or clayey sand or sandy clay that is usually slightly moist and dense. The lowermost layer is grades into decomposed granite. Overall, these lower residual soils units are considered to be slightly to moderately permeable, and slightly to moderately erodible, depending upon depth below the ground surface.

According to Geomatrix (2004), these various soil materials are suitable for use as compacted fill for construction of the proposed dam/ embankment. These soils are also suitable for use as a compacted soil cap for the proposed residential lots.

Alluvium (Qal)

Alluvial soils are those deposited by the active streams and are found in most of the larger drainages courses. Although not encountered in exploratory test pits by Kleinfelder (1960) nor Geomatrix (2004), these alluvial soils likely consist primarily of layers and lenses of fine to coarse-grained sand, silty sand and some finer grained layers. Typically, alluvial soils are loose to medium dense, moist to partially saturated, porous, and likely contain varying amounts of organic matter. In such cases, there is a potential for soils to be subject to collapse upon placement of structural loads (i.e. single family homes and reservoir embankments).

Due to presence of shallow groundwater and potentially looses sandy soils, there is the possibility of seismically-induced settlement and/or liquefaction within portions of Miami and Carter creek. Current development plans indicate that approximately 10 lots in the western portion of the project area are underlain by alluvial soils.

Based on exploratory trenching by Geomatrix (2004), there are limited amounts of alluvial-type soils within the natural drainages in the area of the proposed dam and reservoir. Where encountered, these alluvial soils vary from about 10 to 20 feet thick and are composed of loose to moderately dense silty sand and sand. These soils will be completely removed as part of the foundation excavation for the dam; and from portions of the reservoir area as a source of borrow for dam/embankment. As such, any settlement and/or collapse of the dam due to unsuitable nature of these soils will not be a problem.

Scree and Stream Boulders (Qs and Qb)

Locally along Miami Creek and a tributary drainage near the south boundary are bouldery scree and loose boulders (see Geologic Map). Scree is a deposit of broken rock fragments and/or accumulation of large boulders with little to no matrix (i.e. sand or gravel size particles that would fill the void space) that creeps down steeper slopes. The boulders are derived from steep cliffs and scree slopes and were deposited in the streams in comparatively recent geologic time (Kleinfelder, 1980).

Granitic Bedrock (Kgr)

The entire project area is underlain at relatively shallow depths by granitic rocks that vary in composition from quartz-rich pegmatite to quartz monzonite to more mafic diorite (referred to as the Bass Lake Tonalite by Bateman, 1989). These variations could not be mapped separately due to very limited exposures of these rocks in the project area. These variations do affect the differences in texture, mineralogy, overlying soil profile and depth of weathering. Typically, the coarser grained the textured rocks, the greater the depth of weathering and the greater ease of excavation. Conversely, the finer grained the rock, there is commonly less residual soil and excavatibility becomes more difficult.

The likelihood of drilling and blasting of the grained granitic rock for excavations of individual lots is considered low. However, Geomatrix's (2004) feasibility study for the proposed dam and reservoir area indicates that the zone of weathering within the granitic rock extends to depths of only a few feet to depths of 37 to 44 feet below ground surface. Based on the current layout of the proposed dam and interior slopes of the reservoir, some amount of drilling and blasting will be necessary in order to achieve the desired reservoir slope configuration. Further field investigation studies have been recommended by Geomatrix to further evaluate the excavatibility of the bedrock in the reservoir area.

However, from the perspective of dam stability, Geomatrix (2004) has indicated that the granite will, once the severely weathered (i.e. grussified) material has been removed, make an excellent foundation for the dam embankment.

2.3 BEDROCK STRUCTURE

Geologic structure within the granitic bedrock is defined primarily by jointing. Joints are essentially internal planes of weakness (i.e. fractures) that develop within the rock due to internal stress that have developed within the rock mass. As the rock mass becomes uplifted from depth, such as the ongoing uplift of the Sierra Nevada Mountains and/ or erosion of the overlying rocks, these built up stresses are released, resulting in the creation of joints/ fractures. As with most granitic rock terrains, an orthogonal system of joints often develops. Joints also form the avenues for groundwater flow and connect surface water with the groundwater stored in the joints/ fractures within the bedrock.

The pattern of the jointing in the bedrock within and surrounding the project area essentially controls the creation of surface drainage patterns. Where observed, the joint set includes high angle (50 to 90 degrees) northeast-southwest and northwest-southeast trending joints, as well as nearly flat lying sheet/exfoliation joints that roughly parallel the ground surface. A number of the granitic outcrops often have a rounded dome-like surface due to the process of exfoliation. Typically exfoliation slabs vary in thickness for 0.5 to 3 feet where the outcrops have a rounded surface, but are typically absent where the surface of the outcrop is nearly flat. The high angle joints cutting the granitic rock at the proposed dam site are widely spaced, typically exceeding 20 feet.

In the area of steep natural slopes adjacent to Miami and carter creeks, jointing patterns control the nature and extent of localized "toppling" slope/ block failures. The possibility of joint-controlled toppling failures is increased if the joints become filled with water, such as from precipitation, surface runoff from landscape irrigation and groundwater seepage from the proposed reservoir, and are unable to drain.

2.4 GROUNDWATER

Water that is contained within fractures/ joints in the granitic bedrock serves as the principal groundwater aquifer in the area. There are several operating wells in the vicinity of the project that are used to supplement usage of surface water from Miami Creek. No documentation was available for review concerning quality or quantities of groundwater produced from these wells. However, the majority of potable water supply for the project will come from surface water in Miami Creek that will be stored in the proposed reservoir. Groundwater will continue to provide a supplemental source of water during periods of low flow within the creek.

Depth to groundwater beneath the majority of the proposed residential portions of the site is not well documented. In the proposed residential area adjacent to Miami Creek several springs have been mapped in the area (see Geologic Map) where depth to groundwater is presumed to be relatively shallow and could pose a concern as it relates to potential degradation to water quality from private, onsite sewage disposal and landscape irrigation runoff.

Based on groundwater level information obtained from exploratory drilling performed by Geomatrix (2004), as well as from existing wells in the area of the proposed dam and reservoir, depth to groundwater in the dam/reservoir area varies from about 10 to 40 feet below ground surface. The shallower depths to the groundwater table correspond to the bottom elevations of the two main natural drainage channels that transect the reservoir, from north to south. According to Geomatrix's (2004) dam feasibility study, the direction of groundwater flow is essentially north to south.

The majority of groundwater recharge to the bedrock aquifer is likely supplied from inflow on Miami Creek, as well as from a number of surface water storage ponds upgradient of the project area. Infiltration of rainfall during the winter months also contributes to groundwater recharge in the upland areas. Significant amounts of groundwater recharge could develop with construction of the reservoir, thereby creating elevated groundwater levels in the area surrounding the reservoir.

As part of Geomatrix's study of the dam site, permeability (i.e. packer) testing was conducted in each of the three borings to assess in-situ bedrock fracture permeability (hydraulic conductivity). Average hydraulic conductivities were calculated for each 13- to 20-foot depth interval in each of the 80-to 100-foot deep borings, ranging from approximately 7.3x10-5 centimeters per second (cm/sec) [6 feet per year (ft/yr)] to 2.9x10-4 cm/sec [296 ft/yr]. Based on the location of each of the borings with respect to the proposed embankment and reservoir, the hydraulic conductivity values indicate the granite bedrock displays low to moderate potential for subsurface leakage in the foundation bedrock beneath the dam and from the reservoir, respectively. However, Geomatrix (2004) has recommended construction of a "cut- off trench" within the foundation area beneath dam in order to preclude any significant leakage.

2.5 MINERAL RESOURCES

There are no economic metallic or non-metallic ore deposits within or directly adjacent to the project area. Historically, Coarsegold Creek was the closest area associated with economic mineral deposits, primarily placer gold mining. The only lode mine with a significant record of gold production is the Texas Flat Mine, a short distance northwest of the town of Coarsegold, which was mined intermittently between 1886 and 1927 (Bateman, 1989).

The potential for oil and/or gas deposits beneath the site is considered remote

3.0 GEOLOGIC HAZARDS/CONSTRIANTS

General

The project area is situated with the Foothills/ Mountains subregion of the County as identified in the 1995 Madera County General Plan- Final Environmental Impact Report. This area of the County is known as being underlain by dense soils and competent bedrock that is regarded as relatively safe from damage by ground shaking resulting from seismic activity; and in low risk conditions for damage resulting from liquefaction, subsidence or landslides.

The primary geologic hazards/constraints identified during this study within the project area are those associated with soil erosion, slope stability, possible collapsible and liquefiable alluvial sediments in Miami Creek, possible impacts to surface and groundwater quality, and potential hazards to life and property associated with the failure of the proposed dam/ reservoir.

3.1 FAULTING AND SEISMICITY

Hazards associated with earthquakes include primary hazards, such as ground shaking and surface rupture; and secondary hazards, such as liquefaction, seismically-induced settlement, and landsliding, tsunamis, and seiches.

In accordance with the California Geological Survey (formally the California Division of Mine sand Geology), a fault is a fracture in the crust of the earth along which rocks on one side have moved relative to those on the other side. Most faults are the result of repeated displacements over a long period of time. An inactive fault is a fault that has not experienced earthquake activity within the last three million years. In comparison, an active fault is one which has experienced earthquake activity in the past 11,000 years. A fault which has moved within the last two to three million years, but not proven by direct evidence to have moved within the last 11,000 years, is considered potentially active. No active or potentially active faults are located within or project towards the project area.

The project area, like most of Southern California is part of a seismically active region. The Alquist-Priolo Act of 1972 (now the Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code 2621-2624, Division 2 Chapter 7.5) regulates development near active faults so as to mitigate the hazard of surface fault-rupture. Under the Act, the State Geologist is required to delineate "special study zones: along known active faults in California". The Act also requires that, prior to approval of a project, a geologic study be conducted to define and delineate any hazards from surface rupture. A geologist registered by the State of California,

within or retained by the lead agency for the project must prepare this geologic report.
A 50-foot setback from any known trace of an active fault is required. The project area is not currently known to be located within an Alquist-Priolo Fault Rupture Hazard Zone, according to the California Geological Survey.

The Modified Mercalli intensity scale was developed in 1931 and measures the intensity of an earthquake's effects in a given locality, and is perhaps much more meaningful to the layman because it is based on actual observations of earthquake effects at specific places. On the Modified Mercalli intensity scale, values range from I to XII. The most commonly used adaptation covers the range of intensity from the conditions of "I –not felt except by very few, favorably situate," to "XII – damage total, lines of sight disturbed, objects thrown into the air". While an earthquake has only one magnitude, it can have many intensities, which decrease with distance from the epicenter.

Ground motions, on the other hand, are often measured in percentage of gravity (percent g), where g = 32 feet per second per second (980 cm/sec^2) on the earth.

Ground shaking accompanying earthquakes on nearby faults can be expected to be felt within the site. However, the intensity of ground shaking would depend upon the magnitude of the earthquake, the distance to the epicenter, and the geology of the area between the epicenter and the property.

A listing of active faults considered capable of producing strong ground motion at the site, their closest distances to the property, and the maximum expected earthquake along each fault is presented in Table 1. Also presented are generalized evaluations of maximum ground shaking on site for the maximum earthquakes, and generalized predictions of the likelihood of such events occurring.

TABLE 1

SUMMARY OF FAULT AND GENERALIZED EARTHQUAKE INFORMATION FOR SIERRA MEADOWS ESTATES PROJECT SITE

Name	Miles(direction from site)	Maximum Magnitude	Expected Level of Ground Shaking	Likelihood
Foothills Fault System	11 (north)	6.5	Moderate	Moderate
San Andreas	95 (southwest)	7.4	Low	High
Ortigalita	76 (west)	6.9	Low	High
San Joaquin (Great Valley Thrusts)	69 (west)	6.6	Low	High
Hartley Springs	47 (northeast)	6.8	Low	Moderate
Hilton Creek	46 (east)	6.7	Low	Moderate
Owens Valley.	76 (southeast)	7.6	Low	Moderate

The greatest amount of ground shaking at the site would be expected to accompany a large earthquake on the Foothills fault system, namely the Melones or Bear Creek fault. An earthquake magnitude of 6.5 on either of these two faults could produce Modified Mercallli intensities in the range of IV to VIII within the property, and maximum horizontal ground acceleration between 0.14g and 0.16g. Insofar as this expected ground acceleration and proposed dam is concerned, the California Department of Water Resources Division of Safety of Dams (DSOD), which serves as the regulatory agency for new dams, requires the minimum design ground acceleration for new dams is 0.2g. Damage from ground rupture on-site is extremely unlikely because no known active faults cross the property.

Secondary earthquake hazards include liquefaction, ground lurching, lateral spreading, seismically induced settlement, tsunamis, seiches, and earthquake induced landsliding.

Liquefaction

Seismic ground shaking of relatively loose, granular soils that are saturated or submerged can cause the soils to liquefy and temporarily behave as a dense fluid. Liquifaction is caused by a sudden temporary increase in pore water pressure due to seismic densification or other displacement of submerged granular soils. Liquefaction more often occurs in earthquake prone areas underlain by young alluvium where the groundwater table is higher than 50 feet below the ground surface. Based on the presence of Holocene age alluvium and shallow groundwater within the broad, marshy area of Miami Creek, this portion of the project area could be susceptible to liquifaction. All loose, granular, liquefaction-prone soils within the drainages where the dam is proposed would likely be removed, thereby mitigating any liquefaction potential.

Ground Lurching

Certain soils have been observed to move in a wave-like manner in response to intense seismic ground shaking, forming ridges or cracks on the ground surface. Areas underlain by thick accumulations of colluvium and alluvium appear to be more susceptible to ground lurching than bedrock. Under strong seismic ground motion conditions, lurching can be expected within loose, cohesionless solids, or in clay-rich soils with high moisture content. Generally, only lightly loaded structures such as pavement, fences, pipelines and walkways are damaged by ground lurching; more heavily loaded structures appear to resist such deformation. Ground lurching may occur where deposits of loose alluvium exist on the project site. If alluvial soils prove to be loose (i.e. poorly consolidated), ground lurching may affect structures built on these materials.

Lateral Spreading

Lateral spreading involves the lateral displacement of surficial blocks of sediment as a result of liquifaction in a subsurface layer. Although there may be liquefaction potential within a portion of the project area, the likelihood of lateral spread is considered to be remote.

Seismically Induced Ground Settlement

Strong ground shaking can cause settlement by allowing sediment particles to become more tightly packed, thereby reducing pore space. Unconsolidated, loosely packed alluvial deposits are especially susceptible to this phenomenon. Poorly compacted artificial fills may also experience seismically induced settlement. Unconsolidated soils such as near surface alluvial soils are subject to seismically induced ground settlement. All loose soil will be removed from the foundation of the proposed dam; hence seismically-induced settlement will not be a problem.

Tsunamis

A tsunami is a seismic sea-wave caused by sea-bottom deformations that are associated with earthquakes beneath the ocean floor. The hazard from tsunamis is considered nil, given the large distance from the Pacific Ocean.

Seiching

Seiching involves an enclosed body of water oscillating due to groundshaking, usually following an earthquake. Lakes and water towers are typical bodies of water affected by seiching. The potential for seiching and its impact on dam safety will need to be assessed during the actual design phase for the dam and reservoir.

Other Geologic Hazards

Landslides

No landslides are known to exist within the proposed residential or reservoir areas. Field reconnaissance did not disclose the presence of older, existing landslides within or near the subject property. Aerial photographic analyses performed as part of this study also did not disclose any existing landslides or slumps in the project area. Given the overall character of the granitic bedrock in the vicinity of the proposed reservoir, the potential for landsliding on the proposed internal, 2:1 (horizontal to vertical) slopes bordering the reservoir is considered low.

Expansive Soils

Based on the information generated from previous geotechnical studies, there is no indication of expansive soils within the project area.

Soil Erosion

Increased soil erosion is anticipated within the project site due to the following:

- Grading of individual lots, as well as the proposed reservoirs, that will disturb the natural soil conditions and expose the contact between granite and the overlying decomposed granite and highly erodible soils.
- Loss of vegetative cover.
- Construction of cut slopes for individual lots, roadways and reservoir slopes that will expose weathered bedrock and overlying soils to accelerated erosion.
- Increased surface water runoff resulting from construction of impermeable surfaces, such as roadways, driveways, and extensive hardscape on individual lots.
- Channelization of surface water runoff collected from storm drains that discharge into natural drainages.

Slope Stability

Residential Development

Current grading plans indicate the construction of 2:1 (horizontal to vertical) cut slopes up to 40 feet high as part of grading for individual lots. Based on the very dense nature of the granitic bedrock, lack of weak zones/ layers, and the good performance of existing cut slopes in the residential area and roadways surrounding the project site, surficial and gross stability of cut slopes is not expected to be a problem. In fact, many of the roadway slopes that have been excavated in similar granitic rocks along State Highway 41 and 49 are as steep as 1/2 :1 and are not experiencing signs of instability. All other factors being equal, steeper slopes (i.e. 1 1/2 to 1:1) in sound granitic bedrock are generally less susceptible to surficial instability because of the more limited amount of exposed surface area that is subject to direct contact with rainfall.

In regards to stability of the steep granitic rock slopes bordering portions of Miami and Carter creeks, block-and/or toppling-type failures could occur as the result of the stream erosion undermining portions of these slopes and/or the buildup of water within natural joints and fractures due to infiltration of misdirected surface water runoff and/or from effluent from septic systems. Currently, the accumulation of scree deposits along the base of these slopes helps create a natural buttress for these slopes, thereby enhancing their stability.

Dam and Reservoir Construction

The proposed dam will have crest elevation of 2440 feet above mean sea level (msl) and crest length of approximately 1140 feet and will be comprised of a main dam with a length of approximately 780 feet and a saddle dam with a length of about 150 feet separated by a 210-foot bedrock cut section. The maximum embankment height will be 49 feet as measured from the dam crest to the lowest downstream toe of the main embankment. The geotechnical feasibility study performed by Geomatrix (2004) has indicated that the embankments may be constructed of suitable earthen materials (i.e. residual soils, alluvium, grussified granite) obtained from the excavations for the embankment foundation and reservoir. Hydraulic conductivity testing performed by Geomatrix (2004) on remolded bulk soil samples obtained during their field exploration indicates that the on-site soils will be suitable for embankment construction. Based on the proposed reservoir storage capacity of about 210 acre-feet, the proposed dam will fall under the jurisdiction of DSOD. As such all aspects of dam design and construction will need to be reviewed and approved by DSOD.

The stability of the proposed dam and cut slopes surrounding the reservoir is of critical importance as it relates to public safety. The upstream and downstream face of the embankment will have slope ratios of 3:1 (horizontal to vertical) and 2:1, respectively. The bedrock cut slopes internal to the reservoir will vary in height from about 35 to 60 feet and have slope ratios of 2:1. According to the studies performed by Geomatrix (2004) the embankment slopes, as well as the cut slopes within the reservoir are expected to have adequate factors of safety (i.e. > 1.5) against failure both under static conditions and under earthquake loading during a seismic event in the region. From the perspective of overall stability of dam, once the severely weathered granitic bedrock materials have been removed, the remaining granite bedrock would make an excellent/ stable foundation for the dam embankment.

Based on the seismic refraction surveys, exploratory trenching and core drilling by Geomatrix (2004), the uppermost 17 to 37 feet of highly to moderately weathered (i.e. decomposed) granite should be readily excavatable with conventional heavy earth moving equipment and should provide suitable material for embankment fill when placed and compacted in accordance with the recommendations presented in the Geomatrix (2004) report. By contrast, the excavatibility of the fresh to little weathered granitic bedrock is considered non-rippable using conventional types of grading equipment and would require blasting in order to excavate. There are several areas within the proposed reservoir where it appears that blasting will be required to create portions of the internal slopes. Geomatrix (2004) has recommended that in order to evaluate the depth to which the granite can be readily excavated by typical construction equipment, test excavations using a D 9 bulldozer with ripper shanks should be performed.

Insofar as controlling water seepage from the reservoir through the proposed embankment, a blanket drain at the base of the embankment will be required and a chimney drain may be required depending upon the results of a seepage analyses to be performed during the actual design phase for the project. In order to control seepage through the fractures/ joints in the foundation bedrock, a cut off trench has been suggested by Geomatrix (2004).

Groundwater is anticipated where excavations approach the top of the weathered bedrock, particularly in swales and drainage courses. Dewatering can likely be accomplished by means of sumps and pumps placed at low points in the excavations.

As with similar types of dams, a spillway cut in the bedrock on either the west or eastern abutment will be necessary. To date, no proposed spillway location has been identified. Further investigation of the spillway area will be performed during the design phase for the dam.

On-site Residential Sewage Disposal

Madera County requirements consider percolation rates between 5 and 60 minutes per inch of drop in water level (minutes/inch) as an acceptable range for private sewage systems. However, the percolation rate is only one of many factors that affect the suitability of any site for sewage disposal via the use of leach lines. In the absence of the various factors used to evaluate suitability, poorly designed septic systems can create significant impacts to nearby water courses and riparian habitat, as well as degradation of groundwater quality.

Private onsite sewage disposal in planned for 28, five acre lots, 27 of which border Miami Creek. To date, there has been no specific testing (i.e. percolation tests) within the lots that are planned to use an onsite septic system. Of the 11 percolation tests performed by Kleinfelder

(1980) in and around the project area, percolation rates varied from a low of 0.8 to 400 minutes/inch within test pits that ranged from 1.6 to 3.5 feet deep. The fastest percolation rate is six times as fast as the fastest acceptable rate, and the slowest rate is 1/6 the slowest acceptable rate. Hence, the near surface soils and highly weathered granitic bedrock exhibit a wide range of percolation rates.

4.0 TRESHOLDS OF SIGNIFICANCE

Earth resource and/or topographic impacts resulting from the proposed project could be considered significant if any of the following occur:

- exposure of people or property to substantial geological hazards, such as flooding due to dam or reservoir failure, landslides, mudslides, ground failure or similar hazards, or soil and/or seismic conditions so unfavorable that they could not be overcome by design using reasonable construction and/or maintenance practices;
- location of a structure within a mapped hazard area or within a structural setback zone;
- location of a structure within an Alquist-Priolo Fault-Rupture Hazard Zone, or within a known active fault zone, or an area characterized by surface rupture that might be related to a fault;
- triggering or acceleration of geologic processes, such as landslides or erosion that could result in slope or dam embankment failures;
- substantial irreversible disturbance of the soil materials at the site or adjacent sites, such that their use is compromised;
- modification of the surface soils such that abnormal amounts of windborne or waterborne soils are removed from the site;
- earthquake induced ground shaking capable of causing ground rupture, liquifaction, settlement, or surface cracks resulting in the substantial damage to people and/or property;
- deformation of foundations by expansive soils (those characterized by shrink/swell potential) or collapsible soils; and
- modification of the on-site (i.e. grading) in a manner that results in decreased stability for adjacent residential enclaves.

5.0 IMPACTS

The level of geotechnical and landform information contained herein is adequate to analyze the potential project effects on earth resources and landforms, and to determine appropriate mitigation measures for the proposed residential development and dam/reservoir. Although there is adequate geologic and geotechnical information relative to the siting and construction of the proposed dam, design-level engineering and geotechnical studies will be required, which will need to be reviewed by and approved by DSOD prior to actual construction of the proposed dam. In addition, the project geotechnical engineer will also need to perform additional testing and review of on-site conditions as part of the final design work for the residential portion of the development. This additional work for both the residential development and proposed dam will further refine details for site/dam design, but is not anticipated to alter the conclusions of significance contained herein. In accordance with CEQA case law, these later additional refinements are not a deferral of mitigation. Rather, it is a design refinement, consistent with the commitment to mitigation included in this EIR.

According to the current residential development plan, a total of 317 individual lots are proposed to be constructed in 12 different phases of grading. The lots range in size from about 7000 square feet to six acres. All but the 33, five-to six-acre lots will be tied into a central sewage and treatment system. For the most part, grading will entail excavations to expose competent bedrock within the proposed footprint of individual homes. Excavated materials from the housing pads, as well as adjacent cut slopes, will be placed as compacted fill around the edges of the pads/lots.

Surface water runoff from each lot is planned to be directed away from the fill slopes and sheet flow to shallow earthen or concrete lined swales located within cut portions of the lots. In many cases this surface water runoff from lots and adjacent cut slopes will be directed into nearby natural drainage channels.

In order to supplement water supply during the summer months, the project will include construction of an earthen dam and reservoir that will be filled during the winter months that is capable of holding 227 acre feet of water storage. As indicated earlier in this report, there is sufficient geologic, geotechnical and preliminary dam design information available to adequately assess potential impacts associated with the proposed dam and reservoir.

The project will also include a surface water treatment plant to be located near an existing 150,000 gallon water tank. The treatment plant would be constructed utilizing a factory-assembled metal unit about 10 feet wide, 32 feet long and 10 feet high.

There are a number of short- and long-term impacts to the current physical/geological setting that can be generally expected from grading and development activities associated with the proposed residential development and the dam.

5.1 EFFECTS FOUND NOT TO BE SIGNIFICANT

Based on the results of the information reviewed for this study, earthquake induced strong ground motion, and landsliding (excluding rock fall-type failures) are not considered to represent significant impacts due to the low potential within the project site. There is no indication of the presence of expansive soils within the limits of the project.

5.2 POTENTIALLY SIGNIFICANT IMPACTS

The most significant potential impacts resulting from the proposed residential development and construction of the dam would be caused by changes in existing topography from grading activities, slope stability, erosion of surficial soils and highly weathered granitic bedrock, degradation of surface and groundwater quality from residential septic systems and irrigation runoff, possible collapsible and/or liquefaction-prone alluvial soils, and most certainly any potential failure of the dam.

5.2.1 Slope Stability

Granitic bedrock exposed along the steep natural slopes adjacent to Miami and Carter creeks is considered subject to block-and/or toppling-type failures. The buildup of water within joints and fractures, as well as the removal of natural support via stream erosion can exacerbate any existing instability of bedrock in these areas. Establishing adequate structural setbacks for homes and septic systems, and maintaining positive surface drainage away from these steep slopes should provide appropriate mitigation against slope failures.

Where cut slopes are planned, they will be excavated primarily within granitic bedrock materials at inclinations not exceeding 2:1 (horizontal to vertical) under the observation and by a geotechnical firm. The dam embankment, as well as fill slopes for residential development will be constructed with engineered fill at inclinations no steeper than 2:1. Cut and fill slopes are expected to be grossly and surficially stable and thereby would reduce this impact to a less-than-significant level.

Slope stability can further be protected by the residential construction guidelines set forth in the Madera County Grading Ordinance, and from direction of DSOD for design and construction of the dam.

5.2.2 Soil Erosion

The near surface soils and highly weathered bedrock materials are moderately erodible. Adverse surface drainage across individual residential lots, on the face of manufactured slopes and from concentrated discharge from storm drains into natural drainage channels could promote accelerated soil erosion which could lead to surficial instability of slopes and increased sedimentation. This impact could be considered significant if not mitigated.

Mitigation measures necessary to reduce this impact to a less-than-significant-level would include the following.

- As soon as grading is completed for each lot, establish a protective vegetative cover in all disturbed areas via planting and/or seeding followed by placing a temporary protective cover , such as jute netting, mulch, hay or other non-erodible form of ground cover, until a vegetative cover is established.
- Surface drainage should be diverted from cut and fill slopes via brow ditches, collected in ditches with relatively shallow gradients, and provide a means to inhibit sediment runoff into natural drainages until such time as a protective vegetative cover effectively mitigates further soil erosion. Energy dissipating devices should be placed in drainages subject to increased runoff.
- Grading should attempt to minimize the area of disturbance and be avoided near natural springs.
- Surface erosion aspects associated with construction of the dam would include downstream discharge from the spillway of the dam and surface erosion on the downstream face of the dam due to dispersive soils and/or concentrated surface water runoff. These potential concerns will be addressed during design-level work for the dam.

5.2.3 Sewage Disposal

The potential impacts on surface and groundwater quality and slope stability resulting from proposed on-site residential sewage disposal systems warrant a comprehensive and detailed study of leach field suitability. Such a study should investigate and evaluate all the factors involved in individual sewage disposal system utilization, including soil types and their depths, permeability, slopes, the locations of springs and depth to seasonal groundwater, drainage, effluent volume, and setbacks to watercourses and other features.

Existing County and State regulations for community water systems require testing the water for colliform bacteria and other possible pollutants at least once a month and weekly when the systems serve more than 15 connections. This required testing program tends to mitigate the potential for any undiscovered problem on the site. A similar program could be initiated at a point downstream from the site on Miami Creek to monitor changes in surface water quality passing off-site

Engineering, based on a comprehensive study, may be able to provide one of three possible recommendations:

1. A general individual disposal system suitable for the site as a whole;
2. A system suitable for part of the site, the remainder to be handled on a lot-by-lot basis; or
3. A recommendation to design all systems based on lot-by-lot studies.

Conversely, another measure to mitigate the potential impacts of on-site sewage disposal could include the disposal of sewage to the proposed community treatment plant.

5.2.4 Collapsible and/or Liquefaction-Prone Soils

Portions or all of the alluvial soils associated with the major modern drainages, namely Miami and Carter creeks, as well as portions of the areas underlain by residual soils are likely to be susceptible to collapse upon placement of structural loads, such as from placement of fill/embankment soils or construction of single-family homes. Saturated portions of these soils in these major creeks are also considered potentially susceptible to liquefaction-induced settlement. The impact to homes built atop these alluvial soils from either soil collapse, or soil settlement resulting from liquefaction could be significant unless mitigated. Typical mitigation concepts would include complete removal and replacement of these soils with engineered fill, performing in-situ densification of collapsible/ liquefaction-prone soils, or supporting all future structures that are underlain by these unsuitable soils on piles and grade beams. Geotechnical engineering studies will needed where residential development areas of the project are underlain by alluvial soils. All alluvial and residual soils beneath the proposed dam will be removed, hence this issue will be eliminated.

5.3 CONSTRUCTION RELATED IMPACTS

Grading activities associated with the residential development and construction of the treatment plant and where grading of pads, slopes and associated interior streets is planned would create minor to moderate changes to the current topography. The greatest changes to existing topography would occur from construction of the dam and internal slopes for the reservoir. Only by avoidance can impacts to topography related to grading be mitigated and/or reduced to a less-than-significant level.

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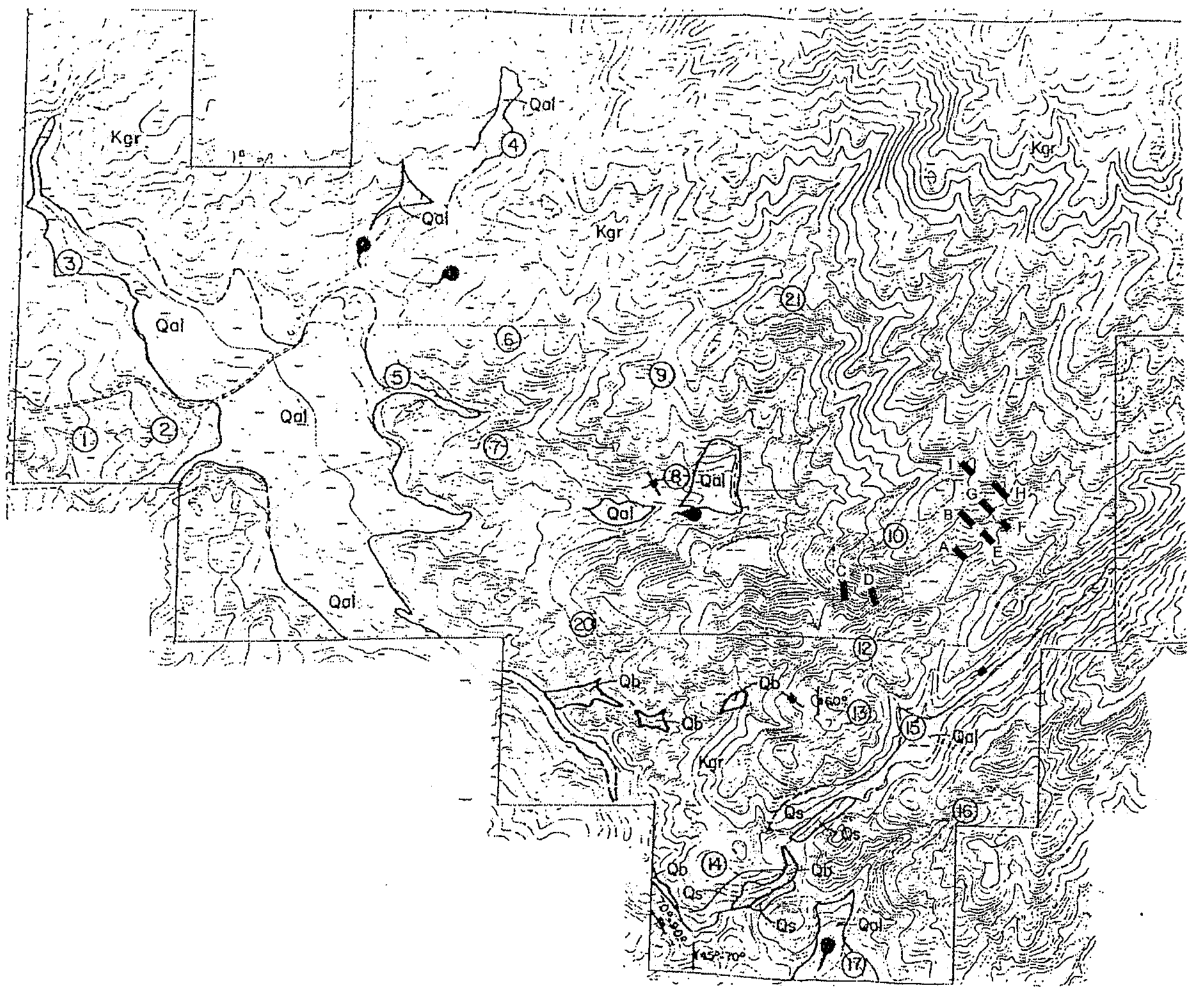
AERIAL PHOTOGRAPHS

Flight Identifier	Date	Flight Frame No.	Scale
CDWR	8-11-81	CDF-ALL-MA 7-28 to 31; 8-28 to 31	1"=2000'



EXPLANATION

①	APPROXIMATE LOCATION AND NUMBER OF TEST PIT BY J. H. KLEINFELDER & ASSOCIATES (1980)
Qal	ALLUVIAL SOILS
Qs	SCREE
Qb	STREAM BOULDERS
Kgr	RESIDUAL GRANITIC SOILS WITH SOME SCATTERED OUTCROPS
- - - -	WELL-LOCATED CONTACT
——	INFERRED CONTACT
↘	STRIKE AND DIP OF JOINT
-•-	VERTICAL JOINT
●	SPRING
	SHADED AREAS DENOTES SIERRA MEADOWS SUBDIVISION
▮	PROPOSED DAM SITE LOCATIONS AND DESIGNATION (APPROXIMATE)

N

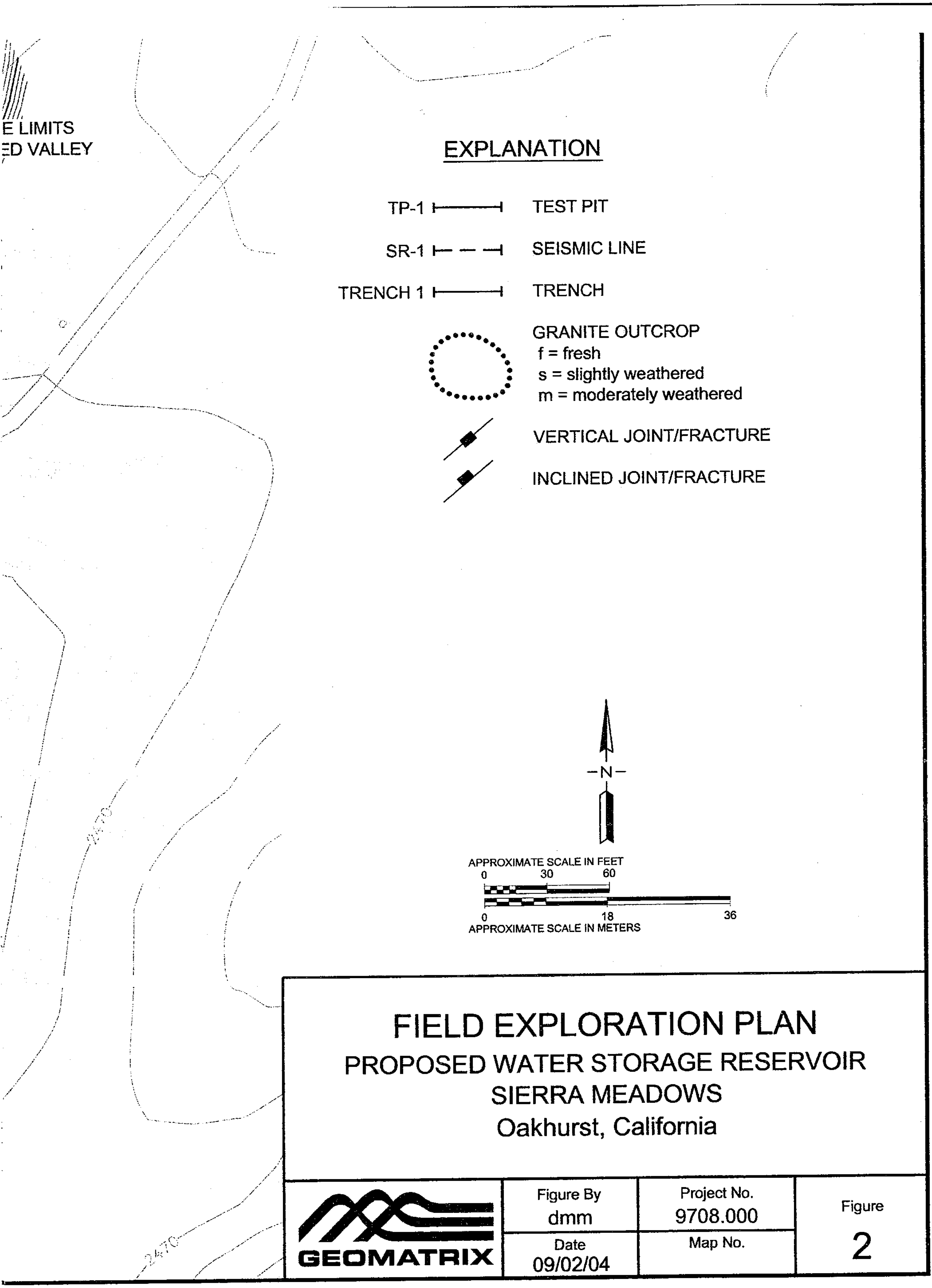
0 500 1000
APPROXIMATE SCALE IN FEET

BASEMAP MODIFIED FROM SITE PLAN DATED
MARCH 1980 FROM J.H. KLEINFELDER & ASSOCIATES.

GEOLOGIC MAP
SIERRA MEADOWS EIR
Madera County, California

D. Scott Magorien, C.E.G. 1290
Consulting Engineering Geologist

	Figure By	Project No.	Figure
	pah	9076	1
	Date 2/11/04		



EXPLANATION

TP-1 ├───┤ TEST PIT

SR-1 ├ ─ ─ ┤ SEISMIC LINE

TRENCH 1 ├───┤ TRENCH

GRANITE OUTCROP
f = fresh
s = slightly weathered
m = moderately weathered

VERTICAL JOINT/FRACTURE

INCLINED JOINT/FRACTURE

FIELD EXPLORATION PLAN
PROPOSED WATER STORAGE RESERVOIR
SIERRA MEADOWS
Oakhurst, California

GEOMATRIX	Figure By dmm	Project No. 9708.000	Figure 2
	Date 09/02/04	Map No.	

GEOMATRIX

Geotechnical Feasibility Study

Sierra Meadows Dam

Oakhurst, County of Madera, California

Prepared for:

Sierra Meadows Golf, Inc.
11661 San Vincente, Suite 305
Los Angeles, California 90049

September 2004

Project 009708

Geomatrix Consultants

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(559) 264-2535 • FAX (559) 264-7431

GEOMATRIX

September 1, 2004
Project 009708

Mr. Robert Bard
Sierra Meadows Golf, Inc.
11661 San Vincente, Suite 305
Los Angeles, California 90049

Subject: Geotechnical Feasibility Study
Sierra Meadows Dam
Oakhurst, County of Madera, California

Dear Mr. Bard:

Geomatrix Consultants, Inc. (Geomatrix), is pleased to submit this Geotechnical Feasibility Study for the Sierra Meadows Dam in Oakhurst, California. Based upon the results of our study, the construction of the proposed dam and reservoir is geotechnically feasible provided the preliminary recommendations presented herein are incorporated into the final design.

Please call either of the undersigned if you have any questions or need other information.

Sincerely yours,
GEOMATRIX CONSULTANTS, INC.

Howard D. Barlow, P. E., G. E.
Senior Geotechnical Engineer

James Weaver
James J. Weaver, G.E. 884
Vice President and Principal
Geotechnical Engineer

Enclosure

cc: Nolte Associates, Inc. (1 copy)
RBF Consulting (3 copies)

HOWARD D. BARLOW
No. 115
Exp. 6-30-07

Geomatrix Consultants, Inc.
Engineers, Geologists, and Environmental Scientists

GEOMATRIX

Geotechnical Feasibility Study

Sierra Meadows Dam

Oakhurst, County of Madera, California

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Los Angeles, California 90049

September 2004

Project 009708

Geomatrix Consultants

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GEOTECHNICAL FEASIBILITY STUDY

Sierra Meadows Dam
Oakhurst, Madera County, California

1.0 INTRODUCTION

This report presents the results of a geotechnical feasibility study performed by Geomatrix Consultants, Inc. (Geomatrix), for a proposed dam in the Sierra Meadows development near Oakhurst in the County of Madera, California. The location of the proposed Sierra Meadows Dam is shown on Figure 1.

The purposes of this investigation were to evaluate the nature and engineering properties of the soil and bedrock materials encountered at a potential water storage reservoir site and develop preliminary recommendations for construction of the dam embankment, including fill gradation and compaction criteria.

The scope of the authorized investigation included conducting a field exploration and laboratory testing program, performing engineering analyses, and preparing this geotechnical feasibility study.

This report has been prepared for Mr. Robert Bard and his design team, Nolte Associates, Inc. (Nolte), for the sole purpose of developing the project described herein. This report may not contain sufficient information for other uses or the purposes of other parties.

2.0 PROJECT DESCRIPTION

Nolte is planning improvements to the Sierra Meadows development, including a new water storage reservoir. The purpose of the reservoir is to store water for domestic use and irrigation of a golf course development. The reservoir was originally planned with an embankment approximately 40 feet in height and a capacity of about 209 acre-feet. This plan envisioned cuts up to 60 feet below ground surface (bgs) in the reservoir area. During the course of this feasibility study, hard rock conditions were encountered at 20 to 30 feet bgs. Consequently, revised plans that limited the depth of reservoir excavation to 30 feet bgs were developed by Nolte. The revised plans indicate that a larger reservoir embankment will be required to impound the desired volume.

The proposed reservoir site is located approximately 2.75 miles west of Oakhurst, just north of Opah Drive near Harmony Lane in Madera County. The terrain in the project vicinity ranges from approximately Elevation 2390 to approximately Elevation 2480. The proposed dam will have a crest elevation of 2440 and a crest length of approximately 1140 feet and will be comprised of a main dam with a length of approximately 780 feet and a saddle dam with a length of approximately 150 feet separated by a 210-foot cut section. The maximum embankment height will be 49 feet as measured from the embankment crest to the lowest outside toe of the main dam embankment. Based on the reservoir storage capacity, the proposed dam will fall under the jurisdiction of the California Division of Safety of Dams (DSOD).

3.0 GEOTECHNICAL INVESTIGATION

The geotechnical feasibility study included field exploration and laboratory testing programs. The field exploration and laboratory testing programs are briefly described in the following sections. More detailed descriptions of these programs are presented in Appendixes A and B.

3.1 FIELD EXPLORATION

The field exploration program included conducting pre-drilling activities, drilling and sampling exploratory borings, excavating backhoe trenches and test pits, and generating seismic refraction survey lines in the area of proposed reservoir. Field activities were conducted between May 18 and 20 and July 24 and 27, 2004.

3.1.1 Exploratory Borings

Drilling services were performed by Pitcher Drilling Company of Palo Alto, California. Three exploratory borings (GB-1 through GB-3) were drilled to depths varying from approximately 80 to 103 feet bgs using a track-mounted rotary wash drill rig. The approximate locations of the borings are shown on Figure 2.

Logs of subsurface conditions encountered in the borings were prepared in the field by a Geomatrix geologist. Final boring logs were prepared based on the field logs after reviewing the physical test results and are presented in Appendix A.

Open borehole piezometers were installed in each of the borings. The upper portion of each borehole was advanced with a 5-inch diameter auger until hard bedrock was encountered. The borehole was continued using an H-size (approximate 2.5-inch diameter) rock coring barrel. The reduction in borehole size at the desired depth created a ledge of bedrock material where the steel or polyvinyl chloride casing was set. The annular space was filled with neat cement grout, and a traffic-rated flush-mounted well box was installed at the surface of each piezometer location.

3.1.2 Backhoe Trenches and Test Pits

Backhoe services were performed by California Paving Company of Oakhurst, California, using a Case 4WD 580L backhoe with an extendahoe. Two trenches (Trench 1 and Trench 2) and 24 test pits (TP-1 through TP-24) were excavated to depths varying from approximately 7 to 14.5 feet bgs. Bulk samples of the excavated soils were obtained at selected depth intervals and were submitted for physical testing. The approximate locations of the trenches and test pits performed during the geotechnical feasibility study are shown on Figure 2.

Logs of subsurface conditions encountered in the trenches and test pits were prepared in the field by a Geomatrix geologist. Logs of Trenches 1 and 2 are depicted on Figures 3 and 4, respectively. Logs of test pits are summarized in tabular form in Appendix A.

3.1.3 Seismic Refraction Survey Lines

Seismic refraction survey services were performed by Portola Geophysics of San Andreas, California. Three seismic refraction lines (SR-1 through SR-3) were performed on May 19, 2004, and four seismic refraction lines (SR-4 through SR-7) were performed on July 24, 2004. The results of the seismic refraction survey are included in Appendix C.

3.2 LABORATORY TESTING

Selected bulk soil samples collected during the field exploration were submitted to BSK Associates of Fresno, California. The samples were tested in the laboratory to assist in evaluating controlling engineering properties of embankment borrow materials within the site of the proposed reservoir. Tests included maximum dry density and optimum moisture content, direct shear strength of remolded soils, hydraulic conductivity of remolded soils, and dispersion characteristics. Selected rock core samples were submitted to Twining Laboratories of Southern California in Long Beach, California, for unconfined compressive strength testing. Descriptions of the physical testing and test results are presented in Appendix B.

4.0 GEOLOGIC SETTING

Oakhurst and the project site lie within the western foothills of the Sierra Nevada Mountains. Bedrock exposed across the region surrounding the Oakhurst region is predominantly granitic rock that forms the core of the Sierra Nevada Mountains. The granitic rock that underlies the project site and the Oakhurst region is identified as the Cretaceous Bass Lake Tonalite (Bateman, 1989). Prebatholithic metamorphic rocks of the Coarsegold roof pendant are exposed across the top of Potter Ridge, directly south of the project site; these rocks are inferred to be correlative with rocks of the Western Metamorphic Belt exposed to the north of Mariposa. The Coarsegold roof pendant includes Jurassic mafic metavolcanic rocks (dominantly amphibolite) and surrounding Triassic slate and phyllite with interbedded quartzite and chert (Bateman, 1989).

Site Conditions

Oakhurst lies in a west-northwest trending valley named the Fresno Flats at an elevation of about 2,200 feet. This valley lies between Potter Ridge on the south and a series of several higher peaks, including Miami Mountain, Pilot Peak, and Speckerman Mountain, at elevations ranging from approximately 4,200 to 7,000 feet on the north. The Fresno River flows westward through the valley bottom within the Fresno Flats floodplain. The project site lies northwest of the center of Oakhurst and above a small valley that extends northwest from the Fresno Flats. The proposed reservoir site is located about one mile north of a divide between the small valley and the Fresno Flats at the base of the southwest dipping range-front below the high peaks to the north and northeast. The site lies in a small depression at an elevation of about 2,400 feet along a small northeast-trending spur ridge on the north side of Miami Creek. Miami Creek extends southwest down the range-front to the bottom of the small valley, turning northwest along the north side of a bedrock knob that separates the small valley from the Fresno Flats.

Geologic conditions at the proposed Sierra Meadows Dam site are depicted on Figure 2. The approximate locations of the 2 trenches, 3 borings, 24 test pits, and 7 seismic refraction lines performed during the field exploration are shown on Figure 2. The approximate limits of an alluviated valley in the eastern portion of the site, interpreted to be of Pleistocene age, are shown on Figure 2. This valley appears to be a former stream channel captured by an eastern tributary to the stream that supplies water to the existing reservoir located south of the proposed new dam. The now infilled former channel of the alluviated valley was intercepted in boring GB-2 and imaged in seismic refraction line SR-3 and is about 16 to 21 feet deep below the base of the proposed dam. The alluvial deposits filling the abandoned channel segment will need to be removed prior to emplacement of the embankment fill.

Figure 2 also shows areas where granitic bedrock (Bass Lake Tonalite) crops out at the surface. The bulk of the outcrops are located north and west of the stream channel near the right abutment that will contain the proposed saddle dam. Other areas of recognized outcrops occur at test pit TP-16, near test pit TP-3, and northeast of test pit TP-11. The preponderance of outcrops (i.e., areas that lack of soil cover) occur on the south-facing slopes in the northwest corner of the proposed reservoir storage area, presumably because conditions in that area are drier and less likely to support a vegetative cover that can hold soil moisture.

The availability of water controls the weathering of granitic rock. Where water is in contact with granite for long periods of time, soluble ions are first removed from biotite mica, which then swells and shrinks as it wets and dries. The shrinking and swelling fractures the component interlocking crystals within the granite, providing pathways for further water penetration and dissolution of the soluble components. The feldspars become chalky and gradually change to clay minerals. The end result of this mechanical disintegration and chemical decomposition is the material known as gruss or decomposed granite, which is a silty sand that is relatively easy to excavate. Depending on the spacing and orientation of joints or fractures within a mass of granite, which typically provide a means for water to penetrate the rock, the resulting weathered rock mass consists of gruss surrounding rounded core stones (or boulders) of typically less weathered rock. One such rounded core stone of little weathered granite, measuring about 15 by 20 feet, is present in the channel beneath the axis of the saddle dam and will have to be removed prior to placement of the embankment.

The geologic map also indicates the degree of weathering and the character of fractures or joints observed in the outcrop areas. The majority of the outcrops northwest of the saddle dam creek channel are fresh to slightly weathered and "ring" when struck by a hammer. The outcrops often have a rounded dome-like surface due to the process of exfoliation. Exfoliation, or the splitting of massive granite into sheets like the layers of an onion, is thought to be an unloading process wherein the rock expands and cracks as the weight of overlying rock is removed by erosion. Typically the exfoliation slabs vary in thickness from 0.5 to 3 feet where the outcrops have a rounded surface, but are typically absent where the surface of the outcrop is nearly flat. While ripping will probably be able to remove the exfoliated slabs from the surface of the rounded outcrops, the flatter outcrops will probably have to be excavated by drilling and blasting.

Steeply dipping joints are also present in the area of the granite outcrops. The most prominent zone of near vertical jointing observed lies northwest of test pit TP-23; it is about 8 feet wide, consists of individual joints spaced 0.5 to 1 foot apart that trend N62°E, and can be traced for only about 100 feet because of soil cover. This is the most common joint orientation observed within the study area. An orthogonal direction of vertical to near vertical joints is also present but does not appear to be as well developed as the northeast trend. The most important characteristic of the joints cutting the granite at the proposed dam site is their wide spacing that typically exceeds 20 feet. For purposes of estimating the excavatability of the outcrops of fresh to little weathered granite, they should be considered massive and non-rippable. However, from the perspective of dam stability, the granite will, once the severely weathered (i.e., grussified) material has been removed, make an excellent foundation for the dam embankment.

The majority of the impoundment area for the proposed Sierra Meadows Dam is underlain by soil that covers the underlying weathered granite to various depths. As mentioned previously, the thickest soil deposits (16 to 21 feet) recognized on the site are found within the abandoned channel of the eastern alluviated valley in the vicinity of the left abutment (Figure 2). Based on the 24 test pits, 2 trenches, and borings GB-1 and GB-3, the average depth to the upper surface of the decomposed granite throughout the site (or the average thickness of the soil deposits) is about 5 to 6 feet.

The soils at the site are typically of colluvial origin derived from the granite with local areas of fluvial deposits preserved on the surface of the granite. The upper soil unit, a typical pedogenic A horizon that is about 1 to 1.5 feet thick, consists of brown sandy silt and is present throughout the area. Beneath is a redder textural B (B_t) horizon that is stiff and contains a small percentage of clay produced by in situ weathering. Lower in the section, within the C_{ox} horizon, sandy silt typically gives way to silty sand. When stripped of organic materials, blended and moisture conditioned, properly placed and compacted, the surficial soils at the site should provide suitable materials for construction of the proposed embankment.

Based on the observed depth to backhoe refusal, estimated by the seismic refraction surveys to be in granite with a p-wave velocity of about 4,000 feet per second, the readily excavatable or grussified granite is at least 8 to 10 feet thick. The seismic refraction survey lines indicate that the zone of weathering in the granite extends to depths of 20 to 44 feet bgs. Borehole data indicate the weathered granite extends to depths of 17 to 37 feet bgs. Given that the severity of weathering decreases with depth and the massive nature of the granite underlying the project site, it is unclear that the granite is rippable to the top of the high velocity zone depicted in the seismic refraction profiles (Appendix C).

5.0 DISCUSSION OF FINDINGS

The following discussion of findings for the site is based on the results of the field exploration and laboratory testing programs performed during this study.

5.1 SUBSURFACE CONDITIONS

Soil borings drilled within the footprint of the proposed reservoir (GB-1 through GB-3) show that the granitic rock is covered by as much as 21 feet of soil and decomposed rock. The soil is dominantly sandy silt and silty sand. The near-surface soils overlie weathered bedrock or a dense residual soil described as decomposed granite. The residual soil comprises granitic rock that has weathered to a soil that maintains the original structure of the rock.

The severity of weathering in the underlying granitic rock decreases with depth. Unconfined compression tests were performed on intact core samples from the borings. The test results indicate that the granitic rock below depths of 25 to 30 feet is very hard and may not be rippable.

Groundwater Conditions

Groundwater in the site vicinity occurs in the fractured granitic bedrock. Groundwater was encountered in the borings during drilling at approximately 10.5 feet bgs in GB-1, 24.5 feet bgs in GB-2, and 12.5 feet bgs in GB-3. Water levels were also collected from two existing wells located within the proposed Sierra Meadows development. Well #1 is located in the southeast corner of the proposed reservoir bottom. Well #2 is located approximately 550 east of Well #1 (Figure 5). Geomatrix collected water levels in Wells #1 and #2 on May 21, 2004. These wells were reportedly installed by the previous property owner and are bedrock wells extending to depths of 222 feet bgs and greater than 300 feet bgs, respectively. Groundwater elevations in May 2004 ranged from approximately 2,454 feet mean sea level (msl) to 2,402 feet msl.

Water levels collected from wells GB-1, GB-2, and GB-3 on August 2, 2004, were 12.6 feet bgs, 26.0 feet bgs, and 13.8 feet bgs, respectively. Groundwater elevations in the site wells ranged from approximately 2,453 feet msl to 2,401 feet msl.

The groundwater elevation data for May and August 2004 were used to prepare groundwater elevation contour maps (Figures 5 and 6). Groundwater flow beneath the site is generally to the south.

Packer testing was conducted in each borehole to assess in-situ bedrock fracture permeability (hydraulic conductivity). Testing methods were in general accordance with United States Department of the Interior, Bureau of Reclamation Procedure for Constant Head Hydraulic Conductivity Tests in Single Drill Holes (USBR 7310-89). Testing was conducted in each borehole at discrete depth intervals using an inflatable packer set approximately 13 to 20 feet above the bottom of the borehole. Boreholes were advanced to the desired testing interval and flushed with clean water to remove drilling fluids and cuttings. A pneumatic packer was placed at the top of the test interval and inflated using nitrogen gas. No site-specific groundwater elevation data were available prior to the start of the drilling program. Because fluids were used during drilling, depth to groundwater could not be measured. Test pressures were selected based on interpreted groundwater conditions at each borehole based on depth-to-water measurements collected in nearby Wells #1 and #2. In general, a 5-cycle procedure was used for each test. Water was pumped into each interval for a 3- to 5-minute cycle starting at approximately one-half the desired pressure increasing for three steps to the desire pressure then descrasing steps to the initial pressure.

Average hydraulic conductivities were calculated for each test interval and ranged from approximately 7.3×10^{-5} centimeters per second (cm/s) (6 feet per year [ft/yr]) to 2.9×10^{-4} cm/s (296 ft/yr). A summary of the packer test results are presented in Table 1.

5.2 CONSOLIDATION CHARACTERISTICS

The near surface native silty to clayey sands likely have moderate to high compressibility when subjected to embankment loads, while the underlying weathered bedrock is very dense. Based on the anticipated loading conditions, Geomatrix recommends that the near surface soils be excavated in the area of the proposed fill embankments. The underlying weathered bedrock will be suitable to support the proposed embankments with negligible settlement.

5.3 STRENGTH CHARACTERISTICS

Direct shear test results for samples of the surficial silty to clayey sands, remolded to 95 percent of their maximum dry density as determined by American Society for Testing and Materials (ASTM) Method D 698, indicate moderately high shear strengths. The remolded samples had angles of internal friction ranging from 34 to 38 degrees with cohesion ranging from 230 to 330 pounds per square foot (psf).

Unconfined compression tests for samples of the unweathered granitic rock indicate very high shear strengths ranging from approximately 55 to 330 tons per square foot. An unconfined compression test for a sample of the granitic rock from boring GB-2 near the interface of the overlying alluvium indicates a moderately high shear strength of approximately 11 tons per square foot.

5.4 PERMEABILITY CHARACTERISTICS

Permeability test results for samples of the surficial silty to clayey sands, remolded to 95 percent of their maximum dry density as determined by ASTM D 698, indicate low to moderately low permeability. The remolded samples had permeabilities ranging from 5.90×10^{-6} to 4.83×10^{-8} cm/s.

5.5 DISPERSION CHARACTERISTICS

Pinhole dispersion test results for samples of the surficial silty to clayey sands, remolded to 95 percent of their maximum dry density as determined by ASTM D 698, indicate the soils are moderately dispersive. The test results indicate that the embankment soils may be moderately susceptible to surface erosion.

6.0 SEISMOLOGY AND FAULTING

The project site is located in central California, a relatively quiescent area of the state surrounded by seismically active areas. No moderate magnitude or larger (M5+) historical earthquakes (since approximately 1800) are known to have occurred closer than about 80 to 100 kilometers (km) (approximately 50 to 60 miles) from the project site, and the site area has not experienced strong ground shaking (Modified Mercalli Intensity of VII or larger) capable of causing significant damage during this time (Petersen et al, 1999). The largest historical earthquake (since approximately 1800) that has occurred within 50 km (31 miles) of the project site is a local magnitude 4.2 event, which occurred on August 10, 1975, approximately 26 km directly west of the project site (National Earthquake Information Center, 2004). This earthquake was centered near the southern end of the Bear Mountains fault zone (described in Section 6.1).

The site is not located within a currently established Alquist-Priolo Special Studies Zone. The location of regional active faults, the potential for active faulting near the site, and deterministic estimates of peak ground acceleration (PGA) due to earthquakes on potential seismic sources are described in the following sections.

6.1 REGIONAL ACTIVE FAULTS

Active faults[1] located in central California that could cause strong ground shaking at the project site in Oakhurst include the San Andreas, the Tesla-Ortigalita, San Joaquin (Great Valley Thrusts), Hartley Springs, Hilton Creek, and Owens Valley faults. The distance and Maximum Credible Earthquake (MCE) for each of these potential earthquake sources is listed in Table 2. Conditionally active faults[2] located in the western slopes of the Sierra Nevada also are considered in this analysis. The closest conditionally active faults to the site are traces of the Foothills fault system. The location and seismic potential of this fault system are described in the following paragraphs. Slip rates for each of these potential seismic sources also are listed in Table 2.

Tectonic Setting and Activity of the Foothills Fault System

The Foothills fault system lies within the western metamorphic belt of the Sierra Nevada. The Foothills fault system is a pre-Cenozoic feature that was formed originally in a compressional tectonic environment. The Foothills fault system is an extensive system of Mesozoic bedrock structures and zones of deformation that occur in a broad region in the western Sierra Nevada. This zone is exposed in an area about 300 km long and ranges in width from 8 to 60 km, extending from Quincy in the north to Mariposa in the south. The Bear Mountains fault zone and the Melones fault zone to the east constitute the two major elements of the Foothills fault system. Oakhurst lies southeast of the southernmost mapped traces of the Foothills fault system.

The Foothills fault system (Figure 7) is considered to represent a zone of suturing between Paleozoic basement terrain on the east and Mesozoic accretionary terrain on the west (Geomatrix and HDR, 2000). This suture zone (the Foothills fault system) marks the location of an ancient plate boundary. This fault system is prominently expressed in the metamorphic rocks of the Sierran foothills but dies out or is obscured to the southeast in the vicinity of the Merced River where granitic rocks of the Sierra Nevada batholith have intruded the metamorphic rocks. During the last five million years, the Sierra Nevada has been uplifted thousands of feet as a tilted block by active faults along the eastern escarpment of the range. In

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[1] Active faults as defined by the DSOD include faults that have ruptured during the Holocene (past 11,000 years) and latest Pleistocene (11,000 to 35,000 years before present; Fraser, 2001).

[2] Conditionally active faults include Quaternary faults where the displacement history in the past 35,000 years has not been established, or in areas of sparse Quaternary sediment cover, pre-Quaternary faults that have attributes consistent with the current tectonic regime (Fraser, 2001).

response to this uplift, portions of the ancient suture zone have been reactivated in the western foothills causing moderate seismicity and small displacements on very low slip rate faults. The 1975 M5.7 Oroville earthquake on the Cleveland Hill fault alerted geologists and engineers to the potential capability of other reactivated segments of this ancient suture zone.

Most geologists consider that if a fault has been recurrently active for millions of years and has been active in historic or relatively recent geologic time (the Quaternary epoch – the past 1,800,000 years), it is very likely to become active again. However, a general absence of Quaternary age deposits across the western Sierran foothills region makes it difficult to identify reactivated faults and to assess the recency of fault activity. As a result, recent practice in dam safety evaluation has been to consider all major ancient fault traces within the Foothills fault system to be *conditionally active* based on the reasoning that these faults are primary zones of weakness and therefore the likely sites of reactivation (Fraser, 2001).

This is the approach taken by the United States Army Corps of Engineers (USACE) in their seismic assessments of Pine Flat Dam (USACE, 1998) and Hidden and Buchanan Dams (USACE, 1988) and by Geomatrix in the seismic assessment of New Exchequer Dam (HDR and Geomatrix, 1998). These dams are located south-southeast, southwest, and northwest of Oakhurst at distances of approximately 65, 30, 30, and 60 km, respectively. These studies all assigned a MCE of M6.5 to the Foothills fault zone. For this study, we adopt the MCE identified in the previous investigations as assigned to the mapped surface traces of the Melones and Bear Mountains fault zones (Table 2).

In the several of the studies noted above (USACE, 1988, 1998), discussions of the Foothills fault system note that several previous studies indicate that the Melones fault zone may extend further south towards Raymond (Bateman et al., 1983) or southeast towards Oakhurst (Nockelberg, 1983). However, no faults are identified in mapping of the Bass Lake Quadrangle (which includes Oakhurst) by Bateman (1989). In addition, the USACE (1988) concluded that there were no capable faults in the area evaluated for Hidden and Buchanan Dams (which includes the southern extent of the Foothills fault zone as mapped by Jennings [1975 and 1994] as well as the Oakhurst area). Thus, while there is some uncertainty in the location of the southern end of the Melones fault zone, no faults are known to extend to the near vicinity of the project site. The distances listed in Table 2 represent the closest approach of the mapped extent of the each fault to the project site.

6.2 POTENTIAL FOR ACTIVE FAULTING NEAR THE PROJECT SITE

Review of geologic maps and aerial photographs show that no mapped faults lie near the project site. Geomatrix previously completed a brief photogeologic interpretation to assess the potential for active faulting at Oakhurst wastewater treatment plant located about 2.2 km (1.3 miles) south of the proposed Sierra Meadows reservoir site. The aerial photographs that were reviewed were taken by Cartwright Aerial Surveys of Sacramento, California, on August 25, 1995, are at a scale of 1 inch equals 750 feet (1:9,000) and include portions of three north-south trending flight lines. The Sierra Meadows project site also lies within the area covered by these aerial photographs.

Several linear features were observed on the aerial photographs. Several short generally north-south trending linear valleys occur northwest and northeast of the project site. These features are oriented down slope from higher ground to the north of Highway 49. These features cross Highway 49 on the north side of the Fresno River, but they do not appear to extend south of the Fresno River. Projection of these north-south trending linear features to the south indicates that these features would not pass through the project site.

One additional linear feature was observed along the hillslope west of the project site. This feature is identified as a small linear valley that extends for approximately 1,600 feet at an orientation of N80°W. The valley extends along and is generally parallel to the south-facing hillslope above the Fresno River. The linear valley ends to the west at a knoll along the south side of the Fresno River and ends to the east at a low-lying area that extends northward to the river. An eastward projection of this linear valley across the low-lying area is generally coincident with two gullies that extend west-northwest and east-southeast from a swale within the eastern part of the project site. However, we did not observe any linear features that extend eastward from the N80°W trending small linear valley into the low-lying area. Further, several linear ridgelines and stream channels that extend through the low-lying area do not appear to be deformed along strike from the linear valley.

No definitive evidence was observed from our review of the aerial photographs to show that these features are related to active faulting or that these features are actually faults. No geologic contacts are mapped in the area of the linear valley. However, we did observe several sets of fractures in bedrock at the project site that trend generally east-northeast. It is possible that the swale and gullies at the project site, and the linear valley, result from erosion along generally east-west trending fractures in the bedrock. The north-south trending linear features also may have formed due to erosion along bedrock fractures.

One other feature of note observed on the aerial photographs is a change in the morphology of the bed of the Fresno River. This change occurs in the area directly south of the project site with the river incised in bedrock to the west and lying within valley sediments to the east. This change is not coincident with any linear features or any mapped bedrock contact.

In summary, no features were observed during our review of the aerial photographs that indicate that active faults are present in the near-vicinity of the project site.

6.3 DETERMINISTIC PEAK GROUND MOTIONS

PGAs at bedrock were estimated using three ground motion attenuation relationships developed for rock site conditions. Because the slip rate for the Foothills fault system is very low (0.05 millimeters per year [CGS, 2004]), estimates of PGA were obtained at the median (50th percentile) level as recommended by Fraser and Howard (2003). The median peak horizontal accelerations were estimated using three sets of rock site attenuation relationships: Sadigh et al. (1997), Abrahamson and Silva (1997), and Idriss (1991, 1994). The estimated peak horizontal accelerations for the assigned maximum magnitudes for fault sources listed in Table 2 are shown on Table 3. The table includes both the median PGA estimates from each attenuation relationship and the average median PGA from all three attenuation relationships. The highest peak horizontal accelerations result from potential earthquakes on traces of the Melones and Bear Mountains fault zones (0.15 and 0.11 g, respectively).

The DSOD has identified a Minimum Earthquake PGA parameter of 0.2 g for new dams (Fraser and Howard, 2003). Because the maximum estimated PGA for the identified fault sources is 0.15 g, the Minimum Earthquake PGA of 0.2 g is invoked as the appropriate value for the Sierra Meadows site. If the consequence of dam failure is considered to be high or extreme, based on the planned class weight and slip rate of the most significant fault sources, a higher minimum PGA may be invoked following the DSOD guidelines.

7.0 PRELIMINARY DESIGN RECOMMENDATIONS

Based upon the results of our study, the construction of the proposed dam and reservoir is geotechnically feasible provided the preliminary recommendations presented herein are incorporated into the final design. If changes in preliminary design of the structures occur, Geomatrix should be contacted to evaluate their effects on these recommendations. The following geotechnical engineering recommendations for the proposed reservoir are based on observations from the field investigation program and the soil physical test results. It must be emphasized that a final design geotechnical investigation will be required for development of construction plans and specifications. Consequently, all recommendations provided herein should be considered preliminary and subject to change based on the results of the design level investigation.

7.1 EARTHWORK

All earthwork, including excavation, backfill, and preparation of subgrade, should be performed in accordance with the geotechnical recommendations presented in this report and applicable portions of the grading code of local regulatory agencies. All earthwork should be performed under the observation and testing of a qualified geotechnical engineer.

7.1.1 Site Clearing and Grubbing

Areas to be cleared should consist of the reservoir site, the reservoir embankment and a 25-foot strip adjoining the downstream toe of the embankment, and borrow and stockpile areas. Clearing should consist of removal and disposal of all trees, brush, debris, and any existing fences.

The entire foundation area for the reservoir embankment and the borrow areas should be grubbed. Grubbing should consist of the removal of all stumps and roots 1 inch or more in diameter to a depth of 3 feet below natural ground surface. The borrow areas should be grubbed to the extent necessary to obtain material free of stumps and roots for use as embankment fill.

7.1.2 Embankment Foundation and Cutoff

The foundation of the reservoir embankment should be excavated to rock material having strength parameters equal to or greater than those required of the embankment material. The depth of excavation is anticipated to be up to 21 feet in the area of the abandoned channel of the eastern alluviated valley. Typical foundation excavation depths outside of the abandoned channel of the eastern alluviated valley are anticipated to be 10 to 15 feet bgs. The exact depth of the foundation excavation will be determined by the nature of the materials encountered.

The depth of excavation recommended should provide adequate cutoff. A cutoff trench may be possible beneath some portions of the embankment, but in the area of the eastern alluvial valley where the depth to rock is anticipated to be on the order of up to 21 feet, the entire dam shell foundation will likely need to be excavated. Consolidation tests should be performed during the design phase to assess the settlement potential of the alluvial soils. If a cutoff trench is used in other areas of the dam, the trench must be a minimum of 14 feet wide.

7.1.3 Embankment Fill

Embankments may be constructed of suitable earthen materials obtained from the excavations for the embankment foundation and reservoir, provided that the materials are free of vegetative matter or other deleterious materials. The gradation of the embankment fill materials will be determined during the design phase, but the fill material should be well graded. Hydraulic conductivity tests performed on remolded bulk soil samples obtained during the field exploration indicate that the on-site soils will be suitable for embankment construction.

Fill soils should be moisture conditioned to at least 2 percent over optimum moisture; placed in lifts not exceeding 8 inches in thickness; and mechanically compacted to an average of 97 percent, with no test less than 95 percent, of the maximum dry density. The maximum dry density and optimum moisture content for the each soil type used as engineered fill should be determined in accordance with ASTM D 698.

No material larger than 6-inches maximum dimension should be permitted in the embankment, and each large piece shall be surrounded by well graded material such that large pieces are not in contact with each other.

7.1.4 Underdrain and Chimney Drain

A blanket drain at the base of embankment will be required and a chimney drain may be required depending on the results of seepage analyses performed during the design phase. The blanket and chimney drains should be constructed of processed drain material meeting the following requirements:

Sieve Size	Percentage Passing
1 ½ inch	90-100
¾ inch	45-75
No. 4	30-45
No. 50	4-10
No. 100	1-3
No. 200	0-2

The drain material should be a minimum of 1.5-foot thick and should be placed at the base of the dam foundation extending from the chimney drain to daylight at the outboard toe of the embankment. The exact width of the blanket drain will also be dependent on the results of seepage analyses. The chimney drain, if required, should have a minimum width of 4 feet. The blanket drain should incorporate a perforated drain pipe at the toe to collect and convey seepage water. The drain material should not be separated from the embankment material by means of a layer of filter fabric.

7.1.5 Spillway

At the time of our feasibility study, no proposed spillway location was identified. If a spillway cut in rock is desired, Geomatrix recommends that the spillway be constructed at the west abutment where slightly to moderately weathered rock was encountered near the ground surface. Further investigation of the spillway area should be performed during the design phase.

7.2 CUT AND FILL SLOPE STABILITY

Based on laboratory tests performed during this study (Appendix B), the strength of remolded samples of the site soils may be modeled as having a friction angle of 35 degrees and 230 psf cohesion if the soils are compacted to a minimum of 95 percent of their maximum dry density as determined by ASTM D 698. Slope stability analyses indicate that outboard embankment fill slopes may be designed with a maximum inclination of 2 horizontal to 1 vertical, provided that drainage is incorporated in the embankment design to alleviate seepage pressure at the downstream toe. Inboard slopes may be designed with a maximum inclination of 3 horizontal to 1 vertical.

Static and pseudo-static slope stability analyses were performed for outboard and inboard embankment fill slopes with overall inclinations of 2 to 1 and 3 to 1, respectively. A seismic coefficient of 0.15g was used to evaluate the factor of safety under earthquake loading. The embankment fill slope stability was analyzed using Spencer's method using the computer program SLOPE W. Static and pseudo-static factors of safety of 3.1 and 1.5 were calculated for the inboard 3 to 1 slopes, as shown in Figures 8 and 9, respectively. Static and pseudo-static factors of safety of 2.0 and 1.5 were calculated for the outboard 2 to 1 slopes in a drained condition, as shown in Figures 10 and 11, respectively.

The weathered granitic bedrock was similarly modeled as having a friction angle of 35 degrees and 230 psf cohesion. Geotechnical engineering analyses indicate that slopes cut into weathered bedrock at overall inclinations of up to 2 horizontal to 1 vertical will have factors of safety greater than 3 against static instability. A qualified engineering geologist should be present during grading to observe the cut slopes, map the exposed geologic materials, and observe unanticipated geologic conditions.

Benches should be constructed on both cut and fill slopes at vertical intervals no greater than 30 feet. The benches should be a minimum of 10 feet in width to allow access for maintenance equipment.

8.0 CONSTRUCTION CONSIDERATIONS

Construction considerations for the proposed reservoir, including excavation difficulties, temporary excavations, and dewatering, are discussed in the following sections.

8.1 EXCAVATION DIFFICULTY

Grading for the proposed water storage reservoir will involve excavation of up to 30 feet. The surficial soils and uppermost decomposed granite should be readily excavatable with conventional heavy earth moving equipment and should provide suitable material for embankment fill when placed and compacted in accordance with the recommendations contained in this report.

By contrast, the granitic rock is expected to be difficult to excavate. Generally, the granitic rock will become fresher and increasingly more difficult to excavate with depth and is likely to yield large boulders that will not be excavated without blasting. We have identified areas within the proposed reservoir where granitic rock is exposed at the ground surface (Figure 2). Hard granitic rock will likely require blasting and the resulting material will not be suitable for use in construction of the reservoir embankments. Boulders and bedrock fragments in excess of 1 foot in diameter should be culled from the fill material.

The seismic refraction survey lines indicate that the zone of weathering in the granite extends to depths of only a few feet to 44 feet bgs. Borehole data indicate the weathered granite extends to depths of 17 to 37 feet bgs. In order to evaluate the depth to which the granite can be readily excavated by typical construction equipment, test excavations using a D 9 bulldozer with ripper shanks should be performed.

8.2 TEMPORARY EXCAVATIONS AND DEWATERING

Temporary excavations during construction of the embankment foundation may be cut as steep as 1 horizontal to 1 vertical. Moisture variation and differences in strength characteristics of the subsurface deposits may necessitate slope flattening during construction. Surcharge loads from vehicle parking and traffic or stockpiled materials should be set back from the top of temporary excavations a horizontal distance equal to at least the depth of excavation.

The short-term stability of excavation depends on many factors, including slope angle, engineering characteristics of surface materials, height of excavation, and length of time the excavation remains unsupported and exposed to equipment vibrations, rainfall, desiccation, etc. Temporary excavations should be performed in accordance with applicable regulations of the city, county, state, and federal agencies.

Groundwater should be anticipated where excavations approach the top of weathered bedrock, particularly in swales and drainage courses. Dewatering can likely be accomplished by means of sumps and pumps placed at low points in the excavations. Surface drainage should be controlled along the top of temporary excavations to preclude wetting of the soils and erosion of the excavated slopes.

9.0 CLOSURE

The conclusions, preliminary recommendations, and opinions presented herein are: (1) based upon an evaluation and interpretation of the findings of the field and laboratory programs, (2) based upon an interpolation of soil conditions between and beyond the explorations, (3) subject to confirmation of conditions encountered during design level studies and construction, and (4) based upon the assumption that sufficient observation and testing will be provided during construction.

As mentioned previously, it will be necessary to conduct a final design level geotechnical investigation to develop construction plans and specifications and meet the requirements of DSOD.

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TABLES

GEOMATRIX

TABLE 1

SUMMARY OF PACKER TEST RESULTS

Sierra Meadows Dam
Oakhurst, County of Madera, California

Borehole ID	Test Date	Test Interval (feet bgs)[1]	Flow Rate (gpm)[2]	Approximate Depth to GW (feet bgs)[1]	Gage Pressure (psi)[3]	Hydraulic Conductivity (ft/yr)[4]	Hydraulic Conductivity (cm/s)[5]
GB-1	05/20/04	21 - 39		10.5	NA	NA	NA
	TEST ABORTED, PACKER SEALS LEAKING						
	05/26/04	30 - 50	4.00	10.5	16	205.6	2.0E-04
			9.50	10.5	25	409.9	4.0E-04
			10.67	10.5	33	366.2	3.5E-04
			6.67	10.5	25	264.8	2.6E-04
			4.50	10.5	16	233.5	2.3E-04
			Average Hydraulic Conductivity			**296.0**	**2.9E-04**
	05/26/04	51 - 71	0.80	10.5	27	27.4	2.7E-05
			1.30	10.5	40	32.1	3.1E-05
			2.30	10.5	54	44.4	4.3E-05
			2.00	10.5	40	49.5	4.8E-05
			1.17	10.5	27	40.7	3.9E-05
			Average Hydraulic Conductivity			**38.8**	**3.8E-05**
	05/26/04	70 - 80	0.70	10.5	34	34.2	3.3E-05
			Average Hydraulic Conductivity			**40.8**	**3.9E-05**
	TEST ABORTED AFTER 5 MINUTES DUE TO HIGH PRESSURE HOSE LEAKING						
GB-2	05/22/04	23 - 43	11	24.5	12	3703.3	3.6E-03
			11	24.5	17	1517.3	1.5E-03
			11	24.5	23	888.2	8.6E-04
			11	24.5	17	1517.3	1.5E-03
			11	24.5	12	3703.3	3.6E-03
Note: Flow assumed at highest rate observed field program - meter not read accurately						**2265.9**	**2.2E-03**
GB-2	05/22/04	43 - 63	2.67	24.5	22	96.8	9.4E-05
			4.00		33	105.3	1.0E-04
			8.00		44	180.0	1.7E-04
			2.00		33	51.6	5.0E-05
			4.33		22	152.5	1.5E-04
			Average Hydraulic Conductivity			**117.2**	**1.1E-04**
GB-2	05/23/04	63 - 83	1.40	24.5	32	37.5	3.6E-05
			0.20		48	3.9	3.7E-06
			0.50		60+	8.0	7.8E-06
			0.40		48	7.7	7.5E-06
			2.80		32	80.1	7.7E-05
			Average Hydraulic Conductivity			**27.4**	**2.7E-05**

TABLE 1

SUMMARY OF PACKER TEST RESULTS

Borehole ID	Test Date	Test Interval (feet bgs)[1]	Flow Rate (gpm)[2]	Approximate Depth to GW (feet bgs)[1]	Gage Pressure (psi)[3]	Hydraulic Conductivity (ft/yr)[4]	Hydraulic Conductivity (cm/s)[5]
GB-2	05/23/04	83 - 103	0.60	24.5	42	12.8	1.2E-05
			1.75		60+	28.3	2.7E-05
			0.70		50	13.1	1.3E-05
			0.70		40	15.6	1.5E-05
			Average Hydraulic Conductivity			**17.5**	**1.7E-05**
GB-3	05/24/04	27 - 47	0.30	12.5	10	20.5	2.0E-05
			0.30		13	17.4	1.7E-05
			0.50		19	22.4	2.2E-05
			0.20		14	11.1	1.1E-05
			0.10		10	6.8	6.6E-06
			Average Hydraulic Conductivity			**15.7**	**1.5E-05**
GB-3	05/25/04	47 - 67	1.40	12.5	16	71.4	6.9E-05
			2.25		25	83.1	8.0E-05
			2.10		33	61.8	6.0E-05
			1.60		25	58.7	5.7E-05
			1.70		16	87.0	8.4E-05
			Average Hydraulic Conductivity			**72.4**	**7.0E-05**
GB-3	05/26/04	67 - 87	0.20	12.5	26	7.1	6.8E-06
			0.10		40	2.5	2.4E-06
			0.10		53	1.9	1.9E-06
			0.10		40	2.5	2.4E-06
			0.10		26	3.5	3.4E-06
			Average Hydraulic Conductivity			**3.5**	**3.4E-06**
GB-3	05/26/04	87 - 100	0.14	12.5	35	5.4	5.3E-06
			0.35		52	9.7	9.4E-06
			Average Hydraulic Conductivity			**7.6**	**7.3E-06**
Note: Packer started to slide up at 52 psi because rock so smooth. Kept pressure at second step for 20 minutes.							

1. Test interval and depth to groundwater (GW) in feet below ground surface (bgs).
2. Flow rate in gallons per minute (gpm).
3. Gage pressure in pounds per square inch (psi).
4. Hydraulic conductivity in feet per year (ft/yr).
5. Hydraulic conductivity in centimeters per second (cm/s).

TABLE 2

PROVISIONAL LIST OF FAULTS FOR DETERMINISTIC GROUND MOTION HAZARD ASSESSMENT

Sierra Meadows Dam
Oakhurst, County of Madera, California

Local and Regional Faults	Capability	Distance to Site (km)[1]	Fault Slip Rate (mm/yr)[2]	MCE (M)[3]
Melones (Foothills Fault System)	Conditionally Active	23	0.05	6.5
Bear Mountains (Foothills Fault System)	Conditionally Active	29	0.05	6.5
Hartley Springs fault zone	Active	69	0.5	6.6
Hilton Creek	Active	81	2.5	6.7
Great Valley Fault Zone (no. 9), (San Joaquin fault)	Active	112	1.5	6.6
Owens Valley	Active	122	1.5	7.6
Tesla-Ortigalita	Active	126	1.0	6.9
San Andreas	Active	157	34	8

1. Distance in kilometers (km).
2. Fault slip rate data from California Geological Survey (2004). mm/yr =
3. Maximum Credible Earthquake (MCE) from maximum earthquakes listed by California Geological Survey (2004) or Working Group on California Earthquake Probabilities (2003).

TABLE 3

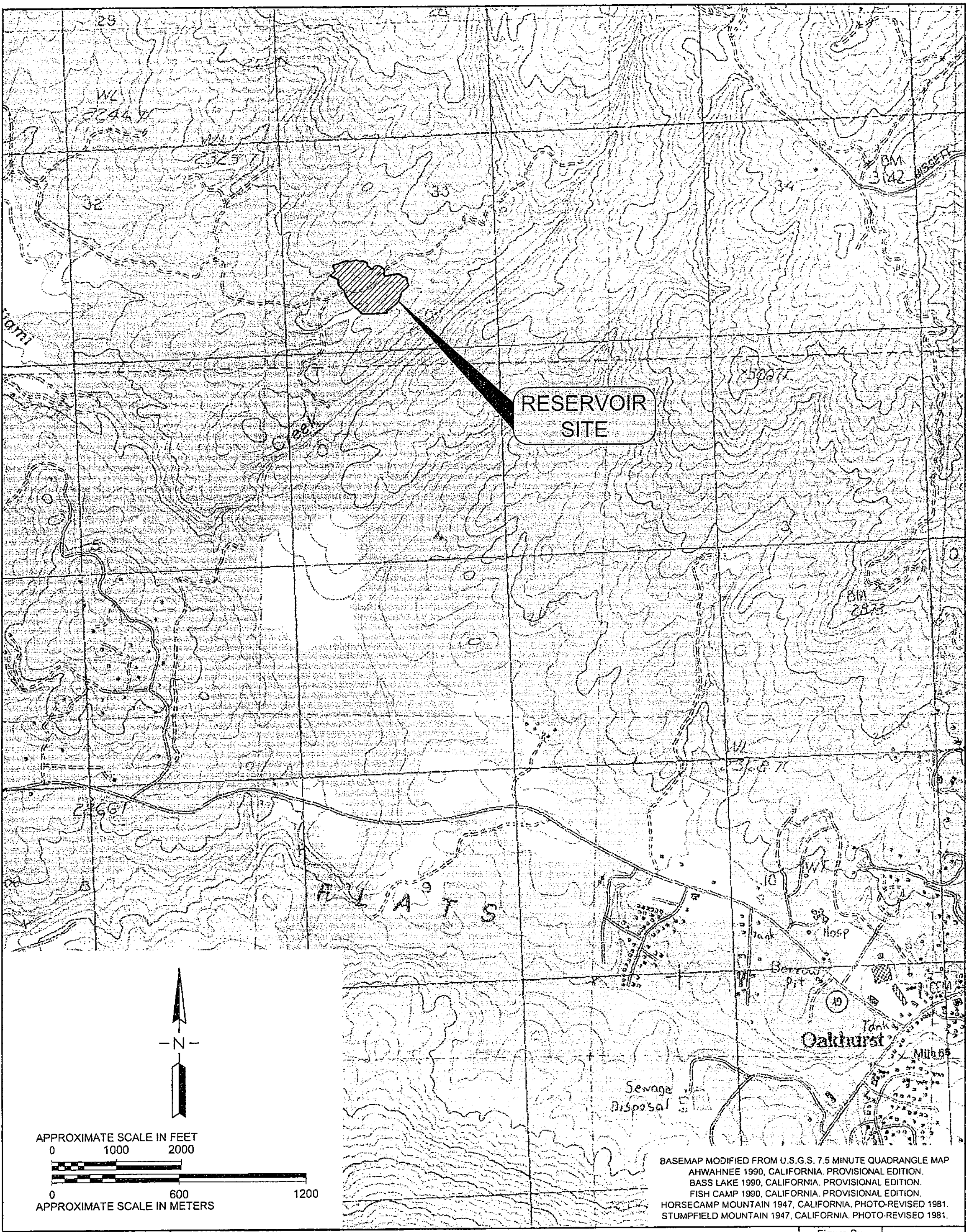
ESTIMATED PEAK GROUND ACCELERATIONS FOR ACTIVE AND CONDITIONALLY ACTIVE FAULTS

Sierra Meadows Dam
Oakhurst, County of Madera, California

Fault	Distance to Site (km)[1]	MCE (M)[2]	Median Horizontal Peak Bedrock Acceleration (g)			
			Sadigh et al. (1997)	Idriss (1991 & 1994)	Abrahamson & Silva (1997)	Average
Melones Fault System (Foothills Fault System)	23	6.5	0.142	0.149	0.143	0.15
Bear Mountains (Foothills Fault System)	29	6.5	0.107	0.117	0.112	0.11
Hartley Springs fault zone	69	6.6	0.032	0.042	0.045	0.04
Hilton Creek	81	6.7	0.027	0.037	0.040	0.03
San Joaquin fault zone	112	6.6[2]	0.014	0.021	0.026	0.02
Owens Valley	122	7.6	0.030	0.049	0.047	0.04
Tesla-Ortigalita	126	6.9	0.015	0.024	0.028	0.02
San Andreas	157	8	0.028	0.052	0.050	0.04

1. Distance in kilometers (km).
2. Maximum Credible Earthquake (MCE) from maximum earthquakes listed by California Geological Survey (2004) or Working Group on California Earthquake Probabilities (2003).

FIGURES



BASEMAP MODIFIED FROM U.S.G.S. 7.5 MINUTE QUADRANGLE MAP
AHWAHNEE 1990, CALIFORNIA. PROVISIONAL EDITION.
BASS LAKE 1990, CALIFORNIA. PROVISIONAL EDITION.
FISH CAMP 1990, CALIFORNIA. PROVISIONAL EDITION.
HORSECAMP MOUNTAIN 1947, CALIFORNIA. PHOTO-REVISED 1981.
STUMPFIELD MOUNTAIN 1947, CALIFORNIA. PHOTO-REVISED 1981.

GEOMATRIX

LOCATION MAP
PROPOSED WATER STORAGE RESERVOIR
SIERRA MEADOWS
Oakhurst, California

Figure By dmm	Project No. 9708.000
Map No.	Figure 1
Date 09/01/04	

Plot Date: 09/01/04 - 10:25am, Plotted by: dmcgowen
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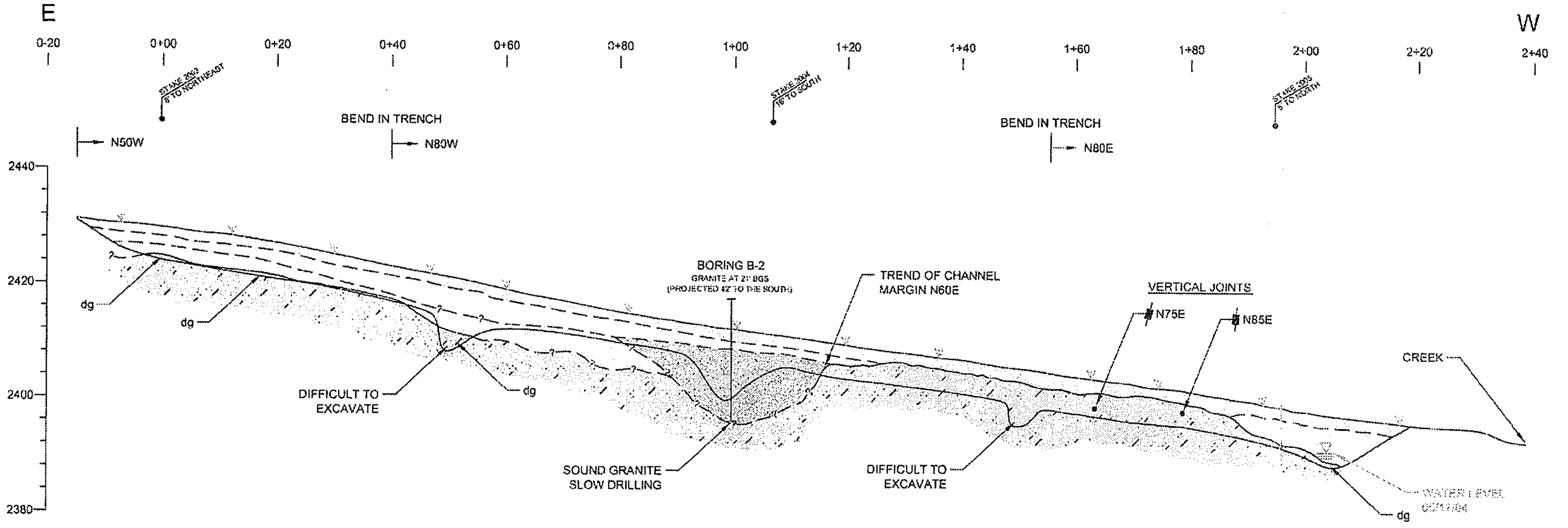
Figure 2

FIELD EXPLORATION PLAN
Proposed Water Storage Reservoir
Sierra Meadows
Oakhurst, California

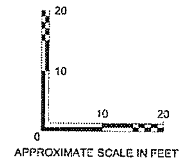


EXPLANATION

TRENCH AND TEST PIT STRATIGRAPHY

UNITS

HOLOCENE	1	SANDY SILT (ML)	A HORIZON TOPSOIL (COLLUVIUM)
	2	SILTY SAND (SM)	YOUNGER COLLUVIUM/ALLUVIUM
LATE PLEISTOCENE	3	SANDY SILT TO SILTY SAND (ML/SM)	COLLUVIUM LOCALLY TEXTURAL B (Bt) HORIZON
	4	SILTY SAND (SM)	COLLUVIUM LOCALLY C (Cox) HORIZON, GRADES LATERALLY INTO OLDER ALLUVIUM
	5	SANDY SILT TO SILTY SAND (ML/SM) LOCAL POORLY GRADED SAND (SP)	OLDER ALLUVIUM
MID PLEISTOCENE	6	SANDY SILT (ML)	OLDER COLLUVIUM BURIED TEXTURAL B (Btb) HORIZON
CRETACEOUS	7	GRANITE	BASS LAKE TONALITE; VARIES FROM DEEPLY WEATHERED (dg) AT THE SURFACE TO FRESH WITH DEPTH



APPROXIMATE SCALE IN FEET

LOG OF TRENCH 1
LEFT ABUTMENT AREA
PROPOSED WATER STORAGE RESERVOIR
SIERRA MEADOWS
Oakhurst, California

GEOMATRIX

Figure By dmm	Project No. 9708.000	Figure 3
Date 09/01/04	Map No.	

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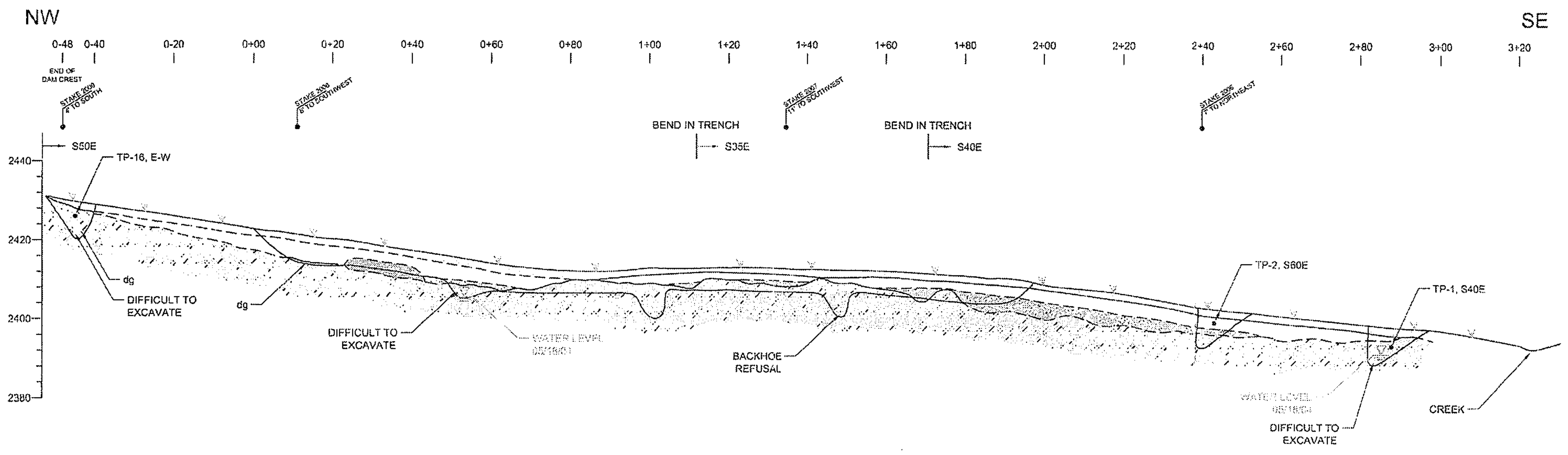
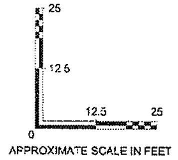


EXPLANATION

TRENCH AND TEST PIT STRATIGRAPHY

UNITS

HOLOCENE	1	SANDY SILT (ML)	A HORIZON TOPSOIL (COLLUVIUM)
	2	SILTY SAND (SM)	YOUNGER COLLUVIUM/ALLUVIUM
LATE PLEISTOCENE	3	SANDY SILT TO SILTY SAND (ML/SM)	COLLUVIUM LOCALLY TEXTURAL B (Bt) HORIZON
	4	SILTY SAND (SM)	COLLUVIUM LOCALLY C (Cox) HORIZON, GRADES LATERALLY INTO OLDER ALLUVIUM
	5	SANDY SILT TO SILTY SAND (ML/SM) LOCAL POORLY GRADED SAND (SP)	OLDER ALLUVIUM
MID PLEISTOCENE	6	SANDY SILT (ML)	OLDER COLLUVIUM BURIED TEXTURAL B (Btb) HORIZON
CRETACEOUS	7	GRANITE	BASS LAKE TONALITE; VARIES FROM DEEPLY WEATHERED (dg) AT THE SURFACE TO FRESH WITH DEPTH



LOG OF TRENCH 2
RIGHT ABUTMENT AREA

PROPOSED WATER STORAGE RESERVOIR
SIERRA MEADOWS
Oakhurst, California

GEOMATRIX

Figure By dmm	Project No. 9708.000	Figure 4
Date 09/01/04	Map No.	

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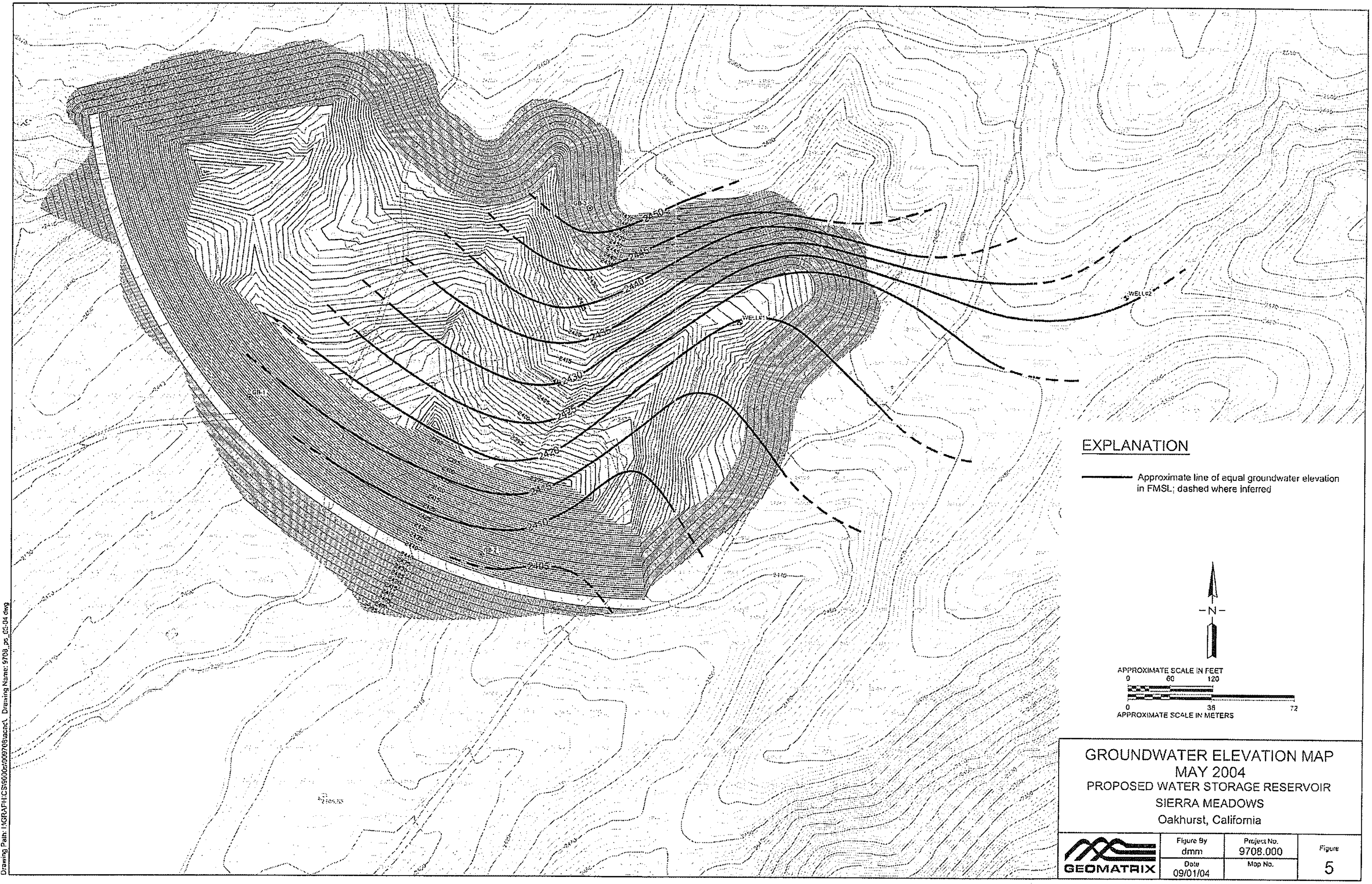

EXPLANATION

Approximate line of equal groundwater elevation in FMSL; dashed where inferred

GROUNDWATER ELEVATION MAP
MAY 2004
PROPOSED WATER STORAGE RESERVOIR
SIERRA MEADOWS
Oakhurst, California

GEOMATRIX	Figure By dmm	Project No. 9708.000	Figure 5
	Date 09/01/04	Map No.	

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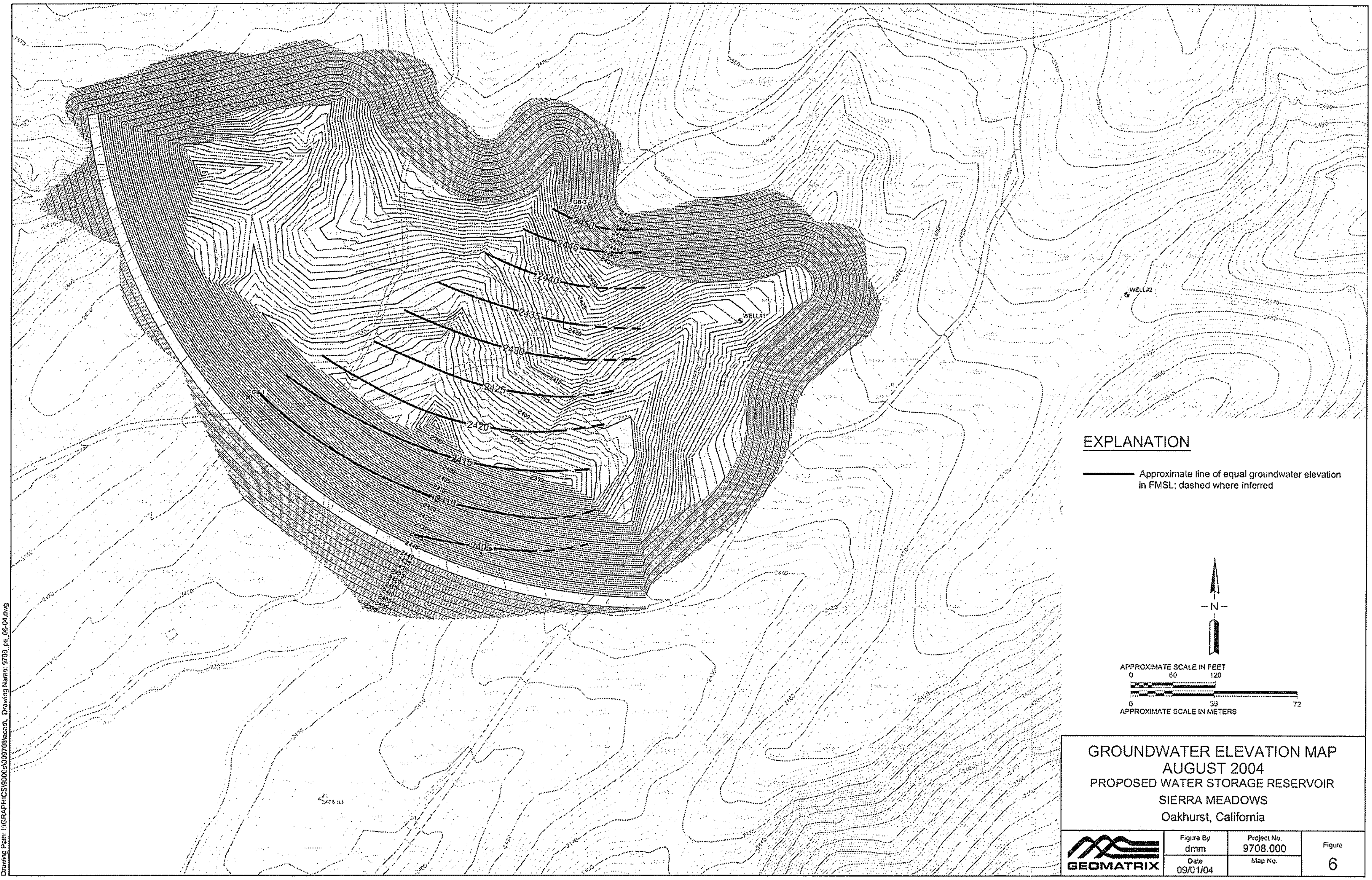

EXPLANATION

Approximate line of equal groundwater elevation in FMSL; dashed where inferred

GROUNDWATER ELEVATION MAP
AUGUST 2004
PROPOSED WATER STORAGE RESERVOIR
SIERRA MEADOWS
Oakhurst, California

GEOMATRIX

Figure By dmm	Project No. 9708.000	Figure 6
Date 09/01/04	Map No.	

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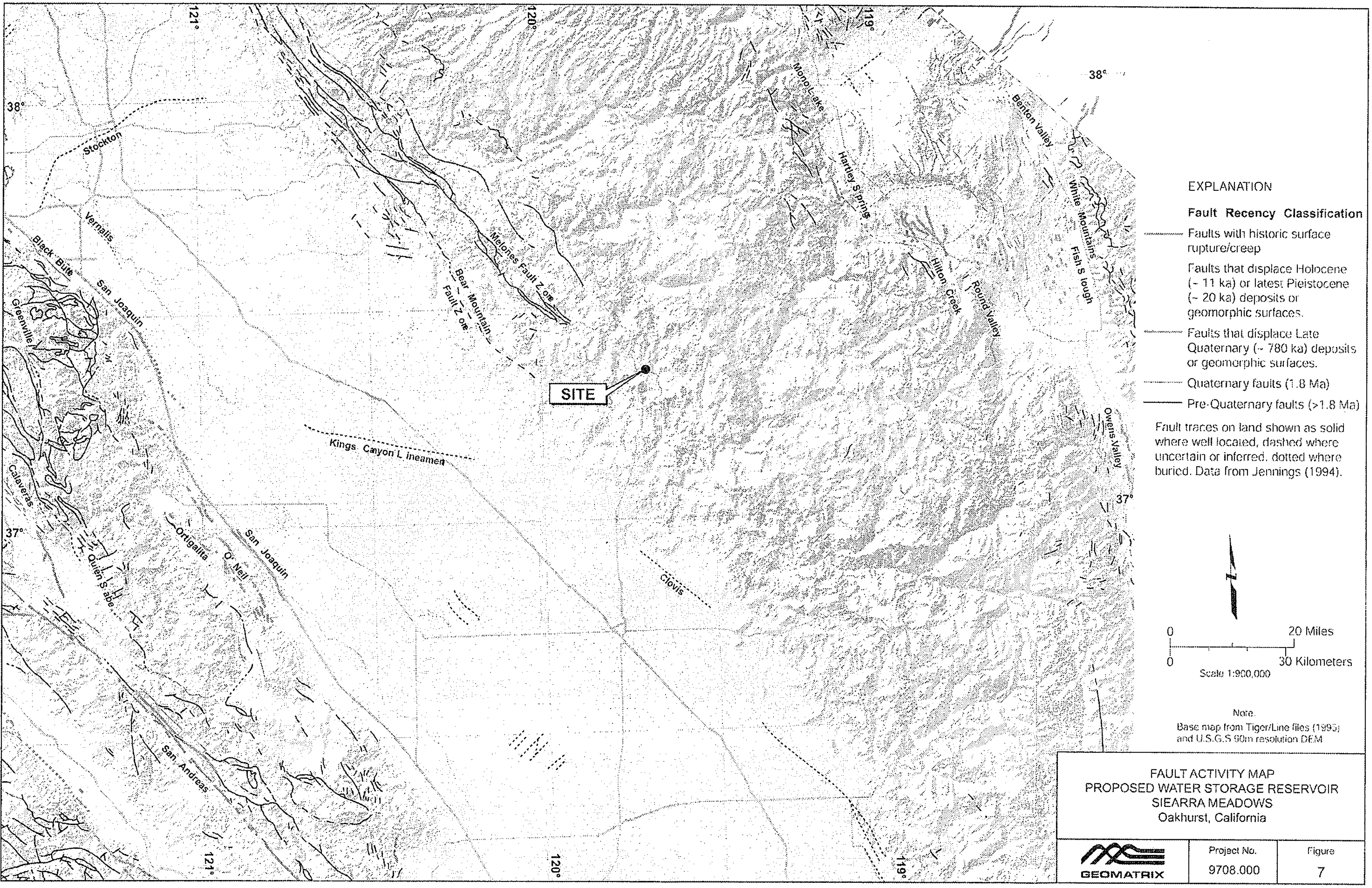
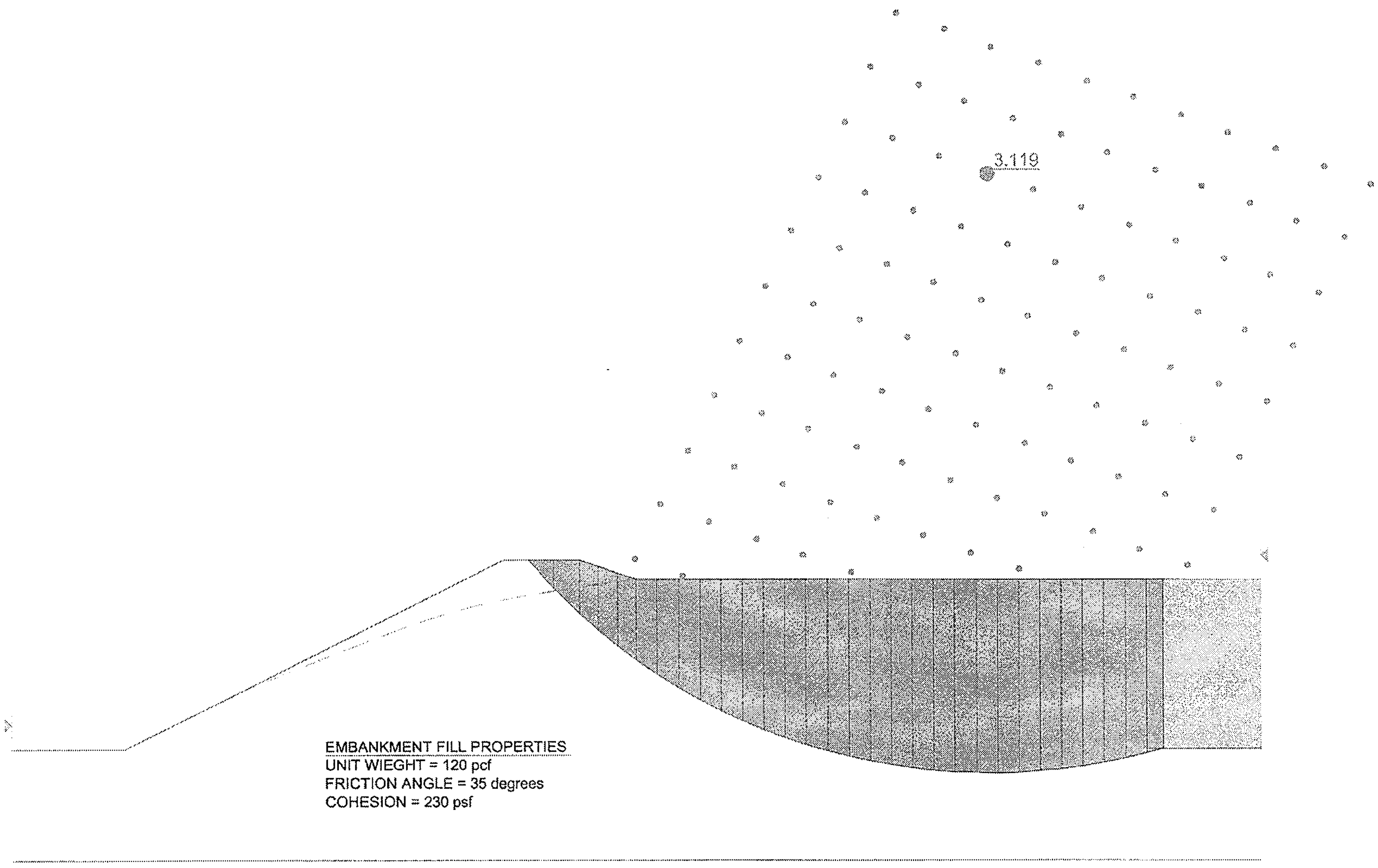


FAULT ACTIVITY MAP
PROPOSED WATER STORAGE RESERVOIR
SIEARRA MEADOWS
Oakhurst, California

GEOMATRIX

Project No.	Figure
9708.000	7



EMBANKMENT FILL PROPERTIES
UNIT WIEGHT = 120 pcf
FRICTION ANGLE = 35 degrees
COHESION = 230 psf

GEOMATRIX

STATIC 3:1
SIERRA MEADOWS
Oakhurst, California

Figure By dmm	Project No. 9708.000
Map No.	
Date 09/01/04	Figure 8

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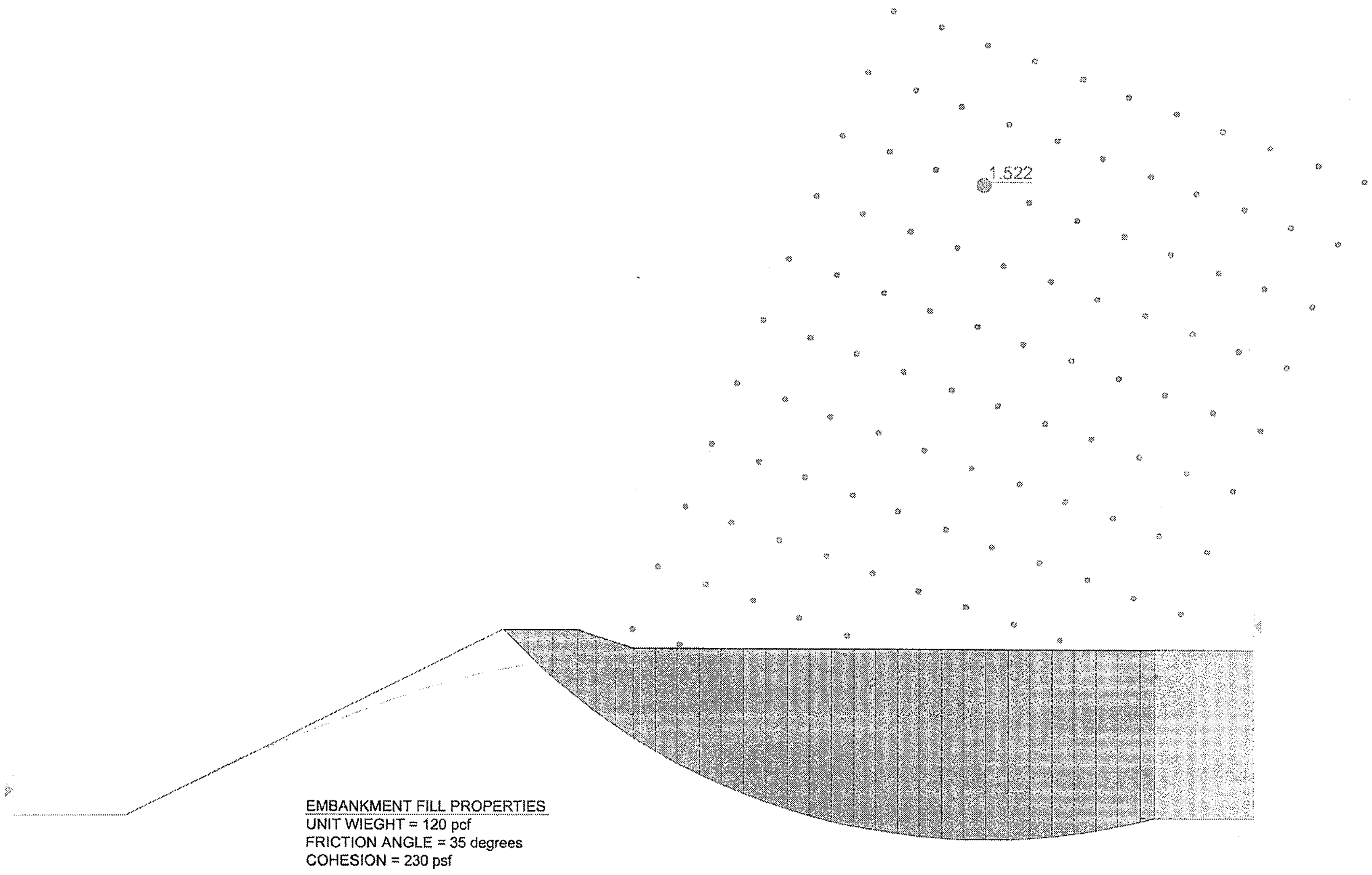

GEOMATRIX

SEISMIC 3:1
SIERRA MEADOWS
Oakhurst, California

Figure By dmm	Project No. 9708.000
Map No.	
Date 09/01/04	Figure 9

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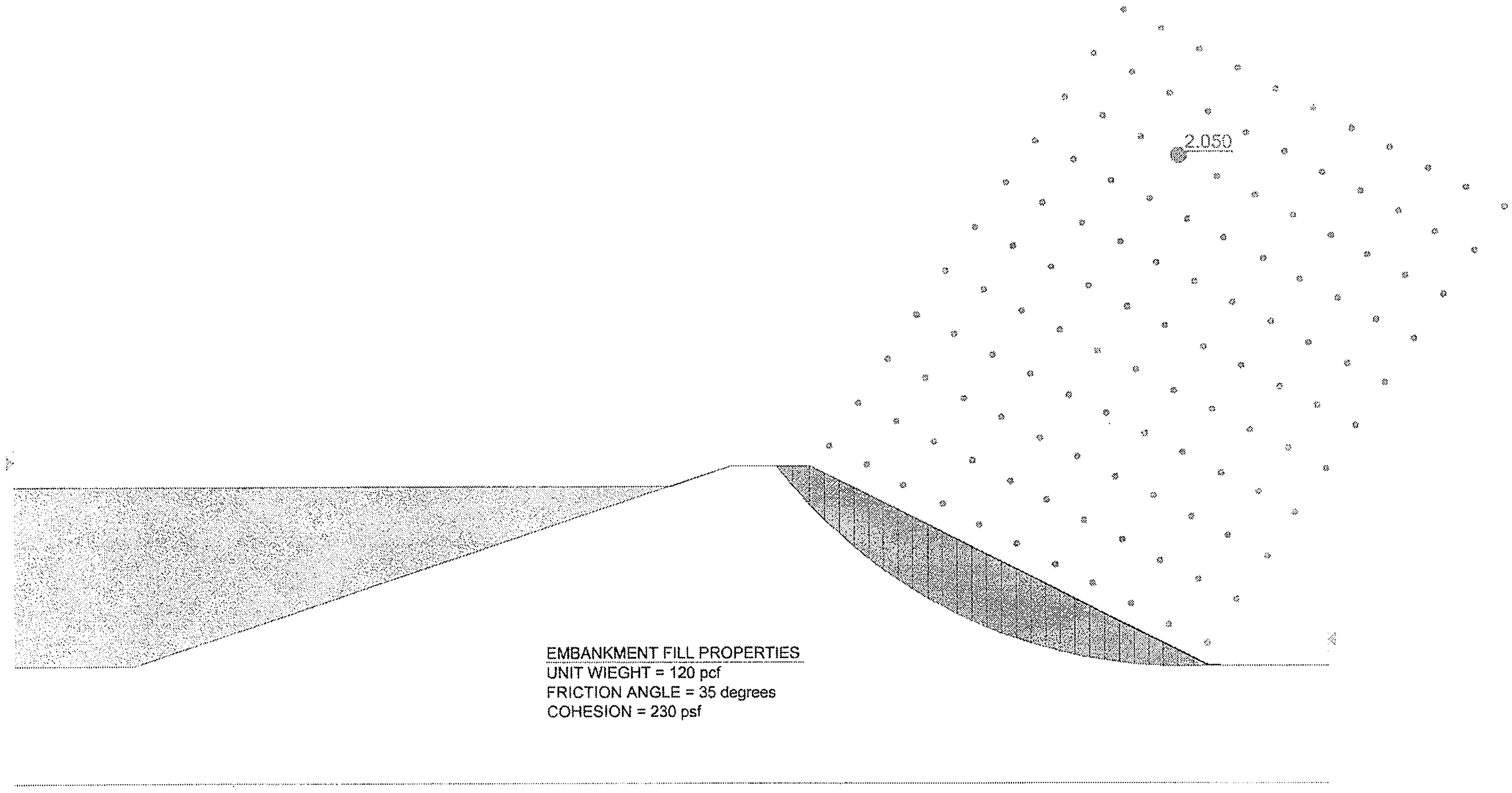

GEOMATRIX

STATIC 2:1
SIERRA MEADOWS
Oakhurst, California

Figure By dmm	Project No. 9708.000
Map No.	Figure 10
Date 09/01/04	

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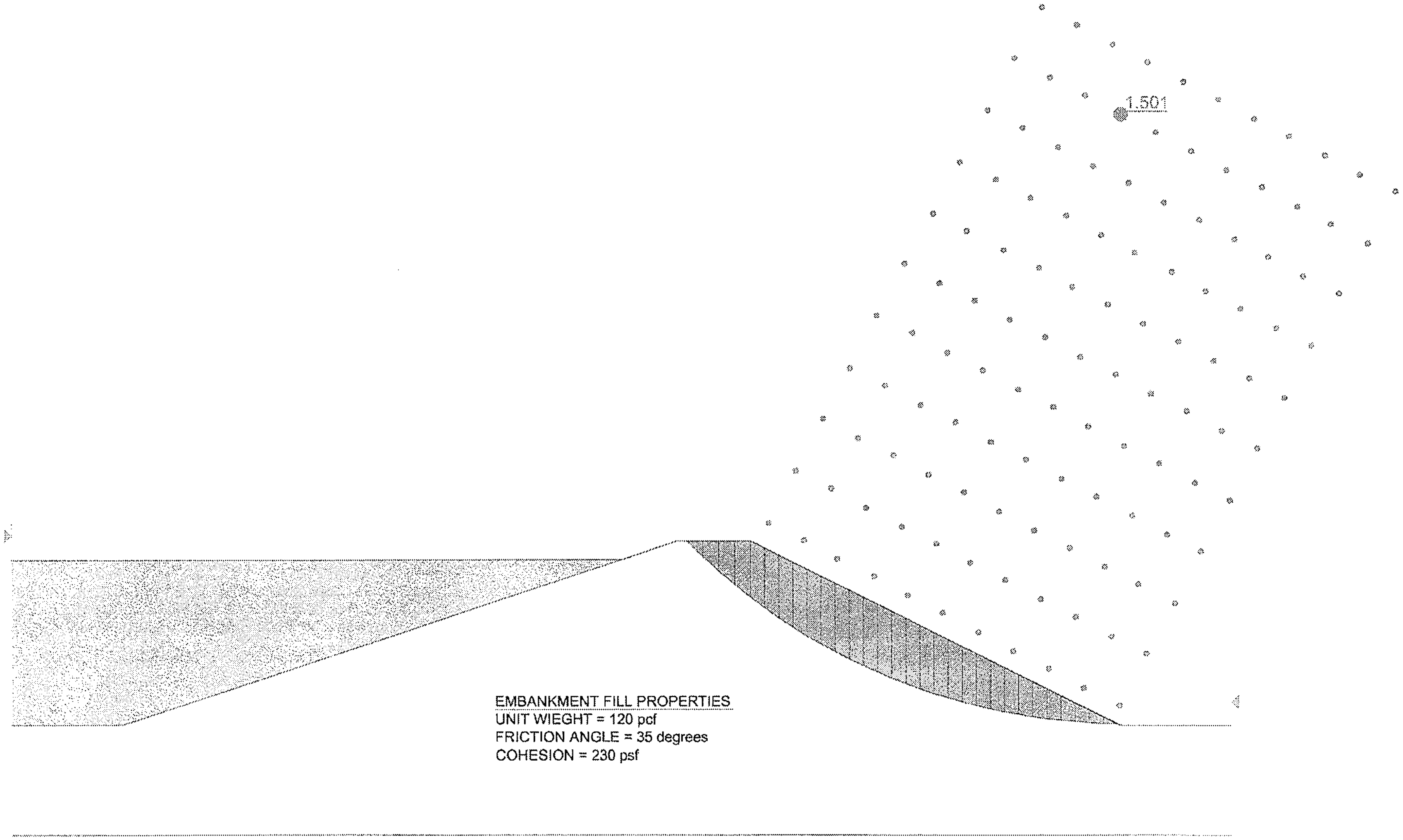

EMBANKMENT FILL PROPERTIES
UNIT WIEGHT = 120 pcf
FRICTION ANGLE = 35 degrees
COHESION = 230 psf

GEOMATRIX

SEISMIC 2:1
SIERRA MEADOWS
Oakhurst, California

Figure By dmm	Project No. 9708.000
Map No.	Figure 11
Date 09/01/04	

Plot Date: 09/01/04 - 10:55am, Plotted by: dmcgowen
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APPENDIX A

APPENDIX A

FIELD INVESTIGATION

APPENDIX A

FIELD INVESTIGATION

Three exploratory soil borings (GB-1 through GB-3) were drilled to depths varying from approximately 80 to 103 feet below existing ground surface using a track-mounted rotary wash drill rig. The upper portion of each borehole was advanced with a 5-inch diameter auger until hard bedrock was encountered. The borehole was continued using an H-size (approximate 2.5-inch diameter) rock coring barrel. The rock core recovered from the borehole was logged and classified in the field by a registered geologist in accordance with the procedures outlined in Appendix D. Final boring logs were prepared from the field logs and are presented in this appendix.

Twenty four test pits and two trenches were excavated at the site with a Case 580L 4X4 backhoe equipped with an extendahoe using a 24-inch bucket. Soil classifications and descriptions were recorded on field logs by a California-licensed engineering geologist using the Unified Soil Classification System as described by the American Society for Testing and Materials D 2488-90 “Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)”. Colors were determined by comparison with Munsell Soil Color Charts. Final test pit logs (presented in Table 1 of this appendix) and trench logs (Figures 3 and 4) were prepared from the field logs.

Upon completion of excavation, logging, and sampling, the trenches and test pits were backfilled with on-site excavated materials, tamped with the bucket, and wheel-rolled. Excess spoil was mounded over the excavation to minimize the formation of a surface depression.

PROJECT: Sierra Meadows

Log of Boring No. GB-1

BORING LOCATION: 70' East of NE Abutment

ELEVATION AND DATUM: Mean Sea Level 2421

DRILLING CONTRACTOR: Pitcher Drilling Company

DATE STARTED: 5/19/2004

DATE FINISHED: 5/26/2004

DRILLING EQUIPMENT: FRASTE MULTI-DRILL SL

TOTAL DEPTH (feet): 80

MEASURING POINT: Ground Surface

DRILLING METHOD: Mud Rotary

DEPTH TO FREE WATER FIRST ENCOUNTERED:

SAMPLING METHOD: 5' Core Barrel

DEPTH TO FREE WATER AT COMPLETION: 10.5feet

HAMMER WEIGHT:

HAMMER DROP:

LOGGED BY: E. BAILIFF

DEPTH (feet)	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURING	HARDNESS	STRENGTH	WEATHERING	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	DISCONTINUITY DESCRIPTION	REMARKS
1								COLLUVIUM: SILTY SAND (SM), brown to dark brown (7.5YR4/3), dry, 80% fine sand, 20% non-plastic fines, upper 6" has abundant root hairs, trace medium sand			set 5" diameter steel casing to 11' below ground surface on top of bedrock and grouted in place.
2								moist			
3								increasing clay content, non-plastic to low plasticity			
4											
5								increasing sand content, fine to medium grained sand			
6								Poorly graded SAND with SILT (SP-SM) Dark yellish brown (10YR4/4), moist, 90% fine to medium sand (mostly fine), 10% non to low plasticity fines @6-6.5: SILTY SAND (SM), yellowish brown (10YR5/4)			
7								ALLUVIUM: Poorly graded SAND with SILT (SP-SM), light olive brown (2.5Y5/3), moist, 90-95% fine sand, 5-10% non-plastic fines			
8											
9								increase in medium to coarse sand, trace well rounded granitic gravel clasts to 2" diameter			
10					So	Fr	Se				Harder drilling, possible bedrock contact ▼
11											11-17' run used Pitcher tube, blocked decomposed granite
12	1	75	0		So	Fr	Se		LC	Me	
13	2	100	0		So	Fr	Se	BEDROCK: BASS LAKE TONALITE Pale yellowish brown (10YR6/2), moist, medium grained, mostly quartz and plagioclase, trace biotite, plagioclase feldspar, mottled where stained with FeO_2, trace well to subrounded plagioclase feldspar and quartz rich fine gravel		Me Me Me Me	13-14.5' run with Pitcher tube still soft, possibly decomposed granite or alluvium with decomposed granite clasts
14											14.5-15.5 core broken
15											

FRACTURING: VC-Very Close (<0.01'), Cl-Close (0.1'-0.3'), Mo-Moderate (0.3'-1'), Wi-Wide (1'-3'), and VW-Very Wide (3'-10'). HARDNESS: So-Soft, Lo-Low, Mo-Moderate, Ha-Hard, and VH-Very Hard. STRENGTH: Fr-Friable, We-Weak, Mo-Moderate, St-Strong, and Ex-Extremely Strong. WEATHERING: Fr-Fresh, Sl-Slight, Mo-Moderate, and Se-Severe. DISCONTINUITY: Type (Be-Bedding, Jo-Joint, Fo-Foliation, Sh-Shear, Me-Mechanical Break, and Ve-Vein), Dip Angle, Aperture (Ti-Tight, Op-Open, He-Healed, and Fi-Filled), Surface Shape (Ir-Irregular, Pl-Planar, and Wa-Wavy), Roughness (St-Stepped, Ro-Rough, Mo-Moderately Rough, Sl-Slightly Rough, Sm-Smooth, and Po-Polished).

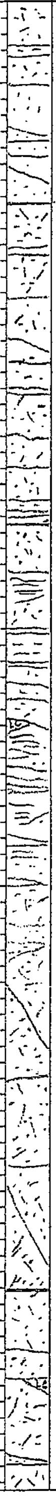
Project No. 9708.000

Figure A-1

Geomatrix Consultants

PROJECT: Sierra Meadows

Log of Boring No. GB-1 cont.



DEPTH (feet)	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURING	HARDNESS	STRENGTH	WEATHERING	LITHOLOGIC DESCRIPTION	DISCONTINUITY DESCRIPTION	REMARKS
	3	100	0		So	Fr	Se	TONALITE (Continued)		by pounding to remove
16 17	4	100	100	Mo	Mo-Ha	We-Mo	Mo	Yellowish gray (5Y7/2), abundant tight/healed microfractures, hard to see, decomposition of Fe minerals gives mottled coloration, microfractures healed with clay material	Me Fx, 5°, Ti, Ir, Ro Fx, 20°, Mo, Ir, Ro Me Me Fx, 50°, Mo, Ir, Ro	15.7-15.9' some washout of core 16.1-16.5' some washout
18 19 20 21	5	98	98	Mo	Mo-Ha	We-Mo	Mo	less weathered, medium to coarse grained	Me Me Jo, 20°, Ti, Pl, Mo Me Me Me Me Me	
22 23 24 25 26	6	100	67	Cl-Mo	Mo-Ha	We-Mo	Mo	Very light gray (N8) to light gray (N7), increase in fracturing, most surfaces clean, some have thin soft clay coating. Abundant healed microfractures, subhorizontal, very close spacing	Fx, <5°, Ti, Ir, Mo-Ro Fx, <5°, Ti, Ir, Mo-Ro Fx, <5°, Ti, Ir, Mo-Ro Fx, <5°, Ti, Ir, Mo-Ro Fx, <5°, Ti, Ir, Mo-Ro Fx, 15°, Ti, Ir, Mo-Ro Fx, 10°, Ti, Ir, Mo-Ro Fx, 10°, Ti, Ir, Mo-Ro Fx, <5°, Ti, Ir, Mo-Ro Fx, 10°, Ti, Ir, Mo-Ro Fx, <10°, Ti, Ir, Mo-Ro	
27 28 29 30 31	7	100	92	Mo-Wi	Mo	We-Mo	Mo	Joint surfaces weathered, stained with FeO_2, healed microfractures less apparent but still present	Fx, <5°, Ti, Ir, Mo-Ro Fx, <5°, Ti, Ir, Mo-Ro Jo, 50°, Ti, Pl, Sl Jo, 80°, Ti, Pl, Sl Fx, 5°, Ti, Ir, Mo-Ro Me Jo, 80°, Ti, Pl, Sl	Packer Test 30'-50'
32 33	8	100	95	Mo-Wi	Mo	We-Mo	Mo	Fracture filled with soft clay, run has abundant healed microfractures yellowish gray (5Y7/2), joint filled with soft clay	Fx, <5°, Fi, Ir, Mo Me Jo, 50°, Ti, Pl, Sl, thin clay coating Jo, 30°, Fi, Ir-Pl, Sl	

FRACTURING: VC-Very Close (<0.01'), Cl-Close (0.1'-0.3'), Mo-Moderate (0.3'-1'), Wi-Wide (1'-3'), and VW-Very Wide (3'-10'). HARDNESS: So-Soft, Lo-Low, Mo-Moderate, Ha-Hard, and VH-Very Hard. STRENGTH: Fr-Friable, We-Weak, Mo-Moderate, St-Strong, and Ex-Extremely Strong. WEATHERING: Fr-Fresh, Sl-Slight, Mo-Moderate, and Se-Severe. DISCONTINUITY: Type (Be-Bedding, Jo-Joint, Fo-Foliation, Sh-Shear, Me-Mechanical Break, and Ve-Vein), Dip Angle, Aperture (Ti-Tight, Op-Open, He-Healed, and Fi-Filled), Surface Shape (Ir-Irregular, Pl-Planar, and Wa-Wavy), Roughness (St-Stepped, Ro-Rough, Mo-Moderately Rough, Sl-Slightly Rough, Sm-Smooth, and Po-Polished).

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Figure A-1 Cont.

PROJECT: Sierra Meadows

Log of Boring No. GB-1 cont.

DEPTH (feet)	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURING	HARDNESS	STRENGTH	WEATHERING	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	DISCONTINUITY DESCRIPTION	REMARKS
34 35 36	8	100	95	Mo-Wi	Mo	We-Mo	Mo	TONALITE (Continued)		Fx, <5°, Ti, Ir, Mo Fx, <5°, Ti, Ir, Mo Jo, 50°, Fi, Ir-Pl, Sl Fx, 20°, Ti, Ir, Mo Fx, 5-10°, Ti-Op, Mo	33.5' increase in drill pressure
37 38 39	9	100	100	Mo	Ha-VH	Mo-St	Fr-Sl	Joint surface stained, minor clay residue on surface		Fx, 20°, Ti, Ir, Mo Fx, 20°, Op, Ir, Mo Jo, 80°, Ti, Pl, Sl	36.5' taking more fulid-slight 37.5' fracture may have had clay infilling, some residue on surface
40 41 42 43 44	10	100	59	Cl-Mo Wi	Mo	Mo	Mo	increased sub-horizontal fracturing, including healed microfractures Relatively unfractured, some healed microfractures		Fx, <5°, Ti, Ir, Sl-Mo Fx, <5°, Ti, Ir, Sl-Mo Fx, <5°, Ti, Ir, Sl-Mo Fx, <5°, Ti, Ir, Sl-Mo Fx, <5°, Ti, Ir, Sl-Mo Fx, <5°, Ti, Ir, Sl-Mo Fx, <5°, Ti, Ir, Sl-Mo Fx, <5°, Ti, Ir, Sl-Mo Fx, 20°, Ti, Wa Jo, 60°, Ti, Wa Jo, 50°, Ti, Wa	water level at 10.7'
45 46 47 48 49	11	50	16	VC-Cl	Mo	Lo	Mo	Intensely fractured, only recovered 0.5' of granitic fragments up to 3/4" diameter, very minor staining, no clay	LC	Fx, <5°, Ti, Ir Fx, <5°, Ti, Ir Fx, <5°, Ti, Ir Fx, <5°, Ti, Ir Fx, <5°, Ti, Ir crushed Fx, <5°, Ti, Ir, Mo Fx, <5°, Ti, Ir, Mo	45-47.5' very fast drilling
50 51 52	12	100	17	Cl-Mo	Ha-VH	Mo	Sl-Mo	Biotite rick zone, fresh		Fx, <5°, Ti, Ir, Mo Fx, <5°, Ti, Ir, Mo Fx, <5°, Ti, Ir, Mo Fx, <5°, Ti, Ir, Mo Fx, <5°, Ti, Ir, Mo Fx, <5°, Ti, Ir, Mo Fx, <5°, Ti, Ir, Mo Fx, <5°, Ti, Ir, Mo Fx, <5°, Ti, Ir, Mo	Packer Test 51-71'

FRACTURING: VC-Very Close (<0.01'), Cl-Close (0.1'-0.3'), Mo-Moderate (0.3'-1'), Wi-Wide (1'-3'), and VW-Very Wide (3'-10'). HARDNESS: So-Soft, Lo-Low, Mo-Moderate, Ha-Hard, and VH-Very Hard. STRENGTH: Fr-Friable, We-Weak, Mo-Moderate, St-Strong, and Ex-Extremely Strong. WEATHERING: Fr-Fresh, Sl-Slight, Mo-Moderate, and Se-Severe. DISCONTINUITY: Type (Be-Bedding, Jo-Joint, Fo-Foliation, Sh-Shear, Me-Mechanical Break, and Ve-Vein), Dip Angle, Aperture (Ti-Tight, Op-Open, He-Healed, and Fi-Filled), Surface Shape (Ir-Irregular, Pl-Planar, and Wa-Wavy), Roughness (St-Stepped, Ro-Rough, Mo-Moderately Rough, Sl-Slightly Rough, Sm-Smooth, and Po-Polished).

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Figure A-1 Cont.

Geomatrix Consultants

PROJECT: Sierra Meadows

Log of Boring No. GB-1 cont.

DEPTH (feet)	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURING	HARDNESS	STRENGTH	WEATHERING	LITHOLOGIC DESCRIPTION	DISCONTINUITY DESCRIPTION	REMARKS
53 54 55	13	93	93	VC-Mo	VH	Mo-St	Sl-Mo	TONALITE (Continued) Abundant healed subhorizontal microfractures, spaced 0.05'-0.40' apart	Fx, <5°, Ti, Ir, Mo Fx, <5°, Ti, Ir, Mo	
56 57 58 59 60	14	100	100	VC-Wi	VH	Mo-St	Sl-Mo	Trace healed fractures	Fx, <5°, Ti, Ir, Mo Fx, <5°, Ti, Ir, Mo Fx, 15°, Ti, Ir, Mo Fx, <5°, Ti, Ir, Mo Fx, 20°, Ti, Ir, Mo Fx, 15°, Ti, Ir, Mo Fx, <5°, Ti, Ir, Mo Fx, <5°, Ti, Ir, Mo	
61 62 63 64 65	15	100	90	VC-Wi	VH	Mo-St	Sl-Mo	Some fracture surfaces FeO_2 stained, fractures mostly sub-horizontal, but several healed sub-vertical fractures with potassium feldspar (moderate orange pink (10YR7/4)), mineralization around fracture, greatest from 64.7-66.0', some vertical fractures filled with quartz up to 1/32" thick	Fx, 10°, Ti, Ir, Mo Fx, ~60°, He Fx Fx Fx Fx, ~70°, He potassium feldspar mineralization around fractures 64'-66' Healed fractures, sub-vertical, some filled with 1/32" quartz	
66 67 68 69 70	16	100	100	Mo-Wi	VH	St	Sl	unfractured	Fx, 20°, Ti, Pl, Sl Fx, 70-90°, He Fx, 40°, He	Packer Test 70-80'

FRACTURING: VC-Very Close (<0.01'), Cl-Close (0.1'-0.3'), Mo-Moderate (0.3'-1'), Wi-Wide (1'-3'), and VW-Very Wide (3'-10'). HARDNESS: So-Soft, Lo-Low, Mo-Moderate, Ha-Hard, and VH-Very Hard. STRENGTH: Fr-Friable, We-Weak, Mo-Moderate, St-Strong, and Ex-Extremely Strong. WEATHERING: Fr-Fresh, Sl-Slight, Mo-Moderate, and Se-Severe. DISCONTINUITY: Type (Be-Bedding, Jo-Joint, Fo-Foliation, Sh-Shear, Me-Mechanical Break, and Ve-Vein), Dip Angle, Aperture (Ti-Tight, Op-Open, He-Healed, and Fi-Filled), Surface Shape (Ir-Irregular, Pl-Planar, and Wa-Wavy), Roughness (St-Stepped, Ro-Rough, Mo-Moderately Rough, Sl-Slightly Rough, Sm-Smooth, and Po-Polished).

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Figure A-1 Cont.

Geomatrix Consultants

PROJECT: Sierra Meadows

Log of Boring No. GB-1 cont.

DEPTH (feet)	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURING	HARDNESS	STRENGTH	WEATHERING	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	DISCONTINUITY DESCRIPTION	REMARKS
								TONALITE (Continued)			
71 72 73 74 75	17	100	100	Cl-Wi	VH	St	Sl-Mo	Fractures are healed, some filled with quartz, vertical fracture has potassium feldspar mineralization along fracture. Horizontal fracture has iron oxide staining		Fx, 70-90°, He/Fi, Pl Fx, <5°, Ti potassium feldspar Fx, 20°, Ti Fx, 20°, Ti	
76 77 78 79	18	100	100	Wi	VH	St	Sl-Mo			Fx, 80°, He, Wa Fx, 80°, He, Pl Fx, 80°, He, Wa Me	
80 81 82 83 84 85 86 87 88								Borehole terminated at 80 feet. Piezometer installed: 5" diameter steel casing set to 11 feet bgs and grouted in place. Open borehole from 11 feet to 80 feet bgs.			

FRACTURING: VC-Very Close (<0.01'), Cl-Close (0.1'-0.3'), Mo-Moderate (0.3'-1'), Wi-Wide (1'-3'), and VW-Very Wide (3'-10'). HARDNESS: So-Soft, Lo-Low, Mo-Moderate, Ha-Hard, and VH-Very Hard. STRENGTH: Fr-Friable, We-Weak, Mo-Moderate, St-Strong, and Ex-Extremely Strong. WEATHERING: Fr-Fresh, Sl-Slight, Mo-Moderate, and Se-Severe. DISCONTINUITY: Type (Be-Bedding, Jo-Joint, Fo-Foliation, Sh-Shear, Me-Mechanical Break, and Ve-Vein), Dip Angle, Aperture (Ti-Tight, Op-Open, He-Healed, and Fi-Filled), Surface Shape (Ir-Irregular, Pl-Planar, and Wa-Wavy), Roughness (St-Stepped, Ro-Rough, Mo-Moderately Rough, Sl-Slightly Rough, Sm-Smooth, and Po-Polished).

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Figure A-1 Cont.

PROJECT: Sierra Meadows

Log of Boring No. GB-2

BORING LOCATION: 100' North of Southern Abutment

ELEVATION AND DATUM: Mean Sea Level 2428

DRILLING CONTRACTOR: Pitcher Drilling Company

DATE STARTED: 5/20/2004

DATE FINISHED: 5/23/2004

DRILLING EQUIPMENT: FRASTE MULTI-DRILL SL

TOTAL DEPTH (feet): 103

MEASURING POINT: Ground Surface

DRILLING METHOD: Mud Rotary

DEPTH TO FREE WATER FIRST ENCOUNTERED:

SAMPLING METHOD: 5' Core Barrel

DEPTH TO FREE WATER AT COMPLETION: 24.5feet

HAMMER WEIGHT:

HAMMER DROP:

LOGGED BY: E. BAILIFF/Z. WASHBURN

DEPTH (feet)	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURING	HARDNESS	STRENGTH	WEATHERING	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	DISCONTINUITY DESCRIPTION	REMARKS
								COLLUVIUM: SILTY SAND to CLAYEY SAND (SM to SC) Yellowish brown (10YR5/4), moist, 70-80% fine sand, 20-30% non-plastic to low plasticity fines, trace medium sand, micaceous, trace organics			
1											
2											
3											
4											
5								POORLY GRADED SAND with SILT (SP-SM) Yellowish brown (10YR5/4), moist, 90% fine to medium sand, 10% non-plastic fines, trace coarse sand			
6											
7								trace carbonaceous wood fragments			
8											
9											
10											
11											
12								POORLY GRADED SAND to POORLY GRADED SAND with SILT (SP to SP-SM) Light yellowish brown (10YR6/4), moist, 85-95% fine to medium sand, 5-15% non-plastic fines, trace coarse sand, trace organics, denser than above			
13											
14											
15											

FRACTURING: VC-Very Close (<0.01'), Cl-Close (0.1'-0.3'), Mo-Moderate (0.3'-1'), Wi-Wide (1'-3'), and VW-Very Wide (3'-10'). HARDNESS: So-Soft, Lo-Low, Mo-Moderate, Ha-Hard, and VH-Very Hard. STRENGTH: Fr-Friable, We-Weak, Mo-Moderate, St-Strong, and Ex-Extremely Strong. WEATHERING: Fr-Fresh, Sl-Slight, Mo-Moderate, and Se-Severe. DISCONTINUITY: Type (Be-Bedding, Jo-Joint, Fo-Foliation, Sh-Shear, Me-Mechanical Break, and Ve-Vein), Dip Angle, Aperture (Ti-Tight, Op-Open, He-Healed, and Fi-Filled), Surface Shape (Ir-Irregular, Pl-Planar, and Wa-Wavy), Roughness (St-Stepped, Ro-Rough, Mo-Moderately Rough, Sl-Slightly Rough, Sm-Smooth, and Po-Polished).

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Figure A-2

RT-1 (3/03)

GEES-ROCK 3/03 9708-ROCKLOGS.GPJ GES32003-7.GDT 8/27/04

Geomatrix Consultants

PROJECT: Sierra Meadows

Log of Boring No. GB-2 cont.

DEPTH (feet)	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURING	HARDNESS	STRENGTH	WEATHERING	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	DISCONTINUITY DESCRIPTION	REMARKS
								yellowish brown (10YR5/4) POORLY GRADED SAND to POORLY GRADED SAND with SILT (SP to SP-SM) (Continued)			
16											
17											
18								ALLUVIUM (?): SILTY SAND to CLAYEY SAND (SM-SC) Pale brown (10YR6/3), moist (almost dry), 85% fine to medium sand, 15% non- to low plasticity fines, high dry strength, trace coarse sand, grades to poorly graded sand with silt at 20'			harder drilling
19											
20								POORLY GRADED SAND with SILT (SP-SM) Pale brown (10YR6/3), dry to moist, dense			
21								BEDROCK: BASS LAKE TONALITE Yellowish gray (5Y7/2), medium to coarse grained, quartz rich with weathered plagioclase feldspar, biotite, hornblende, fracture and joint surfaces stained with FeO_2, some staining within core, healed fractures have thin, hard clay cement, healed microfractures throughout		Fx, 40°, He	
22	1	100	88	Wi	So	Fr	Mo-Se				
				VC						Jo, 70°, Ti, Pl, Sl, thin clay coating	22.8-23' crushed
23											core breaks when handled
24										Me	Packer Test 23-43'
											▽
25										Jo, 60°, Ti, Pl, Sl	
	2	100	91	Mo-Wi	So	Fr	Mo-Se				
26											
										crushed	26.6-26.7' crushed
27								clay infilling is white (2.5Y8/2), low to medium plasticity, some polished surfaces, rock more competant below		Jo, 50°, Fi, Pl, Sm Fx/Jo 40°, Ti, Ir, Mo	26-27' increased drill pressure, 0.1' thick clay filled joint
28								very light gray (N8) mottled with balck (mica and biotite)		Me Me Jo, 40°, He, Pl	
29								fracture/joint surfaces stained		Me	
30					Lo-Mo	We	Sl			Me	
	3	100	88	Mo-Wi						Fx, <5%, Ti, Pl, Sl Fx, 20%, Ti, Pl, Sl	
31										Me	
								yellowish gray (5Y7/2), rock quality decreases			
32					So-Lo	Fr	Mo			Jo, 45°, Ti, Pl, Sl Jo, 40°, Ti, Pl, Sl	
33										Me	

FRACTURING: VC-Very Close (<0.01'), Cl-Close (0.1'-0.3'), Mo-Moderate (0.3'-1'), Wi-Wide (1'-3'), and VW-Very Wide (3'-10'). HARDNESS: So-Soft, Lo-Low, Mo-Moderate, Ha-Hard, and VH-Very Hard. STRENGTH: Fr-Friable, We-Weak, Mo-Moderate, St-Strong, and Ex-Extremely Strong. WEATHERING: Fr-Fresh, Sl-Slight, Mo-Moderate, and Se-Severe. DISCONTINUITY: Type (Be-Bedding, Jo-Joint, Fo-Foliation, Sh-Shear, Me-Mechanical Break, and Ve-Vein), Dip Angle, Aperture (Ti-Tight, Op-Open, He-Healed, and Fi-Filled), Surface Shape (Ir-Irregular, Pl-Planar, and Wa-Wavy), Roughness (St-Stepped, Ro-Rough, Mo-Moderately Rough, Sl-Slightly Rough, Sm-Smooth, and Po-Polished).

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Figure A-2 Cont.

Geomatrix Consultants

PROJECT: Sierra Meadows

Log of Boring No. GB-2 cont.

DEPTH (feet)	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURING	HARDNESS	STRENGTH	WEATHERING	LITHOLOGIC DESCRIPTION	DISCONTINUITY DESCRIPTION	REMARKS
34 35 36 37	4	85	20	Wi	Lo-So Ha-So Ha	Fr We	Mo Sl	TONALITE (Continued) Zone of fracturing with less than 0.5" white (2.5Y 8/2) clay infilling on one side of vertical fracture, minerals along fracture surface, very severely weathered, clay has some polished surfaces very light gray (N8) tonalite	Fx, <5%, Ir, Ro Fx, 90%, Ti, Pl, Sm Fx Jo, 85°, Fi, Pl, Sl Jo, 50°, Ti, Pl, Sl	rock is crushed clay no continuous, washed out zone, likely fracture oxidized along joint surface
38 39 40 41 42	5	100	88	Wi	Ha	St Mo	Sl	rock quality increases, quartz, biotite and hornblende phenocrysts show only slight weathering/alteration on their surfaces	Jo, 55°, Ti, Pl, Sl Jo-Me, 45°, Ti, Pl, Mo Jo, 40°, Ti, Pl, Sl Me Jo-Me, <5°, Ti, Pl, Sl Me	Fe coated joint
43	6	100	100	Wi	Ha	Mo	Sl			
44 45 46 47 48	7	100	40	Mo-Wi	Ha	Mo	Sl		Jo, 90°, He, Pl Jo, 15°, Ti, Pl, Sm Jo, 50°, Ti, Pl, Sl-St Me Me Jo, 65°, Ti, Pl, Mo Jo, 5°, Op, Pl, Sl-St	Packer Test 43-63' Sl with a 1/4" step Sl with 1/8" step
49 50 51 52	8	100	86	Mo	Ha Mo	Mo We	Sl Mo-Se Mo	Light yellowish gray (5Y7/2), more fractured and weathered	Me Jo, 70°, Ti, Pl, Sl Jo, 20°, Ti, Pl, Sl Jo, 40°, Ti, Pl, Mo Me Jo, 5°, Ti, Pl, Sl Me	clay lined slickensides? oxidized crushed zone heavily oxidized

GRAPHIC LOG

FRACTURING: VC-Very Close (<0.01'), Cl-Close (0.1'-0.3'), Mo-Moderate (0.3'-1'), Wi-Wide (1'-3'), and VW-Very Wide (3'-10'). HARDNESS: So-Soft, Lo-Low, Mo-Moderate, Ha-Hard, and VH-Very Hard. STRENGTH: Fr-Friable, We-Weak, Mo-Moderate, St-Strong, and Ex-Extremely Strong. WEATHERING: Fr-Fresh, Sl-Slight, Mo-Moderate, and Se-Severe. DISCONTINUITY: Type (Be-Bedding, Jo-Joint, Fo-Foliation, Sh-Shear, Me-Mechanical Break, and Ve-Vein), Dip Angle, Aperture (Ti-Tight, Op-Open, He-Healed, and Fi-Filled), Surface Shape (Ir-Irregular, Pl-Planar, and Wa-Wavy), Roughness (St-Stepped, Ro-Rough, Mo-Moderately Rough, Sl-Slightly Rough, Sm-Smooth, and Po-Polished).

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Figure A-2 Cont.

PROJECT: Sierra Meadows

Log of Boring No. GB-2 cont.

DEPTH (feet)	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURING	HARDNESS	STRENGTH	WEATHERING	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	DISCONTINUITY DESCRIPTION	REMARKS
								TONALITE (Continued)		Jo, 40°, He, Pl Jo, 15°, Ti, Pl, Mo	
53	9	100	70	Cl	Mo	We	Mo			Jo, <5°, He, Pl Me	
54					So	Fr		moderate yellow (5Y7/6)		Jo, 20°, Ti, Pl, Sl	
55										Jo, 20°, Ti, Pl, Mo Jo, 20°, Ti, Pl, Mo Me	4" FeO_2 stained zone
56				Mo	Mo	We	Sl	Light yellow gray (5Y7/2), medium grained, quartz rich with weathered plagioclase, biotite and hornblende, joint surfaces stained with FeO_2		Jo, 25°, He, Pl Me Me	
57										Me Jo, <5°, Ti, Ir, Ro	
58	10	100	48	Mo	Mo	Fr	Mo			Me Me Me	
59										Jo, 10°, Ti, Pl, Mo	Joint FeO_2 stained
60								rock on either side of shear is FeO_2 stained and extends 3/8" into the rock, rock is beyond stained zone is not sheared and relatively undisturbed		Me Me	
61										Sh, Ti, Wa, Sm Me	shear filled with 1/4" thick clay, pale yellow (2.5Y8/3) with horizontal slicks, medium plasticity
62										Me Me	
63	11	100	80	Wi	Mo	We	Sl	Tonalite becomes more stained, stained surfaces are moderate yellow (5Y7/6), but rock quality increases		Me Jo-Me, 0°, Ti, Pl, Mo Jo-Me, 0°, Ti, Ir, Mo	Packer Test 63'-83'
64										Jo-Me, 0°, Ti, Pl, Mo	
65										Jo, 60°, Ti-Fi, Pl, Sl	Joint FeO_2 stained with thin clay coating, slicks
66										Jo, 45°, Ti, Pl, Sl Jo, 45°, Ti, Pl, Sl Jo, 45°, He, Pl Me	
67										Me	
68	12	100	96	Cl	Mo	We	Mo			Jo, 45°, He, Pl Jo, 45°, Ti, Pl, Sl Me Me	FeO_2 stained
69								concentrated zones of hornblende		Me Me	
70										Me Me crushed zone	

FRACTURING: VC-Very Close (<0.01'), Cl-Close (0.1'-0.3'), Mo-Moderate (0.3'-1'), Wi-Wide (1'-3'), and VW-Very Wide (3'-10'). HARDNESS: So-Soft, Lo-Low, Mo-Moderate, Ha-Hard, and VH-Very Hard. STRENGTH: Fr-Friable, We-Weak, Mo-Moderate, St-Strong, and Ex-Extremely Strong. WEATHERING: Fr-Fresh, Sl-Slight, Mo-Moderate, and Se-Severe. DISCONTINUITY: Type (Be-Bedding, Jo-Joint, Fo-Foliation, Sh-Shear, Me-Mechanical Break, and Ve-Vein), Dip Angle, Aperture (Ti-Tight, Op-Open, He-Healed, and Fi-Filled), Surface Shape (Ir-Irregular, Pl-Planar, and Wa-Wavy), Roughness (St-Stepped, Ro-Rough, Mo-Moderately Rough, Sl-Slightly Rough, Sm-Smooth, and Po-Polished).

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Figure A-2 Cont.

Geomatrix Consultants

PROJECT: Sierra Meadows

Log of Boring No. GB-2 cont.

DEPTH (feet)	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURING	HARDNESS	STRENGTH	WEATHERING	LITHOLOGIC DESCRIPTION	DISCONTINUITY DESCRIPTION	REMARKS
71 72 73	12	100	96	Mo	Mo	Fr	Sl	Tonalite with extensive moderate yellow (5Y7/6) iron oxide staining on some fracture and joint surfaces	Me Jo, 60°, Fi, Pl, Sl Me Me	
74 75 76 77 78	13	100	84	Mo	Mo	Fr	Sl-Mo	Joint open 1/8" and filled with white (2.5Y8/2) clay, medium plasticity	Me Jo, 70°, Fi, Pl, Sl Me Me Me Me/crushed zone Me/crushed zone	
79 80 81 82 83	14	96	73	Mo	Mo	Fr We	Mo Sl		Me Me Me Jo, 50°, Ti, Pl, Sl rock is grus like Jo, 45°, Ti, Pl, Sl	
84 85 86 87 88	15	100	100	Mo	Mo	We	Sl	hornblende increased joint open <1/32" and filled with white clay (2.5Y8/2)	Jo, 30°, Ti, Pl, Sl Me Jo, 20°, He, Pl Me Me Me Me Jo, 60°, Fi, Pl	Packer Test 83-103'
									Me	

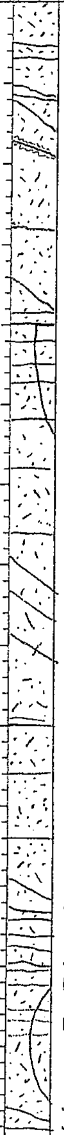
FRACTURING: VC-Very Close (<0.01'), Cl-Close (0.1'-0.3'), Mo-Moderate (0.3'-1'), Wi-Wide (1'-3'), and VW-Very Wide (3'-10'). HARDNESS: So-Soft, Lo-Low, Mo-Moderate, Ha-Hard, and VH-Very Hard. STRENGTH: Fr-Friable, We-Weak, Mo-Moderate, St-Strong, and Ex-Extremely Strong. WEATHERING: Fr-Fresh, Sl-Slight, Mo-Moderate, and Se-Severe. DISCONTINUITY: Type (Be-Bedding, Jo-Joint, Fo-Foliation, Sh-Shear, Me-Mechanical Break, and Ve-Vein), Dip Angle, Aperture (Ti-Tight, Op-Open, He-Healed, and Fi-Filled), Surface Shape (Ir-Irregular, Pl-Planar, and Wa-Wavy), Roughness (St-Stepped, Ro-Rough, Mo-Moderately Rough, Sl-Slightly Rough, Sm-Smooth, and Po-Polished).

Project No. 9708.000

Figure A-2 Cont.

PROJECT: Sierra Meadows

Log of Boring No. GB-2 cont.

DEPTH (feet)	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURING	HARDNESS	STRENGTH	WEATHERING	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	DISCONTINUITY DESCRIPTION	REMARKS
								TONALITE (Continued)			
										Me Me Me	
90								joints stained with FeO_2			
	16	100	100	VW	Mo	Mo	Sl			Jo, 50°, Ti, Pl, Sl Jo, 30°, Ti, Pl, Sl	
91											
92										Me	
										Jo, 50°, He, Pl Me	
93										Me Jo, 90°, Ti, Wa, Sl	
					Mo						
94										Me Me Me	
95								rock becomes fresher with very minor moderate yellow (5Y7/6) staining, color of rock is very light gray (N8)		Me Me Me Me	
	17	100	90	VW		Mo	Sl			Me	
96					Ha			Joint surface coated with 1/32"-1/16" hard, moderate yellow green (5GY7/4), granular mineral (epidote), and clay		Jo, 45°, Ti, Pl, Sl Jo, 45°, Ti, Pl, Sl	
97										Jo, 45°, Ti, Pl, Sl	
98										Me	
										Me	
99				VW	Ha	Mo	Sl			Me	
100								Joint open ~1/8" filled with white (2.5Y8/2) clay, rock becomes more fractures and oxidized with moderate yellow (5Y7/6) oxidized coatings on joints and throughout much of the rock fabric		Jo, ~50°, Fi, Pl, Sl Me	
	18	100	40								
101										Jo, 25°, Ti, Pl, Sl Me	
				Cl	So	Fr	Mo			Me	
102											
										Jo, 70-90°, Fi, Pl, Sl Jo, 30°, Ti, Pl, Sl	
103								Borehole terminated at 103 feet. Piezometer installed: schedule 40 PVC casing set to 30 feet.			
104											
105											
106											
107											

FRACTURING: VC-Very Close (<0.01'), Cl-Close (0.1'-0.3'), Mo-Moderate (0.3'-1'), Wi-Wide (1'-3'), and VW-Very Wide (3'-10'). HARDNESS: So-Soft, Lo-Low, Mo-Moderate, Ha-Hard, and VH-Very Hard. STRENGTH: Fr-Friable, We-Weak, Mo-Moderate, St-Strong, and Ex-Extremely Strong. WEATHERING: Fr-Fresh, Sl-Slight, Mo-Moderate, and Se-Severe. DISCONTINUITY: Type (Be-Bedding, Jo-Joint, Fo-Foliation, Sh-Shear, Me-Mechanical Break, and Ve-Vein), Dip Angle, Aperture (Ti-Tight, Op-Open, He-Healed, and Fi-Filled), Surface Shape (Ir-Irregular, Pl-Planar, and Wa-Wavy), Roughness (St-Stepped, Ro-Rough, Mo-Moderately Rough, Sl-Slightly Rough, Sm-Smooth, and Po-Polished).

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Figure A-2 Cont.

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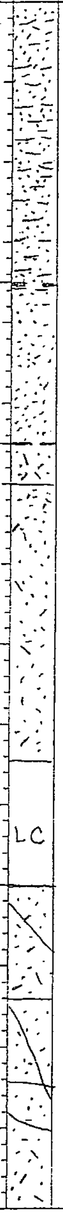
PROJECT: Sierra Meadows	**Log of Boring No. GB-3**
BORING LOCATION: Northern Back Cut	ELEVATION AND DATUM: Mean Sea Level 2470
DRILLING CONTRACTOR: Pitcher Drilling Company	DATE STARTED: 5/23/2004 — DATE FINISHED: 5/26/2004
DRILLING EQUIPMENT: FRASTE MULTI-DRILL SL	TOTAL DEPTH (feet): 100 — MEASURING POINT: Ground Surface
DRILLING METHOD: Mud Rotary	DEPTH TO FREE WATER FIRST ENCOUNTERED:
SAMPLING METHOD: 5' Core Barrel	DEPTH TO FREE WATER AT COMPLETION: 12.5feet
HAMMER WEIGHT: — HAMMER DROP:	LOGGED BY: E. BAILIFF

DEPTH (feet)	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURING	HARDNESS	STRENGTH	WEATHERING	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	DISCONTINUITY DESCRIPTION	REMARKS
1 2 3		0	0					COLLUVIUM: SILTY SAND (SM), yellowish brown (10YR 5/4), moist, 85% fine to coarse sand, 15% non- to low-plasticity fines			set 4" diameter sch. 40 PVC well casing to 24.8 feet. Grouted casing in place. Open borehole from 24.8 to 100 feet bgs.
4 5								Poorly graded SAND (SP), yellowish brown (10YR5/4), moist, 95% fine to coarse sand, 5% non-plastic fines			
6 7								BEDROCK: BASS LAKE TONALITE, yellowish gray (5Y7/2), fine to coarse core, mostly intact but easily broken by hand, but only moderately weathered			
8 9 10	1	66	0	VW	So	Fr	Sl-Mo	Rock is friable but not much weathering of minerals, localized staining around biotite and hornblend, not much plagioclase, mostly quartz			
11 12 13 14 15	2	82	0	VW	So	Fr	Sl-Mo	Thin clay coating on joint surface		Jo, 80°, Ti, Wa, Mo Me Jo, 80°, Ti, Ir, Mo Me Jo, 40°, Ti, Ir, Mo	▼

FRACTURING: VC-Very Close (<0.01'), Cl-Close (0.1'-0.3'), Mo-Moderate (0.3'-1'), Wi-Wide (1'-3'), and VW-Very Wide (3'-10'). HARDNESS: So-Soft, Lo-Low, Mo-Moderate, Ha-Hard, and VH-Very Hard. STRENGTH: Fr-Friable, We-Weak, Mo-Moderate, St-Strong, and Ex-Extremely Strong. WEATHERING: Fr-Fresh, Sl-Slight, Mo-Moderate, and Se-Severe. DISCONTINUITY: Type (Be-Bedding, Jo-Joint, Fo-Foliation, Sh-Shear, Me-Mechanical Break, and Ve-Vein), Dip Angle, Aperture (Ti-Tight, Op-Open, He-Healed, and Fi-Filled), Surface Shape (Ir-Irregular, Pl-Planar, and Wa-Wavy), Roughness (St-Stepped, Ro-Rough, Mo-Moderately Rough, Sl-Slightly Rough, Sm-Smooth, and Po-Polished).

Project No.
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Figure A-3

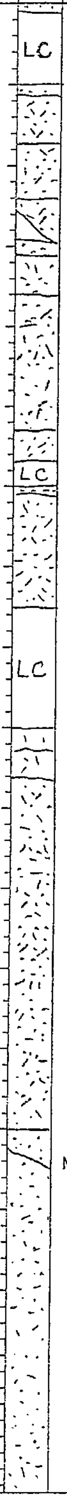
Geomatrix Consultants

PROJECT: Sierra Meadows

Log of Boring No. GB-3 cont.

DEPTH (feet)	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURING	HARDNESS	STRENGTH	WEATHERING	LITHOLOGIC DESCRIPTION	DISCONTINUITY DESCRIPTION	REMARKS
		82	0	VW	So	Fr	Sl-Mo	TONALITE (Continued)		
16 17 18 19 20	3	94	84	VW	So-Lo	Fr	Mo-Mo Se		Me Me Me Jo, 65°, Ti, Ir, Mo Me Me Me Me	Rock quality overall is poor, core will break by hand
21 22 23	4	50	47	Wi	Ha	Mo-St	Fr-Sl	Light gray (N7), rock more competant, very little weathering of minerals, minor staining around discrete biotite crystals, minor FeO_2 staining on fracture surface	Fx, <5°, Ti, Ir, Mo	Harder drilling at 22' core lost due to hard drilling
24 25 26 27 28	5	100	100	VW	Ha	St-VS	Fr	Fine to medium grained, no weathering	Me Me	Start drilling with weight of rod only-very slow, increasing pressure every 6 inches Packer Test 27-47' up to 750 lbs drilling pressure
29 30 31 32 33	6	100	100	VW	Ha	St-VS	Fr-Sl	Minor FeO_2 staining around biotite and hornblende	Me (possible joint) 50°, Ti, Ir, Mo	up to 880 lbs drilling pressure

GRAPHIC LOG



FRACTURING: VC-Very Close (<0.01'), Cl-Close (0.1'-0.3'), Mo-Moderate (0.3'-1'), Wi-Wide (1'-3'), and VW-Very Wide (3'-10'). HARDNESS: So-Soft, Lo-Low, Mo-Moderate, Ha-Hard, and VH-Very Hard. STRENGTH: Fr-Friable, We-Weak, Mo-Moderate, St-Strong, and Ex-Extremely Strong. WEATHERING: Fr-Fresh, Sl-Slight, Mo-Moderate, and Se-Severe. DISCONTINUITY: Type (Be-Bedding, Jo-Joint, Fo-Foliation, Sh-Shear, Me-Mechanical Break, and Ve-Vein), Dip Angle, Aperture (Ti-Tight, Op-Open, He-Healed, and Fi-Filled), Surface Shape (Ir-Irregular, Pl-Planar, and Wa-Wavy), Roughness (St-Stepped, Ro-Rough, Mo-Moderately Rough, Sl-Slightly Rough, Sm-Smooth, and Po-Polished).

Project No. 9708.000

Figure A-3 Cont.

PROJECT: Sierra Meadows

Log of Boring No. GB-3 cont.

DEPTH (feet)	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURING	HARDNESS	STRENGTH	WEATHERING	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	DISCONTINUITY DESCRIPTION	REMARKS
	6							TONALITE (Continued)			up to 1000 lbs drilling pressure
34								Increased weathering around biotite and hornblende		Me (broken at top of run)	
35											
36											
	7	98	98	VW	Ha	St-VS	V. Sl				
37											
38											
39										Fx, 50°, Ti, Wa, Mo-Sl	Minor parallel fracture above break surface
40								medium to coarse			
41											
	8	100	94	Wi-VW	Ha	St-VS	V. Sl				
42										Fx, 70-90°, Ti, Wa, Mo-Sl	Minor epidote on Fx surface, epidote is moderate yellow green (5GY7/4), Fx coated with FeO_2
43											
44										Discontinuous fracture marked by FeO_2 staining Me	
45											
	9	50	50	VW	Ha	St-VS	Fr-V. Sl			Me	
46									LC		Reduced drilling pressure-faster drilling
47											
48											
	10	80	67	Wi-VW	Ha	St-VS	Fr-V. Sl			Me. Me Jo Me Me	Packer Test 47-67'
49											
50							V. Sl	medium to coarse, few healed, discontinuous microfractures		microfractured	
51	11	100	100	VW	Ha	Mo Mo	Sl-Mo	increased FeO_2 staining		Me Me Me Me	
52											

FRACTURING: VC-Very Close (<0.01'), Cl-Close (0.1'-0.3'), Mo-Moderate (0.3'-1'), Wi-Wide (1'-3'), and VW-Very Wide (3'-10'). HARDNESS: So-Soft, Lo-Low, Mo-Moderate, Ha-Hard, and VH-Very Hard. STRENGTH: Fr-Friable, We-Weak, Mo-Moderate, St-Strong, and Ex-Extremely Strong. WEATHERING: Fr-Fresh, Sl-Slight, Mo-Moderate, and Se-Severe. DISCONTINUITY: Type (Be-Bedding, Jo-Joint, Fo-Foliation, Sh-Shear, Me-Mechanical Break, and Ve-Vein), Dip Angle, Aperture (Ti-Tight, Op-Open, He-Healed, and Fi-Filled), Surface Shape (Ir-Irregular, Pl-Planar, and Wa-Wavy), Roughness (St-Stepped, Ro-Rough, Mo-Moderately Rough, Sl-Slightly Rough, Sm-Smooth, and Po-Polished).

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Figure A-3 Cont.

PROJECT: Sierra Meadows

Log of Boring No. GB-3 cont.

DEPTH (feet)	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURING	HARDNESS	STRENGTH	WEATHERING	LITHOLOGIC DESCRIPTION	DISCONTINUITY DESCRIPTION	REMARKS
53 54	11	100	100	VW	 VH Ha	St-VS VS St-VS	Fr-V. Sl	TONALITE (Continued) Quartz rich zone. Upper portion appears pegmatitic, lower portion is fine crystalline. Trace biotite, very hard.	Me Me Fx, 10°, Ti Me Me Me	upper contact: 40° no apparent altering along contact lower contact: 30°
55 56 57	12	100	97	Wi	Ha	St-VS	Sl-Mo	trace healed microfractures, FeO_2 staining along fractures, extends out into core up to 1/2"	Fx, 30° Me Fx, <5° Me Fx, <5° Me	56.5-57' took fluid
58 59	13	83	67	Mo-Wi	Ha VH	St-VS St	Fr-V. Sl		Me/Fx 20°, Ti, Ir, Mo Fx, 20°, Ti, Pl, Sl Me/Contact (?) with quartz rich zone	FeO_2 staining on fracture surfaces
60 61	14	85	85	Wi	VH Ha VH	St St-VS	Fr-V. Sl Fr-V. Sl		contact quartz rich rock 30° Me Fx, <5°	20 min to core 59.5-60.5', at 60.5' coring rate increased then slowed
62	15	100	100	Wi	VH	VS	Fr-V. Sl	becomes harder, fresh, more quartz		1500 lbs drilling pressure, drilling very slow, changed to different type of drill bit
63 64 65	16	100	100	VW	VH	St	Fr-V. Sl	epidote crystals in sample matrix	Me	
66	17	100	100	Wi	VH	St	Fr-V. Sl		Fx	
67 68 69 70	18	100	100	VW	VH	St-VS	Fr-V. Sl		Me	Packer Test 67-87'

FRACTURING: VC-Very Close (<0.01'), Cl-Close (0.1'-0.3'), Mo-Moderate (0.3'-1'), Wi-Wide (1'-3'), and VW-Very Wide (3'-10'). HARDNESS: So-Soft, Lo-Low, Mo-Moderate, Ha-Hard, and VH-Very Hard. STRENGTH: Fr-Friable, We-Weak, Mo-Moderate, St-Strong, and Ex-Extremely Strong. WEATHERING: Fr-Fresh, Sl-Slight, Mo-Moderate, and Se-Severe. DISCONTINUITY: Type (Be-Bedding, Jo-Joint, Fo-Foliation, Sh-Shear, Me-Mechanical Break, and Ve-Vein), Dip Angle, Aperture (Ti-Tight, Op-Open, He-Healed, and Fi-Filled), Surface Shape (Ir-Irregular, Pl-Planar, and Wa-Wavy), Roughness (St-Stepped, Ro-Rough, Mo-Moderately Rough, Sl-Slightly Rough, Sm-Smooth, and Po-Polished).

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Figure A-3 Cont.

RT-2 (3/03)

GEES-ROCK 3/03 9708-ROCKLOGS.GPJ GES32003-7.GDT 8/27/04

PROJECT: Sierra Meadows

Log of Boring No. GB-3 cont.

DEPTH (feet)	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURING	HARDNESS	STRENGTH	WEATHERING	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	DISCONTINUITY DESCRIPTION	REMARKS
71	18	100	100	VW	VH	St-VS	Fr-V. Sl	TONALITE (Continued)		Fx, 70°, He, Pl, Sl	
72 73 74 75 76	19	100	100	VW	VH	St-VS	Fr-V. Sl			Me Me Fx, 70°, He, Pl, Sl Me Fx,15°, He, Ir, Mo	
77 78 79 80 81	20	100	100	VW	VH	St-VS	Fr-V. Sl			Me	
82 83 84 85 86	21	100	94	Mo-Wi	VH	St-VS	Fr-V. Sl			Jo, 70°, Ti, Pl, Sl Fx, 60°, Ti, Pl, Sl Fx, 60°, Ti, Pl, Sl Fx, 70°, Ti, Pl, Sl Jo, 70°, He, Pl, Sl Fx, 40°, Ti, Pl, Sl	
87 88	22	100	100	Wi	VH	St-VS	Fr-V. Sl	extremely hard		Me	87.8' core extremely hard

FRACTURING: VC-Very Close (<0.01'), Cl-Close (0.1'-0.3'), Mo-Moderate (0.3'-1'), Wi-Wide (1'-3'), and VW-Very Wide (3'-10'). HARDNESS: So-Soft, Lo-Low, Mo-Moderate, Ha-Hard, and VH-Very Hard. STRENGTH: Fr-Friable, We-Weak, Mo-Moderate, St-Strong, and Ex-Extremely Strong. WEATHERING: Fr-Fresh, Sl-Slight, Mo-Moderate, and Se-Severe. DISCONTINUITY: Type (Be-Bedding, Jo-Joint, Fo-Foliation, Sh-Shear, Me-Mechanical Break, and Ve-Vein), Dip Angle, Aperture (Ti-Tight, Op-Open, He-Healed, and Fi-Filled), Surface Shape (Ir-Irregular, Pl-Planar, and Wa-Wavy), Roughness (St-Stepped, Ro-Rough, Mo-Moderately Rough, Sl-Slightly Rough, Sm-Smooth, and Po-Polished).

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Figure A-3 Cont.

PROJECT: Sierra Meadows

Log of Boring No. GB-3 cont.

DEPTH (feet)	RUN NO.	RECOVERY (%)	RQD (%)	FRACTURING	HARDNESS	STRENGTH	WEATHERING	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	DISCONTINUITY DESCRIPTION	REMARKS
90 91 92	22	100	100	Wi	VH	St-VS	Fr-V. Sl	TONALITE (Continued) Minor FeO_2 staining on joint surface		Me Jo, 45°, Ti, Pl, Sl	
93 94 95 96 97	23	100	100	VW	VH	St-VS	Fr-V. Sl			Me/Fx(?), 30°, Ti, Wa, Sl	
98 99 100	24	90	90	VW	VH	St-VS	Fr-V. Sl		LC	Me	
101 102 103 104 105 106 107								Borehole terminated at 100 feet. Piezometer installed: schedule 40 PVC casing set to 24.8 feet and grouted in place. Open borehole from 24.8 to 100 feet bgs.			

FRACTURING: VC-Very Close (<0.01'), Cl-Close (0.1'-0.3'), Mo-Moderate (0.3'-1'), Wi-Wide (1'-3'), and VW-Very Wide (3'-10'). HARDNESS: So-Soft, Lo-Low, Mo-Moderate, Ha-Hard, and VH-Very Hard. STRENGTH: Fr-Friable, We-Weak, Mo-Moderate, St-Strong, and Ex-Extremely Strong. WEATHERING: Fr-Fresh, Sl-Slight, Mo-Moderate, and Se-Severe. DISCONTINUITY: Type (Be-Bedding, Jo-Joint, Fo-Foliation, Sh-Shear, Me-Mechanical Break, and Ve-Vein), Dip Angle, Aperture (Ti-Tight, Op-Open, He-Healed, and Fi-Filled), Surface Shape (Ir-Irregular, Pl-Planar, and Wa-Wavy), Roughness (St-Stepped, Ro-Rough, Mo-Moderately Rough, Sl-Slightly Rough, Sm-Smooth, and Po-Polished).

Project No.
9708.000

Figure A-3 Cont.

TABLE A-1

SUMMARY OF TEST PITS

Sierra Meadows Dam
Oakhurst, County of Madera, California

Test Pit Number	Date Excavated	Bearing	Length (feet)	Elevation (feet MSL)[1]	Maximum Depth (feet bgs)[2]	Base of Unit 1[3] (feet bgs)	Thickness Unit 3[3] (feet)	Thickness Unit 4[3] (feet)	Thickness Unit 5[3] (feet)	Top Granite (feet bgs)	Difficult to Excavate (feet)	Groundwater	Comments
TP-1	05/18/04	N40W	15	2398-2400	10	~ 2.0[4]	~ 0 - 2.0	NA[5]	NA	~ 2.0 - 4.0	10	6.5	See log of trench T-2.
TP-2	05/18/04	N60W	13	2405-2407	10	~1.8	~ 3.0	NA	~ 1.0	~ 6.0	10+	---	See log of trench T-2.
TP-3	05/18/04	N25E	10	2468-2470	8	~ 1.0	NA	NA	NA	~ 0+ - 1.0	8 - 9+	---	Granite outcrops ~ 40 feet to the east.
TP-4	05/18/04	N10W	15	2445	10	~ 0.5 - 1.5	NA	NA	NA	~ 0.5 - 1.5	9.5 - 10	---	Upper surface of granite irregular.
TP-5	05/18/04	N23E	15	2431	10	~ 1.4	~ 3.6	NA	~ 2.5	~ 7.5	10 - 11+	10	Color change at 3.4 feet from yellowish brown: 10YR 5/4 to 10YR 5/6.
TP-6	05/19/04	N10E	15	2447-2449	10.5	~ 1.8	~ 5.2	NA	NA	~ 7.0	10 - 11+	---	Unit 3 predominantly silty sand (SM); color change at 6.5 feet from strong brown (7.5YR 4/6) to yellowish brown (10YR 5/4).
TP-7	05/19/04	N40E	15	2423	9	~ 1.4	~ 2.6	NA	NA	~ 4.0	9	---	Silty sand filled fractures extend 1.5 feet into granite.
TP-8	05/19/04	N25E	12	2465-2467	9.5	~ 2.2	~ 2.8	NA	NA	~ 5.0	9-10+	---	Unit 3 predominantly silty sand (SM); extends as fracture fill to ~ 7 feet.
TP-9	05/19/04	N35E	12	2440-2442	10.5	~ 1.0	~ 6.0	NA	NA	~ 7.0	10.5 - 11+	---	Unit 3 contains clasts of dg at depths of ~2-3 feet; upper surface of granite irregular.
TP-10	05/19/04	N65E	15	2430	13	~ 2.8	~ 5.2	NA	NA	~ 8.0	est. 15+	7	Unit 1 is dark gray (10YR 4/1); Unit 3 is sandy silt to silty sand (ML/SM) that gets lighter in color and sandier with depth.
TP-11	05/19/04	N60E	15	2444	12	~ 2.0	~ 4.8	NA	NA	~ 6.8	11.5 - 12	~ 10	Units 1 and 3 both brown (10YR 4/3).
TP-12	05/19/04	N05E	15	2440	13	~ 1.5	~ 4.3	~ 1.8	NA	~ 7.6	13	---	Same stratigraphy as east end of Trench T-1.
TP-13	05/19/04	N25E	20	2461	12	~ 2	~ 1.2 - 2.0	NA	NA	~ 4.0	12	---	Surface of granite irregular, 1-2 feet relief.
TP-14	05/19/04	N70E	12	2470	12	~ 1.5	~ 2.5	NA	NA	~ 4.0	7	---	Similar to TP-13.
TP-15	05/20/04	N70W	14	2438-2441	10	~ 1 - 1.5	NA	NA	NA	~ 1.0 - 1.5	9.5 - 10+	---	Located on side of predominant ridge.
TP-16	05/20/04	E-W	12	2429-2431	9.5	~ 0.0 - 2.2	NA	NA	NA	~ 0.0 - 2.2	9.5	---	See log of Trench T-2.
TP-17	07/26/04	N25W	18	2453	13	~ 1.2	~ 1.8	NA	NA	~ 3.0	13	---	Pit located on crest of ridge that will form left abutment of proposed saddle dam.
TP-18	07/26/04	N-S	18	2441	12.5	~ 1.5	~ 1.8	NA	NA	~ 3.3	12.5	---	Very similar geology to TP-17.
TP-19	07/26/04	N15W	20	2435	14.5	~ 2.6 - 3.6	~ 4.0	NA	NA	~ 7.5	est. 16+	---	Located in saddle between two ridges.
TP-20	07/26/04	N50E	15	2457	6	~ 0.9	NA	NA	NA	~ 0.9	7+	---	Located in area of extensive granite outcrop.
TP-21	07/26/04	N65W	15	2457	6	~ 0.0 - 1.0	~ 1.0 - 1.8	NA	NA	~ 1.8	7.5+	---	Located in area of extensive granite outcrop.
TP-22	07/26/04	N55E	12	2449	7	absent	NA	NA	NA	surface	7	---	Right abutment area of proposed saddle dam.
TP-23	07/26/04	N60W	15	2459-2461	7	~ 1.0	NA	NA	NA	~ 1	3 - 7+	---	Located in area of extensive granite outcrop.
TP-24	07/26/04	N85E	20	2454-2456	14	~ 1.5	~ 7.0	NA	NA	~ 8.5	est. 16+	---	Located at NE and SR-6.

1. Elevation reported in feet above mean sea level (MSL).
2. Maximum depth reported in feet below ground surface (bgs).
3. See Table A-2 for description of stratigraphic units.
4. "~" = approximately.
5. NA = not available.

TABLE A-2

STRATIGRAPHIC UNITS EXPOSED IN TRENCHES AND TEST PITS

Sierra Meadows Dam
Oakhurst, County of Madera, California

UNIT 1 - SANDY SILT (ML): brown (10YR 5/3) to pale brown (10YR 6/3) to dark gray (10YR 4/1); dry; 80%+ fines, 10-15% fine sand, trace clay; slightly plastic, soft; root hair holes common; averages 1.6 ft thick, no obvious structure, lower contact gradational; (TOPSOIL, A horizon)

UNIT 2 - SILTY SAND (SM): dark brown (10YR 3/3); damp; 15-20% fines, 80-85% fine sand, micaceous; non plastic, loose, friable; no obvious structure; granitic source (COLLUVIUM/ALLUVIUM); [W end Trench T-1 only]

UNIT 3 - SANDY SILT to SILTY SAND (ML/SM): strong brown (7.5YR 4/6) to reddish yellow (7.5YR 6/6) at depth; damp; 30-70% fines, 1-3% clay, rest fine to medium sand; micaceous; grades sandy with depth; slightly plastic; medium dense to medium stiff; root hair holes common; no obvious structure; granitic source; (COLLUVIUM, Bt horizon)

UNIT 4 - SILTY SAND (SM): strong brown (7.5YR 5/6); damp; ~20% fines, ~80% fine to medium sand, trace clay; micaceous; non plastic; loose to medium dense; no obvious bedrock structure; granitic source; (COLLUVIUM, Cox horizon)

UNIT 5 - SANDY SILT to SILTY SAND (ML/SM): brown (7.5YR 4/3) with dark reddish brown (5YR 3/3) mottles at depth; damp; averages 60-80% fines, the remainder fine sand with a trace of medium sand and fine gravel, golden [bleached] biotite flakes common; slightly plastic, medium to stiff consistency; contains 6-in-thick lenses of POORLY GRADED FINE SAND (SP); locally stratified; granitic source; (ALLUVIUM)

UNIT 6 - SANDY SILT (ML): pale yellow (2.5YR 7/4) with local strong brown (10YR 5/8) mottles; damp; averages 40-60% fines, rest fine to medium sand, 3-5% clay bridging grains and filling common root hair holes; moderately plastic, stiff; locally cemented with caliche; no obvious structure; granitic source; (COLLUVIUM – buried relict Bt horizon) [near W end of Trench T-2 only]

UNIT 7 - GRANITE: very pale brown (10YR 7/4) to yellow (10YR 7/6) where weathered to typical "salt and pepper" appearance where slightly weathered to fresh; damp to wet with perched water locally; on average upper 8-10 ft moderately severely to very severely weathered; friable, weathered zone (decomposed granite – dg) breaks down to SILTY SAND (SM); 15 ft below its surface rock typically is fresh to slightly weathered and probably non rippable; (BASS LAKE TONALITE)

APPENDIX B

APPENDIX B

PHYSICAL TESTING

PROJECT: GEOMATRIX 9708.000.0-SIERRA MEADOWS
LOCATION: SIERRA MEADOWS, CA
SAMPLED: 05/27/2004
TESTED: 06/30/2004

BSK JOB G04 084 10F
JULY 2004
FIGURE B-14

PINHOLE DISPERSION TEST

ASTM D-4647: Identification Classification of Dispersive Clay Soil by the Pinhole Test

SAMPLE IDENTIFICATION: TH 10 at 0-9 ft.
DRY DENSITY: 114.0 pcf
MOISTURE CONTENT: 14.0 %

95% REMOLDED COMPACTION
of ASTM D 698

MAXIMUM DRY DENSITY 119.5 pcf
OPTIMUM MOISTURE CONTENT 12.0 %

SOIL DESCRIPTION Silty Sand with trace of clay; fine to medium grained.

DATA					OBSERVATION						
Clock Time	Head (in.)	Volume (ml)	Time Elapsed (sec)	Flow Rate (ml/sec)	Very Dark	Dark	Moderately Dark	Slightly Dark	Barely Visible	Completely Clear	Completely Clear from Top
7:20	2"	5	10	0.5					X		
		5	12	0.4					X		
		5	10	0.5					X		
		25	85	0.3					X		
7:35		25	83	0.3				X			
7:50	7"	25	15	1.7				X			
		10	10	1.0			X				
		10	7	1.4			X				
8:10		10	7	1.4			X				
			CLASSIFICATION:	Moderately Dispersive (ND3)							

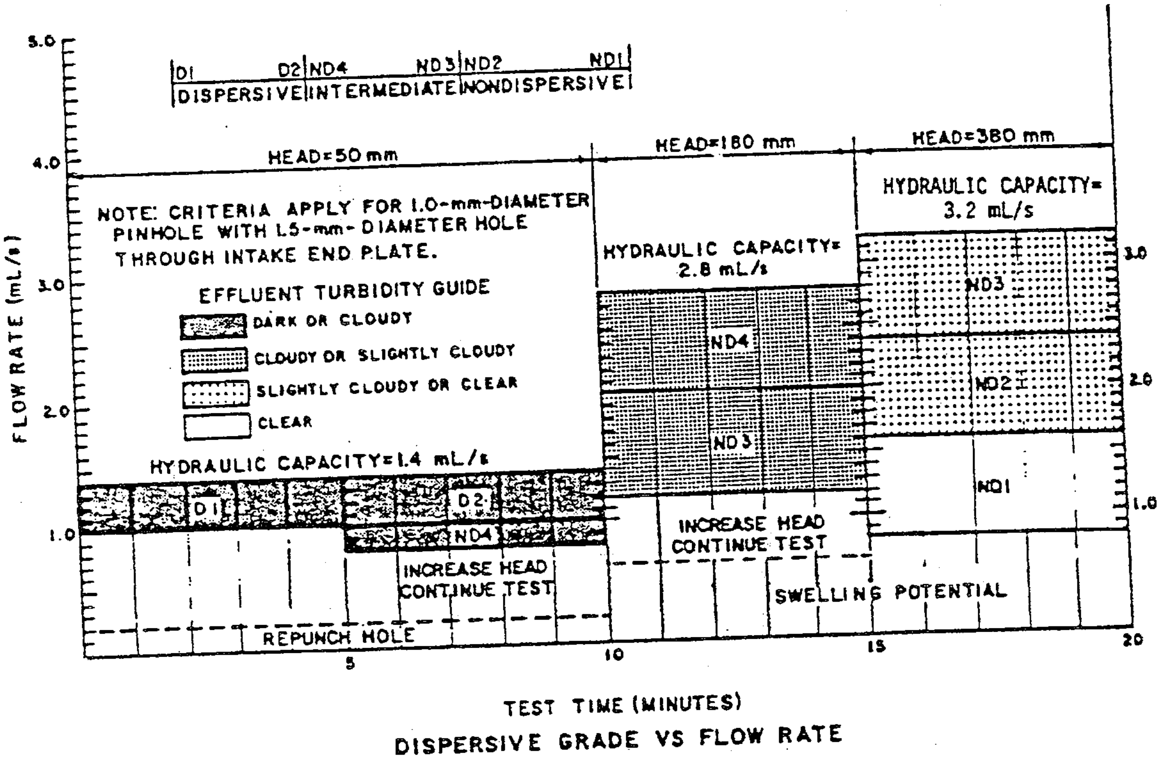


FIG. 8 Criteria for Method C

APPENDIX B

PHYSICAL TESTING

Physical tests were performed on selected bulk soil samples from the test pits and rock core samples to assess the engineering properties and physical characteristics of soils and rock. The following tests were performed:

- Laboratory Moisture-Density Relationship
- Remolded Direct Shear
- Remolded Permeability
- Pinhole Dispersion
- Unconfined Compressive Strength of Rock Cores

Test procedures are described herein. Physical tests performed on soil samples and moisture-density test results are summarized on the boring logs in this appendix. Laboratory test results from soil samples are summarized on laboratory data sheets from BSK Associates are included in this appendix.

LABORATORY MOISTURE-DENSITY RELATIONSHIP

The relationship between the moisture content and density of selected bulk samples of soil were determined in accordance with American Society for Testing and Materials (ASTM) Method D 698 by compacting four samples of the soil at different moisture contents. The samples were compacted in a mold of a standard size with a 10-pound hammer dropped from a height of 12 inches. The dry densities and moisture contents of the four samples were then graphically plotted to determine the maximum dry density and optimum moisture content of the soil when compacted. The graphs of the moisture-density relationships are included in this appendix.

DIRECT SHEAR TESTS

Direct shear tests were performed on bulk soil samples remolded to 95 percent of their maximum dry density. The direct shear tests were performed in accordance with ASTM Method D 3080. A different normal stress was applied vertically to each soil sample, which was then sheared in a horizontal direction. The resulting shear strength for the corresponding normal stress was measured at a displacement of approximately 10 percent. The direct shear results are shown graphically on laboratory data sheets included in this appendix.

PERMEABILITY

Permeability tests were performed on bulk soil samples remolded to 95 percent of their maximum dry density. The permeability tests were performed in accordance with ASTM Method D 5084 using a flexible wall permeameter with 5 pounds per square inch confining pressure. The results of the permeability tests are as follows:

TABLE B-1

REMOLDED PERMEABILITY TEST RESULTS

Test Pit Designation	Depth (feet bgs)[1]	Permeability (cm/s) [2]
TP-3, TP-4, and TP-6	1 – 6	3.17×10^{-6}
TP-8 and TP-9	1 – 10	4.83×10^{-8}
TP-10	0 – 9	5.90×10^{-6}
TP-12 and TP-13	1 – 13	3.17×10^{-7}

1. Depth in feet below ground surface (bgs).
2. Permeability in centimeters per second (cm/s).

PINHOLE DISPERSION

Pinhole dispersion tests were performed on bulk soil samples remolded to 95 percent of their maximum dry density. The pinhole dispersion tests were performed in accordance with ASTM Method D 4647. The results of the pinhole dispersion tests are as follows:

TABLE B-2

PINHOLE DISPERSION TEST RESULTS

Test Pit Designation	Depth (feet bgs)[1]	Dispersion Classification
TP-3, TP-4, and TP-6	1 – 6	ND3 (Moderately Dispersive)
TP-10	0 – 9	ND3 (Moderately Dispersive)

1. Depth in feet below ground surface (bgs).

UNCONFINED COMPRESSIVE STRENGTH OF ROCK CORES

Unconfined compression tests were performed on selected rock core samples obtained from the borings. The unconfined compression tests were performed in accordance with ASTM Method D 5084. The results of the unconfined compression tests are as follows:

TABLE B-3

UNCONFINED COMPRESSION TEST RESULTS

Boring Designation	**Depth (feet)**	**Compressive Strength (psi)[1]**	**Shear Strength (tsf)[2]**
GB-1	31 – 31.7	1,554	55.9
GB-2	21.8 – 22.3	315	11.3
GB-2	38.8 – 39.9	3,599	129
GB-3	21.6 – 22.4	9,199	331
GB-3	34.7 – 35.3	3,136	113

1. Compressive strength in pounds per square inch (psi).
2. Shear strength in tons per square foot (tsf).

BSK

1415 Tuolumne St.
Fresno, CA 93706
(559) 497-2868
FAX (559) 485-6140

RECEIVED
JUL 20 2004

July 16, 2004

BSK Job G04.084.10F

Attn: Howard Barlow
Geomatrix
2444 Main Street
Suite 215
Fresno, CA 93721-2535

SUBJECT: Lab Testing for Sierra Meadows

Dear Howard:

Enclosed are the results of the laboratory tests requested on the four (4) bulk soil samples from the Sierra Meadows project. A modified proctor, remolded direct shear and remolded constant volume permeability were run on each of the four bulk samples. In addition, two pin-hole clay dispersion tests were completed on bulk samples as requested.

We appreciate the opportunity to be of service to Geomatrix. If you have questions or comments, please contact us at (559) 497-2880.

Respectfully submitted,
BSK ASSOCIATES

Michael J. Feist

Michael J. Feist, C.E.
Senior Project Engineer

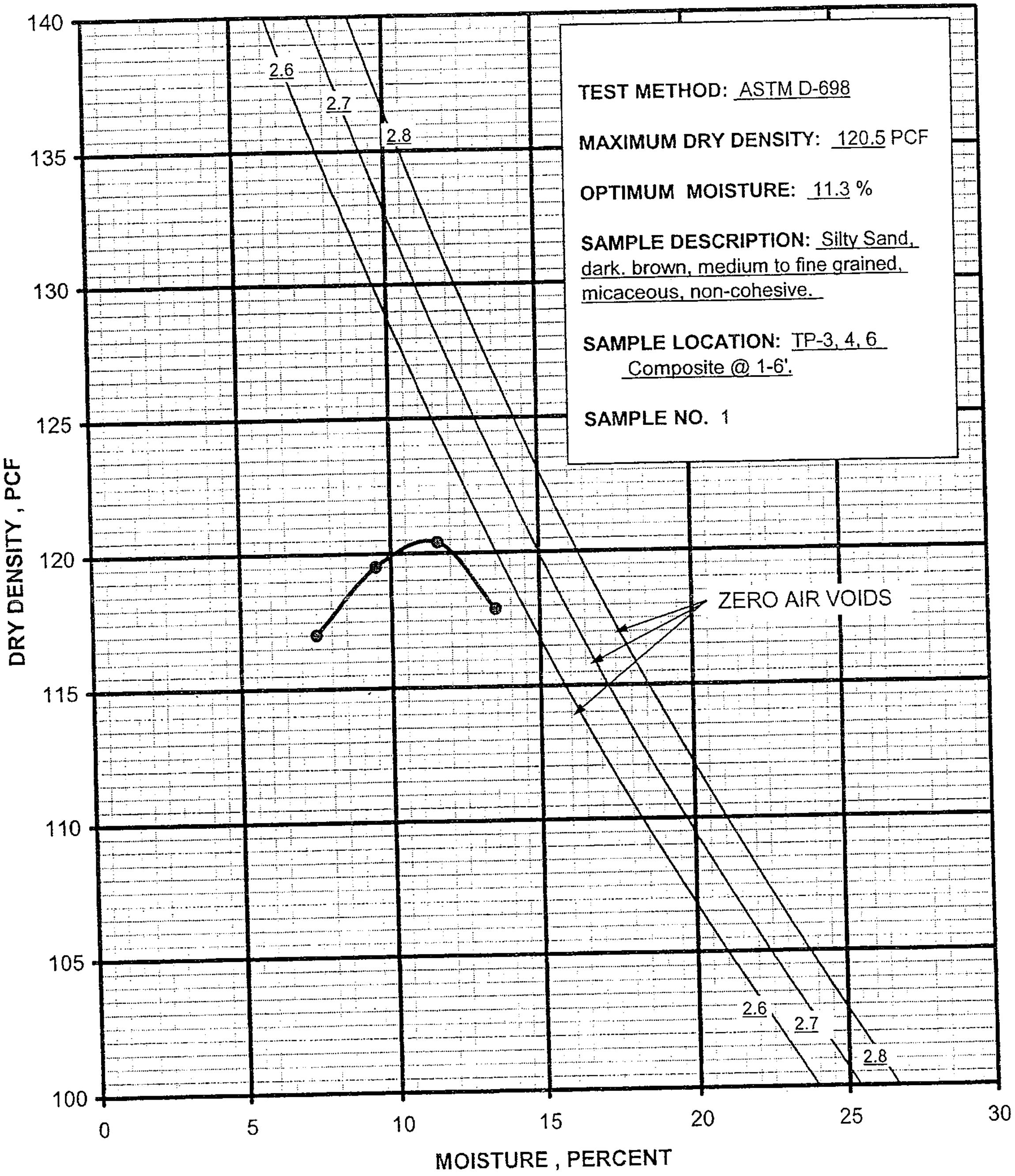
MJF:cl

c: Client (2)

BSK
ASSOCIATES

Report Date: 06/07/04
Sample Date: 05/27/04
Test Date: 05/31/04

BSK Project Name: Sierra Meadows Lab Trsting.
BSK Project No.: G04-084-10F



TEST METHOD: ASTM D-698

MAXIMUM DRY DENSITY: 120.5 PCF

OPTIMUM MOISTURE: 11.3 %

SAMPLE DESCRIPTION: Silty Sand, dark. brown, medium to fine grained, micaceous, non-cohesive.

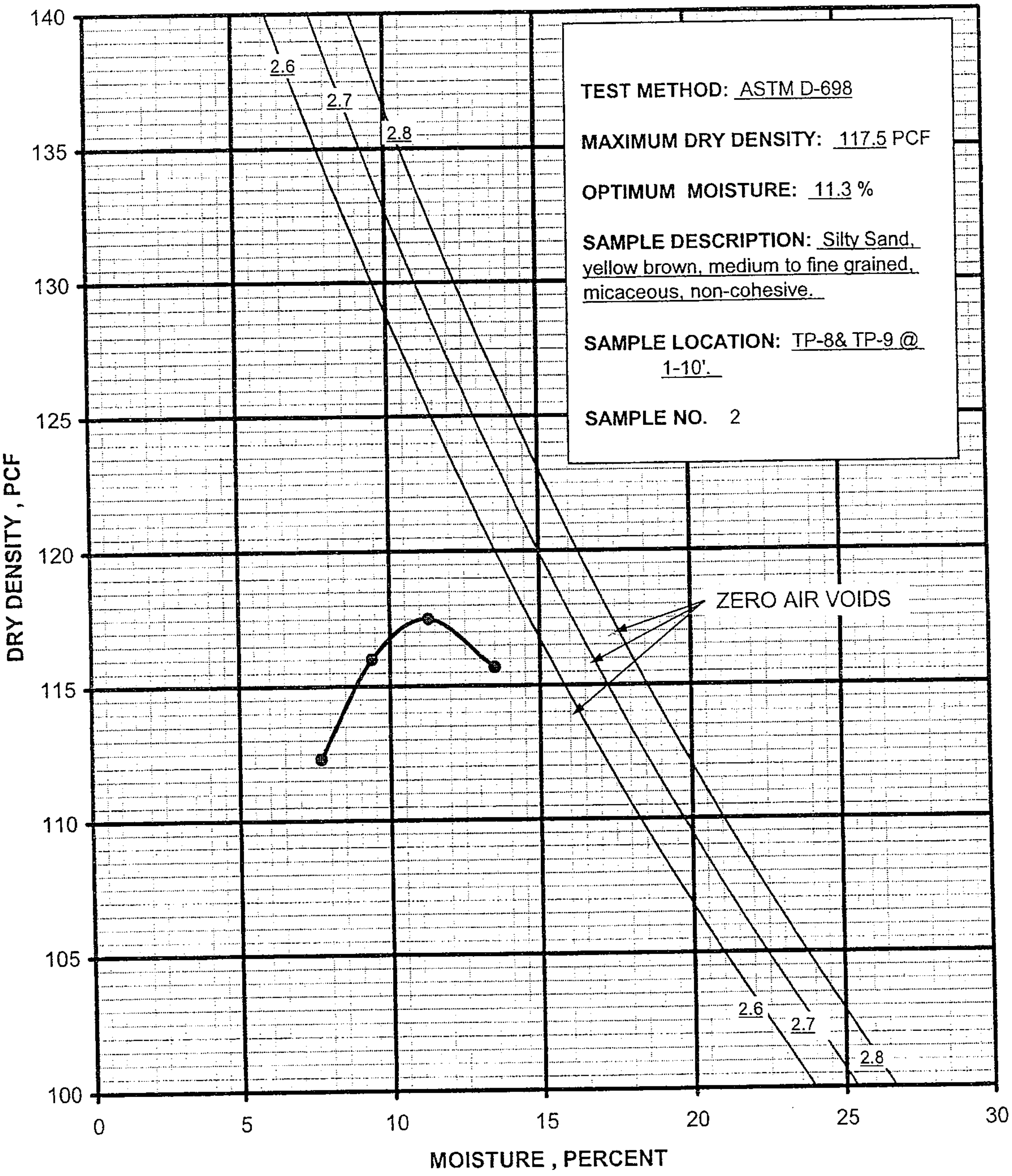
SAMPLE LOCATION: TP-3, 4, 6
Composite @ 1-6'.

SAMPLE NO. 1

BSK
ASSOCIATES

Report Date: 06/07/04
Sample Date: 05/27/04
Test Date: 05/31/04

BSK Project Name: Sierra Meadows Lab Tresting.
BSK Project No.: G04-084-10F



TEST METHOD: ASTM D-698

MAXIMUM DRY DENSITY: 117.5 PCF

OPTIMUM MOISTURE: 11.3 %

SAMPLE DESCRIPTION: Silty Sand, yellow brown, medium to fine grained, micaceous, non-cohesive.

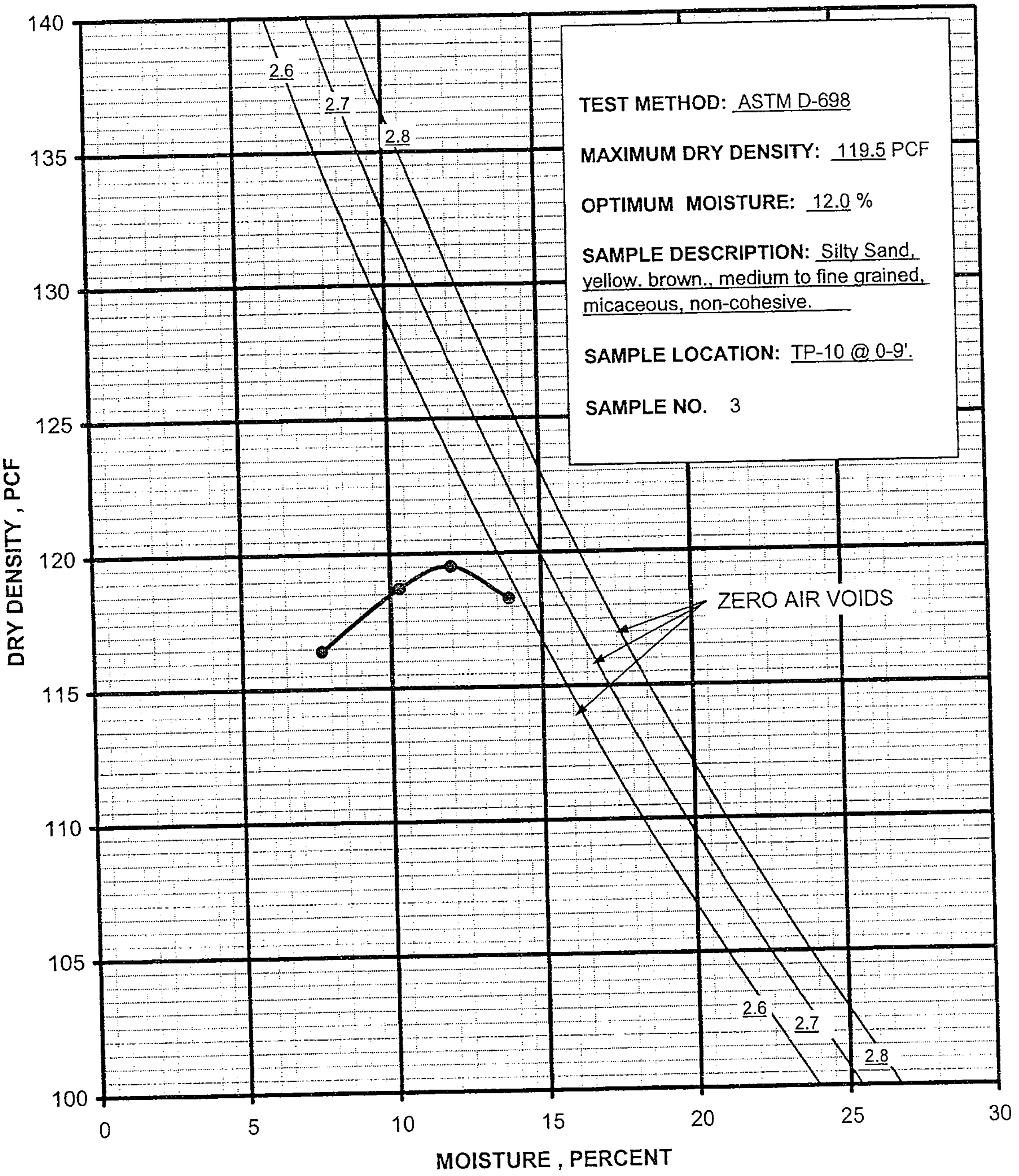
SAMPLE LOCATION: TP-8& TP-9 @ 1-10'.

SAMPLE NO. 2

BSK
ASSOCIATES

Report Date: 06/07/04
Sample Date: 05/27/04
Test Date: 05/31/04

BSK Project Name: Sierra Meadows Lab Tresting.
BSK Project No.: G04-084-10F



TEST METHOD: ASTM D-698

MAXIMUM DRY DENSITY: 119.5 PCF

OPTIMUM MOISTURE: 12.0 %

SAMPLE DESCRIPTION: Silty Sand, yellow. brown., medium to fine grained, micaceous, non-cohesive.

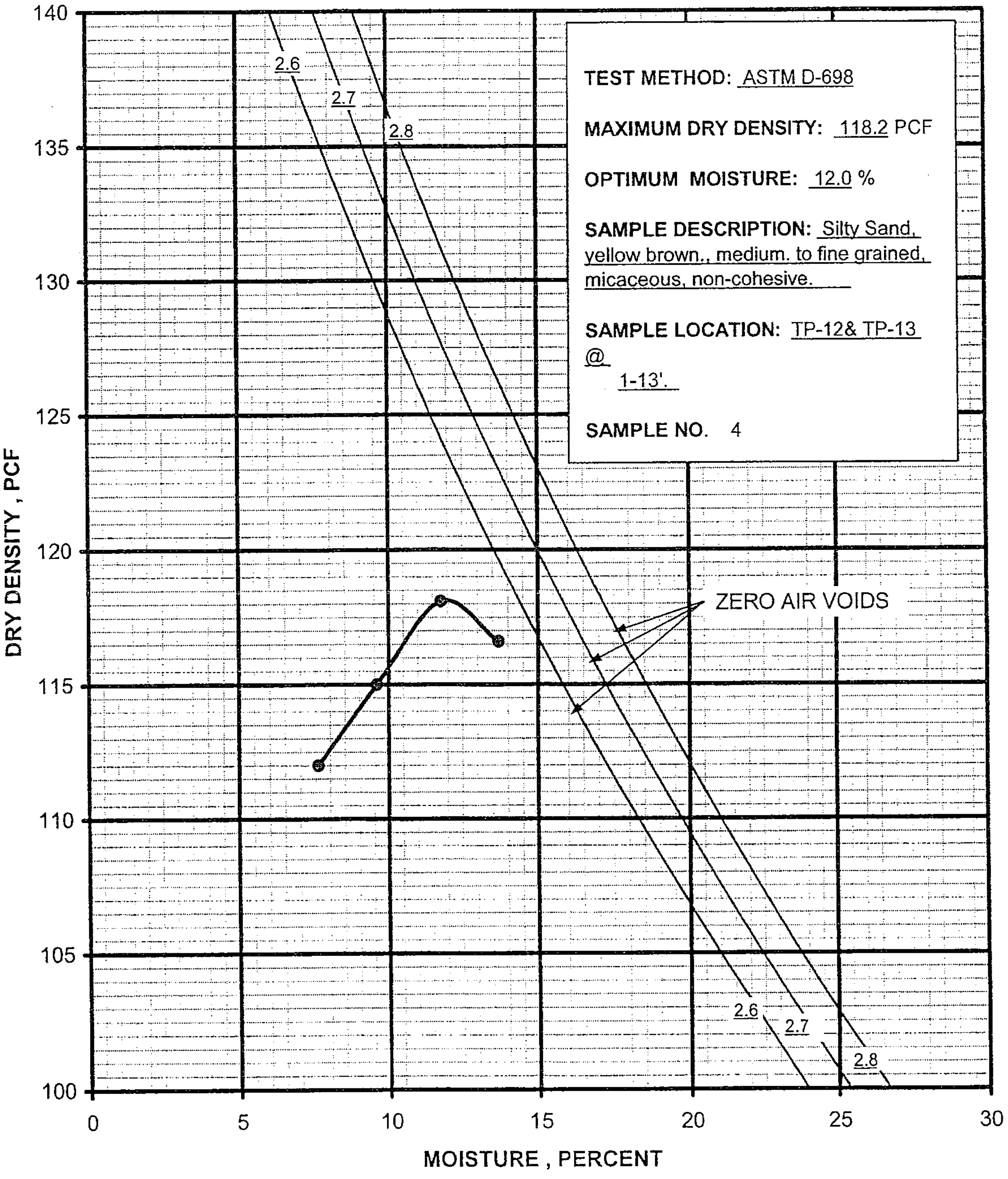
SAMPLE LOCATION: TP-10 @ 0-9'.

SAMPLE NO. 3

BSK
ASSOCIATES

Report Date: 06/07/04
Sample Date: 05/27/04
Test Date: 05/31/04

BSK Project Name: Sierra Meadows Lab Tresting.
BSK Project No.: G04-084-10F



TEST METHOD: ASTM D-698

MAXIMUM DRY DENSITY: 118.2 PCF

OPTIMUM MOISTURE: 12.0 %

SAMPLE DESCRIPTION: Silty Sand, yellow brown., medium. to fine grained, micaceous, non-cohesive.

SAMPLE LOCATION: TP-12& TP-13 @ 1-13'.

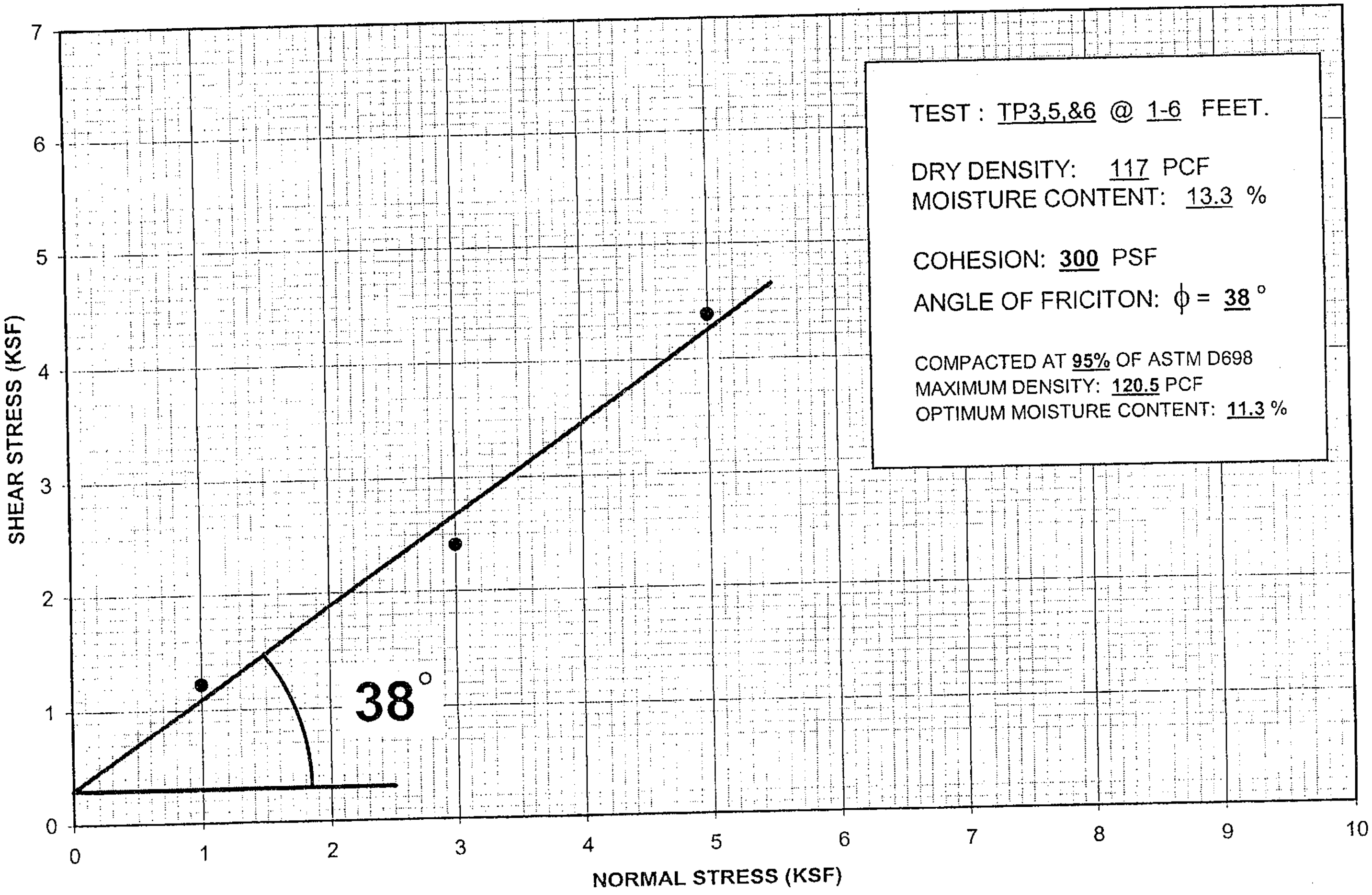
SAMPLE NO. 4

PROJECT: GEOMATRIX 9708.000.0-SIERRA MEADOWS
LOCATION: SIERRA MEADOWS, CA
SAMPLED: 05/27/2004
TESTED: 06/30/2004

BSK JOB G04 084 10F
JUNE 2004
FIGURE B-1

SHEAR STRENGTH DIAGRAM

(DIRECT SHEAR)



TEST : TP3,5,&6 @ 1-6 FEET.

DRY DENSITY: 117 PCF
MOISTURE CONTENT: 13.3 %

COHESION: **300** PSF

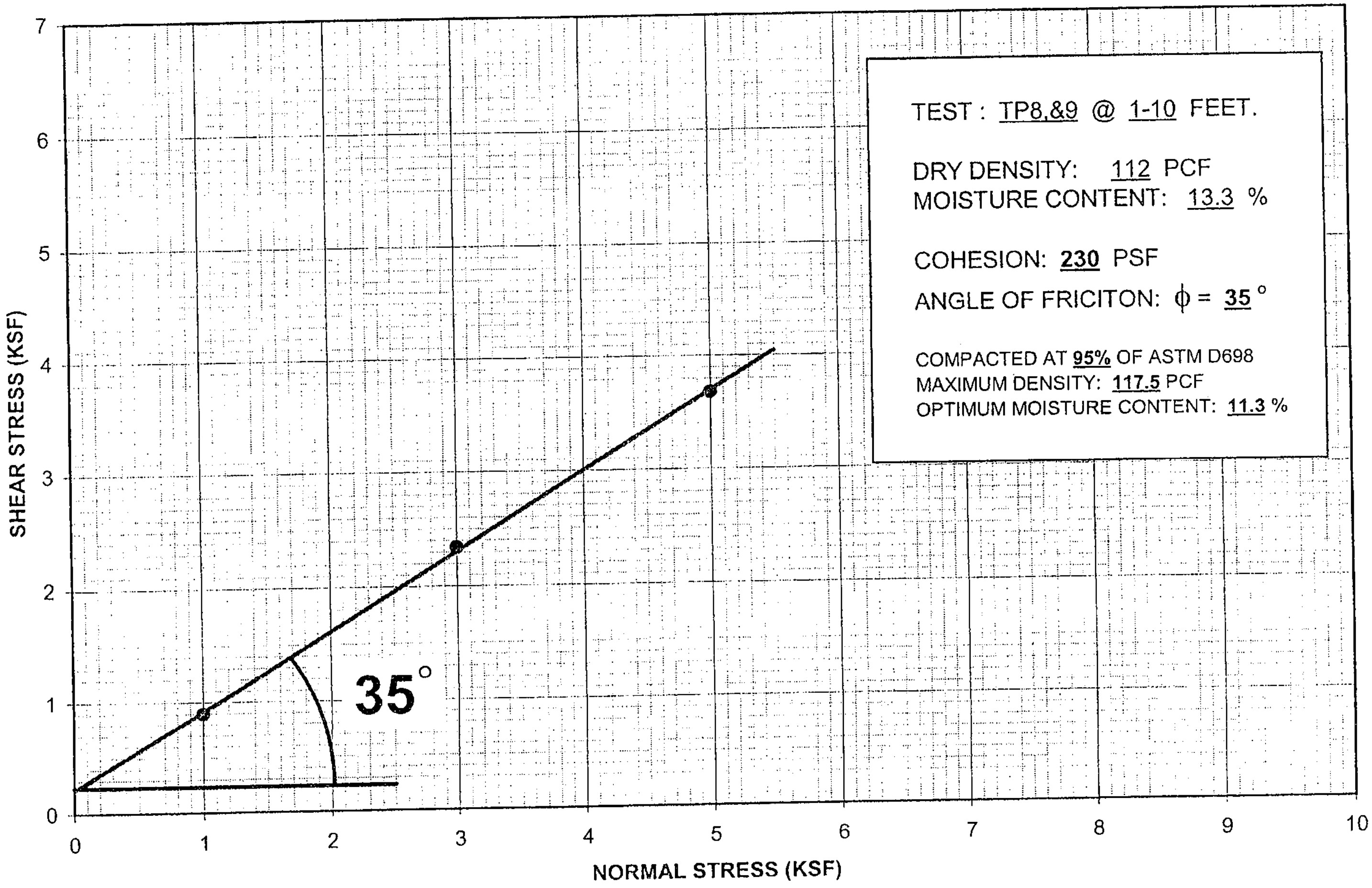
ANGLE OF FRICITON: ϕ = **38** °

COMPACTED AT **95%** OF ASTM D698
MAXIMUM DENSITY: **120.5** PCF
OPTIMUM MOISTURE CONTENT: **11.3** %

PROJECT: GEOMATRIX 9708.000.0-SIERRA MEADOWS
LOCATION: SIERRA MEADOWS, CA
SAMPLED: 05/27/2004
TESTED: 06/30/2004

BSK JOB G04 084 10F
JUNE 2004
FIGURE B-2

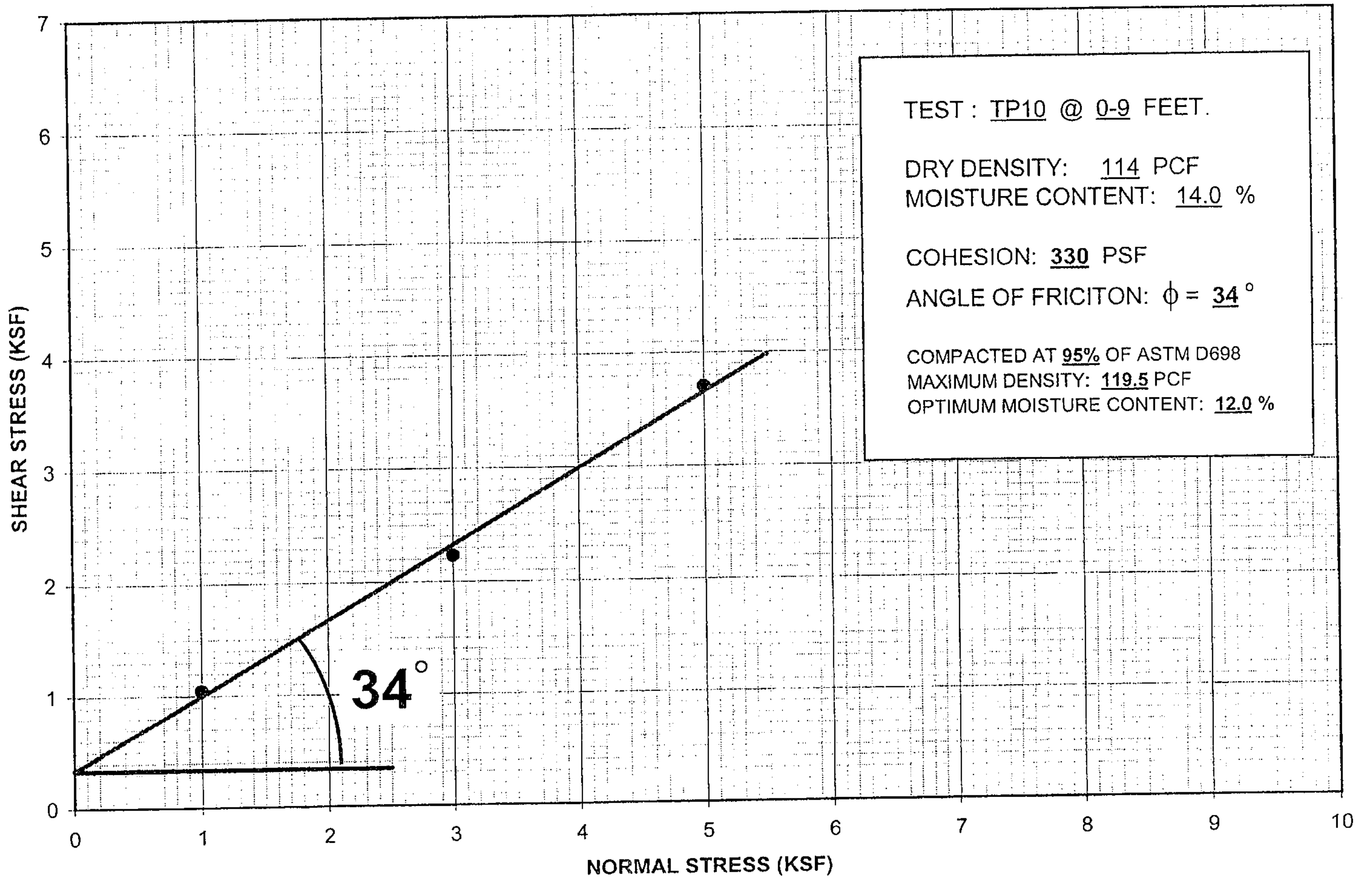
SHEAR STRENGTH DIAGRAM
(DIRECT SHEAR)



PROJECT: GEOMATRIX 9708.000.0-SIERRA MEADOWS
LOCATION: SIERRA MEADOWS, CA
SAMPLED: 05/27/2004
TESTED: 06/30/2004

BSK JOB G04 084 10F
JUNE 2004
FIGURE B-3

SHEAR STRENGTH DIAGRAM
(DIRECT SHEAR)



TEST : TP10 @ 0-9 FEET.

DRY DENSITY: 114 PCF
MOISTURE CONTENT: 14.0 %

COHESION: **330** PSF

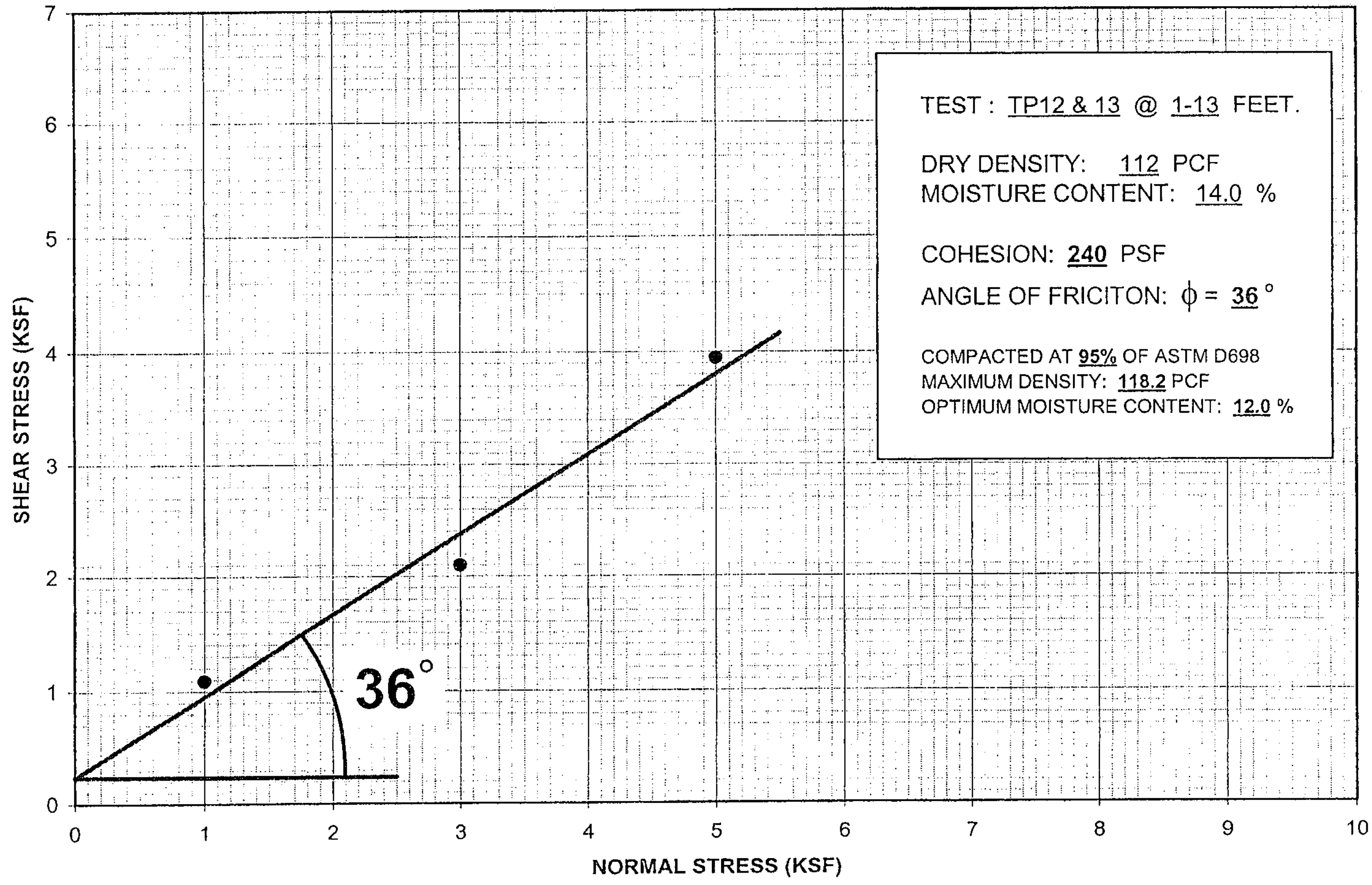
ANGLE OF FRICITON: ϕ = **34** °

COMPACTED AT **95%** OF ASTM D698
MAXIMUM DENSITY: **119.5** PCF
OPTIMUM MOISTURE CONTENT: **12.0** %

PROJECT: GEOMATRIX 9708.000.0-SIERRA MEADOWS
LOCATION: SIERRA MEADOWS, CA
SAMPLED: 05/27/2004
TESTED: 06/30/2004

BSK JOB G04 084 10F
JUNE 2004
FIGURE B-4

SHEAR STRENGTH DIAGRAM
(DIRECT SHEAR)



CONSTANT VOLUME FLEXIBLE-WALL PERMEABILITY TEST (ASTM D-5084)

CLIENT :	
PROJECT NAME	Sierra Meadows Lab Testing
BSK JOB NO.	G04-084-10F
Report Date	6/22/2004
Setup Date	6/7/2004
Sample I.D.	TP-3,4,6 @ 1-6'

SAMPLE DESCRIPTION: Silty sand, drk. brn., med. to fine grained, non-cohesive.

STAGE	INITIAL	FINAL
WET WEIGHT (GM)	145	145
DRY WEIGHT (GM)	125	125
MOISTURE CONTENT (%)	16.0	16.0
AVE. LENGTH (IN)	1.485	1.482
AVE DIAMETER (IN)	1.880	1.870
Vt (CU. FT)	2.39E-03	2.36E-03
Vw (CU. FT)	7.06E-04	7.06E-04
Vs (CU. FT)	1.63E-03	1.63E-03
Va (CU. FT)	4.62E-05	1.61E-05
Vv (CU.FT)	7.52E-04	7.22E-04
s Degree of saturation %	93.9	97.8
DRY DENSITY (PCF)	115.4	116.9
e (VOID RAITO)	0.46	0.44
n (POROSITY)	31.5	30.6
"B" PARAMETER	0.95	
BACK PRESSURE (PSI)	26	
EFFECTIVE PRESSURE (PSI)	5	
PERMEABILITY (cm/sec)	**3.17E-06**	

NOTES : 1) A 0.005N SOLUTION OF CaSO4 WAS USED AS PERMEANT.
2) POROSITY WAS BASED ON AN ASSUMED SPECIFIC GRAVITY OF 2.70

CONSTANT VOLUME FLEXIBLE-WALL PERMEABILITY TEST (ASTM D-5084)

CLIENT :

PROJECT NAME Sierra Meadows Lab Testing

BSK JOB NO. G04-084-10F

Report Date 7/12/2004

Setup Date 6/29/2004

Sample I.D. TP-8 & TP-9 @ 1-10'.

Remolded to 95% of max. density & at 2% Moisture above optimum moisture.

SAMPLE DESCRIPTION: Silty sand, yell. brn., med. to fine grained, non-cohesive.

STAGE	INITIAL	FINAL
WET WEIGHT (GM)	146.5	153.7
DRY WEIGHT (GM)	129.8	129.8
MOISTURE CONTENT (%)	12.9	18.4
AVE. LENGTH (IN)	1.540	1.570
AVE DIAMETER (IN)	1.920	1.900
Vt (CU. FT)	2.58E-03	2.58E-03
Vw (CU. FT)	5.89E-04	8.43E-04
Vs (CU. FT)	1.70E-03	1.70E-03
Va (CU. FT)	2.95E-04	3.63E-05
Vv (CU.FT)	8.84E-04	8.80E-04
s Degree of saturation %	66.7	95.9
DRY DENSITY (PCF)	110.8	111.0
e (VOID RAITO)	0.52	0.52
n (POROSITY)	34.3	34.1
"B" PARAMETER	0.95	
BACK PRESSURE (PSI)	26	
EFFECTIVE PRESSURE (PSI)	5	
PERMEABILITY (cm/sec)	**4.83E-08**	

NOTES : 1) A 0.005N SOLUTION OF CaSO4 WAS USED AS PERMEANT.
2) POROSITY WAS BASED ON AN ASSUMED SPECIFIC GRAVITY OF 2.70

BSK
ASSOCIATES

CONSTANT VOLUME FLEXIBLE-WALL PERMEABILITY TEST (ASTM D-5084)

CLIENT :	
PROJECT NAME	Sierra Meadows Lab Testing
BSK JOB NO.	G04-084-10F
Report Date	7/12/2004
Setup Date	6/29/2004
Sample I.D.	TP-10 & @ 0-9'.

Remolded to 95% of max. density & at 2% Moisture above optimum moisture.

SAMPLE DESCRIPTION: Silty sand, yell. brn., fine grained, non-cohesive.

STAGE	INITIAL	FINAL
WET WEIGHT (GM)	188.06	195.5
DRY WEIGHT (GM)	162.93	162.93
MOISTURE CONTENT (%)	15.4	20.0
AVE. LENGTH (IN)	1.900	1.875
AVE DIAMETER (IN)	1.925	1.920
Vt (CU. FT)	3.20E-03	3.14E-03
Vw (CU. FT)	8.87E-04	1.15E-03
Vs (CU. FT)	2.13E-03	2.13E-03
Va (CU. FT)	1.84E-04	-1.37E-04
Vv (CU.FT)	1.07E-03	1.01E-03
s Degree of saturation %	82.8	113.5
DRY DENSITY (PCF)	112.1	114.2
e (VOID RAITO)	0.50	0.48
n (POROSITY)	33.5	32.2
"B" PARAMETER	0.95	
BACK PRESSURE (PSI)	26	
EFFECTIVE PRESSURE (PSI)	5	
PERMEABILITY (cm/sec)	**5.90E-06**	

NOTES : 1) A 0.005N SOLUTION OF $CaSO_4$ WAS USED AS PERMEANT.
2) POROSITY WAS BASED ON AN ASSUMED SPECIFIC GRAVITY OF 2.70

BSK
ASSOCIATES

CONSTANT VOLUME FLEXIBLE-WALL PERMEABILITY TEST (ASTM D-5084)

CLIENT :
PROJECT NAME Sierra Meadows Lab Testing
BSK JOB NO. G04-084-10F
Report Date 7/12/2004
Setup Date 6/29/2004
Sample I.D. TP-12 & TP-13 @ 1-13'.
Remolded to 95% of max. density & at 2% Moisture above optimum moisture.
SAMPLE DESCRIPTION: Silty sand, yell. brn., fine grained, non-cohesive.

STAGE	INITIAL	FINAL
WET WEIGHT (GM)	158.37	162
DRY WEIGHT (GM)	139.17	139.17
MOISTURE CONTENT (%)	13.8	16.4
AVE. LENGTH (IN)	1.625	1.585
AVE DIAMETER (IN)	1.925	1.921
Vt (CU. FT)	2.74E-03	2.66E-03
Vw (CU. FT)	6.78E-04	8.06E-04
Vs (CU. FT)	1.82E-03	1.82E-03
Va (CU. FT)	2.41E-04	3.40E-05
Vv (CU.FT)	9.18E-04	8.40E-04
s Degree of saturation %	73.8	95.9
DRY DENSITY (PCF)	112.0	115.3
e (VOID RAITO)	0.50	0.46
n (POROSITY)	33.5	31.6
"B" PARAMETER	0.95	
BACK PRESSURE (PSI)	26	
EFFECTIVE PRESSURE (PSI)	5	
PERMEABILITY (cm/sec)	**3.17E-07**	

NOTES : 1) A 0.005N SOLUTION OF $CaSO_4$ WAS USED AS PERMEANT.
2) POROSITY WAS BASED ON AN ASSUMED SPECIFIC GRAVITY OF 2.70

PROJECT: GEOMATRIX 9708.000.0-SIERRA MEADOWS
LOCATION: SIERRA MEADOWS, CA
SAMPLED: 05/27/2004
TESTED: 06/30/2004

BSK JOB G04 084 10F
JULY 2004
FIGURE B-13

PINHOLE DISPERSION TEST

ASTM D-4647: Identification Classification of Dispersive Clay Soil by the Pinhole Test

SAMPLE IDENTIFICATION:	TH 3,4,6 at 1-6 ft.	
DRY DENSITY:	114.5 pcf	95% REMOLDED COMPACTION
MOISTURE CONTENT:	13.3 %	of ASTM D 698
MAXIMUM DRY DENSITY	120.5 pcf	
OPTIMUM MOISTURE CONTENT	11.3 %	
SOIL DESCRIPTION	Silty Sand with some clay; fine to medium grained.	

DATA					OBSERVATION						
Clock Time	Head (in.)	Volume (ml)	Time Elapsed (sec)	Flow Rate (ml/sec)	Very Dark	Dark	Moderately Dark	Slightly Dark	Barely Visible	Completely Clear	Completely Clear from Top
6:30	2"	10	84	0.1				X			
		10	141	0.1				X			
		5	75	0.1				X			
		25	85	0.3				X			
6:40		25	75	0.3				X			
6:50	7"	25	15	1.7				X			
		25	15	1.7			X				
		36	20	1.8			X				
7:00		34	20	1.7			X				
CLASSIFICATION:	Moderately Dispersive (ND3)										

APPENDIX C

APPENDIX C

SEISMIC REFRACTION REPORT

SEISMIC REFRACTION SURVEY
Sierra Meadows Dam Project
Madera County, California

for

GEOMATRIX CONSULTANTS, INC.
330 West Bay Street
Costa Mesa, California 92627

by

PORTOLA GEOPHYSICS
6417 Dogtown Road
San Andreas, California 95249

August 2004

PORTOLA GEOPHYSICS
6417 Dogtown Road, San Andreas, CA 95249 Phone: (209) 736-4252, FAX (209) 736-1212

August 23, 2004
0404A

Mr. Jay Weaver
GEOMATRIX CONSULTANTS, INC.
330 West Bay Street
Costa Mesa, California 92627

SUBJECT: Seismic Refraction Survey
RE: Sierra Meadows Dam Project
Madera County, California

Dear Mr. Weaver:

The following report describes the findings and conclusions of our surface seismic refraction survey geophysical investigation of the proposed Sierra Meadows dam site in Madera County, California. This geophysical investigation was conducted in two phases in May through June and in July through August 2004 with the scope and cost for each phase in accordance with our proposal to you dated May 3, 2004. This report and accompanying graphics supercede the report and graphics submitted to you with our letter dated June 1, 2004.

We appreciate the opportunity to have been of service to you on this project. If you have any questions regarding this report, any aspect of our investigation, or if you need additional services, please contact our office.

Very truly yours,

PORTOLA GEOPHYSICS

Patrick O. Shires
Principal Geophysicist
RGP 879

POS:st

1.0 INTRODUCTION

This report describes the methods and equipment used, interpreted results, limitations and conclusions of a seismic refraction geophysical survey of the proposed Sierra Meadows dam site located near Oakhurst in Madera County, California. This investigation was conducted for GEOMATRIX CONSULTANTS, INC. in two phases in May through June and in July through August 2004 with the scope and cost for each phase in accordance with our proposal to you dated May 3, 2004.

1.1 Project Description

The proposed project consists of the installation of a dam and associated reservoir in Madera County, California. The project will consist of excavation of up to over 60 feet depth in the reservoir area and foundation preparation and fill in the dam area to create a reservoir of approximately 227.4 acre-feet in size.

1.2 Purpose and Scope of Investigation

The purpose of our investigation was to: 1) investigate subsurface velocity conditions of the reservoir area and the abutments of the dam using the seismic refraction geophysical method, and to 2) evaluate the depth to and rippability characteristics of the earth materials in the vicinity of the proposed facilities.

The scope of work included a field seismic refraction survey followed by geophysical analysis of the acquired data, and preparation of this report.

1.3 Geologic Setting

The project area is characterized by hillside, roadway and creek topography underlain by residual and alluvial soils and granitic bedrock. The granitic bedrock is locally characterized by decomposed granite overlying more resistant to fresh granitic rock. Resistant outcrops of the rock are exposed locally throughout the site.

2.0 SEISMIC REFRACTION SURVEY

A total of seven (7) individual seismic refraction lines* with a combined spread length of 1,760 feet were recorded on May 19, and July 24, 2004, in the locations shown on Figure 1. The interpreted results are presented on Figures 2 through 5. The method and equipment used, the interpreted results, limitations and a summary of pertinent conclusions are discussed in the following sections of this report.

---

* For the purposes of this report, a seismic refraction line is defined as twelve geophones spaced at equal intervals of 10 or 25 feet along a straight line and monitored simultaneously while a sledge hammer is repeatedly impacted 10 or 12.5 feet off each end and at 150-foot intervals along longer lines.

2.1 Method and Equipment Used

The seismic refraction survey procedure used consisted of placing twelve (12) geophones in as straight a line as practical (in plan) spaced at 10- or 25-foot intervals along as constant a slope as practical (in profile). A large sledge hammer was impacted at 10 or 12.5 feet off each end and at 150-foot intervals along the longer lines. The hammer impacts generated seismic compression waves which were refracted through subsurface materials and received by the deployed geophones. The signal from the energy source initiation (time break) started the instrument sweep as signals from the geophones were monitored (amplified, filtered and stacked) simultaneously by a digital seismograph with an on-board computer and displayed graphically in analog form on the built-in computer monitor. Digital records stored in the computer were field checked, stored on magnetic disk and returned to our office for printing, data reduction and interpretation.

The seismic refraction lines were plotted on the provided base map for location and elevations. Elevations were field surveying using measuring tape, hand level and Brunton compass methods. Locations and relative elevations should be considered approximate.

The data reduction and interpretation procedure consisted of the following sequence of tasks:

- computerized picking of first breaks of compression waves (P-waves) from the digital records of the seismic system computer,
- visual adjustment of first break picks by observing the analog record,
- plotting of time-distance graphs utilizing raw data,
- preliminary determination of apparent velocities,
- plotting of elevation data along the profiles,
- measurement of differences between actual geophone elevations and a constant slope profile,
- computer analysis of preliminary apparent velocities and elevation differences to determine travel-time corrections,
- adjustment of the time-distance graphs and refinement of apparent velocity determinations satisfying reciprocity,
- comparison of time-distance and velocity data with a catalog of subsurface structures to interpret an appropriate seismic refraction model,

- computer analysis (using computer program developed by Shires, 1983, involving principles published by Mooney, 1977, Handbook of Engineering Geophysics, satisfying the condition of reciprocity, travel-time = distance/velocity, and Snell's Law of Refraction) of apparent velocity and intercept time data to determine depths of refractors, true velocities, dips of refractors, and angles of wave incidence (seismic ray paths),

- measurement of time deviations from "best fit" apparent velocity slopes on the time-distance graphs,

- computer analysis of apparent velocities and time deviations to determine refractor profile corrections,

- adjustment of refractor depths to reflect time deviations,

- correlation of results with known geologic factors (from test pits and drilling logs), or with adjacent seismic refraction data, and

- final preparation of interpreted subsurface velocity profiles.

The equipment used for the seismic refraction survey consisted of twelve (12) geophones at one time of 10 Hz natural frequency. The geophones were connected to 10- or 25-foot take-out spacing cables using Mueller clips. The combination seismograph/oscillograph used was a 24-channel ABEM™ Terraloc Mark 3 Seismic System mounted on a pack frame for portability.

The energy source used consisted of a 16-pound sledge hammer equipped with a seismograph triggering mechanism. The sledge hammer was repeatedly impacted on a steel plate placed in a cleared area on the ground surface. Repeated impact signals were stacked for each seismic record.

2.2 Interpreted Results

SR-1, SR-2, SR-6 and SR-7

Seismic refraction lines SR-1 and SR-2, SR-6 and SR-7 were 300-foot long lines that were recorded in a southwest to northeast direction in the reservoir excavation area in the locations shown on Figure 1. Results are presented on Figure 2 and Figure 5. For all of these lines, we incorporated 12 geophones each spaced at 25 feet with a total spread length of 300 feet, including hammer impacts at 12.5 feet off both ends of the lines and at 150-foot intervals along (at the center of) each line.

Lines SR-1 and SR-2, SR-6 and SR-7 are interpreted to be underlain by three (3) velocity zones (refractors) to the depth surveyed. The zone closest to the ground surface is characterized by low velocity (1260 to 1970 ft/sec) materials to a thickness of 3.8 to 12.8 feet beneath the ground surface. This upper zone likely corresponds to soil and/or deeply weathered (decomposed granite) bedrock materials that are relatively dry. The underlying zone consists of medium velocity (3330 to 4680 ft/sec) materials, extending from 3.8 to 12.8 feet on down to 18.3 to 52.7 feet beneath the ground surface. This zone likely corresponds to weathered bedrock materials that could be saturated in some areas. The underlying zone consists of high velocity (9550 to 20,000 ft/sec) materials that appear to extend from 18.3 to 52.7 feet to the full depth limit of information obtained (about 96 feet). This zone likely corresponds to relatively fresh bedrock materials that could also be saturated.

The hard bedrock interface appeared to be very irregular in shape and there appeared to be a potential buried channel in the hard bedrock beneath the center to northeast end of Line SR-2. The upper low velocity zone for both lines SR-1 and SR-2 corresponded well with the depth of more easily excavated residual soil and deeply weathered decomposed granite materials encountered in test pits TP-3, 5, 6, and 8. The lower velocity zone beneath the northeast end of Line SR-1 was reinterpreted to correlate well with the depth to harder materials in Boring B-3. Water perched atop the less weathered decomposed granite may be too thin to be picked up as a discrete seismic refraction zone although where it was encountered beneath Line SR-2 in TP-5, the medium velocity zone had somewhat higher velocity at the southwest end than at the northwest end where water was not encountered in TP-6 or TP-3.

SR-3

Seismic refraction Line SR-3 and was a 130-foot long line that was recorded near and along the left abutment of the proposed dam centerline in the location shown on Figure 1. Results are presented on Figure 3. For line SR-3, we incorporated 12 geophones spaced at 10 feet with a total spread length of 130 feet, including hammer impacts at 10 feet off both ends of the line.

Line SR-3, near the left dam abutment, is interpreted to be underlain by two (2) velocity zones (refractors) to the depth surveyed. The zone closest to the ground surface is characterized by low velocity (1150 ft/sec) materials to a thickness of 3.6 to 16 feet beneath the ground surface. This upper zone likely corresponds to residual or alluvial soil and/or deeply weathered (decomposed granite) bedrock materials that are relatively dry. The underlying zone consists of medium velocity (4300 ft/sec) materials that appear to extend from 3.6 to 16 feet on down to the full depth limit of information obtained (about 40 feet). This zone likely corresponds to less weathered granitic bedrock materials that could be saturated.

A bedrock channel was denoted beneath the central portion of Line SR-3, but velocities traveling in the harder underlying material may be following shorter pathways if the channel is at all sinuous or irregular in shape, making it difficult to pick up the full depth of so small a channel with the seismic refraction method. The channel depth of 21 feet observed in Boring B-2 is deeper than the 16 feet interpreted in the SR-3 seismic refraction data, but B-2 is also at least 40 feet away from SR-3.

SR-4 and SR-5

Seismic refraction lines SR-4 and SR-5 were 300-foot and 130-foot long lines, respectively, that were recorded in a northwest to southeast direction along the centerline of the proposed embankment dam near the right abutment in the locations shown on Figure 1. Results are presented on Figure 4. For Line SR-4, we incorporated 12 geophones spaced at 25 feet with a total spread length of 300 feet, including hammer impacts at 12.5 feet off both ends of the lines and at the 150-foot interval along (at the center of) the line. For Line SR-5, we incorporated 12 geophones spaced at 10 feet with a total spread length of 130 feet, including hammer impacts at 10 feet off both ends of the line.

Lines SR-4 and SR-5 are interpreted to be underlain by three (3) velocity zones (refractors) to the depth surveyed. The zone closest to the ground surface is characterized by low velocity (1440 to 1630 ft/sec) materials to a thickness of 3.4 to 5.6 feet beneath the ground surface. This upper zone likely corresponds to soil and/or deeply weathered (decomposed granite) bedrock materials that are relatively dry. The underlying zone consists of medium velocity (3030 to 3830 ft/sec) materials, extending from 3.4 to 5.6 feet on down to 20.1 to 43.6 feet beneath the ground surface. This zone likely corresponds to weathered bedrock materials that could be saturated in some areas. The underlying zone consists of high velocity (8950 to 10,820 ft/sec) materials that appear to extend from 20.1 to 43.6 feet to the full depth limit of information obtained [about 40 feet (Line SR-5) to 96 feet (Line SR-4)]. This zone likely corresponds to relatively fresh bedrock materials that could also be saturated.

The hard bedrock interface appeared to be irregular in shape. The upper low velocity zone for both lines SR-4 and SR-5 corresponded well with the depth of more easily excavated residual soil and deeply weathered decomposed granite materials encountered in test pits TP-15 and TP-16 as well as Trench 2. The lower velocity zone beneath the southeast end of Line SR-4 did not correlate closely with the depth to harder materials in Boring B-1, but SR-4 was offset approximately 65 feet from B-1. The granitic ledge exposed in TP-16 was not evident in the seismic refraction results, indicating that this ledge may be separated from intact fresh bedrock by fractures. Difficult back-hoe excavation could be experienced in the near-4000 ft/sec materials present in the intermediate velocity zone. Water perched atop the less weathered decomposed granite may be too thin to be picked up as a discrete seismic refraction zone.

3.0 RIPPABILITY

Rippability is strongly influenced by the physical condition of the rock masses to be ripped. Structural features in rock such as bedding planes, cleavage planes, joints, fractures and shear zones influence rippability. Rock masses tend to be rippable if they have closely-spaced fractures, joints, or other planes of weakness. Massive rock materials lacking discontinuities, even where partially weathered, may exhibit marginal rippability, requiring blasting for removal. In addition, massive rock that may be rippable may yield oversize materials or core stones as part of the ripping process that may not be suitable as borrow for standard engineered fill.

Seismic compression wave velocities can be related to both rock hardness and fracture density. Seismic refraction velocities have been related to rippability by Caterpillar Inc. (1990) as displayed on graphs relating seismic velocity for various rock types to rippability with various types of equipment (combinations of dozers and rippers). Two examples of these graphs are presented on Figure 6 for both D8L and D9N dozer/ripper combinations. In general, rocks such as the granitic rocks present at this site become marginally rippable above about 7,500 feet/second and non-rippable above about 9,700 feet/second using either a D8 Dozer with a Multi or Single Shank No. 8 Ripper, or a D9 Dozer with a Multi or Single Shank No. 9 Ripper. Use of a D11 Dozer with a Single Shank No. 11 ripper could allow for rippability in materials with velocities about 1,000 ft/sec higher than these values.

The charts of ripper performance should be considered as being only one indicator of rippability. The following precautions should be observed when evaluating the rippability of a given rock formation:

- Ripper tooth penetration is usually the key to successful ripping, regardless of seismic velocity. This is particularly true in finer-grained homogeneous materials (such as the little-fractured zones of grantic rock present at this site) and in tightly cemented formations.
- Although low seismic velocities in sedimentary rocks indicate probable rippability, if the fractures and bedding joints do not allow tooth penetration, the material may not be ripped effectively.
- Pre-blasting or "popping" may be required to induce sufficient fracturing to allow tooth penetration, but the economics of this should be checked carefully in the higher grades of sandstones, limestones and granites.
- Impact ripping may be used in marginal situations because significant boosts in production may be possible relative to conventional ripping by using an impact ripper mounted on a D10N or D11N dozer.
- Ripping success may well depend on the operator finding the proper combination of number of shanks used, length and depth of shank, tooth angle and direction and throttle position.

Based on the seismic velocities measured at this site, it appears that the high velocity materials should be non-rippable with either the D8 dozer with No. 8 ripper combination, or a D9 dozer with No. 9 ripper. Based on seismic velocity correlation's, the surficial soils and desomposed granite bedrock at this site should not pose significant problems to mass grading with heavy construction equipment. We note that standard backhoes used for subsurface exploration (on other projects) have met with practical refusal in medium velocity materials (about 4000 ft/sec).

For the best evaluation of the depth of rippability in the subject site materials, as well as for providing information regarding sizes of ripped materials, we recommend that you consider having a test trench excavated by a large dozer and single-tooth ripper combination (such as a Caterpillar D-9 with a No. 9 ripper, or equivalent) in the vicinity of one of the seismic refraction lines performed. Line SR-6 might provide a representative location for such a test trench.

4.0 INVESTIGATION LIMITATIONS

The subsurface velocity profiles presented in this report represent the most reasonable interpretation of geophysical survey data based on our limited knowledge of the existing geologic conditions at the site. The results are presented for design information only and are not intended to serve as information for determining construction procedures. Interpretations were made in accordance with generally accepted geophysical methods and practices. This warranty is in lieu of all other warranties, express or implied.

It is best to correlate seismic refraction data with direct subsurface exploration data and this can be evaluated by comparing seismic refraction survey results with nearby subsurface exploration, specifically exploratory trenches T-1 and T-2, test pits TP-3, 4, 5, 6, 8, 9, 11, 12, 15 and 16 and borings B-1 and B-2.

The quality of seismic refraction data for this survey was good, but in some cases affected by background noise from drilling and trenching equipment, wind, irregular terrain, and lateral inhomogeneity. These factors produced noise signals and/or scatter in the recorded data, limiting the accuracy of first break compression wave picks and interpretation. The seismic refraction method used has some inherent limitations such as the possibility for undetectable hidden layers, blind zones, and velocity inversions. The maximum depth of reliable seismic information obtained during this survey can be assumed to be approximately one-third of the length of the individual lines (given an increase in velocity with depth), with information at a maximum depth underlying the middle one-third of the lines. For example, a seismic refraction line 300 feet in length will typically yield reliable data on subsurface materials to a depth of about 100 feet beneath the middle 100 feet of the line.

5.0 REFERENCES

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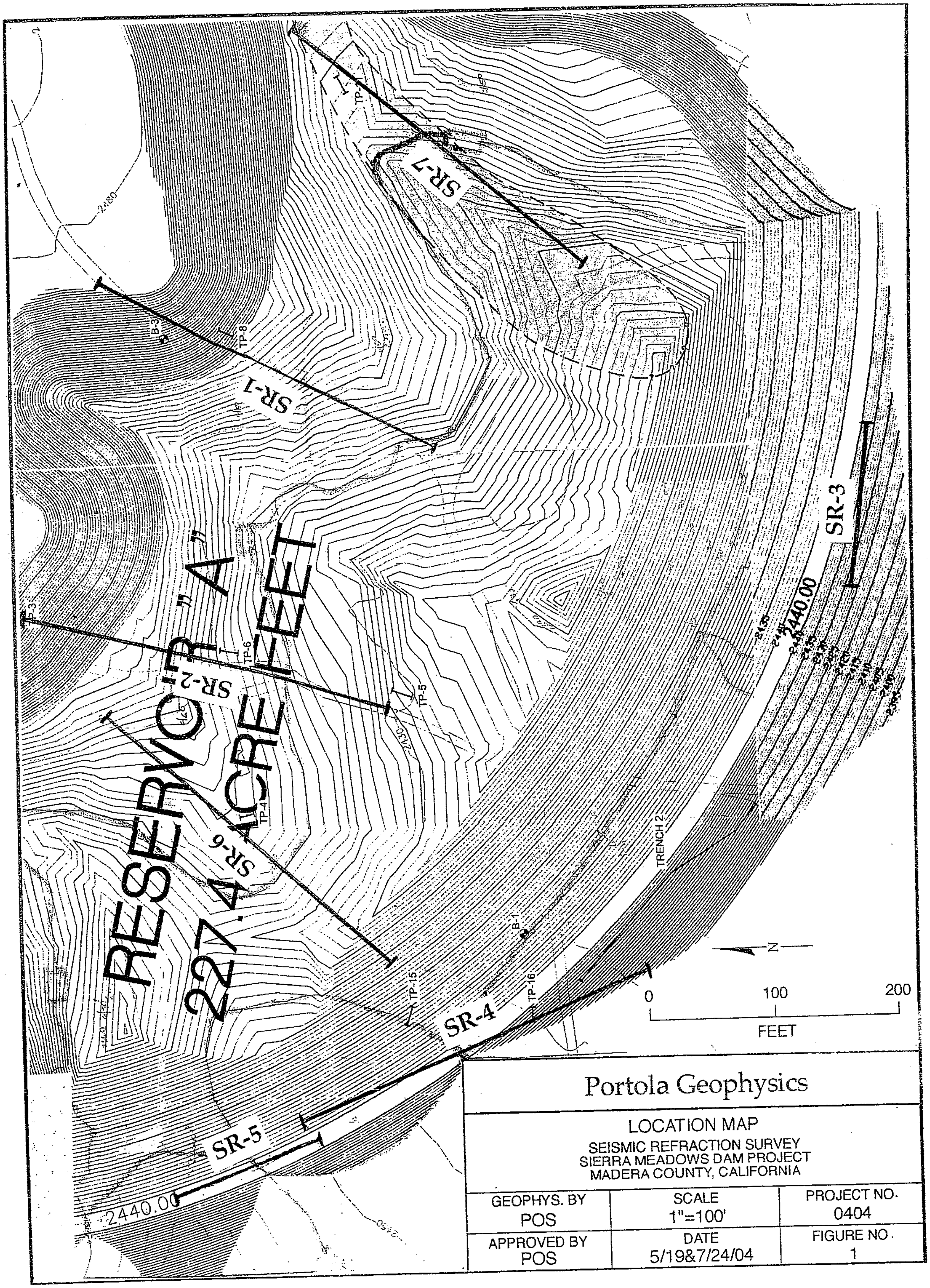
Caterpillar, Inc., (1990), "Caterpillar™ Performance Handbook", a CAT™ Publication by Caterpillar, Inc., Peoria, Illinois, U.S.A.

Dobrin, M. B., (1960), "Introduction to Geophysical Prospecting", McGraw-Hill Book Company.

Shires, P. O., (1983), "A Seismic Refraction Interpretation Program for Multi-Dipping Layers".

FIGURES

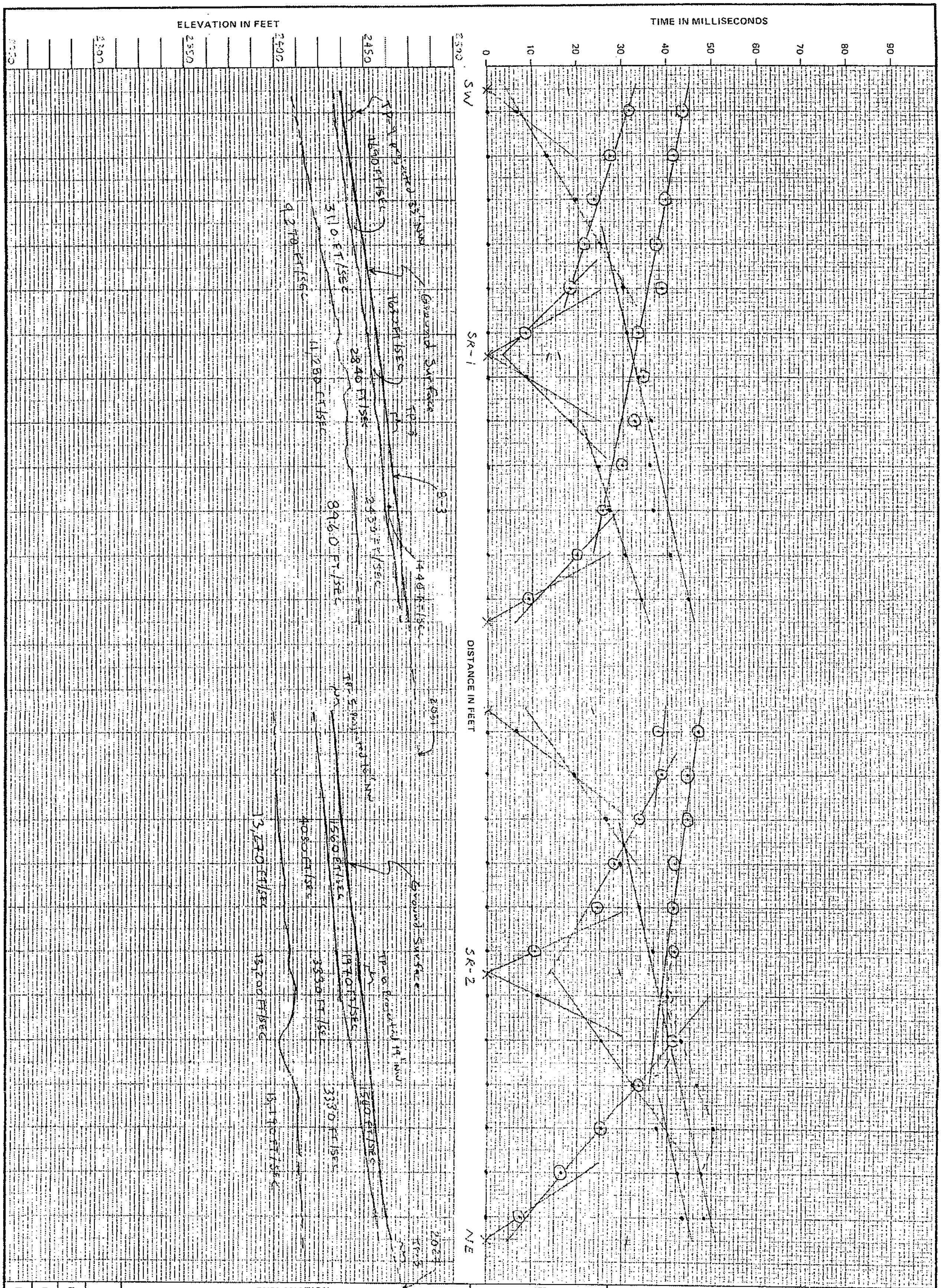


Portola Geophysics

LOCATION MAP

SEISMIC REFRACTION SURVEY
SIERRA MEADOWS DAM PROJECT
MADERA COUNTY, CALIFORNIA

GEOPHYS. BY POS	SCALE 1"=100'	PROJECT NO. 0404
APPROVED BY POS	DATE 5/19&7/24/04	FIGURE NO. 1



SEISMIC LINE NO.(S): SR-1 & SR-2

DATE: 5/19/04

PROJECT NO.: 0404

FIGURE NO.: 2

EXPLANATION

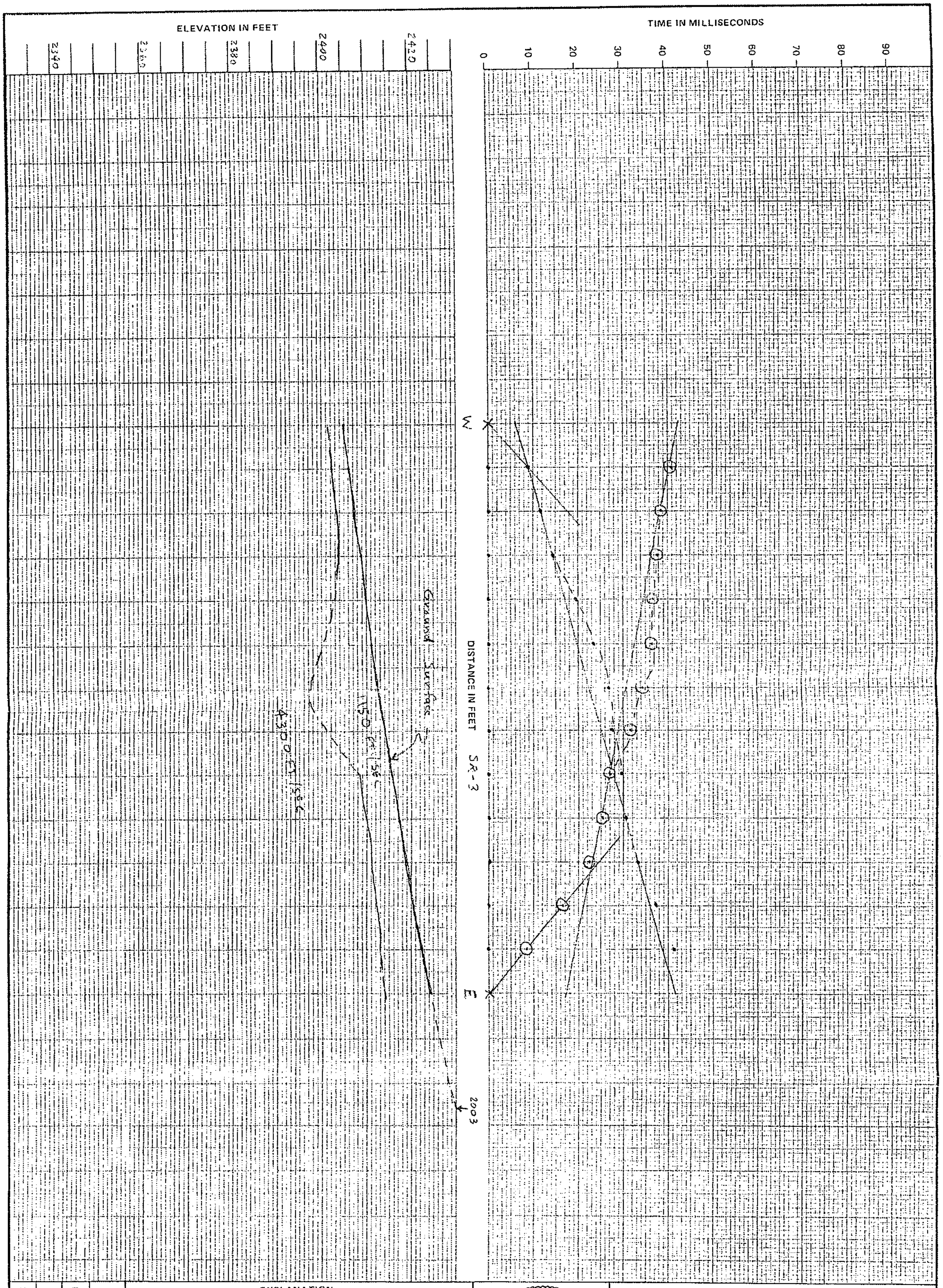
1. TIME–DISTANCE GRAPHS AT TOP OF FIGURE REPRESENT SEISMIC REFRACTION SURVEY DATA; DOTS ON BOTTOM LINE OF GRAPHS REPRESENT GEOPHONE LOCATIONS, X'S REPRESENT SHOT POINT LOCATIONS.
   VERTICAL SCALE: 1" = 20 MILLISECONDS
   HORIZONTAL SCALE: 1" = 50 FEET
2. SUBSURFACE VELOCITY PROFILES AT BOTTOM OF FIGURE REPRESENT INTERPRETATIONS OF SEISMIC REFRACTION DATA AND ARE INTENDED FOR DESIGN PURPOSES ONLY.
   VERTICAL AND HORIZONTAL SCALE: 1" = 50 FEET
3. LOCATION OF SEISMIC LINES SHOWN ON FIGURE NO.(S) 1

PATRICK O. SHIRES
No. 879

Portola Geophysics

SEISMIC REFRACTION SURVEY
DATA AND INTERPRETED SUBSURFACE VELOCITY PROFILES

SIERRA MEADOWS DAM
MADERA COUNTY, CALIFORNIA



EXPLANATION

1. TIME–DISTANCE GRAPHS AT TOP OF FIGURE REPRESENT SEISMIC REFRACTION SURVEY DATA; DOTS ON BOTTOM LINE OF GRAPHS REPRESENT GEOPHONE LOCATIONS, X'S REPRESENT SHOT POINT LOCATIONS.
VERTICAL SCALE: 1" = 20 MILLISECONDS
HORIZONTAL SCALE: 1" = 20 FEET
2. SUBSURFACE VELOCITY PROFILES AT BOTTOM OF FIGURE REPRESENT INTERPRETATIONS OF SEISMIC REFRACTION DATA AND ARE INTENDED FOR DESIGN PURPOSES ONLY.
VERTICAL AND HORIZONTAL SCALE: 1" = 20 FEET
3. LOCATION OF SEISMIC LINES SHOWN ON FIGURE NO.(S) |

SEISMIC LINE NO.(S): SR-3

DATE: 5/17/04

PROJECT NO.: 0404

FIGURE NO.: 3

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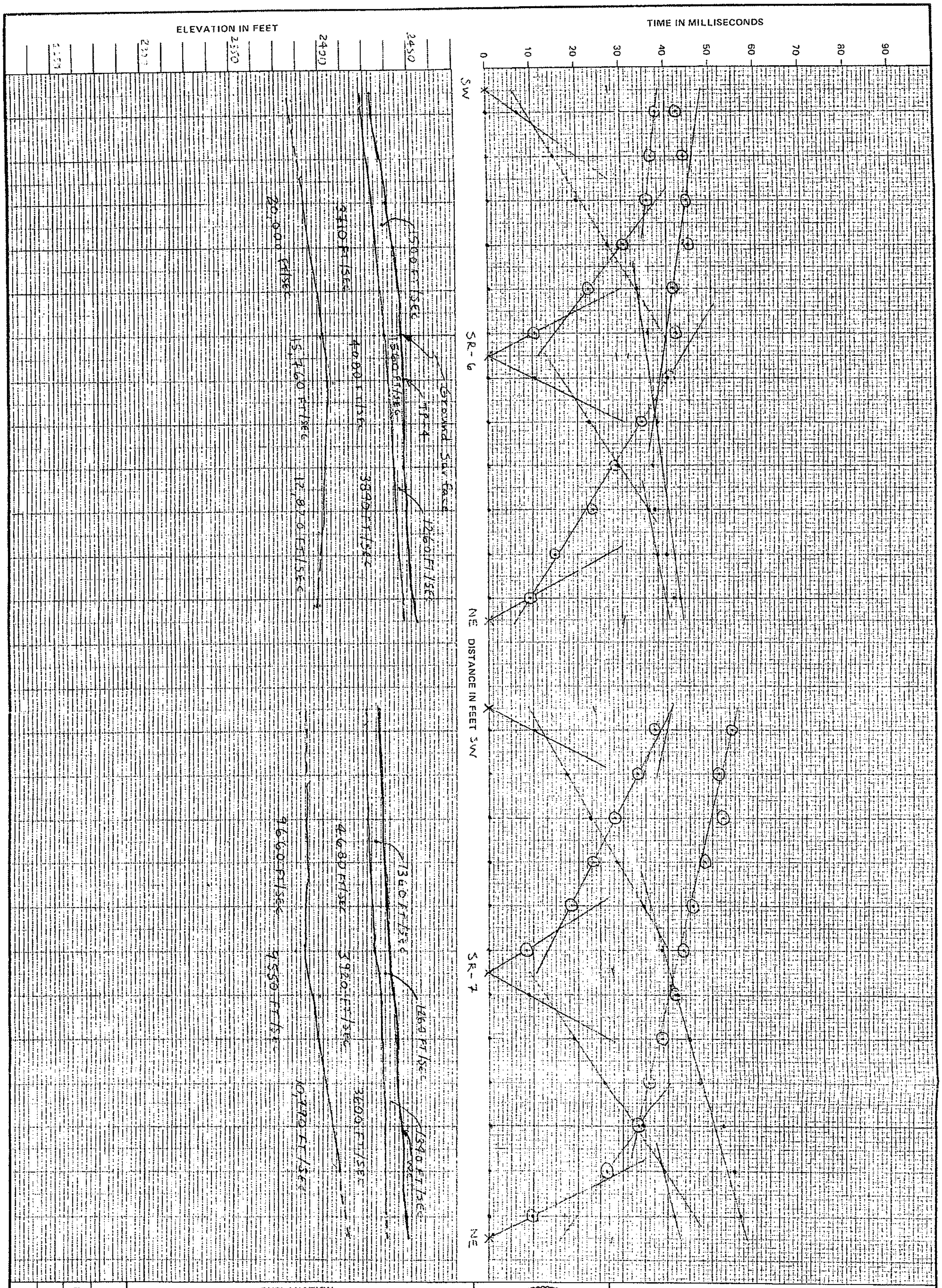
SEISMIC REFRACTION SURVEY
DATA AND INTERPRETED SUBSURFACE VELOCITY PROFILES

SIERRA MEADOWS DAM
MADERA COUNTY, CALIFORNIA



Portola Geophysics

SEISMIC REFRACTION SURVEY
DATA AND INTERPRETED SUBSURFACE VELOCITY PROFILES

SIERRA MEADOWS [illegible] PROJECT
MADERA COUNTY, CALIFORNIA

REGISTERED GEOPHYSICIST
PATRICK O. SHIRES
No. 879
STATE OF CALIFORNIA

EXPLANATION

1. TIME–DISTANCE GRAPHS AT TOP OF FIGURE REPRESENT SEISMIC REFRACTION SURVEY DATA; DOTS ON BOTTOM LINE OF GRAPHS REPRESENT GEOPHONE LOCATIONS, X'S REPRESENT SHOT POINT LOCATIONS.
   VERTICAL SCALE: 1" = 20 MILLISECONDS
   HORIZONTAL SCALE: 1" = 50 FEET
2. SUBSURFACE VELOCITY PROFILES AT BOTTOM OF FIGURE REPRESENT INTERPRETATIONS OF SEISMIC REFRACTION DATA AND ARE INTENDED FOR DESIGN PURPOSES ONLY.
   VERTICAL AND HORIZONTAL SCALE: 1" = 50 FEET
3. LOCATION OF SEISMIC LINES SHOWN ON FIGURE NO.(S) 1

SEISMIC LINE NO.(S): SR-6 + SR-7

DATE: 7/24/84

PROJECT NO.: [illegible]

FIGURE NO.: 5

APPENDIX D

FIELD LOGGING AND CLASSIFICATION OF ROCK

APPENDIX D

FIELD LOGGING AND CLASSIFICATION OF ROCK

This appendix presents the descriptive terms and general procedures that will be used to classify rock core sampled in exploratory borings, and the general format for presenting the rock core data that are recorded in the field. The classification terms presented in Tables D-1 and D-2 also should be used to describe rock encountered in exploratory test pits or trenches. The classification terms presented in this appendix are based either wholly or in part on the standardized terms for logging rock core presented in the following references:

1. U.S. Bureau of Reclamation, 1998, Engineering Geology Field Manual, Volume 1 (second edition).

2. State of California Department of Transportation (Caltrans), 1995, Soil & Rock Logging Classification Manual (Field Guide).

The above references should be consulted for additional information and guidance. Additional rock classification guidelines from Caltrans (1995) are included in this appendix.

The following data are considered to be the minimum information that should be recorded in the field when logging rock core. An example of Geomatrix's field boring (rock core) log is presented in Appendix B. The various components (columns) of the field log are described below, in order from left to right as they appear on the log:

Core Run
Indicates the run number, or sampling interval.

Core Recoverey
Indicates the percent core recovery for a specific run. Recovery can be expressed as a ratio and/or a percentage.

RQD
Indicates summation of sound (i.e. fresh to only moderately weathered) core pieces over 4 inches in length (measured along he axis of the core) divided by the total length of the core run. RQD can be expressed as a ratio and/or a percentage.

Fracturing[1]
Indicates the fracture spacing within a run.

Hardness[1]
Indicates the hardness of the core within a run.

Strength[1]
Indicates the strength of the core within a run.

Weathering[1]
Indicates the degree of weathering of the core within the run.

---

[1] Values and definitions are listed in Table D-1 of this appendix.

Lithologic Descriptions (which are to include the following):

1. First Line: ALL CAPITAL LETTERS
   a) Rock Name [and Formation name if known]

2. Second Line, Third Line, etc. (in the following order): all lower case letters
   a) Color. Use the Munsell Color Chart for rock color descriptions. Describe color when the rock is moist or wet. The Munsell number is recorded after the color. The color of mottling or conspicuous zones of weathering or alteration also should be noted.
   b) Grain size and texture. Note grain roundness, shape, and sorting.
   c) Lithology. Predominant minerals identifiable in hand specimen should be noted.
   d) Bedding/Foliation/Flow Texture. Note attitude(s) and describe any depositional features or structures (e.g., planar or cross bedding, laminated bedding, etc.).
   e) Contacts. Contacts should be identified and their nature described.
   f) Any other distinctive geologic features that will aid in correlation or interpretation of the geologic conditions (e.g., the type and size of voids, fossils, cementation, reaction to HCl, etc).

Examples:

BASS LAKE TONALITE
pale yellowish brown (10 YR 4/4), moist, medium grained, mostly quartz and plagioclase, trace biotite and plagioclase feldspar, mottled where stained with FeO2, microfractures healed with hard clay material.

Graphic Log

Depicts the core as sketched in the field.

Discontinuity Descriptions[2] (which are to include the following in order):

1. Discontinuity type (i.e., bedding plane, joint, foliation, shear/fault, mechanical break, or vein) and dip angle.

2. Aperture (i.e., tight, open, filled, or healed). Note presence and type of staining or coatings on fracture surfaces, fracture surface moisture conditions, amount of separation/filling, and type and hardness of filling.

3. Surface shape (i.e., irregular, planar, and wavy or undulating)

4. Roughness (i.e., stepped, rough, moderately rough, slightly rough, smooth, polished). Note the presence of slickensides or striations.

---

[2] See Table D-2 for additional information.

Remarks

Records information pertaining to the drilling operation. Some of the information that may be recorded includes:

Drilling methods
Drilling rate
Loss of circulation
Casing used and reasons
Driller's comments
Samples and sampling methods
Drilling difficulties
Color of return water
Cement or drilling mud used
Water pressure test intervals

Core box numbers and boundaries between boxes will be noted in this column.

The reason for stopping the hole is recorded at the bottom of the column, using the following terms:

Terminated hole: hole stopped by geologist because sufficient information and depth was attained.

Abandoned hole: stopped hole because of coring difficulties.

Refusal: stopped by rock too hard for drilling equipment.

TABLE D-1

KEY TO TERMS USED TO DESCRIBE THE PHYSICAL CONDITION OF ROCKS[3]

Sierra Meadows Dam
Oakhurst, County of Madera, California

FRACTURING	SPACING (True spacing)
(VC) Very closely spaced (crushed)	Less than 0.1 ft (< 30 mm)
(Cl) Closely spaced	0.1 ft to 0.3 ft (30 to 100 mm)
(Mo) Moderately spaced	0.3 ft to 1.0 ft (100 to 300 mm)
(Wi) Widely spaced	1.0 ft to 3.0 ft (300 mm to 1 m)
(VW) Very widely spaced	3.0 ft to 10.0 ft (1 to 3 m)
(Ex) Extremely wide	Greater than 10 ft (> 3 m)

BEDDING OR FLOW TEXTURE	THICKNESS/SPACING
(La) Laminated	Less than 0.03 ft (3/8 in) (< 10 mm)
(VTn) Very thinly	0.03 (3/8 in) to 0.1 ft (10 to 30 mm)
(Tn) Thinly	0.1 to 0.3 ft (30 to 100 mm)
(Mo) Moderately	0.3 to 1 ft (100 to 300 mm)
(Tk) Thickly	1.0 to 3.0 ft (300 mm to 1 m)
(VTk) Very thickly	3.0 to 10.0 ft (1 to 3 m)
(Ma) Massive	Greater than 10 ft (> 3 m)

HARDNESS - a measure of the resistance of a rock surface to scratching/abrasion.

(So) Soft – can be grooved or gouged easily with a knife, can be scratched with fingernail
(Lo) Low Hardness - can be grooved 1/16 inch (2 mm) deep with a knife with moderate or heavy pressure
(Mo) Moderately Hard - can be scratched with a knife with light or moderate pressure
(Ha) Hard - can be scratched with a knife with difficulty
(VH) Very Hard - cannot be scratched with a knife

STRENGTH - a measure of crushing resistance of rock.

(Fr) Friable – breaks with light to moderate manual pressure
(We) Weak – core or fragment breaks with light hammer blow or heavy manual pressure
(Mo) Moderately Strong – core or fragment breaks with moderate hammer blow
(St) Strong – heavy hammer blow required to break specimen
(VS) Very Strong – core or fragment breaks only with repeated heavy hammer blows
(Ex) Extremely Strong – core or fragment can only be chipped with repeated heavy hammer blows

WEATHERING - a measure of the physical and chemical alteration of a rock from its original "fresh" condition.[4]

(Fr) Fresh	Rock fresh, crystals bright, few joins may show slight staining. Rock rings under hammer if crystalline.
(VSl) Very Slight	Rock generally fresh, joints stained, some joints may show thin clay coatings, crystals in broken face show bright. Rock rings under hammer if crystalline.
(Sl) Slight	Rock generally fresh, joints stained and discoloration extends into rock up to 1-inch. Joints may contain clay. In granitoid rocks, some occasional feldspar crystals are dull and discolored. Crystalline rock rings under hammer.
(Mo) Moderate	Significant portions of rock show discoloration and weathering effects. In granitoid rocks, most feldspars are dull and discolored; some show clayey (alteration). Rock has dull sound under hammer and shows significant loss of strength as compared with fresh rock.

---

[3] Based on US Bureau of Reclamation, 1998, Engineering Geology Field Manual, Second Edition, Vol.1.

[4] Based on State of California, Division of Safety of Dams Description Standards, Rocks, Discontinuties, and Soils, October 16, 2001.

(Mo-Se) Moderately Severe	All rock except quartz discolored or stained. In granitoid rocks, all fedspars are dull and discolored and majority show kaolinization. Rock shows severe loss of strength and can be excavated with geologist's ick. Rock goes "clunk" when struck.
(Se) Severe	All rock except quartz discolored or stained. Rock "fabric" clear and evident, but reduced in strength to strong soil. In some granitoid rocks, all feldspars kaolinized to some extent. Some fragments of strong rock usually left.
(VS) Very Severe	All rock except quartz discolored or stained. Rock "fabric" discernible but mass effectively reduced to "soil" with only fragments of strong rock remaining.
(Co) Complete	Rock reduced to "soil". Rock "fabric" not discernible or discernible only in small scattered locations. Quartz may be present as dikes or stringers.

TABLE D-2

KEY TO TERMS USED TO DESCRIBE DISCONTINUITES IN ROCK[5]

Sierra Meadows Dam
Oakhurst, County of Madera, California

DISCONTINUITY TYPE (and dip angle)

- (Be) Bedding plane
- (Fo) Foliation
- (Me) Mechanical break (dip angle not recorded)
- (Jo) Joint
- (Sh) Shear or Fault
- (Ve) Vein
- (Fx) Fracture

APERTURE

- (Ti) Tight – No visible separation
- (Op) Open – (Note amount of separation; note staining or coatings on fracture surfaces; note fracture surface moisture conditions)
- (He) Healed – (Note degree of healing, i.e., partial or complete, thickness and mineralogy/hardness)
- (Fi) Filled – (Note degree of filling, i.e., partial or complete, thickness and type of filling)

SURFACE SHAPE

- (Ir) Irregular
- (Pl) Planar
- (Wa) Wavy or undulating

ROUGHNESS (note presence of slickensides or striations)

- (St) Stepped – Near normal steps and ridges occur on fracture surface
- (Ro) Rough – Large, angular asperities can be seen
- (Mo) Moderately rough – Asperities are clearly visible and fracture surface feels abrasive
- (Sl) Slightly rough – Small asperities on the fracture surface visible and can be felt
- (Sm) Smooth – No asperities, smooth to touch
- (Po) Polished – Extremely smooth and shiny

Where appropriate during field mapping, the following discontinuity characteristics also should be noted:

- Discontinuity orientations (strike and dip)
- Prominent joint sets, cleavages, foliations, etc.
- Fracture continuity
- Fracture cross-cutting relationships
- Moisture/seepage conditions

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[5] Based on U.S. Bureau of Reclamation, 1998, Engineering Geology Field Manual, Second Edition, Vol. 1.

15.9 Hydrology/Water Quality Data

SIERRA MEADOWS EIR
HYDROLOGY AND WATER QUALITY
TECHNICAL APPENDIX

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Madera County

Prepared By:

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January 2004
August 2003

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APPENDICES

SECTION 1 INTRODUCTION

The following study is the Hydrology and Drainage Technical Appendix prepared as part of the *Sierra Meadows Estates Environmental Impact Report (EIR)*. The Sierra Meadows project site is located in the unincorporated area of eastern Madera County, California near the eastern border of Mariposa County, refer to Figure 1 for a Vicinity Map. The general location of the project is approximately 2.5 miles west of State Highway 41 near Oakhurst. The project site is situated along Opah Drive, approximately 0.75 north of its intersection with Harmony Lane; refer to Figure 2 for a Location Map. This report is a technical engineering study/evaluation solely to support the environmental document for the project on issues related to drainage and surface hydrology. The level of analysis prepared is compatible with the level of planning information available.

The 487-acre project site is located adjacent to the existing 142-acre Sierra Meadows Ranch Golf Course. As of spring 2004, fifty-eight (58) residential units have been developed as part of the Ahwahnee Country Club Estates Subdivision. The Sierra Meadows Estates Planned Residential Development proposes 315 single-family residential units at full build out. In addition, as part of the development several roads will be constructed throughout the development.

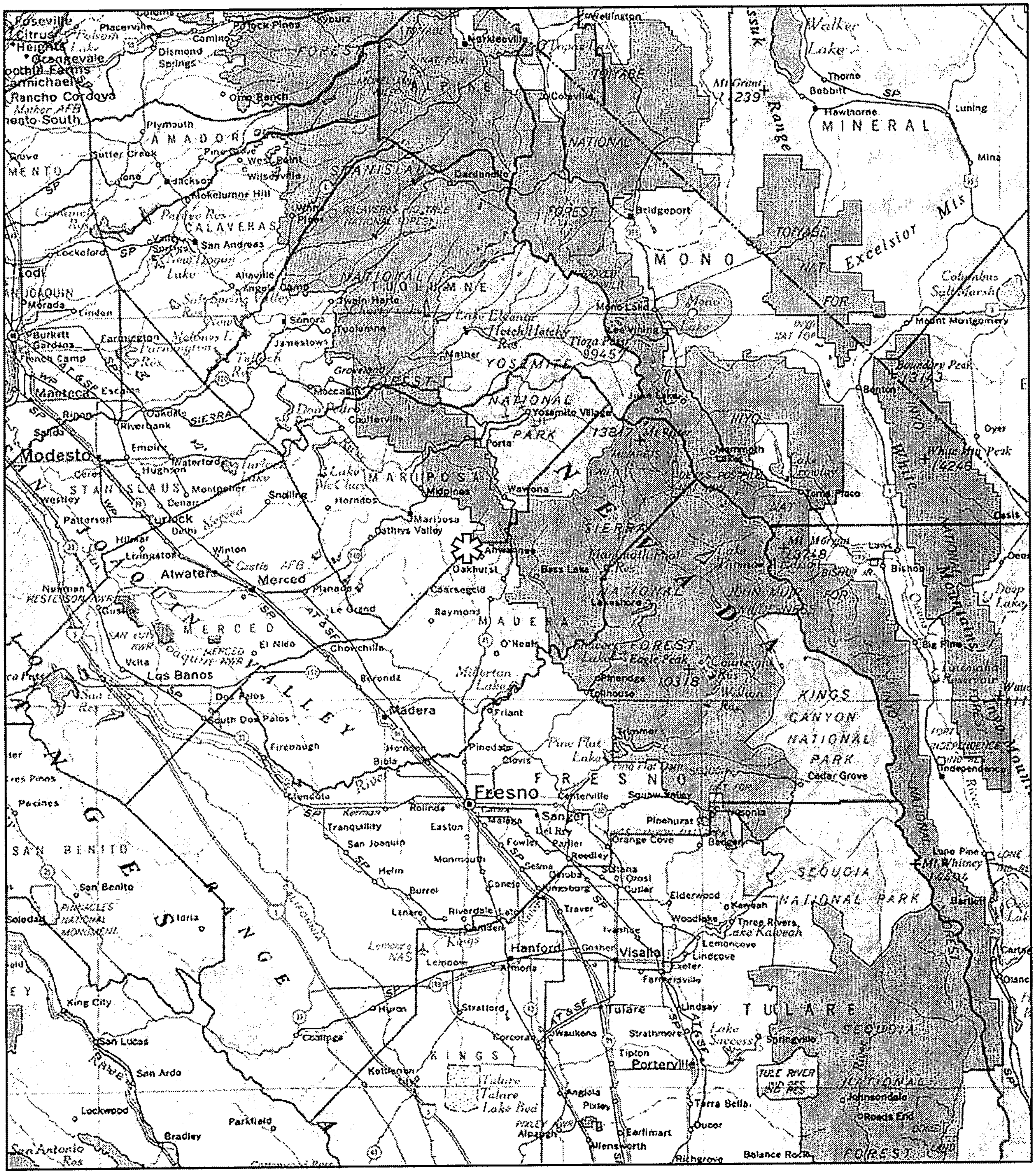
The assessments and technical analysis in this report are in compliance with the local drainage policies and requirements for the Madera County, Central Valley Regional Water Quality Control Board, and the California Environmental Quality Act (CEQA) of 1970, as amended. The hydrology analysis and drainage assessments have been prepared at a preliminary engineering level based upon the details of the available information for an environmental document.

1.1 Background

The local hydrology area consists of elevations ranging from approximately 3,200 feet to 2,100 feet, with terrain that varies from level to steep slopes. The project area generally has a south to southwesterly sloping aspect. Slopes average between 1 and 30 percent in the project area.

There are two perennial creeks located within the project boundaries. Miami Creek enters the site from the east and generally traverses the south boundary and Carter Creek enters the site near the northwest area and a generally traverses along the western boundary of the project site. The two creeks converge at the existing Sierra Meadows Golf Course. There are a numerous small ponds located throughout the golf course, which are being used for the irrigation of the golf course.

The project site is in a relatively undisturbed foothill woodland vegetation and wildlife community. The Ahwahnee/Nipinnawasee area contains no public transportation facilities or routes within the boundaries. Therefore, the area is dependent on private automobile and truck access. Opah Drive is the main arterial through the project site. The majority of Opah Drive was constructed approximately 15 years ago as a local road to serve the Sierra Meadows Golf Course and Ahwahnee Country Club Estates Subdivision. Currently, Opah Drive is paved to a point just west of Wallu Lane. As of Spring 2004, 58 residential units have been developed as part of the Ahwahnee Country Club Estates.



Source: National Geographic Holdings (www.topo.com).

✲ - Project Site

Not to Scale

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10/04

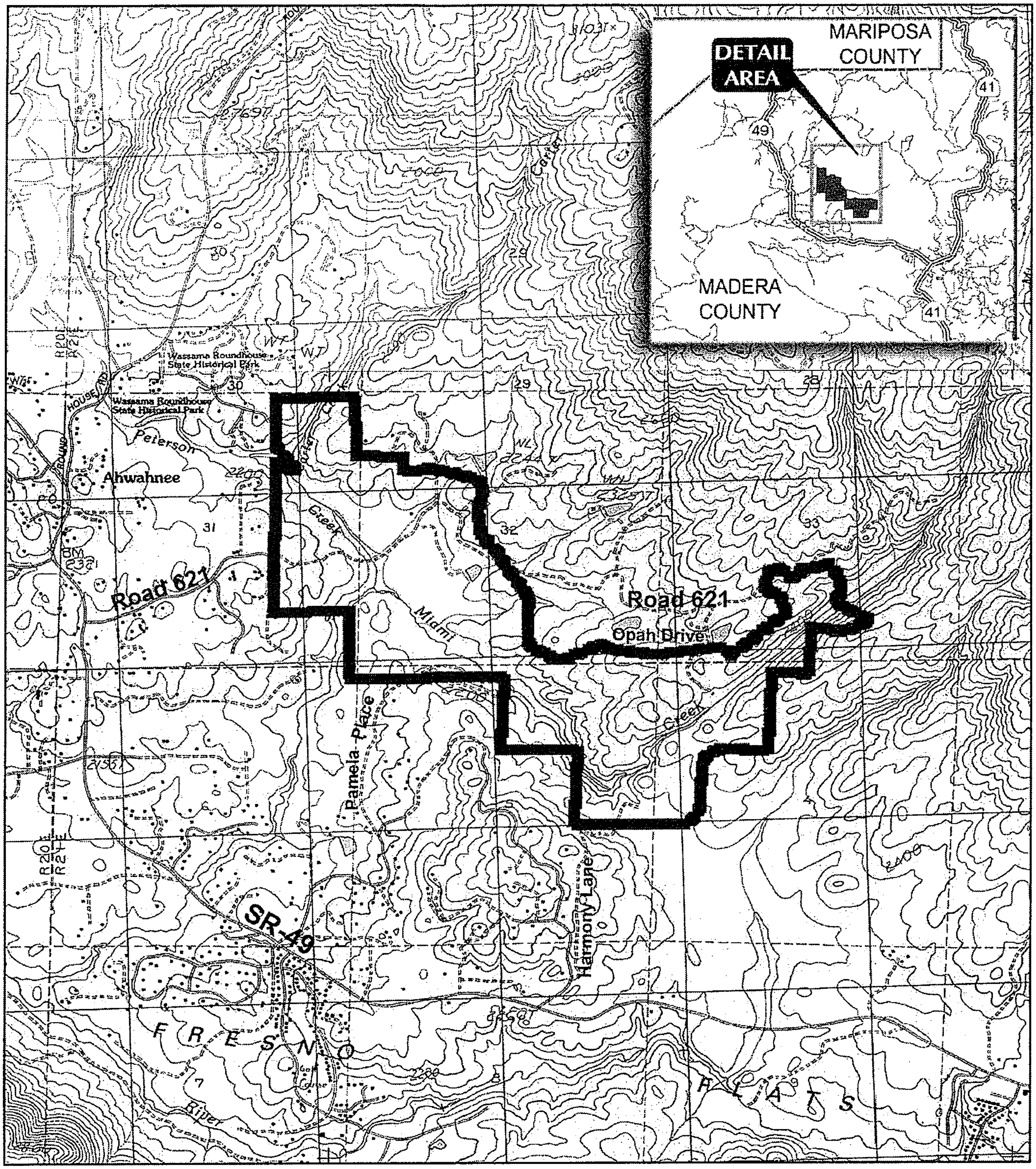
JN 10-102469

MADERA COUNTY, CALIFORNIA

SIERRA MEADOWS ESTATES

VICINITY MAP

FIGURE 1



Source: National Geographic Holdings (www.topo.com).

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10/04 JN 10-102469

MADERA COUNTY, CALIFORNIA
SIERRA MEADOWS ESTATES

LOCAL LOCATION MAP

FIGURE 2

1.2 Definitions of Level of Significance

The purpose of this technical evaluation is to determine the impact of the proposed development has on surface water drainage and storm water quality within Madera County on the Sierra Meadows site. Should the analysis determine that the proposed project significantly impacts surface water drainage or storm water quality, appropriate mitigation will be identified to minimize the project impacts to a less than significant level. The following CEQA list is the criteria evaluate impacts of the proposed project.

- Does the project violate any water quality standards or waste discharge requirements?
- Does the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?
- Does the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, which would result in flooding on- or off-site?
- Does the project create or contribute runoff water, which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?
- Does the project otherwise substantially degrade water quality?
- Does the project place housing within a 100-yr flood hazard area as mapped on the federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?
- Does the project expose people or structures to a risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?
- Is the project inundation by seiche, tsunami or mudflow?

These criteria can generally be separated into three different types of impacts: 1) Hydrology and Surface Water Drainage; 2) Floodplain; and 3) Storm Water Quality. The following sections discuss applicable laws and regulations, which will be used to determine the level of significance of each impact.

Hydrology and Surface Water Drainage

Federal, state and local drainage laws and regulations govern the evaluation of impacts to surface water drainage. For this evaluation, impacts to surface water drainage would be considered significant if the project alters the drainage patterns of the site, which would result in substantial erosion, siltation, or increase runoff that would result in increased flooding. Increase in the amount of runoff could be considered a significant if it impacts local road and downstream drainage facilities.

A dam is within County jurisdiction if its embankment height is at or under 25 feet and the storage capacity behind the dam is less than 50 acre-feet or if storage capacity is less than 15 acre-feet regardless of embankment height. Otherwise the dam falls under Division of Safety of Dams (DSOD) jurisdiction and needs to be designed per DSOD standards.

Floodplain

As a participate in the National Flood Insurance Program (NFIP) communities must adopt and enforce minimum floodplain management standards, including identification of flood hazards and flooding risks as defined by the Federal Emergency Management Agency (FEMA). Since Madera County is a participant of NFIP, any changes to existing FEMA mapped floodplains must conform to FEMA standards.

Storm Water Quality

Storm water quality is measures for both post-construction and construction conditions.

Post- Construction

The evaluation of impacts to storm water quality is of growing concern throughout the country. The project site is located in an area that does not currently have a Municipal National Pollution Discharge Elimination System (NPDES) Permit. The Municipal Permit would regulate post construction water quality requirements. However, per conversation with Madera County Flood Control staff the site should reduce the discharge of pollutants to a less then significant level through the implementation of the post-construction water quality measures. In addition to the post construction water quality requirements, the site will require coverage under the Construction NPDES Permit CAS000002 for the discharge of stormwater runoff associated with construction activities on site.

Madera County Recommendations

The following are recommended guidelines to reduce the storm water discharge pollutants to a less then significant level in the post construction stage. Even though the area does not have a municipal NPDES permit it is good practice to:

1. Effectively prohibit non-storm water discharges, and
2. Reduce the discharge of pollutants from storm water conveyance system to the Maximum Extent Practicable.

For this evaluation, impacts to storm water quality would be considered significant if the project did not attempt to address storm water pollution to the maximum extent practicable. Currently, there are no definitive water quality standards that require storm water quality leaving a project site to meet standards for individual pollutants. However, Madera County recommends that a Water Quality Management Plan (WQMP) be developed. Through implementation of the WQMP impacts to storm water quality will be considered less than significant if they meet all of the following guidelines:

1. Conserve natural areas by using cluster development, limiting clearing and grading of native vegetation, maximize trees and other vegetation, promote natural vegetation, and preserve riparian area and wetlands.
2. Minimize storm water pollutants of concern by incorporating BMPs or combinations of BMPs best suited to maximize the reduction of pollutant loadings in runoff to the maximum extent practicable.
3. Protect slopes and channels to decrease the potential of slopes and channels from eroding and impacting storm water runoff.

4. Properly design outdoor material storage areas.
5. Properly design trash storage areas.
6. Provide proof of ongoing BMP maintenance.
7. Properly design vehicle/equipment wash areas.

Construction

The Construction General Permit authorizes the discharge of stormwater to surface waters for construction activities that result in the disturbance of one or more acres of land. It prohibits the discharge of materials other than storm water and authorized non-storm water discharges, which contains hazardous substances. The General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). Best Management Practices (BMPs) required for the SWPPP primarily emphasize source control such as erosion control and pollution prevention methods.

SECTION 2 EXISTING CONDITIONS

The purpose of this existing conditions evaluation is to establish a baseline for comparison of the pre-project and the post-project conditions. Baseline conditions investigated include: land use, hydrology, floodplain mapping, and surface water quality.

2.1 Existing Condition Watershed

2.1.1 Existing Land Use

The site is located within the transitional area between rolling foothills and the Sierra Nevada Mountain range in Madera County. There is an eighteen-hole Sierra Meadows Golf Course located on approximately 142 acres. The course has been in operation for 15 years and includes a clubhouse, restaurant, pool, ponds, tennis courts and other association amenities. In addition, as of Spring 2004, approximately 58 residential units have been developed as part of the *Ahwahnee Country Club Estates*, which have been developed.

2.1.2 Existing Facilities

There are many small cross culverts along Opah Drive, Wallu Lane and Sierra Meadows Golf Course that convey the flows from onsite facilities or regional creeks. The pipes range in size from 18 inch to 30 inch corrugated metal pipe. There is a large culvert crossing at Miami and Carter Creek. In addition there are a few bridge crossings within the golf course.

2.1.3 Watershed Description

The historic drainage patterns for the areas follow the natural topography. The site drains from north to south and a small portion from northeast to southwest. See Hydrology map (Figure 3) for drainage patterns. Although, there are no storm drains on site, cross culverts convey flows across Opah Drive and through the golf course.

The maximum elevation differential of the local tributary watershed is approximately 1100 feet (from elevation 3200 feet at the north point of the study to an elevation of 2100 at the southern end of the project site). Slopes on the project range from approximately 1 to 30 percent.

The area has been divided into 9 watersheds. Each watershed is divided into smaller subareas and illustrated in Figure 3. The existing Ahwahnee Estates development is located in watersheds C, D and E. A small portion of watersheds A, B, D, E, F, G and H contain portion of the Sierra Meadows Golf Course. The majority of the site is natural open space with Miami Creek flowing along the southern boundary and Carter Creek flowing along the western boundary of the project site. Table 2.1 summarizes the watershed acreages and corresponding tributary creeks.

Table 2.1 – Existing Condition Watershed Area

Tributary Creek	Watershed	Area (acres)
Carter Creek	A	245.7
	B	73.3
	C	269.3

Table 2.1 – Existing Condition Watershed Area

Tributary Creek	Watershed	Area (acres)
Carter Creek	D	101.9
	E	152.2
Miami Creek	F	183.1
	G	471.1
	H	632.4
Confluence of Two Creeks	I	176.1

RBF Consulting examined the existing terrain and topographic conditions of the site through site visits and information provided by Nolte Associates and USGS topography. Hydrologic properties such as slope, length, soil type, vegetation and landuse were characterized for each subarea. Table 2.2 contains a summary of the existing subarea characteristics.

Table 2.2 – Existing Subwatershed Characteristics

Sub-Basin ID	Length (ft)	Slope (ft/ft)	Soil Type	Land Use (Acres)					Total Area (Acres)
				0-1 DU	Commercial	Golf Course	Open Space	Ponds	
A1	300	0.05	C				2.1		2.1
A2	400	0.0375	C				4.2		4.2
A3	620	0.0806	C				15.2		15.2
A4	615	0.1951	C				41.9		41.9
A5	2100	0.0238	C				65.5		65.5
A6	350	0.0286	C				66.3		66.3
A7	2140	0.0117	C				50.5		50.5
B1	230	0.2174	C				1.5		1.5
B2	440	0.0909	C				4.3		4.3
B3	835	0.0958	C				11.9		11.9
B4	1170	0.0769	C				30.3		30.3
B5	1730	0.0549	C			10.6	14.7		25.3
C1	300	0.0667	C				1.3		1.3
C2	360	0.0556	C				3.1		3.1
C3	590	0.1017	C				7.8		7.8
C4	780	0.2308	C				12.4		12.4
C5	3425	0.1752	C				47.9		47.9
C6			C				77.5		77.5
C7	2130	0.0376	C	2.5			56.5	1.7	83.1
C8	820	0.0488	C	14.6					14.6
C9	2320	0.0323	C			21.6			21.6
D1	300	0.1167	C				3.1		3.1
D2	660	0.1364	C				14		14
D3	1250	0.224	C				19.1		19.1

Table 2.2 – Existing Subwatershed Characteristics

Sub-Basin ID	Length (ft)	Slope (ft/ft)	Soil Type	Land Use (Acres)					Total Area (Acres)
				0-1 DU	Commercial	Golf Course	Open Space	Ponds	
D4	840	0.2024	C				11.9		11.9
D5	630	0.2222	C				17.5		17.5
D6	3540	0.0452	C	28.0			7.3	1.1	36.3
E1	300	0.2667	C				1.5		1.5
E2	500	0.28	C				4.5		4.5
E3	1450	0.1793	C				20.2		20.2
E4	1100	0.0636	C				26.3		26.3
E5	1740	0.0517	C	51.2					51.2
E6	2150	0.0581	C	14.1		31.0	3.4		48.5
F1	300	0.1	C				1.4		1.4
F2	430	0.186	C				7		7
F3	470	0.2979	C				13.6		13.6
F4	1480		C				47.7		47.7
F5	2055	0.0608	C				57.2	1.8	59
F6	1915	0.0627	C				25.9		25.9
F7	2240	0.0246	C		2.6	17.4	6.0	2.6	28.5
G1	300	0.1333	C				1.7		1.7
G2	275	0.1818	C				2.9		2.9
G3	335	0.0597	C				5.3		5.3
G4	670	0.0746	C				13.7		13.7
G5	1290	0.062	C				32.6		32.6
G6	3860	0.0959	C				60.3		60.3
G7	3760	0.0931	C				94.9		94.9
G8			C				162.2	3.3	165.5
G9	1505	0.0399	C				61.4		61.4
G10	2090	0.0191	C		0.7	21.6	10.5		32.8
H1	330	0.1818	C				1.4		1.4
H2	285	0.2105	C				2.2		2.2
H3	685	0.1752	C				6.5		6.5
H4	1200	0.1833	C				35.5		35.5
H5	1315	0.0152	C				56.6		56.6
H6	2340	0.0128	C				61.8		61.8
H7	2750	0.0545	C				126.6		126.6
H8	2280	0.0088	C				171		171
H9	3070	0.0065	C			15.3	123.8		139.1
H10	1090	0.0275	C			4.1	27.6		31.7
I-1	3345	0.0045	C				176.1		176.1

Percentage pervious factors for the site range from approximately 0% for paved surfaces, 100% for natural cover, 98% for golf courses, 75% to 80% for single-family housing and 10% for commercial development.

2.2 Hydrology

RBF conducted a local hydrology analysis that provides the basis for the existing condition hydrology for the Sierra Meadows site. Hydrologic calculations to evaluate surface water runoff associated with 10-year and 100-year design storm frequencies were performed on local drainage areas, not the entire Cater Creek and Miami Creek watersheds. This analysis includes only local drainage areas instead of the entire tributary watershed because the entire Carter and Miami Creek watershed is approximately 30 square miles. The Sierra Meadows project comprises only 0.8 square miles or 2.6% of the total watershed. Hence, a local analysis is more applicable to determine the local drainage impacts from the proposed project.

Different references were used to determine the hydrologic parameters for the site. The soil type was determined using the *Madera Area Soil Survey*. The Department of Water Resources provided synthesized rainfall data. Refer to Appendix A for data.

Hydrologic calculations to evaluate surface runoff associated with 10-year and 100-year design storm frequencies from the local drainage areas were performed using the Rational Method. The time of concentration was determined using the TR-55 formula for overland flow and the Manning's equation for natural valley routing. TR-55 is a computerized watershed model that is used to determine peak discharge or peak flow hydrograph for a drainage design, developed by Soil Conservation Service (SCS). The watershed subarea boundaries were delineated utilizing topographic mapping (provided by Nolte Associates) and a site visit to determine the existing drainage patterns. Figure 3 contains the hydrology map for the existing condition.

2.2.1 Rational Method

The hydrologic model used for the analysis is a Rational Method Excel Program that was developed by RBF Consulting. The program consists of several worksheets within the excel workbook to perform rational method hydrology. Worksheets (1) and (2), **Flowrate** and **Travel Time**, are used to perform the hydrologic analysis for the subwatershed. These two worksheets are used together to obtain the time of concentration (T_c) and peak discharge (Q_p) at Rational Method hydrology nodes. T_c and Q_p are calculated twice, once for a return period of 10 years and once for a return period of 100 years. Peak flow is calculated using the Rational Method:

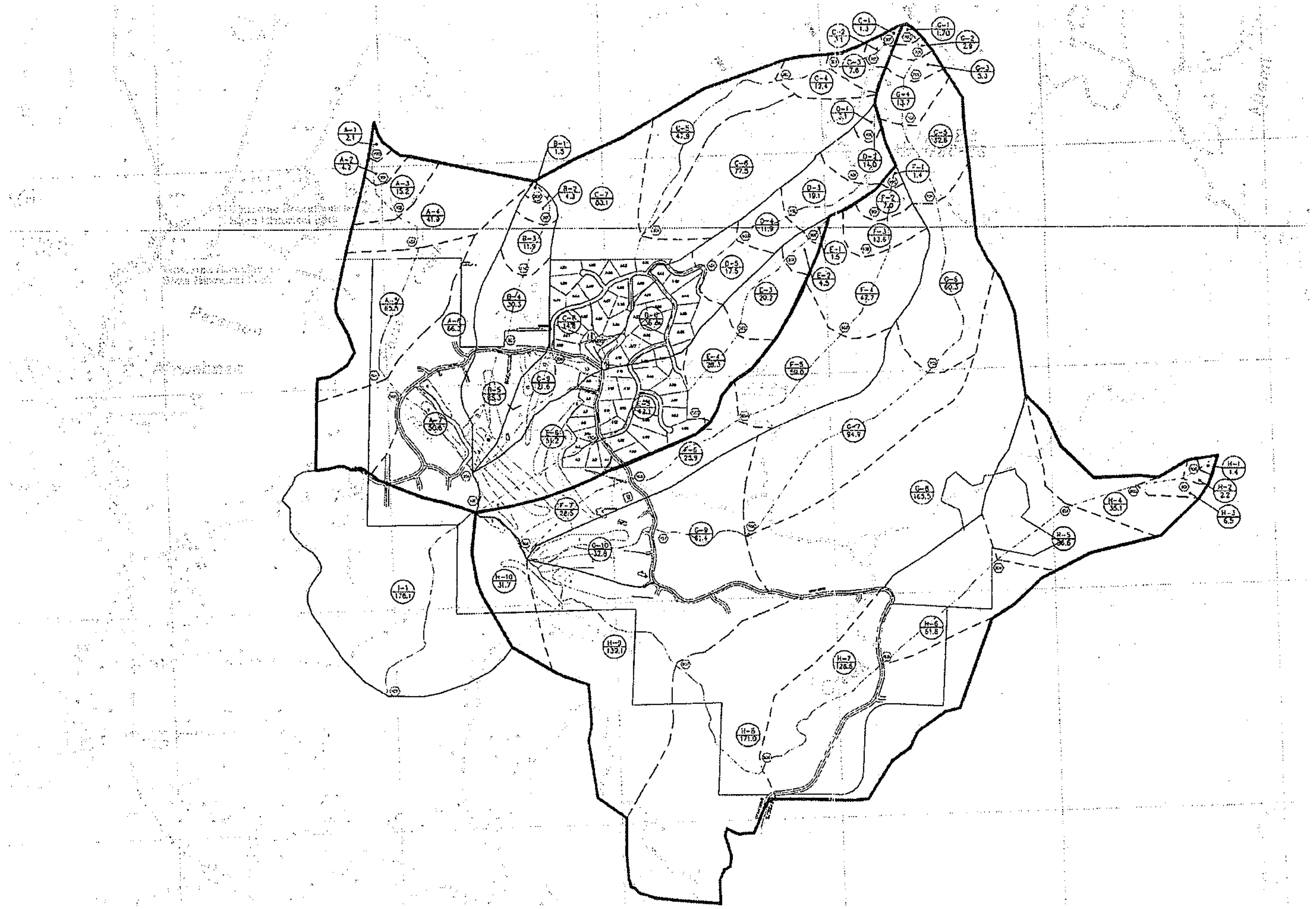
$$Q_p = CiA$$

Q_p = peak flow (cfs),

i = rainfall intensity (in./hr),

C = runoff coefficient,

A = catchment area (ac)



LEGEND

- DRAINAGE BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH
- DIVISION BETWEEN MIAMI AND CARTER CREEK WATERSHED
- A-1 / 2.1 SUBAREA DESIGNATION / SUBAREA AREA (ACRES)
- 1 HYDROLOGY NODE

NOTES:

1. HYDROLOGY MAP FOR PROJECT AREA AND LOCAL OFFSITE AREAS TRIBUTARY TO PROPOSED DEVELOPMENT REGIONAL FLOW TO MAJOR CREEKS NOT INCLUDED.

1600' 0' 1600'

GRAPHIC SCALE: 1"=1600'

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RCE 58797

JOB No. 10-102409
DRAWING No.

DESIGN: SS
DRAWN: EC
CHECKED: SS
P.M. RJA
SCALE AS SHOWN

NO. DATE APVD. REVISIONS

MADERA COUNTY, CALIFORNIA
SIERRA MEADOWS ESTATES
HYDROLOGY MAP
EXISTING CONDITION

FOR: MADERA CO.

FIGURE 3

SHEET 1 OF 1

All runoff coefficients "C" were obtained from a textbook (*Hydrologic Analysis and Design*) table titled *Runoff Coefficients for the Rational Formula versus Hydrologic Soil Group (A, B, C, D) and Slope Range* (Table 7-9, McCuen, 1998). The soils map from the *Madera Area Soil Survey* indicates that the study area consists of soil type Ahwahnee and Auberry series soil. This translates to hydrological soil type "C". The runoff coefficients selected from these sources have been compiled in Worksheet (6), **C-values** and summarized in Table 2.3.

Table 2.3 – Runoff Coefficients for the Rational Formula

Land Use	Slope Range		Soil Type "C"	
	From	To	10-yr Storm Event	100-yr Storm Event
0-1 Dwellings per acre	0%	2%	0.20	0.28
	2%	6%	0.25	0.32
	6%	+	0.31	0.40
0-5 Dwellings per acre	0%	2%	0.27	0.36
	2%	6%	0.31	0.40
	6%	+	0.36	0.47
Mixed Use Commercial or Service Commercial	0%	2%	0.72	0.89
	2%	6%	0.72	0.89
	6%	+	0.72	0.90
Golf Course	0%	2%	0.14	0.20
	2%	6%	0.19	0.25
	6%	+	0.26	0.34
Open Space	0%	2%	0.12	0.18
	2%	6%	0.17	0.23
	6%	+	0.24	0.32
Pond	0%	2%	0.85	0.95
	2%	6%	0.86	0.96
	6%	+	0.87	0.97

The rainfall intensity (i) is obtained from an intensity-duration-frequency (IDF) curve for the specified return period for a duration equal to the time of concentration T_c. IDF curves are generated by Worksheet (5), **IDF Data**. The raw data used to generate the IDF curves in **IDF Data** was in the form of rainfall depth-duration-frequency tables for numerous rain gages provided by the Department of Water Resources, the user has the option of selecting one of two IDF curve generation methods. The first is a single linear regression of all data points on a log-log plot, and the second is a point-to-point linear regression of the data points. In this analysis, method one was selected.

Table 2.4 – Maximum Rainfall (inches) for Indicated Number of Consecutive Hours

Hours	1	2	3	6	12	24	48	72	96
Mariposa, Station No. B60 6321 85 Madera									
RP 2	0.83	1.12	1.33	1.81	2.39	3.01	3.66	3.93	-
RP 10	1.30	1.76	2.09	2.84	3.76	4.72	5.92	6.53	-
RP100	1.85	2.50	2.98	4.04	5.35	6.72	8.56	9.56	-

Table 2.4 – Maximum Rainfall (inches) for Indicated Number of Consecutive Hours

Hours	1	2	3	6	12	24	48	72	96
Oakhurst, Station No. B60 63212 20 Madera									
RP 2	0.59	0.95	1.12	1.77	2.47	3.14	3.93	4.4	-
RP 10	0.93	1.49	1.77	2.78	3.89	4.30	6.37	7.31	-
RP 100	1.32	2.12	2.52	3.96	5.53	7.02	9.21	10.70	-

In the case where a best-fit linear regression through all the data points on a log-log plot is used, the following mathematical representation of an IDF curve is expressed as:

$$i = aD^b$$

i = rainfall intensity (in./hr),
D = duration (hr),
a and b = fitting coefficients that vary with frequency.

This equation is linearized into the following form:

$$\log i = \log a + b \log D.$$

Calculations for confluencing are performed on Worksheet (1), **Flowrate**. Calculations for confluencing appear at the lower, left portion of the **Flowrate** Worksheet. Given are two confluencing flows, Q_1 and Q_2, each with a time of concentration of t_1 and t_2, respectively, where t_1 is greater than t_2. First, the total flow, Q_t, is computed assuming that t_1 controls,

$$Q_t = Q_1 + Q_2 \frac{i_1}{i_2}$$

If t1 controls the effective total area is:

$$A_t = A_1 + A_2$$

Next, Q_t is computed assuming that t_2 controls,

$$Q_t = Q_2 + Q_1 \left(\frac{i_2}{i_1} \right) \left(\frac{t_2}{t_1} \right)$$

If t2 controls the effective total area is:

$$A_t = A_2 + A_1 \left(\frac{t_2}{t_1} \right)$$

The largest calculated Q_t governs at the confluence. The two equations shown above are used twice, because Q_p must be obtained for a storm return period of 10 years (Q_{10}) and a storm return period of 100 years (Q_{100}).

Travel time (T_t), the cumulative sum of which is equal to T_c, is calculated on Worksheet (2), **Travel Time**. The initial T_t is computed using the Technical Release 55 (TR-55) travel time equation for sheet flow. Manning's equation is used to determine the travel time for the component flow segments of street flow, pipe flow and open channel flow.

In the existing condition, natural trapezoidal channel was used with a Manning's "n" value ranging from 0.035 for golf course to 0.045 for open space.

2.2.2 Existing Condition Surface Water Hydrology

The total tributary area associated with the project site is approximately 30 square miles. The site is located within the Miami Creek and Carter Creek Watersheds. The project site is approximately 0.8 square miles of the tributary watersheds. The project site is tributary to Miami and Carter Creek Watersheds. Approximately 3.5% of the local watershed drains to Miami Creek and 1.5% of the local watershed drains to Carter Creek. Due to the small percentage of watershed impact, only local analysis was performed. A local hydrology analysis was performed on the site to determine what impacts the development will have locally.

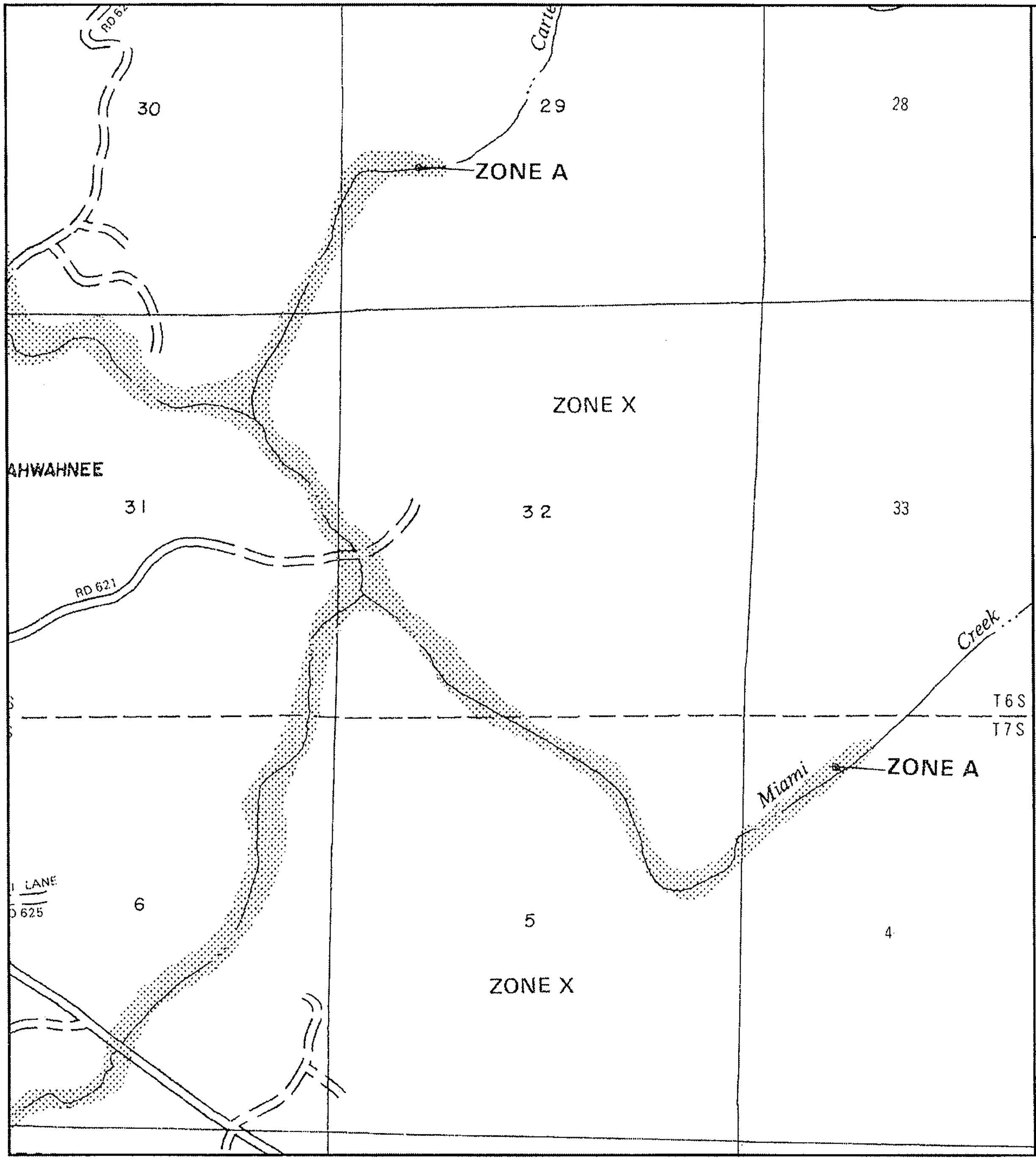
The hydrology map for the existing condition rational method model is included in Figure 3. The results of the rational method analysis are summarized in the Table 2.5. The data utilized for the existing condition analyses is included in Appendix A.

Table 2.5 – Existing Condition Hydrology Summary

Description	Effective Total Area (acres)	10-year Flowrate (cfs)	100-year Flowrate (cfs)
Carter Creek	842	368	632
Miami Creek	1053	409	792
Confluence of Miami Creek and Carter Creeks	2072	735	1355

2.3 Floodplain Mapping

Madera County is a participant in the National Flood Insurance Program (NFIP). Communities participating in the NFIP must adopt and enforce minimum floodplain management standards, including identification of flood hazards and flooding risks. Participation in the NFIP allows communities to purchase low cost insurance protection against losses from flooding. The published Flood Insurance Rate Map (FIRMs) for the project site is included on Community Panel No. 0601700225B. The area along Miami and Carter Creeks are mapped as a Zone "A" floodplain, refer to Figure 4. Zone "A" is classified as an area of 100-year flooding, where no flood elevations and flood hazards have been determined.



APPROXIMATE SCALE IN FEET

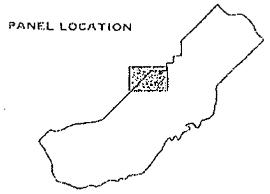
2000 0 2000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MADERA COUNTY,
CALIFORNIA
(UNINCORPORATED AREAS)

PANEL 225 OF 775
(SEE MAP INDEX FOR PANELS NOT PRINTED)



COMMUNITY-PANEL NUMBER
060170 0225 B

EFFECTIVE DATE:
AUGUST 4, 1987

Federal Emergency Management Agency

2.4 Storm Water Quality

As indicated in Section 1.2, storm water quality is a significant concern in California. This section discusses typical pollutants found in storm water runoff and discusses the types of contaminants that may be found in existing storm water runoff from the project site.

2.4.1 Nonpoint Source Pollutants

A net effect of development can be to increase pollutant export over naturally occurring conditions. The impact of the higher export can be on the adjacent streams and also on the downstream receiving waters. However, an important consideration in evaluating storm water quality from the project is to assess if it impairs the beneficial use to the receiving waters. Receiving waters can assimilate a limited quantity of various constituent elements, however there are thresholds beyond which the measured amount becomes a pollutant and results in an undesirable impact. Background of these standard water quality categories provides an understanding of typical impacts.

Sediment - Sediment is made up of tiny soil particles that are washed or blown into surface waters. It is the major pollutant by volume in surface water. Suspended soil particles can cause the water to look cloudy or turbid. The fine sediment particles also act as a vehicle to transport other pollutants including nutrients, trace metals, and hydrocarbons. Construction sites are the largest source of sediment for areas under development. Another major source of sediment is stream bank erosion, which may be accelerated by increases in peak rates and volumes of runoff due to an increase in impervious areas.

Nutrients - Nutrients are a major concern for surface water quality, especially phosphorous and nitrogen, can cause algal blooms and excessive vegetative growth. Of the two, phosphorus is usually the limiting nutrient that controls the growth of algae in lakes. The orthophosphorous form of phosphorus is readily available for plant growth. The ammonium form of nitrogen can also have severe effects on surface water quality. The ammonium is converted to nitrate and nitrite forms of nitrogen in a process called nitrification. This process consumes large amounts of oxygen, which can impair the dissolved oxygen levels in water. The nitrate form of nitrogen is very soluble and is found naturally at low levels in water. When nitrogen fertilizer is applied to lawns or other areas in excess of plant needs, nitrates can leach below the root zone, eventually reaching ground water. Orthophosphate from auto emissions also contributes phosphorus in areas with heavy automobile traffic. As a general rule of thumb, nutrient export is greatest from development sites with the most impervious areas. Other problems resulting from excess nutrients are 1) surface algal scums, 2) water discolorations, 3) odors, 4) toxic releases, and 5) overgrowth of plants. Common measures for nutrients are total nitrogen, organic nitrogen, total Kjeldahl nitrogen (TKN), nitrate, ammonia, total phosphate, and total organic carbon (TOC).

Trace Metals - Trace metals are primarily a concern because of their toxic effects on aquatic life and their potential to contaminate drinking water supplies. The most common trace metals found in runoff are lead, zinc, and copper. Fallout from automobile emissions is also a major source of lead in urban areas. A large fraction of the trace metals in urban runoff are attached to sediment and this effectively reduces the level, which is immediately available for biological uptake and subsequent bioaccumulation. Metals associated with the sediment settle out rapidly and accumulate in the soils. Shorter duration storms have limited exposure, which could be toxic to the aquatic environment. The toxicity of trace metals in runoff varies with the hardness of the receiving water. As total hardness of the water increases, the threshold concentration levels for adverse effects increases.

Oxygen-Demanding Substances - Aquatic life is dependent on the dissolved oxygen (DO) in the water and when organic matter is consumed by microorganisms then DO is consumed in the process. A rainfall event can deposit large quantities of oxygen demanding substance in lakes and streams. The biochemical oxygen demand of typical urban runoff is on the same order of magnitude as the effluent from an effective secondary wastewater treatment plant. A problem from low DO results when the rate of oxygen-demanding material exceeds the rate of replenishment. Oxygen demand is estimated by direct measure of DO and indirect measures such as biochemical oxygen demand (BOD), chemical oxygen demand (COD), oils and greases, and total organic carbon (TOC).

Bacteria - Bacteria levels in undiluted runoff exceed public health standards for water contact recreation almost without exception. Studies have found that total coliform counts exceeded EPA water quality criteria at almost every site and almost every time it rained. The coliform bacteria that are detected may not be a health risk in themselves, but are often associated with human pathogens.

Oil and Grease - Oil and grease contain a wide variety of hydrocarbons some of which could be toxic to aquatic life in low concentrations. These materials initially float on water and create the familiar rainbow-colored film. Hydrocarbons have a strong affinity for sediment and quickly become absorbed to it. The major sources of hydrocarbons are through leakage of crankcase oil and other lubricating agents from automobiles. Hydrocarbon levels are highest in the runoff from parking lots, roads, and service stations. Residential land uses generate less hydrocarbons export, although illegal disposal of waste oil into storm waters can be a local problem.

Other Toxic Chemicals - Priority pollutants are generally related to hazardous wastes or toxic chemicals and can be sometimes detected in storm water. Priority pollutant scans have been conducted in previous studies, which evaluated the presence of over 120 toxic chemicals and compounds. The scans rarely revealed toxins that exceeded the current safety criteria. The runoff scans were primarily conducted in small residential areas not expected to have many sources of toxic pollutants (with the possible exception of illegally disposed or applied household hazardous wastes). Measures of priority pollutants in storm water include - 1) phthalate (plasticizer compound), 2) phenols and creosols (wood preservatives), 3) pesticides and herbicides, 4) oils and greases, and 5) metals.

2.4.2 Physical Characteristics of Surface Water Quality

Standard parameters, which can assess the quality of storm water, provide a method of measuring impairment. A background of these typical characteristics assists in understanding water quality requirements. The quantity of a material in the environment and its characteristics determine the degree of availability as a pollutant in surface runoff. In an urban environment, the quantity of certain pollutants in the environment is a function of the intensity of the land use. For instance, a high density of automobile traffic makes a number of potential pollutants (such as lead and hydrocarbons) more available. The availability of a material, such as a fertilizer, is a function of the quantity and the manner in which it is applied. Applying fertilizer in quantities that exceed plant needs leaves the excess nutrients available for loss to surface or ground water.

The physical properties and chemical constituents of water traditionally have served as the primary means for monitoring and evaluating water quality. Evaluating the condition of water through a water quality standard refers to its physical, chemical, or biological characteristics. Water quality parameters for storm water comprise a long list and are classified in many ways. In many cases, the concentration of pollutant is needed to assess a water quality problem, instead of the annual pollutant loads. Some of the physical, chemical or biological characteristics that evaluate the quality of the surface runoff are outline below:

Dissolved Oxygen - Dissolved oxygen in the water has a pronounced effect on the aquatic organisms and the chemical reactions that occur. It is one of the most important biological water quality characteristics in the aquatic environment. The dissolved oxygen concentration of a water body is determined by the solubility of oxygen, which is inversely related to water temperature, pressure, and biological activity. Dissolved oxygen is a transient property that can fluctuate rapidly in time and space. Dissolved oxygen represents the status of the water system at a particular point and time of sampling. The decomposition of organic debris in water is a slow process and the resulting changes in oxygen status respond slow also. The oxygen demand is an indication of the pollutant load and includes measurements of biochemical oxygen demand or chemical oxygen demand.

Biochemical Oxygen Demand (BOD) - The biochemical oxygen demand (BOD) is an index of the oxygen-demanding properties of the biodegradable material in the water. Samples are taken from the field and incubated in the laboratory at 20°C, after which the residual dissolved oxygen is measured. The BOD value commonly referenced is the standard 5-day values. These values are useful in assessing stream pollution loads and for comparison purposes.

Chemical Oxygen Demand - The chemical oxygen demand (COD) is a measure of the pollutant loading in terms of complete chemical oxidation using strong oxidizing agents. It can be determined quickly because it does not rely on bacteriological actions as with BOD. COD does not necessarily provide a good index of oxygen demanding properties in natural waters.

Total Dissolved Solids (TDS) - TDS concentration is determined by evaporation of a filtered sample to obtain residue whose weight is divided by the sample volume. The TDS of natural waters varies widely. There are several reasons why TDS is an important indicator of water quality. Dissolved solids affect the ionic bonding strength related to other pollutants such as metals in the water. TDS are also a major determinant of aquatic habitat. TDS affects saturation concentration of dissolved oxygen and influences the ability of a water body to assimilate wastes. Eutrophication rates depend on total dissolved solids.

pH - The pH of water is the negative log, base 10, of the hydrogen ion (H^+) activity. A pH of 7 is neutral; a pH greater than 7 indicates alkaline water; a pH less than 7 represents acidic water. In natural water, carbon dioxide reactions are some of the most important in establishing pH. The pH at any one time is an indication of the balance of chemical equilibrium in water and affects the availability of certain chemicals or nutrients in water for uptake by plants. The pH of water directly affects fish and other aquatic life and generally toxic limits are pH values less than 4.8 and greater than 9.2.

Alkalinity - Alkalinity is the opposite of acidity, representing the capacity of water to neutralize acid. Alkalinity is also linked to pH and is caused by the presence of carbonate, bicarbonate, and hydroxide, which are formed when carbon dioxide is dissolved. A high alkalinity is associated with a high pH and excessive solids. Most streams have alkalinities less than 200 mg/l and ranges of alkalinity of 100-200mg/l seem to support well-diversified aquatic life.

Specific Conductance - The specific conductivity of water, or its ability to conduct an electric current, is related to the total dissolved ionic solids. Long term monitoring a project waters can develop a relationship between specific conductivity and TDS. Its measurement is quick and inexpensive and can be used to approximate TDS. Specific conductivities in excess of 2000 µohms/cm indicate a TDS level too high for most freshwater fish.

Turbidity - The clarity of water is an important indicator of water quality that relates to the alkalinity of photosynthetic light to penetrate. Turbidity is an indicator of the property of water that causes light to become scattered or absorbed. Suspended clays and other organic particles cause turbidity. It can be used as an indicator of certain water quality constituents such as predicting the sediment concentrations.

Nitrogen (N) - Sources of nitrogen in storm water are from the additions of organic matter to water bodies or chemical additions. Ammonia and nitrate are important nutrients for the growth of algae and other plants. Excessive nitrogen can lead to eutrophication since nitrification consumes dissolved oxygen in the water. Nitrogen occurs in many forms. Organic Nitrogen breaks down into ammonia, which eventually becomes oxidized to nitrate-nitrogen, a form available for plants. High concentrations of nitrate-nitrogen (N/N) in water can stimulate growth of algae and other aquatic plants, but if phosphorus (P) is present, only about 0.30 mg/l of nitrate-nitrogen is needed for algal blooms. Some fish life can be affected when nitrate-nitrogen exceeds 4.2 mg/l. There are a number of ways to measure the various forms of aquatic nitrogen. Typical measurements of nitrogen include Kjeldahl nitrogen (organic nitrogen plus ammonia); ammonia; nitrite plus nitrate; nitrite; and nitrogen in plants. The principal water quality criteria for nitrogen focus on nitrate and ammonia.

Phosphorus (P) - Phosphorus is an important component of organic matter. In many water bodies, phosphorus is the limiting nutrient that prevents additional biological activity from occurring. The origin of this constituent in storm water discharge is generally from fertilizers and other industrial products. Orthophosphate is soluble and is considered to be the only biologically available form of phosphorus. Since phosphorus strongly associates with solid particles and is a significant part of organic material, sediments influence concentration in water and are an important component of the phosphorus cycle in streams. The primary methods of measurement include detecting orthophosphate and total phosphorus.

2.4.3 Existing Storm Water Quality

The project site lacks any measured data on storm water runoff quality. In the absence of site-specific data, expected storm water quality can be qualitatively discussed by relating typical pollutants to specific land uses. The site contains a golf course, come residential development, roads and open space. The expected existing pollutants in the existing condition storm water runoff from the developed areas of the Ahwahnee Estates residential development and the golf course include trash, nutrients, bacteria, pesticides and herbicides, oil and grease, and household hazardous wastes. The natural areas are likely to produce suspended solids.

The retention ponds on the golf course will potentially decrease the amount of pollutants in storm water runoff. These retention ponds are being used for golf course irrigation. It is likely that portions of potential pollutants are removed through the use of natural conveyance rather than a storm drain system. Conveying flows overland through vegetation affords some infiltration and biofiltration of runoff and thus potential pollutant removal. A draw back to conveying flows overland is that it tends to create erosion problems and thus increases suspended solids in the runoff. Since the majority of the site drains to the golf course, the existing runoff may contain additional pollutants from fertilizer, pesticides and herbicides.

SECTION 3 PROPOSED CONDITION

The following is an analysis of the proposed project conditions, which is compared to the existing conditions analysis, to determine impacts associated with development of the property. The impact analysis is presented in Section 4. As mentioned previously, only local hydrology analysis was conducted on the site. Proposed conditions investigated include land use, assumed roadway drainage, hydrology, floodplain mapping, and surface water quality. A hydrologic analysis has not been provided by the Applicant; therefore, several engineering assumptions concerning drainage patterns were made in order to assess project impacts.

3.1 Proposed Condition Watershed

3.1.1 Proposed Land Use

The proposed project involves the development of 315 single-family residential lots and necessary infrastructure to support the development. The lots will range in size from approximately 7,000 square feet to 6 acres. Numerous roads will be built to support the development. As part of the development, Opah Drive will be extend to Pine River Road, which is a county road that terminates just west of the proposed project. Water will be diverted from Miami Creek into a 210-acre feet reservoir for onsite water supply. Figure 5 is a Proposed Site Map.

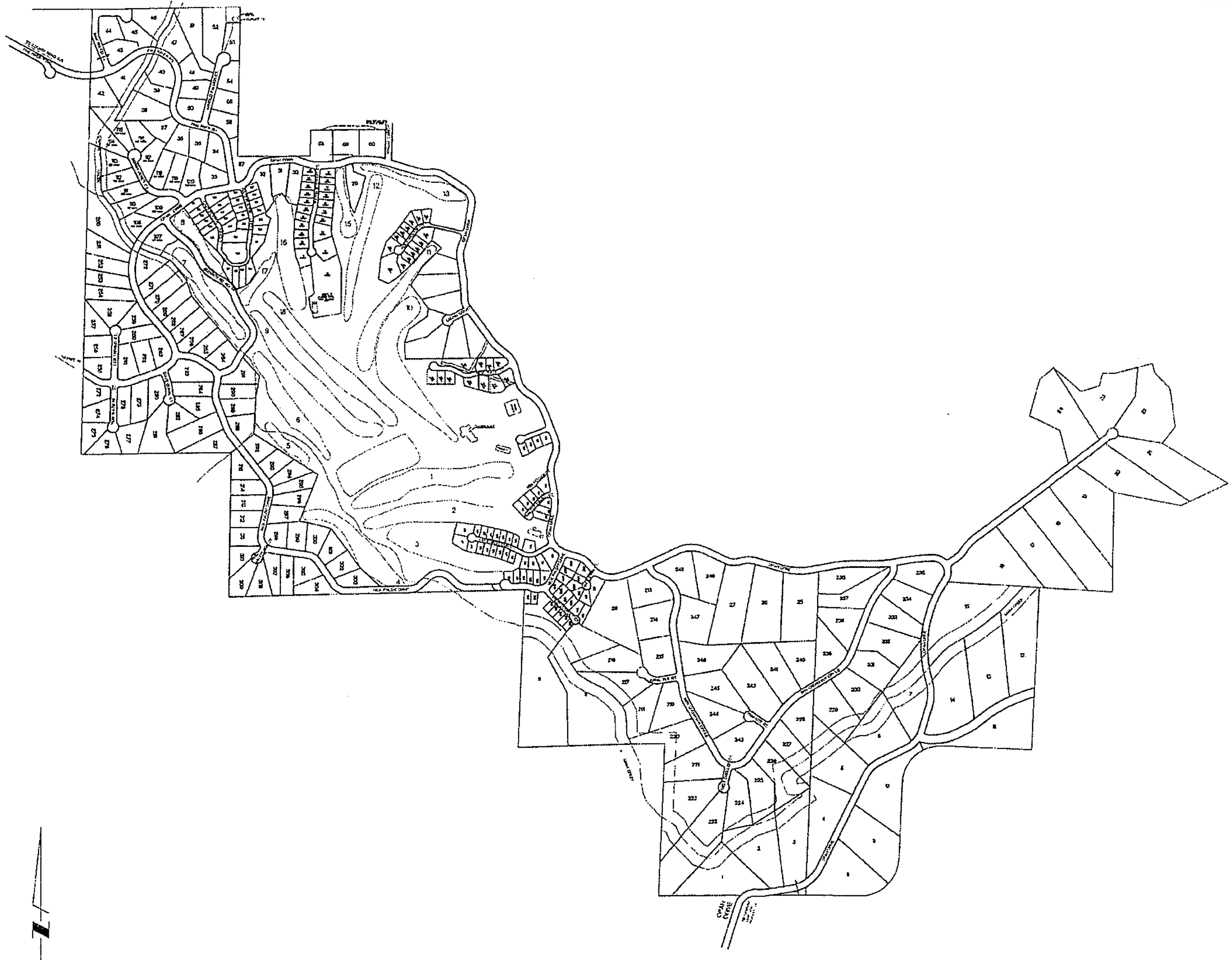
3.1.2 Watershed Description

It is RBF's understanding that there will be no storm drain system on site to convey flows. However, there will be cross culverts to direct flow across streets and around homes. Table 3.1 provides an area summary for the proposed hydrology.

Table 3.1 – Proposed Condition Watershed Area

Tributary Creek	Watershed	Area (acres)
Carter Creek	A	230.1
	B	90.4
	C	272.3
	D	101.9
	E	134.1
Miami Creek	F	185.4
	G	472.9
	H	600.3
Confluence of Two Creeks	I	217.7

Hydrologic properties such as slope, assumed drainage patterns, soil type, vegetation and land use were characterized for each subarea. The watershed subareas were utilized to develop a "link-node" model, which allows transformation of a physical process into a mathematical simulation or model. Table 3.2 contains a summary of the sub-watershed characteristics.



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10-102469

DRAWING No.

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DESIGN: SS
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NO.	DATE	APVD.	REVISIONS

MADERA COUNTY, CALIFORNIA
SIERRA MEADOWS ESTATES
PROPOSED SITE MAP

FOR: MADERA CO.

FIGURE
5

SHEET
1 OF 1

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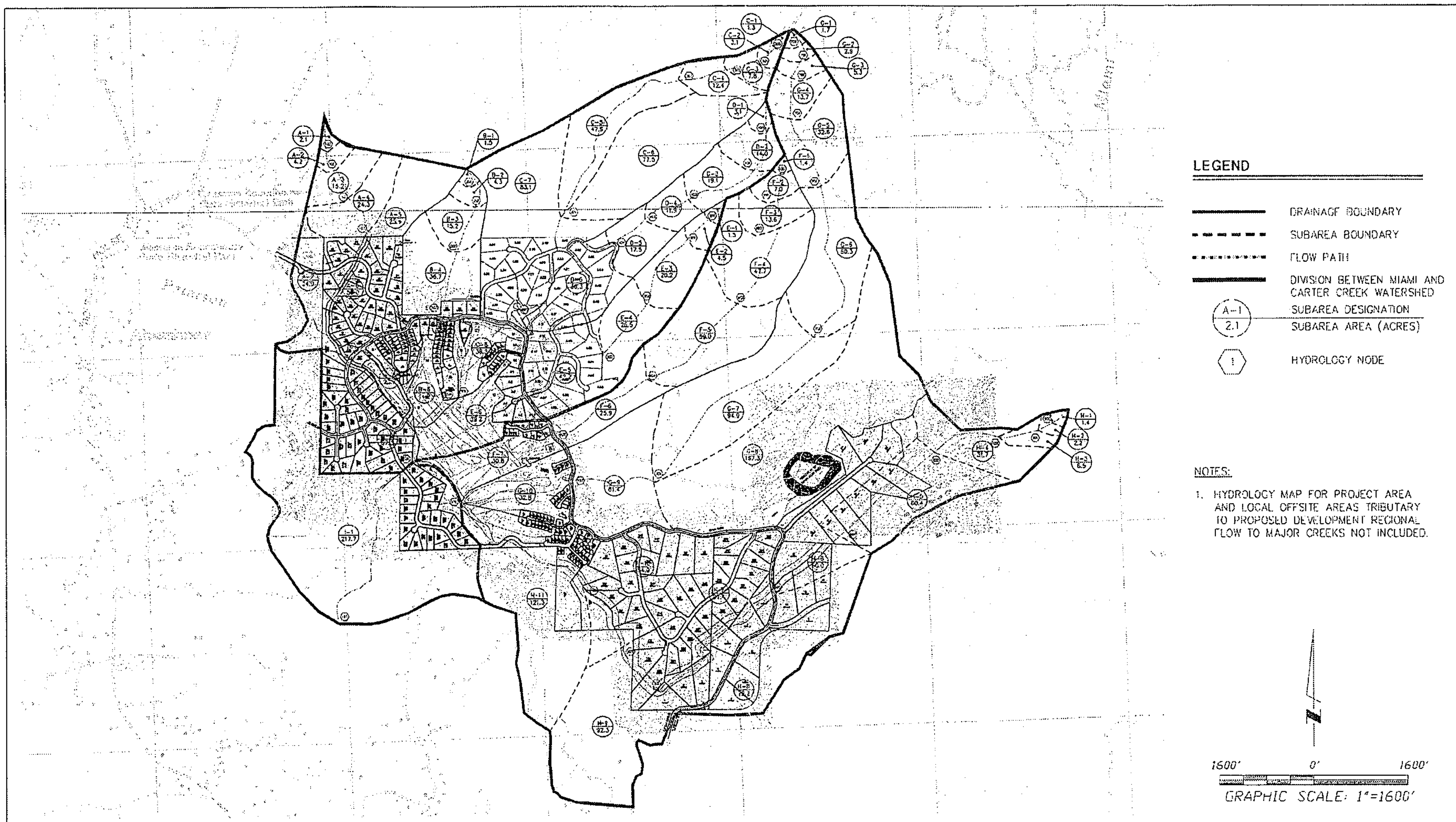

LEGEND

━━━	DRAINAGE BOUNDARY
╌╌╌	SUBAREA BOUNDARY
┈┈┈	FLOW PATH
▬▬▬	DIVISION BETWEEN MIAMI AND CARTER CREEK WATERSHED
A–1	SUBAREA DESIGNATION
2.1	SUBAREA AREA (ACRES)
⬡ 1	HYDROLOGY NODE

NOTES:

1. HYDROLOGY MAP FOR PROJECT AREA AND LOCAL OFFSITE AREAS TRIBUTARY TO PROPOSED DEVELOPMENT REGIONAL FLOW TO MAJOR CREEKS NOT INCLUDED.

SOURCE:

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DATE 6/03
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SCALE AS SHOWN

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MADERA COUNTY, CALIFORNIA
SIERRA MEADOWS ESTATES

HYDROLOGY MAP
PROPOSED CONDITIONS

FOR: MADERA CO.

FIGURE 6

SHEET 1 OF 1

P:\PDATA\10102469\CADD\MISC\EX-102PROP_COND_HYDROMAP.DWG HAN 9/28/04 11:26 am proposed project contains one reservoir for drinking and irrigation water storage. For the hydrology analysis it was assumed that the reservoir is full, therefore no attenuation of flood flows was considered.

The watershed subarea boundaries were delineated utilizing topographic mapping (provided by Nolte Associates), onsite grading provided by Nolte Associates and a site visit to determine the existing drainage patterns. The Proposed Conditions Hydrology Map is illustrated in Figure 6. In the proposed condition the proposed lots and open ditches, will flow directly towards Miami and Carter Creeks through cross culverts and overland flow.

Different references were used to determine the hydrologic parameters for the site. The soil type was determined using the Madera Area Soil Survey. Synthesized rainfall data was provided by the Department of Water Resources, refer to Appendix A for data.

3.2.1 Rational Method

The hydrologic model used for the proposed condition analysis is a Rational Method Excel Program. The program consists of several worksheets within the excel workbook to perform rational method hydrology. Refer to section 2.2.1 for a detailed explanation of the worksheets and the methodology.

3.2.2 Proposed Condition Surface Water Hydrology

Appendix B includes the results from the 10-year and 100-year flows. Results of the proposed condition hydrologic analysis are summarized in Table 3.3.

Table 3.3 – Proposed Condition Hydrology Summary

Description	Effective Total Area (acres)	10-year Flowrate (cfs)	100-year Flowrate (cfs)
Carter Creek	828.8	461	667
Miami Creek	1209.4	443	848
Confluence of Miami and Carter Creeks	1990	939	1590

Based on engineering assumptions, as discussed above, the proposed flow path is assumed to travel through streets and between lots in an overland flow pattern or through cross culverts at road crossings.

3.3 Floodplain Mapping

The current Flood Insurance Rate Map (FIRM) shows the site is contained within a Zone "A" floodplain along Carter and Miami Creeks. The project site is located in a Zone "A" floodplain created by Carter and Miami Creeks. A Zone "A" designation refers to a 100-year floodplain, where flood elevations and flood hazard factors have not determined. Since there are no detailed hydraulic analyses performed for this area, no Base Flood Elevations or depths are shown within this zone. The project will require culverts or bridges for proposed crossings of Carter and Miami Creeks. Therefore, project improvements will be needed to conform to FEMA requirements.

3.4 Proposed Water Quality

At the time of RBF's analysis a Storm Water Quality Management Plan (WQMP) for the Sierra Meadows project had not been prepared. A WQMP should be implemented for this project per recommendations made by Madera County. A WQMP outlines the proposed Best Management Practices (BMPs) the developer will implement with the construction of the site. It is possible to grade the site so that the flows are directed to the existing ponds located with in the golf course. It is likely that some pollutants are removed through the use of natural conveyance. Conveying flows overland through vegetation affords some infiltration and biofiltration of runoff and thus, potential pollutant removal. However, additional BMPs are outlined in Section 5.5, which would reduce the pollutants from the entire site.

The expected pollutants would include trash, nutrients, bacteria, pesticides and herbicides, oil and grease, and household hazardous wastes. The natural areas are likely to produce suspended solids in the stormwater runoff.

SECTION 4 IMPACTS

4.1 Drainage

The proposed project would alter drainage patterns due to onsite grading and increases in the amount of impervious area. This could result in increased local erosion and runoff. The impacts are considered potentially significant if not mitigated.

In the proposed condition, the watershed delineation changes slightly from the existing condition, due to grading, and increases of impervious areas (roads and lots). Table 4.1 compares the existing and proposed condition drainage areas.

Table 4.1 – Total Watershed Area Comparison

Tributary Creeks	Watershed	Existing Condition (acres)	Proposed Condition (acres)	Difference (acres)
Carter Creek	A	245.7	230.1	15.6
	B	73.3	90.4	-17.1
	C	269.3	272.3	-3.0
	D	101.9	101.9	0.0
	E	152.2	134.1	18.1
Miami Creel	F	183.1	185.4	-2.3
	G	471.1	472.9	-1.8
	H	632.4	600.3	32.1
Confluence of two Creeks	I	176.1	217.7	-41.6
Total		**2305.1**	**2305.1**	**0.0**

With the construction of 315 homes on the project site, drainage boundaries will be altered due to grading. This will increase the overall imperviousness for the watershed from 3% pervious in existing condition to 8.5% in developed condition. As shown in Table 4.1, under the proposed condition watersheds B, C, F, G and I would increase the total area draining to each watershed. While watersheds A, E and H would decrease the total area draining to each watershed. Watershed D does not change between existing and proposed condition. Existing drainage courses are slightly altered through grading. The addition of homes and roads would require a drainage system to reduce flooding and erosion impacts. Concentrate flows entering the creeks at various discharge locations may cause an increase to potential local erosion.

Designing drainage conveyance systems, such as open ditches and connections to existing creeks per County requirements would reduce the erosion potential. Drainage impacts are considered potentially significant if not mitigated. However, providing protection to minimize erosion, designing cross culverts based on Madera County requirements and designing creek crossings based on FEMA requirements would reduce the impacts to drainage to a less then significant level.

4.2 Hydrology

The proposed project would alter hydrology due to onsite grading and increases in impervious area. This could result in existing crossings being undersized due to the increased flows onsite. Thus, the impacts are considered potentially significant if not mitigated.

The Sierra Meadows Estates project would result in an increase in impervious areas on site as mentioned in Section 4.1. The project would include 315 lots at full build-out and supporting infrastructure. Drainage patterns were assumed for the hydrologic analysis based on information collected at a site visit, current proposed site grading and lot layout.

Table 4.2 compares the overall flowrate from the local site tributary area in Carter Creek, Miami Creek, and at a downstream point in Miami Creek after the confluence with Carter Creek.

Table 4.2 –Flowrate Comparison

Tributary Creek	**10-year Flowrate (cfs)**		**100-year Flowrate (cfs)**	
	Existing Condition	**Proposed Condition**	**Existing Condition**	**Proposed Condition**
Carter Creek	368	461	632	667
Miami Creek	409	443	792	848
Confluence of Two Creeks	735	939	1355	1590

The total tributary area to Miami and Carter Creek watersheds are approximately 30 square miles. This analyses only focuses on local hydrology, which is approximately 3.4 square miles. The overall increase in flows entering Carter Creek is 35 cubic feet per second (cfs) and Miami Creek is 56 cfs for the 100-year storm event, which will increase the local flow from the site entering each creek by approximately 5.5%. After the confluence of Carter and Miami Creeks the overall increase in flows will be 235 cfs in the 100-year, which will increase the local flows from the site entering the creeks by approximately 17%. However, the increase of 17% is only for the local area, which is 2.6% of the total Miami and Carter Creek Watersheds. Due to the increase in runoff from the site the existing facilities may be undersized.

By designing culverts per Madera County and creek crossings to FEMA standards would reduce the potential for onsite and offsite flooding and mitigate any potentially significant impacts regarding runoff. Impacts would be reduced to less than significant level.

4.3 Dams

There is one dam being constructed as part of a water storage reservoir. The dam falls under Division of Safety of Dams (DSOD) jurisdiction. Thus impacts are potentially significant if not mitigated.

One dam is being constructed as part of the proposed project water supply demand. Figure 7 provides a dam location map. Based on preliminary plans provided by the applicant it appears that the dam is within DSOD jurisdiction. A dam is outside of DSOD jurisdiction if its embankment height is at or under 25 feet and the storage capacity behind the dam is less than 50 acre-feet or if storage capacity is less than 15 acre-feet regardless of embankment height. Since this dam has a 40-foot embankment and 210 ac-ft it is within DSOD jurisdiction.

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MADERA COUNTY, CALIFORNIA
SIERRA MEADOWS ESTATES

DAM SITE MAP
PROPOSED CONDITION

FOR. MADERA CO.

FIGURE 7

SHEET 1 OF 1

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Per natural drainage courses shown on the hydrology map, it appears that if the dam fails, the flow from the dam many inundate the lots on the southeast of the existing golf course. This may cause damage to structures within the flow path.

Designing the dam per DSOD and Madera County requirements would reduce the risk of the flooding due to failure of the dam to a less than significant level.

4.4 Floodplain

The proposed development would impact mapped 100-year floodplains. Portions of the Sierra Meadows site is located in Zone "A" floodplain along Miami and Carter Creeks. The construction of four proposed culverts/bridges within Carter and Miami Creeks has the potential to impact the 100-year floodplain. Construction near the floodplain may be required for some lots. Also, several lots span the Carter and Miami Creeks. The lots have the potential to be impacted by the 100-year flows in the creeks.

Constructing the culverts and lots per FEMA standards would reduce the risk of flooding to less than significant.

4.5 Water Quality

The development of the Sierra Meadows Estates would increase impervious areas and increase onsite activities, which would result in impacts to both pre- and post construction storm water quality. Increased pollutant loading would occur immediately offsite. However, implementation of construction and post-construction Best Management Practices, including the preparation of a Water Qulaity Management Plan, Storm Water Pollution Prevention Plan and a Notice of Intent, would reduce impacts to water quality to a less than significant level.

Madera County (Post-Construction)

Post construction of the Sierra Meadows site would increase trash, nutrients, bacteria, pesticides and herbicides, oil and grease, and household hazardous wastes from the development and increase activity in Carter Creek and Miami Creek watersheds. The natural areas are likely to produce suspended solids. The development would be required to prepare and implement a Water Quality Management Plan that includes post-construction Best Management Practice (BMPs) to reduce pollutant loadings. Thus water quality impacts due to the development of the site are potentially significant if not mitigated.

Construction

Due to construction and associated earth moving there will be additional impacts to storm water quality. Construction of the proposed development has the potential to produce typical pollutants such as nutrients, heavy metals, pesticides and herbicides, toxic chemicals related to construction and cleaning, waste materials including wash water, paints, wood, paper, concrete, food containers, and sanitary wastes, fuel, and lubricants. Prior to construction a Notice of Intent (NOI) and Storm Water Pollution Prevention Plan (SWPPP) would be required to reduce pollutant loadings. Impacts to water quality due to construction are significant if not mitigated.

SECTION 5 MITIGATION

5.1 Drainage

- Local (outside of FEMA floodplain) cross culverts and drainage ditches shall be sized to convey the 10-yr storm event or per direction of the Madera County engineering staff.
- Culverts or bridges designed for the proposed road crossings over Miami and Carter Creeks shall be sized for the 100-year storm flows.
- Connections to the creeks from onsite drainage systems shall be designed to minimize local erosion.

Completion of these drainage mitigation measures would reduce impacts to a less than significant level.

5.2 Hydrology

Refer to mitigation measures outlined in Section 5.1. Completion of these mitigation measures would reduce flooding impacts to a less than significant level.

5.3 Dams

- Dams shall be designed for either DSOD or Madera County criteria.
- Applicant shall obtain from DSOD a letter that describes the jurisdictional status of the dam

Completion of the above mitigation measures would reduce impacts due to dam failure to a less than significant level.

5.4 Floodplain

- Culverts or bridges located within Miami and Carter Creeks shall be designed to convey the 100-year flow.
- Applicant shall obtain a Conditional Letter of Map Revision and Letter of Map Revision from FEMA for the proposed construction with the mapped floodplain.

Completion of the above mitigation measures would reduce flooding impacts to a less than significant level.

5.5 Water Quality

- Applicants shall prepare and submit a Notice of Intent to comply with the Construction General Permit to the California State Water Resources Board.
- Applicants shall prepare a Storm Water Pollution Prevention Plan (SWPPP) per requirements of the Construction General NPDES Permit.
- Applicant shall prepare a WQMP addressing post-construction BMPs per direction of Madera County.

Completion of the above mitigation measures would reduce water quality impacts to a less than significant level. The following section list potential BMPs that can be used for both construction and post-construction stormwater quality.

5.5.1 Non-Structural/Source Control BMPs Mitigation (Post Construction)

Education for Property Owners, Tenants and Occupations – The Property Owners Association (POA) is required to provide awareness educational material, including information provided by Madera County and Regional Water Quality Control Board. The materials would include a description of chemicals that should be limited to the property and proper disposal, including prohibition of hosing waste directly to gutters, catch basins, storm drains or the lake.
Activity Restrictions – The developer would prepare conditions, covenants and restriction of the protection of surface water quality.

Common Area Litter Control – POAs are required to implement trash management and litter control procedures to minimize pollution to drainage waters.

The following are proposed mitigations from the *California Storm Water Best Management Practice Handbook - Municipal*:

5.5.2 Structural/Treatment BMPs Mitigation (Post Construction)

In addition to the BMPs discussed in the proposed water quality Section 3.4, the following Structural/Treatment BMPs are suggested to reduce pollutants:

Control of Impervious Runoff – Surface runoff shall be directed to landscape areas or pervious areas.

Storm Water Pollutants of Concern – Minimize pollution by using vegetated swales, vegetated strips, oil/water separators, and cross culvert screens. In addition, direct rooftop runoff to pervious areas such as yards, open channels or vegetative area.

Common Area Runoff-Minimizing Landscape Design – Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration.

Slopes and Channels – Protect slopes and channels by installing energy dissipaters, such as rip rap, at the outlet of a new culvert, use velocity rings to reduce the velocity of the water.

Debris Posts – Are necessary to prevent large floatable debris from entering the storm drains. They are place upstream of the cross culverts.

Inlet Trash Racks – Where appropriate to reduce intake and transport through the storm drain system of large floatable debris, trash racks shall be provided where drainage from open areas entering storm drain or cross culverts.

Parking Areas – Reduce the oil and hydrocarbon runoff from parking area by treating to remove oil and hydrocarbons. Also maintain and operate treatment systems to reduce oil and sludge in the storm drain.

The following are proposed mitigations from the *California Storm Water Best Management Practice Handbook - Municipal*:

TC 10 Infiltration Trenches – Are long, narrow, rock-filled trenches with no outlet that receive stormwater. They perform well in removing fine sediment and associated pollutants. A typical infiltration trench is essentially an excavated trench, which is lined with filter fabric and backfilled with stones. Depth of the infiltration trench ranges from 3 to 8 feet and functions best in areas with permeable soils, and water table and bedrock depth situated well below the bottom of the trench. Trenches should not be used to trap coarse sediments, because large sediment will likely clog the trench. Grass buffers can be installed to capture sediment before it enters the trench to minimize clogging.

TC 30 Vegetative Swales – Open shallow channels with vegetation covering the site slopes and bottom that collect and slowly covey runoff flow. Treat runoff from filtration by vegetation. In order for the vegetation swales to be effective in the removal of potential pollutants, the swales must be treated as water quality features and must be maintained differently than grass areas. Specifically, pesticides, herbicide, and fertilizers, which may be used on the grass areas, must not be used in the vegetation swales.

TC 31 Buffer Swales – Grassed strips that treat by sheet flow. They remove sediment and other pollutants to settle and by providing some infiltration into the soil.

5.5.3 Construction Erosion Controls Mitigation (Construction)

The following are potential BMPs that may be outlined in the SWPPP:

Employee and Subcontractor Training – Have a training session for employees and subcontractors to understand the need for implementation and usage of BMPs.

From the California Storm Water Best Management Practice Handbook - Construction Activity:

EC 2 Preservation of Existing Vegetation – Minimize the removal of existing trees and shrubs because they serve as erosion control.

EC 3 Hydraulic Mulching – Provides suitable soil disturbed areas requiring temporary protection by applying a mixture of wood fiber and stabilizing emulsion until permanent stabilization is established.

EC 4 Hydroseeding – Provides suitable soil disturbed areas requiring temporary protection by applying a mixture of wood fiber, seed, fertilizer, and stabilizing emulsion until permanent stabilization is established.

EC 5 Soil Binders – Applying soil stabilizers to exposed soil surfaces to prevent water induced erosion and wind erosion.

EC 7 Geotextiles and Mats – Natural or synthetics material can be used for soil stability.

EC 9 Earth Dikes and Drainage Swales – Construct earth dikes of compacted soil to divert runoff or channel water to a desired location. Use temporary drains and swales to divert off-site runoff around the construction site, stabilized areas and direct it into sediment basins or traps.

SE 1 Silt Fence – Composed of filter fabric, which have been entrenched, attached to support poles and sometimes backed by wire fence support. Silt fences promote sedimentation behind the fence of sediment-laden water.

SE 3 Sediment Trap – A sediment trap is a small, excavated or bermed area where runoff for small drainage areas can pass through allowing sediment to settle out.

SE 5 Fiber Rolls – Placed at the toe and face of the slopes to intercept runoff, reduce its flow velocity, release the runoff as sheet flow and provide sediment removal.

SE 6 Gravel Bag Berms – Placed on level contours to pond sheet flow, allow sediment to settle and release runoff slowly as sheet flow to prevent erosion.

SE 7 Street Sweeping and Vacuuming – Used to remove sediment from streets and roadways.

SE 8 Sand Bag Barriers – By stacking sand bags on a level contour, creates a barrier to detain sediment-laden water. The barrier would promote sedimentation.

SE 9 Straw Bale Barrier – Place straw bales end to end in a level contour in a shallow trench and stake them in place. The bales would detain runoff and promote sedimentation.

NS 2 Dewatering Operations – This operation requires the use of sediment controls to prevent or reduce the discharge of pollutant to storm water from dewatering operations.

NS 3 Paving and Grinding Operations – Prevent or reduce the runoff of pollutant from paving operations by proper storage of materials, protecting storm drain facilities during construction and training employees.

NS 8 Vehicle and Equipment Cleaning – Use off-site facilities, or wash in designated areas to reduce pollutant discharge into the storm drain facilities.

NS 9 Vehicle and Equipment Fueling – Use off-site facilities, or designated areas with enclosing or coverings to reduce pollutant discharge into the storm drain facilities.

NS 10 Vehicle and Equipment Maintenance – Use off-site facilities, or designated areas with enclosing or coverings to reduce pollutant discharge into the storm drain facilities. In addition run a "dry site" to prevent pollution discharge into storm drains.

WE 1 Wind Erosion Control – Applying water or other dust palliatives to prevent or alleviate dust nuisance.

TC 1 Stabilized Construction Entrance – Stabilize the entrance pad to construction area to reduce amount of sediment tracked off site.

TC-2 Construction Road Stabilization – All on-site vehicle transport routes should be stabilized immediately after grading and frequently maintained to prevent erosion and control dust.

WM 5 Solid Waste Management - This BMP describes the requirements to properly design and maintain trash storage areas. The primary design feature requires the storage of trash in covered areas

WM 6 Hazardous Waste Management - This BMP describes the requirements to properly design and maintain waste areas.

WM 7 Concrete Waste Management – Prevent and reduce pollutant discharge to storm water from concrete waste by performing on and off-site washouts in designated areas and training employees and consultants.

WM 9 Sanitary Septic Water Management – Provide convenient, well-maintained facilities, and arrange regular service and disposal of sanitary waste.

By implementing some of these mitigation measures impacts are reduced to a less then significant level.

SECTION 6 REFERENCES

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Appendix A

Modified Rational Method - Existing Condition
10-yr and 100-yr

SIERRA MEADOWS EIR
HYDROLOGY AND WATER QUALITY
TECHNICAL APPENDIX

Prepared For:

Madera County

Prepared By:

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JN 10102469

Sierra Meadows
Rational Method Peak Discharge Estimation
Existing Condition

Basin ID	Hydrology Node		Sub-Basin ID	Area (Acres)			Slope (ft/ft)	Soil Type Fraction				Land Use Fraction						Runoff Coefficient RP 10Y		Runoff Coefficient RP 100Y		Tt (min)	Σ Tc (min)	Rainfall Intensity (in/hr)		Peak Discharge (cfs)	
	U/S	D/S		Sub	Total Area	Effective Area		B	C	D	Σ Soil Fractions	HS, 0-1 D.U./ac	Mixed Use Com.	Agriculture \ Golf Course	Open Space	Ponds	Total Land Use Frac.	Ci	Cavg	Ci	Cavg			10Y	100Y	Q10	Q100
A		100	A1	2.1	2.1	2.1	0.0500		1		1				1		1	0.170	0.170	0.230	0.230	6.37	6.37	4.43	6.13	1.60	2.99
A	100	101	A2	4.2	6.3	6.3	0.0375		1		1				1		1	0.170	0.170	0.230	0.230	2.05	8.42	3.77	5.23	4.07	7.65
A	101	102	A3	15.2	21.5	21.5	0.0806		1		1				1		1	0.240	0.219	0.320	0.294	1.84	10.26	3.36	4.68	16.01	29.77
A	102	103	A4	41.9	63.4	63.4	0.1951		1		1				1		1	0.240	0.233	0.320	0.311	0.96	11.22	3.19	4.45	47.60	88.40
A	103	104	A5	65.5	128.9	128.9	0.0238		1		1				1		1	0.170	0.201	0.230	0.270	5.65	17.08	2.51	3.50	65.49	122.83
A	104	105	A6	66.3	195.2	195.2	0.0286		1		1				1		1	0.170	0.190	0.230	0.256	0.88	17.96	2.43	3.40	91.29	171.69
A	105	106	A7	50.5	245.7	245.7	0.0117		1		1				1		1	0.120	0.176	0.180	0.241	5.90	23.86	2.07	2.90	90.08	172.61
MEMORY	106	106	MEMORY 1		245.7	245.7																	23.86				
B		200	B1	1.5	1.5	1.5	0.2174		1		1				1		1	0.240	0.240	0.320	0.320	5.00	5.00	5.10	7.04	1.85	3.41
B	201	201	B2	4.3	5.8	5.8	0.0909		1		1				1		1	0.240	0.240	0.320	0.320	1.48	6.48	4.39	6.07	6.16	11.37
B	202	202	B3	11.9	17.7	17.7	0.0958		1		1				1		1	0.240	0.240	0.320	0.320	2.14	8.62	3.72	5.16	15.94	29.49
B	203	203	B4	30.3	48	48.0	0.0769		1		1				1		1	0.240	0.240	0.320	0.320	2.63	11.25	3.19	4.44	37.06	68.76
B	204	204	B5	25.3	73.3	73.3	0.0549		1		1			0.4202	0.58		1	0.178	0.219	0.238	0.292	3.25	14.50	2.75	3.84	44.54	82.88
MEMORY			MEMORY 2		73.3	73.3																-	14.50				
C		300	C1	1.3	1.3	1.3	0.0667		1		1				1		1	0.240	0.240	0.320	0.320	5.68	5.68	4.74	6.55	1.49	2.75
C	300	301	C2	3.1	4.4	4.4	0.0556		1		1				1		1	0.170	0.191	0.230	0.257	1.58	7.26	4.11	5.69	3.48	6.48
C	301	302	C3	7.8	12.2	12.2	0.1017		1		1				1		1	0.240	0.222	0.320	0.297	1.74	9.00	3.63	5.04	9.92	18.43
C	302	303	C4	12.4	24.6	24.6	0.2308		1		1				1		1	0.240	0.231	0.320	0.309	1.37	10.37	3.34	4.65	19.18	35.60
C	303	304	C5	47.9	72.5	72.5	0.1752		1		1				1		1	0.240	0.237	0.320	0.316	5.31	15.68	2.63	3.68	45.63	84.95
C		304	C6	77.5	150	150.0			1		1				1		1	0.120	0.177	0.180	0.246	0.00	15.68	2.63	3.68	70.32	136.66
C	304	305	C7	83.1	233.1	233.1	0.0376		1		1	0.30			0.68	0.01	1	0.203	0.186	0.267	0.253	4.74	20.42	2.26	3.16	98.91	188.40
MEMORY			MEMORY 3		233.1	233.1																-	20.42				
D		400	D1	3.1	3.1	3.1	0.1167		1		1				1		1	0.240	0.240	0.320	0.320	5.00	5.00	5.10	7.04	3.82	7.04
D	400	401	D2	14	17.1	17.1	0.1364		1		1				1			0.240	0.240	0.320	0.320	1.48	6.48	4.30	6.07	18.15	33.50
D	401	402	D3	19.1	36.2	36.2	0.2240		1		1				1		1	0.240	0.240	0.320	0.320	1.90	8.38	3.78	5.25	33.13	61.29
D	402	403	D4	11.9	48.1	48.1	0.2024		1		1				1		1	0.240	0.240	0.320	0.320	1.23	9.61	3.49	4.86	40.68	75.35
D	403	404	D5	17.5	65.6	65.6	0.2222		1		1				1		1	0.240	0.240	0.320	0.320	0.84	10.45	3.33	4.63	52.85	97.98
D	404	305	D6	36.3	101.9	101.9	0.0452		1		1	0.7658			0.2026	0.0316	1	0.253	0.245	0.322	0.321	7.89	18.34	2.41	3.36	60.46	110.79
CONFLUENCE	305	305	CONFLUENCE WITH MEMORY 3		335	335.0													0.204		0.274	-	20.42			155.74	292.64
C	305	306	C8	14.6	349.6	349.6	0.0488		1		1	1					1	0.250	0.250	0.320	0.276	1.44	21.86	2.17	3.04	191.51	295.82
C	306	204	C9	21.6	371.2	371.2	0.0323		1		1			1			1	0.190	0.247	0.250	0.274	3.71	25.58	1.98	2.78	183.13	285.74
CONFLUENCE	204	204	CONFLUENCE WITH MEMORY 2		444.5	444.5													0.242		0.277	-	25.58			215.21	345.77
	204	107	ROUTE		444.5	444.5	0.0167												0.242		0.277	1.45	27.03	1.92	2.70	215.21	345.77
CONFLUENCE	106	106	CONFLUENCE WITH MEMORY 1		690.2	690.2													0.218		0.264	-	27.03			299.03	506.56
MEMORY	106	106	MEMORY 4		690.2	690.2													0.218		0.264	-	27.03	1.92	2.70	299.03	506.56
E		500	E1	1.5	1.5	1.5	0.2667		1		1				1		1	0.240	0.240	0.320	0.320	5.00	5.00	5.10	7.04	1.85	3.41
E	500	501	E2	4.5	6	6.0	0.2800		1		1				1		1	0.240	0.240	0.320	0.320	1.10	6.10	4.54	6.28	6.60	12.17
E	501	502	E3	20.2	26.2	26.2	0.1793		1		1				1		1	0.240	0.240	0.320	0.320	2.69	8.80	3.68	5.11	23.32	43.16
E	502	503	E4	26.3	52.5	52.5	0.0636		1		1				1		1	0.240	0.240	0.320	0.320	2.54	11.34	3.18	4.42	40.35	74.87
E	503	504	E5	51.2	103.7	103.7	0.0517		1		1	1					1	0.250	0.245	0.320	0.320	3.80	15.13	2.69	3.75	68.84	125.49
E	504	106	E6	48.5	152.2	152.2	0.0581		1		1	0.2928		0.6392	0.068		1	0.206	0.233	0.269	0.304	3.41	18.54	2.39	3.34	85.31	155.78
CONFLUENCE	106	106	CONFLUENCE WITH MEMORY 4		842.4	842.4													0.221		0.271	-	27.03			367.65	632.30
CLEAR MEMORY	106	106	MEMORY 5		842.4	842.4													0.221		0.271	-	27.03	1.92	2.70	367.65	632.30
F		600	F1	1.4	1.4	1.4	0.1000		1		1				1		1	0.240	0.240	0.320	0.320	5.00	5.00	5.10	7.04	1.73	3.18
F	600	601	F2	7	8.4	8.4	0.1860		1		1				1		1	0.240	0.240	0.320	0.320	1.03	6.03	4.57	6.33	9.30	17.15
F	601	602	F3	13.6	22	22.0	0.2079		1		1				1		1	0.240	0.240	0.320	0.320	0.73	6.76	4.28	5.93	22.80	42.09
F	602	603	F4	47.7	69.7	69.7	0.2432		1		1				1		1	0.240	0.240	0.320	0.320	1.92	8.68	3.71	5.15	62.52	115.72
F	603	604	F5	59	128.7	128.7	0.0608		1		1				0.9661	0.0339	1	0.261	0.250	0.342	0.330	3.82	12.50	3.00	4.18	97.30	179.10
F	604	605	F6	25.9	154.6	154.6	0.0627		1		1				1		1	0.240	0.248	0.320	0.328	3.41	15.91	2.61	3.64	101.00	188.60
F	605	606	F7	28.5	183.1	183.1	0.0246		1		1		0.0842	0.614	0.2105	0.0912	1	0.292	0.255	0.364	0.334	4.65	20.56	2.25	3.15	105.95	194.29
MEMORY	606	606	MEMORY 6		183.1	183.1																-				105.05	194.29
G		700	G1	1.7	1.7	1.7	0.1333		1		1				1		1	0.240	0.240	0.320	0.320	5.00	5.00	5.10	7.04	2.10	3.88
G	700	701	G2	2.9	4.6	4.6	0.1818		1		1				1		1	0.240	0.240	0.320	0.320	0.70	5.70	4.73	6.53	5.26	9.70

Sierra Meadows
Rational Method Peak Discharge Estimation
Existing Condition

Basin ID	Hydrology Node		Sub-Basin ID	Area (Acres)			Slope (ft/ft)	Soil Type Fraction				Land Use Fraction						Runoff Coefficient RP 10Y		Runoff Coefficient RP 100Y		Tt (min)	Σ Tc (min)	Rainfall Intensity (in/hr)		Peak Discharge (cfs)	
	U/S	D/S		Sub	Total Area	Effective Area		B	C	D	Σ Soil Fractions	HS, 0-1 D.U./ac	Mixed Use Com.	Agriculture \ Golf Course	Open Space	Ponds	Total Land Use Frac.	Cl	Cavg	Cl	Cavg			10Y	100Y	Q10	Q100
G	701	702	G3	5.3	9.9	9.9	0.0597		1		1				1		1	0.170	0.203	0.230	0.272	1.11	6.81	4.26	5.00	8.62	16.02
G	702	703	G4	13.7	23.6	23.6	0.0746		1		1				1		1	0.240	0.224	0.320	0.300	1.79	8.60	3.73	5.17	19.88	36.89
G	703	704	G5	32.6	56.2	56.2	0.0620		1		1				1		1	0.240	0.233	0.320	0.312	3.02	11.63	3.13	4.36	41.40	76.91
G	704	705	G6	60.3	116.5	116.5	0.0959		1		1				1		1	0.240	0.237	0.320	0.318	6.57	18.20	2.42	3.38	67.21	125.32
G	705	706	G7	94.9	211.4	211.4	0.0931		1		1				1		1	0.240	0.238	0.320	0.318	5.87	24.07	2.06	2.88	104.39	195.12
G		706	G8	165.5	376.9	376.9			1		1				0.9813	0.0187	1	0.134	0.192	0.194	0.264	0.00	24.07	2.06	2.88	150.24	288.59
G	706	707	G9	61.4	438.3	438.3	0.0399		1		1				1		1	0.170	0.189	0.230	0.259	2.85	26.92	1.93	2.70	161.12	309.31
G	707	606	G10	32.8	471.1	471.1	0.0191		1		1		0.0152	0.6646	0.3201		1	0.142	0.186	0.204	0.255	4.28	31.20	1.77	2.49	156.29	301.21
CONFLUENCE	606	606	CONFLUENCE WITH MEMORY 6		654.2	654.2													0.205		0.277	-	31.20	1.77	2.49	239.56	454.52
																						-					
MEMORY			MEMORY 7		654.2	654.2													0.205		0.277	-	31.20	1.77	2.49	239.56	454.52
H		800	H1	1.4	1.4	1.4	0.1818		1		1				1		1	0.240	0.240	0.320	0.320	5.00	5.00	5.10	7.04	1.73	3.18
H	800	801	H2	2.2	3.6	3.6	0.2105		1		1				1		1	0.240	0.240	0.320	0.320	0.77	5.77	4.69	6.49	4.09	7.53
H	801	802	H3	6.5	10.1	10.1	0.1752		1		1				1		1	0.240	0.240	0.320	0.320	1.57	7.35	4.08	5.66	9.97	18.43
H	802	803	H4	35.5	45.6	45.6	0.1833		1		1				1		1	0.240	0.240	0.320	0.320	5.52	12.87	2.95	4.11	32.58	60.51
H	802	803	H5	56.6	102.2	102.2	0.0152		1		1				1		1	0.120	0.174	0.180	0.242	8.15	21.02	2.22	3.11	39.78	77.75
H	802	803	H6	61.8	164	164.0	0.0128		1		1				1		1	0.120	0.153	0.180	0.219	5.70	26.72	1.94	2.71	49.08	98.28
H	804	805	H7	126.6	290.6	290.6	0.0545		1		1				1		1	0.170	0.161	0.230	0.224	5.70	32.42	1.73	2.43	81.44	159.48
H	805	806	H8	171	461.6	461.6	0.0088		1		1				1		1	0.120	0.148	0.180	0.208	8.41	40.83	1.51	2.13	102.62	200.08
H	806	608	h9	139.1	600.7	600.7	0.0065		1		1			0.11	0.89		1	0.122	0.140	0.182	0.202	10.19	51.02	1.33	1.88	113.05	229.60
CONFLUENCE	606	606	CONFLUENCE WITH MEMORY 7		1254.9	1021.5													0.174		0.241		31.20	1.77	2.49	407.88	791.58
H	608	107	H10	31.7	1286.6	1053.2	0.0275		1		1			0.1325	0.8675		1	0.173	0.174	0.233	0.241	1.88	33.08	1.71	2.40	407.88	791.58
CONFLUENCE	106	106	CONFLUENCE WITH MEMORY 5		2129	1895.6													0.195		0.254	-	33.08			735.03	1355.31
I	106	107	I-1	176.1	2305.1	2071.7	0.0045		1		1				1		1	0.120	0.189	0.180	0.248	9.71	42.79	1.47	2.08	735.03	1355.31

Sierra Meadows
Rational Method Peak Discharge Estimation
Existing Condition

Confluence with Memory 3:

T_{2} =	20.42	T_{1} =	18.34	
Q_{10-2} =	98.91	Q_{10-1} =	60.46	
Q_{100-2} =	188.40	Q_{100-1} =	110.79	
I_{10-2} =	2.26	I_{10-1} =	2.41	
I_{100-2} =	3.16	I_{100-1} =	3.36	
A_{2}=	233.10	A_{1}=	101.90	
	Q_{10} =	Q_{100} =	Effective Area	Tc
TRUE	155.7	292.6	335	20.4

Confluence with Memory 2:

T_{2} =	25.58	T_{1} =	14.50	
Q_{10-2} =	183.13	Q_{10-1} =	44.54	
Q_{100-2} =	285.74	Q_{100-1} =	82.88	
I_{10-2} =	1.98	I_{10-1} =	2.75	
I_{100-2} =	2.78	I_{100-1} =	3.84	
A_{2}=	371.20	A_{1}=	73.30	
	Q_{10} =	Q_{100} =	Effective Area	Tc
TRUE	215.2	345.8	444.5	25.6

Confluence with Memory 1:

T_{2} =	27.03	T_{1} =	23.86	
Q_{10-2} =	215.21	Q_{10-1} =	90.08	
Q_{100-2} =	345.77	Q_{100-1} =	172.61	
I_{10-2} =	1.92	I_{10-1} =	2.07	
I_{100-2} =	2.70	I_{100-1} =	2.90	
A_{2}=	444.50	A_{1}=	245.70	
	Q_{10} =	Q_{100} =	Effective Area	Tc
TRUE	299.0	506.6	690.2	27.0

Confluence with Memory 4:

T_{2} =	27.03	T_{1} =	18.54
Q_{10-2} =	299.03	Q_{10-1} =	85.31
Q_{100-2} =	506.56	Q_{100-1} =	155.78
I_{10-2} =	1.92	I_{10-1} =	2.39
I_{100-2} =	2.70	I_{100-1} =	3.34
A_{2}=	690.20	A_{1}=	152.20

Sierra Meadows
Rational Method Peak Discharge Estimation
Existing Condition

	Q_{10} =	Q_{100} =	Effective Area	Tc
TRUE	367.6	632.3	842.4	27.0

Confluence with Memory 6:				
T_2 =	31.20	T_1 =	20.56	
Q_{10-2} =	156.29	Q_{10-1} =	105.95	
Q_{100-2} =	301.21	Q_{100-1} =	194.29	
I_{10-2} =	1.77	I_{10-1} =	2.25	
I_{100-2} =	2.49	I_{100-1} =	3.15	
A_2=	471.10	A_1=	183.10	
	Q_{10} =	Q_{100} =	Effective Area	Tc
TRUE	239.6	454.5	654.2	31.2

Confluence with Memory 7:				
T_2 =	51.02	T_1 =	31.20	
Q_{10-2} =	113.05	Q_{10-1} =	239.56	
Q_{100-2} =	229.60	Q_{100-1} =	454.52	
I_{10-2} =	1.33	I_{10-1} =	1.77	
I_{100-2} =	1.88	I_{100-1} =	2.49	
A_2=	600.70	A_1=	654.20	
	Q_{10} =	Q_{100} =	Effective Area	Tc
FALSE	407.9	791.6	1021.5	31.2

Confluence with Memory 5:				
T_2 =	33.08	T_1 =	27.03	
Q_{10-2} =	407.88	Q_{10-1} =	367.65	
Q_{100-2} =	791.58	Q_{100-1} =	632.30	
I_{10-2} =	1.71	I_{10-1} =	1.92	
I_{100-2} =	2.40	I_{100-1} =	2.70	
A_2=	1053.23	A_1=	842.40	
	Q_{10} =	Q_{100} =	Effective Area	Tc
TRUE	735.0	1355.3	1895.6	33.1

Sierra Meadows
Travel Time Worksheet
Existing Condition

Sub-Basin ID	Hydrology Node				TR-55 Sheet Flow Travel Time					Trapezoidal Channel Travel Time												
	U/S	D/S	L (ft)	So (ft/ft)	L (ft)	So (ft/ft)	n	2-yr, 24-hr (in)	Tt (min)	Avg. Q10 (cfs)	L (ft)	So (ft/ft)	n	$Z_{afficient}$ (ft/ft)	Adjust BW (ft)	Check for = 0	$Qn/(1.49So^{1/2})$	$A^{5/3}/P^{2/3}$	Adjustedy (ft)	V (fps)	Tt (min)	Σ Tt (min)
A1	0	100	300	0.0500	300	0.05	0.045	3.08	6.37													6.37
A2	100	101	400	0.0375						3.19	400	0.0375	0.045	0.2000	0.98	0.00	0.50	0.49	0.85	3.24	2.05	2.05
A3	101	102	620	0.0806						8.99	620	0.0806	0.045	0.2000	1.26	0.00	0.96	0.95	1.09	5.61	1.84	1.84
A4	102	103	615	0.1951						31.60	615	0.1951	0.045	0.2000	1.71	0.00	2.16	2.16	1.48	10.71	0.96	0.96
A5	103	104	2100	0.0238						72.19	2100	0.0238	0.045	0.2000	3.45	0.00	14.13	14.13	2.99	5.98	5.85	5.85
A6	104	105	350	0.0286						82.33	350	0.0286	0.045	0.2000	3.50	0.00	14.71	14.71	3.03	6.62	0.88	0.88
A7	105	106	2140	0.0117						103.09	2140	0.0117	0.035	0.2000	4.10	0.00	22.41	22.40	3.55	6.04	5.90	5.90
MEMORY 1	106	106	0	0.0000																		
B1	0	200	230	0.2174	230	0.217391	0.045	3.08	2.86													5.00
B2	201	201	440	0.0909						4.50	440	0.0909	0.045	0.2000	0.95	0.00	0.45	0.45	0.82	4.95	1.48	1.48
B3	202	202	835	0.0958						12.48	835	0.0958	0.045	0.2000	1.38	0.00	1.22	1.22	1.19	6.50	2.14	2.14
B4	203	203	1170	0.0769						29.58	1170	0.0769	0.045	0.2000	1.98	0.00	3.22	3.22	1.71	7.43	2.63	2.63
B5	204	204	1730	0.0549						46.83	1730	0.0549	0.035	0.2000	2.28	0.00	4.69	4.69	1.97	8.86	3.25	3.25
MEMORY 2	0	0	0	0.0000																		-
C1	0	300	300	0.0667	300	0.066667	0.045	3.08	5.68													5.68
C2	300	301	360	0.0556						3.27	360	0.0556	0.045	0.2000	0.92	0.00	0.42	0.42	0.80	3.79	1.58	1.58
C3	301	302	590	0.1017						6.56	590	0.1017	0.045	0.2000	1.07	0.00	0.62	0.62	0.93	5.67	1.74	1.74
C4	302	303	780	0.2308						14.97	780	0.2308	0.045	0.2000	1.25	0.00	0.94	0.94	1.08	9.47	1.37	1.37
C5	303	304	3425	0.1752						37.85	3425	0.1752	0.045	0.2000	1.86	0.00	2.73	2.73	1.61	10.75	5.31	5.31
C6	0	304	0	0.0000																		0.00
C7	304	305	2130	0.0376						89.80	2130	0.0376	0.045	0.2000	3.44	0.00	13.99	14.00	2.97	7.49	4.74	4.74
MEMORY 3	0	0	0	0.0000																		-
D1	0	400	300	0.1167	300	0.116667	0.045	3.08	4.54													5.00
D2	400	401	660	0.1364						12.46	660	0.1364	0.045	0.2000	1.29	0.00	1.02	1.02	1.11	7.41	1.48	1.48
D3	401	402	1250	0.2240						28.29	1250	0.2240	0.045	0.2000	1.60	0.00	1.81	1.81	1.38	10.97	1.90	1.90
D4	402	403	840	0.2024						38.57	840	0.2024	0.045	0.2000	1.83	0.00	2.59	2.59	1.58	11.41	1.23	1.23
D5	403	404	630	0.2222						48.08	630	0.2222	0.045	0.2000	1.95	0.00	3.08	3.08	1.69	12.49	0.84	0.84
D6	404	305	3540	0.0452						67.47	3540	0.0452	0.045	0.2000	2.98	0.00	9.59	9.58	2.58	7.48	7.89	7.89
CONFLUENCE WITH MEMORY 3	305	305	0	0.0000	0	0	0.045	3.08	-													-
0	0	0	0	0.0000																		-
C8	305	306	820	0.0488						159.13	820	0.0488	0.045	0.2000	4.01	0.61	21.76	21.15	3.47	9.47	1.44	1.44
C9	306	204	2320	0.0323						197.43	2320	0.0323	0.035	0.2000	4.32	0.00	25.79	25.79	3.74	10.41	3.71	3.71
CONFLUENCE WITH MEMORY 2	204	204	0	0.0000	0	0	0.045	3.08	-													-
0	0	0	0	0.0000																		-
ROUTE	204	107	600	0.0167						215.21	600	0.0167	0.045	0.2000	5.55	0.00	50.35	50.35	4.81	6.87	1.45	1.45
CONFLUENCE WITH MEMORY 1	106	106	0	0.0000	0	0	0.045	3.08	-													-
0	0	0	0	0.0000																		-
MEMORY 4	106	106	0	0.0000																		-
E1	0	500	300	0.2667	300	0.266667	0.045	3.08	3.26													5.00
E2	500	501	500	0.2800						4.63	500	0.2800	0.045	0.2000	0.77	0.00	0.26	0.26	0.67	7.55	1.10	1.10
E3	501	502	1450	0.1793						17.70	1450	0.1793	0.045	0.2000	1.40	0.00	1.26	1.27	1.21	8.98	2.69	2.69
E4	502	503	1100	0.0636						35.02	1100	0.0636	0.045	0.2000	2.19	0.00	4.19	4.19	1.89	7.22	2.54	2.54
E5	503	504	1740	0.0517						60.03	1740	0.0517	0.045	0.2000	2.78	0.00	7.97	7.97	2.41	7.64	3.80	3.80
E6	504	106	2150	0.0581						84.94	2150	0.0581	0.035	0.2000	2.82	0.00	8.27	8.27	2.44	10.51	3.41	3.41
CONFLUENCE WITH MEMORY 4	106	106	0	0.0000	0	0	0.045	3.08	-													-
0	0	0	0	0.0000																		-
MEMORY 5	106	106	0	0.0000																		-
F1	0	600	300	0.1000	300	0.1	0.045	3.08	4.83													5.00
F2	600	601	430	0.1860						6.04	430	0.1860	0.045	0.2000	0.93	0.00	0.42	0.42	0.80	6.95	1.03	1.03
F3	601	602	470	0.2979						16.83	470	0.2979	0.045	0.2000	1.25	0.00	0.93	0.93	1.08	10.73	0.73	0.73
F4	602	603	1480	0.2432						47.51	1480	0.2432	0.045	0.2000	1.91	0.00	2.91	2.91	1.65	12.87	1.92	1.92
F5	603	604	2055	0.0608						88.99	2055	0.0608	0.045	0.2000	3.13	0.00	10.90	10.90	2.71	8.96	3.82	3.82
F6	604	605	1915	0.0627						107.09	1915	0.0627	0.045	0.2000	3.27	0.70	12.92	12.23	2.83	9.36	3.41	3.41
F7	605	606	2240	0.0246						110.31	2240	0.0246	0.035	0.2000	3.59	0.75	16.54	15.79	3.11	8.03	4.65	4.65
MEMORY 6	606	606	0	0.0000																		-
G1	0	700	300	0.1333	300	0.133333	0.045	3.08	4.30													5.00
G2	700	701	275	0.1818						3.89	275	0.1818	0.045	0.2000	0.86	-0.07	0.28	0.35	0.74	6.55	0.70	0.70

Sierra Meadows
Travel Time Worksheet
Existing Condition

	Hydrology Node				TR-55 Sheet Flow Travel Time					Trapezoidal Channel Travel Time												
Sub-Basin ID	U/S	D/S	L (ft)	So (ft/ft)	L (ft)	So (ft/ft)	n	2-yr, 24-hr (in)	Tt (min)	Avg. Q10 (cfs)	L (ft)	So (ft/ft)	n	$Z_{efficient}$ (ft/ft)	Adjust BW (ft)	Check for = 0	$Qn/(1.49So^{1/2})$	$A^{5/3}/P^{2/3}$	Adjustedy (ft)	V (fps)	Tt (min)	Σ Tt (min)
G3	701	702	335	0.0597						8.29	335	0.0597	0.045	0.2000	1.33	-0.10	1.02	1.12	1.15	5.02	1.11	1.11
G4	702	703	670	0.0746						14.58	670	0.0746	0.045	0.2000	1.56	-0.08	1.61	1.70	1.35	6.23	1.79	1.79
G5	703	704	1290	0.0620						33.62	1290	0.0620	0.045	0.2000	2.18	-0.08	4.08	4.16	1.89	7.11	3.02	3.02
G6	704	705	3860	0.0959						63.61	3860	0.0959	0.045	0.2000	2.54	-0.05	6.20	6.26	2.20	9.79	6.57	6.57
G7	705	706	3760	0.0931						94.58	3760	0.0931	0.045	0.2000	2.96	-0.03	9.36	9.40	2.56	10.68	5.87	5.87
G8	0	706	0	0.0000																		0.00
G9	706	707	1505	0.0399						162.48	1505	0.0399	0.045	0.2000	4.19	0.86	24.58	23.72	3.63	8.81	2.85	2.85
G10	707	606	2090	0.0191						167.15	2090	0.0191	0.035	0.2000	4.43	0.86	28.38	27.52	3.83	8.14	4.28	4.28
CONFLUENCE WITH MEMORY 6	606	606	0	0.0000	0	0	0.045	3.08	-													-
0	0	0	0	0.0000																		-
MEMORY 7	0	0	0	0.0000																		-
H1	0	800	330	0.1818	330	0.181818	0.045	3.08	4.10													5.00
H2	800	801	285	0.2105						3.08	285	0.2105	0.045	0.2000	0.70	0.00	0.20	0.20	0.61	6.14	0.77	0.77
H3	801	802	685	0.1752						7.78	685	0.1752	0.045	0.2000	1.03	0.00	0.56	0.56	0.89	7.25	1.57	1.57
H4	802	803	1200	0.1833						27.50	1200	0.1833	0.045	0.2000	1.64	0.00	1.94	1.94	1.42	10.10	1.98	1.98
H5	802	803	1315	0.0152						27.50	1315	0.0152	0.045	0.2000	2.61	0.00	6.74	6.74	2.26	3.97	5.52	5.52
H6	802	803	2340	0.0128						74.87	2340	0.0128	0.045	0.2000	3.93	0.00	19.97	19.97	3.40	4.78	8.15	8.15
H7	804	805	2750	0.0545						68.02	2750	0.0545	0.045	0.2000	2.89	0.00	8.80	8.80	2.50	8.04	5.70	5.70
H8	805	806	2280	0.0088						105.40	2280	0.0088	0.045	0.2000	4.79	0.00	33.99	33.99	4.15	4.52	8.41	8.41
h9	806	606	3070	0.0065						118.08	3070	0.0065	0.035	0.2000	4.81	0.00	34.37	34.36	4.17	5.02	10.19	10.19
CONFLUENCE WITH MEMORY 7	606	606	0	0.0000	0	0	0.045	3.08	-													-
H10	606	107	1090	0.0275						414.21	1090	0.0275	0.045	0.2000	6.35	3.49	75.40	71.91	5.50	9.66	1.88	1.88
CONFLUENCE WITH MEMORY 5	106	106	0	0.0000	0	0	0.045	3.08	-													-
I-1	106	107	3345	0.0045						769.17	3345	0.0045	0.045	0.2000	11.34	8.91	346.90	337.99	9.82	5.74	9.71	9.71

Sierra Meadows
Runoff Coefficients
Existing Condition

Runoff Coefficients for the Rational Formula
Storm Recurrence Intervals < 25 Years

Land Use	Slope Range		Soil Type		
	From	To	B	C	D
HS, 0-1 D.U./ac	0.00	0.02	0.17	0.20	0.24
	0.02	0.06	0.21	0.25	0.29
	0.06	+	0.26	0.31	0.35
Low, 0-5 D.U./ac	0.00	0.02	0.24	0.27	0.30
	0.02	0.06	0.29	0.31	0.34
	0.06	+	0.33	0.36	0.40
Med., 5-12 D.U./ac	0.00	0.02	0.27	0.30	0.33
	0.02	0.06	0.30	0.33	0.36
	0.06	+	0.35	0.38	0.42
High, 12-20 D.U./ac	0.00	0.02	0.75	0.75	0.75
	0.02	0.06	0.75	0.75	0.75
	0.06	+	0.75	0.75	0.75
MHP, 20+ D.U./ac	0.00	0.02	0.80	0.80	0.80
	0.02	0.06	0.80	0.80	0.80
	0.06	+	0.80	0.80	0.80
Office Professional	0.00	0.02	0.71	0.72	0.72
	0.02	0.06	0.72	0.72	0.72
	0.06	+	0.72	0.72	0.72
Central Bus. Dist.	0.00	0.02	0.71	0.72	0.72
	0.02	0.06	0.72	0.72	0.72
	0.06	+	0.72	0.72	0.72
Mixed Use Com.	0.00	0.02	0.71	0.72	0.72
	0.02	0.06	0.72	0.72	0.72
	0.06	+	0.72	0.72	0.72
Neighborhood Com.	0.00	0.02	0.71	0.72	0.72
	0.02	0.06	0.72	0.72	0.72
	0.06	+	0.72	0.72	0.72
Service Com.	0.00	0.02	0.71	0.72	0.72
	0.02	0.06	0.72	0.72	0.72
	0.06	+	0.72	0.72	0.72
Light Industrial	0.00	0.02	0.68	0.68	0.69
	0.02	0.06	0.68	0.69	0.69
	0.06	+	0.69	0.69	0.70
Public	0.00	0.02	0.50	0.60	0.70
	0.02	0.06	0.50	0.60	0.70
	0.06	+	0.50	0.60	0.70
Agriculture \ Golf Course	0.00	0.02	0.11	0.14	0.18
	0.02	0.06	0.15	0.19	0.23
	0.06	+	0.21	0.26	0.31
Open Space	0.00	0.02	0.08	0.12	0.16
	0.02	0.06	0.13	0.17	0.21
	0.06	+	0.19	0.24	0.28
Ponds	0.00	0.02	0.85	0.85	0.85
	0.02	0.06	0.86	0.86	0.86
	0.06	+	0.87	0.87	0.87
Street/Highway	0.00	0.02	0.71	0.72	0.73
	0.02	0.06	0.72	0.73	0.75
	0.06	+	0.74	0.76	0.78

Runoff Coefficients for the Rational Formula
Storm Recurrence Intervals >= 25 Years

Land Use	Slope Range		Soil Type		
	From	To	B	C	D
HS, 0-1 D.U./ac	0.00	0.02	0.24	0.28	0.31
	0.02	0.06	0.28	0.32	0.35
	0.06	+	0.34	0.40	0.46
Low, 0-5 D.U./ac	0.00	0.02	0.33	0.36	0.38
	0.02	0.06	0.37	0.40	0.42
	0.06	+	0.42	0.47	0.52
Med., 5-12 D.U./ac	0.00	0.02	0.35	0.38	0.41
	0.02	0.06	0.39	0.42	0.45
	0.06	+	0.44	0.49	0.54
High, 12-20 D.U./ac	0.00	0.02	0.75	0.75	0.75
	0.02	0.06	0.75	0.75	0.75
	0.06	+	0.75	0.75	0.75
MHP, 20+ D.U./ac	0.00	0.02	0.80	0.80	0.80
	0.02	0.06	0.80	0.80	0.80
	0.06	+	0.80	0.80	0.80
Office Professional	0.00	0.02	0.89	0.89	0.89
	0.02	0.06	0.89	0.89	0.89
	0.06	+	0.89	0.90	0.90
Central Bus. Dist.	0.00	0.02	0.89	0.89	0.89
	0.02	0.06	0.89	0.89	0.89
	0.06	+	0.89	0.90	0.90
Mixed Use Com.	0.00	0.02	0.89	0.89	0.89
	0.02	0.06	0.89	0.89	0.89
	0.06	+	0.89	0.90	0.90
Neighborhood Com.	0.00	0.02	0.89	0.89	0.89
	0.02	0.06	0.89	0.89	0.89
	0.06	+	0.89	0.90	0.90
Service Com.	0.00	0.02	0.89	0.89	0.89
	0.02	0.06	0.89	0.89	0.89
	0.06	+	0.89	0.90	0.90
Light Industrial	0.00	0.02	0.85	0.86	0.86
	0.02	0.06	0.86	0.86	0.86
	0.06	+	0.86	0.87	0.88
Public	0.00	0.02	0.50	0.60	0.70
	0.02	0.06	0.50	0.60	0.70
	0.06	+	0.50	0.60	0.70
Agriculture \ Golf Course	0.00	0.02	0.16	0.20	0.24
	0.02	0.06	0.21	0.25	0.29
	0.06	+	0.28	0.34	0.41
Open Space	0.00	0.02	0.14	0.18	0.22
	0.02	0.06	0.19	0.23	0.27
	0.06	+	0.26	0.32	0.39
Ponds	0.00	0.02	0.95	0.95	0.95
	0.02	0.06	0.96	0.96	0.96
	0.06	+	0.97	0.97	0.97
Street/Highway	0.00	0.02	0.80	0.84	0.89
	0.02	0.06	0.82	0.85	0.91
	0.06	+	0.84	0.89	0.95

IDF Curve Methodology: Select one of the two methods presented below

Enter 1 to select Method 1; enter 2 to select Method 2. No entry automatically selects Method 2: 1

IDF Curve Method 1: Single linear regression of all data points on log-log plot

Logarithms taken for Weighted IDF Curve Data Table

Hours	-0.60	-0.30	0.00	0.30	0.48	0.78	1.08	1.38	1.68	1.86	1.98
RP 2	-	-	-0.15	-0.29	-0.39	-0.53	-0.69	-0.89	-1.10	-1.24	-
RP 10	-	-	0.05	-0.09	-0.19	-0.33	-0.50	-0.73	-0.89	-1.02	-
RP100	-	-	0.20	0.06	-0.04	-0.18	-0.34	-0.54	-0.73	-0.85	-

Regression Statistics

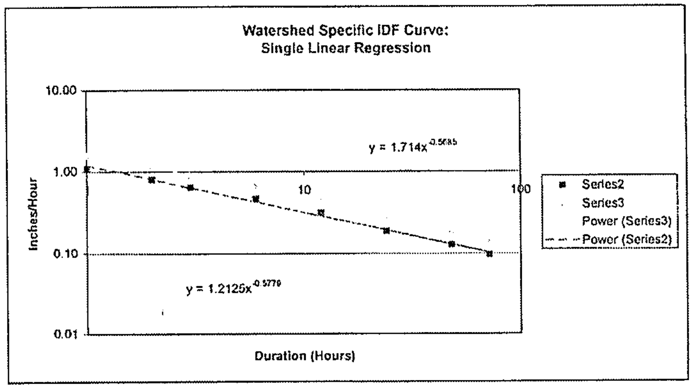
	m	b	sem	seb	r2	sey	F	df	ssreg	ssresid
RP 10	-0.5779	0.0837	0.0171	0.0193	0.9948	0.0302	1147	6	1.0475	0.0055
RP 100	-0.5685	0.2340	0.0155	0.0176	0.9955	0.0275	1337	6	1.0136	0.0045

Description of Regression Statistics Abbreviations

m:	slope
b:	y-intercept
sem:	standard error value for the slope
seb:	standard error value for the y-intercept
r2:	coefficient of determination (values range from 0 to 1: 1 is perfect correlation)
sey:	standard error for the y estimate
F.	F statistic or F-observed value
df:	degrees of freedom
ssreg:	regression sum of squares
ssresid:	residual sum of squares

Table to Find Intensity for a Given Duration (input duration)

	Slope	y-intercept	Duration (hr)	Log of Duration	Solve I (in/hr)
RP 10	-0.5779	0.0837	1.00	0.00	1.21
RP 100	-0.5685	0.2340	1.00	0.00	1.71


Watershed Specific IDF Curve:
Single Linear Regression

IDF Curve Method 2: Point-to-Point linear regression of data points

Inverse taken for Weighted IDF Curve Data Table

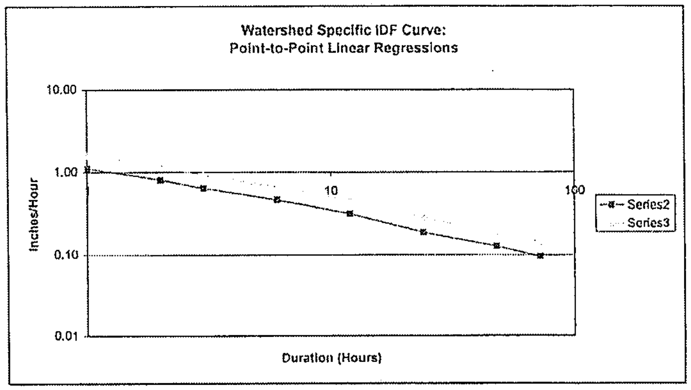
Hours	0.25	0.5	1	2	3	6	12	24	48	72	96
RP 2			1.41	1.93	2.45	3.35	4.94	7.80	12.65	17.29	
RP 10			0.90	1.23	1.55	2.14	3.14	5.32	7.81	10.40	
RP 25			0.63	0.87	1.09	1.50	2.21	3.49	5.40	7.11	

RP 10: Table to Find Intensity for a Given Duration (input duration)

	Start (hr)	End (hr)	Start (min)	End (min)	Slope	y-intercept	Duration (hr)	Log of Duration	Solve I (in/hr)
RP 10	0	0.25	0	15			0.08	NA	
RP 10	0.25	0.5	15	30			0.50	NA	
RP 10	0.5	1	30	60			1.00	NA	
RP 10	1	2	60	120	0.3339	0.5630	2.00	NA	0.81
RP 10	2	3	120	180	-0.5758	0.0831	3.00	0.48	0.64
RP 10	3	6	180	360	-0.4580	0.0270	6.00	0.78	0.47
RP 10	6	12	360	720	-0.5551	0.1025	12.00	1.08	0.32
RP 10	12	24	720	1440	-0.7623	0.3261	24.00	1.38	0.19
RP 10	24	48	1440	2880	-0.5537	0.0382	48.00	1.68	0.13
RP 10	48	72	2880	4320	-0.7071	0.2960	72.00	1.86	0.10
RP 10	72	96	4320	5760			96.00	1.98	
RP 10	96	+	5760	+			96.00	1.98	

RP 100: Table to Find Intensity for a Given Duration (input duration)

	Start (hr)	End (hr)	Start (min)	End (min)	Slope	y-intercept	Duration (hr)	Log of Duration	Solve I (in/hr)
RP 100	0	0.25	0	15			0.08	NA	
RP 100	0.25	0.5	15	30			0.50	NA	
RP 100	0.5	1	30	60			1.00	NA	
RP 100	1	2	60	120	0.2349	0.3960	2.00	NA	1.16
RP 100	2	3	120	180	-0.5700	0.2342	3.00	0.48	0.92
RP 100	3	6	180	360	-0.4594	0.1814	6.00	0.78	0.67
RP 100	6	12	360	720	-0.5564	0.2569	12.00	1.08	0.45
RP 100	12	24	720	1440	-0.6633	0.3722	24.00	1.38	0.29
RP 100	24	48	1440	2880	-0.6289	0.3248	48.00	1.68	0.19
RP 100	48	72	2880	4320	-0.6766	0.4049	72.00	1.86	0.14
RP 100	72	96	4320	5760			96.00	1.98	
RP 100	96	+	5760	+			96.00	1.98	


Watershed Specific IDF Curve:
Point-to-Point Linear Regressions

SIERRA MEADOWS EIR

Appendix B

Modified Rational Method - Proposed Condition
10-year and 100-year

Sierra Meadows
Rational Method Peak Discharge Estimation
Proposed Condition

Basin ID	Hydrology Node		Sub-Basin ID	Area (acres)			Elevation (ft)	Slope (ft/ft)	Soil Type Fraction			Land Use Fraction									Runoff Coefficient RP 10Y		Runoff Coefficient RP 100Y		Tt (min)	Σ Tc (min)	Rainfall Intensity (in/hr)		Peak Discharge (cfs)	
	U/S	D/S		Sub	Total	Effective Area	D/S		B	C	D	HS, 0-1 D.U./ac	Low, 0-5 D.U./ac	Neighborhood Com.	Service Com.	Light Industrial	Public	Agriculture \ Golf Course	Open Space	Ponds	CI	Cavg	CI	Cavg			10Y	100Y	Q10	Q100
A		100	A1	2.1	2.1	2.1	##	0.0500		1									1		0.170	0.170	0.230	0.230	6.37	6.37	4.43	6.13	1.60	2.99
A	100	101	A2	4.2	6.3	6.3	##	0.0375		1									1		0.170	0.170	0.230	0.230	2.05	8.42	3.77	5.23	4.07	7.65
A	101	102	A3	15.2	21.5	21.5	##	0.0926		1									1		0.240	0.219	0.320	0.294	1.52	9.94	3.43	4.76	16.30	30.31
A	102	103	A4	24.3	45.8	45.8	##	0.1392		1									1		0.240	0.230	0.320	0.308	1.47	11.42	3.16	4.40	33.65	62.54
A			A5	25.4	71.2	71.2				1									1		0.120	0.191	0.180	0.262	0.00	11.42	3.16	4.40	43.38	82.83
A	103	104	A6	53	124.2	124.2	##	0.0338		1		1									0.250	0.216	0.320	0.287	5.04	16.45	2.56	3.58	69.33	128.45
A			A7	24.9	149.1	149.1				1									1		0.120	0.200	0.180	0.269	0.00	16.45	2.56	3.58	77.05	144.61
A	104	105	A8	23.7	172.8	172.8	##	0.0062		1			0.55					0.45			0.212	0.202	0.288	0.272	5.99	16.45	2.56	3.58	89.99	169.23
			MEMORY 1		172.8	172.8																				16.45	2.56	3.58	89.99	169.23
B		200	B1	1.5	1.5	1.5	##	0.2174		1									1		0.240	0.240	0.320	0.320	5.00	5.00	5.10	7.04	1.85	3.41
B	200	201	B2	4.3	5.8	5.8	##	0.0909		1									1		0.240	0.240	0.320	0.320	1.48	6.48	4.39	6.07	6.16	11.37
B	201	202	B3	15.2	21	21.0	##	0.1000		1									1		0.240	0.240	0.320	0.320	1.95	8.44	3.77	5.23	19.15	35.43
B	202	203	B4	36.7	57.7	57.7	##	0.0877		1									1		0.240	0.240	0.320	0.320	2.32	10.76	3.27	4.55	45.72	84.79
	203	204	B5	18.5	76.2	76.2	##	0.0419		1			0.8		0.2						0.392	0.277	0.498	0.363	3.77	10.76	3.27	4.55	69.66	127.09
	204	204	MEMORY 2		76.2	76.2																				10.76	3.27	4.55	69.66	127.09
C		300	C1	1.3	1.3	1.3	##	0.0667		1									1		0.240	0.240	0.320	0.320	5.68	5.68	4.74	6.55	1.49	2.75
C	300	301	C2	3.1	4.4	4.4	##	0.0556		1									1		0.170	0.191	0.230	0.257	1.58	7.26	4.11	5.69	3.48	6.40
C	301	302	C3	7.8	12.2	12.2	##	0.1017		1									1		0.240	0.222	0.320	0.297	1.74	9.00	3.63	5.04	9.92	18.43
C	302	303	C4	12.4	24.6	24.6	##	0.2308		1									1		0.240	0.231	0.320	0.309	1.37	10.37	3.34	4.65	19.18	35.60
C	303	304	C5	47.9	72.5	72.5	##	0.1752		1									1		0.240	0.237	0.320	0.316	5.31	15.68	2.63	3.68	45.63	84.95
C			C6	77.5	150	150.0				1									1		0.120	0.177	0.180	0.246	5.31	20.99	2.22	3.11	59.41	115.77
C	304	305	C7	83.1	233.1	233.1	##	0.0376		1		0.3							0.69	0.01	0.201	0.185	0.264	0.252	4.94	20.99	2.22	3.11	96.86	184.74
			MEMORY 3		233.1	233.1																				20.99	2.22	3.11	96.86	184.74
D		400	D1	3.1	3.1	3.1	##	0.1167		1									1		0.240	0.240	0.320	0.320	5.00	5.00	5.10	7.04	3.82	7.04
D	400	401	D2	14	17.1	17.1	##	0.1364		1									1		0.240	0.240	0.320	0.320	1.48	6.48	4.39	6.07	18.15	33.50
D	401	402	D3	19.1	36.2	36.2	##	0.2240		1									1		0.240	0.240	0.320	0.320	1.90	8.38	3.78	5.25	33.13	61.29
D	402	403	D4	11.9	48.1	48.1	##	0.2024		1									1		0.240	0.240	0.320	0.320	1.23	9.61	3.49	4.85	40.67	75.35
D	403	404	D5	17.5	65.6	65.6	##	0.2222		1									1		0.240	0.240	0.320	0.320	0.84	10.45	3.33	4.63	52.85	97.98
D	404	305	D6	36.3	101.9	101.9	##	0.0226		1		1									0.250	0.244	0.320	0.320	10.23	20.69	2.24	3.14	56.15	103.24
	305	305	CONFLUENCE WITH MEMORY 3		335	335.0																0.203		0.273		20.99	2.22	3.11	152.54	287.18
C	305	306	C8	39.2	374.2	374.2	##	0.0909		1		0.6						0.4			0.290	0.290	0.376	0.284	2.14	23.13	2.10	2.95	230.15	315.49
	306	204	ROUTE		374.2	374.2	##	0.0192		1												0.290	0.376	0.284	0.49	23.62	2.08	2.91	227.40	311.78
	204	204	CONFLUENCE WITH MEMORY 2		450.4	450.4																0.289		0.297		23.62	2.08	2.91	271.62	393.05
B	204	105	B6	14.2	464.6	464.6	##	0.0368		1								1			0.290	0.288	0.250	0.288	0.95	24.57	2.03	2.85	273.91	383.95
	105	105	CONFLUENCE WITH MEMORY 1		637.4	637.4																0.288		0.288		24.57	2.03	2.85	345.28	518.68
A	105	106	A9	57.3	694.7	694.7	##	0.0161		1		1									0.290	0.288	0.280	0.284	1.35	25.92	1.97	2.76	397.38	550.25
	106	106	MEMORY 4		694.7	694.7																				25.92	1.97	2.76	397.38	550.25
E		500	E1	1.5	1.5	1.5	##	0.2667		1									1		0.290	0.290	0.320	0.320	5.00	5.00	5.10	7.04	2.24	3.41
E	500	501	E2	4.5	6	6.0	##	0.2800		1									1		0.240	0.253	0.320	0.320	1.05	6.05	4.57	6.32	6.98	12.23
E	501	502	E3	20.2	26.2	26.2	##	0.1793		1									1		0.240	0.243	0.320	0.320	2.66	8.71	3.70	5.14	23.74	43.41
E	502	503	E4	26.5	52.7	52.7	##	0.0636		1									1		0.240	0.241	0.320	0.320	2.53	11.24	3.19	4.44	40.96	75.54
E	503	504	E5	42.2	94.9	94.9	##	0.0517		1		1									0.250	0.245	0.320	0.320	3.84	15.08	2.69	3.76	63.21	115.09
E	504	106	E6	39.2	134.1	134.1	##	0.0599		1			0.3					0.7			0.226	0.240	0.295	0.313	3.50	18.57	2.39	3.34	77.37	141.16
	106	106	CONFLUENCE WITH MEMORY 4		828.8	828.8																0.280		0.289		25.92	1.97	2.76	461.19	667.05
	106	106	MEMORY 5		828.8	828.8																0.280		0.289		25.92	1.97	2.76	461.19	667.04
F		600	F1	1.4	1.4	1.4	##	0.1000		1									1		0.290	0.290	0.320	0.320	5.00	5.00	5.10	7.04	2.09	3.18
F	600	601	F2	7	8.4	8.4	##	0.1860		1									1		0.290	0.290	0.320	0.320	0.99	5.99	4.59	6.36	11.29	17.22

Sierra Meadows
Rational Method Peak Discharge Estimation
Proposed Condition

Basin ID	Hydrology Node		Sub-Basin ID	Area (acres)			Elevation (ft)	Slope (ft/ft)	Soil Type Fraction			Land Use Fraction									Runoff Coefficient RP 10Y		Runoff Coefficient RP 100Y		Tt (min)	Σ Tc (min)	Rainfall Intensity (in/hr)		Peak Discharge (cfs)	
	U/S	D/S		Sub	Total	Effective Area	D/S		B	C	D	HS, 0-1 D.U./ac	Low, 0-5 D.U./ac	Neighborhood Com.	Service Com.	Light Industrial	Public	Agriculture \ Golf Course	Open Space	Ponds	Ci	Cavg	Ci	Cavg			10Y	100Y	Q10	Q100
F	601	602	F3	13.6	22	22.0	##	0.2979		1									1		0.240	0.259	0.320	0.320	0.70	6.68	4.31	5.97	24.78	42.37
F	602	603	F4	47.7	69.7	69.7	##	0.2432		1									1		0.240	0.246	0.320	0.320	1.88	8.56	3.74	5.19	64.61	116.03
F	603	604	F5	59	128.7	128.7	##	0.0608		1									0.97	0.03	0.259	0.252	0.340	0.329	3.79	12.35	3.02	4.21	98.62	179.70
F	604	605	F6	25.9	154.6	154.6	##	0.0627		1									1		0.240	0.250	0.320	0.327	3.39	15.74	2.63	3.67	102.36	187.19
F	605	606	F7	30.8	185.4	185.4	##	0.0335		1		0.45							0.55		0.206	0.243	0.271	0.318	4.11	19.86	2.30	3.21	104.20	191.04
	606	606	MEMORY 6		185.4	185.4																					2.30	3.21	104.20	191.04
G		700	G1	1.7	1.7	1.7	##	0.1333		1									1		0.240	0.240	0.320	0.320	5.00	5.00	5.10	7.04	2.10	3.86
G	700	701	G2	2.9	4.6	4.6	##	0.1818		1									1		0.290	0.272	0.320	0.320	0.74	5.74	4.71	6.51	5.93	9.66
G	701	702	G3	5.3	9.9	9.9	##	0.0615		1									1		0.240	0.255	0.320	0.320	1.06	6.80	4.27	5.91	10.85	18.88
G	702	703	G4	13.7	23.6	23.6	##	0.0746		1									1		0.240	0.246	0.320	0.320	1.71	8.51	3.75	5.20	21.96	39.61
G	703	704	G5	32.6	56.2	56.2	##	0.0620		1									1		0.240	0.243	0.320	0.320	2.97	11.48	3.15	4.39	43.35	79.59
G	704	705	G6	60.3	116.5	116.5	##	0.0959		1									1		0.240	0.241	0.320	0.320	6.51	17.99	2.43	3.40	68.93	127.79
G	705	706	G7	94.9	211.4	211.4	##	0.0931		1									1		0.240	0.241	0.320	0.320	5.84	23.83	2.07	2.90	106.08	197.64
G		706	G8	167.3	378.7	378.7				1									0.9	0.1	0.193	0.220	0.257	0.292	0.00	23.83	2.07	2.90	173.40	323.26
G	706	707	G9	61.4	440.1	440.1	##	0.0399		1									1		0.170	0.213	0.230	0.283	2.83	26.66	1.94	2.72	182.90	341.98
G	707	606	G10	32.8	472.9	472.9	##	0.0287		1			0.26					0.74			0.221	0.213	0.289	0.284	3.65	30.31	1.80	2.53	182.97	342.05
	606	606	CONFLUENCE WITH MEMORY 6		658.3	658.3																0.222		0.293	0.00	30.31	1.80	2.53	264.58	492.26
	606	606	MEMORY 7		658.3	658.3																0.222		0.293	0.00	30.31	1.80	2.53	264.58	492.26
H		800	H1	1.4	1.4	1.4	##	0.1818		1									1		0.290	0.290	0.320	0.320	5.00	5.00	5.10	7.04	2.09	3.18
H	800	801	H2	2.2	3.6	3.6	##	0.2105		1									1		0.290	0.290	0.320	0.320	0.74	5.74	4.71	6.51	4.96	7.56
H	801	802	H3	6.5	10.1	10.1	##	0.1752		1									1		0.290	0.290	0.320	0.320	1.50	7.24	5.10	7.04	15.06	22.94
H	802	803	H4	31.7	41.8	41.8	##	0.1833		1									1		0.240	0.252	0.320	0.320	1.92	9.16	3.59	4.99	38.17	67.29
H	803	804	H5	60.4	102.2	41.8	##	0.0139		1		0.3							0.7		0.144	0.252	0.210	0.320	8.59	9.16	3.59	4.99	38.17	67.29
H	804	805	H6	60	162.2	101.8	##	0.0167		1		0.85							0.15		0.188	0.214	0.265	0.288	4.96	14.12	2.80	3.90	61.55	115.18
H	805	806	H7	97.4	259.6	199.2	##	0.1771		1		0.5							0.5		0.275	0.244	0.360	0.323	1.04	15.16	2.68	3.75	131.58	243.06
H		806	H8	72.2	331.8	271.4				1		0.45							0.55		0.156	0.221	0.225	0.297	0.00	15.16	2.68	3.75	162.07	304.43
H	806	807	H9	92.3	424.1	363.7	##	0.0091		1		0.15							0.85		0.132	0.198	0.195	0.271	2.63	17.79	2.45	3.42	177.84	340.08
H	807	808	H10	54.9	479	418.6	##	0.0143		1		0.78							0.22		0.182	0.196	0.258	0.269	2.81	20.60	2.25	3.15	186.10	357.81
H	808	606	H11	121.3	600.3	539.9	##	0.0030		1			0.17					0.13	0.7		0.148	0.185	0.213	0.257	10.22	30.83	1.78	2.50	179.71	357.81
	606	606	CONFLUENCE WITH MEMORY 7		1258.6	1209.3																0.205		0.277	0.00	30.83	1.78	2.50	443.02	847.50
	606	106	ROUTE		1258.6	1209.3	##	0.0090		1												0.205		0.277	2.39	33.22	1.71	2.40	427.00	847.50
	106	106	CONFLUENCE WITH MEMORY 5		2087.4	1772.5																0.210		0.282	0.00	25.92	2.30	3.21	939.09	1589.89
A	106	107	I-1	217.7	2305.1	1990.2	##	0.0030		1			0.75						0.25		0.290	0.219	0.315	0.286	9.45	35.37	1.65	2.31	939.09	1589.89

Sierra Meadows
Rational Method Peak Discharge Estimation
Proposed Condition

Basin ID	Hydrology Node		Sub-Basin ID	Area (acres)			Elevation (ft)		Slope (ft/ft)	Soil Type Fraction			Land Use Fraction									Runoff Coefficient RP 10Y		Runoff Coefficient RP 100Y		Ti (min)	Σ Tc (min)	Rainfall Intensity (in/hr)		Peak Discharge (cfs)	
	U/S	D/S		Sub	Total	Effective Area	U/S	D/S		B	C	D	HS, 0-1 D.U./ac	Low, 0-5 D.U./ac	Neighborhood Com.	Service Com.	Light Industrial	Public	Agriculture \ Golf Course	Open Space	Ponds	CI	Cavg	CI	Cavg			10Y	100Y	Q10	Q100
A		100	A1	2.1	2.1	2.1	2400	2385	0.0500		1									1		0.170	0.170	0.230	0.230	6.37	6.37	4.43	6.13	1.60	2.99
A	100	101	A2	4.2	6.3	6.3	2385	2370	0.0375		1									1		0.170	0.170	0.230	0.230	2.05	8.42	3.77	5.23	4.07	7.65
A	101	102	A3	15.2	21.5	21.5	2370	2320	0.0926		1									1		0.240	0.219	0.320	0.294	1.52	9.94	3.43	4.76	16.30	30.31
A	102	103	A4	24.3	45.8	45.8	2320	2210	0.1392		1									1		0.240	0.230	0.320	0.308	1.47	11.42	3.16	4.40	33.65	62.54
A			A5	25.4	71.2	71.2					1									1		0.120	0.191	0.180	0.262	0.00	11.42	3.16	4.40	43.38	82.83
A	103	104	A6	53	124.2	124.2	2210	2130	0.0338		1		1									0.250	0.216	0.320	0.287	5.04	16.45	2.56	3.58	69.33	128.45
A			A7	24.9	149.1	149.1					1									1		0.120	0.200	0.180	0.269	0.00	16.45	2.56	3.58	77.05	144.61
A	104	105	A8	23.7	172.8	172.8	2130	2120	0.0062		1			0.55					0.45			0.212	0.202	0.288	0.272	5.99	16.45	2.56	3.56	89.90	169.23
			MEMORY 1		172.8	172.8																					16.45	2.56	3.58	89.99	169.23
B		200	B1	1.5	1.5	1.5	2480	2430	0.2174		1									1		0.240	0.240	0.320	0.320	5.00	5.00	5.10	7.04	1.85	3.41
B	200	201	B2	4.3	5.8	5.8	2430	2390	0.0909		1									1		0.240	0.240	0.320	0.320	1.48	6.48	4.39	6.07	6.16	11.37
B	201	202	B3	15.2	21	21.0	2390	2310	0.1000		1									1		0.240	0.240	0.320	0.320	1.95	8.44	3.77	5.23	19.15	35.43
B	202	203	B4	36.7	57.7	57.7	2310	2210	0.0877		1									1		0.240	0.240	0.320	0.320	2.32	10.76	3.27	4.55	45.72	84.79
	203	204	B5	18.5	76.2	76.2	2210	2145	0.0419		1			0.8		0.2						0.392	0.277	0.498	0.363	3.77	10.76	3.27	4.55	69.66	127.09
	204	204	MEMORY 2		76.2	76.2																					10.76	3.27	4.55	69.66	127.09
C		300	C1	1.3	1.3	1.3	3200	3180	0.0667		1									1		0.240	0.240	0.320	0.320	5.68	5.68	4.74	6.55	1.49	2.75
C	300	301	C2	3.1	4.4	4.4	3180	3160	0.0556		1									1		0.170	0.191	0.230	0.257	1.58	7.26	4.11	5.69	3.48	6.48
C	301	302	C3	7.8	12.2	12.2	3160	3100	0.1017		1									1		0.240	0.222	0.320	0.297	1.74	9.00	3.63	5.04	9.92	18.43
C	302	303	C4	12.4	24.6	24.6	3100	2920	0.2308		1									1		0.240	0.231	0.320	0.309	1.37	10.37	3.34	4.65	19.18	35.80
C	303	304	C5	47.9	72.5	72.5	2920	2320	0.1752		1									1		0.240	0.237	0.320	0.316	5.31	15.68	2.63	3.68	45.63	84.95
C			C6	77.5	150	150.0					1									1		0.120	0.177	0.180	0.246	5.31	20.99	2.22	3.11	59.41	115.77
C	304	305	C7	83.1	233.1	233.1	2320	2240	0.0376		1		0.3							0.69	0.01	0.201	0.185	0.264	0.252	4.94	20.99	2.22	3.11	96.86	184.74
			MEMORY 3		233.1	233.1																					20.99	2.22	3.11	96.86	184.74
D		400	D1	3.1	3.1	3.1	3115	3080	0.1167		1									1		0.240	0.240	0.320	0.320	5.00	5.00	5.10	7.04	3.82	7.04
D	400	401	D2	14	17.1	17.1	3080	2990	0.1364		1									1		0.240	0.240	0.320	0.320	1.48	6.48	4.39	6.07	18.15	33.50
D	401	402	D3	19.1	36.2	36.2	2990	2710	0.2240		1									1		0.240	0.240	0.320	0.320	1.90	8.38	3.78	5.25	33.13	61.29
D	402	403	D4	11.9	48.1	48.1	2710	2540	0.2024		1									1		0.240	0.240	0.320	0.320	1.23	9.61	3.49	4.85	40.67	75.35
D	403	404	D5	17.5	65.6	65.6	2540	2400	0.2222		1									1		0.240	0.240	0.320	0.320	0.84	10.45	3.33	4.63	52.85	97.98
D	404	305	D6	36.3	101.9	101.9	2400	2320	0.0226		1		1									0.250	0.244	0.320	0.320	10.23	20.69	2.24	3.14	56.15	103.24
	305	305	CONFLUENCE WITH MEMORY 3		335	335.0																	0.203		0.273		20.99	2.22	3.11	152.54	287.13
C	305	306	C8	39.2	374.2	374.2	2320	2150	0.0909		1		0.6						0.4			0.290	0.290	0.376	0.284	2.14	23.13	2.10	2.95	230.15	315.49
	306	204	ROUTE		374.2	374.2	2150	2145	0.0192		1												0.290	0.376	0.284	0.49	23.62	2.08	2.91	227.40	311.78
	204	204	CONFLUENCE WITH MEMORY 2		450.4	450.4																	0.288		0.297		23.62	2.08	2.91	271.62	383.05
B	204	105	B6	14.2	464.6	464.6	2145	2120	0.0368		1								1			0.290	0.288	0.250	0.288	0.95	24.57	2.03	2.85	273.91	383.95
	105	105	CONFLUENCE WITH MEMORY 1		637.4	637.4																	0.288		0.285		24.57	2.03	2.85	345.28	518.58
A	105	106	A9	57.3	694.7	694.7	2120	2110	0.0161		1		1									0.290	0.288	0.280	0.284	1.35	25.92	1.97	2.76	397.38	550.25
	106	106	MEMORY 4		694.7	694.7																					25.92	1.97	2.76	397.38	550.25
E		500	E1	1.5	1.5	1.5	2880	2800	0.2667		1									1		0.290	0.290	0.320	0.320	5.00	5.00	5.10	7.04	2.24	3.41
E	500	501	E2	4.5	6	6.0	2800	2660	0.2800		1									1		0.240	0.253	0.320	0.320	1.05	6.05	4.57	6.32	6.98	12.23
E	501	502	E3	20.2	26.2	26.2	2660	2400	0.1793		1									1		0.240	0.243	0.320	0.320	2.66	8.71	3.70	5.14	23.74	43.41
E	502	503	E4	26.5	52.7	52.7	2400	2330	0.0636		1									1		0.240	0.241	0.320	0.320	2.53	11.24	3.19	4.44	40.96	75.54
E	503	504	E5	42.2	94.9	94.9	2330	2240	0.0517		1		1									0.250	0.245	0.320	0.320	3.84	15.08	2.69	3.76	63.21	115.09
E	504	106	E6	39.2	134.1	134.1	2240	2110	0.0599		1			0.3					0.7			0.226	0.240	0.295	0.313	3.50	18.57	2.39	3.34	77.37	141.16
	106	106	CONFLUENCE WITH MEMORY 4		828.8	828.8																	0.280		0.289		25.92	1.97	2.76	461.19	667.04
	106	106	MEMORY 5		828.8	828.8																	0.280		0.289		25.92	1.97	2.76	461.19	667.04
F		600	F1	1.4	1.4	1.4	3050	3020	0.1000		1									1		0.290	0.290	0.320	0.320	5.00	5.00	5.10	7.04	2.09	3.18
F	600	601	F2	7	8.4	8.4	3020	2940	0.1860		1									1		0.290	0.290	0.320	0.320	0.99	5.99	4.59	6.36	11.29	17.22

Sierra Meadows
Rational Method Peak Discharge Estimation
Proposed Condition

Basin ID	Hydrology Node		Sub-Basin ID	Area (acres)			Elevation (ft)		Slope (ft/ft)	Soil Type Fraction			Land Use Fraction									Runoff Coefficient RP 10Y		Runoff Coefficient RP 100Y		Tt (min)	Σ Tc (min)	Rainfall Intensity (in/hr)		Peak Discharge (cfs)	
	U/S	D/S		Sub	Total	Effective Area	U/S	D/S		B	C	D	HS, 0-1 D.U./ac	Low, 0-5 D.U./ac	Neighborhood Com.	Service Com.	Light Industrial	Public	Agriculture \ Golf Course	Open Space	Ponds	Cl	Cavg	Cl	Cavg			10Y	100Y	Q10	Q100
F	601	602	F3	13.6	22	22.0	2940	2800	0.2979		1									1		0.240	0.259	0.320	0.320	0.70	6.68	4.31	5.97	24.78	42.37
F	602	603	F4	47.7	69.7	69.7	2800	2440	0.2432		1									1		0.240	0.246	0.320	0.320	1.88	8.56	3.74	5.19	64.61	116.63
F	603	604	F5	59	128.7	128.7	2440	2315	0.0608		1									0.97	0.03	0.259	0.252	0.340	0.329	3.79	12.35	3.02	4.21	98.82	179.70
F	604	605	F6	25.9	154.6	154.6	2315	2195	0.0627		1									1		0.240	0.250	0.320	0.327	3.39	15.74	2.63	3.67	102.36	187.19
F	605	606	F7	30.8	185.4	185.4	2195	2120	0.0335		1		0.45							0.55		0.206	0.243	0.271	0.318	4.11	19.86	2.30	3.21	104.20	191.04
	606	606	MEMORY 6		185.4	185.4																						2.30	3.21	104.20	191.04
G		700	G1	1.7	1.7	1.7	3200	3160	0.1333		1									1		0.240	0.240	0.320	0.320	5.00	5.00	5.10	7.04	2.10	3.86
G	700	701	G2	2.9	4.6	4.6	3160	3110	0.1818		1									1		0.290	0.272	0.320	0.320	0.74	5.74	4.71	6.51	5.93	9.66
G	701	702	G3	5.3	9.9	9.9	3110	3090	0.0615		1									1		0.240	0.255	0.320	0.320	1.06	6.80	4.27	5.91	10.85	18.88
G	702	703	G4	13.7	23.6	23.6	3090	3040	0.0746		1									1		0.240	0.246	0.320	0.320	1.71	8.51	3.75	5.20	21.96	39.61
G	703	704	G5	32.6	56.2	56.2	3040	2960	0.0620		1									1		0.240	0.243	0.320	0.320	2.97	11.48	3.15	4.39	43.35	79.59
G	704	705	G6	60.3	116.5	116.5	2960	2590	0.0959		1									1		0.240	0.241	0.320	0.320	6.51	17.99	2.43	3.40	68.93	127.79
G	705	706	G7	94.9	211.4	211.4	2590	2240	0.0931		1									1		0.240	0.241	0.320	0.320	5.84	23.83	2.07	2.90	106.08	197.64
G		706	G8	167.3	378.7	378.7					1									0.9	0.1	0.193	0.220	0.257	0.292	0.00	23.83	2.07	2.90	173.40	323.26
G	706	707	G9	61.4	440.1	440.1	2240	2180	0.0399		1									1		0.170	0.213	0.230	0.283	2.83	26.66	1.94	2.72	182.90	341.98
G	707	606	G10	32.8	472.9	472.9	2180	2120	0.0287		1			0.26					0.74			0.221	0.213	0.289	0.284	3.65	30.31	1.80	2.53	182.97	342.05
	606	606	CONFLUENCE WITH MEMORY 6		658.3	658.3																	0.222		0.293	0.00	30.31	1.80	2.53	264.58	492.26
	606	606	MEMORY 7		658.3	658.3																	0.222		0.293	0.00	30.31	1.80	2.53	264.58	492.26
H		800	H1	1.4	1.4	1.4	2840	2780	0.1818		1									1		0.290	0.290	0.320	0.320	5.00	5.00	5.10	7.04	2.09	3.18
H	800	801	H2	2.2	3.6	3.6	2780	2720	0.2105		1									1		0.290	0.290	0.320	0.320	0.74	5.74	4.71	6.51	4.96	7.56
H	801	802	H3	6.5	10.1	10.1	2720	2600	0.1752		1									1		0.290	0.290	0.320	0.320	1.50	7.24	5.10	7.04	15.06	22.94
H	802	803	H4	31.7	41.8	41.8	2600	2380	0.1833		1									1		0.240	0.252	0.320	0.320	1.92	9.16	3.59	4.99	38.17	67.29
H	803	804	H5	60.4	102.2	41.8	2380	2350	0.0139		1		0.3							0.7		0.144	0.252	0.210	0.320	8.59	9.16	3.59	4.99	38.17	67.29
H	804	805	H6	60	162.2	101.8	2350	2325	0.0167		1		0.85							0.15		0.188	0.214	0.265	0.288	4.96	14.12	2.80	3.90	61.55	115.18
H	805	806	H7	97.4	259.6	199.2	2325	2155	0.1771		1		0.5							0.5		0.275	0.244	0.360	0.323	1.04	15.16	2.68	3.75	131.58	243.06
H		806	H8	72.2	331.8	271.4					1		0.45							0.55		0.156	0.221	0.225	0.297	0.00	15.16	2.68	3.75	162.07	304.43
H	806	807	H9	92.3	424.1	363.7	2155	2146	0.0091		1		0.15							0.85		0.132	0.198	0.195	0.271	2.63	17.79	2.45	3.42	177.84	340.06
H	807	808	H10	54.9	479	418.6	2146	2128	0.0143		1		0.78							0.22		0.182	0.196	0.258	0.269	2.81	20.60	2.25	3.15	186.10	357.81
H	808	606	H11	121.3	600.3	539.9	2128	2120	0.0030		1			0.17					0.13	0.7		0.148	0.185	0.213	0.257	10.22	30.83	1.78	2.50	179.71	357.01
	606	606	CONFLUENCE WITH MEMORY 7		1258.6	1209.3																	0.205		0.277	0.00	30.83	1.78	2.50	443.02	847.50
	606	106	ROUTE		1258.6	1209.3	2120	2110	0.0090		1												0.205		0.277	2.39	33.22	1.71	2.40	427.00	847.50
	106	106	CONFLUENCE WITH MEMORY 5		2087.4	1772.5																	0.210		0.282	0.00	25.92	2.30	3.21	939.09	1589.89
A	106	107	I-1	217.7	2305.1	1990.2	2110	2100	0.0030		1			0.75						0.25		0.290	0.219	0.315	0.286	9.45	35.37	1.65	2.31	939.09	1589.89

Sierra Meadows

Travel Time Worksheet

Proposed Condition

Sub-Basin ID	Hydrology Node		L (ft)	So (ft/ft)	TR-55 Sheet Flow Travel Time					Trapezoidal Channel Travel Time												Σ Tt (min)
	U/S	D/S			L (ft)	So (ft/ft)	n	2-yr, 24-hr (in)	Tt (min)	Avg. Q10 (cfs)	L (ft)	So (ft/ft)	n	$Z_{efficient}$ (ft/ft)	Adjust BW (ft)	Check for ≠ 0	$Qn/(1.49So^{1/2})$	$A^{5/3}/P^{2/3}$	Adjust dy (ft)	V (fps)	Tt (min)	
A1	0	100	300	0.0500	300	0.05	0.045	3.08	6.37													6.37
A2	100	101	400	0.0375						3.19	400	0.0375	0.045	0.2000	0.93	0.00	0.50	0.49	0.85	3.24	2.05	2.05
A3	101	102	540	0.0926						8.99	540	0.0926	0.045	0.2000	1.23	0.00	0.89	0.90	1.06	5.92	1.52	1.52
A4	102	103	790	0.1392						25.52	790	0.1392	0.045	0.2000	1.68	0.00	2.07	2.06	1.45	8.94	1.47	1.47
A5																						
A6	103	104	2370	0.0338						69.52	2370	0.0338	0.035	0.2000	2.73	0.00	7.61	7.61	2.37	7.84	5.04	5.04
A7																						
A8	104	105	1620	0.0062						83.17	1620	0.0062	0.035	0.2000	4.26	0.00	24.87	24.87	3.69	4.51	5.99	5.93
MEMORY 1																						-
B1	0	200	230	0.2174	230	0.2173913	0.045	3.08	2.88													5.00
B2	200	201	440	0.0609						4.50	440	0.0909	0.045	0.2000	0.95	0.00	0.45	0.45	0.82	4.95	1.48	1.48
B3	201	202	800	0.1000						14.23	800	0.1000	0.045	0.2000	1.43	0.00	1.36	1.36	1.24	6.83	1.95	1.95
B4	202	203	1140	0.0877						35.88	1140	0.0877	0.045	0.2000	2.08	0.00	3.66	3.66	1.80	8.19	2.32	2.32
B5	203	204	1550	0.0419						53.05	1550	0.0419	0.045	0.2000	2.76	0.00	7.82	7.83	2.30	6.85	3.77	3.77
MEMORY 2																						
C1	0	300	300	0.0667	300	0.06666667	0.045	3.08	5.68													5.68
C2	300	301	360	0.0556						3.27	360	0.0556	0.045	0.2000	0.92	0.00	0.42	0.42	0.80	3.79	1.58	1.58
C3	301	302	590	0.1017						6.56	590	0.1017	0.045	0.2000	1.07	0.00	0.62	0.62	0.93	5.67	1.74	1.74
C4	302	303	780	0.2308						14.97	780	0.2308	0.045	0.2000	1.25	0.00	0.94	0.94	1.08	9.47	1.37	1.37
C5	303	304	3425	0.1752						37.85	3425	0.1752	0.045	0.2000	1.86	0.00	2.73	2.73	1.61	10.76	5.31	5.31
C6																						5.31
C7	304	305	2130	0.0376						75.87	2130	0.0376	0.045	0.2000	3.22	0.00	11.82	11.82	2.79	7.18	4.94	4.94
MEMORY 3																						
D1	0	400	300	0.1167	300	0.11666667	0.045	3.08	4.54													5.00
D2	400	401	660	0.1364						12.46	660	0.1364	0.045	0.2000	1.29	0.00	1.02	1.02	1.11	7.41	1.48	1.48
D3	401	402	1250	0.2240						28.29	1250	0.2240	0.045	0.2000	1.59	0.00	1.81	1.81	1.38	10.97	1.90	1.90
D4	402	403	840	0.2024						38.57	840	0.2024	0.045	0.2000	1.83	0.00	2.59	2.59	1.58	11.41	1.23	1.23
D5	403	404	630	0.2222						48.07	630	0.2222	0.045	0.2000	1.95	0.00	3.08	3.08	1.69	12.46	0.84	0.84
D6	404	305	3540	0.0226						67.47	3540	0.0226	0.045	0.2000	3.39	0.00	13.55	13.56	2.94	5.77	10.23	10.23
CONFLUENCE WITH MEMORY 3																						
C8	305	306	1870	0.0909						161.47	1870	0.0909	0.035	0.2000	3.29	0.13	12.58	12.45	2.85	14.55	2.14	2.14
ROUTE	306	204	260	0.0192						230.15	260	0.0192	0.035	0.2000	5.04	0.00	38.99	38.99	4.37	8.90	0.49	0.49
CONFLUENCE WITH MEMORY 2																						
B6	204	105	680	0.0368						275.50	680	0.0368	0.035	0.2000	4.78	0.00	33.80	33.80	4.14	11.88	0.95	0.95
CONFLUENCE WITH MEMORY 1																						
A9	105	106	620	0.0161						360.80	620	0.0161	0.045	0.2000	6.72	2.15	85.80	83.65	5.62	7.68	1.35	1.35
MEMORY 4																						
E1	0	500	300	0.2667	300	0.26666667	0.045	3.08	3.26													5.00
E2	500	501	500	0.2800						5.50	500	0.2800	0.045	0.2000	0.83	0.00	0.32	0.32	0.72	7.94	1.05	1.05
E3	501	502	1450	0.1793						18.72	1450	0.1793	0.045	0.2000	1.42	0.00	1.33	1.33	1.23	9.10	2.66	2.66
E4	502	503	1100	0.0636						35.74	1100	0.0636	0.045	0.2000	2.20	0.00	4.28	4.28	1.91	7.25	2.53	2.53
E5	503	504	1740	0.0517						57.36	1740	0.0517	0.045	0.2000	2.73	0.00	7.62	7.62	2.37	7.55	3.84	3.84
E6	504	106	2170	0.0599						76.27	2170	0.0599	0.035	0.2000	2.69	0.00	7.32	7.32	2.33	10.35	3.50	3.50
CONFLUENCE WITH MEMORY 4																						
MEMORY 5																						
F1	0	600	300	0.1000	300	0.1	0.045	3.08	4.83													5.00
F2	600	601	430	0.1860						7.30	430	0.1860	0.045	0.2000	0.99	0.00	0.51	0.51	0.86	7.28	0.99	0.99
F3	601	602	470	0.2979						20.42	470	0.2979	0.045	0.2000	1.34	0.00	1.13	1.13	1.16	11.24	0.70	0.70
F4	602	603	1480	0.2432						51.64	1480	0.2432	0.045	0.2000	1.97	0.00	3.16	3.16	1.70	13.14	1.88	1.88
F5	603	604	2055	0.0608						91.95	2055	0.0608	0.045	0.2000	3.17	0.00	11.26	11.26	2.74	9.03	3.79	3.79
F6	604	605	1915	0.0627						108.76	1915	0.0627	0.045	0.2000	3.29	0.62	13.12	12.50	2.85	9.41	3.39	3.39
F7	605	606	2240	0.0335						112.55	2240	0.0335	0.035	0.2000	3.42	0.58	14.45	13.87	2.96	5.07	4.11	4.11
MEMORY 6																						
G1	0	700	300	0.1333	300	0.13333333	0.045	3.08	4.30													5.00
G2	700	701	275	0.1818						3.89	275	0.1818	0.045	0.2000	0.79	0.00	0.28	0.28	0.68	6.19	0.74	0.74
G3	701	702	325	0.0615						9.34	325	0.0615	0.045	0.2000	1.34	0.00	1.14	1.14	1.16	5.12	1.06	1.06
G4	702	703	670	0.0746						18.36	670	0.0746	0.045	0.2000	1.67	0.00	2.03	2.03	1.44	6.52	1.71	1.71
G5	703	704	1290	0.0620						37.12	1290	0.0620	0.045	0.2000	2.25	0.00	4.50	4.50	1.94	7.25	2.97	2.97
G6	704	705	3860	0.0959						66.61	3860	0.0959	0.045	0.2000	2.58	0.00	6.50	6.49	2.23	9.88	6.51	6.51
G7	705	706	3760	0.0931						97.60	3760	0.0931	0.045	0.2000	2.98	0.00	9.60	9.60	2.58	10.73	5.84	5.84
G8																						
G9	706	707	1505	0.0399						187.45	1505	0.0390	0.045	0.2000	4.22	4.05	28.35	24.30	3.66	8.66	2.83	2.83
G10	707	606	2090	0.0287						169.71	2090	0.0287	0.035	0.2000	4.14	3.33	26.30	22.98	3.58	9.53	3.65	3.65
CONFLUENCE WITH MEMORY 6																						
MEMORY 7																						
H1	0	800	330	0.1818	330	0.18181818	0.045	3.08	4.10													5.00
H2	800	801	285	0.2105						3.73	285	0.2105	0.045	0.2000	0.75	0.00	0.26	0.24	0.65	6.43	0.74	0.74
H3	801	802	685	0.1752						9.43	685	0.1752	0.045	0.2000	1.11	0.00	0.68	0.68	0.96	7.60	1.50	1.50
H4	802	803	1200	0.1833						31.25	1200	0.1833	0.045	0.2000	1.72	0.00	2.20	2.20	1.49	10.42	1.92	1.92
H5	803	804	2155	0.0139						38.68	2155	0.0139	0.045	0.2000	3.02	0.00	9.90	9.90	2.61	4.18	8.59	8.59

Sierra Meadows
Travel Time Worksheet
Proposed Condition

H6	804	805	1500	0.0167						65.57	1500	0.0167	0.045	0.2000	3.49	0.75	15.34	14.59	3.02	5.04	4.96	4.96
H7	805	806	960	0.1771						91.00	960	0.1771	0.035	0.2000	2.15	1.05	5.08	4.02	1.86	15.32	1.04	1.04
H8																						
H9	808	807	990	0.0091						189.63	990	0.0091	0.035	0.2000	5.23	3.68	46.72	43.04	4.53	6.28	2.63	2.63
H10	807	808	1260	0.0143						191.26	1260	0.0143	0.035	0.2000	4.85	2.52	37.59	35.07	4.20	7.47	2.81	2.81
H11	808	606	2640	0.0030						213.06	2640	0.0030	0.035	0.2000	6.78	5.29	90.92	85.65	5.87	4.30	10.22	10.22
CONFLUENCE WITH MEMORY 7																						
ROUTE	606	106	1110	0.0090						443.02	1110	0.0090	0.035	0.2000	7.22	8.16	109.64	101.48	6.25	7.74	2.39	2.39
CONFLUENCE WITH MEMORY 5																						
I-1	106	107	3350	0.0030						996.77	3350	0.0030	0.035	0.2000	11.03	114.50	428.55	314.04	9.55	5.91	9.45	9.45

IDF Curve Methodology: Select one of the two methods presented below

Enter 1 to select Method 1; enter 2 to select Method 2. No entry automatically selects Method 2: 1

IDF Curve Method 1: Single linear regression of all data points on log-log plot

Logarithms taken for Weighted IDF Curve Data Table

Hours	-0.60	-0.30	0.00	0.30	0.48	0.78	1.08	1.38	1.68	1.86	1.98
RP 2	-	-	-0.15	-0.29	-0.39	-0.53	-0.69	-0.89	-1.10	-1.24	-
RP 10	-	-	0.05	-0.09	-0.19	-0.33	-0.50	-0.73	-0.89	-1.02	-
RP100	-	-	0.20	0.06	-0.04	-0.18	-0.34	-0.54	-0.73	-0.85	-

Regression Statistics

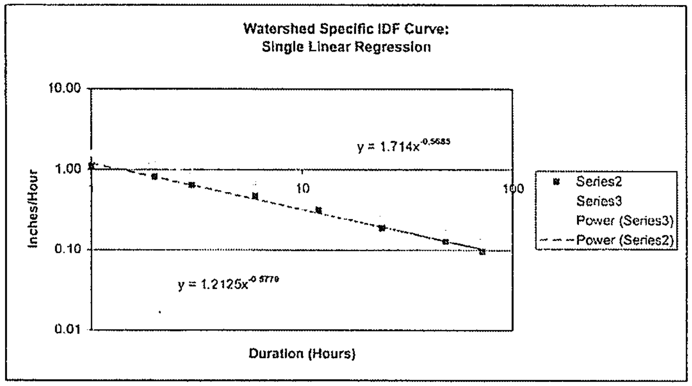
	m	b	sem	seb	r2	sey	F	df	ssreg	ssresid
RP 10	-0.5779	0.0837	0.0171	0.0193	0.9940	0.0302	1147	6	1.0475	0.0055
RP 100	-0.5685	0.2340	0.0155	0.0176	0.9955	0.0275	1337	6	1.0136	0.0045

Description of Regression Statistics Abbreviations

m:	slope
b:	y-intercept
sem:	standard error value for the slope
seb:	standard error value for the y-intercept
r2:	coefficient of determination (values range from 0 to 1; 1 is perfect correlation)
sey:	standard error for the y estimate
F:	F statistic or F-observed value
df:	degrees of freedom
ssreg:	regression sum of squares
ssresid:	residual sum of squares

Table to Find Intensity for a Given Duration (input duration)

	Slope	y-intercept	Duration (hr)	Log of Duration	Solve I (in/hr)
RP 10	-0.5779	0.0837	1.00	0.00	1.21
RP 100	-0.5685	0.2340	1.00	0.00	1.71



IDF Curve Method 2: Point-to-Point linear regression of data points

Inverse taken for Weighted IDF Curve Data Table

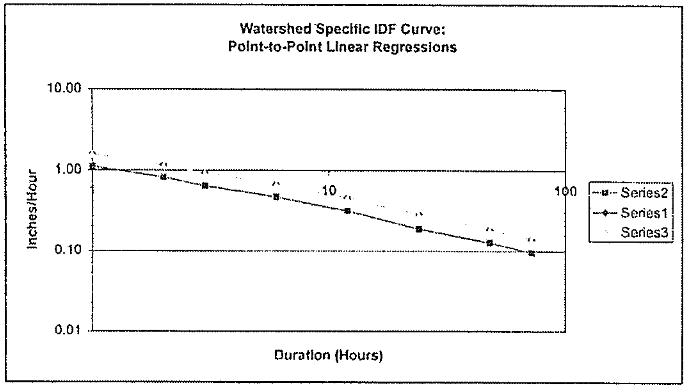
Hours	0.25	0.5	1	2	3	6	12	24	48	72	96
RP 2			1.41	1.93	2.45	3.35	4.94	7.80	12.65	17.29	
RP 10			0.90	1.23	1.55	2.14	3.14	5.32	7.81	10.40	
RP 25			0.63	0.87	1.09	1.50	2.21	3.49	5.40	7.11	

RP 10: Table to Find Intensity for a Given Duration (input duration)

	Start (hr)	End (hr)	Start (min)	End (min)	Slope	y-intercept	Duration (hr)	Log of Duration	Solve I (in/hr)
RP 10	0	0.25	0	15			0.08	NA	
RP 10	0.25	0.5	15	30			0.50	NA	
RP 10	0.5	1	30	60			1.00	NA	
RP 10	1	2	60	120	0.3339	0.5630	2.00	NA	0.81
RP 10	2	3	120	180	-0.5758	0.0831	3.00	0.48	0.64
RP 10	3	6	180	360	-0.4580	0.0270	6.00	0.78	0.47
RP 10	6	12	360	720	-0.5551	0.1025	12.00	1.08	0.32
RP 10	12	24	720	1440	-0.7623	0.3261	24.00	1.38	0.19
RP 10	24	48	1440	2880	-0.5537	0.0382	48.00	1.68	0.13
RP 10	48	72	2880	4320	-0.7071	0.2960	72.00	1.86	0.10
RP 10	72	96	4320	5760			96.00	1.98	
RP 10	96	+	5760	+	.		96.00	1.98	

RP 100: Table to Find Intensity for a Given Duration (input duration)

	Start (hr)	End (hr)	Start (min)	End (min)	Slope	y-intercept	Duration (hr)	Log of Duration	Solve I (in/hr)
RP 100	0	0.25	0	15			0.08	NA	
RP 100	0.25	0.5	15	30			0.50	NA	
RP 100	0.5	1	30	60			1.00	NA	
RP 100	1	2	60	120	0.2349	0.3960	2.00	NA	1.16
RP 100	2	3	120	180	-0.5700	0.2342	3.00	0.48	0.92
RP 100	3	6	180	360	-0.4594	0.1814	6.00	0.78	0.67
RP 100	6	12	360	720	-0.5564	0.2569	12.00	1.08	0.45
RP 100	12	24	720	1440	-0.6633	0.3722	24.00	1.38	0.29
RP 100	24	48	1440	2880	-0.6289	0.3248	48.00	1.68	0.19
RP 100	48	72	2880	4320	-0.6766	0.4049	72.00	1.86	0.14
RP 100	72	96	4320	5760			96.00	1.98	
RP 100	96	+	5760	+			96.00	1.98	



Sierra Meadows
Runoff Coefficients
Proposed Condition

Runoff Coefficients for the Rational Formula
Storm Recurrence Intervals < 25 Years

Land Use	Slope Range		Soil Type		
	From	To	B	C	D
HS, 0-1 D.U./ac	0.00	0.02	0.17	0.20	0.24
	0.02	0.06	0.21	0.25	0.29
	0.06	+	0.26	0.31	0.35
Low, 0-5 D.U./ac	0.00	0.02	0.24	0.27	0.30
	0.02	0.06	0.29	0.31	0.34
	0.06	+	0.33	0.36	0.40
Med., 5-12 D.U./ac	0.00	0.02	0.27	0.30	0.33
	0.02	0.06	0.30	0.33	0.36
	0.06	+	0.35	0.38	0.42
High, 12-20 D.U./ac	0.00	0.02	0.75	0.75	0.75
	0.02	0.06	0.75	0.75	0.75
	0.06	+	0.75	0.75	0.75
MHP, 20+ D.U./ac	0.00	0.02	0.80	0.80	0.80
	0.02	0.06	0.80	0.80	0.80
	0.06	+	0.80	0.80	0.80
Office Professional	0.00	0.02	0.71	0.72	0.72
	0.02	0.06	0.72	0.72	0.72
	0.06	+	0.72	0.72	0.72
Central Bus. Dist.	0.00	0.02	0.71	0.72	0.72
	0.02	0.06	0.72	0.72	0.72
	0.06	+	0.72	0.72	0.72
Mixed Use Com.	0.00	0.02	0.71	0.72	0.72
	0.02	0.06	0.72	0.72	0.72
	0.06	+	0.72	0.72	0.72
Neighborhood Com.	0.00	0.02	0.71	0.72	0.72
	0.02	0.06	0.72	0.72	0.72
	0.06	+	0.72	0.72	0.72
Service Com.	0.00	0.02	0.71	0.72	0.72
	0.02	0.06	0.72	0.72	0.72
	0.06	+	0.72	0.72	0.72
Light Industrial	0.00	0.02	0.68	0.68	0.69
	0.02	0.06	0.68	0.69	0.69
	0.06	+	0.69	0.69	0.70
Public	0.00	0.02	0.50	0.60	0.70
	0.02	0.06	0.50	0.60	0.70
	0.06	+	0.50	0.60	0.70
Agriculture \ Golf Course	0.00	0.02	0.11	0.14	0.18
	0.02	0.06	0.15	0.19	0.23
	0.06	+	0.21	0.26	0.31
Open Space	0.00	0.02	0.08	0.12	0.16
	0.02	0.06	0.13	0.17	0.21
	0.06	+	0.19	0.24	0.28
Ponds	0.00	0.02	0.85	0.85	0.85
	0.02	0.06	0.86	0.86	0.86
	0.06	+	0.87	0.87	0.87
Street/Highway	0.00	0.02	0.71	0.72	0.73
	0.02	0.06	0.72	0.73	0.75
	0.06	+	0.74	0.76	0.78

Runoff Coefficients for the Rational Formula
Storm Recurrence Intervals >= 25 Years

Land Use	Slope Range		Soil Type		
	From	To	B	C	D
HS, 0-1 D.U./ac	0.00	0.02	0.24	0.28	0.31
	0.02	0.06	0.28	0.32	0.35
	0.06	+	0.34	0.40	0.46
Low, 0-5 D.U./ac	0.00	0.02	0.33	0.36	0.38
	0.02	0.06	0.37	0.40	0.42
	0.06	+	0.42	0.47	0.52
Med., 5-12 D.U./ac	0.00	0.02	0.35	0.38	0.41
	0.02	0.06	0.39	0.42	0.45
	0.06	+	0.44	0.49	0.54
High, 12-20 D.U./ac	0.00	0.02	0.75	0.75	0.75
	0.02	0.06	0.75	0.75	0.75
	0.06	+	0.75	0.75	0.75
MHP, 20+ D.U./ac	0.00	0.02	0.80	0.80	0.80
	0.02	0.06	0.80	0.80	0.80
	0.06	+	0.80	0.80	0.80
Office Professional	0.00	0.02	0.89	0.89	0.89
	0.02	0.06	0.89	0.89	0.89
	0.06	+	0.89	0.90	0.90
Central Bus. Dist.	0.00	0.02	0.89	0.89	0.89
	0.02	0.06	0.89	0.89	0.89
	0.06	+	0.89	0.90	0.90
Mixed Use Com.	0.00	0.02	0.89	0.89	0.89
	0.02	0.06	0.89	0.89	0.89
	0.06	+	0.89	0.90	0.90
Neighborhood Com.	0.00	0.02	0.89	0.89	0.89
	0.02	0.06	0.89	0.89	0.89
	0.06	+	0.89	0.90	0.90
Service Com.	0.00	0.02	0.89	0.89	0.89
	0.02	0.06	0.89	0.89	0.89
	0.06	+	0.89	0.90	0.90
Light Industrial	0.00	0.02	0.85	0.86	0.86
	0.02	0.06	0.86	0.86	0.86
	0.06	+	0.86	0.87	0.88
Public	0.00	0.02	0.50	0.60	0.70
	0.02	0.06	0.50	0.60	0.70
	0.06	+	0.50	0.60	0.70
Agriculture \ Golf Course	0.00	0.02	0.16	0.20	0.24
	0.02	0.06	0.21	0.25	0.29
	0.06	+	0.28	0.34	0.41
Open Space	0.00	0.02	0.14	0.18	0.22
	0.02	0.06	0.19	0.23	0.27
	0.06	+	0.26	0.32	0.39
Ponds	0.00	0.02	0.95	0.95	0.95
	0.02	0.06	0.96	0.96	0.96
	0.06	+	0.97	0.97	0.97
Street/Highway	0.00	0.02	0.80	0.84	0.89
	0.02	0.06	0.82	0.85	0.91
	0.06	+	0.84	0.89	0.95

15.10 Water and Wastewater Infrastructure Study

RBF
CONSULTING

MEMORANDUM

To: Mike Harden and Glenn Lajoie, MS 455 JN 10-102469

From: Charlie Marr and Corey Hess, MS 210

Date: October 3, 2004

Subject: Sierra Meadows Water and Wastewater Infrastructure Study

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Per your request we have completed a water and wastewater utility study for the Sierra Meadows Estates development located in an unincorporated area of Madera County northwest of Oakhurst, California. The development will add 315 dwelling units in several stages, and develop 467 acres located around the existing Sierra Meadows Golf Course (see Exhibit 1). The proposed lots within the development range in size from 7,000 square feet to larger than six acres. The goal of this analysis is to develop a plan for water and wastewater service for the Sierra Meadows Estates development project.

Project Background

The proposed Sierra Meadows Estates development surrounds the existing Sierra Meadows golf course. Currently, the golf course, clubhouse and 58 dwelling units exist in the study area. The existing dwelling units are served water from the Madera County Maintenance District 46 system. The existing distribution system includes a 150,000-gallon tank and an 8-inch pipeline in Opah Drive. Local groundwater wells serve as the source of water for the system. Wastewater service is currently provided by septic tanks. The water and wastewater system for the Sierra Meadows project is proposed to be combined with Maintenance District 46 existing system. The ultimate Maintenance District facilities (as shown in the Sierra Meadows and Maintenance District 46 – Water Balance Calculations performed by Nolte) would include the golf course, clubhouse and expansion to 105 dwelling units. Therefore, ultimate buildout of Maintenance District #46 and Sierra Meadows facilities will include 420 dwelling units, a golf course and the clubhouse. The proposed development will be built on land with existing water rights.

Two separate reports have been written which outline water service to the Sierra Meadows Estates development. The first study, titled *Sierra Meadows Development – Study of Water*

System Demands and Supplies was performed by Provost and Pritchard in July 2002. It discussed anticipated water demands and supplies, proposed infrastructure components, and included a cost estimate. The second report titled *Sierra Meadows Development Water and Wastewater Planning Technical Study* completed by Nolte in March 2003 discussed water demands and supplies, created a water budget, and analyzed possible water and wastewater treatment processes. Nolte provided RBF with a revised water budget as of November 2003. Further information about Sierra Meadows has been drawn from the Nolte site plan, and through phone conversations with Nolte staff.

Water Demand

The water demand factors used for this study are based on the Provost and Pritchard report that references the Madera County Standard for an average flow of 1 gpm per dwelling unit. That equates to an average demand of 1,440 gallons per day (gpd) for each residence, for internal and external uses. For the purposes of this study, and based on RBF's expertise, an internal (indoor) demand of 300 gpd per dwelling unit is used in this study. The remaining 1,140 gpd per resident is the average external (irrigation) demand for each residence. Peaking has been performed according to the peak factors provided in the Provost and Pritchard report, and are 1.5 times average day for internal use, and 2.0 times average day for external use. The estimated average and maximum-day demands are calculated in Table 1.

Table 1 – Maintenance District No. 46 Residential Demands Only (at Buildout)

Dwelling Units	Internal Demand Factor	External Demand Factor	Internal Avg. Demand	External Avg. Demand	Total Avg Demand		Internal Max Day Demand [1]	External Max Day Demand [2]	Total Max Day Demand
-	(gpd/du)	(gpd/du)	(gpd)	(gpd)	(gpd)	(AF/yr)	(gpd)	(gpd)	(gpd)
420	300	1,140	126,000	478,800	604,800	679	189,000	957,600	1,146,600

[1] Internal Use Peaking Factor = 1.5, based on Provost and Pritchard report
[2] External Use Peaking Factor = 2.0, based on Provost and Pritchard report

Water Supply

Currently, water is supplied to the golf course and existing residents from the existing Maintenance District 46 groundwater wells. The proposed primary water source for the Sierra Meadows Estates development is surface water from the Miami Creek, as established in both reports. Local groundwater is proposed to provide supplemental supply for redundancy and reliability.

The rights to the water of Miami Creek are referenced to a *Water Location Notice* filed with the County of Madera on September 18, 1893 by Edwin J. Leonard. Mr. Leonard intended to divert the water by means of a dam and ditch for purposes of water stock and general domestic and household purposes on his ranch. The *Water Location Notice* is recorded in Volume 1 of Water Rights page 15 et. seq. of Madera County Records. The Miami Creek varies in flow throughout the year and is dependent upon precipitation and snowmelt within the tributary watershed. As a condition for development, Sierra Meadows is not limited to a particular quantity, but water cannot be drawn during the summer months, and a minimum of 0.5 cubic feet per second must be maintained in Miami Creek.

The Miami Creek surface water will require treatment for potable use. There are also several wells located with the Sierra Meadows development area. Based upon the Nolte Report, the existing Maintenance District 46 groundwater wells have the capacity to provide the proposed project with a continual flow of 150 gpm. It is understood that an additional 150 gpm from Sierra Meadows wells will be available to the development. To meet water demands during the summer months, supply must come from storage and/or groundwater. Table 2 is based on the most recently distributed Water Budget provided by Nolte and shows the groundwater and storage capacity necessary for Sierra Meadows with 315 dwelling units.

Table 2 [1] – Maintenance District No. 46 at Buildout – Water Budget for First Drought Year

Month	Miami Creek Supply	Existing M.D. # 46 Groundwater	Proposed Sierra Meadows Groundwater	Potential Reclaimed Wastewater	Total Supply	Total Demand	Required Storage
	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)
Jan	68.07	20.55	20.55	8.19	117.36	57.53	59.83
Feb	46.51	18.56	18.56	7.66	91.29	51.96	99.16
Mar	65.62	20.55	20.55	8.19	114.91	57.53	156.54
Apr	30.83	19.89	19.89	7.92	78.53	55.67	179.4
May	76.05	20.55	20.55	8.19	125.34	76.47	228.27
Jun	18.35	19.89	19.89	7.92	66.05	98.41	195.91
Jul	0	20.55	20.55	8.19	49.29	110.48	134.72
Aug	0	20.55	20.55	8.19	49.29	105.98	78.03
Sep	0	19.89	19.89	7.92	47.7	105.86	19.87
Oct	9.15	20.55	20.55	8.19	58.44	76.47	1.84
Nov	14.2	19.89	19.89	7.92	61.9	55.67	8.07
Dec	23.26	20.55	20.55	8.19	72.55	57.53	23.09
Total	**352.04**	**241.97**	**241.97**	**96.45** [2]	**932.43**	**909.55**	-

[1] Based on the Sierra Meadows and Maintenance District # 46 – Water Budget Balance Calculations performed by Nolte

[2] Based on 100 percent treatment plant efficiency

Based on Table 2, a minimum of 230 acre-feet of operational storage (refer to May - "Required Storage" calculation) is required for supply during a single dry year under ultimate build-out of Sierra Meadows. However, under two successive dry years Nolte shows in their Water Budget Balance Calculations that 300 acre-feet of operational storage is required. Currently, 93 acre-feet of storage is available on-site. The current site plan provided by Nolte includes approximately 210 acre-feet of developed storage at a proposed on-site reservoir (reservoir capacity is approximately 227 acre-feet), yielding 303 acre-feet of total storage.

As shown in the water budget of Table 2, a third water source is reclaimed water provided from the wastewater treatment plant. From the 287 dwelling units proposed for sewer service in Sierra Meadows, the calculated wastewater flow is 86,100 gallons per day (gpd), or approximately 96 acre-feet annually. However, effluent capacity should be assumed to have a maximum of 75 percent yield, or approximately 64,575 gpd (72 acre-feet per year). With a maximum-day residential irrigation demand estimated at 957,000 gpd, it would not be feasible to utilize the reclaimed water for residences. This water would be discharged to the golf course lake(s), which would then supplement golf course irrigation.

The modified supply and demand table for Sierra Meadows that reflects lowered reclaimed water production is shown in Table 3. It should be noted that the Miami Creek water supply in the Water Budget is based upon the most severe drought year of record. During such a drought year, it is understood that golf course demands will be cut back to ensure that demands will not exceed supply.

Table 3 [1] – **Maintenance District No. 46 at Buildout - Modified (Actual) Supply and Demand**

Description	**Project Supply (Assumes Drought Year Conditions for Miami Creek)**		**Average Demand**	
	(gpd)	**(AF/yr)**	**(gpd)**	**(AF/yr)**
Miami Creek	370,080	352		
Sierra Meadows Groundwater	216,000	242		
Maintenance District 46 Groundwater	216,000	242		
Treated Effluent	64,575	72 [4]		
Sierra Meadows Lots (315 lots)			453,600	508
Golf Course [2]			283,873	317 / 178 [3]
Maintenance District #46 (105 lots)			151,200	169
Total – without 50% Golf Course Irrigation Reduction	**866,655**	**908**	**888,673**	**994**
Total - with 50% Golf Course Irrigation Reduction	**-**	**-**	**746,737**	**817 [5]**

[1] Based upon the Sierra Meadows and Maintenance District #46 – Water Balance Table by Nolte

[2] Per Water Balance Calculations, golf course irrigation only performed from May to October.

[3] Per Water Balance Calculations, a 50 percent cutback of golf course irrigation from June to September is deemed possible for meeting drought conditions. Total demand for the golf course under 50% cutback is 178 acre-feet.

[4] Based on 75% treatment plant efficiency

[5] Demand based upon 178 acre-feet golf course irrigation demand per [3].

The Sierra Meadows water distribution system must be a self-sufficient system as due to its isolated location there are no facilities available for inter-connection. The proposed supply to the site under Table 3 is sufficient to meet the average yearly and monthly peaking demands during a drought season, through cutback of golf course irrigation. In order to meet demands during the dry months, additional water will be drawn as shown in Table 2 so that water supplies will be available in the months of July and August when no Miami Creek supplies may be withdrawn. Both the supply sources and demands are shown in Table 3.

Water Distribution System

Based upon the Nolte report, and follow up discussions with Nolte representatives, a currently proposed water system include ponds for Miami Creek water storage, a water treatment plant, pumps to deliver residential demands, and a 150,000 gallon tank for emergency fire flow demand. The treatment facility for the surface water is proposed to be a micro-filtration plant with maximum day demand flow capacity. Pumping capacity for the water distribution system would need to meet the maximum day residential demand for the development and provide water for the proposed 150,000-gallon fire flow storage tank. The fire flow tank has been proposed to be located at the end of Arnold Palmer Court (see Exhibit 1). The tank would be used strictly to meet the proposed fire flow demand, which is identified as 1,000 gpm for two hours per Madera County Fire Department and Appendix 3A of section 901.3 of the Uniform Fire Code.

RBF has outlined alternative distribution methods, and included distribution storage at elevation. The use of a reservoir at elevation provides three major benefits:

1. Reduced energy and operation costs (utilizes 'free' gravity head during peak power costs)
2. Ability to 'peak' off of storage for more hydraulic stability
3. Provides consumptive use of stored water – 'turnover' - and can be sized to maintain adequate fire flow volume.

Elevations within the Sierra Meadows site vary from 2,150 feet above mean sea level (amsl) to 2,540 feet amsl. This represents almost 200 psi of static pressure difference. Three alternative distribution systems are investigated for the purpose of this report. Each alternative was modeled via computer hydraulic analysis, using WaterCAD by Haestad Methods and run to ensure each Alternative is satisfactory under peak hour and max day plus fire flow (FF) conditions. A summary of each of the Alternatives and the model results is provided as follows:

Alternative 1

Alternative 1 investigates the use of a reservoir along Miami Highland Drive to serve the majority of the development. This reservoir would have capacity to serve both user demands and provide fire flow capacity. It would have a high water level (HWL) of 2,464 feet amsl. See the attached Alternative 1 exhibit for the distribution system schematic. Development of the Miami Highlands Drive reservoir would eliminate the need for the 150,000-gpd-fire flow reservoir currently envisioned. A total of 34 dwelling units are at higher elevations than can be served by the reservoir. In order to serve these dwelling units a closed-system pump will be required, the pumping system will need to have the capacity to pump demands and fire flow. A summary of the computer model results is as follows:

Scenario	Junction	Min. Pressure	Pipe	Max. Velo.
		(psi)		(fps)
Peak Hour	J-1	48.69	P-110	4.75
Max Day + FF @ J-1	J-1	20.93	P-1	6.51
Max Day + FF @ J-19	J-1	25.73	P-19	6.48
Max Day + FF @ J-20	J-1	28.59	P-20	6.56
Max Day + FF @ J-21	J-1	32.07	P-21	6.60
Max Day + FF @ J-107	J-1	61.87	P-129	6.50
Max Day + FF @ J-116	J-116	29.58	P-128	6.78

Alternative 2

For Alternative 2 the concept of locating a reservoir and treatment facility within reasonable proximity of the proposed 227 acre-foot water reservoir is investigated. The proposed location of the reservoir is along Opah Drive. This location would minimize on-site piping. The reservoir proposed would have a high water level of 2,464 feet amsl. As with Alternative 1, in order to serve the residential lots at higher elevations, a closed pumping system would be necessary. The closed pumping system would have capacity to pump peak hour and max day plus fire flow demands. See the Alternative 2 exhibit for the distribution system schematic corresponding to Alternative 2. A summary of the model results for Alternative 2 is as follows:

Scenario	Junction	Min. Pressure	Pipe	Max. Velo.
		(psi)		(fps)
Peak Hour	J-116	43.56	P-110	4.75
Max Day + FF @ J-1	J-1	28.75	P-1	6.51
Max Day + FF @ J-19	J-1	33.56	P-19	6.48
Max Day + FF @ J-20	J-1	36.41	P-20	6.56
Max Day + FF @ J-21	J-1	39.89	P-21	6.60
Max Day + FF @ J-107	J-107	46.49	P-127	6.50
Max Day + FF @ J-113	J-1	40.42	P-116	6.45
Max Day + FF @ J-116	J-1	40.42	P-117	6.52

Alternative 3

Alternative 3 is based on the development of a single reservoir to serve the Sierra Meadows development and eliminate the need for a small closed system pump or private pumps. Therefore, Alternative 3 investigates the use of a single reservoir at elevation to serve the entire development. The reservoir proposed under this alternative would have a high water level of 2,166 feet amsl. In order to serve the residential lots at lower elevations pressure-reducing valves will be required in the system. See the Alternative 3 exhibit for the distribution system schematic corresponding to Alternative 3. A summary of the model results for Alternative 3 is as follows:

Scenario	Junction	Min. Pressure	Pipe	Max. Velo.
		(psi)		(fps)
Peak Hour	J-1	45.89	P-110	4.75
Max Day + FF @ J-1	J-1	20.65	P-1	6.51
Max Day + FF @ J-19	J-1	25.45	P-19	6.48
Max Day + FF @ J-20	J-1	28.31	P-20	6.56
Max Day + FF @ J-21	J-1	31.79	P-21	6.60
Max Day + FF @ J-107	J-116	38.44	P-127	6.50
Max Day + FF @ J-113	J-116	38.44	P-116	6.45
Max Day + FF @ J-116	J-116	38.44	P-120	5.21

Wastewater System

The Sierra Meadows development will include a wastewater treatment plant (WWTP) to serve wastewater flows. For this study the wastewater generation is based on the estimated internal water use. Sewer connections are proposed at all residences on lots smaller then five acres. (Approximately 287 dwelling units) The remaining 28 larger lots are proposed for service with septic tanks. Currently 287 dwelling units are proposed for sewer connection. The estimated wastewater generation is shown in Table 4.

Table 4– Wastewater Generated by the Sierra Meadows Project

Dwelling Units	Factor	Avg Flow		Peak Flow [1]	
-	(gpd/du)	(gpd)	(gpm)	(gpd)	(gpm)
287	300	86,100	60	129,150	90

[1] Wastewater generation equals internal water demand, therefore the Internal Water Demand Peak of 1.5 was used

The Nolte report outlines a proposed location for the wastewater treatment plant adjacent to Payne Stewart Court, within the area of the golf course. The plant would treat all generated wastewater from the proposed development to full Title 22 standards. The WWTP should be sized to serve the peak estimated flow, or include a forebay for inlet flow equalization. As indicated at the beginning of this study, reclaimed effluent from the plant could be used for supplemental golf course irrigation. It is assumed that a discharge permit could be obtained for permanent discharge to an existing golf course lake for supplemental golf course irrigation.

Conclusion

The proposed Sierra Meadows Estates development must have stand-alone water and wastewater systems. Water supply would be stored within existing ponds (approximately 93 acre-feet) and a proposed 227 acre-foot water reservoir (approximately 209 acre-feet actual usage), which totals approximately 303 acre-feet of existing and proposes water storage. Water would be supplied by groundwater and from Miami Creek. Miami Creek water will require treatment prior to potable use. For two successive dry years 300 AF of operational storage is required. The current site plan shows 303 AF of gross storage. This would require that approximately 100% of the gross storage is operational. In order for the on-site storage to meet demands during a two dry year scenario, either further storage or increased allowance for groundwater pumping during the summer months needs to be developed. A preliminary design is necessary to determine the maximum operational volume for the proposed and existing on-site storage pond configuration.

Based upon Table 3, the annual supply is 908 acre-feet per year under drought conditions, and demand during a normal year is estimated at 994 acre-feet. Therefore, in order to meet demands in the event severe drought conditions golf course irrigation will need to be cutback by approximately 50% to make up for the 86 acre-feet per year deficiency.

The recommended alternative for water distribution is Alternative 3. The alternative takes advantage of the topography and storage pond locations. However, the alternative is dependent on ability to site a reservoir with a pad elevation of 2,464 feet amsl. The advantage of this alternative is the ability to pump to the reservoir during off-peak power costs, and the ability to use gravity flow from the reservoir to meet the proposed demands.

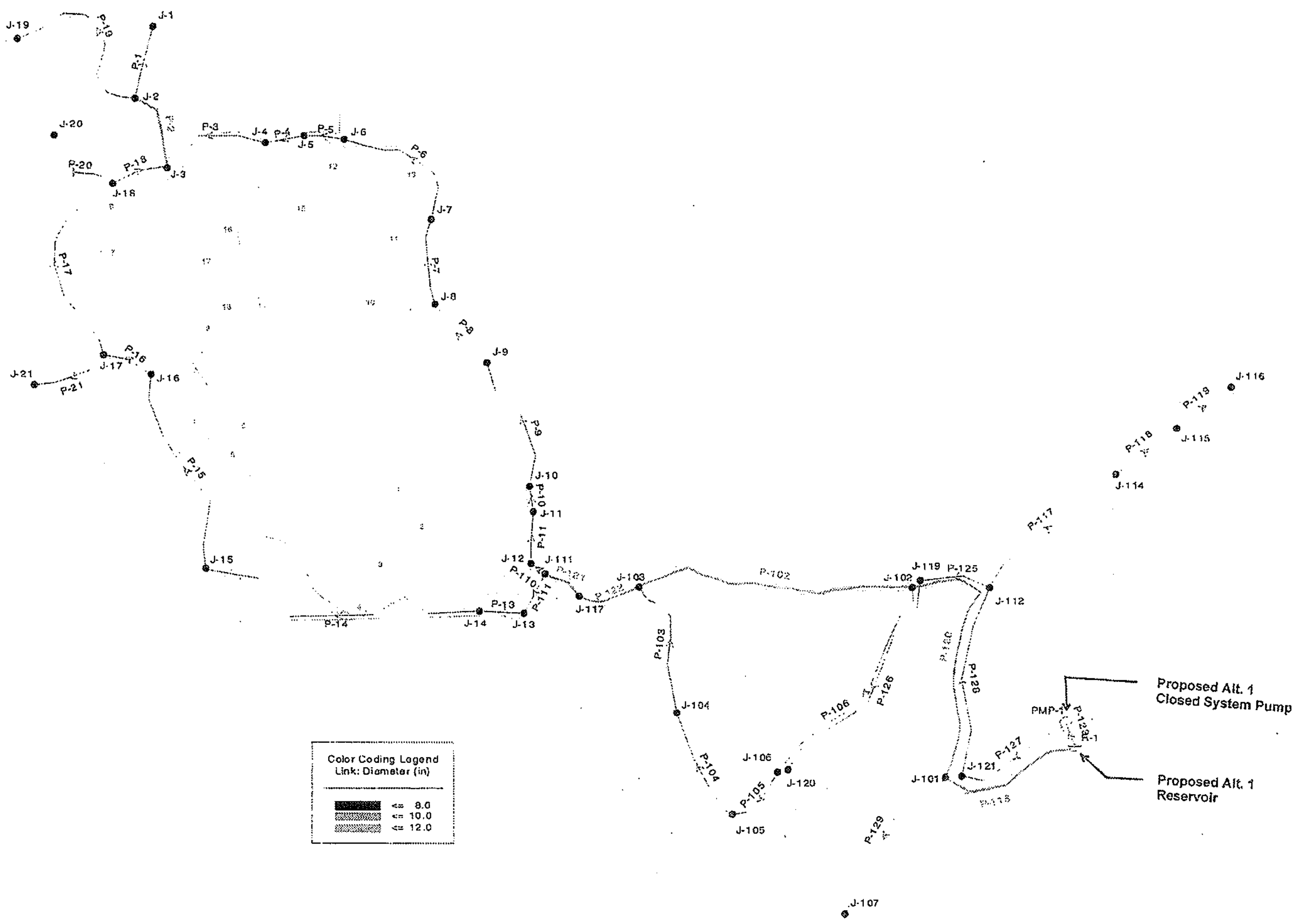
Please call me at x3655 or Charlie at x3416 if you have any questions regarding this study.

Attachments

cc: File, w/ attachments

Hydraulic Model Runs

Scenario: Peak Hour



Alternative 1

Title: Sierra Meadows
h:\...\watercad\rev - sierra meadows alt 1.wcd
01/28/04 05:25:51 PM

RBF Consulting
© Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 USA +1-203-755-1666

Project Engineer: Charlie Marr
WaterCAD v5.0 [5.0037]

Scenario: Peak Hour
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	40.00	Fixed	40.00	2,412.54	48.69
J-2	2,287.00	Zone-1	Demand	24.00	Fixed	24.00	2,412.57	54.33
J-3	2,209.00	Zone-1	Demand	132.00	Fixed	132.00	2,412.62	88.10
J-4	2,230.00	Zone-1	Demand	84.00	Fixed	84.00	2,412.81	79.09
J-5	2,240.00	Zone-1	Demand	16.00	Fixed	16.00	2,413.03	74.86
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,413.29	79.30
J-7	2,247.00	Zone-1	Demand	56.00	Fixed	56.00	2,414.26	72.37
J-8	2,235.00	Zone-1	Demand	324.00	Fixed	324.00	2,415.18	77.95
J-9	2,207.00	Zone-1	Demand	44.00	Fixed	44.00	2,419.26	91.83
J-10	2,186.00	Zone-1	Demand	16.00	Fixed	16.00	2,427.49	104.48
J-11	2,188.00	Zone-1	Demand	32.00	Fixed	32.00	2,429.16	104.34
J-12	2,198.00	Zone-1	Demand	84.00	Fixed	84.00	2,432.74	101.56
J-13	2,170.00	Zone-1	Demand	96.00	Fixed	96.00	2,432.03	113.37
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,430.52	112.71
J-15	2,170.00	Zone-1	Demand	96.00	Fixed	96.00	2,420.16	108.23
J-16	2,150.00	Zone-1	Demand	28.00	Fixed	28.00	2,415.37	114.81
J-17	2,170.00	Zone-1	Demand	68.00	Fixed	68.00	2,414.37	105.73
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,412.84	108.10
J-19	2,250.00	Zone-1	Demand	32.00	Fixed	32.00	2,412.52	70.32
J-20	2,220.00	Zone-1	Demand	56.00	Fixed	56.00	2,412.79	83.41
J-21	2,228.00	Zone-1	Demand	68.00	Fixed	68.00	2,414.29	80.60
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,457.45	35.24
J-102	2,380.00	Zone-1	Demand	0.00	Fixed	0.00	2,446.25	28.66
J-103	2,270.00	Zone-1	Demand	36.00	Fixed	36.00	2,438.30	72.82
J-104	2,240.00	Zone-1	Demand	28.00	Fixed	28.00	2,439.88	86.48
J-105	2,310.00	Zone-1	Demand	24.00	Fixed	24.00	2,441.45	56.87
J-106	2,349.00	Zone-1	Demand	0.00	Fixed	0.00	2,442.48	40.45
J-107	2,285.00	Zone-1	Demand	36.00	Fixed	36.00	2,457.39	74.59
J-111	2,208.00	Zone-1	Demand	84.00	Fixed	84.00	2,434.26	97.89
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,654.68	117.11
J-114	2,482.00	Zone-1	Demand	20.00	Fixed	20.00	2,654.60	74.67
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,654.59	49.58
J-116	2,530.00	Zone-1	Demand	24.00	Fixed	24.00	2,654.58	53.90
J-117	2,235.00	Zone-1	Demand	24.00	Fixed	24.00	2,435.81	86.88
J-119	2,380.00	Zone-1	Demand	32.00	Fixed	32.00	2,654.58	118.80
J-120	2,349.00	Zone-1	Demand	48.00	Fixed	48.00	2,654.45	132.15
J-121	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,655.27	120.83

Scenario: Peak Hour
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-40.00	0.03	0.05	0.26
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-96.00	0.05	0.08	0.39
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-87.64	0.18	0.20	0.56
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-171.64	0.22	0.70	1.10
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-187.64	0.26	0.82	1.20
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-187.64	0.97	0.82	1.20
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-243.64	0.92	1.34	1.56
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-567.64	4.08	6.40	3.62
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-611.64	8.23	7.35	3.90
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-627.64	1.67	7.71	4.01
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-659.64	3.58	8.45	4.21
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	456.36	1.51	4.27	2.91
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	456.36	10.36	4.27	2.91
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	360.36	4.79	2.76	2.30
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	332.36	1.00	2.37	2.12
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	196.36	1.52	0.90	1.25
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	140.36	0.22	0.48	0.90
P-19	J-2	J-19	1,512.00	8.0	Ductile Iron	130.0	32.00	0.05	0.03	0.20
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	56.00	0.06	0.09	0.36
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	68.00	0.08	0.13	0.43
P-102	J-102	J-103	2,263.00	12.0	Ductile Iron	130.0	1,192.23	7.94	3.51	3.38
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	-247.77	1.57	1.38	1.58
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	-275.77	1.57	1.68	1.76
P-105	J-105	J-106	526.00	8.0	Ductile Iron	130.0	-299.77	1.03	1.96	1.91
P-106	J-106	J-102	1,920.00	8.0	Ductile Iron	130.0	-299.77	3.77	1.96	1.91
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-743.64	1.52	10.55	4.75
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	552.36	2.23	6.08	3.53
P-116	J-101	R-1	1,179.00	12.0	Ductile Iron	130.0	-1,528.00	6.55	5.56	4.33
P-117	J-112	J-114	1,387.00	8.0	Ductile Iron	130.0	44.00	0.08	0.06	0.28
P-118	J-114	J-115	622.00	8.0	Ductile Iron	130.0	24.00	0.01	0.02	0.15
P-119	J-115	J-116	548.00	8.0	Ductile Iron	130.0	24.00	0.01	0.02	0.15
P-120	J-101	J-102	2,106.00	12.0	Ductile Iron	130.0	1,492.00	11.20	5.32	4.23
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-1,380.00	1.55	4.60	3.91
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-1,404.00	2.49	4.75	3.98
P-123	R-1	PMP-1	218.00	8.0	Ductile Iron	130.0	124.00	0.08	0.38	0.79
P-125	J-112	J-119	581.00	8.0	Ductile Iron	130.0	80.00	0.10	0.17	0.51
P-126	J-119	J-120	1,951.00	8.0	Ductile Iron	130.0	48.00	0.13	0.07	0.31
P-127	PMP-1	J-121	981.00	8.0	Ductile Iron	130.0	124.00	0.38	0.38	0.79
P-128	J-121	J-112	1,567.00	8.0	Ductile Iron	130.0	124.00	0.60	0.38	0.79
P-129	J-101	J-107	1,413.00	8.0	Ductile Iron	130.0	36.00	0.05	0.04	0.23

Scenario: Max Day + FF @ J-1
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	1,020.00	Fixed	1,020.00	2,348.37	20.93
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,359.49	31.36
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,363.94	67.03
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,369.99	60.57
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,372.40	57.28
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,374.89	62.69
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,384.04	59.29
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,389.82	66.99
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,397.91	82.60
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,412.82	98.13
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,415.75	98.54
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,421.68	96.78
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,420.07	108.19
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,416.81	106.78
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,394.46	97.11
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,380.46	99.71
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,377.18	89.64
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,366.55	88.07
J-19	2,250.00	Zone-1	Demand	16.00	Fixed	16.00	2,359.48	47.37
J-20	2,220.00	Zone-1	Demand	28.00	Fixed	28.00	2,366.53	63.40
J-21	2,228.00	Zone-1	Demand	34.00	Fixed	34.00	2,377.16	64.53
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,455.45	34.37
J-102	2,380.00	Zone-1	Demand	0.00	Fixed	0.00	2,440.47	26.16
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,429.71	69.10
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,432.17	83.14
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,434.36	53.80
J-106	2,349.00	Zone-1	Demand	0.00	Fixed	0.00	2,435.67	37.50
J-107	2,285.00	Zone-1	Demand	18.00	Fixed	18.00	2,455.44	73.74
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,423.89	93.40
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,659.57	119.23
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,659.55	76.82
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,659.55	51.72
J-116	2,530.00	Zone-1	Demand	12.00	Fixed	12.00	2,659.55	56.05
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,426.14	82.70
J-119	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,659.55	120.95
J-120	2,349.00	Zone-1	Demand	24.00	Fixed	24.00	2,659.51	134.34
J-121	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,659.74	122.76

Scenario: Max Day + FF @ J-1
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-1,020.00	11.12	18.95	6.51
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-1,048.00	4.45	6.72	4.28
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-580.85	6.06	6.68	3.71
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-622.85	2.40	7.60	3.98
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-630.85	2.50	7.78	4.03
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-630.85	9.14	7.78	4.03
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-658.85	5.79	8.43	4.21
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-820.85	8.08	12.67	5.24
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-842.85	14.91	13.31	5.38
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-850.85	2.94	13.54	5.43
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-866.85	5.93	14.02	5.53
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	691.15	3.26	9.22	4.41
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	691.15	22.35	9.22	4.41
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	643.15	14.00	8.07	4.11
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	629.15	3.28	7.74	4.02
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	561.15	10.63	6.27	3.58
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	533.15	2.61	5.70	3.40
P-19	J-2	J-19	1,512.00	8.0	Ductile Iron	130.0	16.00	0.01	0.01	0.10
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	28.00	0.02	0.02	0.18
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	34.00	0.02	0.03	0.22
P-102	J-102	J-103	2,263.00	12.0	Ductile Iron	130.0	1,404.44	10.76	4.75	3.98
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	-315.56	2.46	2.16	2.01
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	-329.56	2.19	2.34	2.10
P-105	J-105	J-106	526.00	8.0	Ductile Iron	130.0	-341.56	1.31	2.50	2.18
P-106	J-106	J-102	1,920.00	8.0	Ductile Iron	130.0	-341.56	4.80	2.50	2.18
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-908.85	2.20	15.30	5.80
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	739.15	3.82	10.44	4.72
P-116	J-101	R-1	1,179.00	12.0	Ductile Iron	130.0	-1,764.00	8.55	7.25	5.00
P-117	J-112	J-114	1,387.00	8.0	Ductile Iron	130.0	22.00	0.02	0.02	0.14
P-118	J-114	J-115	622.00	8.0	Ductile Iron	130.0	12.00	0.00	0.01	0.08
P-119	J-115	J-116	548.00	8.0	Ductile Iron	130.0	12.00	0.00	0.00	0.08
P-120	J-101	J-102	2,106.00	12.0	Ductile Iron	130.0	1,746.00	14.98	7.11	4.95
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-1,690.00	2.26	6.70	4.79
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-1,702.00	3.56	6.79	4.83
P-123	R-1	PMP-1	218.00	8.0	Ductile Iron	130.0	62.00	0.02	0.11	0.40
P-125	J-112	J-119	581.00	8.0	Ductile Iron	130.0	40.00	0.03	0.05	0.26
P-126	J-119	J-120	1,951.00	8.0	Ductile Iron	130.0	24.00	0.04	0.02	0.15
P-127	PMP-1	J-121	981.00	8.0	Ductile Iron	130.0	62.00	0.10	0.11	0.40
P-128	J-121	J-112	1,567.00	8.0	Ductile Iron	130.0	62.00	0.17	0.11	0.40
P-129	J-101	J-107	1,413.00	8.0	Ductile Iron	130.0	18.00	0.02	0.01	0.11

Scenario: Max Day + FF @ J-19
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	20.00	Fixed	20.00	2,359.48	25.73
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,359.49	31.36
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,363.94	67.03
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,369.99	60.57
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,372.40	57.28
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,374.89	62.69
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,384.04	59.29
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,389.82	66.99
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,397.91	82.60
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,412.82	98.13
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,415.75	98.54
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,421.68	96.78
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,420.07	108.19
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,416.81	106.78
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,394.46	97.11
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,380.46	99.71
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,377.18	89.64
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,366.55	88.07
J-19	2,250.00	Zone-1	Demand	1,016.00	Fixed	1,016.00	2,331.05	35.07
J-20	2,220.00	Zone-1	Demand	28.00	Fixed	28.00	2,366.53	63.40
J-21	2,228.00	Zone-1	Demand	34.00	Fixed	34.00	2,377.16	64.53
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,455.45	34.37
J-102	2,380.00	Zone-1	Demand	0.00	Fixed	0.00	2,440.47	26.16
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,429.71	69.10
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,432.17	83.14
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,434.36	53.80
J-106	2,349.00	Zone-1	Demand	0.00	Fixed	0.00	2,435.67	37.50
J-107	2,285.00	Zone-1	Demand	18.00	Fixed	18.00	2,455.44	73.74
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,423.89	93.40
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,659.57	119.23
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,659.55	76.82
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,659.55	51.72
J-116	2,530.00	Zone-1	Demand	12.00	Fixed	12.00	2,659.55	56.05
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,426.14	82.70
J-119	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,659.55	120.95
J-120	2,349.00	Zone-1	Demand	24.00	Fixed	24.00	2,659.51	134.34
J-121	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,659.74	122.76

Scenario: Max Day + FF @ J-19
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-20.00	0.01	0.01	0.13
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-1,048.00	4.45	6.72	4.28
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-580.85	6.06	6.68	3.71
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-622.85	2.40	7.60	3.98
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-630.85	2.50	7.78	4.03
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-630.85	9.14	7.78	4.03
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-658.85	5.79	8.43	4.21
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-820.85	8.08	12.67	5.24
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-842.85	14.91	13.31	5.38
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-850.85	2.94	13.54	5.43
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-866.85	5.93	14.02	5.53
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	691.15	3.26	9.22	4.41
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	691.15	22.35	9.22	4.41
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	643.15	14.00	8.07	4.11
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	629.15	3.28	7.74	4.02
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	561.15	10.63	6.27	3.58
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	533.15	2.61	5.70	3.40
P-19	J-2	J-19	1,512.00	8.0	Ductile Iron	130.0	1,016.00	28.44	18.81	6.48
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	28.00	0.02	0.02	0.18
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	34.00	0.02	0.03	0.22
P-102	J-102	J-103	2,263.00	12.0	Ductile Iron	130.0	1,404.44	10.76	4.75	3.98
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	-315.56	2.46	2.16	2.01
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	-329.56	2.19	2.34	2.10
P-105	J-105	J-106	526.00	8.0	Ductile Iron	130.0	-341.56	1.31	2.50	2.18
P-106	J-106	J-102	1,920.00	8.0	Ductile Iron	130.0	-341.56	4.80	2.50	2.18
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-908.85	2.20	15.30	5.80
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	739.15	3.82	10.44	4.72
P-116	J-101	R-1	1,179.00	12.0	Ductile Iron	130.0	-1,764.00	8.55	7.25	5.00
P-117	J-112	J-114	1,387.00	8.0	Ductile Iron	130.0	22.00	0.02	0.02	0.14
P-118	J-114	J-115	622.00	8.0	Ductile Iron	130.0	12.00	0.00	0.01	0.08
P-119	J-115	J-116	548.00	8.0	Ductile Iron	130.0	12.00	0.00	0.00	0.08
P-120	J-101	J-102	2,106.00	12.0	Ductile Iron	130.0	1,746.00	14.98	7.11	4.95
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-1,690.00	2.26	6.70	4.79
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-1,702.00	3.56	6.79	4.83
P-123	R-1	PMP-1	218.00	8.0	Ductile Iron	130.0	62.00	0.02	0.11	0.40
P-125	J-112	J-119	581.00	8.0	Ductile Iron	130.0	40.00	0.03	0.05	0.26
P-126	J-119	J-120	1,951.00	8.0	Ductile Iron	130.0	24.00	0.04	0.02	0.15
P-127	PMP-1	J-121	981.00	8.0	Ductile Iron	130.0	62.00	0.10	0.11	0.40
P-128	J-121	J-112	1,567.00	8.0	Ductile Iron	130.0	62.00	0.17	0.11	0.40
P-129	J-101	J-107	1,413.00	8.0	Ductile Iron	130.0	18.00	0.02	0.01	0.11

Scenario: Max Day + FF @ J-20
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	20.00	Fixed	20.00	2,366.08	28.59
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,366.08	34.22
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,366.10	67.97
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,371.88	61.39
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,374.18	58.05
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,376.58	63.42
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,385.34	59.85
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,390.89	67.45
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,398.71	82.95
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,413.15	98.28
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,416.00	98.64
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,421.75	96.81
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,419.93	108.13
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,416.54	106.67
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,393.32	96.62
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,378.73	98.96
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,375.32	88.83
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,364.17	87.04
J-19	2,250.00	Zone-1	Demand	16.00	Fixed	16.00	2,366.07	50.22
J-20	2,220.00	Zone-1	Demand	1,028.00	Fixed	1,028.00	2,351.47	56.88
J-21	2,228.00	Zone-1	Demand	34.00	Fixed	34.00	2,375.30	63.73
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,455.45	34.37
J-102	2,380.00	Zone-1	Demand	0.00	Fixed	0.00	2,440.47	26.16
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,429.71	69.10
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,432.17	83.14
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,434.36	53.80
J-106	2,349.00	Zone-1	Demand	0.00	Fixed	0.00	2,435.67	37.50
J-107	2,285.00	Zone-1	Demand	18.00	Fixed	18.00	2,455.44	73.74
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,423.89	93.40
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,659.57	119.23
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,659.55	76.82
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,659.55	51.72
J-116	2,530.00	Zone-1	Demand	12.00	Fixed	12.00	2,659.55	56.05
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,426.14	82.70
J-119	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,659.55	120.95
J-120	2,349.00	Zone-1	Demand	24.00	Fixed	24.00	2,659.51	134.34
J-121	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,659.74	122.76

Scenario: Max Day + FF @ J-20
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-20.00	0.01	0.01	0.13
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-48.00	0.01	0.02	0.20
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-566.45	5.78	6.38	3.62
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-608.45	2.30	7.28	3.88
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-616.45	2.39	7.46	3.93
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-616.45	8.76	7.46	3.93
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-644.45	5.55	8.10	4.11
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-806.45	7.82	12.26	5.15
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-828.45	14.44	12.89	5.29
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-836.45	2.85	13.12	5.34
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-852.45	5.75	13.59	5.44
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	705.55	3.39	9.57	4.50
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	705.55	23.22	9.57	4.50
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	657.55	14.59	8.40	4.20
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	643.55	3.42	8.08	4.11
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	575.55	11.14	6.57	3.67
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	-452.45	1.93	4.20	2.89
P-19	J-2	J-19	1,512.00	8.0	Ductile Iron	130.0	16.00	0.01	0.01	0.10
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	1,028.00	12.71	19.22	6.56
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	34.00	0.02	0.03	0.22
P-102	J-102	J-103	2,263.00	12.0	Ductile Iron	130.0	1,404.44	10.76	4.75	3.98
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	-315.56	2.46	2.16	2.01
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	-329.56	2.19	2.34	2.10
P-105	J-105	J-106	526.00	8.0	Ductile Iron	130.0	-341.56	1.31	2.50	2.18
P-106	J-106	J-102	1,920.00	8.0	Ductile Iron	130.0	-341.56	4.80	2.50	2.18
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-894.45	2.14	14.86	5.71
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	753.55	3.96	10.82	4.81
P-116	J-101	R-1	1,179.00	12.0	Ductile Iron	130.0	-1,764.00	8.55	7.25	5.00
P-117	J-112	J-114	1,387.00	8.0	Ductile Iron	130.0	22.00	0.02	0.02	0.14
P-118	J-114	J-115	622.00	8.0	Ductile Iron	130.0	12.00	0.00	0.01	0.08
P-119	J-115	J-116	548.00	8.0	Ductile Iron	130.0	12.00	0.00	0.00	0.08
P-120	J-101	J-102	2,106.00	12.0	Ductile Iron	130.0	1,746.00	14.98	7.11	4.95
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-1,690.00	2.26	6.70	4.79
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-1,702.00	3.56	6.79	4.83
P-123	R-1	PMP-1	218.00	8.0	Ductile Iron	130.0	62.00	0.02	0.11	0.40
P-125	J-112	J-119	581.00	8.0	Ductile Iron	130.0	40.00	0.03	0.05	0.26
P-126	J-119	J-120	1,951.00	8.0	Ductile Iron	130.0	24.00	0.04	0.02	0.15
P-127	PMP-1	J-121	981.00	8.0	Ductile Iron	130.0	62.00	0.10	0.11	0.40
P-128	J-121	J-112	1,567.00	8.0	Ductile Iron	130.0	62.00	0.17	0.11	0.40
P-129	J-101	J-107	1,413.00	8.0	Ductile Iron	130.0	18.00	0.02	0.01	0.11

Scenario: Max Day + FF @ J-21
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	20.00	Fixed	20.00	2,374.12	32.07
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,374.13	37.70
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,374.15	71.45
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,378.92	64.43
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,380.84	60.93
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,382.85	66.13
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,390.19	61.95
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,394.88	69.17
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,401.73	84.25
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,414.42	98.82
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,416.92	99.04
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,421.99	96.91
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,419.37	107.89
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,415.46	106.20
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,388.72	94.63
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,371.75	95.94
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,367.76	85.56
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,372.64	90.70
J-19	2,250.00	Zone-1	Demand	16.00	Fixed	16.00	2,374.12	53.70
J-20	2,220.00	Zone-1	Demand	28.00	Fixed	28.00	2,372.62	66.03
J-21	2,228.00	Zone-1	Demand	1,034.00	Fixed	1,034.00	2,355.69	55.25
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,455.45	34.37
J-102	2,380.00	Zone-1	Demand	0.00	Fixed	0.00	2,440.47	26.16
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,429.71	69.10
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,432.17	83.14
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,434.36	53.80
J-106	2,349.00	Zone-1	Demand	0.00	Fixed	0.00	2,435.67	37.50
J-107	2,285.00	Zone-1	Demand	18.00	Fixed	18.00	2,455.44	73.74
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,423.89	93.40
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,659.57	119.23
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,659.55	76.82
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,659.55	51.72
J-116	2,530.00	Zone-1	Demand	12.00	Fixed	12.00	2,659.55	56.05
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,426.14	82.70
J-119	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,659.55	120.95
J-120	2,349.00	Zone-1	Demand	24.00	Fixed	24.00	2,659.51	134.34
J-121	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,659.74	122.76

Scenario: Max Day + FF @ J-21
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-20.00	0.01	0.01	0.13
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-48.00	0.01	0.02	0.20
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-510.47	4.77	5.26	3.26
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-552.47	1.92	6.09	3.53
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-560.47	2.01	6.25	3.58
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-560.47	7.34	6.25	3.58
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-588.47	4.69	6.84	3.76
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-750.47	6.85	10.73	4.79
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-772.47	12.68	11.32	4.93
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-780.47	2.50	11.54	4.98
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-796.47	5.07	11.98	5.08
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	761.53	3.90	11.03	4.86
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	761.53	26.75	11.03	4.86
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	713.53	16.97	9.78	4.55
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	699.53	3.99	9.42	4.46
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	-368.47	4.88	2.87	2.35
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	-396.47	1.51	3.29	2.53
P-19	J-2	J-19	1,512.00	8.0	Ductile Iron	130.0	16.00	0.01	0.01	0.10
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	28.00	0.02	0.02	0.18
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	1,034.00	12.07	19.43	6.60
P-102	J-102	J-103	2,263.00	12.0	Ductile Iron	130.0	1,404.44	10.76	4.75	3.98
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	-315.56	2.46	2.16	2.01
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	-329.56	2.19	2.34	2.10
P-105	J-105	J-106	526.00	8.0	Ductile Iron	130.0	-341.56	1.31	2.50	2.18
P-106	J-106	J-102	1,920.00	8.0	Ductile Iron	130.0	-341.56	4.80	2.50	2.18
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-838.47	1.90	13.18	5.35
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	809.53	4.52	12.35	5.17
P-116	J-101	R-1	1,179.00	12.0	Ductile Iron	130.0	-1,764.00	8.55	7.25	5.00
P-117	J-112	J-114	1,387.00	8.0	Ductile Iron	130.0	22.00	0.02	0.02	0.14
P-118	J-114	J-115	622.00	8.0	Ductile Iron	130.0	12.00	0.00	0.01	0.08
P-119	J-115	J-116	548.00	8.0	Ductile Iron	130.0	12.00	0.00	0.00	0.08
P-120	J-101	J-102	2,106.00	12.0	Ductile Iron	130.0	1,746.00	14.98	7.11	4.95
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-1,690.00	2.26	6.70	4.79
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-1,702.00	3.56	6.79	4.83
P-123	R-1	PMP-1	218.00	8.0	Ductile Iron	130.0	62.00	0.02	0.11	0.40
P-125	J-112	J-119	581.00	8.0	Ductile Iron	130.0	40.00	0.03	0.05	0.26
P-126	J-119	J-120	1,951.00	8.0	Ductile Iron	130.0	24.00	0.04	0.02	0.15
P-127	PMP-1	J-121	981.00	8.0	Ductile Iron	130.0	62.00	0.10	0.11	0.40
P-128	J-121	J-112	1,567.00	8.0	Ductile Iron	130.0	62.00	0.17	0.11	0.40
P-129	J-101	J-107	1,413.00	8.0	Ductile Iron	130.0	18.00	0.02	0.01	0.11

Scenario: Max Day + FF @ J-107
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	20.00	Fixed	20.00	2,443.01	61.87
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,443.02	67.50
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,443.03	101.26
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,443.08	92.19
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,443.15	87.89
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,443.22	92.25
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,443.49	85.01
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,443.74	90.31
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,444.87	102.92
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,447.15	112.99
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,447.62	112.32
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,448.61	108.43
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,448.41	120.46
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,447.99	120.27
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,445.12	119.03
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,443.79	127.11
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,443.52	118.34
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,443.10	121.18
J-19	2,250.00	Zone-1	Demand	16.00	Fixed	16.00	2,443.01	83.50
J-20	2,220.00	Zone-1	Demand	28.00	Fixed	28.00	2,443.08	96.52
J-21	2,228.00	Zone-1	Demand	34.00	Fixed	34.00	2,443.49	93.23
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,455.45	34.37
J-102	2,380.00	Zone-1	Demand	0.00	Fixed	0.00	2,452.35	31.30
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,450.15	77.94
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,450.58	91.11
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,451.02	61.01
J-106	2,349.00	Zone-1	Demand	0.00	Fixed	0.00	2,451.30	44.26
J-107	2,285.00	Zone-1	Demand	1,018.00	Fixed	1,018.00	2,428.77	62.20
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,449.03	104.28
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,659.57	119.23
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,659.55	76.82
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,659.55	51.72
J-116	2,530.00	Zone-1	Demand	12.00	Fixed	12.00	2,659.55	56.05
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,449.46	92.79
J-119	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,659.55	120.95
J-120	2,349.00	Zone-1	Demand	24.00	Fixed	24.00	2,659.51	134.34
J-121	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,659.74	122.76

Scenario: Max Day + FF @ J-107
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-20.00	0.01	0.01	0.13
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-48.00	0.01	0.02	0.20
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-43.82	0.05	0.06	0.28
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-85.82	0.06	0.19	0.55
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-93.82	0.07	0.23	0.60
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-93.82	0.27	0.23	0.60
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-121.82	0.25	0.37	0.78
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-283.82	1.13	1.77	1.81
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-305.82	2.28	2.04	1.95
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-313.82	0.46	2.14	2.00
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-329.82	0.99	2.34	2.11
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	228.18	0.42	1.18	1.46
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	228.18	2.87	1.18	1.46
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	180.18	1.33	0.76	1.15
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	166.18	0.28	0.66	1.06
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	98.18	0.42	0.25	0.63
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	70.18	0.06	0.13	0.45
P-19	J-2	J-19	1,512.00	8.0	Ductile Iron	130.0	16.00	0.01	0.01	0.10
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	28.00	0.02	0.02	0.18
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	34.00	0.02	0.03	0.22
P-102	J-102	J-103	2,263.00	12.0	Ductile Iron	130.0	596.11	2.20	0.97	1.69
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	-123.89	0.44	0.38	0.79
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	-137.89	0.44	0.47	0.88
P-105	J-105	J-106	526.00	8.0	Ductile Iron	130.0	-149.89	0.29	0.54	0.96
P-106	J-106	J-102	1,920.00	8.0	Ductile Iron	130.0	-149.89	1.04	0.54	0.96
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-371.82	0.42	2.92	2.37
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	276.18	0.62	1.69	1.76
P-116	J-101	R-1	1,179.00	12.0	Ductile Iron	130.0	-1,764.00	8.55	7.25	5.00
P-117	J-112	J-114	1,387.00	8.0	Ductile Iron	130.0	22.00	0.02	0.02	0.14
P-118	J-114	J-115	622.00	8.0	Ductile Iron	130.0	12.00	0.00	0.01	0.08
P-119	J-115	J-116	548.00	8.0	Ductile Iron	130.0	12.00	0.00	0.00	0.08
P-120	J-101	J-102	2,106.00	12.0	Ductile Iron	130.0	746.00	3.10	1.47	2.12
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-690.00	0.43	1.28	1.96
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-702.00	0.69	1.32	1.99
P-123	R-1	PMP-1	218.00	8.0	Ductile Iron	130.0	62.00	0.02	0.11	0.40
P-125	J-112	J-119	581.00	8.0	Ductile Iron	130.0	40.00	0.03	0.05	0.26
P-126	J-119	J-120	1,951.00	8.0	Ductile Iron	130.0	24.00	0.04	0.02	0.15
P-127	PMP-1	J-121	981.00	8.0	Ductile Iron	130.0	62.00	0.10	0.11	0.40
P-128	J-121	J-112	1,567.00	8.0	Ductile Iron	130.0	62.00	0.17	0.11	0.40
P-129	J-101	J-107	1,413.00	8.0	Ductile Iron	130.0	1,018.00	26.68	18.88	6.50

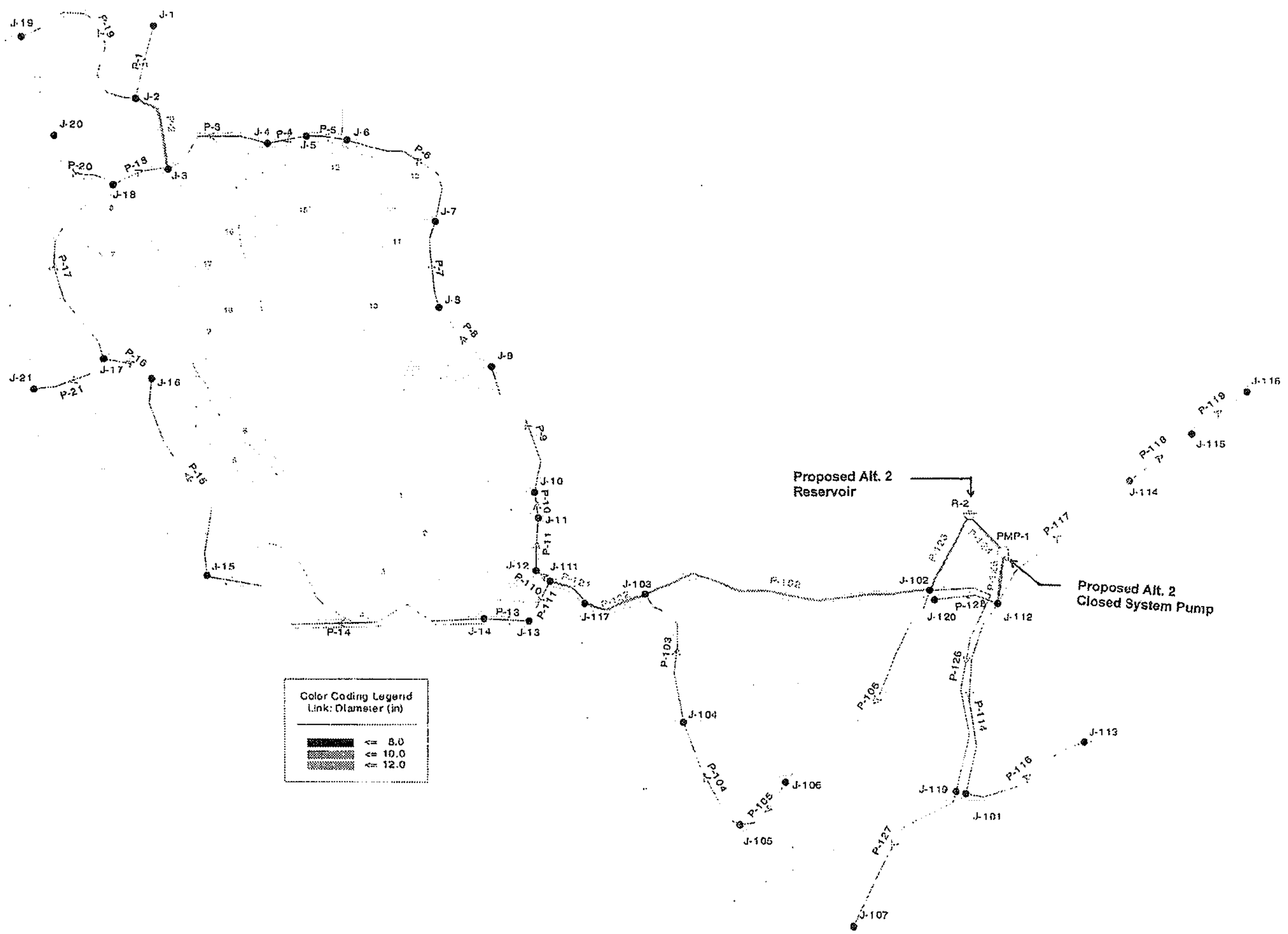
Scenario: Max Day + FF @ J-116
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	20.00	Fixed	20.00	2,449.75	64.79
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,449.75	70.42
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,449.77	104.17
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,449.82	95.11
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,449.88	90.81
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,449.95	95.16
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,450.22	87.92
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,450.48	93.23
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,451.61	105.83
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,453.89	115.90
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,454.35	115.24
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,455.34	111.34
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,455.14	123.37
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,454.73	123.19
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,451.86	121.95
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,450.53	130.02
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,450.25	121.25
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,449.83	124.10
J-19	2,250.00	Zone-1	Demand	16.00	Fixed	16.00	2,449.74	86.42
J-20	2,220.00	Zone-1	Demand	28.00	Fixed	28.00	2,449.81	99.43
J-21	2,228.00	Zone-1	Demand	34.00	Fixed	34.00	2,450.23	96.15
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,462.18	37.29
J-102	2,380.00	Zone-1	Demand	0.00	Fixed	0.00	2,459.08	34.22
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,456.88	80.86
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,457.32	94.02
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,457.75	63.93
J-106	2,349.00	Zone-1	Demand	0.00	Fixed	0.00	2,458.04	47.18
J-107	2,285.00	Zone-1	Demand	18.00	Fixed	18.00	2,462.17	76.65
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,455.76	107.19
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,646.60	113.62
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,620.23	59.80
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,608.61	29.68
J-116	2,530.00	Zone-1	Demand	1,012.00	Fixed	1,012.00	2,598.38	29.58
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,456.19	95.70
J-119	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,646.57	115.33
J-120	2,349.00	Zone-1	Demand	24.00	Fixed	24.00	2,646.54	128.73
J-121	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,678.60	130.92

Scenario: Max Day + FF @ J-116
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-20.00	0.01	0.01	0.13
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-48.00	0.01	0.02	0.20
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-43.82	0.05	0.06	0.28
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-85.82	0.06	0.19	0.55
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-93.82	0.07	0.23	0.60
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-93.82	0.27	0.23	0.60
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-121.82	0.25	0.37	0.78
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-283.82	1.13	1.77	1.81
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-305.82	2.28	2.04	1.95
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-313.82	0.46	2.14	2.00
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-329.82	0.99	2.34	2.11
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	228.18	0.42	1.18	1.46
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	228.18	2.87	1.18	1.46
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	180.18	1.33	0.76	1.15
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	166.18	0.28	0.66	1.06
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	98.18	0.42	0.25	0.63
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	70.18	0.06	0.13	0.45
P-19	J-2	J-19	1,512.00	8.0	Ductile Iron	130.0	16.00	0.01	0.01	0.10
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	28.00	0.02	0.02	0.18
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	34.00	0.02	0.03	0.22
P-102	J-102	J-103	2,263.00	12.0	Ductile Iron	130.0	596.11	2.20	0.97	1.69
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	-123.89	0.43	0.38	0.79
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	-137.89	0.44	0.47	0.88
P-105	J-105	J-106	526.00	8.0	Ductile Iron	130.0	-149.89	0.29	0.54	0.96
P-106	J-106	J-102	1,920.00	8.0	Ductile Iron	130.0	-149.89	1.04	0.54	0.96
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-371.82	0.42	2.92	2.37
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	276.18	0.62	1.69	1.76
P-116	J-101	R-1	1,179.00	12.0	Ductile Iron	130.0	-764.00	1.82	1.54	2.17
P-117	J-112	J-114	1,387.00	8.0	Ductile Iron	130.0	1,022.00	26.38	19.02	6.52
P-118	J-114	J-115	622.00	8.0	Ductile Iron	130.0	1,012.00	11.62	18.67	6.46
P-119	J-115	J-116	548.00	8.0	Ductile Iron	130.0	1,012.00	10.23	18.67	6.46
P-120	J-101	J-102	2,106.00	12.0	Ductile Iron	130.0	746.00	3.10	1.47	2.12
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-690.00	0.43	1.27	1.96
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-702.00	0.69	1.32	1.99
P-123	R-1	PMP-1	218.00	8.0	Ductile Iron	130.0	1,062.00	4.45	20.42	6.78
P-125	J-112	J-119	581.00	8.0	Ductile Iron	130.0	40.00	0.03	0.05	0.26
P-126	J-119	J-120	1,951.00	8.0	Ductile Iron	130.0	24.00	0.04	0.02	0.15
P-127	PMP-1	J-121	981.00	8.0	Ductile Iron	130.0	1,062.00	20.03	20.42	6.78
P-128	J-121	J-112	1,567.00	8.0	Ductile Iron	130.0	1,062.00	32.00	20.42	6.78
P-129	J-101	J-107	1,413.00	8.0	Ductile Iron	130.0	18.00	0.02	0.01	0.11

Scenario: Peak Hour



Alternative 2

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Project Engineer: Charlie Marr
WaterCAD v5.0 [5.0037]
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Scenario: Peak Hour
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	40.00	Fixed	40.00	2,425.86	54.45
J-2	2,287.00	Zone-1	Demand	24.00	Fixed	24.00	2,425.88	60.09
J-3	2,209.00	Zone-1	Demand	132.00	Fixed	132.00	2,425.94	93.86
J-4	2,230.00	Zone-1	Demand	84.00	Fixed	84.00	2,426.12	84.85
J-5	2,240.00	Zone-1	Demand	16.00	Fixed	16.00	2,426.34	80.62
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,426.60	85.06
J-7	2,247.00	Zone-1	Demand	56.00	Fixed	56.00	2,427.57	78.12
J-8	2,235.00	Zone-1	Demand	324.00	Fixed	324.00	2,428.49	83.71
J-9	2,207.00	Zone-1	Demand	44.00	Fixed	44.00	2,432.57	97.59
J-10	2,186.00	Zone-1	Demand	16.00	Fixed	16.00	2,440.80	110.24
J-11	2,188.00	Zone-1	Demand	32.00	Fixed	32.00	2,442.48	110.10
J-12	2,198.00	Zone-1	Demand	84.00	Fixed	84.00	2,446.05	107.32
J-13	2,170.00	Zone-1	Demand	96.00	Fixed	96.00	2,445.34	119.13
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,443.83	118.47
J-15	2,170.00	Zone-1	Demand	96.00	Fixed	96.00	2,433.47	113.99
J-16	2,150.00	Zone-1	Demand	28.00	Fixed	28.00	2,428.68	120.57
J-17	2,170.00	Zone-1	Demand	68.00	Fixed	68.00	2,427.68	111.48
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,426.16	113.86
J-19	2,250.00	Zone-1	Demand	32.00	Fixed	32.00	2,425.84	76.08
J-20	2,220.00	Zone-1	Demand	56.00	Fixed	56.00	2,426.10	89.17
J-21	2,228.00	Zone-1	Demand	68.00	Fixed	68.00	2,427.60	86.36
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,640.74	114.54
J-102	2,380.00	Zone-1	Demand	0.00	Fixed	0.00	2,459.96	34.59
J-103	2,270.00	Zone-1	Demand	36.00	Fixed	36.00	2,451.62	78.58
J-104	2,240.00	Zone-1	Demand	28.00	Fixed	28.00	2,453.00	92.15
J-105	2,310.00	Zone-1	Demand	24.00	Fixed	24.00	2,454.40	62.48
J-106	2,349.00	Zone-1	Demand	48.00	Fixed	48.00	2,455.33	46.00
J-107	2,285.00	Zone-1	Demand	36.00	Fixed	36.00	2,459.82	75.64
J-111	2,208.00	Zone-1	Demand	84.00	Fixed	84.00	2,447.57	103.65
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,640.76	111.09
J-113	2,448.00	Zone-1	Demand	20.00	Fixed	20.00	2,640.73	83.38
J-114	2,482.00	Zone-1	Demand	20.00	Fixed	20.00	2,640.68	68.65
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,640.67	43.56
J-116	2,530.00	Zone-1	Demand	24.00	Fixed	24.00	2,640.66	47.88
J-117	2,235.00	Zone-1	Demand	24.00	Fixed	24.00	2,449.12	92.64
J-119	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,459.88	36.29
J-120	2,380.00	Zone-1	Demand	32.00	Fixed	32.00	2,640.75	112.81

Scenario: Peak Hour
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-40.00	0.03	0.05	0.26
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-96.00	0.05	0.08	0.39
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-87.64	0.18	0.20	0.56
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-171.64	0.22	0.70	1.10
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-187.64	0.26	0.82	1.20
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-187.64	0.97	0.82	1.20
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-243.64	0.92	1.34	1.56
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-567.64	4.08	6.40	3.62
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-611.64	8.23	7.35	3.90
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-627.64	1.67	7.71	4.01
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-659.64	3.58	8.45	4.21
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	456.36	1.51	4.27	2.91
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	456.36	10.36	4.27	2.91
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	360.36	4.79	2.76	2.30
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	332.36	1.00	2.38	2.12
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	196.36	1.52	0.90	1.25
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	140.36	0.22	0.48	0.90
P-19	J-2	J-19	1,479.00	8.0	Ductile Iron	130.0	32.00	0.05	0.03	0.20
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	56.00	0.06	0.09	0.36
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	68.00	0.08	0.13	0.43
P-102	J-102	J-103	2,316.00	12.0	Ductile Iron	130.0	1,208.79	8.34	3.60	3.43
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	-231.21	1.38	1.21	1.48
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	-259.21	1.40	1.50	1.65
P-105	J-105	J-106	526.00	8.0	Ductile Iron	130.0	-283.21	0.93	1.77	1.81
P-106	J-106	J-102	1,960.00	8.0	Ductile Iron	130.0	-331.21	4.63	2.36	2.11
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-743.64	1.52	10.55	4.75
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	552.36	2.23	6.08	3.53
P-114	J-101	J-112	1,570.00	8.0	Ductile Iron	130.0	-20.00	0.02	0.01	0.13
P-116	J-101	J-113	1,058.00	8.0	Ductile Iron	130.0	20.00	0.01	0.01	0.13
P-117	J-112	J-114	1,455.00	8.0	Ductile Iron	130.0	44.00	0.08	0.06	0.28
P-118	J-114	J-115	622.00	8.0	Ductile Iron	130.0	24.00	0.01	0.02	0.15
P-119	J-115	J-116	548.00	8.0	Ductile Iron	130.0	24.00	0.01	0.02	0.15
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-1,380.00	1.55	4.60	3.91
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-1,404.00	2.49	4.75	3.98
P-123	J-102	R-2	687.00	12.0	Ductile Iron	130.0	-1,576.00	4.04	5.89	4.47
P-124	R-2	PMP-1	399.00	12.0	Ductile Iron	130.0	96.00	0.01	0.03	0.27
P-125	PMP-1	J-112	417.00	12.0	Ductile Iron	130.0	96.00	0.01	0.03	0.27
P-126	J-102	J-119	2,106.00	8.0	Ductile Iron	130.0	36.00	0.08	0.04	0.23
P-127	J-119	J-107	1,413.00	8.0	Ductile Iron	130.0	36.00	0.05	0.04	0.23
P-128	J-112	J-120	514.00	8.0	Ductile Iron	130.0	32.00	0.02	0.03	0.20

Scenario: Max Day + FF @ J-1
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	1,020.00	Fixed	1,020.00	2,366.44	28.75
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,377.57	39.18
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,382.01	74.86
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,388.07	68.39
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,390.47	65.10
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,392.97	70.51
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,402.12	67.11
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,407.90	74.81
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,415.99	90.42
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,430.89	105.95
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,433.83	106.36
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,439.76	104.60
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,438.15	116.01
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,434.88	114.60
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,412.53	104.93
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,398.53	107.53
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,395.26	97.46
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,384.62	95.89
J-19	2,250.00	Zone-1	Demand	16.00	Fixed	16.00	2,377.55	55.19
J-20	2,220.00	Zone-1	Demand	28.00	Fixed	28.00	2,384.61	71.22
J-21	2,228.00	Zone-1	Demand	34.00	Fixed	34.00	2,395.23	72.35
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,642.56	115.33
J-102	2,380.00	Zone-1	Demand	0.00	Fixed	0.00	2,458.89	34.13
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,447.78	76.92
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,450.15	90.92
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,452.26	61.55
J-106	2,349.00	Zone-1	Demand	24.00	Fixed	24.00	2,453.52	45.22
J-107	2,285.00	Zone-1	Demand	18.00	Fixed	18.00	2,458.85	75.22
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,441.96	101.23
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,642.57	111.87
J-113	2,448.00	Zone-1	Demand	10.00	Fixed	10.00	2,642.56	84.18
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,642.54	69.46
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,642.54	44.36
J-116	2,530.00	Zone-1	Demand	12.00	Fixed	12.00	2,642.54	48.69
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,444.22	90.52
J-119	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,458.87	35.85
J-120	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,642.56	113.60

Scenario: Max Day + FF @ J-1
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-1,020.00	11.12	18.95	6.51
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-1,048.00	4.45	6.72	4.28
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-580.85	6.06	6.68	3.71
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-622.85	2.40	7.60	3.98
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-630.85	2.50	7.78	4.03
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-630.85	9.14	7.78	4.03
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-658.85	5.79	8.43	4.21
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-820.85	8.09	12.67	5.24
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-842.85	14.91	13.31	5.38
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-850.85	2.94	13.54	5.43
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-866.85	5.93	14.02	5.53
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	691.15	3.26	9.22	4.41
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	691.15	22.35	9.22	4.41
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	643.15	14.00	8.07	4.11
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	629.15	3.28	7.74	4.02
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	561.15	10.63	6.27	3.58
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	533.15	2.61	5.70	3.40
P-19	J-2	J-19	1,479.00	8.0	Ductile Iron	130.0	16.00	0.01	0.01	0.10
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	28.00	0.02	0.02	0.18
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	34.00	0.02	0.03	0.22
P-102	J-102	J-103	2,316.00	12.0	Ductile Iron	130.0	1,411.07	11.11	4.80	4.00
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	-308.93	2.36	2.07	1.97
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	-322.93	2.11	2.25	2.06
P-105	J-105	J-106	526.00	8.0	Ductile Iron	130.0	-334.93	1.27	2.41	2.14
P-106	J-106	J-102	1,960.00	8.0	Ductile Iron	130.0	-358.93	5.37	2.74	2.29
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-908.85	2.20	15.30	5.80
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	739.15	3.82	10.44	4.72
P-114	J-101	J-112	1,570.00	8.0	Ductile Iron	130.0	-10.00	0.01	0.00	0.06
P-116	J-101	J-113	1,058.00	8.0	Ductile Iron	130.0	10.00	0.00	0.00	0.06
P-117	J-112	J-114	1,455.00	8.0	Ductile Iron	130.0	22.00	0.02	0.02	0.14
P-118	J-114	J-115	622.00	8.0	Ductile Iron	130.0	12.00	0.00	0.01	0.08
P-119	J-115	J-116	548.00	8.0	Ductile Iron	130.0	12.00	0.00	0.00	0.08
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-1,690.00	2.26	6.70	4.79
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-1,702.00	3.56	6.79	4.83
P-123	J-102	R-2	687.00	12.0	Ductile Iron	130.0	-1,788.00	5.11	7.44	5.07
P-124	R-2	PMP-1	399.00	12.0	Ductile Iron	130.0	48.00	0.00	0.01	0.14
P-125	PMP-1	J-112	417.00	12.0	Ductile Iron	130.0	48.00	0.00	0.01	0.14
P-126	J-102	J-119	2,106.00	8.0	Ductile Iron	130.0	18.00	0.02	0.01	0.11
P-127	J-119	J-107	1,413.00	8.0	Ductile Iron	130.0	18.00	0.02	0.01	0.11
P-128	J-112	J-120	514.00	8.0	Ductile Iron	130.0	16.00	0.00	0.01	0.10

Scenario: Max Day + FF @ J-19
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	20.00	Fixed	20.00	2,377.56	33.56
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,377.57	39.18
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,382.01	74.86
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,388.07	68.39
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,390.47	65.10
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,392.97	70.51
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,402.12	67.11
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,407.90	74.81
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,415.99	90.42
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,430.89	105.95
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,433.83	106.36
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,439.76	104.60
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,438.15	116.01
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,434.88	114.60
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,412.53	104.93
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,398.53	107.53
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,395.26	97.46
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,384.62	95.89
J-19	2,250.00	Zone-1	Demand	1,016.00	Fixed	1,016.00	2,349.74	43.15
J-20	2,220.00	Zone-1	Demand	28.00	Fixed	28.00	2,384.61	71.22
J-21	2,228.00	Zone-1	Demand	34.00	Fixed	34.00	2,395.23	72.35
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,642.56	115.33
J-102	2,380.00	Zone-1	Demand	0.00	Fixed	0.00	2,458.89	34.13
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,447.78	76.92
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,450.15	90.92
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,452.26	61.55
J-106	2,349.00	Zone-1	Demand	24.00	Fixed	24.00	2,453.52	45.22
J-107	2,285.00	Zone-1	Demand	18.00	Fixed	18.00	2,458.85	75.22
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,441.96	101.23
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,642.57	111.87
J-113	2,448.00	Zone-1	Demand	10.00	Fixed	10.00	2,642.56	84.18
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,642.54	69.46
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,642.54	44.36
J-116	2,530.00	Zone-1	Demand	12.00	Fixed	12.00	2,642.54	48.69
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,444.22	90.52
J-119	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,458.87	35.85
J-120	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,642.56	113.60

Scenario: Max Day + FF @ J-19
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-20.00	0.01	0.01	0.13
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-1,048.00	4.45	6.72	4.28
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-580.85	6.06	6.68	3.71
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-622.85	2.40	7.60	3.98
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-630.85	2.50	7.78	4.03
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-630.85	9.14	7.78	4.03
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-658.85	5.79	8.43	4.21
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-820.85	8.09	12.67	5.24
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-842.85	14.91	13.31	5.38
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-850.85	2.94	13.54	5.43
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-866.85	5.93	14.02	5.53
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	691.15	3.26	9.22	4.41
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	691.15	22.35	9.22	4.41
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	643.15	14.00	8.07	4.11
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	629.15	3.28	7.74	4.02
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	561.15	10.63	6.27	3.58
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	533.15	2.61	5.70	3.40
P-19	J-2	J-19	1,479.00	8.0	Ductile Iron	130.0	1,016.00	27.82	18.81	6.48
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	28.00	0.02	0.02	0.18
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	34.00	0.02	0.03	0.22
P-102	J-102	J-103	2,316.00	12.0	Ductile Iron	130.0	1,411.07	11.11	4.80	4.00
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	-308.93	2.36	2.07	1.97
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	-322.93	2.11	2.25	2.06
P-105	J-105	J-106	526.00	8.0	Ductile Iron	130.0	-334.93	1.27	2.41	2.14
P-106	J-106	J-102	1,960.00	8.0	Ductile Iron	130.0	-358.93	5.37	2.74	2.29
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-908.85	2.20	15.30	5.80
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	739.15	3.82	10.44	4.72
P-114	J-101	J-112	1,570.00	8.0	Ductile Iron	130.0	-10.00	0.01	0.00	0.06
P-116	J-101	J-113	1,058.00	8.0	Ductile Iron	130.0	10.00	0.00	0.00	0.06
P-117	J-112	J-114	1,455.00	8.0	Ductile Iron	130.0	22.00	0.02	0.02	0.14
P-118	J-114	J-115	622.00	8.0	Ductile Iron	130.0	12.00	0.00	0.01	0.08
P-119	J-115	J-116	548.00	8.0	Ductile Iron	130.0	12.00	0.00	0.00	0.08
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-1,690.00	2.26	6.70	4.79
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-1,702.00	3.56	6.79	4.83
P-123	J-102	R-2	687.00	12.0	Ductile Iron	130.0	-1,788.00	5.11	7.44	5.07
P-124	R-2	PMP-1	399.00	12.0	Ductile Iron	130.0	48.00	0.00	0.01	0.14
P-125	PMP-1	J-112	417.00	12.0	Ductile Iron	130.0	48.00	0.00	0.01	0.14
P-126	J-102	J-119	2,106.00	8.0	Ductile Iron	130.0	18.00	0.02	0.01	0.11
P-127	J-119	J-107	1,413.00	8.0	Ductile Iron	130.0	18.00	0.02	0.01	0.11
P-128	J-112	J-120	514.00	8.0	Ductile Iron	130.0	16.00	0.00	0.01	0.10

Scenario: Max Day + FF @ J-20
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	20.00	Fixed	20.00	2,384.15	36.41
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,384.16	42.04
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,384.18	75.79
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,389.96	69.21
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,392.26	65.88
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,394.65	71.24
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,403.41	67.67
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,408.97	75.27
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,416.79	90.77
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,431.23	106.10
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,434.08	106.47
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,439.83	104.63
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,438.01	115.95
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,434.62	114.49
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,411.40	104.44
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,396.81	106.78
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,393.39	96.65
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,382.25	94.86
J-19	2,250.00	Zone-1	Demand	16.00	Fixed	16.00	2,384.15	58.04
J-20	2,220.00	Zone-1	Demand	1,028.00	Fixed	1,028.00	2,369.54	64.70
J-21	2,228.00	Zone-1	Demand	34.00	Fixed	34.00	2,393.37	71.55
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,642.56	115.33
J-102	2,380.00	Zone-1	Demand	0.00	Fixed	0.00	2,458.89	34.13
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,447.78	76.92
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,450.15	90.92
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,452.26	61.55
J-106	2,349.00	Zone-1	Demand	24.00	Fixed	24.00	2,453.52	45.22
J-107	2,285.00	Zone-1	Demand	18.00	Fixed	18.00	2,458.85	75.22
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,441.96	101.23
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,642.57	111.87
J-113	2,448.00	Zone-1	Demand	10.00	Fixed	10.00	2,642.56	84.18
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,642.54	69.46
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,642.54	44.36
J-116	2,530.00	Zone-1	Demand	12.00	Fixed	12.00	2,642.54	48.69
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,444.22	90.52
J-119	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,458.87	35.85
J-120	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,642.56	113.60

Scenario: Max Day + FF @ J-20
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-20.00	0.01	0.01	0.13
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-48.00	0.01	0.02	0.20
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-566.45	5.78	6.38	3.62
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-608.45	2.30	7.28	3.88
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-616.45	2.39	7.46	3.93
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-616.45	8.76	7.46	3.93
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-644.45	5.55	8.10	4.11
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-806.45	7.82	12.26	5.15
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-828.45	14.44	12.89	5.29
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-836.45	2.85	13.12	5.34
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-852.45	5.75	13.59	5.44
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	705.55	3.39	9.57	4.50
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	705.55	23.22	9.57	4.50
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	657.55	14.59	8.40	4.20
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	643.55	3.42	8.08	4.11
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	575.55	11.14	6.57	3.67
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	-452.45	1.93	4.21	2.89
P-19	J-2	J-19	1,479.00	8.0	Ductile Iron	130.0	16.00	0.01	0.01	0.10
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	1,028.00	12.71	19.22	6.56
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	34.00	0.02	0.03	0.22
P-102	J-102	J-103	2,316.00	12.0	Ductile Iron	130.0	1,411.07	11.11	4.80	4.00
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	-308.93	2.36	2.07	1.97
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	-322.93	2.11	2.25	2.06
P-105	J-105	J-106	526.00	8.0	Ductile Iron	130.0	-334.93	1.27	2.41	2.14
P-106	J-106	J-102	1,960.00	8.0	Ductile Iron	130.0	-358.93	5.37	2.74	2.29
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-894.45	2.14	14.86	5.71
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	753.55	3.96	10.82	4.81
P-114	J-101	J-112	1,570.00	8.0	Ductile Iron	130.0	-10.00	0.01	0.00	0.06
P-116	J-101	J-113	1,058.00	8.0	Ductile Iron	130.0	10.00	0.00	0.00	0.06
P-117	J-112	J-114	1,455.00	8.0	Ductile Iron	130.0	22.00	0.02	0.02	0.14
P-118	J-114	J-115	622.00	8.0	Ductile Iron	130.0	12.00	0.00	0.01	0.08
P-119	J-115	J-116	548.00	8.0	Ductile Iron	130.0	12.00	0.00	0.00	0.08
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-1,690.00	2.26	6.70	4.79
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-1,702.00	3.56	6.79	4.83
P-123	J-102	R-2	687.00	12.0	Ductile Iron	130.0	-1,788.00	5.11	7.44	5.07
P-124	R-2	PMP-1	399.00	12.0	Ductile Iron	130.0	48.00	0.00	0.01	0.14
P-125	PMP-1	J-112	417.00	12.0	Ductile Iron	130.0	48.00	0.00	0.01	0.14
P-126	J-102	J-119	2,106.00	8.0	Ductile Iron	130.0	18.00	0.02	0.01	0.11
P-127	J-119	J-107	1,413.00	8.0	Ductile Iron	130.0	18.00	0.02	0.01	0.11
P-128	J-112	J-120	514.00	8.0	Ductile Iron	130.0	16.00	0.00	0.01	0.10

Scenario: Max Day + FF @ J-21
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	20.00	Fixed	20.00	2,392.20	39.89
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,392.21	45.52
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,392.22	79.27
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,396.99	72.25
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,398.92	68.76
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,400.92	73.95
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,408.27	69.77
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,412.96	77.00
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,419.81	92.07
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,432.49	106.65
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,435.00	106.86
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,440.07	104.73
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,437.44	115.71
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,433.54	114.02
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,406.79	102.45
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,389.82	103.76
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,385.84	93.38
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,390.72	98.52
J-19	2,250.00	Zone-1	Demand	16.00	Fixed	16.00	2,392.20	61.52
J-20	2,220.00	Zone-1	Demand	28.00	Fixed	28.00	2,390.70	73.85
J-21	2,228.00	Zone-1	Demand	1,034.00	Fixed	1,034.00	2,373.77	63.07
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,642.56	115.33
J-102	2,380.00	Zone-1	Demand	0.00	Fixed	0.00	2,458.89	34.13
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,447.78	76.92
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,450.15	90.92
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,452.26	61.55
J-106	2,349.00	Zone-1	Demand	24.00	Fixed	24.00	2,453.52	45.22
J-107	2,285.00	Zone-1	Demand	18.00	Fixed	18.00	2,458.85	75.22
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,441.96	101.23
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,642.57	111.87
J-113	2,448.00	Zone-1	Demand	10.00	Fixed	10.00	2,642.56	84.18
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,642.54	69.46
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,642.54	44.36
J-116	2,530.00	Zone-1	Demand	12.00	Fixed	12.00	2,642.54	48.69
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,444.22	90.52
J-119	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,458.87	35.85
J-120	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,642.56	113.60

Scenario: Max Day + FF @ J-21
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-20.00	0.01	0.01	0.13
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-48.00	0.01	0.02	0.20
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-510.47	4.77	5.26	3.26
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-552.47	1.92	6.09	3.53
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-560.47	2.01	6.25	3.58
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-560.47	7.35	6.25	3.58
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-588.47	4.69	6.84	3.76
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-750.47	6.85	10.73	4.79
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-772.47	12.68	11.32	4.93
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-780.47	2.50	11.54	4.98
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-796.47	5.07	11.98	5.08
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	761.53	3.90	11.03	4.86
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	761.53	26.75	11.03	4.86
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	713.53	16.97	9.78	4.55
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	699.53	3.99	9.42	4.46
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	-368.47	4.88	2.87	2.35
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	-396.47	1.51	3.29	2.53
P-19	J-2	J-19	1,479.00	8.0	Ductile Iron	130.0	16.00	0.01	0.01	0.10
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	28.00	0.02	0.02	0.18
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	1,034.00	12.07	19.43	6.60
P-102	J-102	J-103	2,316.00	12.0	Ductile Iron	130.0	1,411.07	11.11	4.80	4.00
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	-308.93	2.36	2.07	1.97
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	-322.93	2.11	2.25	2.06
P-105	J-105	J-106	526.00	8.0	Ductile Iron	130.0	-334.93	1.27	2.41	2.14
P-106	J-106	J-102	1,960.00	8.0	Ductile Iron	130.0	-358.93	5.37	2.74	2.29
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-838.47	1.90	13.18	5.35
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	809.53	4.52	12.35	5.17
P-114	J-101	J-112	1,570.00	8.0	Ductile Iron	130.0	-10.00	0.01	0.00	0.06
P-116	J-101	J-113	1,058.00	8.0	Ductile Iron	130.0	10.00	0.00	0.00	0.06
P-117	J-112	J-114	1,455.00	8.0	Ductile Iron	130.0	22.00	0.02	0.02	0.14
P-118	J-114	J-115	622.00	8.0	Ductile Iron	130.0	12.00	0.00	0.01	0.08
P-119	J-115	J-116	548.00	8.0	Ductile Iron	130.0	12.00	0.00	0.00	0.08
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-1,690.00	2.26	6.70	4.79
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-1,702.00	3.56	6.79	4.83
P-123	J-102	R-2	687.00	12.0	Ductile Iron	130.0	-1,788.00	5.11	7.44	5.07
P-124	R-2	PMP-1	399.00	12.0	Ductile Iron	130.0	48.00	0.00	0.01	0.14
P-125	PMP-1	J-112	417.00	12.0	Ductile Iron	130.0	48.00	0.00	0.01	0.14
P-126	J-102	J-119	2,106.00	8.0	Ductile Iron	130.0	18.00	0.02	0.01	0.11
P-127	J-119	J-107	1,413.00	8.0	Ductile Iron	130.0	18.00	0.02	0.01	0.11
P-128	J-112	J-120	514.00	8.0	Ductile Iron	130.0	16.00	0.00	0.01	0.10

Scenario: Max Day + FF @ J-107
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	20.00	Fixed	20.00	2,449.45	64.66
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,449.45	70.29
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,449.47	104.04
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,449.52	94.98
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,449.58	90.68
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,449.65	95.03
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,449.92	87.79
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,450.18	93.10
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,451.31	105.70
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,453.59	115.77
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,454.05	115.11
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,455.04	111.21
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,454.84	123.24
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,454.43	123.06
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,451.56	121.82
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,450.23	129.89
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,449.95	121.12
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,449.53	123.97
J-19	2,250.00	Zone-1	Demand	16.00	Fixed	16.00	2,449.44	86.29
J-20	2,220.00	Zone-1	Demand	28.00	Fixed	28.00	2,449.51	99.30
J-21	2,228.00	Zone-1	Demand	34.00	Fixed	34.00	2,449.93	96.02
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,642.56	115.33
J-102	2,380.00	Zone-1	Demand	0.00	Fixed	0.00	2,458.89	34.13
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,456.58	80.73
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,456.96	93.87
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,457.35	63.75
J-106	2,349.00	Zone-1	Demand	24.00	Fixed	24.00	2,457.61	46.99
J-107	2,285.00	Zone-1	Demand	1,018.00	Fixed	1,018.00	2,392.45	46.49
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,455.46	107.06
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,642.57	111.87
J-113	2,448.00	Zone-1	Demand	10.00	Fixed	10.00	2,642.56	84.18
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,642.54	69.46
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,642.54	44.36
J-116	2,530.00	Zone-1	Demand	12.00	Fixed	12.00	2,642.54	48.69
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,455.89	95.57
J-119	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,419.13	18.66
J-120	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,642.56	113.60

Scenario: Max Day + FF @ J-107
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-20.00	0.01	0.01	0.13
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-48.00	0.01	0.02	0.20
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-43.82	0.05	0.06	0.28
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-85.82	0.06	0.19	0.55
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-93.82	0.07	0.23	0.60
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-93.82	0.27	0.23	0.60
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-121.82	0.25	0.37	0.78
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-283.82	1.13	1.77	1.81
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-305.82	2.28	2.04	1.95
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-313.82	0.46	2.14	2.00
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-329.82	0.99	2.34	2.11
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	228.18	0.42	1.18	1.46
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	228.18	2.87	1.18	1.46
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	180.18	1.33	0.76	1.15
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	166.18	0.28	0.66	1.06
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	98.18	0.42	0.25	0.63
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	70.18	0.06	0.13	0.45
P-19	J-2	J-19	1,479.00	8.0	Ductile Iron	130.0	16.00	0.01	0.01	0.10
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	28.00	0.02	0.02	0.18
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	34.00	0.02	0.03	0.22
P-102	J-102	J-103	2,316.00	12.0	Ductile Iron	130.0	604.39	2.31	1.00	1.71
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	-115.61	0.38	0.34	0.74
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	-129.61	0.39	0.42	0.83
P-105	J-105	J-106	526.00	8.0	Ductile Iron	130.0	-141.61	0.26	0.49	0.90
P-106	J-106	J-102	1,960.00	8.0	Ductile Iron	130.0	-165.61	1.28	0.65	1.06
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-371.82	0.42	2.92	2.37
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	276.18	0.62	1.69	1.76
P-114	J-101	J-112	1,570.00	8.0	Ductile Iron	130.0	-10.00	0.01	0.00	0.06
P-116	J-101	J-113	1,058.00	8.0	Ductile Iron	130.0	10.00	0.00	0.00	0.06
P-117	J-112	J-114	1,455.00	8.0	Ductile Iron	130.0	22.00	0.02	0.02	0.14
P-118	J-114	J-115	622.00	8.0	Ductile Iron	130.0	12.00	0.00	0.01	0.08
P-119	J-115	J-116	548.00	8.0	Ductile Iron	130.0	12.00	0.00	0.00	0.08
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-690.00	0.43	1.28	1.96
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-702.00	0.69	1.32	1.99
P-123	J-102	R-2	687.00	12.0	Ductile Iron	130.0	-1,788.00	5.11	7.44	5.07
P-124	R-2	PMP-1	399.00	12.0	Ductile Iron	130.0	48.00	0.00	0.01	0.14
P-125	PMP-1	J-112	417.00	12.0	Ductile Iron	130.0	48.00	0.00	0.01	0.14
P-126	J-102	J-119	2,106.00	8.0	Ductile Iron	130.0	1,018.00	39.76	18.88	6.50
P-127	J-119	J-107	1,413.00	8.0	Ductile Iron	130.0	1,018.00	26.68	18.88	6.50
P-128	J-112	J-120	514.00	8.0	Ductile Iron	130.0	16.00	0.00	0.01	0.10

Scenario: Max Day + FF @ J-113
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,360.00	Zone-1	Demand	20.00	Fixed	20.00	2,453.43	40.42
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,453.44	72.01
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,453.46	105.76
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,453.51	96.70
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,453.57	92.40
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,453.64	96.76
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,453.91	89.52
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,454.16	94.82
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,455.29	107.43
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,457.57	117.50
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,458.04	116.83
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,459.03	112.93
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,458.83	124.96
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,458.41	124.78
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,455.54	123.54
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,454.22	131.62
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,453.94	122.85
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,453.52	125.69
J-19	2,250.00	Zone-1	Demand	16.00	Fixed	16.00	2,453.43	88.01
J-20	2,220.00	Zone-1	Demand	28.00	Fixed	28.00	2,453.45	101.00
J-21	2,228.00	Zone-1	Demand	34.00	Fixed	34.00	2,453.92	97.74
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,619.83	105.49
J-102	2,380.00	Zone-1	Demand	0.00	Fixed	0.00	2,462.88	35.86
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,460.57	82.45
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,460.95	95.60
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,461.34	65.48
J-106	2,350.00	Zone-1	Demand	24.00	Fixed	24.00	2,461.60	48.28
J-107	2,285.00	Zone-1	Demand	18.00	Fixed	18.00	2,462.84	76.94
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,459.45	108.79
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,649.04	114.67
J-113	2,448.00	Zone-1	Demand	1,010.00	Fixed	1,010.00	2,600.15	65.83
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,649.02	72.26
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,649.02	47.17
J-116	2,530.00	Zone-1	Demand	12.00	Fixed	12.00	2,649.02	51.49
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,459.88	97.29
J-119	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,462.86	37.58
J-120	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,649.03	116.39

Scenario: Max Day + FF @ J-113
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-20.00	0.01	0.01	0.13
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-48.00	0.01	0.02	0.20
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-43.82	0.05	0.06	0.28
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-85.82	0.06	0.19	0.55
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-93.82	0.07	0.23	0.60
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-93.82	0.27	0.23	0.60
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-121.82	0.25	0.37	0.78
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-283.82	1.13	1.77	1.81
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-305.82	2.28	2.04	1.95
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-313.82	0.46	2.14	2.00
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-329.82	0.99	2.34	2.11
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	228.18	0.42	1.18	1.46
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	228.18	2.87	1.18	1.46
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	180.18	1.33	0.76	1.15
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	166.18	0.28	0.66	1.06
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	98.18	0.42	0.25	0.63
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	70.18	0.06	0.13	0.45
P-19	J-2	J-19	1,479.00	8.0	Ductile Iron	130.0	16.00	0.01	0.01	0.10
P-20	J-18	J-20	661.00	6.0	Ductile Iron	130.0	28.00	0.07	0.10	0.32
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	34.00	0.02	0.03	0.22
P-102	J-102	J-103	2,316.00	12.0	Ductile Iron	130.0	604.39	2.31	1.00	1.71
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	-115.61	0.38	0.34	0.74
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	-129.61	0.39	0.42	0.83
P-105	J-105	J-106	526.00	8.0	Ductile Iron	130.0	-141.61	0.26	0.49	0.90
P-106	J-106	J-102	1,960.00	8.0	Ductile Iron	130.0	-165.61	1.28	0.65	1.06
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-371.82	0.42	2.92	2.37
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	276.18	0.62	1.69	1.76
P-114	J-101	J-112	1,570.00	8.0	Ductile Iron	130.0	-1,010.00	29.21	18.61	6.45
P-116	J-101	J-113	1,058.00	8.0	Ductile Iron	130.0	1,010.00	19.68	18.61	6.45
P-117	J-112	J-114	1,455.00	8.0	Ductile Iron	130.0	22.00	0.02	0.02	0.14
P-118	J-114	J-115	622.00	8.0	Ductile Iron	130.0	12.00	0.00	0.01	0.08
P-119	J-115	J-116	548.00	8.0	Ductile Iron	130.0	12.00	0.00	0.00	0.08
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-690.00	0.43	1.27	1.96
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-702.00	0.69	1.32	1.99
P-123	J-102	R-2	687.00	12.0	Ductile Iron	130.0	-788.00	1.12	1.63	2.24
P-124	R-2	PMP-1	399.00	12.0	Ductile Iron	130.0	1,048.00	1.10	2.76	2.97
P-125	PMP-1	J-112	417.00	12.0	Ductile Iron	130.0	1,048.00	1.15	2.76	2.97
P-126	J-102	J-119	2,106.00	8.0	Ductile Iron	130.0	18.00	0.02	0.01	0.11
P-127	J-119	J-107	1,413.00	8.0	Ductile Iron	130.0	18.00	0.02	0.01	0.11
P-128	J-112	J-120	514.00	6.0	Ductile Iron	130.0	16.00	0.02	0.04	0.18

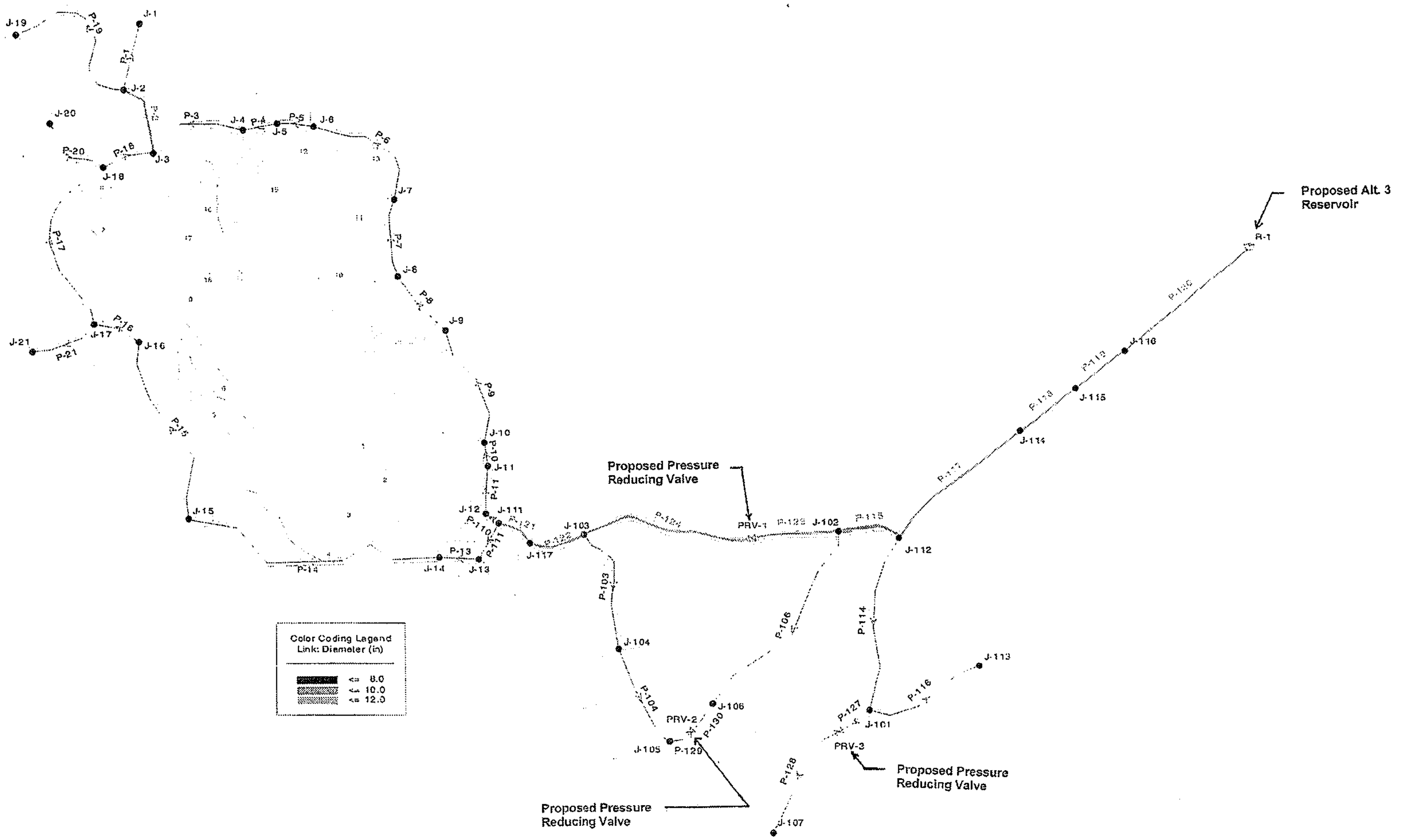
Scenario: Max Day + FF @ J-116
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,360.00	Zone-1	Demand	20.00	Fixed	20.00	2,453.43	40.42
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,453.44	72.01
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,453.46	105.76
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,453.51	96.70
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,453.57	92.40
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,453.64	96.76
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,453.91	89.52
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,454.16	94.82
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,455.29	107.43
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,457.57	117.50
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,458.04	116.83
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,459.03	112.93
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,458.83	124.96
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,458.41	124.78
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,455.54	123.54
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,454.22	131.62
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,453.94	122.85
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,453.52	125.69
J-19	2,250.00	Zone-1	Demand	16.00	Fixed	16.00	2,453.43	88.01
J-20	2,220.00	Zone-1	Demand	28.00	Fixed	28.00	2,453.45	101.00
J-21	2,228.00	Zone-1	Demand	34.00	Fixed	34.00	2,453.92	97.74
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,649.04	118.13
J-102	2,380.00	Zone-1	Demand	0.00	Fixed	0.00	2,462.88	35.86
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,460.57	82.45
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,460.95	95.60
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,461.34	65.48
J-106	2,350.00	Zone-1	Demand	24.00	Fixed	24.00	2,461.60	48.28
J-107	2,285.00	Zone-1	Demand	18.00	Fixed	18.00	2,462.84	76.94
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,459.45	108.79
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,649.04	114.67
J-113	2,448.00	Zone-1	Demand	10.00	Fixed	10.00	2,649.03	86.98
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,621.37	60.30
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,609.76	30.18
J-116	2,530.00	Zone-1	Demand	1,012.00	Fixed	1,012.00	2,599.52	30.08
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,459.88	97.29
J-119	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,462.86	37.58
J-120	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,649.03	116.39

Scenario: Max Day + FF @ J-116
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-20.00	0.01	0.01	0.13
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-48.00	0.01	0.02	0.20
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-43.82	0.05	0.06	0.28
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-85.82	0.06	0.19	0.55
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-93.82	0.07	0.23	0.60
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-93.82	0.27	0.23	0.60
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-121.82	0.25	0.37	0.78
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-283.82	1.13	1.77	1.81
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-305.82	2.28	2.04	1.95
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-313.82	0.46	2.14	2.00
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-329.82	0.99	2.34	2.11
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	228.18	0.42	1.18	1.46
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	228.18	2.87	1.18	1.46
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	180.18	1.33	0.76	1.15
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	166.18	0.28	0.66	1.06
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	98.18	0.42	0.25	0.63
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	70.18	0.06	0.13	0.45
P-19	J-2	J-19	1,479.00	8.0	Ductile Iron	130.0	16.00	0.01	0.01	0.10
P-20	J-18	J-20	661.00	6.0	Ductile Iron	130.0	28.00	0.07	0.10	0.32
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	34.00	0.02	0.03	0.22
P-102	J-102	J-103	2,316.00	12.0	Ductile Iron	130.0	604.39	2.31	1.00	1.71
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	-115.61	0.38	0.34	0.74
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	-129.61	0.39	0.42	0.83
P-105	J-105	J-106	526.00	8.0	Ductile Iron	130.0	-141.61	0.26	0.49	0.90
P-106	J-106	J-102	1,960.00	8.0	Ductile Iron	130.0	-165.61	1.28	0.65	1.06
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-371.82	0.42	2.92	2.37
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	276.18	0.62	1.69	1.76
P-114	J-101	J-112	1,570.00	8.0	Ductile Iron	130.0	-10.00	0.01	0.00	0.06
P-116	J-101	J-113	1,058.00	8.0	Ductile Iron	130.0	10.00	0.00	0.00	0.06
P-117	J-112	J-114	1,455.00	8.0	Ductile Iron	130.0	1,022.00	27.67	19.02	6.52
P-118	J-114	J-115	622.00	8.0	Ductile Iron	130.0	1,012.00	11.62	18.67	6.46
P-119	J-115	J-116	548.00	8.0	Ductile Iron	130.0	1,012.00	10.23	18.67	6.46
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-690.00	0.43	1.27	1.96
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-702.00	0.69	1.32	1.99
P-123	J-102	R-2	687.00	12.0	Ductile Iron	130.0	-788.00	1.12	1.63	2.24
P-124	R-2	PMP-1	399.00	12.0	Ductile Iron	130.0	1,048.00	1.10	2.76	2.97
P-125	PMP-1	J-112	417.00	12.0	Ductile Iron	130.0	1,048.00	1.15	2.76	2.97
P-126	J-102	J-119	2,106.00	8.0	Ductile Iron	130.0	18.00	0.02	0.01	0.11
P-127	J-119	J-107	1,413.00	8.0	Ductile Iron	130.0	18.00	0.02	0.01	0.11
P-128	J-112	J-120	514.00	6.0	Ductile Iron	130.0	16.00	0.02	0.04	0.18

Scenario: Peak Hour



Alternative 3

Title: Sierra Meadows
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Project Engineer: Charlie Marr
WaterCAD v5.0 [5.0037]

Scenario: Peak Hour
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	40.00	Fixed	40.00	2,406.07	45.89
J-2	2,287.00	Zone-1	Demand	24.00	Fixed	24.00	2,406.10	51.53
J-3	2,209.00	Zone-1	Demand	132.00	Fixed	132.00	2,406.15	85.30
J-4	2,230.00	Zone-1	Demand	84.00	Fixed	84.00	2,406.33	76.29
J-5	2,240.00	Zone-1	Demand	16.00	Fixed	16.00	2,406.55	72.06
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,406.82	76.50
J-7	2,247.00	Zone-1	Demand	56.00	Fixed	56.00	2,407.79	69.57
J-8	2,235.00	Zone-1	Demand	324.00	Fixed	324.00	2,408.70	75.15
J-9	2,207.00	Zone-1	Demand	44.00	Fixed	44.00	2,412.79	89.03
J-10	2,186.00	Zone-1	Demand	16.00	Fixed	16.00	2,421.02	101.68
J-11	2,188.00	Zone-1	Demand	32.00	Fixed	32.00	2,422.69	101.54
J-12	2,198.00	Zone-1	Demand	84.00	Fixed	84.00	2,426.27	98.76
J-13	2,170.00	Zone-1	Demand	96.00	Fixed	96.00	2,425.56	110.57
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,424.05	109.91
J-15	2,170.00	Zone-1	Demand	96.00	Fixed	96.00	2,413.69	105.43
J-16	2,150.00	Zone-1	Demand	28.00	Fixed	28.00	2,408.90	112.01
J-17	2,170.00	Zone-1	Demand	68.00	Fixed	68.00	2,407.89	102.92
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,406.37	105.30
J-19	2,250.00	Zone-1	Demand	32.00	Fixed	32.00	2,406.05	67.52
J-20	2,220.00	Zone-1	Demand	56.00	Fixed	56.00	2,406.31	80.61
J-21	2,228.00	Zone-1	Demand	68.00	Fixed	68.00	2,407.81	77.80
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,604.03	98.66
J-102	2,380.00	Zone-1	Demand	32.00	Fixed	32.00	2,600.89	95.57
J-103	2,270.00	Zone-1	Demand	36.00	Fixed	36.00	2,431.83	70.02
J-104	2,240.00	Zone-1	Demand	28.00	Fixed	28.00	2,431.74	82.96
J-105	2,310.00	Zone-1	Demand	24.00	Fixed	24.00	2,431.73	52.67
J-106	2,350.00	Zone-1	Demand	48.00	Fixed	48.00	2,600.76	108.49
J-107	2,285.00	Zone-1	Demand	36.00	Fixed	36.00	2,439.99	67.06
J-111	2,208.00	Zone-1	Demand	84.00	Fixed	84.00	2,427.79	95.09
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,604.17	95.26
J-113	2,448.00	Zone-1	Demand	20.00	Fixed	20.00	2,604.02	67.50
J-114	2,482.00	Zone-1	Demand	20.00	Fixed	20.00	2,613.14	56.74
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,617.11	33.36
J-116	2,530.00	Zone-1	Demand	24.00	Fixed	24.00	2,620.62	39.21
J-117	2,235.00	Zone-1	Demand	24.00	Fixed	24.00	2,429.34	84.08

Scenario: Peak Hour
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-40.00	0.03	0.05	0.26
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-96.00	0.05	0.08	0.39
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-87.64	0.18	0.20	0.56
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-171.64	0.22	0.70	1.10
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-187.64	0.26	0.82	1.20
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-187.64	0.97	0.82	1.20
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-243.64	0.92	1.34	1.56
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-567.64	4.08	6.40	3.62
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-611.64	8.23	7.35	3.90
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-627.64	1.67	7.71	4.01
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-659.64	3.58	8.45	4.21
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	456.36	1.51	4.27	2.91
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	456.36	10.36	4.27	2.91
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	360.36	4.79	2.76	2.30
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	332.36	1.00	2.38	2.12
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	196.36	1.52	0.90	1.25
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	140.36	0.22	0.48	0.90
P-19	J-2	J-19	1,512.00	8.0	Ductile Iron	130.0	32.00	0.05	0.03	0.20
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	56.00	0.06	0.09	0.36
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	68.00	0.08	0.13	0.43
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	52.00	0.09	0.08	0.33
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	24.00	0.02	0.02	0.15
P-106	J-102	J-106	1,964.00	8.0	Ductile Iron	130.0	48.00	0.13	0.07	0.31
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-743.64	1.52	10.55	4.75
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	552.36	2.23	6.08	3.53
P-114	J-101	J-112	1,599.00	8.0	Ductile Iron	130.0	-56.00	0.14	0.09	0.36
P-115	J-112	J-102	560.00	12.0	Ductile Iron	130.0	1,572.00	3.28	5.86	4.46
P-116	J-101	J-113	1,097.00	8.0	Ductile Iron	130.0	20.00	0.01	0.01	0.13
P-117	J-112	J-114	1,434.00	12.0	Ductile Iron	130.0	-1,628.00	8.96	6.25	4.62
P-118	J-114	J-115	622.00	12.0	Ductile Iron	130.0	-1,648.00	3.98	6.39	4.68
P-119	J-115	J-116	548.00	12.0	Ductile Iron	130.0	-1,648.00	3.50	6.39	4.68
P-120	R-1	J-116	1,429.00	12.0	Ductile Iron	130.0	1,672.00	9.38	6.57	4.74
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-1,380.00	1.55	4.60	3.91
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-1,404.00	2.49	4.75	3.98
P-123	J-102	PRV-1	762.00	12.0	Ductile Iron	130.0	1,492.00	4.05	5.32	4.23
P-124	PRV-1	J-103	1,542.00	12.0	Ductile Iron	130.0	1,492.00	8.20	5.32	4.23
P-127	J-101	PRV-3	324.00	8.0	Ductile Iron	130.0	36.00	0.01	0.04	0.23
P-128	PRV-3	J-107	1,092.00	8.0	Ductile Iron	130.0	36.00	0.04	0.04	0.23
P-129	J-105	PRV-2	209.00	8.0	Ductile Iron	130.0	-0.00	0.00	0.00	0.00
P-130	PRV-2	J-106	316.00	8.0	Ductile Iron	130.0	-0.00	0.00	0.00	0.00

Scenario: Max Day + FF @ J-1
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	1,020.00	Fixed	1,020.00	2,347.72	20.65
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,358.84	31.08
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,363.29	66.75
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,369.35	60.29
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,371.75	57.00
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,374.25	62.41
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,383.39	59.01
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,389.18	66.71
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,397.26	82.32
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,412.17	97.85
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,415.11	98.26
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,421.04	96.50
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,419.42	107.91
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,416.16	106.50
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,393.81	96.83
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,379.81	99.43
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,376.53	89.36
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,365.90	87.79
J-19	2,250.00	Zone-1	Demand	16.00	Fixed	16.00	2,358.83	47.09
J-20	2,220.00	Zone-1	Demand	28.00	Fixed	28.00	2,365.88	63.12
J-21	2,228.00	Zone-1	Demand	34.00	Fixed	34.00	2,376.51	64.25
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,598.82	96.41
J-102	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,594.71	92.89
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,429.06	68.82
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,429.04	81.79
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,429.03	51.50
J-106	2,350.00	Zone-1	Demand	24.00	Fixed	24.00	2,594.67	105.86
J-107	2,285.00	Zone-1	Demand	18.00	Fixed	18.00	2,440.02	67.07
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,423.24	93.12
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,598.86	92.96
J-113	2,448.00	Zone-1	Demand	10.00	Fixed	10.00	2,598.82	65.25
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,609.81	55.30
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,614.61	32.28
J-116	2,530.00	Zone-1	Demand	12.00	Fixed	12.00	2,618.84	38.44
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,425.50	82.42

Scenario: Max Day + FF @ J-1
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-1,020.00	11.12	18.95	6.51
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-1,048.00	4.45	6.72	4.28
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-580.85	6.06	6.68	3.71
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-622.85	2.40	7.60	3.98
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-630.85	2.50	7.78	4.03
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-630.85	9.14	7.78	4.03
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-658.85	5.79	8.43	4.21
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-820.85	8.08	12.67	5.24
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-842.85	14.91	13.31	5.38
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-850.85	2.94	13.54	5.43
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-866.85	5.93	14.02	5.53
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	691.15	3.26	9.22	4.41
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	691.15	22.35	9.22	4.41
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	643.15	14.00	8.07	4.11
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	629.15	3.28	7.74	4.02
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	561.15	10.63	6.27	3.58
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	533.15	2.61	5.70	3.40
P-19	J-2	J-19	1,512.00	8.0	Ductile Iron	130.0	16.00	0.01	0.01	0.10
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	28.00	0.02	0.02	0.18
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	34.00	0.02	0.03	0.22
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	26.00	0.02	0.02	0.17
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	12.00	0.00	0.00	0.08
P-106	J-102	J-106	1,964.00	8.0	Ductile Iron	130.0	24.00	0.04	0.02	0.15
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-908.85	2.20	15.30	5.80
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	739.15	3.82	10.44	4.72
P-114	J-101	J-112	1,599.00	8.0	Ductile Iron	130.0	-28.00	0.04	0.02	0.18
P-115	J-112	J-102	560.00	12.0	Ductile Iron	130.0	1,786.00	4.16	7.42	5.07
P-116	J-101	J-113	1,097.00	8.0	Ductile Iron	130.0	10.00	0.00	0.00	0.06
P-117	J-112	J-114	1,434.00	12.0	Ductile Iron	130.0	-1,814.00	10.95	7.64	5.15
P-118	J-114	J-115	622.00	12.0	Ductile Iron	130.0	-1,824.00	4.80	7.71	5.17
P-119	J-115	J-116	548.00	12.0	Ductile Iron	130.0	-1,824.00	4.23	7.71	5.17
P-120	R-1	J-116	1,429.00	12.0	Ductile Iron	130.0	1,836.00	11.16	7.81	5.21
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-1,690.00	2.26	6.70	4.79
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-1,702.00	3.56	6.79	4.83
P-123	J-102	PRV-1	762.00	12.0	Ductile Iron	130.0	1,746.00	5.42	7.12	4.95
P-124	PRV-1	J-103	1,542.00	12.0	Ductile Iron	130.0	1,746.00	10.97	7.11	4.95
P-127	J-101	PRV-3	324.00	8.0	Ductile Iron	130.0	18.00	0.00	0.01	0.11
P-128	PRV-3	J-107	1,092.00	8.0	Ductile Iron	130.0	18.00	0.01	0.01	0.11
P-129	J-105	PRV-2	209.00	8.0	Ductile Iron	130.0	-0.00	0.00	0.00	0.00
P-130	PRV-2	J-106	316.00	8.0	Ductile Iron	130.0	-0.00	0.00	0.00	0.00

Scenario: Max Day + FF @ J-19
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	20.00	Fixed	20.00	2,358.83	25.45
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,358.84	31.08
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,363.29	66.75
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,369.35	60.29
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,371.75	57.00
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,374.25	62.41
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,383.39	59.01
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,389.18	66.71
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,397.26	82.32
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,412.17	97.85
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,415.11	98.26
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,421.04	96.50
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,419.42	107.91
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,416.16	106.50
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,393.81	96.83
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,379.81	99.43
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,376.53	89.36
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,365.90	87.79
J-19	2,250.00	Zone-1	Demand	1,016.00	Fixed	1,016.00	2,330.40	34.79
J-20	2,220.00	Zone-1	Demand	28.00	Fixed	28.00	2,365.88	63.12
J-21	2,228.00	Zone-1	Demand	34.00	Fixed	34.00	2,376.51	64.25
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,598.82	96.41
J-102	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,594.71	92.89
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,429.06	68.82
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,429.04	81.79
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,429.03	51.50
J-106	2,350.00	Zone-1	Demand	24.00	Fixed	24.00	2,594.67	105.86
J-107	2,285.00	Zone-1	Demand	18.00	Fixed	18.00	2,440.02	67.07
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,423.24	93.12
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,598.86	92.96
J-113	2,448.00	Zone-1	Demand	10.00	Fixed	10.00	2,598.82	65.25
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,609.81	55.30
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,614.61	32.28
J-116	2,530.00	Zone-1	Demand	12.00	Fixed	12.00	2,618.84	38.44
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,425.50	82.42

Scenario: Max Day + FF @ J-19
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-20.00	0.01	0.01	0.13
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-1,048.00	4.45	6.72	4.28
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-580.85	6.06	6.68	3.71
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-622.85	2.40	7.60	3.98
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-630.85	2.50	7.78	4.03
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-630.85	9.14	7.78	4.03
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-658.85	5.79	8.43	4.21
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-820.85	8.08	12.67	5.24
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-842.85	14.91	13.31	5.38
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-850.85	2.94	13.54	5.43
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-866.85	5.93	14.02	5.53
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	691.15	3.26	9.22	4.41
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	691.15	22.35	9.22	4.41
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	643.15	14.00	8.07	4.11
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	629.15	3.28	7.74	4.02
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	561.15	10.63	6.27	3.58
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	533.15	2.61	5.70	3.40
P-19	J-2	J-19	1,512.00	8.0	Ductile Iron	130.0	1,016.00	28.44	18.81	6.48
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	28.00	0.02	0.02	0.18
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	34.00	0.02	0.03	0.22
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	26.00	0.02	0.02	0.17
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	12.00	0.00	0.00	0.08
P-106	J-102	J-106	1,964.00	8.0	Ductile Iron	130.0	24.00	0.04	0.02	0.15
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-908.85	2.20	15.30	5.80
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	739.15	3.82	10.44	4.72
P-114	J-101	J-112	1,599.00	8.0	Ductile Iron	130.0	-28.00	0.04	0.02	0.18
P-115	J-112	J-102	560.00	12.0	Ductile Iron	130.0	1,786.00	4.16	7.42	5.07
P-116	J-101	J-113	1,097.00	8.0	Ductile Iron	130.0	10.00	0.00	0.00	0.06
P-117	J-112	J-114	1,434.00	12.0	Ductile Iron	130.0	-1,814.00	10.95	7.64	5.15
P-118	J-114	J-115	622.00	12.0	Ductile Iron	130.0	-1,824.00	4.80	7.71	5.17
P-119	J-115	J-116	548.00	12.0	Ductile Iron	130.0	-1,824.00	4.23	7.71	5.17
P-120	R-1	J-116	1,429.00	12.0	Ductile Iron	130.0	1,836.00	11.16	7.81	5.21
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-1,690.00	2.26	6.70	4.79
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-1,702.00	3.56	6.79	4.83
P-123	J-102	PRV-1	762.00	12.0	Ductile Iron	130.0	1,746.00	5.42	7.12	4.95
P-124	PRV-1	J-103	1,542.00	12.0	Ductile Iron	130.0	1,746.00	10.97	7.11	4.95
P-127	J-101	PRV-3	324.00	8.0	Ductile Iron	130.0	18.00	0.00	0.01	0.11
P-128	PRV-3	J-107	1,092.00	8.0	Ductile Iron	130.0	18.00	0.01	0.01	0.11
P-129	J-105	PRV-2	209.00	8.0	Ductile Iron	130.0	-0.00	0.00	0.00	0.00
P-130	PRV-2	J-106	316.00	8.0	Ductile Iron	130.0	-0.00	0.00	0.00	0.00

Scenario: Max Day + FF @ J-20
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	20.00	Fixed	20.00	2,365.43	28.31
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,365.44	33.94
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,365.45	67.69
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,371.23	61.11
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,373.53	57.77
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,375.93	63.14
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,384.69	59.57
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,390.24	67.17
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,398.07	82.67
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,412.50	98.00
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,415.35	98.36
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,421.10	96.53
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,419.28	107.85
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,415.89	106.39
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,392.67	96.34
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,378.09	98.68
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,374.67	88.55
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,363.53	86.76
J-19	2,250.00	Zone-1	Demand	16.00	Fixed	16.00	2,365.42	49.94
J-20	2,220.00	Zone-1	Demand	1,028.00	Fixed	1,028.00	2,350.82	56.60
J-21	2,228.00	Zone-1	Demand	34.00	Fixed	34.00	2,374.65	63.45
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,598.82	96.41
J-102	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,594.71	92.89
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,429.06	68.82
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,429.04	81.79
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,429.03	51.50
J-106	2,350.00	Zone-1	Demand	24.00	Fixed	24.00	2,594.67	105.86
J-107	2,285.00	Zone-1	Demand	18.00	Fixed	18.00	2,440.02	67.07
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,423.24	93.12
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,598.86	92.96
J-113	2,448.00	Zone-1	Demand	10.00	Fixed	10.00	2,598.82	65.25
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,609.81	55.30
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,614.61	32.28
J-116	2,530.00	Zone-1	Demand	12.00	Fixed	12.00	2,618.84	38.44
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,425.50	82.42

Scenario: Max Day + FF @ J-20
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-20.00	0.01	0.01	0.13
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-48.00	0.01	0.02	0.20
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-566.45	5.78	6.38	3.62
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-608.45	2.30	7.28	3.88
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-616.45	2.39	7.46	3.93
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-616.45	8.76	7.46	3.93
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-644.45	5.55	8.10	4.11
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-806.45	7.82	12.26	5.15
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-828.45	14.44	12.89	5.29
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-836.45	2.85	13.12	5.34
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-852.45	5.75	13.59	5.44
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	705.55	3.39	9.57	4.50
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	705.55	23.22	9.57	4.50
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	657.55	14.59	8.40	4.20
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	643.55	3.42	8.08	4.11
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	575.55	11.14	6.57	3.67
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	-452.45	1.93	4.20	2.89
P-19	J-2	J-19	1,512.00	8.0	Ductile Iron	130.0	16.00	0.01	0.01	0.10
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	1,028.00	12.71	19.22	6.56
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	34.00	0.02	0.03	0.22
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	26.00	0.02	0.02	0.17
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	12.00	0.00	0.00	0.08
P-106	J-102	J-106	1,964.00	8.0	Ductile Iron	130.0	24.00	0.04	0.02	0.15
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-894.45	2.14	14.86	5.71
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	753.55	3.96	10.82	4.81
P-114	J-101	J-112	1,599.00	8.0	Ductile Iron	130.0	-28.00	0.04	0.02	0.18
P-115	J-112	J-102	560.00	12.0	Ductile Iron	130.0	1,786.00	4.16	7.42	5.07
P-116	J-101	J-113	1,097.00	8.0	Ductile Iron	130.0	10.00	0.00	0.00	0.06
P-117	J-112	J-114	1,434.00	12.0	Ductile Iron	130.0	-1,814.00	10.95	7.64	5.15
P-118	J-114	J-115	622.00	12.0	Ductile Iron	130.0	-1,824.00	4.80	7.71	5.17
P-119	J-115	J-116	548.00	12.0	Ductile Iron	130.0	-1,824.00	4.23	7.71	5.17
P-120	R-1	J-116	1,429.00	12.0	Ductile Iron	130.0	1,836.00	11.16	7.81	5.21
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-1,690.00	2.26	6.70	4.79
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-1,702.00	3.56	6.79	4.83
P-123	J-102	PRV-1	762.00	12.0	Ductile Iron	130.0	1,746.00	5.42	7.12	4.95
P-124	PRV-1	J-103	1,542.00	12.0	Ductile Iron	130.0	1,746.00	10.97	7.11	4.95
P-127	J-101	PRV-3	324.00	8.0	Ductile Iron	130.0	18.00	0.00	0.01	0.11
P-128	PRV-3	J-107	1,092.00	8.0	Ductile Iron	130.0	18.00	0.01	0.01	0.11
P-129	J-105	PRV-2	209.00	8.0	Ductile Iron	130.0	-0.00	0.00	0.00	0.00
P-130	PRV-2	J-106	316.00	8.0	Ductile Iron	130.0	-0.00	0.00	0.00	0.00

Scenario: Max Day + FF @ J-21
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	20.00	Fixed	20.00	2,373.48	31.79
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,373.49	37.42
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,373.50	71.17
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,378.27	64.15
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,380.19	60.65
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,382.20	65.85
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,389.54	61.67
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,394.24	68.89
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,401.09	83.97
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,413.77	98.54
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,416.27	98.76
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,421.34	96.63
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,418.72	107.61
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,414.82	105.92
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,388.07	94.35
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,371.10	95.66
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,367.11	85.28
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,371.99	90.42
J-19	2,250.00	Zone-1	Demand	16.00	Fixed	16.00	2,373.47	53.42
J-20	2,220.00	Zone-1	Demand	28.00	Fixed	28.00	2,371.98	65.75
J-21	2,228.00	Zone-1	Demand	1,034.00	Fixed	1,034.00	2,355.05	54.97
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,598.82	96.41
J-102	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,594.71	92.89
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,429.06	68.82
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,429.04	81.79
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,429.03	51.50
J-106	2,350.00	Zone-1	Demand	24.00	Fixed	24.00	2,594.67	105.86
J-107	2,285.00	Zone-1	Demand	18.00	Fixed	18.00	2,440.02	67.07
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,423.24	93.12
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,598.86	92.96
J-113	2,448.00	Zone-1	Demand	10.00	Fixed	10.00	2,598.82	65.25
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,609.81	55.30
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,614.61	32.28
J-116	2,530.00	Zone-1	Demand	12.00	Fixed	12.00	2,618.84	38.44
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,425.50	82.42

Scenario: Max Day + FF @ J-21
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-20.00	0.01	0.01	0.13
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-48.00	0.01	0.02	0.20
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-510.47	4.77	5.26	3.26
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-552.47	1.92	6.09	3.53
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-560.47	2.01	6.25	3.58
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-560.47	7.35	6.25	3.58
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-588.47	4.69	6.84	3.76
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-750.47	6.85	10.73	4.79
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-772.47	12.68	11.32	4.93
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-780.47	2.50	11.54	4.98
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-796.47	5.07	11.98	5.08
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	761.53	3.90	11.03	4.86
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	761.53	26.74	11.03	4.86
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	713.53	16.97	9.78	4.55
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	699.53	3.99	9.42	4.46
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	-368.47	4.88	2.87	2.35
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	-396.47	1.51	3.29	2.53
P-19	J-2	J-19	1,512.00	8.0	Ductile Iron	130.0	16.00	0.01	0.01	0.10
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	28.00	0.02	0.02	0.18
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	1,034.00	12.07	19.43	6.60
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	26.00	0.02	0.02	0.17
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	12.00	0.00	0.00	0.08
P-106	J-102	J-106	1,964.00	8.0	Ductile Iron	130.0	24.00	0.04	0.02	0.15
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-838.47	1.90	13.18	5.35
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	809.53	4.52	12.35	5.17
P-114	J-101	J-112	1,599.00	8.0	Ductile Iron	130.0	-28.00	0.04	0.02	0.18
P-115	J-112	J-102	560.00	12.0	Ductile Iron	130.0	1,786.00	4.16	7.42	5.07
P-116	J-101	J-113	1,097.00	8.0	Ductile Iron	130.0	10.00	0.00	0.00	0.06
P-117	J-112	J-114	1,434.00	12.0	Ductile Iron	130.0	-1,814.00	10.95	7.64	5.15
P-118	J-114	J-115	622.00	12.0	Ductile Iron	130.0	-1,824.00	4.80	7.71	5.17
P-119	J-115	J-116	548.00	12.0	Ductile Iron	130.0	-1,824.00	4.23	7.71	5.17
P-120	R-1	J-116	1,429.00	12.0	Ductile Iron	130.0	1,836.00	11.16	7.81	5.21
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-1,690.00	2.26	6.70	4.79
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-1,702.00	3.56	6.79	4.83
P-123	J-102	PRV-1	762.00	12.0	Ductile Iron	130.0	1,746.00	5.42	7.12	4.95
P-124	PRV-1	J-103	1,542.00	12.0	Ductile Iron	130.0	1,746.00	10.97	7.11	4.95
P-127	J-101	PRV-3	324.00	8.0	Ductile Iron	130.0	18.00	0.00	0.01	0.11
P-128	PRV-3	J-107	1,092.00	8.0	Ductile Iron	130.0	18.00	0.01	0.01	0.11
P-129	J-105	PRV-2	209.00	8.0	Ductile Iron	130.0	-0.00	0.00	0.00	0.00
P-130	PRV-2	J-106	316.00	8.0	Ductile Iron	130.0	-0.00	0.00	0.00	0.00

Scenario: Max Day + FF @ J-107
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	20.00	Fixed	20.00	2,430.62	56.52
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,430.63	62.14
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,430.65	95.90
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,430.70	86.83
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,430.76	82.53
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,430.83	86.89
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,431.10	79.65
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,431.35	84.95
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,432.49	97.56
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,434.77	107.63
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,435.23	106.96
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,436.22	103.07
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,436.02	115.10
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,435.60	114.91
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,432.73	113.67
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,431.41	121.75
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,431.13	112.98
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,430.71	115.82
J-19	2,250.00	Zone-1	Demand	16.00	Fixed	16.00	2,430.62	78.15
J-20	2,220.00	Zone-1	Demand	28.00	Fixed	28.00	2,430.69	91.16
J-21	2,228.00	Zone-1	Demand	34.00	Fixed	34.00	2,431.11	87.87
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,568.12	83.12
J-102	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,597.96	94.30
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,437.76	72.58
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,437.74	85.55
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,437.73	55.26
J-106	2,350.00	Zone-1	Demand	24.00	Fixed	24.00	2,597.92	107.26
J-107	2,285.00	Zone-1	Demand	1,018.00	Fixed	1,018.00	2,419.41	58.15
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,436.64	98.92
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,598.86	92.96
J-113	2,448.00	Zone-1	Demand	10.00	Fixed	10.00	2,568.12	51.97
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,609.81	55.30
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,614.61	32.28
J-116	2,530.00	Zone-1	Demand	12.00	Fixed	12.00	2,618.84	38.44
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,437.07	87.43

Scenario: Max Day + FF @ J-107
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-20.00	0.01	0.01	0.13
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-48.00	0.01	0.02	0.20
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-43.82	0.05	0.06	0.28
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-85.82	0.06	0.19	0.55
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-93.82	0.07	0.23	0.60
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-93.82	0.27	0.23	0.60
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-121.82	0.25	0.37	0.78
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-283.82	1.13	1.77	1.81
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-305.82	2.28	2.04	1.95
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-313.82	0.46	2.14	2.00
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-329.82	0.99	2.34	2.11
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	228.18	0.42	1.18	1.46
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	228.18	2.87	1.18	1.46
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	180.18	1.33	0.76	1.15
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	166.18	0.28	0.66	1.06
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	98.18	0.42	0.25	0.63
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	70.18	0.06	0.13	0.45
P-19	J-2	J-19	1,512.00	8.0	Ductile Iron	130.0	16.00	0.01	0.01	0.10
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	28.00	0.02	0.02	0.18
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	34.00	0.02	0.03	0.22
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	26.00	0.02	0.02	0.17
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	12.00	0.00	0.00	0.08
P-106	J-102	J-106	1,964.00	8.0	Ductile Iron	130.0	24.00	0.04	0.02	0.15
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-371.82	0.42	2.92	2.37
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	276.18	0.62	1.69	1.76
P-114	J-101	J-112	1,599.00	8.0	Ductile Iron	130.0	-1,028.00	30.74	19.22	6.56
P-115	J-112	J-102	560.00	12.0	Ductile Iron	130.0	786.00	0.91	1.62	2.23
P-116	J-101	J-113	1,097.00	8.0	Ductile Iron	130.0	10.00	0.00	0.00	0.06
P-117	J-112	J-114	1,434.00	12.0	Ductile Iron	130.0	-1,814.00	10.95	7.64	5.15
P-118	J-114	J-115	622.00	12.0	Ductile Iron	130.0	-1,824.00	4.80	7.71	5.17
P-119	J-115	J-116	548.00	12.0	Ductile Iron	130.0	-1,824.00	4.23	7.71	5.17
P-120	R-1	J-116	1,429.00	12.0	Ductile Iron	130.0	1,836.00	11.16	7.81	5.21
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-690.00	0.43	1.28	1.96
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-702.00	0.69	1.32	1.99
P-123	J-102	PRV-1	762.00	12.0	Ductile Iron	130.0	746.00	1.12	1.47	2.12
P-124	PRV-1	J-103	1,542.00	12.0	Ductile Iron	130.0	746.00	2.27	1.47	2.12
P-127	J-101	PRV-3	324.00	8.0	Ductile Iron	130.0	1,018.00	6.12	18.88	6.50
P-128	PRV-3	J-107	1,092.00	8.0	Ductile Iron	130.0	1,018.00	20.62	18.88	6.50
P-129	J-105	PRV-2	209.00	8.0	Ductile Iron	130.0	-0.00	0.00	0.00	0.00
P-130	PRV-2	J-106	316.00	8.0	Ductile Iron	130.0	-0.00	0.00	0.00	0.00

Scenario: Max Day + FF @ J-113
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	20.00	Fixed	20.00	2,430.62	56.52
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,430.63	62.14
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,430.65	95.90
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,430.70	86.83
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,430.76	82.53
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,430.83	86.89
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,431.10	79.65
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,431.35	84.95
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,432.49	97.56
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,434.77	107.63
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,435.23	106.96
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,436.22	103.07
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,436.02	115.10
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,435.60	114.91
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,432.73	113.67
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,431.41	121.75
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,431.13	112.98
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,430.71	115.82
J-19	2,250.00	Zone-1	Demand	16.00	Fixed	16.00	2,430.62	78.15
J-20	2,220.00	Zone-1	Demand	28.00	Fixed	28.00	2,430.69	91.16
J-21	2,228.00	Zone-1	Demand	34.00	Fixed	34.00	2,431.11	87.87
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,568.12	83.12
J-102	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,597.96	94.30
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,437.76	72.58
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,437.74	85.55
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,437.73	55.26
J-106	2,350.00	Zone-1	Demand	24.00	Fixed	24.00	2,597.92	107.26
J-107	2,285.00	Zone-1	Demand	18.00	Fixed	18.00	2,440.02	67.07
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,436.64	98.92
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,598.86	92.96
J-113	2,448.00	Zone-1	Demand	1,010.00	Fixed	1,010.00	2,547.71	43.14
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,609.81	55.30
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,614.61	32.28
J-116	2,530.00	Zone-1	Demand	12.00	Fixed	12.00	2,618.84	38.44
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,437.07	87.43

Scenario: Max Day + FF @ J-113
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-20.00	0.01	0.01	0.13
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-48.00	0.01	0.02	0.20
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-43.82	0.05	0.06	0.28
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-85.82	0.06	0.19	0.55
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-93.82	0.07	0.23	0.60
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-93.82	0.27	0.23	0.60
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-121.82	0.25	0.37	0.78
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-283.82	1.13	1.77	1.81
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-305.82	2.28	2.04	1.95
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-313.82	0.46	2.14	2.00
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-329.82	0.99	2.34	2.11
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	228.18	0.42	1.18	1.46
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	228.18	2.87	1.18	1.46
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	180.18	1.33	0.76	1.15
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	166.18	0.28	0.66	1.06
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	98.18	0.42	0.25	0.63
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	70.18	0.06	0.13	0.45
P-19	J-2	J-19	1,512.00	8.0	Ductile Iron	130.0	16.00	0.01	0.01	0.10
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	28.00	0.02	0.02	0.18
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	34.00	0.02	0.03	0.22
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	26.00	0.02	0.02	0.17
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	12.00	0.00	0.00	0.08
P-106	J-102	J-106	1,964.00	8.0	Ductile Iron	130.0	24.00	0.04	0.02	0.15
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-371.82	0.42	2.92	2.37
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	276.18	0.62	1.69	1.76
P-114	J-101	J-112	1,599.00	8.0	Ductile Iron	130.0	-1,028.00	30.74	19.22	6.56
P-115	J-112	J-102	560.00	12.0	Ductile Iron	130.0	786.00	0.91	1.62	2.23
P-116	J-101	J-113	1,097.00	8.0	Ductile Iron	130.0	1,010.00	20.41	18.61	6.45
P-117	J-112	J-114	1,434.00	12.0	Ductile Iron	130.0	-1,814.00	10.95	7.64	5.15
P-118	J-114	J-115	622.00	12.0	Ductile Iron	130.0	-1,824.00	4.80	7.71	5.17
P-119	J-115	J-116	548.00	12.0	Ductile Iron	130.0	-1,824.00	4.23	7.71	5.17
P-120	R-1	J-116	1,429.00	12.0	Ductile Iron	130.0	1,836.00	11.16	7.81	5.21
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-690.00	0.43	1.28	1.96
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-702.00	0.69	1.32	1.99
P-123	J-102	PRV-1	762.00	12.0	Ductile Iron	130.0	746.00	1.12	1.47	2.12
P-124	PRV-1	J-103	1,542.00	12.0	Ductile Iron	130.0	746.00	2.27	1.47	2.12
P-127	J-101	PRV-3	324.00	8.0	Ductile Iron	130.0	18.00	0.00	0.01	0.11
P-128	PRV-3	J-107	1,092.00	8.0	Ductile Iron	130.0	18.00	0.01	0.01	0.11
P-129	J-105	PRV-2	209.00	8.0	Ductile Iron	130.0	-0.00	0.00	0.00	0.00
P-130	PRV-2	J-106	316.00	8.0	Ductile Iron	130.0	-0.00	0.00	0.00	0.00

Scenario: Max Day + FF @ J-116
Steady State Analysis
Junction Report

Label	Elevation (ft)	Zone	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
J-1	2,300.00	Zone-1	Demand	20.00	Fixed	20.00	2,430.62	56.52
J-2	2,287.00	Zone-1	Demand	12.00	Fixed	12.00	2,430.63	62.14
J-3	2,209.00	Zone-1	Demand	66.00	Fixed	66.00	2,430.65	95.90
J-4	2,230.00	Zone-1	Demand	42.00	Fixed	42.00	2,430.70	86.83
J-5	2,240.00	Zone-1	Demand	8.00	Fixed	8.00	2,430.76	82.53
J-6	2,230.00	Zone-1	Demand	0.00	Fixed	0.00	2,430.83	86.89
J-7	2,247.00	Zone-1	Demand	28.00	Fixed	28.00	2,431.10	79.65
J-8	2,235.00	Zone-1	Demand	162.00	Fixed	162.00	2,431.35	84.95
J-9	2,207.00	Zone-1	Demand	22.00	Fixed	22.00	2,432.49	97.56
J-10	2,186.00	Zone-1	Demand	8.00	Fixed	8.00	2,434.77	107.63
J-11	2,188.00	Zone-1	Demand	16.00	Fixed	16.00	2,435.23	106.96
J-12	2,198.00	Zone-1	Demand	42.00	Fixed	42.00	2,436.22	103.07
J-13	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,436.02	115.10
J-14	2,170.00	Zone-1	Demand	0.00	Fixed	0.00	2,435.60	114.91
J-15	2,170.00	Zone-1	Demand	48.00	Fixed	48.00	2,432.73	113.67
J-16	2,150.00	Zone-1	Demand	14.00	Fixed	14.00	2,431.41	121.75
J-17	2,170.00	Zone-1	Demand	34.00	Fixed	34.00	2,431.13	112.98
J-18	2,163.00	Zone-1	Demand	0.00	Fixed	0.00	2,430.71	115.82
J-19	2,250.00	Zone-1	Demand	16.00	Fixed	16.00	2,430.62	78.15
J-20	2,220.00	Zone-1	Demand	28.00	Fixed	28.00	2,430.69	91.16
J-21	2,228.00	Zone-1	Demand	34.00	Fixed	34.00	2,431.11	87.87
J-101	2,376.00	Zone-1	Demand	0.00	Fixed	0.00	2,614.25	103.08
J-102	2,380.00	Zone-1	Demand	16.00	Fixed	16.00	2,613.38	100.97
J-103	2,270.00	Zone-1	Demand	18.00	Fixed	18.00	2,437.76	72.58
J-104	2,240.00	Zone-1	Demand	14.00	Fixed	14.00	2,437.74	85.55
J-105	2,310.00	Zone-1	Demand	12.00	Fixed	12.00	2,437.73	55.26
J-106	2,350.00	Zone-1	Demand	24.00	Fixed	24.00	2,613.34	113.94
J-107	2,285.00	Zone-1	Demand	18.00	Fixed	18.00	2,440.02	67.07
J-111	2,208.00	Zone-1	Demand	42.00	Fixed	42.00	2,436.64	98.92
J-112	2,384.00	Zone-1	Demand	0.00	Fixed	0.00	2,614.29	99.63
J-113	2,448.00	Zone-1	Demand	10.00	Fixed	10.00	2,614.24	71.93
J-114	2,482.00	Zone-1	Demand	10.00	Fixed	10.00	2,616.77	58.31
J-115	2,540.00	Zone-1	Demand	0.00	Fixed	0.00	2,617.87	33.69
J-116	2,530.00	Zone-1	Demand	1,012.00	Fixed	1,012.00	2,618.84	38.44
J-117	2,235.00	Zone-1	Demand	12.00	Fixed	12.00	2,437.07	87.43

Scenario: Max Day + FF @ J-116
Steady State Analysis
Pipe Report

Label	From Node	To Node	Length (ft)	Diameter (in)	Material	Hazen-Williams C	Discharge (gpm)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)	Velocity (ft/s)
P-1	J-1	J-2	587.00	8.0	Ductile Iron	130.0	-20.00	0.01	0.01	0.13
P-2	J-2	J-3	662.00	10.0	Ductile Iron	130.0	-48.00	0.01	0.02	0.20
P-3	J-3	J-4	907.00	8.0	Ductile Iron	130.0	-43.82	0.05	0.06	0.28
P-4	J-4	J-5	316.00	8.0	Ductile Iron	130.0	-85.82	0.06	0.19	0.55
P-5	J-5	J-6	321.00	8.0	Ductile Iron	130.0	-93.82	0.07	0.23	0.60
P-6	J-6	J-7	1,175.00	8.0	Ductile Iron	130.0	-93.82	0.27	0.23	0.60
P-7	J-7	J-8	686.00	8.0	Ductile Iron	130.0	-121.82	0.25	0.37	0.78
P-8	J-8	J-9	638.00	8.0	Ductile Iron	130.0	-283.82	1.13	1.77	1.81
P-9	J-9	J-10	1,120.00	8.0	Ductile Iron	130.0	-305.82	2.28	2.04	1.95
P-10	J-10	J-11	217.00	8.0	Ductile Iron	130.0	-313.82	0.46	2.14	2.00
P-11	J-11	J-12	423.00	8.0	Ductile Iron	130.0	-329.82	0.99	2.34	2.11
P-13	J-13	J-14	354.00	8.0	Ductile Iron	130.0	228.18	0.42	1.18	1.46
P-14	J-14	J-15	2,425.00	8.0	Ductile Iron	130.0	228.18	2.87	1.18	1.46
P-15	J-15	J-16	1,736.00	8.0	Ductile Iron	130.0	180.18	1.33	0.76	1.15
P-16	J-16	J-17	423.00	8.0	Ductile Iron	130.0	166.18	0.28	0.66	1.06
P-17	J-17	J-18	1,697.00	8.0	Ductile Iron	130.0	98.18	0.42	0.25	0.63
P-18	J-18	J-3	458.00	8.0	Ductile Iron	130.0	70.18	0.06	0.13	0.45
P-19	J-2	J-19	1,512.00	8.0	Ductile Iron	130.0	16.00	0.01	0.01	0.10
P-20	J-18	J-20	661.00	8.0	Ductile Iron	130.0	28.00	0.02	0.02	0.18
P-21	J-17	J-21	621.00	8.0	Ductile Iron	130.0	34.00	0.02	0.03	0.22
P-103	J-103	J-104	1,139.00	8.0	Ductile Iron	130.0	26.00	0.02	0.02	0.17
P-104	J-104	J-105	937.00	8.0	Ductile Iron	130.0	12.00	0.00	0.00	0.08
P-106	J-102	J-106	1,964.00	8.0	Ductile Iron	130.0	24.00	0.04	0.02	0.15
P-110	J-12	J-111	144.00	8.0	Ductile Iron	130.0	-371.82	0.42	2.92	2.37
P-111	J-111	J-13	366.00	8.0	Ductile Iron	130.0	276.18	0.62	1.69	1.76
P-114	J-101	J-112	1,599.00	8.0	Ductile Iron	130.0	-28.00	0.04	0.02	0.18
P-115	J-112	J-102	560.00	12.0	Ductile Iron	130.0	786.00	0.91	1.62	2.23
P-116	J-101	J-113	1,097.00	8.0	Ductile Iron	130.0	10.00	0.00	0.00	0.06
P-117	J-112	J-114	1,434.00	12.0	Ductile Iron	130.0	-814.00	2.48	1.73	2.31
P-118	J-114	J-115	622.00	12.0	Ductile Iron	130.0	-824.00	1.10	1.77	2.34
P-119	J-115	J-116	548.00	12.0	Ductile Iron	130.0	-824.00	0.97	1.77	2.34
P-120	R-1	J-116	1,429.00	12.0	Ductile Iron	130.0	1,836.00	11.16	7.81	5.21
P-121	J-111	J-117	337.00	12.0	Ductile Iron	130.0	-690.00	0.43	1.28	1.96
P-122	J-117	J-103	525.00	12.0	Ductile Iron	130.0	-702.00	0.69	1.32	1.99
P-123	J-102	PRV-1	762.00	12.0	Ductile Iron	130.0	746.00	1.12	1.47	2.12
P-124	PRV-1	J-103	1,542.00	12.0	Ductile Iron	130.0	746.00	2.27	1.47	2.12
P-127	J-101	PRV-3	324.00	8.0	Ductile Iron	130.0	18.00	0.00	0.01	0.11
P-128	PRV-3	J-107	1,092.00	8.0	Ductile Iron	130.0	18.00	0.01	0.01	0.11
P-129	J-105	PRV-2	209.00	8.0	Ductile Iron	130.0	-0.00	0.00	0.00	0.00
P-130	PRV-2	J-106	316.00	8.0	Ductile Iron	130.0	-0.00	0.00	0.00	0.00