TECHNICAL APPENDICES

DRAFT SUBSEQUENT ENVIRONMENTAL IMPACT REPORT

SIERRA STAR MASTER PLAN PROJECT

Lead Agency:
Town of Mammoth Lakes
Planning Department
PO Box 1690
Mammoth Lakes, CA 93546

SCH # 2005092103
April 2007

TECHNICAL APPENDICES
SIERRA STAR MASTER PLAN
DRAFT SUBSEQUENT ENVIRONMENTAL IMPACT REPORT

Submitted to:

Town of Mammoth Lakes
Community Development Department
PO Box 1690
Mammoth Lakes, CA 93546

Attn: Craig Olson
Senior Planner

Submitted by:

CHRISTOPHER A. JOSEPH & ASSOCIATES
Environmental Planning and Research

In association with:

Schaaf & Wheeler
SWCA Environmental Consultants
Treadwell & Rollo
WRA Environmental Consultants

April 2007

TECHNICAL APPENDICES
SIERRA STAR MASTER PLAN PROJECT
DRAFT ENVIRONMENTAL IMPACT REPORT

APPENDIX A

NOTICE OF PREPARATION (NOP) AND INITIAL STUDY

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse and Planning Unit

Arnold Schwarzenegger
Governor

Sean Walsh
Director

Notice of Preparation

RECEIVED
SEP 30 2005
TOWN OF MAMMOTH
COMMUNITY DEVELOPMENT DEPARTMENT

September 21, 2005

To: Reviewing Agencies

Re: Sierra Star Master Plan
SCH# 2005092103

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

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

Please direct your comments to:

Craig Olson
City of Mammoth Lakes
P.O. Box 1609
Mammoth Lakes, CA 93546

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

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

Sincerely,

Scott Morgan
Project Analyst, State Clearinghouse

Attachments
cc: Lead Agency

Document Details Report
State Clearinghouse Data Base

SCH#	**2005092103**
Project Title	Sierra Star Master Plan
Lead Agency	Mammoth Lakes, City of

Type	**NOP** Notice of Preparation
Description	New Master Plan to replace Lodestar Master Plan. New plan proposes 832 units, 29,000 square feet of retail and 30,000 of conference space. A total of 1,283 units would be built under the Lodestar and Sierra Star developments.

Lead Agency Contact

Name	Craig Olson		
Agency	City of Mammoth Lakes		
Phone	(760) 934-8989 x269	***Fax***	
email			
Address	P.O. Box 1609		
City	Mammoth Lakes	***State*** CA	***Zip*** 93546

Project Location

County	Mono						
City	Mammoth Lakes						
Region							
Cross Streets	Main Street / Minaret Road						
Parcel No.							
Township		***Range***		***Section***		***Base***	

Proximity to:

Highways	SR 203
Airports	
Railways	
Waterways	
Schools	
Land Use	Resort

Project Issues

Reviewing Agencies	Resources Agency; Regional Water Quality Control Bd., Region 6 (So Lake Tahoe); Department of Parks and Recreation; Native American Heritage Commission; Department of Health Services; Office of Emergency Services; Department of Forestry and Fire Protection; Department of Fish and Game, Region 6 (Inyo & Mono Region); Department of Water Resources; Department of Conservation; California Highway Patrol; Caltrans, District 9; Caltrans, Division of Aeronautics; State Lands Commission

Date Received 09/21/2005 ***Start of Review*** 09/21/2005 ***End of Review*** 10/20/2005

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

NOP Distribution List

County: Mono   SCH# [illegible]

Resources Agency

- [x] **Resources Agency** Nadell Gayou
- [ ] **Dept. of Boating & Waterways** David Johnson
- [ ] **California Coastal Commission** Elizabeth A. Fuchs
- [ ] **Colorado River Board** Gerald R. Zimmerman
- [x] **Dept. of Conservation** Roseanne Taylor
- [ ] **California Energy Commission** Roger Johnson
- [x] **Dept. of Forestry & Fire Protection** Allen Robertson
- [ ] **Office of Historic Preservation** Wayne Donaldson
- [x] **Dept of Parks & Recreation** Environmental Stewardship Section
- [ ] **Reclamation Board** DeeDee Jones
- [ ] **S.F. Bay Conservation & Dev't. Comm.** Steve McAdam
- [x] **Dept. of Water Resources** Resources Agency Nadell Gayou
- [ ] ____________ Conservancy

Fish and Game

- [ ] **Depart. of Fish & Game** Scott Flint, Environmental Services Division
- [ ] **Fish & Game Region 1** Donald Koch
- [ ] **Fish & Game Region 2** Banky Curtis
- [ ] **Fish & Game Region 3** Robert Floerke
- [ ] **Fish & Game Region 4** Mike Mulligan
- [ ] **Fish & Game Region 5** Don Chadwick, Habitat Conservation Program
- [ ] **Fish & Game Region 6** Gabrina Gatchel, Habitat Conservation Program
- [x] **Fish & Game Region 6 I/M** Tammy Allen, Inyo/Mono, Habitat Conservation Program
- [ ] **Dept. of Fish & Game M** George Isaac, Marine Region

Other Departments

- [ ] **Food & Agriculture** Steve Shaffer, Dept. of Food and Agriculture
- [ ] **Depart. of General Services** Public School Construction
- [ ] **Dept. of General Services** Robert Sleppy, Environmental Services Section
- [x] **Dept. of Health Services** Veronica Rameriz, Dept. of Health/Drinking Water

Independent Commissions,Boards

- [ ] **Delta Protection Commission** Debby Eddy
- [x] **Office of Emergency Services** Dennis Castrillo
- [ ] **Governor's Office of Planning & Research** State Clearinghouse
- [x] **Native American Heritage Comm.** Debbie Treadway
- [ ] **Public Utilities Commission** Ken Lewis
- [x] **State Lands Commission** Jean Sarino
- [ ] **Tahoe Regional Planning Agency (TRPA)** Cherry Jacques

Business, Trans & Housing

- [x] **Caltrans - Division of Aeronautics** Sandy Hesnard
- [ ] **Caltrans - Planning** Terri Pencovic
- [x] **California Highway Patrol** John Olejnik, Office of Special Projects
- [ ] **Housing & Community Development** Lisa Nichols, Housing Policy Division

Dept. of Transportation

- [ ] **Caltrans, District 1** Rex Jackman
- [ ] **Caltrans, District 2** Marcelino Gonzalez
- [ ] **Caltrans, District 3** Katherine Eastham
- [ ] **Caltrans, District 4** Tim Sable
- [ ] **Caltrans, District 5** David Murray
- [ ] **Caltrans, District 6** Marc Birnbaum
- [ ] **Caltrans, District 7** Cheryl J. Powell
- [ ] **Caltrans, District 8** Dan Kopulsky
- [x] **Caltrans, District 9** Gayle Rosander
- [ ] **Caltrans, District 10** Tom Dumas
- [ ] **Caltrans, District 11** Mario Orso
- [ ] **Caltrans, District 12** Bob Joseph

Cal EPA

Air Resources Board

- [ ] Airport Projects, Jim Lerner
- [ ] Transportation Projects, Kurt Karperos
- [ ] Industrial Projects, Mike Tollstrup
- [ ] **California Integrated Waste Management Board** Sue O'Leary
- [ ] **State Water Resources Control Board** Jim Hockenberry, Division of Financial Assistance
- [ ] **State Water Resources Control Board** Student Intern, 401 Water Quality Certification Unit, Division of Water Quality
- [ ] **State Water Resouces Control Board** Steven Herrera, Division of Water Rights
- [ ] **Dept. of Toxic Substances Control** CEQA Tracking Center
- [ ] **Department of Pesticide Regulation**

Regional Water Quality Control Board (RWQCB)

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

Last Updated on 08/10/05

Town of Mammoth Lakes

Planning Department
P.O. Box 1609
Mammoth Lakes, CA 93546

ENVIRONMENTAL INITIAL STUDY

This form and the descriptive information supplied by the applicant constitute the Environmental Initial Study pursuant to Section 15063 of the California Environmental Quality Act (CEQA) Guidelines.

1. Project Title: Sierra Star Master Plan (formerly Lodestar Master Plan).

2. Lead Agency Name and Address: Town of Mammoth Lakes
   P.O. Box 1609
   Mammoth Lakes, CA 93546

3. Contact Person and Phone Number: Craig R. Olson, Senior Planner
   (760) 934-8989 x269

4. Project Location: Generally located on approximately 220 acres, south of Main Street/Lake Mary Road, north of Meridian Boulevard and bisected by Minaret Road (Exhibit A).

5. Project Sponsor's Name and Address: Scott Schoenfeld, P.E.
   Intrawest California Holdings, Inc.
   6990 South McCarron Boulevard, Ste. 3000
   Reno, NV 89509

6. General Plan Designation: R – Resort

7. Zoning: R – Resort

8. Description of the Project: The Sierra Star Master Plan (Exhibit B) represents a revision to the 1991 Lodestar Master Plan. The Town's adoption of the Sierra Star Master Plan will result in replacement of the Lodestar Master Plan with a new master plan that changes the name, land area, and land uses set forth in the Lodestar Master Plan. The original Lodestar Master Plan set the development standards for an approximately 220-acre site in a centrally located area of Town that is situated around the developed 18-hole, 114-acre, Sierra Star Golf Course. The Lodestar Master Plan envisioned the development of a major commercial, residential, and recreational hub within the Town. Table 1 shows the Lodestar Master Plan land use plan as amended in 1992 (Ord. 92-16) to include a total of 1,251 "units", and 80,000 square feet of Resort Commercial space. Pursuant to the Town's Zoning Code (Sec. 17.28.240G), a room equates to ½-unit, or a unit equates to two rooms. Therefore 1,251 units could translate to

751 dwelling units and a 500-room hotel. It is important to note that the 500 Resort Hotel rooms are identified on Table 1 as "units" rather than "rooms". The hotel rooms therefore could be considered to be "double counted", for a total equivalent unit count of 1,251, rather than the 1,001 units that would equal 751 units and a 500-room hotel. The Lodestar Master Plan also proposed a "people mover", a chair lift or gondola to transport people to Mammoth Mountain's Eagle Lodge and Base Lodge.

Table 2 shows the development that has been constructed or approved through August 2005. A total of 451 units have been constructed or approved under the Lodestar Master Plan. Commercial has not been developed. Using the Town's room-to-unit calculation method would leave a balance of 550 units, rather than the 800 shown.

The May 2005 Sierra Star Master Plan proposes to re-focus remaining development within the specific plan area towards the creation of transient occupancy units, establishment of a more efficient transportation and circulation system, and the development of additional affordable housing units (see Table 3). The people mover is no longer proposed as part of the project.

A total of 832 new dwelling units are proposed. Bearing in mind that units can be converted to hotel rooms at a ratio of two hotel rooms per unit with a Use Permit, this could translate to a total buildout of 1,033 units and a 500-room hotel or 282 more units than proposed under the Lodestar Master Plan as amended. In addition, transient occupancy units are allowed with a Use Permit on single-family properties. Limited commercial development (29,000 square feet of retail and a 30,000 square foot conference center), also subject to the Town's discretionary approval, is allowed in Areas 2, 4, 5, and on the existing golf course. The May 2005 Sierra Star Master Plan also proposes a 200-foot height maximum in Area 5, with the intent of attracting a five-star hotel.

With approval of the Sierra Star Master Plan, the Town's General Plan, Zoning Ordinance, and Design Guidelines serve as the base document when the proposed Sierra Star Master Plan is silent on an issue. Although the Lodestar Master Plan will essentially cease to exist, the associated environmental impact report (EIR) still serves as the base environmental document for the Sierra Star Master Plan Project. Table 3-1of the 1991 Lodestar at Mammoth Lakes Final EIR (State Clearinghouse # 90020042) presents the impacts, level of significance, and mitigation. Pursuant to Section 15150 of the CEQA Guidelines, Table 3-1 is incorporated into this CEQA analysis.

9. Surrounding Land Uses and Setting: The Lodestar Master Plan area has been improved with a 114-acre, 18-hole golf course. Other developments include the 54-lot single-family residential subdivision (Starwood) located to the southeast of the intersection of Meridian Boulevard and Minaret Road in Planning Area 3; a 32-unit Townhome condominium project (The Timbers) located off Sierra Star Parkway in Planning Area 5; a 58-unit condominium project (Solstice) that is currently under construction on Sierra Star Parkway in Planning Area 5; a 46-unit condominium development (Mammoth Green) located on Lodestar Drive in Planning Area 1; and a 24-unit condominium project and 10 single-family residential lots (Crooked Pines) that is located on Lodestar Drive in Planning Area 1. In addition, a 35-unit Workforce Housing development (The Chutes) has been constructed on the Main Street frontage road within Planning Area 4. In April 2005, the Town approved a 28-unit Townhome condominium project (Woodwinds) located on Sierra Star Parkway within Planning Area 5 and a 40-unit Workforce Housing condominium project located on the access roadway to the Main Street frontage road within Planning Area 4.

10. Other public agencies whose approval is required:
    US Army Corp of Engineers
    California Department of Transportation
    California Department of Fish and Game
    Great Basin Unified Air Pollution Control District (UAPCD)
    Lahonton Regional Water Quality Control Board (RWQCB)
    Mammoth Lakes Fire Protection District
    Mammoth Community Water District

LODESTAR AT MAMMOTH LAKES

LAND USE DIAGRAM

	Area	Units	Gross Density	Maximum % Site Coverage
Residential				
Area 1	20 Acres	180	Units	
Area 2	23 Acres	210	Units	
Area 3	22 Acres	61	Units	
Total				39.0 Acres
Lodge, Apartments, Employee Housing	65 Acres	451 Units	7 Units/Acre	
Area 4				
Total				
	3 Acres	100 Units	33 Units/Acre	70% - 2.4 Acres
Resort				
Area 5				
Resort Hotel	3 Acres	200 Units		
Resort Hotel	7 Acres	300 Units		
Resort Res.	10 Acres	200 Units		
Resort Res.	20 Acres	700 Units	35 Units/Acre	: 16.0 Acres
Resort Comm.	5 Acres	80,000 sf.		4.5 Acres
Total Resort	25 Acres			70% 20.5 Acres
Developed Area				
Total	93 Acres	1251 Units 80K Commercial	13 ,• 5 Units /Acre	6 2.3Acres
Open Area				
Golf	116 Acres			12.0 Acres-
Roads	12 Acres			
Open Space	5 Acres			
Total Open	111 Acres			,12 .0
Site Area				
Total Area	222, Acres			- 74.3 Acres

Table 1

Sierra Star

Lodestar Densities as of May 31, 2005

The following chart indicates the number of dwelling units approved in the 1991 Lodestar Plan, the number of dwelling units already developed under that plan, and the remaining number of dwelling units that would be allowable under the 1991 Lodestar Plan.

Dwelling Units (DUs) allowed in 1991 Lodestar Plan			**1,251***	**DU**
Lodestar Areas Previously Allocated	Area 1	13.7 ac	(81)	DU
	Area 3 (sold)	23.1 ac	(54)	DU
	Area 4B	1.5 ac	(24)	DU
	Area 4C	1.0 ac	(35)	DU
	Area 4D (sold)	1.4 ac	(61)	DU
	Area 4E	1.0 ac	(16)	DU
	Area 5E	6.4 ac	(58)	DU
	Area 5F	3.9 ac	(32)	DU
	Area 5G	5.1 ac	(28)	DU
	Area 6 (sold)	7.9 ac	(62)	DU
Total Built Under Lodestar		**65.0 ac**	**(451)**	**DU**
Total Remaining DUs under Lodestar			**800**	**DU**

Note: Acreages for each area are based on diagrammatic area boundaries. Actual acreages for parcels may vary slightly.

* The 1991 Lodestar Lands lie within the Mammoth Lakes Resort Corridor which is covered by a Resort Zone overlay, as per the town of Mammoth Lakes Municipal Code. Within this Resort Zone, the average allowable development density is 8 units/acre. The ands encompass 219.7 acres; thus, the maximum permitted density within the entire Resort Zone Overlay is 1,757 DUs.

3.2. Maximum Density for *Sierra Star Lands*. The following outlines the maximum densities permitted on *Sierra Star Lands*. The 1991 Lodestar Lands are covered by a Resort Zone overlay, as per the Town of Mammoth Lakes Municipal Code. Within this Resort Zone, the average allowable development density is 8 units/acre. Refer to Appendix D for the calculation of these values in relation to the 1991 Lodestar Master Plan.

	Development Area	Acreage	Maximum DU's
Residential	**Area 2**		
	Area 2A/2B/2C		186 DU
	Area 2D		39 DU
	Total: Area 2	**16.8 ac**	**225 DU (14 DU/ac)**
	Area 5		
	Area 5A		246 DU
	Area 5B/5C/5D		257 DU
	Total: Area 5	**17.6 ac**	**503 DU (29 DU/ac)**
Affordable Housing Units	**Area 4**		
	Area 4A		80 DU
	Area 4F		16 DU (8 Existing)
	Total: Area 4	**6.4 ac**	**104 DU (17 DU/ac)**
Total Master Plan 2005		**40.8 ac**	**832 DU**
Total Golf (Area G)		113.9 ac	0 DU
Completed (see App D)		65.0 ac	451 DU
Total		**219.7 ac**	**1,283 DU (6 DU/ac)**
Commercial/Retail	Areas 2, 4A, 5, G		29,000 s.f.
Conference	Areas 2, 4A, 5		30,000 s.f.

* Acreages are based on diagrammatic area boundaries and may vary slightly.

Table 3

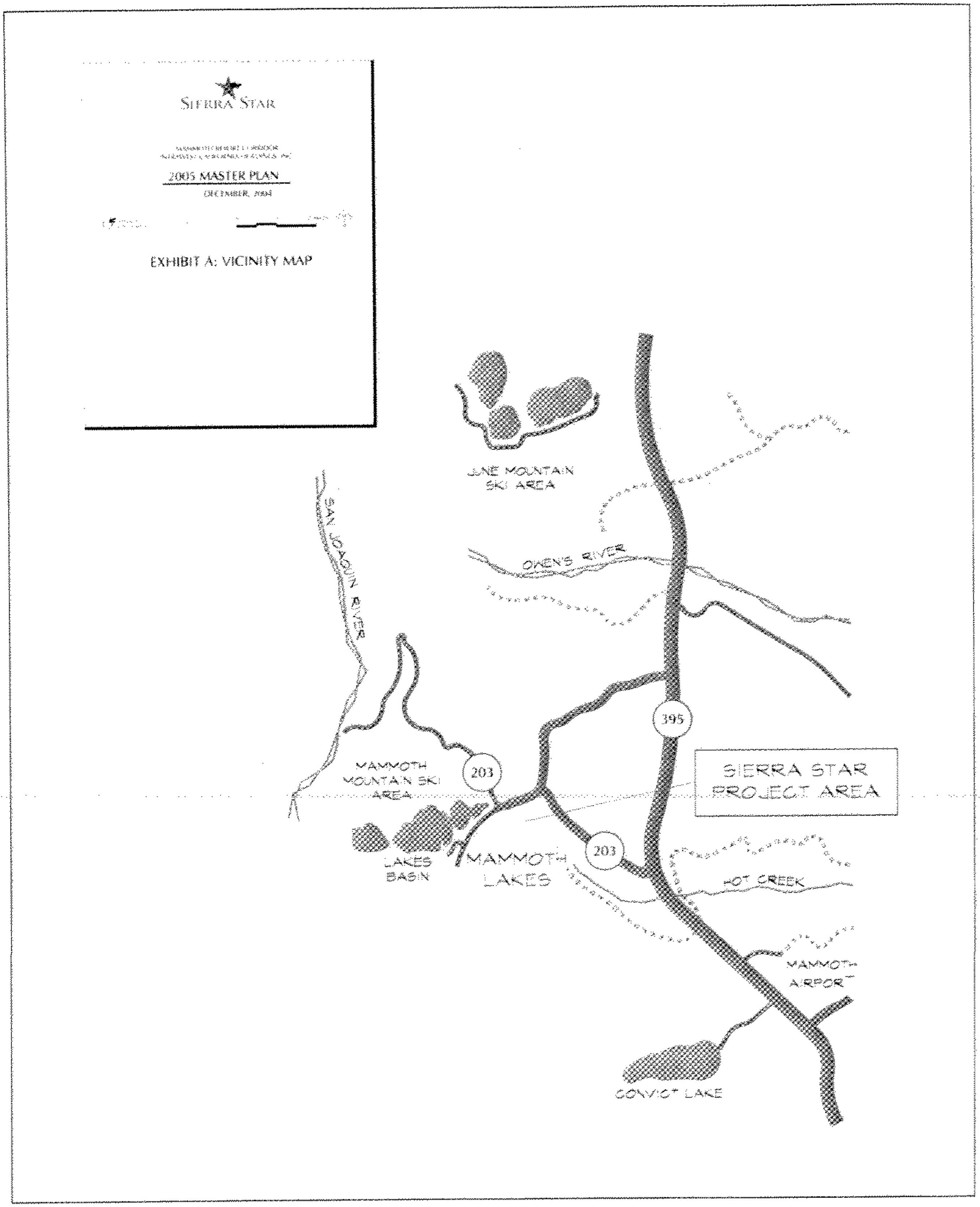
SIERRA STAR
2005 MASTER PLAN
DECEMBER, 2004
EXHIBIT A: VICINITY MAP
JUNE MOUNTAIN
SKI AREA
SAN JOAQUIN RIVER
OWEN'S RIVER
395
SIERRA STAR
PROJECT AREA
MAMMOTH
MOUNTAIN SKI
AREA
203
LAKES
BASIN
MAMMOTH
LAKES
203
HOT CREEK
MAMMOTH
AIRPORT
CONVICT LAKE

Exhibit A

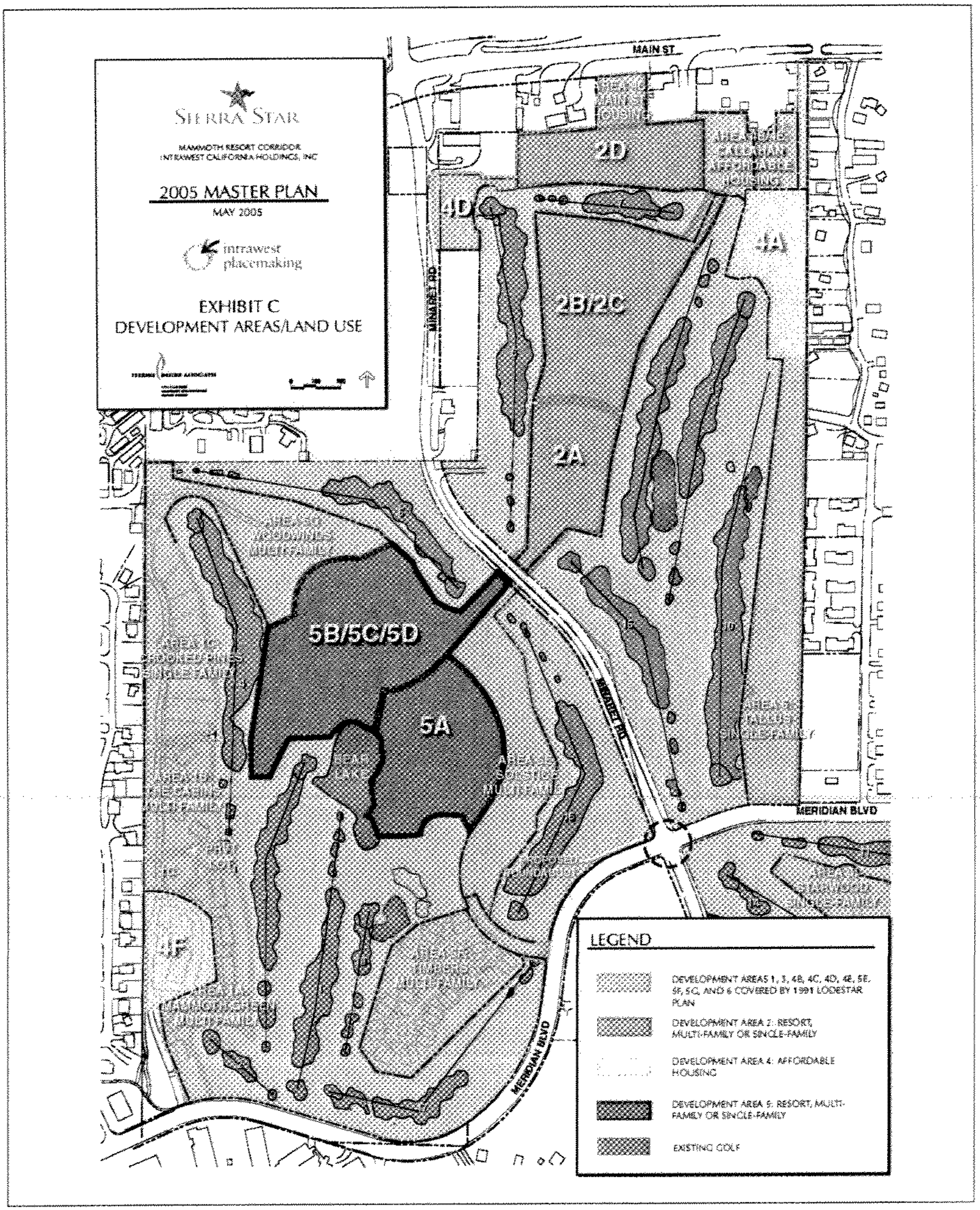
SIERRA STAR
MAMMOTH RESORT CORRIDOR
INTRAWEST CALIFORNIA HOLDINGS, INC
2005 MASTER PLAN
MAY 2005
intrawest placemaking
EXHIBIT C
DEVELOPMENT AREAS/LAND USE
MAIN ST
2D
4D
4A
2B/2C
2A
MINARET RD
5B/5C/5D
5A
4F
MERIDIAN BLVD
LEGEND
DEVELOPMENT AREAS 1, 3, 4B, 4C, 4D, 4E, 5E, 5F, 5G, AND 6 COVERED BY 1991 LODESTAR PLAN
DEVELOPMENT AREA 2: RESORT, MULTI-FAMILY OR SINGLE-FAMILY
DEVELOPMENT AREA 4: AFFORDABLE HOUSING
DEVELOPMENT AREA 5: RESORT, MULTI-FAMILY OR SINGLE-FAMILY
EXISTING GOLF

Exhibit B

The environmental factors checked below (■) would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages. **Note: For impacts identified as "Less Than Significant with Mitigation" the categories are also checked below and are discussed in more detail within the Initial Study.**

■	Aesthetics	■	Hazards & Hazardous Materials	■	Public Services
	Agricultural Resources	■	Hydrology/Water Quality		Recreation
■	Air Quality	■	Land Use/Planning	■	Transportation/Traffic
■	Biological Resources		Mineral Resources	■	Utilities/Service Systems
■	Cultural Resources	■	Noise		Mandatory Findings of Significance
■	Geology/Soils	■	Population/Housing		

DETERMINATION:
Based on this initial evaluation:

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

Craig R. Olson — 16 SEPT 2005

Signature — Date

Craig R. Olson, Senior Planner — *for* Town of Mammoth Lakes

Printed Name

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g. the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g. the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take into account the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational, impacts.

3) Once the lead agency has determined that a particular physical impact may occur, the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Potentially Significant Unless Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analysis," may be cross-referenced).

5) Earlier analysis may be used where, pursuant to the tiering, program EIR, or other CEQA processes, an effect has been adequately analyzed in an earlier EIR or negative declaration. (Section 15063 (c) (3) (d)). In this case, a brief discussion should identify the following:

(a) Earlier Analysis Used. Identify and state where they are available for review.

(b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

(c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

NOTE: <u>PREVIOUS ENVIRONMENTAL DOCUMENTATION</u>
An Environmental Impact Report (EIR) has been prepared and certified for the Sierra Star (Lodestar) at Mammoth Master Plan (February 1991). The EIR was prepared by EIP Associates (SCH# 90020042). The mitigation measures and Mitigation Monitoring and Reporting Program contained in the final EIR are applicable and are hereby incorporated into this Initial Study (see Exhibit "A" [Table 3-1 from final EIR]: Summary of Environmental Impacts and Mitigation Measures). The above mentioned environmental document is available for review at the Town of Mammoth Lakes offices, 437 Old Mammoth Road, Suite R; Mammoth Lakes, California, between 8 am and noon and 1 pm to 5 pm, weekdays.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached and other sources used or individuals contacted, should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The analysis of each issue should identify: (a) the significance criteria or threshold used to evaluate each question; and (b) the mitigation measure identified, if any, to reduce the impact to less than significance.

Issues and Supporting Information	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
1. **AESTHETICS.** Would the project:				
a) Have a substantial adverse effect on a scenic vista?	■			
The project proposes construction of a high-end hotel with a height of up to 200 feet within Area 5A, located at the northwest corner of Minaret Road and Meridian Boulevard. Although the location is at a relatively low elevation, a 200-foot structure would rise approximately 50 to 75 feet above the tree canopy. In addition, the proposed height is approximately twice the Town's established maximum height limit. The Town's scenic wilderness is an important identity and Town policy generally prohibits structure height above the tallest trees within the project area. On the other hand, Area 5A is a central point in Town, and a readily visible increase in height offers a unique opportunity to develop an "iconic" structure. These issues would be evaluated in the Sierra Star EIR.				
b) Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?		■		
The loss of forestation is identified in the 1991 Lodestar EIR as a significant, unavoidable visual impact (Impact 4.10-1). As such, a Statement of Overriding Consideration has been adopted by the Town for the development at the Sierra Star location. With regard to the potential loss of trees, mitigation measures established by the 1991 Lodestar EIR require the retention of the forested areas to the maximum extent feasible, contour grading to blend manufactured slopes into the natural terrain to the extent that surface slope requirements can be maintained, the avoidance of any significant visual resource, and the landscaping of manufactured slopes with native and zone tolerant plant material. Prior to final approval of project development plans, a tree preservation and replacement plan shall be prepared by a professional forester or arborist and submitted to the Town for review and approval. Trees shall be replaced on a value-to-value basis with as many trees retained on-site as possible. To the maximum extent possible, native trees shall be concentrated around all structures, streets, and parking areas within the project site. These mitigation measures would be assured by the Community Development Director and Town Engineer prior to Grading or Building Permit issuance. These issues would be evaluated in the Sierra Star EIR.				
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	■			
See Item 1a).				
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?		■		
A 200-foot structure would be required for air safety to be visible at night, and light from hotel rooms would be readily visible from higher floors. The potential for glare also exists. The Sierra Star EIR would address these issues.				
2. **AGRICULTURE RESOURCES**: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation				

and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project?

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

The project is not proposed on agricultural land nor is the land recognized as having the soil characteristics of important, prime or significant agricultural land. This issue would not be discussed in the Sierra Star EIR.

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

See item 2a).

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

See item 2a).

3. **AIR QUALITY:** Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:

a) Conflict with or obstruct implementation of the applicable air quality plan?		■		

As mitigated, the project would not conflict with the implementation of the applicable air quality plan.

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

Increased particulate matter (PM_{10}) from wood burning appliances and fugitive dust generated from grading and construction activities is considered potentially significant. The project must conform to the requirements of the Air Quality Management Plan and the Particulate Emissions Regulations of the Town Municipal Code. All residential units shall be limited to one EPA Phase II certified wood burning appliance, one EPA Phase II certified pellet stove, and any number of gas or electric heating appliances. All construction contracts shall require watering to minimize airborne dust during grading and construction to the satisfaction of the Town Engineer. These mitigation measures shall be assured by the Community Development Director and Town Engineer prior to Grading or Building Permit issuance.

As identified in the project description above, the May 2005 Sierra Star Master Plan proposes 282 additional units, which would lead to an increase in vehicle kilometers traveled (VKT), the measure that was utilized by the 1991 Lodestar EIR to model air quality impacts. In addition, the "people mover" has been called out as mitigation for impacts identified in the traffic analysis (see Section 15 Transportation/Traffic). Therefore, a new or amended air quality study is required to analyze the

operational air quality impacts of the project. These issues would be discussed in the Sierra Star EIR.				
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?		■		
As mitigated, the project is not expected to result in cumulative air quality impacts.				
d) Expose sensitive receptors to substantial pollutant concentrations?			■	
See Items 2(a)-2(c).				
e) Create objectionable odors affecting a substantial number of people?			■	
Minor odors could be generated from construction (fuel or dust) or operation (restaurants, etc.), but these are not generally considered objectionable.				
4. **BIOLOGICAL RESOURCES**. Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U. S. Fish and Wildlife Service?		■		
The project could pose adverse impacts to on-site wildlife and vegetation resources. Impact 4.3-1 and 4.3-2 of the 1991 Lodestar EIR identify these impacts as significant and unavoidable. As such, a Statement of Overriding Consideration has been adopted by the Town for the development at the Sierra Star location. To address the potential loss of wildlife habitat, the project shall preserve, to the maximum extent feasible, existing native vegetation. All landscaping shall utilize native plants species indigenous to the Mammoth Lakes region and all disturbed areas adjacent to development sites shall be re-vegetated with native plant species.				
b) Have a substantially adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U. S. Wildlife Service?		■		
Siltation or other pollution into adjacent drainage channels during construction can impact aquatic organisms and stream bank vegetation downstream of the project site. Limitation on the grading of the site to dry spring and summer months, siltation fencing and other Best Management Practices (BMPs) to control erosion during site grading, and the installation of permanent storm water collection and retention facilities will reduce adverse siltation and erosion impacts to a level below significance. Retention basins are required to control runoff from home sites, roadways, and the golf course facilities				

to control downstream impacts of fertilizers and other pollutants. To the maximum extent possible, the project shall preserve existing native vegetation. All landscaping shall utilize native plants species indigenous to the Mammoth Lakes region. Proper disposal methods for all coniferous slash shall be used to prevent the spread of bark beetles. These mitigation measures shall be assured by the Community Development Director and Town Engineer prior to Grading or Building Permit issuance to reduce adverse impacts to biological resources to a level below significance. This issue would not be discussed in the Sierra Star EIR. See Section 8 Hydrology and Water Quality below for additional information.				
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?		■		
A wetland delineation report for the Sierra Star property was prepared in August 2004 by Resource Concepts, Inc. (RCI). The delineation identified two adjacent but unconnected features as potential jurisdictional Waters of the U.S. (WOUS). The first was identified as a remnant drainage feature created prior to the golf course. The feature formerly flowed north to south across the property, but was likely disturbed during construction of the golf course. It currently flows from the golf course north and drains in to a culvert. The feature exhibited wetland vegetation and soil, but because the feature lacked the ordinary high water mark that is characteristic of wetland hydrology, RCI issued the opinion that it was not a jurisdictional WOUS. The second feature, located immediately south of the golf course, was assessed as a potential wetland. The feature was likely formed because the road impeded natural surface drainage from the golf course, causing the growth of wetland vegetation. Wetland soils and hydrology were not present, suggesting that the feature is new and manmade. RCI indicated, however, that the U.S Army Corp of Engineers (USACE) must make the final determination. Disturbance to any natural drainage feature may require permitting from the California Department of Fish and Game (CDFG). Mitigation measure 4.3-8(b) provides mitigation by requiring CDFG review of riparian creation plans, but stops short of jurisdictional determination. This would be discussed in the Sierra Star EIR.				
d) Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established native resident migratory wildlife corridors, or impede the use of native wildlife nursery sites?			■	
The project does not propose changes in the physical layout of land use, rather minor changes of the types of land uses allowed. Therefore, the impact to wildlife corridors would not change from existing conditions.				
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?		■		
The Lodestar EIR requires a tree removal and replacement plan consistent with the Town's tree retention policy. A Timber Harvest Permit, or an exemption, shall be obtained from the California Department of Forestry prior to the issuance of a Grading Permit.				
f) Conflict with the provisions of an adopted Habitat				■

Conservation Plan, Natural Conservation Community Plan, other approved local, regional, or state habitat conservation plan?				

The project would not affect applicable conservation plans.

5. **CULTURAL RESOURCES.** Would the project:

a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?				■

Cultural resources within the project area could be directly affected by construction activities and indirectly by the increased numbers and presence of people in the area. The 1991 Lodestar EIR mitigation measures 4.91(a-c) require monitoring of initial grading activities, cessation of work if resources are found, and evaluation of the discovered resources.

A records search conducted by Trans-Sierran Archaeological Research in summer 2002 identified five previously recorded sites within the project site. Four of the sites are prehistoric sites and the fifth is historic in nature. At least three of the sites may have been disturbed thus far by the buildout of Lodestar. Per conditions of approval for the recently approved Timber Harvest Plan 1.1-acre site, the fifth site will be monitored during construction activities. A sixth site is within Area 5 of the Sierra Star Master Plan.

On June 30, 2004, Trans-Sierran Archaeological Research conducted a site assessment of the fifth site. The site consists of a historic period trash deposit containing various bottles and cans. The assessment utilized CEQA Appendix K, specifically, its 100-year rule for historic significance. Trans-Sierran also concluded that the site was not associated with major events or persons in California history, nor was it unique. Although these conclusions may be valid, CEQA Appendix K no longer exists as guidance on cultural resources (Appendix K of the 2005 CEQA Guidelines is "Criteria for Shortened Clearinghouse Review"). Furthermore, the 100-year rule for historic evaluation is now 50 years for federal regulations and 45 years for California regulations. In addition, the four previously recorded prehistoric sites were originally analyzed using the criteria found in the California Archaeological Resource Identification and Data Acquisition Program (CARIDAP): Sparse Lithic Scatters, published by the Office of Historic Preservation in 1988. Trans-Sierran used the CARIDAP program criteria to determine if the previous evaluations were adequate. Trans-Sierran determined that the previous evaluations were not adequate due to a perceived lack of subsurface evaluation by the previous researchers. However, the second criteria for classification as a Sparse Lithic Scatter is that the sites "lack a substantial subsurface deposit". Therefore, Trans-Sierran's recommendation for further testing to determine if the sites meet CARIDAP criteria is confusing at best.

All four of the prehistoric sites (CA-MNO-2485, CA-MNO-2486, CA-MNO-2487, and CA-MNO-529) should be re-evaluated using appropriate CEQA Guidelines in the EIR. Potential impact to and mitigation for the fifth site, Site CA-MNO-2482, in Exhibit C, should be addressed in the EIR.

b) Cause a substantial adverse change in the significance of an archaeological resources pursuant to Section 15064.5?				■

See Item 5(a).

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

Paleontological resources were not addressed in the 1991 Lodestar Master Plan and should be discussed in the EIR.				
d) Disturb any human remains, including those interred outside of formal cemeteries?			■	
Accidental discovery of previously unknown human remains should be addressed in the EIR.				
6. **GEOLOGY AND SOILS**. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:				
(i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				■
(ii) Strong seismic ground shaking?			■	
(iii) Seismic-related ground failure, including liquefaction?				■
The property is not located within an Earthquake Hazard Zone as identified on the official maps prepared by the State Geologist. The Town has adopted an emergency response plan to respond to any potential seismic or volcanic hazard. Mitigation can be accomplished by safe building design engineered by a California Registered Structural Engineer, using the ground motion parameters that have been calculated for this particular site.				
(b) Result in substantial soil erosion or the loss of topsoil?			■	
Geotechnical and Soils Studies shall be prepared for the site work prior to Grading or Building Permit issuance. These mitigation measures shall be assured by the Community Development Director and Town Engineer prior to Grading or Building Permit issuance. See Section 8 Hydrology and Water Quality for additional information.				
(c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?				■
See Items 6(a) and 6(b).				
(d) Be located on expansive soil, as defined in Table 18-a-B of the Uniform Building Code (1994), creating substantial risks to life or property?				■
See Item 6(b).				
(e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				■

The project does not include septic systems.				
7. **HAZARDS AND HAZARDOUS MATERIALS.** Would the project?				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?				■
The project does not propose the transport, use, or disposal of significant hazardous materials.				
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?				■
See item 7(a) above.				
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an exiting or proposed school?				■
The project is not located within one-quarter mile of a school.				
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and as a result would it create a significant hazard to the public or the environment?		■		
The 1991 EIR did not include research on the presence of hazardous materials sites. Since the site has historically been heavily forested, the presence of hazardous materials is unlikely. However, previous staging areas and equipment storage areas, as well as unrecorded dump sites, present a potential hazard. A hazardous materials records search is recommended. This should be addressed in the EIR.				
e) For a project located within an airport land use plan or where such a plan has not been adopted within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?				■
The project is not located within two miles of a public airport.				
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				■
The project is not located in the vicinity of a private airstrip.				
g) Impair implementation of, or physically interfere with an adopted emergency response plan or emergency				■

evacuation plan?				
The project will not affect emergency response or evacuation.				
h) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				■
The project is located near the center of the Town's incorporated area. Although the project area is wooded, the project proposed no more risk of wildland fire than would the original Lodestar Master Plan.				
8. **HYDROLOGY AND WATER QUALITY**. Would the project:				
a) Violate any water quality standards or waste discharge requirements?		■		
As noted in Item 8(c) below, the project would be subject to the regulations of the Lahontan Regional Water Quality Control Board (RWQCB). While adherence to the regulations would mitigate the potential for violations, water quality laws have changed significantly since the 1991 Lodestar EIR was certified. Most significant is the National Pollutant Discharge Elimination System (NPDES), which requires Phase I and Phase II permitting for municipalities, as well as permitting for construction activities involving disturbance to one acre or more. This would be discussed in the Sierra Star EIR.				
b) Substantially degrade groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?			■	
See Item 8(c).				
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?		■		
Development of the site will result in a modification of the existing drainage paths and a higher surface runoff than currently leaves the project site. Siltation or other pollution into adjacent drainage channels during construction can impact aquatic organisms and water quality downstream of the project site. Limiting site grading to dry spring and summer months, siltation fencing, and other Best Management Practices (BMPs) to control erosion and siltation during grading, and the construction of permanent storm control facilities and desiltation basins will reduce erosion, siltation, and water quality impacts. Adherence to the requirements of a project specific hydrology analysis will reduce water quality impacts to a level below significance. The Town or the Lahontan RWQCB shall review and approve a Storm Water Pollution Prevention Plan (SWPPP) that shall be adhered to during construction activities. An NPDES Permit shall be obtained from the Lahontan RWQCB since the project area exceeds one acre in size. Plan shall incorporate BMPs such as siltation fencing and surface runoff controls. These				

mitigation measures shall be assured by the Community Development Director and Town Engineer prior to Grading or Building Permit issuance.				
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or surface runoff in a manner which would result in flooding on- or off-site?			■	
See Item 8(c) above.				
e) Create or contribute runoff which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?		■		
Storm drainage infrastructure plans have not been submitted to the Town.				
f) Otherwise substantially degrade water quality?			■	
As mitigated by the Lodestar EIR Table 3-1, the project would not degrade water quality.				
g) Place housing within a 100-year floodplain, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				■
The project is not located within a 100-year flood plain.				
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?				■
See Item 8g) above.				
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				■
The project is not located in the proximity of a levee or dam.				
j) Inundation by seiche, tsunami, or mudflow?				■
The project is located on relatively level ground and away from bodies of water capable of producing seiche or tsunami.				
9. **LAND USE AND PLANNING**. Would the project:				
a) Physically divide an established community?				■
The project would not divide an established community.				

b) Conflict with an applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	■			
The proposed 200-foot maximum height is not consistent with the General Plan, Zoning Ordinance, 1991 Lodestar Master Plan, or Development Agreement. This would be analyzed in the Sierra Star EIR.				
c) Conflict with any applicable habitat conservation plan or natural communities conservation plan?				■
As noted in Section 4 Biological Resources, the project will not conflict with applicable conservation plans.				
10. **MINERAL RESOURCES.** Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				■
The project will not affect mineral resources.				
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				■
See Item 10(a) above.				
11. **NOISE.** Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?				■
The project would not produce noise levels in excess of what was projected by the 1991 Lodestar Master Plan EIR.				
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?			■	
See Item 11(d).				
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?				■
See Item 11(a).				
d) A substantially temporary or periodic increase in		■		

ambient noise levels in the project vicinity above levels existing without the project?				

Construction related noise levels would increase ambient noise levels in areas surrounding the project site. Any impact would be mitigated by mitigation measures 4.8-1a and 4.8-1b. Noise levels exceeding 60 dB currently exist at street intersections within the vicinity of the project and the construction of the Sierra Star Master Plan will increase traffic levels. Construction hours are limited to between 7am and 8pm Monday through Saturday and from 9am to 5pm on Sundays and Town-recognized holidays with prior approval by the Town Manager or designee in order to minimize noise impacts. The project site is not located adjacent to any existing residential development that could be adversely impacted by project-generated noise or noise from project-generated traffic. Mitigation measures 4.8-2(a-c) address operational impact. These mitigation measures shall be assured by the Community Development Director and Town Engineer prior to Grading or Building Permit issuance.

Because the May 2005 Sierra Star Master Plan proposes an increase in density, operational noise, most of which would be associated with traffic, is likely to increase over what was concluded in the noise analysis for the 1991 Lodestar EIR.

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

The project is not located within two miles of a public airport.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				■
The project is not located in the vicinity of a private airstrip.				
12. **POPULATION AND HOUSING.** Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?		■		

The project would require development of 100 percent of employee housing needs. The 1991 Lodestar development would require 231 units for low- and moderate-income housing, whereas a total of 219 such units would be provided by the total buildout from both the Lodestar and Sierra Star developments. It does not appear that adequate employee housing would be provided by the project. This issue would be discussed in the Sierra Star EIR.

While the overall density of the Sierra Star/Lodestar proposals is less than the maximum allowed under the Resort designation in the Zoning Code and General Plan, the density of this project has increased since its original entitlement. Table 1shows the original total number of units, 790 dwelling units and a 500-room hotel, entitled by the 1991 Lodestar Master Plan. In 1992, Ordinance 92-16 amended the

Lodestar Master Plan to allow for a total of 1, 001 dwelling units or, using the one-unit-equals ½ hotel room conversion, 751 dwelling units and a 500-room hotel. Sierra Star Master Plan proposes 832 units or, using the conversion, 582 dwelling units and a 500-room hotel. Adding to the 582 Sierra Star dwelling units the 451 dwelling units already developed or approved under Lodestar provides a total of 1,033 proposed dwelling units and a 500-unit hotel under the current proposal. Of the additional dwelling units, 16 dwelling units would be developed in Area 4F, which was not included in the Lodestar Master Plan.

The total number of dwelling units could increase even further because transient occupancy units are proposed, with a Use Permit, on single-family properties. This could increase the total density by an indeterminate amount, but by at least 100 total dwelling units.

This discrepancy in total density would be addressed in the EIR.

b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				■

The project will not displace housing.

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				■

The project will not displace people.

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

a) Fire protection?			■	

Since the physical layout and density of development of the project are is not expected to change significantly from the Lodestar Master Plan, fire protection services are not anticipated to be significantly affected.

b) Police protection?			■	

Since the physical layout and density of development of the project are is not expected to change significantly, police protection services are not anticipated to be significantly affected.

c) Schools?	■			

The 1991 Lodestar EIR Impact 4.11-2 is identified as significant and unavoidable. As such, a Statement of Overriding Consideration has been adopted by the Town for the development at the Sierra Star location. Mitigation required payment of school impact fees and annual review by the Mammoth Unified School District. However, because additional school capacity would be required to support implementation of the May 2005 Sierra Star Master Plan, the impact on schools should be addressed by the Sierra Star EIR.

d) Parks?		■		

The applicant is required by a Development Agreement with the Town to contribute to new park and recreation facilities proportionate to the population numbers accommodated by the Intrawest resort development. Therefore, no additional mitigation measures are required. All other Development Impact Fees (DIFs) shall be paid in accordance with the adopted ordinances of the Town. These mitigation measures shall be assured by the Community Development Director and Town Engineer prior to Grading or Building Permit issuance. These issues would be discussed in the Sierra Star EIR.

e) Other public facilities?		■		

Impacts to public services will result from the build-out of the Sierra Star Master Plan area. Town services (including snow removal), school, police and fire services will be impacted by project build-out. On-site snow storage areas shall equal at least 70 percent of the impervious surfaces used for access and parking. The project proponents or future landowners shall pay school impact fees prior to the issuance of Building Permits for future residences. All other DIFs shall be paid in accordance with the adopted ordinances of the Town. These mitigation measures shall be assured by the Community Development Director and Town Engineer prior to Grading or Building Permit issuance. These issues would be discussed in the Sierra Star EIR.

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

See Items 13(d) and 13(e).

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

See Items 13(d) and 13(e).

15. **TRANSPORTATION/TRAFFIC.** Would the project:				
a) Cause an increase in the traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?		■		

A traffic analysis for the Sierra Star Master Plan was prepared by Leslie E. Card P. E., LSA Associates, in January 2005 and revised in June 2005. The traffic analysis utilized the busiest possible time period for its analysis: a winter Saturday. When considering the number of units to analyze under the May

2005 Sierra Star Master Plan, Mr. Card's revised analysis considered the approved and developed dwelling units that fall under the Lodestar Master Plan. The revised traffic analysis ultimately addressed traffic impacts of 204 low-density and 734 medium-density units, a 100-room hotel and 59,000 square feet of commercial/conference space, rather than the 832 units proposed by the May 2005 Sierra Star Master Plan. While total units under Lodestar and Sierra Star do not match, discussions with Mr. Card indicate that considerable care was taken in the analysis to account for all development within the project area. The difference in units may therefore be partially because of subsequent project approval under Lodestar.

Under this scenario, buildout of the Sierra Star Master Plan would generate 9,650 average daily trips on a typical winter Saturday. During the morning peak, the project would generate 439 trips, and 372 trips would be generated during the evening peak. The traffic study compared cumulative baseline levels of service (LOS) to cumulative plus project LOS. Cumulative plus project LOS would exceed the Town's acceptable level (LOS D) at two intersections. The Main Street-Lake Mary Road/Minaret Road intersection would operate at LOS D under the cumulative plus project scenario. The intersection of Mountain Street/Main Street is forecast to operate at LOS F under both scenarios. The Mountain Boulevard/Main Street and Minaret Road/Sierra Star Parkway would operate at LOS F with the proposed project. As a result, traffic signal analyses were prepared which indicated that the intersections did not meet the minimum threshold to warrant signalization. Therefore, the impacts are not considered significant by the revised traffic analysis. The project would be subject to the 1991 Lodestar EIR mitigation measure 4.6-1, which requires developers' to contribute to a transit system (in lieu fees), as well as a fair share participation to roadway improvements. Mitigation measure 4.6-3 is provided to address impacts at intersections. Traffic volumes at some intersections indicate that signalization will be required to maintain acceptable levels of service as determined by the Town Engineer at the build-out of the Sierra Star Master Plan. Construction of the private access roadway (Sierra Star Parkway) through the subdivision may be adequate to accommodate project-generated traffic.

However, the revised traffic analysis does not appear to have considered the transient occupancy units that could be developed, with Use Permit, on single-family properties. Therefore, an additional 204 transient occupancy units could be built under the scenario presented. The revised traffic analysis also considered the mitigating impact of a "people mover", as originally planned in the Lodestar Master Plan. The revised analysis estimated that a gondola or similar feature would reduce trips from Area 5 by up to 30 percent. The people mover feature was not considered as part of the 2005 Sierra Star Master Plan. These issues would be discussed in the Sierra Star EIR.

b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?		■		

See Item 15(a).

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?			■	

A 200-foot structure may affect air traffic. However, proper lighting would provide mitigation.

d) Substantially increase hazards to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?			■	

Street layout will be subject to approval by the Town Engineering Department. However, the current circulation plan for the project does not show emergency access to Minaret Road as an internal roadway. Furthermore, a connection to Dorrance Drive is shown, but it has not been demonstrated that the area connector streets could support additional capacity. This would be discussed in the Sierra Star EIR.				
e) Result in inadequate emergency access?			■	
As noted above, the project will not adversely affect emergency access.				
f) Result in inadequate parking capacity?			■	
A parking plan has not been submitted. The project will be required to provide adequate parking as part of the approval process of individual developments.				
g) Conflict with adopted policies or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?		■		
The project proposes connection with the Town's pedestrian and bicycle path networks. Exhibit D of the May 2005 Sierra Star Master Plan shows the proposed circulation network and appears to be in conformance with Mammoth Lakes Trail System Plan (L.K. Johnston and Associates, 1991) and the General Bikeway Plan Map (as Amended June 5, 1997). However, Exhibit D shows direct access to State Highway 203 (Main Street), which is under the jurisdiction of the California Department of Transportation (Caltrans). Early consultation with Caltrans is recommended and would be discussed in the Sierra Star EIR.				
16. **UTILITIES AND SERVICE SYSTEMS.** Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?			■	
The applicant will be required to demonstrate adequate treatment capacity prior to project approval. This will be discussed in the Sierra Star EIR.				
b) Require or result in construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?		■		
Plans for infrastructure improvements have not been provided by the applicant; therefore it is not possible to address adequacy. The applicant would also be required to provide verification of adequate supply with the utilities providers. This will be discussed in the Sierra Star EIR.				
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?		■		
See Item 16(b). In addition, an increase in the amount of impervious surface and storm water runoff will result from the construction of the project and buildout of the Sierra Star Master Plan area.				

Drainage collectors, the utilization of BMPs, and construction of retention and filtration (desiltation basins) facilities shall be constructed and maintained to prevent the transport of the runoff from a 20-year storm event. The Town or the Lahontan RWQCB shall review and approve a Storm Water Pollution Prevention Plan (SWPPP) that shall be adhered to during construction activities. A National Pollutant Discharge Elimination System (NPDES) Permit shall be obtained from the Lahontan RWQCB since the project area exceeds one acre in size. Plans shall incorporate BMPs such as siltation fencing and surface runoff control.

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

The applicant will be required to demonstrate adequate capacity prior to project approval.

e) Result in a determination by the wastewater treatment provider which services or may serve the project determined that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?		■		

The Mammoth Community Water District (MCWD) has adequate capacity to provide potable water and wastewater services to the community at buildout. Any on-site water and wastewater facility improvements required to service the project area shall be provided by the subdivider to the specifications of the MCWD. No additional mitigation measures are required.

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

The project is not anticipated to produce solid wastes in any amounts that cannot be disposed of by current disposal methods.

g) Comply with federal, state, and local statutes and regulations related to solid waste?				■

See Item 15(f).

17. **MANDATORY FINDINGS OF SIGNIFICANCE.**

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

The project could pose adverse impacts to on-site wildlife and vegetation resources including loss of forestation. Impact 4.3-1 and 4.3-2 of the 1991 Lodestar EIR identify these impacts as significant and unavoidable. As such, a Statement of Overriding Consideration has been adopted by the Town for the development at the Sierra Star location. To address the potential loss of wildlife habitat, the project shall preserve, to the maximum extent feasible, existing native vegetation. All landscaping shall utilize native plants species indigenous to the Mammoth Lakes region and all disturbed areas adjacent to development sites shall be re-vegetated with native plant species.

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

The project would contribute cumulatively to the loss of biological resources. This was addressed in the 1991 Lodestar EIR, and a Statement of Overriding Consideration has been adopted by the Town for the development at the Sierra Star location.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?				■

As identified in the analysis above, the project has the potential to significantly affect aesthetics, air quality, biology, cultural resources, hydrology, land use, noise, population, public services, traffic and utilities. These issues will be discussed in the EIR.

May 2005 Sierra Star Master Plan
Bibliography

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APPENDIX B

RESPONSES TO THE NOP AND EIR SCOPING MEETING

COMMENTS RECEIVED IN RESPONSE TO NOTICE OF PREPARATION
AND AT EIR SCOPING MEETING HELD ON JANUARY 24, 2006.

SUMMARY OF COMMENTS	Project Description	Aesthetics	Air Quality	Biological Resources	Cultural Resources	Geology / Soils	Hazards / Hazardous Materials	Hydrology / Water Quality	Land Use Planning	Noise	Population / Housing	Public Services	Transportation / Traffic	Utilities / Service Systems	Construction Impacts	Alternatives	Other	NOTES
LETTERS RECEIVED IN RESPONSE TO THE NOTICE OF PREPARATION DATED SEPTEMBER 21, 2005																		
Regional Agencies																		
Scott Morgan Project Analyst State Clearinghouse 1400 Tenth Street Sacramento, CA 95812-3044 September 21, 2005																	•	Confirmation of NOP posting
Dennis Castrillo OES Environmental Officer Governor’s Office of Emergency Services Response & Recovery Branch 3650 Schriever Avenue Mather, CA 95655 October 17, 2005												•						California Department of Forestry & Fire Protection have identified the project location a having a very high wild land fire risk. Requests EIR discuss issue of fire safety and the alternatives and mitigation measures that would mitigate any adverse impacts and should examine the capability of the local fire department and determine if they are properly equipped to handle the increased service demands.
Douglas E. Feay, R.G. Engineering Geologist California Regional Water Quality Control Board; Lahontan Region 14440 Civic Drive, Suite 200 Victorville, CA 92392-2306 October 20, 2005								•	•								•	Requests the proposed project address the potential impacts to the land regarding maintaining high water quality. States that the relationship between land use and water quality has become increasingly critical given growth and urbanization in the Mammoth area. Requests the EIR contain specific to typical Best Management practices that will implement the principals of Low Impact Development; also notices that at NPDES construction stormwater permit may be required
Gayle J. Rosander IGR/CEQA Coordinator Department of Transportation District 9 500 South Main Street Bishop, CA 93514 October 20, 2005	•												•				•	Requests review of traffic analysis, reduced right-of-way width; the trails map is not legible; ensure connectivity of trails; encroachment permit may be required; ensure parking for private & commercial vehicles is adequate; ensure snow removal & storage provision are addressed; DOT would support Fair Share development financing; and discuss possible relinquishment of SR 203 to the Town.

COMMENTS RECEIVED IN RESPONSE TO NOTICE OF PREPARATION
AND AT EIR SCOPING MEETING HELD ON JANUARY 24, 2006.

SUMMARY OF COMMENTS	Project Description	Aesthetics	Air Quality	Biological Resources	Cultural Resources	Geology / Soils	Hazards / Hazardous Materials	Hydrology / Water Quality	Land Use Planning	Noise	Population / Housing	Public Services	Transportation / Traffic	Utilities / Service Systems	Construction Impacts	Alternatives	Other	NOTES
Carol Gaubatz Program Analyst Native American Heritage Commission 915 Capitol Mll, Room 364 Sacramento, CA 95814 October 3, 2005					•												•	Commission performed a record search of its Sacred Lands File which failed to indicate the presence of Native American cultural resource in the immediate project area, however this does not indicate the absence of cultural resources in any project area and suggests that other cultural resources should also be contacted for information. They suggest early consultation with area tribes. Also, lack of surface evidence of archeological resource does not preclude the existence of archeological resources and requests that provisions be included for accidentally discovered archeological resources during construction.
Local Agencies																		
Gary Sisson, General Manager Ericka Spies, Environmental Specialist Mammoth Community Water District PO Box 597 Mammoth Lakes, CA 93546 October 6, 2006											•	•		•			•	Clarify the density; they note the proposed project has not been included in water demand projections that were provided to the Town of Mammoth for the Draft General Plan EIR this was due to the fact that the they are requesting additional units beyond the Lodestar Master Plan; The District has concluded there are currently inadequate water supplies in multiple dry yeas to meet the demands at build-out as proposed in the Draft 2005 General Plan EIR; Requests the EIR evaluate the impact of the proposed project on wastewater flows in the District's collection system and water distribution system's ability to meet increased water flow and pressure requirements created by the proposed increase in hotel height.
Private Individuals and Organizations																		
Scott Schoenfeld, P.E. Director of Land Development Intrawest Placemaking 6900 South McCarran Blvd, Ste 3000 Reno, NV 89509 October 17, 2005	•	•	•								•		•				•	Express concern over density description (see Table 1 and Table 2), believe there is a confusing issue between zoning and density, and air quality, population and traffic impacts are not accurate due to density misinterpretation; clarify people mover; clarify location of building 5A regarding aesthetics;

COMMENTS RECEIVED IN RESPONSE TO NOTICE OF PREPARATION
AND AT EIR SCOPING MEETING HELD ON JANUARY 24, 2006.

SUMMARY OF COMMENTS	Project Description	Aesthetics	Air Quality	Biological Resources	Cultural Resources	Geology / Soils	Hazards / Hazardous Materials	Hydrology / Water Quality	Land Use Planning	Noise	Population / Housing	Public Services	Transportation / Traffic	Utilities / Service Systems	Construction Impacts	Alternatives	Other	NOTES
Tom Hodges Director of Planning Planning Department Mammoth Mountain Ski Area (MMSA) 1 Minaret Road Mammoth Lakes, CA 93546 September 26, 2005											•	•	•				•	Clarify MMSA is general managing partner of the Mammoth Golf Management, the entity that holds title to and operates Sierra Star Golf Course and that Intrawest holds the remaining minority interest. Requests that the listed modifications to the master plan previously requested by Intrawest be included in their current application to the Town. Issues expresses pertain to the following; Density, Building Heights & Setbacks, Affordable Housing, Sierra Star Golf Course, Internal Roadway, and Multi-Use Trail.
Ron and Patrice Fausset 1827 Summer Cloud Drive Thousand Oaks, CA 91362 September 12, 2005		•							•		•		•				•	Concerned homeowners regarding their second home at Mammoth Green, #114. There concerns are regarding affordable housing that is surrounded by million dollar homes and 5 star condominium complexes; traffic impacts to this area; adequate parking; trespassers; blocked views; and decrease in property value.
Bruce Vincent February 22, 2006		•							•		•						•	Concerned about two hundred foot building; Questions the precedent is there for that type of building with the SFR homes all over the area, Wonders if there is not enough housing with all the new "condo-hotels" now existing and currently in construction;
COMMENTS FROM JANUARY 24, 2006 EIR SCOPING MEETING																		
Private Individuals and Organizations																		
Speakers																		
Nancy Peterson Walter					•													TransSierran makes it clear there needs to be monitoring but some archeological resources need to be investigated further yet it is given little significance…you don't know what is below the ground until you get there and I think it would behoove you once the snow melts to have an archeologist can get in there to do some of this testing. You may find you have to relocate some of your buildings.

COMMENTS RECEIVED IN RESPONSE TO NOTICE OF PREPARATION AND AT EIR SCOPING MEETING HELD ON JANUARY 24, 2006.

SUMMARY OF COMMENTS	Project Description	Aesthetics	Air Quality	Biological Resources	Cultural Resources	Geology / Soils	Hazards / Hazardous Materials	Hydrology / Water Quality	Land Use Planning	Noise	Population / Housing	Public Services	Transportation / Traffic	Utilities / Service Systems	Construction Impacts	Alternatives	Other	NOTES
Jo Bacon		•									•	•				•	•	Requests mapping of the tree heights; Visual sims should be done from various points around town; clarify density; analyze for a 160 ft and 140 ft level Noise: 11A – for the noise; analyze noise impacts with units for visitors and affordable housing; analyze fire in 200 ft building Clarify what proper lighting of the building might be and impacts of it.
John Walter		•	•	•			•					•	•	•			•	Requests that the EIR consider the view from 395 Lake Mary Road and Mammoth Lake Trail; Bus emissions impacting air quality; emergency & evacuation plans; project site is right in way of where lahar (i.e., mudslide) comes down; Recreation and parks analysis in GP EIR; access to public lands including Mammoth mountain; use current transportation data; Please use current (General Plan) EIR.
Julie Yost														•			•	Requested to know more about a proposed round-about.
Written Comments																		
John Walter Advocates for Mammoth PO Box 2383 Mammoth Lakes, CA 93546	•	•	•				•			•			•				•	Requests an up-to-date data from GPU RDPEIR in including remarks raised and observations in comment letters particularly for: air quality, noise, water availability, light & glare, circulation & traffic, and emergency planning. Also, regarding aesthetics, since building are 2 times higher than anything considered in the past, please include in the EIR a review of past community meetings & surveys regarding a village in the trees and a 3d computer model of the project from all possible views.
Nancy Peterson Walter, PhD PO Box 2383 Mammoth Lakes, CA 93546					•													Questions how we know what is below the ground; TransSierran points out that monitoring and the possibility of artifacts is high. Request excavation of site and further evaluation and monitoring; include a Paiute Indian during construction

COMMENTS RECEIVED IN RESPONSE TO NOTICE OF PREPARATION AND AT EIR SCOPING MEETING HELD ON JANUARY 24, 2006.

SUMMARY OF COMMENTS	Project Description	Aesthetics	Air Quality	Biological Resources	Cultural Resources	Geology / Soils	Hazards / Hazardous Materials	Hydrology / Water Quality	Land Use Planning	Noise	Population / Housing	Public Services	Transportation / Traffic	Utilities / Service Systems	Construction Impacts	Alternatives	Other	NOTES
Ken Klein February 04, 2006	•	•						•	•	•						•	•	Opposed to proposed project, in particular the proposed 200 foot building. Notes that thirteen (13) of seventeen (17) environmental factors would be effected by the project. Growth and development within the town over the past five years and the infrastructure (including police, fire, transportation, traffic, access [to the Post Office, Vons, and restaurants], open space and water) is already being strained. Requests abiding by City standards for building height, population density and set-back requirements.
Meeting Attendees																		
Leslie Hismire PO Box 89 Bishop, CA 93514																		Had no formal comment during Scoping Meeting.
Jo Bacon PO Box 100 PMB 134 Mammoth Lakes, CA 93546																		See comments above.
Lara Kirkner Mammoth Times																		Had no formal comment during Scoping Meeting.
Gordon Alper PO Box 2007 Mammoth Lakes, CA 93546																		Had no formal comment during Scoping Meeting.
Tom Hamilton Summit Condos Mammoth Lakes, CA																		Had no formal comment during Scoping Meeting.
Julie Yost PO Box 3699 Mammoth Lakes, CA 93546																		See comment above.

COMMENTS RECEIVED IN RESPONSE TO NOTICE OF PREPARATION AND AT EIR SCOPING MEETING HELD ON JANUARY 24, 2006.

SUMMARY OF COMMENTS	Project Description	Aesthetics	Air Quality	Biological Resources	Cultural Resources	Geology / Soils	Hazards / Hazardous Materials	Hydrology / Water Quality	Land Use Planning	Noise	Population / Housing	Public Services	Transportation / Traffic	Utilities / Service Systems	Construction Impacts	Alternatives	Other	NOTES
Shalle Genevieve PO Box 5005 Mammoth Lakes, CA 93546																		Had no formal comment during Scoping Meeting.
Nancy & John Walter 760-934-1767 Mammoth Lakes																		See comments above.
Susan Klein																		Had no formal comment during Scoping Meeting.
Ken Klein Concerned Citizen PO Box 1654 Mammoth Lakes, CA 93546																		See comments above.
Tom Hodges Mammoth Mountain Ski Area Planning Department PO Box 24 Mammoth Lakes, CA 93546																		Had no formal comment during Scoping Meeting.
John Walter Advocates for Mammoth PO Box 2383 Mammoth Lakes, CA 93546																		See comments above.

COMMENT LETTERS

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

Arnold
Schwarzenegger
Governor

Sean Walsh
Director

Notice of Preparation

RECEIVED
SEP 30 2005
TOWN OF MAMMOTH
COMMUNITY DEVELOPMENT DEPARTMENT

September 21, 2005

To: Reviewing Agencies

Re: Sierra Star Master Plan
SCH# 2005092103

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

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

Please direct your comments to:

Craig Olson
City of Mammoth Lakes
P.O. Box 1609
Mammoth Lakes, CA 93546

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

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

Sincerely,

Scott Morgan

Scott Morgan
Project Analyst, State Clearinghouse

Attachments
cc: Lead Agency

Document Details Report
State Clearinghouse Data Base

SCH#	**2005092103**
Project Title	Sierra Star Master Plan
Lead Agency	Mammoth Lakes, City of

Type **NOP** Notice of Preparation

Description New Master Plan to replace Lodestar Master Plan. New plan proposes 832 units, 29,000 square feet of retail and 30,000 of conference space. A total of 1,283 units would be built under the Lodestar and Sierra Star developments.

Lead Agency Contact

Name Craig Olson
Agency City of Mammoth Lakes
Phone (760) 934-8989 x269 ***Fax***
email
Address P.O. Box 1609
City Mammoth Lakes ***State*** CA ***Zip*** 93546

Project Location

County Mono
City Mammoth Lakes
Region
Cross Streets Main Street / Minaret Road
Parcel No.
Township ***Range*** ***Section*** ***Base***

Proximity to:

Highways SR 203
Airports
Railways
Waterways
Schools
Land Use Resort

Project Issues

Reviewing Agencies Resources Agency; Regional Water Quality Control Bd., Region 6 (So Lake Tahoe); Department of Parks and Recreation; Native American Heritage Commission; Department of Health Services; Office of Emergency Services; Department of Forestry and Fire Protection; Department of Fish and Game, Region 6 (Inyo & Mono Region); Department of Water Resources; Department of Conservation; California Highway Patrol; Caltrans, District 9; Caltrans, Division of Aeronautics; State Lands Commission

Date Received 09/21/2005 ***Start of Review*** 09/21/2005 ***End of Review*** 10/20/2005

NOP Distribution List

County: Mono **SCH#** [illegible]

Resources Agency

- [x] **Resources Agency**
  Nadell Gayou
- [ ] **Dept. of Boating & Waterways**
  David Johnson
- [ ] **California Coastal Commission**
  Elizabeth A. Fuchs
- [ ] **Colorado River Board**
  Gerald R. Zimmerman
- [x] **Dept. of Conservation**
  Roseanne Taylor
- [ ] **California Energy Commission**
  Roger Johnson
- [x] **Dept. of Forestry & Fire Protection**
  Allen Robertson
- [ ] **Office of Historic Preservation**
  Wayne Donaldson
- [x] **Dept of Parks & Recreation**
  Environmental Stewardship Section
- [ ] **Reclamation Board**
  DeeDee Jones
- [ ] **S.F. Bay Conservation & Dev't. Comm.**
  Steve McAdam
- [x] **Dept. of Water Resources**
  Resources Agency
  Nadell Gayou
- [ ] ____________ Conservancy

Fish and Game

- [ ] **Depart. of Fish & Game**
  Scott Flint
  Environmental Services Division
- [ ] **Fish & Game Region 1**
  Donald Koch
- [ ] **Fish & Game Region 2**
  Banky Curtis
- [ ] **Fish & Game Region 3**
  Robert Floerke
- [ ] **Fish & Game Region 4**
  Mike Mulligan
- [ ] **Fish & Game Region 5**
  Don Chadwick
  Habitat Conservation Program
- [ ] **Fish & Game Region 6**
  Gabrina Gatchel
  Habitat Conservation Program
- [x] **Fish & Game Region 6 I/M**
  Tammy Allen
  Inyo/Mono, Habitat Conservation Program
- [ ] **Dept. of Fish & Game M**
  George Isaac
  Marine Region

Other Departments

- [ ] **Food & Agriculture**
  Steve Shaffer
  Dept. of Food and Agriculture
- [ ] **Depart. of General Services**
  Public School Construction
- [ ] **Dept. of General Services**
  Robert Sleppy
  Environmental Services Section
- [x] **Dept. of Health Services**
  Veronica Rameriz
  Dept. of Health/Drinking Water

Independent Commissions,Boards

- [ ] **Delta Protection Commission**
  Debby Eddy
- [x] **Office of Emergency Services**
  Dennis Castrillo
- [ ] **Governor's Office of Planning & Research**
  State Clearinghouse
- [x] **Native American Heritage Comm.**
  Debbie Treadway
- [ ] **Public Utilities Commission**
  Ken Lewis
- [x] **State Lands Commission**
  Jean Sarino
- [ ] **Tahoe Regional Planning Agency (TRPA)**
  Cherry Jacques

Business, Trans & Housing

- [x] **Caltrans - Division of Aeronautics**
  Sandy Hesnard
- [ ] **Caltrans - Planning**
  Terri Pencovic
- [x] **California Highway Patrol**
  John Olejnik
  Office of Special Projects
- [ ] **Housing & Community Development**
  Lisa Nichols
  Housing Policy Division

Dept. of Transportation

- [ ] **Caltrans, District 1**
  Rex Jackman
- [ ] **Caltrans, District 2**
  Marcelino Gonzalez
- [ ] **Caltrans, District 3**
  Katherine Eastham
- [ ] **Caltrans, District 4**
  Tim Sable
- [ ] **Caltrans, District 5**
  David Murray
- [ ] **Caltrans, District 6**
  Marc Birnbaum
- [ ] **Caltrans, District 7**
  Cheryl J. Powell
- [ ] **Caltrans, District 8**
  Dan Kopulsky
- [x] **Caltrans, District 9**
  Gayle Rosander
- [ ] **Caltrans, District 10**
  Tom Dumas
- [ ] **Caltrans, District 11**
  Mario Orso
- [ ] **Caltrans, District 12**
  Bob Joseph

Cal EPA

Air Resources Board

- [ ] Airport Projects
  Jim Lerner
  - [ ] Transportation Projects
    Kurt Karperos
  - [ ] Industrial Projects
    Mike Tollstrup
- [ ] **California Integrated Waste Management Board**
  Sue O'Leary
- [ ] **State Water Resources Control Board**
  Jim Hockenberry
  Division of Financial Assistance
- [ ] **State Water Resources Control Board**
  Student Intern, 401 Water Quality Certification Unit
  Division of Water Quality
- [ ] **State Water Resouces Control Board**
  Steven Herrera
  Division of Water Rights
- [ ] **Dept. of Toxic Substances Control**
  CEQA Tracking Center
- [ ] **Department of Pesticide Regulation**

Regional Water Quality Control Board (RWQCB)

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

Last Updated on 08/10/05

STATE OF CALIFORNIA ARNOLD SCHWARZENEGGER, Governor

GOVERNOR'S OFFICE OF EMERGENCY SERVICES
Response and Recovery Branch
3650 Schriever Avenue
Mather, Cab 95655
PHONE: (916) 845-8101 FAX: (916) 845-8381

OES CALIFORNIA
Governor's Office of Emergency Services

October 17, 2005

RECEIVED
OCT 24 2005
TOWN OF MAMMOTH
COMMUNITY DEVELOPMENT DEPARTMENT

City of Mammoth Lakes
Mr. Craig Olson
P O Box 1609
Mammoth Lakes, CA 93546

Dear Mr. Olson:

RE: Sierra Star Master Plan, NOP
SCH# 2005092103

We have reviewed your Notice of Preparation for the above referenced project. The California Department of Forestry and Fire Protection have identified the project location as having a very high wild land fire risk.

When completing your environmental document, the issue of fire safety and the alternatives and mitigation measures that would mitigate any adverse impacts should be thoroughly discussed. The EIR should also examine the capability of the local fire department and determine if they are properly equipped to handle the increased service demands the proposed project will create.

Thank you for the opportunity to comment on your NOP. If you have any questions regarding our comments, please contact Wendy Boemecke, Staff Services Analyst at (916) 845-8275.

Sincerely,

Dennis Castrillo

Dennis Castrillo
OES Environmental Officer

California Regional Water Quality Control Board
Lahontan Region

Alan C. Lloyd Ph.D.
Agency Secretary

Victorville Office
14440 Civic Drive, Suite 200, Victorville, California 92392-2306
(760) 241-6583 • Fax (760) 241-7308
http://www.waterboards.ca.gov/lahontan

Arnold Schwarzenegger
Governor

October 20, 2005

FILE: 6B260110N02

RECEIVED
OCT 25 2005
TOWN OF MAMMOTH
COMMUNITY DEVELOPMENT DEPARTMENT

Craig Olsen, Senior Planner
Town of Mammoth Lakes
P.O. Box 1609
Mammoth Lakes, CA 93546

COMMENTS ON NOTICE OF COMPLETION OF ENVIRONMENTAL IMPACT REPORT FOR SIERRA STAR MASTER PLAN STATE CLEARINGHOUSE NO. 90020042, MONO COUNTY

California Regional Water Quality Control Board (Board) staff has reviewed the Environmental Impact Report (EIR) for the Sierra Star Master Plan and has the following comments.

Proposed Project

The Sierra Star Master Plan will replace the 1991 Lodestar Master Plan as the guiding document for Sierra Star development. The new master plan proposes to develop transient dwelling units, additional affordable units and commercial dwelling units. A total of 1,283 units will be developed under the master plan. A total of 29,000 square feet of retail space and 30,000 square feet of conference space are also proposed under the new master plan.

General Comments

Maintaining high water quality and ensuring the protection of beneficial uses depends largely on land use development decisions. Many of the water bodies within the Mammoth area are affected by watershed conditions, the protection of which is within the purview of local development. The relationship between land use and water quality has become increasingly critical given growth and urbanization in the Mammoth area.

The Sierra Star development should recognize and address the potential impacts of land use on water quality. The primary adverse impacts of poorly planned development on waters include:

1. The direct physical impacts to aquatic, wetland, and riparian habitat;
2. Generation of construction-related and urban pollutants; and
3. Alteration of flow regimens and groundwater recharge as a result of impervious surfaces, stream course modification, and storm drain collector systems.

These factors have historically resulted in a cycle of destabilized streams, poor quality water, and engineered solutions to disrupted flow patterns, culminating in loss of natural functions and societal values in the effected basins.

Reduction and management of these impacts from improperly designed and constructed prior development forms a large part of the workload of the Board, including nonpoint source, stormwater, and wetland protection programs. However, after-the-fact, regulatory control is at best a partial substitute for resource-sensitive planning, which avoids environmental degradation. Non-point pollutant sources such as urban runoff, which are best managed through appropriate land use practices, are a leading cause of overall water quality degradation. These sources are major contributors of pollution to streams, lakes, wetlands, and ground water basins.

A method of reducing impacts to watersheds from urban development is to implement the principles of "Low Impact Development" (LID), the goals of which are maintaining a landscape functionally equivalent to the predevelopment hydrologic conditions and minimal generation of nonpoint source pollutants. LID results in less surface runoff and less pollution routed to receiving waters. Principles of LID include:

1. Maintaining natural drainage paths and landscape features to slow and filter runoff and maximize ground water recharge.
2. Reducing the impervious cover created by development and the associated transportation network, and
3. Managing runoff as close to the source as possible.

Board staff requests that the EIR contain specific or typical Best Management Practices (BMPs) that will implement the principals of LID into all Sierra Star developments.

If any project disturbs more then one acre of soil the owner will need to apply for a National Pollution Discharge Elimination System (NPDES) construction stormwater permit. An NPDES stormwater permit can be obtained at the following address.

State Water Resources Control Board
Division of Water Quality
Stormwater Permit Unit
P.O. Box 1977
Sacramento, CA 95812
916-341-5536

NPDES permits have requirements that must be complied with during construction. Requirements such as Best Management Practices (BMPs) must be used at the site to control stormwater. The BMPs should also be applied to areas where machine clean out or maintenance takes place as well as storage of hazardous and non-hazardous materials. The <u>Stormwater Pollution Prevention Plan</u> (SWPPP) that will be used at the site must be submitted to Board staff for review as part of compliance with the permit. Board staff may inspect the construction site to monitor compliance under the NPDES permit.

If you have any questions, please telephone me at (760) 241-7353, or Cindi Mitton at (760) 241-7413.

Sincerely,

Douglas E. Feay, R.G.
Engineering Geologist

cc: State Clearinghouse
P.O. Box 3044
Sacramento, CA 95812-3044

DF\rc\U:\SierraStarMP2005NOP.doc

DEPARTMENT OF TRANSPORTATION
District 9
500 South Main Street
Bishop, California 93514
PHONE (760) 872-0785
FAX (760) 872-0754
TTY (760) 872-9043

RECEIVED
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TOWN OF MAMMOTH
COMMUNITY DEVELOPMENT DEPARTMENT

Flex your power!
Be energy efficient!

October 20, 2005

Mr. Craig R. Olson
Senior Planner
Town of Mammoth Lakes
P.O. Box 1609
Mammoth Lakes, California 93546

File: 09-MNO
NOP DEIR
SCH #: 2005092103

Dear Mr. Olson:

Sierra Star Master Plan - Notice of Preparation (NOP) for a Draft Environmental Report (DEIR) (September 2005)

Thank you for giving the California Department of Transportation (Caltrans) the opportunity to respond during the NOP phase for the Sierra Star Master Plan, which is a revision of the 1991 Lodestar Master Plan. We also appreciate that Tami Borton of your office provided us with the June 2005 Traffic Study and May 2005 Sierra Star Master Plan.

In order to strive for the "establishment of a more efficient transportation and circulation system," as noted in the project description, we have the following transportation related comments:

- We will look forward to the review of updated traffic analysis, which addresses additional transient occupancy units along with other items as noted in Checklist Item 15.

- The document copy of the Trails Map is not totally legible regarding existing and planned trails. Ensure connectivity, and if applicable, consider the potential 8050 Club Corridor Study for the adjacent Minaret Road area. As already noted, Caltrans will work with the Town for this end.

- It is stated that the right-of-way width would be smaller when a road is adjacent to the golf course (Section 3.5.3). Analyze and mitigate any usage impacts to SR 203 or other local road that could occur due to roadway design necessitated by this smaller width.

- Any new connection to an existing main water line on Main Street (section 7.2.3) would require an encroachment permit. Terry Erlwein, our Permits Engineer, would be the point of contact at (760) 872-0674.

- Ensure parking requirements for private vehicles and commercial deliveries are adequate. From the history in the Mammoth Lakes area, it appears a more generous approach needs to be taken.

- Ensure snow removal and storage provisions are addressed. Again, historically this can become a major issue.
- We would be supportive of Fair Share developer financing to include "roadway improvements" in addition to the currently collected fees for transit.
- If appropriate, mention could be made of past discussions regarding the possible relinquishment of State Route 203 to the Town.

If you have any questions, I may be contacted at (760) 872-0785. We value a cooperative working relationship with the Town of Mammoth Lakes concerning transportation matters and development.

Sincerely,

Gayle J Rosander

GAYLE J. ROSANDER
IGR/CEQA Coordinator

c: State Clearinghouse
Terry Gess, Caltrans

STATE OF CALIFORNIA — Arnold Schwarzenegger, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
(916) 657-5390 – Fax

Oct. 5, 2005

Mr. Craig Olson
City of Mammoth Lakes
P.O. Box 1609
Mammoth Lakes, CA 93546

Re: Sierra Star master Plan
SCH# 2005092103

Dear Mr. Olson:

Thank you for the opportunity to comment on the above-mentioned document. The Commission was able to perform a record search of its Sacred Lands File for the project area, which 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.

Early consultation with tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. Enclosed is a list of Native Americans individuals/organizations that may have knowledge of cultural resources in the project area. The Commission makes no recommendation of a single individual or group over another. Please contact all those listed; if they cannot supply you with specific information, they may be able to recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe or group. If you have not received a response within two weeks' time, we recommend that you follow-up with a telephone call to make sure that the information was received.

Lack of surface evidence of archeological resources does not preclude the existence of archeological resources. Lead agencies should consider avoidance, as defined in Section 15370 of the CEQA Guidelines, when significant cultural resources could be affected by a project. Provisions should also be included for accidentally discovered archeological resources during construction per California Environmental Quality Act (CEQA), Public Resources Code §15064.5 (f). Health and Safety Code §7050.5; and Public Resources Code §5097.98 mandate the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery and should be included in all environmental documents. If you have any questions, please contact me at (916) 653-6251.

Sincerely,

Carol Gaubatz

Carol Gaubatz
Program Analyst

Cc: State Clearinghouse

Native American Contacts
Mono County
October 3, 2005

\ntelope Valley Indian Community Coleville Paiutes
3ill Lovett, Chairperson
'O Box 119 — Washoe / Paiute
:oleville, CA 96107
530) 495-2801

Walker River Reservation
Laurie Thom, Chairperson
P.O. Box 220 — Northern Paiute
Schurz, NV 89427
chair@wrpt.net
775-773-2306
775-773-2585 - Fax

\ntelope Valley Paiute Tribe
3ill Lovett, Chairperson
1 Camp Antelope Road — Pauite
:oleville, CA 96107
530) 495-2801
530) 495-2736

3enton Paiute Reservation
Rose Marie Saulque, Chairperson
Star Route 4, Box 56-A — Paiute
3enton, CA 93512
umic@gnet.com
760) 933-2321
760)933-2412

3ridgeport Paiute Indian Colony
Tineca Hess, Chairperson
'.O. Box 37 — Paiute
3ridgeport, CA 93517
ic@gnet.com
760) 932-7083
760) 932-7846 Fax

Mono Lake Indian Community
Ronald Baincey, Chairperson
'.O. Box 237 — Mono, Northern Paiute
.ee Vining, CA 93451

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resource assessment for the proposed Sierra Star Master Plan, SCH# 2005092103, Mono County.

Mammoth Community Water District
P.O. Box 597, Mammoth Lakes, CA 93546
(760) 934-2596; fax (760) 934-4080

October 6, 2005

Craig Olson
Senior Planner
Town of Mammoth Lakes
P.O. Box 1609
Mammoth Lakes, CA 93546

Re: Notice of Preparation of a Draft Environmental Impact Report for the Sierra Star Master Plan

Dear Mr. Olson,

The District has reviewed the Notice of Preparation of a Draft Environmental Impact Report for the Sierra Star Master Plan. We appreciate the opportunity to comment on the scope of the Draft EIR.

After reviewing the project description in the initial study, the District has determined that the number of new units that will be proposed in the Draft EIR is 282 residential units. If this interpretation is flawed, the District would like to be corrected. In addition, the District would like to request a detailed and clear description of specific unit counts in the Draft EIR. This should include types of units (i.e. single family homes, condominiums, hotel etc.) and a comparison of units in the original Lodestar Master Plan with the new proposed Sierra Star Master Plan.

These unit counts will be essential when evaluating water demand from the proposed project. It is important to note that the proposed project has not been included in water demand projections that were provided to the Town of Mammoth Lakes for the Draft 2005 General Plan EIR (February 2005 Draft and September 2005 Revised Draft). The proposed project was not included because the Draft EIR for the Sierra Star Master Plan is evaluating for additional units beyond those that were included in the original Lodestar Master Plan. Thus, the initial study inaccurately states on page 27 that the

District "has adequate capacity to provide potable water and wastewater services to the community at buildout." On the contrary, the District has concluded that there are currently inadequate water supplies in multiple dry years to meet the demands at build-out as the Town is currently proposing in the revised 2005 Draft General Plan EIR.

In addition, the Draft EIR should evaluate the impact of the proposed project on wastewater flows in the District's collection system. The increased capacity from the proposed project has also not been evaluated Draft 2005 General Plan EIR.

The District would also like to request an estimate of the maximum density increase that could occur for the proposed project by allowing the proposed transient occupancy units in areas not previously zoned for such units. It appears from page 23 that this density bonus could increase the number of units in the proposed project by at least 100. Such an increase in units is significant and such increases should be clearly described in the Draft EIR. A description of maximum unit counts will enable the District to evaluate a range of water demand scenarios for the proposed project.

The Draft EIR should also evaluate potential impacts to the District's water distribution systems ability to meet increased water flow and pressure requirements created by the proposed increase in hotel height. The District will be able to provide assistance in providing this evaluation.

Thank you again for the opportunity to comment on this document. The District is happy to provide any information on estimated water and wastewater demand for the proposed project and looks forward to assisting in the competition of a comprehensive Draft EIR. Please feel free to contact the District if you have any questions.

Sincerely,

Gary Sisson   Ericka Spies 10/7/05

Gary Sisson, General Manager   Ericka Spies, Environmental Specialist

intrawest
placemaking

6900 South McCarran Boulevard, Suite 3000
Reno, NV 89509 USA
T 775 332 1200 F 775 332 1199

October 17, 2005

Town of Mammoth Lakes
Planning Department
Attn: Craig Olson, Tami Borton
P.O. Box 1609
Mammoth Lakes, CA 93546

Dear Tami & Craig

We have reviewed the Environmental Initial Study for the Sierra Star 2005 Master Plan. The following are a few comments in response to our review. It may be helpful to speak on the phone or meet soon regarding the density issues, in particular.

Comment #1 Re: Description of Project:

We have a few concerns in the way the project is described in this section. The primary concern is the consistency and method of interpretation of the Lodestar unit count, vs. the Sierra Star Master Plan unit count, vs. the unit count previously used for the 1991 EIR.

The following statement is unclear and a bit misleading: "Pursuant to the Town's zoning Code (Sec. 17.28.240G), a room equates to ½-unit, or a unit equates to two rooms. Therefore 1,251 units could translate to 751 dwelling units and 500-room hotel. It is important to note that the 500 Resort Hotel rooms are identified on Table 1 as 'units' rather than 'rooms.' The hotel rooms therefore could be considered to be 'double counted' for a total equivalent unit count of 1,251, rather than the 1,001 units that would equal 751 units and a 500-room hotel."

a) It seems clear from Table 1 that the *total* number of intended units was 1,251. The 1992 Amendment (92-16) also shows a total of 1251 units, although the distribution of units shifted slightly, as a total of 700 Resort Residential Units are listed for Area 5 in this Amendment. How is the assumed total 1,001 units? If "Hotel Guest Rooms" were counted as ½ unit, there would be a total of 250 units (500 hotel guest rooms) plus the 200 additional Resort Residential units indicated in the totals for Area 5.

b) Referring to Table 2, you state that "a total of 451 units have been constructed or approved under the Lodestar Master Plan… Using the Town's room-to-unit calculation method would leave a balance of 550 units, rather than the 800 shown." We disagree. As per the comments above, the balance of 550 assumes that the total under Lodestar would be 1,001 units, not 1,251.

c) We have a concern about the use of the expression "double counted" (the phrase implies that someone is trying to get away with something).

Overall, we believe that you are confusing density and zoning with *how many keys need to be looked at for the Environmental Document.* The 1991 Document did not differentiate between the two, as a hotel guest room was analyzed as a "unit" in that document. Although the TOML code equates a hotel room with ½ a unit, this is only relevant to the EIS in so far as it relates to the *total number of keys that needs to be analyzed in the Environmental Document.* The references to TOML code in the Project Description, as written, confuse the issue of total unit counts analyzed in the 1991 EIR and the comparison of these 1991 unit counts to the current unit count. It seems that for clarity we need to determine a maximum number of keys, which need to be analyzed, based on the potential number of units that could be built based on the building code.

The original Lodestar EIR analyzed 1575 units (keys) and 80,000 s.f. of commercial. The Town approved 1575 units and 80,000 s.f. of Commercial in 1991. The approval was subsequently amended to 1251 units and 80,000 s.f. of Commercial. As we have stated previously, the 1991 Lodestar EIR did not differentiate between units and hotel rooms, which means that from the perspective of the EIR analysis, the 500 unit hotel could be a 500 key hotel consisting of studio type hotel rooms or a 500 key condo-hotel with a mixture of 1, 2, and 3 bedroom units. For example, consider the potential scenario of 927 units and 648 hotel rooms. The 648 hotels rooms equate to 324 units, for a total of 1,251 units and 1,575 keys. This would be equivalent to the unit count analyzed in the 1991 EIR. It would also meet the TOML standard of a hotel room equating to ½ a "unit".

Several other statements imply that the Sierra Star Master Plan is asking for 282 more units than was approved under the Lodestar Master Plan, and we do not feel this is true.

Intrawest is requesting a total 872 new dwelling units for a total of 1,323 units, 49,000 s.f. of commercial, and 30,000 s.f. of conference (this includes the 49,000 s.f. of commercial requested by MMSA). We do not believe we are increasing the density of the Lodestar area with the Sierra Star Master Plan, except for the following:

d) 16 Units in Area 4E (annexed into the Lodestar Area by the Town of Mammoth Lakes).
e) 16 Units in Area 4F (requested by Mammoth Mountain Ski Area).
f) 40 Units in the Area G (requested Mammoth Mountain Ski Area).

As noted above, Mammoth Mountain Ski Area is requesting 20,000 s.f. of Commercial space (included in the 49,000 s.f. requested).

We believe the increase in density is a total of 72 units, with a decrease in commercial of 1,000 s.f.

Finally, the Project Description does not mention the total allowable density for the Sierra Star Property under the Resort Designation in the Zoning Code and General Plan (not mentioned until section 12). The maximum allowable density would be 1,728 units. We feel this is relevant to the discussion.

Comment #2 Re: Project Description - People-Mover
The people mover is not a part of the Lodestar Master Plan and is not a mitigation measure in the 1991 Lodestar EIR.

Comment #3 Re: Aesthetics (1.a.)
Building 5A is described as being "located at the northwest corner of Minaret Road and Meridian Boulevard." We feel this is not quite accurate, as the building site is located approximately 750 feet from the intersection, and at least 500 feet from any point on Minaret. Characterizing it as being "at the corner" of the intersection is a bit misleading.

Comment #4 Re: Air Quality (3.b.)
We disagree that "the May 2005 Sierra Star Master Plan proposes 282 additional units…" See Comment #1 for explanation. We believe that we are proposing an increase of 72 units and a decrease in 1,000 sf of commercial space. Again, the people mover is not a part of the Lodestar Master Plan and is not a mitigation measure in the 1991 Lodestar EIR.

Comment #5 Re: Population (12.a.)

Density issue again. We do not agree. The Lodestar Master Plan allows for 1,251 units. See Comment #1 for explanation.

Area 4F was included in Area 1 of the original Lodestar Master Plan and is currently entitled for 8 units.

We do not have any future single family lots proposed in the Sierra Star Master. Density should not increase because of transient occupancy on single-family properties.

Comment #6 Re: Transportation/Traffic (15.a)
We do not have any future single family lots proposed in the Sierra Star Master. Density should not increase because of transient occupancy on single-family properties.

The people mover is not a part of the Lodestar Master Plan and is not a mitigation measure in the 1991 Lodestar EIR. The People mover was originally include in the Sierra Star Master Plan. The Traffic Study needs to be revised.

If you have any questions, please feel free to contact us.

If you questions or comments please call me at 775-332-1247.

Sincerely,
INTRAWEST CALIFORNIA HOLDINGS

Scott Schoenfeld, P.E.
Director of Land Development

Cc: Bill Taylor, Town of Mammoth Lakes
Beno Nager, Intrawest
Jane Sedonaen, Integrated Design Studio
Steve Perkins, Perkins Design

MAMMOTH

Planning Department
Mammoth Mountain Ski Area
Post Office Box 24
1 Minaret Road
Mammoth Lakes, CA 93546
Telephone – 760.934.2571, x3243
Facsimile – 760.934-0648

September 26, 2005

Mr. Mark Wardlaw
Community Development Director
Town Of Mammoth Lakes
P.O. Box 1609
Mammoth Lakes, CA 93546

Re: Intrawest - Sierra Star Master Plan Amendment Application - 2005
Modifications to proposed language

Dear Mr. Wardlaw:

Following up discussions from our recent joint staff meeting, we are forwarding herewith suggested changes to the Sierra Star 2005 Master Plan, submitted by Intrawest California Holdings, Inc. We understand the master plan is currently submitted to the Town for preparation of a draft EIR for which initial work has just begun.

As you may already know, Mammoth Mountain Ski Area (MMSA) is general managing partner of Mammoth Golf Management, the entity that holds title to and operates Sierra Star Golf Course. Intrawest holds the remaining minority interest in the golf course. As such, MMSA holds final approval and signatory rights for all matters, real estate and otherwise, relating to Sierra Star Golf Course. The golf course property is identified as Area G in Exhibit C: Development Areas/Land Use of the currently submitted plan. Additionally, MMSA wholly owns the 1100 Lodestar Drive parcel which is contained within the Sierra Star Master Plan, Area 4F of the master plan and is subject to future development.

The following modifications to the master plan have been previously requested through Intrawest and should be included in their current application submitted to the Town. By this letter correspondence, MMSA wishes to confirm these modifications for the benefit of all affected parties.

Section 3.4 – Development Areas 4A and 4F – (Affordable Housing)

1. In Section 3.2 - Density Calculations Table, assign a total of 32 DU's to Area 4F, of which 8 DU's are existing.

2. In Section 3.4.1.3.2, Amend language to designate Area 4F separate from Area 4A and designate that Area 4F shall have NO non-affordable housing restrictions. In other words, fully market rate housing will be allowed in Area 4F as a Conditional Use, up to 32 DU's.

Section 3.6 – Development Area G – Sierra Star Golf Course

1. In Section 3.2 – Density Calculations Table (page 5 of 21), assign 40 DU's to Area G (Golf Course Property). It has always been contemplated that the golf course parking lot area will be redeveloped when the permanent club house facility is constructed. Even with this small incremental increase in the total plan densities, the overall SSMP density will be just slightly over 6.0 DU's/acre, well within the general plan allowances. This may precipitate the need to designate a sub-area of Area G that is the current club house and parking lot area. It should also include the practice putting green and driving cage as well, since these may be relocated within this area depending upon the eventual redevelopment plan. This specific area could be defined as Area 6. A proposed map outlining this area is attached herewith as Attachment "A".

2. In the Density Calculations Table (page 5 of 21) designate a total of 29,000 sf for Commercial/Retail Uses. This is combined square footage for Areas 2, 4A, 5 and Proposed Area 6. At least 20,000 sf of this total is dedicated specifically to Area 6 (Golf Course).

3. In the Density Calculations Table (page 5 of 21) designate Conference uses in Areas 2, 4A, 5 and proposed Area 6 (Golf Course).

4. Associated with (1) above, in Section 3.6.1.2 – Proposed Development Area 6 (Golf Course), (page 16 of 21) please amend Conditional Uses to include the same uses as designated for Area 5 with the exclusion of hotels, therefore:

   a) Single-family dwellings with transient occupancy

   b) Multi-family dwellings

   c) Resort condominiums

   d) Commercial/retail uses

   e) Conference facilities

   f) Affordable housing

   g) Recreational facilities

5. Add Section 3.6.3 - Maximum Building Heights for Proposed Area 6, which shall be the same as Areas 5B/5C/5D, therefore:

   a) 3.6.3.1 Single-family dwellings 35'

   b) 3.6.3.2 Multi-family dwellings 75'

c) 3.6.3.3 Resort condominiums 75'

d) 3.6.3.4 Commercial/retail uses 55'

e) 3.6.3.5 Affordable housing 55'

f) 3.6.3.6 For Multi-family and resort condominiums an additional 10' allowed if the majority of the ground floor is dedicated to under structure parking (subject to use permit).

6. Add Section 3.6.4 - Minimum Street ROW for Proposed Area 6 which shall be the same as Area 5, therefore:

"Within Development Area 6, the minimum R.O.W. for all streets shall be 40', with the following exception: R.O.W. may be reduced to 15' from roadway centerline when setback is adjacent to the golf course property line."

7. Add Section 3.6.5 - Minimum Building Setbacks for Proposed Area 6 shall be the same as Area 5, therefore:

	Single Family	Multi Family	Resort Condos
Front	10'	10'	10'
Side	10'	10'	0'
Side/Street	10'	10'	10'
Rear	10'	10'	0'

8. Add Section 3.6.6 - Minimum Building Separations for Proposed Area 6 shall be the same as Area 5, therefore:

"Within Development Area 6, minimum building separation for all structures shall be no less than 20', with the exception of non-habitable secondary structures or accessory buildings such as utility enclosures and similar accessory structures. Where building construction type requires greater separation per building codes, the building codes shall apply. Minimum building separation is subject to Design Review for compliance with snow shedding and snow storage requirements."

9. Add Section 3.6.7 - Minimum Single Family Lot Size for Proposed Area 6 shall be the same as Area 5, therefore:

a) 3.6.7.1 Minimum depth to be 75'

b) 3.6.7.2 Minimum lot area to be 7,500 sf

c) 3.6.7.3 Minimum lot width to be 75'

10. Add Section 3.6.8 - Maximum Site Coverage for Proposed Area 6 shall be the same as Area 5, therefore:

    a) "Within Development Area 6, the maximum site coverage in any parcel, including all structures and paved or other impervious surfaces, shall be 70%."

Section 5.1 – Transportation, Vehicular Circulation and Emergency Vehicular Access

It is the opinion of MMSA that the proposed internal roadway from Area 4B to Area 2 A/B/C (between the #7 Green and the #8 Tee) should be for emergency vehicular access only and should not be open to public traffic. Due to the play of the golf course, this area is subject to errant golf balls and will present a safety hazard to motorists utilizing this section of roadway. Additionally, golf carts must cross this section of roadway and sight lines at this intersection, which are very proximate to a proposed 90 degree turn in the roadway to the immediate north, are poor and could lead to potential collisions. MMSA is working closely with Intrawest on this particular issue in hopes of finding an equitable solution for all parties that preserves the safety of both motorists and golfers.

In regards to the proposed internal roadway from Sierra Star Parkway accessing Areas 5B/5C/5D, it is the understanding of MMSA that the primary access to the site will now be along the section of roadway designated as Emergency Vehicular Access, as shown on Exhibit D of the Sierra Star 2005 Master Plan. As a result of this change, the section of roadway along the #5 Fairway will become Emergency Vehicular Access only from the intersection of Sierra Star Parkway to the proposed Woodwinds Development, if and when required by the ML Fire Protection District as warranted by further development of Areas 5B/5C/5D.

Section 5.3 – Trail System

It is the opinion of MMSA that the proposed multi-use trail between the #6 Green and the #7 Tee will unnecessarily disrupt play of the Sierra Star Golf Course in this vicinity. The proposed trail falls within the limits of the golf flight line setback as recommended by the course architect. As such, it is subject to the flight of errant golf balls. This poses an immediate safety concern for users of the trail and places an unnecessary burden on approaching golfers to confirm if the trail is clear. This being the case, MMSA requests that any pedestrian trail traffic be directed back out to Minaret Road along the Sierra Star Parkway right-of-way and the proposed trail between #6 & #7 be eliminated from the Sierra Star 2005 Master Plan.

A similar situation exists at the proposed trail segment between the #4 Green and the #5 Tee. However, at this particular trail segment, MMSA does not own the underlying land. Nevertheless, the same safety concerns exist as between #6 & #7. MMSA requests that the Town of Mammoth Lakes provide an indemnification to Mammoth Golf Management for any injuries and/or damages suffered by users of the trail as a result of play on the golf course.

Please contact the undersigned if you require any further explanation of the foregoing requests. We look forward to working jointly with Intrawest and Town staff to see the successful approval of the proposed Sierra Star 2005 Master Plan.

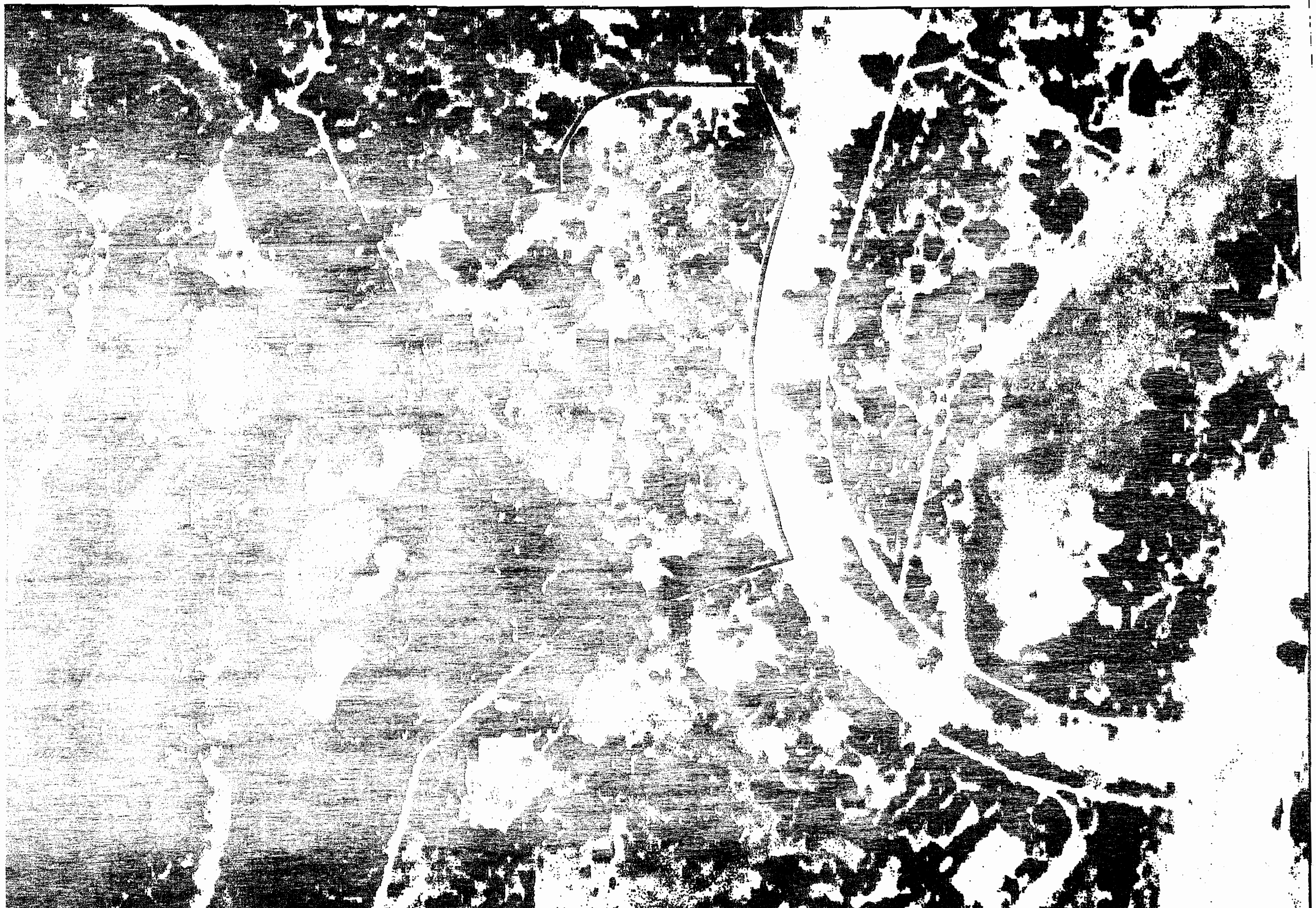
Sincerely,

Tom Hodges

Tom Hodges
Director of Planning
Mammoth Mountain Ski Area

Cc: Benno Nager, IW
Scott Schoenfeld, IW
Peter Denniston, MMSA
Pam Murphy, MMSA
Dave Schacht, MMSA
Jon Cook, MMSA

Proposed Area 6 Sierra Star Master Plan



1 inch equals 100 feet

0 100 200 Feet

Base Layer from Rectified
Scanned 2001 Airphoto / 2003 Orthophoto

Ron and Patrice Fausset
Mammoth Green, #114
1500 Lodestar
Mammoth Lakes, California

September 12, 2005

RECEIVED
SEP 16 2005
TOWN OF MAMMOTH
COMMUNITY DEVELOPMENT DEPARTMENT

Planning Commission Members
City of Mammoth Lakes
P.O. Box 1609
Mammoth Lakes, California 93546

Dear Committee Members,

We are writing to you as a concerned homeowner regarding our second home property at Mammoth Green, #114. We purchased our condominium in June of 2004. One of our concerns when we purchased the property was the large undeveloped foundation on Lodestar in front of our future home. We inquired about this with two different realty companies, Coldwater Banker and Remax, and the HOA. We were assured that Mammoth Mountain, who owned the property, had publicly stated if and when, they would build an identical complex as the adjoining 8-plex building, which would house middle management executives.

We received a notice that Mammoth Mountain now is submitting plans to build a 3-story structure, 32 unit low income housing on the existing concrete pad. How can the City agree to this? It would be surrounded by million dollar single-family homes and 5 star rated condominium complexes. There are many reasons that Mammoth Mountain should be held accountable to their previous plan and the City's standards.

- We live in a low-density area with one way in and one way out.
- The increased traffic will interfere with the existing complexes. Presently the entrance to the proposed structure would be using our turnaround private road that we maintain at Mammoth Green.
- There will not be adequate parking available with 32 units.
- We presently have problems with trespassers using our facility for parking, and pool and jacuzzi use. We believe, this will only increase if you add a low-income high-density structure with no amenities.
- Our views will be blocked with this proposed structure.
- This type of built structure will immediately devalue our property.

We respectfully request your help in collaborating with Mammoth Mountain to move this type of low income housing to another parcel they own. We need to keep Mammoth Mountain accountable to continue moving forward in the community with proper building guidelines and boundaries. Your return response would be appreciated and desired.

Sincerely,

Ron and Patrice Fausset

Ron and Patrice Fausset
Mailing Address:
1827 Summer Cloud Drive
Thousand Oaks, CA 91362
(805) 750-4917 - Ron
(805) 795-4917 - Patrice

Nancy Peterson Walter

Cultural Resource Section Trans-Sierran makes it clear there needs to be monitoring but some archeological resources need to be investigated further yet it is given little significance…you don't know what is below the ground until you get there and I think it would behoove you once the snow melts the archeologist can get in there to do some of this testing. You may find you have to relocate some of your buildings.

Jo Bacon

- Aesthetics: I would request that you do a mapping of the tree heights since building height is going to be such a consideration and whether or not the staff comment says 50 to 55 feet above the tree canopy it would be nice to know how tall those trees really are. And when you do your mock up you choose various points around town not just right there at Minaret in the low point looking up, but farther away and even in fact I know you are not using the new general plan but there is an excellent graph in there showing where to consider the view points; it would be nice to have mock up from those locations for comparisons.

- Density: And you have heard from everybody tonight trying to figure out the calculations from the density and all that is very confusing; please make it as simple as you can make that would be the better for everybody.

- Alternatives: 9B – in the CEQA document that Craig had prepared with the staff comments talks about the 200 foot maximum height building not being consistent – I would ask that in your alternatives section that you also analyze the 160 foot level and the 140 foot level sections and not just the 200 foot level when you are looking at your impacts

- Noise: 11A – for the noise; I question the fact that it would not produce noise levels that were in excess of the other EIR especially when it says there are more units for visitors and affordable housing. So I question that comment and would ask you to look at the noise impact.

- Public Services: 13A– Fire Protection; the staff comments say that the physical/density amount expected to change and therefore there is no effect but I doubt that the 1991 plan talked about trying to fight the fire in a 200 ft. tall building, So I would ask that there be an analysis of that in the fire protection area.

- Air Traffic Patterns: 15C where it is talking about air traffic patterns where it says that proper lighting would provide mitigation, however nowhere in the aesthetics area was there a mention of what that proper lighting of the building might be and the impacts of it.

John Walter

- Aesthetics: I would really like to know what it's going to look like from 395 Lake Mary Road and Mammoth Lake Trail.

- Air Quality: The noxious odors is marked that there won't be any, I suggest you look at what all these buses are running from. Particularly since you are taking out the mitigation when you transport people from this area to the ski area I assume there are going to have to be buses or something to substitute for that 30% and that is where I am going to have to rely on smelling diesel fuels.

- Hazards: The project will, I take it, says it won't affect the emergency plan and evacuation. I think it will because it is right up against wildfire, right up against the more forested area of town. You really have to appreciate having the right kind of escape corridors and things like that from that layout. From one thing that's been encouraged in South America ….looks like this project might be right in way of where lahar (i.e., mudslide) comes down if we were on the perk of the mountain ridge …. 20 feet of snow up there and we could get quite a mud flow swimming right there down that whole canyon side and I think that needs to be analyzed. A heightened fire protection.

- Recreation and parks detected no problem, you said you are not going to include them, I would refer you to the comments on recreation and parks to particularly Mammoth mountain's comments on the inadequacy of the park analysis of the current EIR plan before you make that conclusion. I think you really have to go back and look and make sure that the parks are being adequately handled and I think you have ask yourself what was not considered and that is how this project is going to affect the access to public lands including Mammoth mountain where you have a base area community to occupant capacity of how many units are going to be there and how many units it can take.

- Transportation: The transportation model needs to be completely re-evaluated with the latest up-to-date data and I think you've got to factor in the rather disturbing problems we're seeing in transportation lately not just go back to old studies. We've got current measurements ….before this data turns into a mess. We hope your studies will factor in up-to-date things and I think they have to factor in increased traffic because you are taking out the mitigation measures, which was the people mover. While you are at it refers us to the comments on the current (General Plan) EIR and that should be carefully looked at.

Julie Yost

- Transportation: There is a plan for a round-about at Minaret and Meridian, is that correct? Did I see something referring to it when I was looking at this?

Comment Card

(Please note that this document will be part of the public record.)

MAMMOTH LAKES CALIFORNIA

Date: Tuesday, January 24, 2006 at 6:00 PM
Location: Town of Mammoth Lakes Council Chambers
Suite Z within the Minaret Village Shopping Center
437 Old Mammoth Road, Mammoth Lakes, California
Project: Sierra Star Master Plan Project EIR

Comments may be submitted at the Scoping Meeting or may be mailed to:

Attn: Craig R. Olson
Town of Mammoth Lakes
Planning Department
PO Box 1690
Mammoth Lakes, CA 93546
Phone: (760) 934-8989 x269 or FAX: (760) 934-8608

Comments must be received no later than 5:00 p.m. on Tuesday, January 31, 2006.

Name (Please Print): John Walter

Mailing Address: PO Box 2383 Mammoth Lakes CA 93546

Resident, Business, Organization, etc.: Advocates for Mammoth

Comment (s): (1) Please use up to date data from GPU RDPEIR in ~~[illegible]~~ including remarks raised and observations & in comment letters - particularly on air quality noise, water availability, light & glare, circulation & traffic, & emergency planning.
(2) Aesthetics, since buildings of this height are well beyond (by a factor of 2) anything considered in the past in ML. I would like to see as part of EIR
a) Redo of the community meetings & surveys that have over the years shown a strong preference for a village in the trees to see if community has had a magical change of heart b) A 3d computer model that would allow the public to visualize the impacts from all angles & corridors.

Completing and signing this document is voluntary. The Town of Mammoth Lakes may use this information for statistical purposes, to notify you of any future meetings, or to assist in providing you with further information. This document is a public record and may be subject to inspection and copying by other members of the public.

Please address all of the other issues raised in the comment period

Comment Card

(Please note that this document will be part of the public record.)

MAMMOTH LAKES CALIFORNIA

Date: Tuesday, January 24, 2006 at 6:00 PM

Location: Town of Mammoth Lakes Council Chambers
Suite Z within the Minaret Village Shopping Center
437 Old Mammoth Road, Mammoth Lakes, California

Project: Sierra Star Master Plan Project EIR

Comments may be submitted at the Scoping Meeting or may be mailed to:

Attn: Craig R. Olson
Town of Mammoth Lakes
Planning Department
PO Box 1690
Mammoth Lakes, CA 93546
Phone: (760) 934-8989 x269 or FAX: (760) 934-8608

Comments must be received no later than 5:00 p.m. on Tuesday, January 31, 2006.

Name (Please Print): Nancy Peterson Walter, PhD

Mailing Address: PO Box 2383 ML 93546

Resident, Business, Organization, etc.:

Comment (s): P16 Cultural Resources (a) how do you know what is below ground? Trans-Sierra points out you need monitoring & the possibility of artifacts is high.
your last sentence is incorrect. In many cases if you did not excavate how do you truly know what ~~to~~ is there?
You do need to further evaluate and possibility / probably monitor including a Paiute Indian during construction

Completing and signing this document is voluntary. The Town of Mammoth Lakes may use this information for statistical purposes, to notify you of any future meetings, or to assist in providing you with further information. This document is a public record and may be subject to inspection and copying by other members of the public.

Terri McCracken

From: Rob Carnachan [robcarn@msn.com]
Sent: Monday, February 06, 2006 11:14 AM
To: terri@cajaeir.com
Subject: Sierra Star - e-mail comment sent to Town

From: Ken Klein - ML [mailto:gumdoc@earthlink.net]
Sent: Saturday, February 04, 2006 5:00 PM
To: Craig Olson
Subject: SIERRA STAR MASTER PLAN

I am opposed to the Sierra Star Master Plan, in particular the proposed 200 foot building. The latest Master Plan proposal (for Sierra Star) is so egregious in scope and intent in defying all logic and common sense that it is a tribute to the democratic process that it was not rejected out of hand. In the Environmental Initial Study, the Senior Planner determined that the proposed project MAY have a "potential significant impact" or "potentially significant unless mitigated" impact on the environment. That is quite an understatement as thirteen (13) of seventeen (17) environmental factors would be effected by the project.
The Planning Commission and the Town Council have a fiduciary responsibility to act in the best interest of the majority of voting citizens. We have seen dramatic growth and development within the town over the past five years and the infrastructure (including police, fire, transportation, traffic, access [to the Post Office, Vons, and restaurants], open space and water) is already being strained. It is time to take a deep breath and evaluate the impact of current development on quality of life issues before permitting additional mass density projects. Wise and prudent predecessors on the Planning Commission and Town Council have provided reasonable and acceptable standards for building height, population density and set-back requirements. These are currently being subverted by so-called "Master Plans" and/or excessive mitigation. The town of Mammoth Lakes is losing its soul, and if the unbridled development continues unchecked, I propose that the town consider changing its name to Mitigation Lakes.

Ken Klein

SCOPING MEETING
DRAFT ENVIRONMENTAL IMPACT REPORT
SIERRA STAR MASTER PLAN

PLEASE SIGN IN — Meeting: 6:00 P.M. 01/24/06

#	NAME	ORGANIZATION/AFFILIATION (IF ANY)	ADDRESS
1	Leslie Alesmire	— PO Box 89	Bishop, CA 93514
2	Jo Bacon	— PO Box 100 PMB 134	ML 93546
3	Lara Kirkner	Mammoth Times	
4	Gordon Alper	Box 2007	Mammoth
5	Tom Hamilton	Summit Condos	Mammoth
6	Julie Yost	POB 3699 →	ML
7	Shelle Genevieve		POB 5005 ML
8	Nancy & John Walter	934-1767	ML
9	Susan Klein		
10	Ken Kolon	Concerned Citizen	POB 1654 ML
11	Tom Hodges	MMSA - Planning Dept	POB 24 ML
12	John Walter	Advocates for Mammoth	PO box 2383 ML
13			
14			
15			
16			

APPENDIX C

AIR QUALITY DATA

Sierra Star Master Plan Estimated Vehicle Miles of Travel (VMT) on Study Roadway Segments

Segment	Description	Length (Miles)	Sierra Star MP ADT	Sierra Star MP VMT
Main Street Segment 1	Between Meridian and Sierra Park	1.03	430	443
Main Street Segment 2	Between Sierra Park and Old Mammoth	0.12	430	52
Main Street Segment 3	Between Old Mammoth and Mono	0.48	600	288
Main Street Segment 4	Between Mono and Minaret	0.45	950	428
Lake Mary Road (Old Main Street Segment 5)	Between Minaret and Lakeview	0.49	1,070	524
Lake Mary Road Segment 1	Between Lakeview and Juniper	0.46	1,100	506
Lake Mary Road Segment 2	South of Juniper	1.20	0	0
Meridian Boulevard Segment 1	SR 203 to Sierra Park	1.09	480	523
Meridian Boulevard Segment 2	Sierra Park to Old Mammoth	0.14	410	57
Meridian Boulevard Segment 3	Old Mammoth to Minaret	0.58	490	284
Meridian Boulevard Segment 4	Minaret to Majestic Pines	0.66	1,480	977
Old Mammoth Road Segment 1	Main to Meridian	0.45	410	185
Old Mammoth Road Segment 2	Meridian to Sherwin Creek	0.36	10	4
Old Mammoth Road Segment 3	Sherwin to Minaret	0.29	50	15
Old Mammoth Road Segment 4	Minaret to Club	0.47	0	0
Old Mammoth Road Segment 5	Club Drive to Waterford	0.26	0	0
Old Mammoth Road Segment 6	West of Sherwin	0.71	0	0
Forest Trail	Entire Length of Road	1.06	0	0
Canyon Boulevard	Lake Mary to Lakeview	0.32	0	0
Lakeview Drive	Canyon to Davison	0.93	0	0
Kelly Road and Majestic Pines	Lake Mary to Meridian	0.60	0	0
SR 203 Segment 1 (Minaret North of Main)	Lake Mary to Forest Trail	0.26	1,090	283
SR 203 Segment 2	Forest Trail to 1.0 Mile North	1.00	1,090	1,090
Minaret Road Segment 1	Main to Meridian	0.64	2,570	1,645
Minaret Road Segment 2	Meridian to Chateau	0.51	70	36
Minaret Road Segment 3	Chateau to Old Mammoth	0.21	70	15
Fairway Drive	Immediately South of Old Mammoth	0.13	0	0
TOTAL VMT				**7,353**

Source: 2004 Mammoth TranPLAN Transportation Demand Model

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Title: Sierra Star

Background Information

Nearest Air Monitoring Station measuring CO:	Gateway Home Center
Background 1-hour CO Concentration (ppm):	10.0
Background 8-hour CO Concentration (ppm):	5.3
Persistence Factor:	0.7
Analysis Year:	2004

Roadway Data

Intersection:	Minaret Road/Merdidian Boulevard
Analysis Condition:	Existing

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Minaret Road	At Grade	4	20	20
East-West Roadway:	Meridian Boulevard	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes

	N	64	183	237	
W		<	v	>	E
128 ^				^	115
255 >				<	142
65 v				v	10
		<	^	>	
		13	73	18	
	S				

P.M. Peak Hour Traffic Volumes

	N	64	183	237	
W		<	v	>	E
128 ^				^	115
255 >				<	142
65 v				v	10
		<	^	>	
		13	73	18	
	S				

Highest Traffic Volumes (Vehicles per Hour)

	A.M.	P.M.
N-S Road:	588	588
E-W Road:	715	715

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	A_4	B	C				
	Reference CO Concentrations				Traffic	Emission	Estimated CO Concentrations			
Roadway	E.O.R.	25 Feet	50 Feet	100 Feet	Volume	Factors[2]	E.O.R.	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour										
North-South Road	11.9	7.0	5.4	3.8	588	7.65	0.54	0.31	0.24	0.17
East-West Road	3.3	2.6	2.2	1.7	715	7.65	0.18	0.14	0.12	0.09
P.M. Peak Traffic Hour										
North-South Road	11.9	7.0	5.4	3.8	588	7.65	0.54	0.31	0.24	0.17
East-West Road	3.3	2.6	2.2	1.7	715	7.65	0.18	0.14	0.12	0.09

[1] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).
[2] Emission factors from EMFAC2002 (2003).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

Roadway	A.M. Peak Hour	P.M. Peak Hour	8-Hour
Roadway Edge	10.7	10.7	5.6
25 Feet from Roadway Edge	5.8	10.5	7.3
50 Feet from Roadway Edge	10.4	10.4	7.3
100 Feet from Roadway Edge	10.3	10.3	7.2

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Title: Sierra Star

Background Information

Nearest Air Monitoring Station measuring CO:	Gateway Home Center
Background 1-hour CO Concentration (ppm):	10.0
Background 8-hour CO Concentration (ppm):	5.3
Persistence Factor:	0.7
Analysis Year:	2012

Roadway Data

Intersection:	Minaret Road/Merdidian Boulevard
Analysis Condition:	Existing Plus Project

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Minaret Road	At Grade	4	20	20
East-West Roadway:	Meridian Boulevard	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes

```
        N|
         |  161    190    273|
W        |   <      v      > |        E
  218 ^                     ^   134
  291 >                     <   145
   65 v                     v    11
         |   <      ^      > |
         |   13     82     19|
        S|
```

P.M. Peak Hour Traffic Volumes

```
        N|
         |  161    190    273|
W        |   <      v      > |        E
  218 ^                     ^   134
  291 >                     <   145
   65 v                     v    11
         |   <      ^      > |
         |   13     82     19|
        S|
```

Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	738	N-S Road:	738
E-W Road:	864	E-W Road:	864

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	A_4	B	C				
	Reference CO Concentrations				Traffic	Emission	Estimated CO Concentrations			
Roadway	E.O.R.	25 Feet	50 Feet	100 Feet	Volume	Factors[2]	E.O.R.	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour										
North-South Road	11.9	7.0	5.4	3.8	738	3.73	0.33	0.19	0.15	0.10
East-West Road	3.3	2.6	2.2	1.7	864	3.73	0.11	0.08	0.07	0.05
P.M. Peak Traffic Hour										
North-South Road	11.9	7.0	5.4	3.8	738	3.73	0.33	0.19	0.15	0.10
East-West Road	3.3	2.6	2.2	1.7	864	3.73	0.11	0.08	0.07	0.05

[1] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).
[2] Emission factors from EMFAC2002 (2003).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
Roadway Edge	10.4	10.4	5.5
25 Feet from Roadway Edge	5.6	10.3	7.2
50 Feet from Roadway Edge	10.2	10.2	7.2
100 Feet from Roadway Edge	10.2	10.2	7.1

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Title: Sierra Star

Background Information

Nearest Air Monitoring Station measuring CO:	Gateway Home Center
Background 1-hour CO Concentration (ppm):	10.0
Background 8-hour CO Concentration (ppm):	5.3
Persistence Factor:	0.7
Analysis Year:	2014

Roadway Data

Intersection:	Minaret Road/Merdidian Boulevard
Analysis Condition:	Cumulative Plus Project

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Minaret Road	At Grade	4	20	20
East-West Roadway:	Meridian Boulevard	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes

	N				
		275	268	318	
W		<	v	>	E
333 ^				^	147
367 >				<	233
90 v				v	12
		<	^	>	
		38	155	20	
	S				

P.M. Peak Hour Traffic Volumes

	N				
		275	268	318	
W		<	v	>	E
333 ^				^	147
367 >				<	233
90 v				v	12
		<	^	>	
		38	155	20	
	S				

Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	1,074	N-S Road:	1,074
E-W Road:	1,182	E-W Road:	1,182

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	A_4	B	C				
	Reference CO Concentrations				Traffic	Emission	Estimated CO Concentrations			
Roadway	E.O.R.	25 Feet	50 Feet	100 Feet	Volume	Factors[2]	E.O.R.	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour										
North-South Road	11.9	7.0	5.4	3.8	1,074	3.10	0.40	0.23	0.18	0.13
East-West Road	3.3	2.6	2.2	1.7	1,182	3.10	0.12	0.10	0.08	0.06
P.M. Peak Traffic Hour										
North-South Road	11.9	7.0	5.4	3.8	1,074	3.10	0.40	0.23	0.18	0.13
East-West Road	3.3	2.6	2.2	1.7	1,182	3.10	0.12	0.10	0.08	0.06

[1] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).
[2] Emission factors from EMFAC2002 (2003).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
Roadway Edge	10.5	10.5	5.5
25 Feet from Roadway Edge	5.6	10.3	7.2
50 Feet from Roadway Edge	10.3	10.3	7.2
100 Feet from Roadway Edge	10.2	10.2	7.1

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Title: Sierra Star

Background Information

Nearest Air Monitoring Station measuring CO:	Gateway Home Center
Background 1-hour CO Concentration (ppm):	10.0
Background 8-hour CO Concentration (ppm):	5.3
Persistence Factor:	0.7
Analysis Year:	2004

Roadway Data

Intersection:	Minaret Road/Old Mammoth Road
Analysis Condition:	Existing

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Minaret Road	At Grade	2	20	20
East-West Roadway:	Old Mammoth Road	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes

N
188 40 111
W < v > E
50 ^ ^ 36
123 > < 127
4 v v 20
< ^ >
3 20 17
S

P.M. Peak Hour Traffic Volumes

N
188 40 111
W < v > E
50 ^ ^ 36
123 > < 127
4 v v 20
< ^ >
3 20 17
S

Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	379	N-S Road:	379
E-W Road:	360	E-W Road:	360

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	A_4	B	C				
	Reference CO Concentrations				Traffic	Emission	Estimated CO Concentrations			
Roadway	E.O.R.	25 Feet	50 Feet	100 Feet	Volume	Factors[2]	E.O.R.	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour										
North-South Road	14.0	7.6	5.7	4.0	379	7.65	0.41	0.22	0.17	0.12
East-West Road	3.3	2.6	2.2	1.7	360	7.65	0.09	0.07	0.06	0.05
P.M. Peak Traffic Hour										
North-South Road	14.0	7.6	5.7	4.0	379	7.65	0.41	0.22	0.17	0.12
East-West Road	3.3	2.6	2.2	1.7	360	7.65	0.09	0.07	0.06	0.05

[1] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).
[2] Emission factors from EMFAC2002 (2003).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
Roadway Edge	10.5	10.5	5.5
25 Feet from Roadway Edge	5.6	10.3	7.2
50 Feet from Roadway Edge	10.2	10.2	7.2
100 Feet from Roadway Edge	10.2	10.2	7.1

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Title: Sierra Star

Background Information

Nearest Air Monitoring Station measuring CO:	Gateway Home Center
Background 1-hour CO Concentration (ppm):	10.0
Background 8-hour CO Concentration (ppm):	5.3
Persistence Factor:	0.7
Analysis Year:	2012

Roadway Data

Intersection: Minaret Road/Old Mammoth Road
Analysis Condition: Existing Plus Project

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Minaret Road	At Grade	2	20	20
East-West Roadway:	Old Mammoth Road	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes

```
        N|                         |
         |  188     40     111     |
W        |   <      v       >      |       E
   54 ^                           ^     41
  127 >                           <    127
    4 v                           v     20
         |   <      ^       >      |
         |   3      24      17     |
        S|                         |
```

P.M. Peak Hour Traffic Volumes

```
        N|                         |
         |  188     40     111     |
W        |   <      v       >      |       E
   54 ^                           ^     41
  127 >                           <    127
    4 v                           v     20
         |   <      ^       >      |
         |   3      24      17     |
        S|                         |
```

Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	383	N-S Road:	383
E-W Road:	373	E-W Road:	373

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	A_4	B	C				
	Reference CO Concentrations				Traffic	Emission	Estimated CO Concentrations			
Roadway	E.O.R.	25 Feet	50 Feet	100 Feet	Volume	Factors[2]	E.O.R.	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour										
North-South Road	14.0	7.6	5.7	4.0	383	3.73	0.20	0.11	0.08	0.06
East-West Road	3.3	2.6	2.2	1.7	373	3.73	0.05	0.04	0.03	0.02
P.M. Peak Traffic Hour										
North-South Road	14.0	7.6	5.7	4.0	383	3.73	0.20	0.11	0.08	0.06
East-West Road	3.3	2.6	2.2	1.7	373	3.73	0.05	0.04	0.03	0.02

[1] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).
[2] Emission factors from EMFAC2002 (2003).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
Roadway Edge	10.2	10.2	5.4
25 Feet from Roadway Edge	5.4	10.1	7.1
50 Feet from Roadway Edge	10.1	10.1	7.1
100 Feet from Roadway Edge	10.1	10.1	7.1

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Title: Sierra Star

Background Information

Nearest Air Monitoring Station measuring CO:	Gateway Home Center
Background 1-hour CO Concentration (ppm):	10.0
Background 8-hour CO Concentration (ppm):	5.3
Persistence Factor:	0.7
Analysis Year:	2014

Roadway Data

Intersection:	Minaret Road/Old Mammoth Road
Analysis Condition:	Cumulative Plus Project

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Minaret Road	At Grade	2	20	20
East-West Roadway:	Old Mammoth Road	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes

	N			
	271 <	43 v	137 >	
W				E
121 ^				^ 70
173 >				< 184
4 v				v 20
	< 3	^ 24	> 17	
	S			

P.M. Peak Hour Traffic Volumes

	N			
	271 <	43 v	137 >	
W				E
121 ^				^ 70
173 >				< 184
4 v				v 20
	< 3	^ 24	> 17	
	S			

Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	495	N-S Road:	495
E-W Road:	572	E-W Road:	572

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	A_4	B	C				
	Reference CO Concentrations				Traffic	Emission	Estimated CO Concentrations			
Roadway	E.O.R.	25 Feet	50 Feet	100 Feet	Volume	Factors[2]	E.O.R.	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour										
North-South Road	14.0	7.6	5.7	4.0	495	3.10	0.22	0.12	0.09	0.06
East-West Road	3.3	2.6	2.2	1.7	572	3.10	0.06	0.05	0.04	0.03
P.M. Peak Traffic Hour										
North-South Road	14.0	7.6	5.7	4.0	495	3.10	0.22	0.12	0.09	0.06
East-West Road	3.3	2.6	2.2	1.7	572	3.10	0.06	0.05	0.04	0.03

[1] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).
[2] Emission factors from EMFAC2002 (2003).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
Roadway Edge	10.3	10.3	5.4
25 Feet from Roadway Edge	5.5	10.2	7.1
50 Feet from Roadway Edge	10.1	10.1	7.1
100 Feet from Roadway Edge	10.1	10.1	7.1

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Title: Sierra Star

Background Information

Nearest Air Monitoring Station measuring CO:	Gateway Home Center
Background 1-hour CO Concentration (ppm):	10.0
Background 8-hour CO Concentration (ppm):	5.3
Persistence Factor:	0.7
Analysis Year:	2004

Roadway Data

Intersection:	Minaret Road/Lake Mary Road-Main Street
Analysis Condition:	Existing

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Minaret Road	At Grade	4	20	20
East-West Roadway:	Lake Mary Road-Main Street	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes

N

126 253 536

< v >

W E

0 ^ ^ 103

72 > < 316

192 v v 83

< ^ >

122 101 104

S

P.M. Peak Hour Traffic Volumes

N

126 253 536

< v >

W E

0 ^ ^ 103

72 > < 316

192 v v 83

< ^ >

122 101 104

S

Highest Traffic Volumes (Vehicles per Hour)

	A.M.	P.M.
N-S Road:	1,242	1,242
E-W Road:	766	766

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	A_4	B	C				
	Reference CO Concentrations				Traffic	Emission	Estimated CO Concentrations			
Roadway	E.O.R.	25 Feet	50 Feet	100 Feet	Volume	Factors[2]	E.O.R.	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour										
North-South Road	11.9	7.0	5.4	3.8	1,242	7.65	1.13	0.67	0.51	0.36
East-West Road	3.3	2.6	2.2	1.7	766	7.65	0.19	0.15	0.13	0.10
P.M. Peak Traffic Hour										
North-South Road	11.9	7.0	5.4	3.8	1,242	7.65	1.13	0.67	0.51	0.36
East-West Road	3.3	2.6	2.2	1.7	766	7.65	0.19	0.15	0.13	0.10

[1] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).
[2] Emission factors from EMFAC2002 (2003).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
Roadway Edge	11.3	11.3	5.9
25 Feet from Roadway Edge	6.1	10.8	7.6
50 Feet from Roadway Edge	10.6	10.6	7.4
100 Feet from Roadway Edge	10.5	10.5	7.3

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Title: Sierra Star

Background Information

Nearest Air Monitoring Station measuring CO:	Gateway Home Center
Background 1-hour CO Concentration (ppm):	10.0
Background 8-hour CO Concentration (ppm):	5.3
Persistence Factor:	0.7
Analysis Year:	2012

Roadway Data

Intersection: Minaret Road/Lake Mary Road-Main Street
Analysis Condition: Existing Plus Project

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Minaret Road	At Grade	4	20	20
East-West Roadway:	Lake Mary Road-Main Street	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes

N
126 341 545
W < v > E
0 ^ ^ 111
81 > < 324
268 v v 121
< ^ >
184 172 136
S

P.M. Peak Hour Traffic Volumes

N
126 341 545
W < v > E
0 ^ ^ 111
81 > < 324
268 v v 121
< ^ >
184 172 136
S

Highest Traffic Volumes (Vehicles per Hour)

	A.M.	P.M.
N-S Road:	1,504	1,504
E-W Road:	905	905

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	A_4	B	C				
	Reference CO Concentrations				Traffic	Emission	Estimated CO Concentrations			
Roadway	E.O.R.	25 Feet	50 Feet	100 Feet	Volume	Factors[2]	E.O.R.	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour										
North-South Road	11.9	7.0	5.4	3.8	1,504	3.73	0.67	0.39	0.30	0.21
East-West Road	3.3	2.6	2.2	1.7	905	3.73	0.11	0.09	0.07	0.06
P.M. Peak Traffic Hour										
North-South Road	11.9	7.0	5.4	3.8	1,504	3.73	0.67	0.39	0.30	0.21
East-West Road	3.3	2.6	2.2	1.7	905	3.73	0.11	0.09	0.07	0.06

[1] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).
[2] Emission factors from EMFAC2002 (2003).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
Roadway Edge	10.8	10.8	5.6
25 Feet from Roadway Edge	5.8	10.5	7.3
50 Feet from Roadway Edge	10.4	10.4	7.3
100 Feet from Roadway Edge	10.3	10.3	7.2

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Title: Sierra Star

Background Information

Nearest Air Monitoring Station measuring CO:	Gateway Home Center
Background 1-hour CO Concentration (ppm):	10.0
Background 8-hour CO Concentration (ppm):	5.3
Persistence Factor:	0.7
Analysis Year:	2014

Roadway Data

Intersection:	Minaret Road/Lake Mary Road-Main Street
Analysis Condition:	Cumulative Plus Project

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Minaret Road	At Grade	4	20	20
East-West Roadway:	Lake Mary Road-Main Street	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes

	N				
W	177 <	474 v	623 >		E
113 ^				^	196
565 >				<	452
360 v				v	157
	< 264	^ 283	> 167		
	S				

P.M. Peak Hour Traffic Volumes

	N				
W	177 <	474 v	623 >		E
113 ^				^	196
565 >				<	452
360 v				v	157
	< 264	^ 283	> 167		
	S				

Highest Traffic Volumes (Vehicles per Hour)

	A.M.	P.M.
N-S Road:	1,988	1,988
E-W Road:	1,843	1,843

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	A_4	B	C				
	Reference CO Concentrations				Traffic	Emission	Estimated CO Concentrations			
Roadway	E.O.R.	25 Feet	50 Feet	100 Feet	Volume	Factors[2]	E.O.R.	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour										
North-South Road	11.9	7.0	5.4	3.8	1,988	3.10	0.73	0.43	0.33	0.23
East-West Road	3.3	2.6	2.2	1.7	1,843	3.10	0.19	0.15	0.13	0.10
P.M. Peak Traffic Hour										
North-South Road	11.9	7.0	5.4	3.8	1,988	3.10	0.73	0.43	0.33	0.23
East-West Road	3.3	2.6	2.2	1.7	1,843	3.10	0.19	0.15	0.13	0.10

[1] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).
[2] Emission factors from EMFAC2002 (2003).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
Roadway Edge	10.9	10.9	5.7
25 Feet from Roadway Edge	5.9	10.6	7.4
50 Feet from Roadway Edge	10.5	10.5	7.3
100 Feet from Roadway Edge	10.3	10.3	7.2

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Title: Sierra Star

Background Information

Nearest Air Monitoring Station measuring CO:	Gateway Home Center
Background 1-hour CO Concentration (ppm):	10.0
Background 8-hour CO Concentration (ppm):	5.3
Persistence Factor:	0.7
Analysis Year:	2004

Roadway Data

Intersection: Main Street/Old Mammoth Road
Analysis Condition: Existing

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Main Street	At Grade	2	20	20
East-West Roadway:	Old Mammoth Road	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes

```
   N|
    |     0      0      0|
W   |    <      v      > |      E
  0 ^                  ^      0
416 >                  <    267
689 v                  v    126
    <      ^           >
    |  333      0    105|
   S|
```

P.M. Peak Hour Traffic Volumes

```
   N|
    |     0      0      0|
W   |    <      v      > |      E
  0 ^                  ^      0
416 >                  <    267
689 v                  v    126
    <      ^           >
    |  333      0    105|
   S|
```

Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	438	N-S Road:	438
E-W Road:	1,498	E-W Road:	1,498

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	A_4	B	C				
	Reference CO Concentrations				Traffic	Emission	Estimated CO Concentrations			
Roadway	E.O.R.	25 Feet	50 Feet	100 Feet	Volume	Factors[2]	E.O.R.	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour										
North-South Road	14.0	7.6	5.7	4.0	438	7.65	0.47	0.25	0.19	0.13
East-West Road	3.7	2.7	2.2	1.7	1,498	7.65	0.42	0.31	0.25	0.19
P.M. Peak Traffic Hour										
North-South Road	14.0	7.6	5.7	4.0	438	7.65	0.47	0.25	0.19	0.13
East-West Road	3.7	2.7	2.2	1.7	1,498	7.65	0.42	0.31	0.25	0.19

[1] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).
[2] Emission factors from EMFAC2002 (2003).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
Roadway Edge	10.9	10.9	5.7
25 Feet from Roadway Edge	5.9	10.6	7.4
50 Feet from Roadway Edge	10.4	10.4	7.3
100 Feet from Roadway Edge	10.3	10.3	7.2

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Title: Sierra Star

Background Information

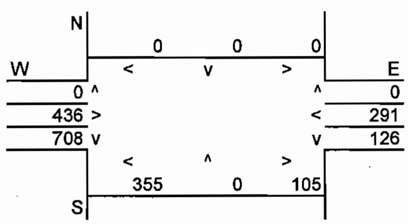
Nearest Air Monitoring Station measuring CO:	Gateway Home Center
Background 1-hour CO Concentration (ppm):	10.0
Background 8-hour CO Concentration (ppm):	5.3
Persistence Factor:	0.7
Analysis Year:	2012

Roadway Data

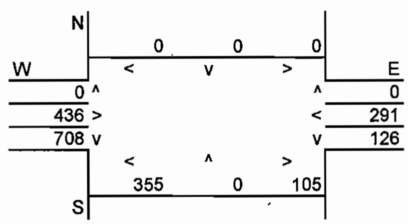
Intersection: Main Street/Old Mammoth Road
Analysis Condition: Existing Plus Project

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Main Street	At Grade	2	20	20
East-West Roadway:	Old Mammoth Road	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	460	N-S Road:	460
E-W Road:	1,561	E-W Road:	1,561

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	A_4	B	C				
	Reference CO Concentrations				Traffic	Emission	Estimated CO Concentrations			
Roadway	E.O.R.	25 Feet	50 Feet	100 Feet	Volume	Factors[2]	E.O.R.	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour										
North-South Road	14.0	7.6	5.7	4.0	460	3.73	0.24	0.13	0.10	0.07
East-West Road	3.7	2.7	2.2	1.7	1,561	3.73	0.22	0.16	0.13	0.10
P.M. Peak Traffic Hour										
North-South Road	14.0	7.6	5.7	4.0	460	3.73	0.24	0.13	0.10	0.07
East-West Road	3.7	2.7	2.2	1.7	1,561	3.73	0.22	0.16	0.13	0.10

[1] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).
[2] Emission factors from EMFAC2002 (2003).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
Roadway Edge	10.5	10.5	5.5
25 Feet from Roadway Edge	5.6	10.3	7.2
50 Feet from Roadway Edge	10.2	10.2	7.2
100 Feet from Roadway Edge	10.2	10.2	7.1

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Title: Sierra Star

Background Information

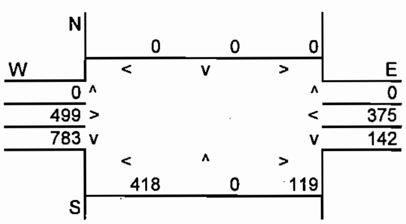
Nearest Air Monitoring Station measuring CO:	Gateway Home Center
Background 1-hour CO Concentration (ppm):	10.0
Background 8-hour CO Concentration (ppm):	5.3
Persistence Factor:	0.7
Analysis Year:	2014

Roadway Data

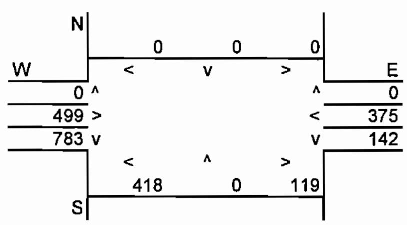
Intersection:	Main Street/Old Mammoth Road
Analysis Condition:	Cumulative Plus Project

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Main Street	At Grade	2	20	20
East-West Roadway:	Old Mammoth Road	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.	P.M.
N-S Road:	537	537
E-W Road:	1,799	1,799

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	A_4	B	C				
	Reference CO Concentrations				Traffic	Emission	Estimated CO Concentrations			
Roadway	E.O.R.	25 Feet	50 Feet	100 Feet	Volume	Factors[2]	E.O.R.	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour										
North-South Road	14.0	7.6	5.7	4.0	537	3.10	0.23	0.13	0.10	0.07
East-West Road	3.7	2.7	2.2	1.7	1,799	3.10	0.21	0.15	0.12	0.09
P.M. Peak Traffic Hour										
North-South Road	14.0	7.6	5.7	4.0	537	3.10	0.23	0.13	0.10	0.07
East-West Road	3.7	2.7	2.2	1.7	1,799	3.10	0.21	0.15	0.12	0.09

[1] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).
[2] Emission factors from EMFAC2002 (2003).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
Roadway Edge	10.4	10.4	5.5
25 Feet from Roadway Edge	5.6	10.3	7.2
50 Feet from Roadway Edge	10.2	10.2	7.2
100 Feet from Roadway Edge	10.2	10.2	7.1

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Title: Sierra Star

Background Information

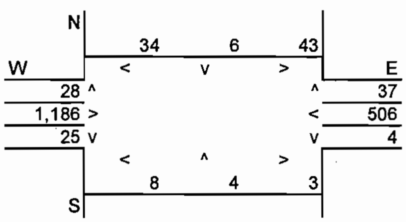
Nearest Air Monitoring Station measuring CO:	Gateway Home Center
Background 1-hour CO Concentration (ppm):	10.0
Background 8-hour CO Concentration (ppm):	5.3
Persistence Factor:	0.7
Analysis Year:	2004

Roadway Data

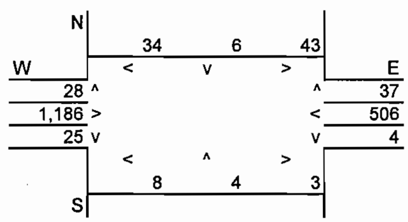
Intersection:	East Mountain Boulevard/Main Street
Analysis Condition:	Existing

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	East Mountain Boulevard	At Grade	2	20	20
East-West Roadway:	Main Street	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	98	N-S Road:	98
E-W Road:	1,786	E-W Road:	1,786

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	A_4	B	C				
	Reference CO Concentrations				Traffic	Emission	Estimated CO Concentrations			
Roadway	E.O.R.	25 Feet	50 Feet	100 Feet	Volume	Factors[2]	E.O.R.	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour										
North-South Road	14.0	7.6	5.7	4.0	98	7.65	0.10	0.06	0.04	0.03
East-West Road	3.3	2.6	2.2	1.7	1,786	7.65	0.45	0.36	0.30	0.23
P.M. Peak Traffic Hour										
North-South Road	14.0	7.6	5.7	4.0	98	7.65	0.10	0.06	0.04	0.03
East-West Road	3.3	2.6	2.2	1.7	1,786	7.65	0.45	0.36	0.30	0.23

[1] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).
[2] Emission factors from EMFAC2002 (2003).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
Roadway Edge	10.6	10.6	5.6
25 Feet from Roadway Edge	5.7	10.4	7.3
50 Feet from Roadway Edge	10.3	10.3	7.2
100 Feet from Roadway Edge	10.3	10.3	7.2

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Title: Sierra Star

Background Information

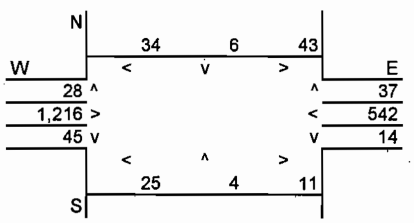
Nearest Air Monitoring Station measuring CO:	Gateway Home Center
Background 1-hour CO Concentration (ppm):	10.0
Background 8-hour CO Concentration (ppm):	5.3
Persistence Factor:	0.7
Analysis Year:	2012

Roadway Data

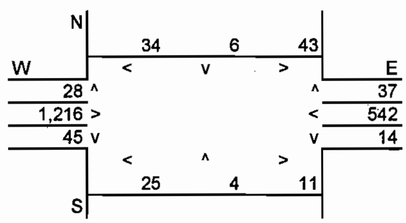
Intersection:	East Mountain Boulevard/Main Street
Analysis Condition:	Existing Plus Project

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	East Mountain Boulevard	At Grade	2	20	20
East-West Roadway:	Main Street	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	123	N-S Road:	123
E-W Road:	1,882	E-W Road:	1,882

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	A_4	B	C				
	Reference CO Concentrations				Traffic	Emission	Estimated CO Concentrations			
Roadway	E.O.R.	25 Feet	50 Feet	100 Feet	Volume	Factors[2]	E.O.R.	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour										
North-South Road	14.0	7.6	5.7	4.0	123	3.73	0.06	0.03	0.03	0.02
East-West Road	3.3	2.6	2.2	1.7	1,882	3.73	0.23	0.18	0.15	0.12
P.M. Peak Traffic Hour										
North-South Road	14.0	7.6	5.7	4.0	123	3.73	0.06	0.03	0.03	0.02
East-West Road	3.3	2.6	2.2	1.7	1,882	3.73	0.23	0.18	0.15	0.12

[1] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).
[2] Emission factors from EMFAC2002 (2003).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
Roadway Edge	10.3	10.3	5.5
25 Feet from Roadway Edge	5.5	10.2	7.2
50 Feet from Roadway Edge	10.2	10.2	7.1
100 Feet from Roadway Edge	10.1	10.1	7.1

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Title: Sierra Star

Background Information

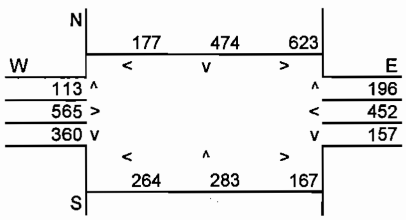
Nearest Air Monitoring Station measuring CO:	Gateway Home Center
Background 1-hour CO Concentration (ppm):	10.0
Background 8-hour CO Concentration (ppm):	5.3
Persistence Factor:	0.7
Analysis Year:	2014

Roadway Data

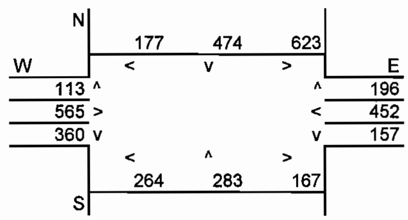
Intersection:	East Mountain Boulevard/Main Street
Analysis Condition:	Cumulative Plus Project

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	East Mountain Boulevard	At Grade	2	20	20
East-West Roadway:	Main Street	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	1,988	N-S Road:	1,988
E-W Road:	1,843	E-W Road:	1,843

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	A_4	B	C				
	Reference CO Concentrations				Traffic	Emission	Estimated CO Concentrations			
Roadway	E.O.R.	25 Feet	50 Feet	100 Feet	Volume	Factors[2]	E.O.R.	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour										
North-South Road	14.0	7.6	5.7	4.0	1,988	3.10	0.86	0.47	0.35	0.25
East-West Road	3.3	2.6	2.2	1.7	1,843	3.10	0.19	0.15	0.13	0.10
P.M. Peak Traffic Hour										
North-South Road	14.0	7.6	5.7	4.0	1,988	3.10	0.86	0.47	0.35	0.25
East-West Road	3.3	2.6	2.2	1.7	1,843	3.10	0.19	0.15	0.13	0.10

[1] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).
[2] Emission factors from EMFAC2002 (2003).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
Roadway Edge	11.1	11.1	5.7
25 Feet from Roadway Edge	5.9	10.6	7.4
50 Feet from Roadway Edge	10.5	10.5	7.3
100 Feet from Roadway Edge	10.3	10.3	7.2

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

APPENDIX D

BIOLOGY DATA

Biological Assessment Report

Sierra Star Development
Mammoth Lakes, Mono County
California

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1.0 INTRODUCTION

1.1 Purpose

WRA biologists performed a biological assessment of the proposed Intrawest-Sierra Star Development (Project Site), located on a 70-acre parcel in Mammoth Lakes, Mono County, California (Figure 1). The purpose of the assessment was to determine:

1) habitat suitability and subsequent likelihood of occurrence of special status wildlife and plant species potentially occurring on the site;

2) the presence of wetlands or waters potentially subject to federal jurisdiction under Section 404 of the Clean Water Act; and

3) the presence of stream or riparian areas potentially subject to state jurisdiction under Section 1600 of the California Fish and Game Code;

A biological assessment provides general information on the potential presence of sensitive species or habitats. The biological assessment is not an official protocol level survey for listed species that may be required for project approval by local, state, or federal agencies. However, specific findings on the occurrence of any species or the presence of sensitive habitats may require that protocol surveys be conducted. This assessment is based on information available at the time of the study and on conditions that were observed in site photographs.

1.2 Description of Proposed Project

The proposed Sierra Star Development Project (Project) proposes to develop approximately 70 acres within the existing Sierra Star Golf Course. The proposed development in the golf course would be comprised of residential housing and a resort hotel, accommodating 1,251 residential and hotel units. The Project will provide overnight accommodations, residences, and commercial facilities to the users of the Sierra Star Golf Course, residents of the Town of Mammoth Lakes, and visiting recreationists. The Project will contain multi- and single-family residences, restaurants, retail stores, and affordable housing sites. A two-lane paved road will be constructed between Minaret Road and Main Street (Highway 203), providing the primary access to the development. Several smaller roads will be constructed to access the individual building sites. The Project will require the culverting of portions of two existing drainages for road crossings and location of residential and commercial facilities.

The Project is to be completed in three phases. Phase 1 will include construction of Grove Road, the main north/south roadway connecting Minaret Road and Main Street. Phase 1 is to be completed during the 2006 construction season. Phase 2 will include an affordable housing area, associated roads and parking located east of Fairway 8 and will be completed during the 2007 construction season. Phase 3 will include commercial and residential housing located west of Grove Road and will be completed during the 2008 construction season. No detailed development plans have yet been created for Phases 2 and 3.

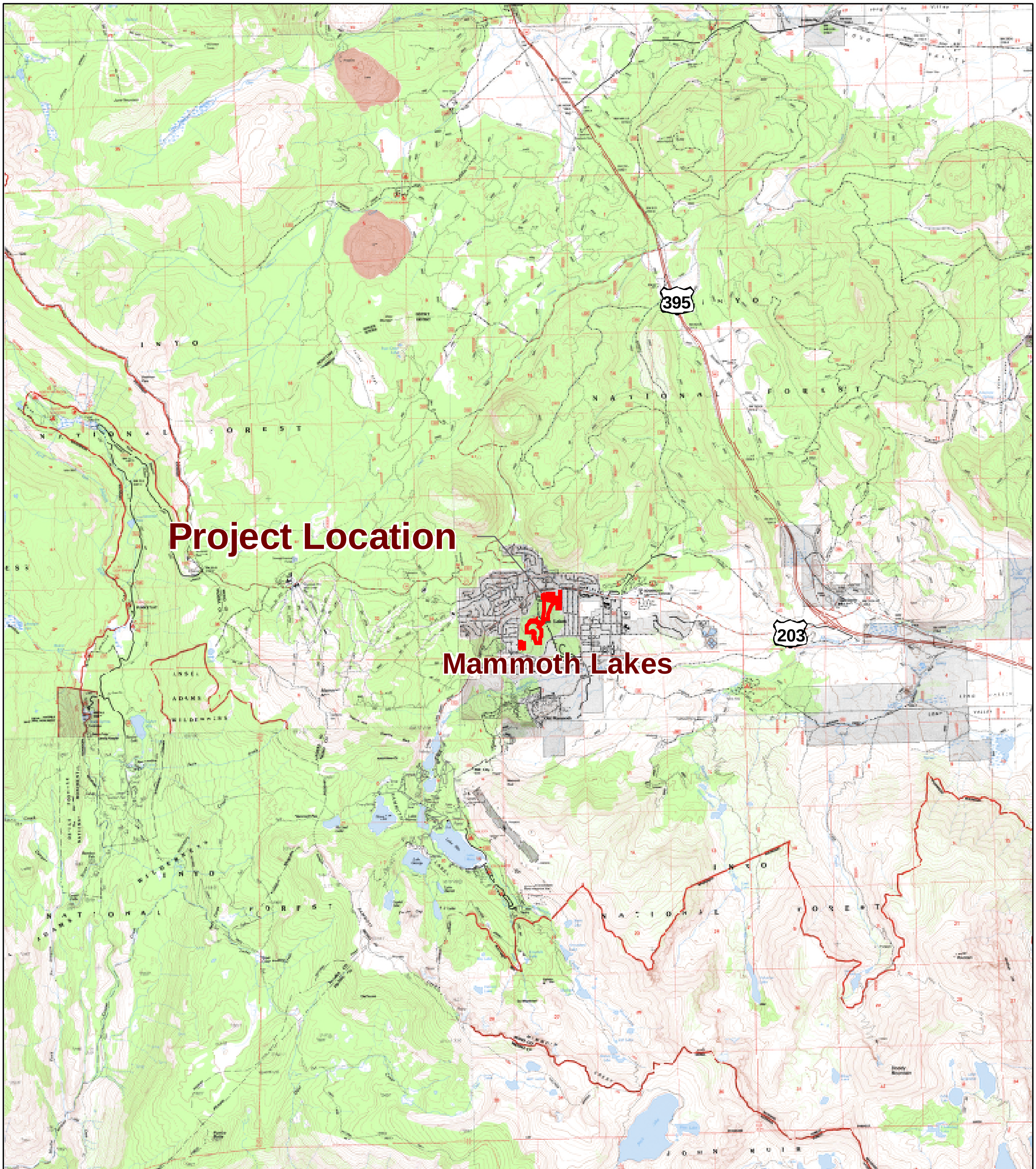

Figure 1. Location Map

Mammoth Lakes
Mono County, California

ENVIRONMENTAL CONSULTANTS

Date: Aug 2006
Basemap: USGS Topo Quad
Map By: Michael Rochelle
Filepath: I:\ACAD2000\15000\15166\GIS\ArcMap\Location.mxd

1.3 General Project Site Description

The Project Site is located in Mammoth Lakes, Mono County, California. The site includes various undeveloped parcels or portions of parcels surrounding the Sierra Star Golf Course located at Minaret Road and Meridian Boulevard. Meridian Boulevard borders the golf course to the south, Main Street to the north, and residential developments lie along the east and west borders. Minaret Road bisects the golf course. The Project Site is entirely surrounded by golf fairways and residential and/or commercial development and is characterized by Jeffrey pine forest with a sparse understory.

1.4 Regulatory Background

1.4.1 Special Status Species

Special status species include those plants and wildlife species that have been formally listed, are proposed as endangered or threatened, or are candidates for such listing under the federal Endangered Species Act (ESA) or California Endangered Species Act (CESA). These Acts afford protection to both listed and proposed species. In addition, California Department of Fish and Game (CDFG) Species of Special Concern, which are species that face extirpation in California if current population and habitat trends continue, U.S. Fish and Wildlife Service (USFWS) Birds of Conservation Concern, sensitive species included in USFWS Recovery Plans, and CDFG special status invertebrates are considered special status species. Although California and USFWS species of concern generally have no special legal status, they are given special consideration under the California Environmental Quality Act (CEQA). In addition to regulations for special status species, most birds in the United States, including non-status species, are protected by the Migratory Bird Treaty Act of 1918. Under this legislation, destroying active nests, eggs, and young is illegal. Plant species on California Native Plant Society (CNPS) Lists 1 and 2 are also considered special status plant species. Impacts to these species are considered significant according to CEQA. The CNPS List 3 and 4 plants have little or no protection under CEQA, but are included in this analysis for completeness. (The assessment may also include species of local concern as indicated by the USFWS list for the quad/county, or as designated by a City or County).

1.4.2 Sensitive Plant Communities and Aquatic Features

Sensitive habitats include habitats that fulfill special functions or have special values, such as wetlands, streams, and riparian habitat. These habitats are regulated under federal regulations (such as the Clean Water Act), state regulations (such as the Porter-Cologne Act, the CDFG Streambed Alteration Program, or the CEQA), or local ordinances or policies (city or county Tree Ordinances, Special Habitat Management Areas or General Plan Special Land Use areas).

<u>Waters of the United States</u>

The U.S. Army Corps of Engineers (Corps) regulates “Waters of the United States” under Section 404 of the Clean Water Act. “Waters of the U.S.” are defined broadly as waters susceptible to use in commerce, including interstate waters and wetlands, all other waters (intrastate waterbodies, including wetlands), and their tributaries (33 CFR 328.3). Potential wetland areas, according to the three criteria used to delineate wetlands stated in the *Corps of Engineers Wetlands Delineation Manual* (1987), are identified by the presence of (1) hydrophytic vegetation, (2) hydric soils, and

(3) wetland hydrology. Areas that are inundated for sufficient duration and depth to exclude growth of hydrophytic vegetation are subject to Section 404 jurisdiction as “other waters” and are often characterized by an ordinary high water line (OHW). Other waters, for example, generally include lakes, rivers, and streams. The placement of fill material into “Waters of the U.S.” (including wetlands) generally requires an individual or nationwide permit (NWP) from the Corps under Section 404 of the Clean Water Act.

Waters of the State

“Waters of the State” are defined by the Porter-Cologne Act as “any surface water or groundwater, including saline waters, within the boundaries of the state.” The RWQCB protects all waters in its regulatory scope, but has special responsibility for isolated wetlands and headwaters. These waterbodies have high resource value, are vulnerable to filling, and are not systematically protected by other programs. RWQCB jurisdiction includes “isolated” wetlands and waters that may not be regulated by the Corps under Section 404. “Waters of the State” are regulated by the RWQCB under the State Water Quality Certification Program which regulates discharges of fill and dredged material under Section 401 of the Clean Water Act and the Porter-Cologne Water Quality Control Act. Projects that require a Corps permit, or fall under other federal jurisdiction, and have the potential to impact “Waters of the State,” are required to comply with the terms of the Water Quality Certification determination. If a proposed project does not require a federal permit, but does involve dredge or fill activities that may result in a discharge to “Waters of the State,” the RWQCB has the option to regulate the dredge and fill activities under its state authority in the form of Waste Discharge Requirements or Certification of Waste Discharge Requirements.

Streams, Lakes, and Riparian Habitat

Streams and lakes, as habitat for fish and wildlife species, are subject to jurisdiction by the CDFG under Sections 1600-1616 of the State Fish and Game Code. Alterations to or work within or adjacent to streambeds or lakes generally require a 1602 Lake and Streambed Alteration Agreement. The term stream, which includes creeks and rivers, is defined in the California Code of Regulations (CCR) as follows: “a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation” (14 CCR 1.72). In addition, the term stream can include ephemeral streams, dry washes, watercourses with subsurface flows, canals, aqueducts, irrigation ditches, and other means of water conveyance if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife (CDFG ESD 1994). Riparian is defined as, “on, or pertaining to, the banks of a stream;” therefore, riparian vegetation is defined as, “vegetation which occurs in and/or adjacent to a stream and is dependent on, and occurs because of, the stream itself” (CDFG ESD 1994). Removal of riparian vegetation also requires a Section 1602 Lake and Streambed Alteration Agreement from CDFG.

Sensitive Plant Communities

Sensitive plant communities include habitats that fulfill special functions or have special values. Natural communities considered sensitive are those identified in local or regional plans, policies, regulations, or by the CDFG. CDFG ranks sensitive communities as ‘threatened’ or ‘very threatened’ and keeps records of their occurrences in its Natural Diversity Database. Sensitive plant communities are also identified by CDFG on their *List of California Natural Communities*

Recognized by the CNDDB. Impacts to sensitive natural communities identified in local or regional plans, policies, regulations or by the CDFG or USFWS must be considered and evaluated under the California Environmental Quality Act (California Code of Regulations: Title 14, Div. 6, Chap. 3, Appendix G).

2.0 METHODS

A site visit was conducted by WRA biologists on July 26, 2006, to determine (1) plant communities present within the Project Site, (2) if existing conditions provided suitable habitat for any special status plant or wildlife species, and (3) if sensitive habitats were present. Biological resources in the Project Site were also assessed in the past during field surveys conducted by a wildlife biologist on June 16 through 18, 1990 and by a botanist on June 26 through 27, 1990 (Town of Mammoth Lakes 1991). More recently, an update to the EIR Biotic Resources Report was prepared by Resource Concepts, Inc. (RCI) for the Sierra Star Master Plan on February 17, 2003. The following materials were reviewed prior to conducting the site visit: aerial photographs, 2006 permit applications for the Corps, RWQCB, and CDFG permits, a wetland delineation report (Resource Concepts, July 17, 2006), USGS topographic maps, current CNDDB records (CDFG 2006), and the CNPS on-line inventory (2006). In addition, the Soil Survey of Mono County, California [U.S. Department of Agriculture (USDA)] was examined to determine if any unique soil types that could support sensitive plant communities and/or aquatic features could be present in the Project Site.

2.1 Plant Communities

Plant communities were classified based on existing descriptions developed by the *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986). However, in some cases it is necessary to identify variants of plant community types or to describe non-vegetated areas that are not described in the literature.

2.2 Sensitive Habitats and Aquatic Features

Plant communities identified within the Project Site were evaluated to determine if they are considered sensitive under federal or state regulations or policies. Special methods used to determine potential jurisdiction under these regulations and policies are given below.

2.2.1 Wetlands and Waters

On July 27, 2006, a Section 404 jurisdictional wetland delineation was performed by biologists from WRA and Christopher Joseph & Associates within the Project Area. The purpose of this study was to determine if any wetlands and “waters” potentially subject to jurisdiction by the Corps, RWQCB, or CDFG were present. The delineation was based on methods contained in the Corps Manual (Environmental Laboratory 1987). The Project Site was evaluated for the presence of wetland indicators including dominance by hydrophytic plant species, presence of hydric soils, and presence of wetland hydrology. A summary of potential wetland and waters observed in the Project Site is provided in Section 3.2.1 of this report.

2.2.2 Riparian Habitat

An inspection of aerial photographs and site photographs was conducted to determine if the banks of drainages, streams, and other aquatic features within the Project Site supported hydrophytic or stream-dependent woody plant species (riparian species). In addition, CDFG, RWQCB, and Corps application packages were reviewed to determined whether riparian habitat was noted during studies conducted by the RCI Environmental Specialist.

2.3 Special Status Species

2.3.1 Literature Review

Potential occurrence of special status species on the Project Site was evaluated by first determining which special status species have potential to occur in the vicinity of the Project Site through a literature and database search. Database searches for known occurrences of special status species included the Old Mammoth 7.5 minute USGS quadrangle and the eight surrounding USGS quadrangles. The following sources were reviewed to determine which special status plant and wildlife species have been documented to occur in the vicinity of the Project Site:

1. California Natural Diversity Database records (CNDDB) (CDFG 2006)
2. USFWS Quadrangle Species Lists (USFWS 2006)
3. CNPS Electronic Inventory records (CNPS 2006)
4. CDFG publication “California’s Wildlife, Volumes I-III” (Zeiner et al. 1990)
5. CDFG publication “Amphibians and Reptile Species of Special Concern in California” (Jennings 1994)

2.3.2 Species Assessment

A species assessment was conducted by evaluating the suitability of habitats within the Project Site for those species recorded within the vicinity of the site. Potential for special status species to occur in the Project Site was then evaluated according to the following criteria:

(1) Not Present. Habitat on and adjacent to the site is clearly unsuitable for the species requirements (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).

(2) Unlikely. Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species is not likely to be found on the site.

(3) Moderate Potential. Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a moderate probability of being found on the site.

(4) High Potential. All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species has a high probability of being found on the site.

(5) Present. Species is observed on the site or has been recorded (i.e. CNDDB, other reports) on the site recently.

Appendix A presents the special status plant and wildlife species with a potential to occur within the Project Site, their habitat requirements, and a rating of potential for occurrence. A site visit was conducted to evaluate habitat suitability and to determine the potential for the Project to impact special status plant and wildlife species.

3.0 RESULTS AND DISCUSSION

The following sections present the results and discussion of the biological assessment for special status species and sensitive habitats within the Project Site. A map of plant communities and sensitive habitats including aquatic features is provided in Figure 2.

3.1 Plant Communities

Jeffrey pine-fir forest is the dominant plant community within and surrounding the Sierra Star Golf Course parcels. Within the Project Site, this community has been disturbed and fragmented by various types of developments, including roads, homes, and a golf course (Figure 2). Jeffrey pine-fir forest is not recognized as sensitive in local or regional plans, policies, regulations, or by the CDFG. The forest canopy consists of Jeffrey pine (*Pinus jeffreyi*), red fir (*Abies magnifica*), white fir (*Abies concolor*), and lodgepole pine (*Pinus contorta*). Common understory plants are comprised of montane chaparral species, including Great Basin sagebrush (*Artemesia tridentata*), tobacco brush, (*Ceanothus velutinus*), greenleaf manzanita (*Arctostaphylos patula*), creeping snowberry (*Symphoricarpos mollis*), and wax currant (*Ribes cereum*). The drainages contain herbaceous plants such as mule ears (*Wyethia mollis*), sedges (*Carex* spp.), and yarrow (*Achillea millefolium*). This plant community has an open understory, well-drained soils and transitions into subalpine coniferous forest and lodgepole pine forest at its upper elevation limit.

3.2 Sensitive Habitats

The Corps of Engineers regulates “waters of the United States” under Section 404 of the Clean Water Act. Such “waters” include a variety of features including streams, wetlands, and impoundments. Based on our initial review of available literature and photographs covering the Project Site, our biological assessment focused on three types of features–wetlands, other waters, and riparian habitat.

3.2.1 Other “Waters of the United States” and “Waters of the State”

Two unnamed streams were observed in the Project Site, identified on Figure 2 as Drainage A and Drainage B. Drainage A is a hydrologically isolated, remnant channel that may have been connected to the stormwater system. This feature did not exhibit any connection to a Water of the U.S. Drainage A did not contain well-defined bed and bank topography and did not exhibit signs of recent flow, such as sediment deposits or scour. Accumulation of pine cones and leaf litter also indicate that the feature did not convey water during the recent spring runoff resulting from snow melt.

Figure 2.
Map of Plant Communities and
Aquatic Features Within the Project Site

Mammoth Lakes
Mono County, CA

0 250 500 1,000
Feet

N W E S

wra
ENVIRONMENTAL CONSULTANTS

Date: Aug 2006
Map By: Michael Rochelle
Filepath: I:\Acad2000files\15000\15166\gis\Arcmap\PlantandWater.mxd

Drainage B is an ephemeral stream that flows between two golf course fairways (Figure 2). The channel is intermittently open and culverted under the golf course, discharging into a subsurface stormwater system that eventually flows into Mammoth Creek. The channel has flowing water only during and for a short duration following precipitation events in a typical year; runoff from rainfall and snow melt is the primary source of hydrology. The streambed is located above the water table year-round, therefore groundwater is not a primary source of water for stream flow. This feature meets the definition of "waters of the U.S." and "waters of the State", as it is inundated for sufficient duration and depth to exclude growth of hydrophytic vegetation, convey water, and is defined by the presence of an ordinary high water (OHW) mark. All areas that are below or contained by an OHW mark are considered to be "waters of the United States" and "waters of the State".

3.2.2 Wetlands

In addition to the drainages described in the previous section, one potential jurisdictional wetland feature was observed just south of Minaret Road. This feature appeared to be sustained by groundwater seepage that surfaced near the base of an earthen dam impounding a constructed pond. This area supported a predominance of hydrophytic vegetation, including wetland-classified northern willow herb (*Epilobium ciliatum*) and fireweed (*Epilobium angustifolium*). Sampled soil was determined to be hydric, as it exhibited a low chroma matrix and was distinct from soils observed in an adjacent upland area. Direct evidence of hydrology was also observed, in the form of sediment deposits, a well defined drainage pattern within the wetland, and algal mats on the soil surface. The wetland drained into a two foot-wide channel that entered a culvert, flowed under a newly constructed road off-site, and eventually entered a stormwater ditch. The wetland and associated channel did not exhibit a hydrologic connection to a jurisdictional "water of the U.S.", however, it did eventually flow into the stormwater system along Minaret Road. The jurisdictional status of this wetland would need to be verified by the Corps.

3.2.3 Riparian Habitat

Drainages within the Project Site did not support hydrophytic or stream-dependent woody plant species (riparian species). In addition, the presence of riparian habitat was not noted during past biological studies.

3.3 Special Status Species

3.3.1 Wildlife

The site visit did not constitute a protocol-level survey for potentially occurring special status wildlife species; however, if a special status species is observed during the site visit, its presence was recorded and potential impacts were evaluated under CEQA. Eighty-one special status species of wildlife have been recorded in the vicinity of the Project Site. Appendix A summarizes the potential for occurrence for these species. Of these species, 20 species are not likely to ever be present, 57 wildlife species are unlikely to occur, and ten species have a moderate potential. One species has a high potential for occurrence, Yuma myotis (*Myotis yumanensis*).

Many of the species were considered unlikely to occur because the Project Site is surrounded by development and a golf course. The species that were present during the site assessment or with a high or moderate potential for occurrence are discussed below.

High Potential

Yuma myotis *(Myotis yumanensis*), Western Bat Working Group (WBWG) Low-Medium Priority. This bat species is known for its ability to survive in urbanized environments. It is also found in heavily forested settings. Day roosts are found in buildings, trees, mines, caves, bridges and rock crevices. Night roosts are associated with man-made structures. This species may forage over the waters of the ponds and nearby grassland habitat. Suitable roosting and foraging habitat is available on site.

Moderate Potential

Long-eared myotis (*Myotis evotis).* WBWG Medium Priority. Long-eared myotis is a bat species that primarily inhabits coniferous forest and woodland, including juniper, ponderosa pine, and spruce-fir. It typically forages over rivers, streams, and ponds within the forest-woodland environment. During summer, it roosts in a wide variety of structures, including cavities in snags, under loose bark, stumps, buildings, rock crevices, caves and abandoned mines. During winter, it typically hibernates primarily in caves and abandoned mines. Suitable foraging habitat is available on site.

Fringed myotis (*Myotis thysanodes).* WBWG High Priority. This bat species has been found in hot desert scrubland, grassland, xeric woodland, sage-grass steppe, mesic old-growth forest, and multi-aged subalpine coniferous and mixed-deciduous forest. Xeric woodlands (oak and pinyon-juniper) appear to be the most commonly used. Where available, caves, buildings, underground mines, rock crevices in cliff faces and bridges are used for maternity and night roosts, while hibernation has only been documented in buildings and underground mines. Tree-roosting has also been documented in Oregon, New Mexico, and California. Suitable roosting and foraging habitat is available on site.

Long-legged myotis (*Myotis volans).* WBWG High Priority. Habitat of the long-legged myotis is primarily coniferous forests, but the species also occurs seasonally in riparian and desert habitats. They establish roosts in trees, rock crevices, fissures in stream banks, and buildings. Caves and mines are not used in the day, but *M. volans* can be captured there at night (Van Zyll de Jong, 1985). Suitable roosting and foraging habitat is available on site.

California Gull (*Larus californicus*). CDFG Species of Special Concern. California Gulls live in areas that contain lakes, marshes, and along the seacoast. They also reside on offshore islands, near rivers, agricultural land, and garbage dumps. When breeding, they often construct their nests near shrubs by bodies of water. Suitable roosting and foraging habitat is available on site.

Vaux's Swift (*Chaetura vauxi).* CDFG Species of Special Concern. Vaux's Swifts generally can be found in old-growth forests consisting of coniferous and deciduous vegetation. Very important to swifts' nesting grounds are large, hollow trees that are either dead or alive (Bull, Collins 1993). During the breeding season, Vaux's Swifts occupy forests of coast redwood and Douglas firs. They forage for food in naturally occurring openings in the forest and along streams as well as high above the tree-tops. Suitable roosting and foraging habitat is available on site.

Lewis' Woodpecker (*Melanerpes lewis).* USFWS, Bird of Conservation Concern (BCC).

Lewis' Woodpeckers prefer logged or burned out areas. They prefer old growth woodlands rather than dense forest. In winter they choose oak woodland or commercial orchards such as almond and walnut and pecan trees (Winkler et al. 1995). Suitable roosting and foraging habitat is available on site.

White-headed Woodpecker (*Picoides albolarvatus*). USFWS BCC. White-headed Woodpecker requires mature ponderosa pine stands. They have also been found in ornamental gardens, mixed ponderosa pine/Douglas fir forest, Douglas fir forest, Engelmann spruce/lodgepole pine forest and black cottonwoods. Suitable roosting and foraging habitat is available on site.

Olive-sided Flycatcher (*Contopus cooperi).* USFWS BCC. This species historically used recently burned areas, but now that most fires are suppressed, it often takes advantage of areas that have been logged, as well as other clearings and edges, which are superficially similar to post-fire stands.

Willow Flycatcher (*Empidonax traillii adastus*). State Endangered. Found in willow thickets and other brushy areas near streams, marshes, or other wetlands, and in clear-cuts and other open areas with nearby trees or brush. May forage and nest in the Project Site.

Southwestern Willow Flycatcher (*Empidonax traillii extimus*). Federal Endangered. Breeds in California from the Mexican border north to Independence in the Owens Valley, the South Fork Kern River, and the Santa Ynez River in Santa Barbara County. May forage and nest in the Project Site.

3.3.2 Plants

Based upon a review of the resources and databases given in Section 2.3.1, 31 special status plant species have been documented to occur in the general vicinity of the Project Site. Appendix A summarizes the potential for occurrence and habitat requirements for special status plant species in the Project Site. WRA conducted a protocol-level rare plant survey on July 26, 2006, which captured peak blooming periods of all special status plant species with potential to occur within the Project Site. Plant species were identified to the level necessary to determine if they were rare or not; no special status species were found in the Project Site. A list of observed species is provided in Appendix B.

4.0 CONCLUSION AND RECOMMENDATIONS

Based on the results of the biological assessment, eleven special status wildlife species have a moderate or high potential to occur within the Project Site; their potential habitat may be impacted by the proposed Project. Sensitive aquatic habitat features, including two drainages and one potential wetland feature, were also identified within the Project Site. No special status plant species were observed during the assessment.

The following sections present recommendations for future studies and/or measures to avoid or reduce impacts to these sensitive resources.

4.1 Sensitive Plant Communities and Aquatic Features

4.1.1 Wetlands and Waters

The jurisdictional delineation identified a potential wetland and two drainages that have the potential to be considered jurisdictional by the Corps, CDFG, and Regional Water Quality Control Board. Results of the wetland delineation study will be submitted to the Corps for verification. Impacts to aquatic or wetland features are considered a potentially significant impact and would need to be authorized through Section 404 and 401permits. Impacts to the bed or bank of any stream or tributary channel may also require a CDFG Streambed Alteration Agreement.

<u>Waters of the U.S. including Wetlands</u>

The potential water features identified within the Project Site appear to be ephemeral. For the Los Angeles Corps District, the 300 linear foot fill limit allowed under the Nationwide Permit Program, does not apply to ephemeral streams. The area of mapped wetlands was less than 0.5 acre, the upper limit allowed to be filled under the Nationwide Permit Program. It is expected that impacts to both potential wetland and water features can be permitted under the Nationwide Permit Program.

<u>“Waters of the State”</u>

When the Corps of Engineers issues a permit for fill of “waters of the United States”, it must also receive a Certification of Water Quality from the RWQCB under Section 401 of the Clean Water Act. The Regional Boards often follow the Corps lead on jurisdictional issues. However, in cases when the Corps does not exert federal jurisdiction over either wetlands or streams due to exemptions or exclusions from the Clean Water Act, the State claims these features as “waters of the State”. In addition, the CDFG also regulates fill within streams under Section 1600 of the Fish and Game Code. Both the RWQCB and the CDFG use similar definitions of “bed and bank” for determining their jurisdiction in streams. However, the CDFG also requires that the stream support aquatic life.

For the golf course site, all the areas described above would also be “waters of the State” and subject to regulation by both RWQCB and CDFG, even if the Corps does not exert jurisdiction. It is possible that the ephemeral streams may not require a Section 1600 Streambed Alteration Agreement if it can be shown they do not possess “aquatic life”. However, even these features can be regulated and are subject to permitting depending upon the local policies.

4.2 Plants

WRA conducted a protocol-level rare plant survey on July 26, 2006, which captured peak blooming periods of all special status plant species with potential to occur within the Project Site. The site visit confirmed their absence with certainty; therefore, potential adverse impacts to special status plants are not expected to occur as a result of the proposed Project.

4.3 Wildlife

4.3.1 Bats

Suitable roost habitat is present for four special status bat species: long-eared myotis, long-legged myotis, fringed myotis and Yuma myotis. Potential roost habitat within the Project Site includes any mature (>25" dbh) tree stand and any large snags or felled trees. To avoid impacting breeding or hibernating bats, it is recommended that tree and snag removal occur in September and October, after the bat breeding season and before the bat hibernation season. If snag and tree removal is to take place outside of this time frame, a bat survey should be conducted. If no roosting bats are found during the survey, no further mitigation would be required. If bats are detected, a 50-foot buffer exclusion zone should be established around each occupied snag or tree until the roosting period has ended. Implementation of these impact avoidance measures would reduce potential impacts to roosting bats to a less than significant level.

4.3.2 Birds

Since raptors and other birds may potentially nest within the trees and shrubs that occur in and adjacent to the Project Site, there is a potential for construction-related impacts to nesting birds. Snags are also an important habitat requirement for cavity nesting bird species. Disturbance that results in the abandonment of an active nest is considered a significant impact.

There are two approaches to avoid impacts to these species. The first approach is to limit construction to September through March, when birds are not nesting. The second approach is to conduct pre-construction surveys for nesting birds (a standard CEQA requirement) if construction is to take place during the nesting season. The purpose of these surveys is to avoid project-related impacts and establish a disturbance buffer if nests are located. A minimum exclusion buffer of 25 feet is required by CDFG for songbird nests, and 200 to 500 feet for raptor nests, depending on the species and location.

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APPENDIX A

LIST OF POTENTIAL SPECIAL STATUS PLANT AND ANIMAL SPECIES

Appendix A. Special status wildlife and plant species that may occur, or are known to occur in habitats similar to those found in the Project Area. List compiled from the California Department of Fish and Game (CDFG) Natural Diversity Database (CDFG 2006) and USFWS Species lists (USFWS 2006) of Old Mammoth, Mammoth Mountain, June Lake, Bloody Mountain, Crestview, Convict Lake, Dexter Canyon, Crystal Crag, and Whitmore Springs USGS 7.5 minute quadrangles.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
Mammals			
Townsend's western big-eared bat *Corynorhinus townsendii townsendii*	CSC	Primarily found in rural settings in a wide variety of habitats including oak woodlands and mixed coniferous-deciduous forest. Day roosts highly associated with caves and mines. Very sensitive to human disturbance.	**Unlikely.** Study Area surrounded by development and disturbance.
Western small-footed myotis *Myotis ciliolabrum*	WBWG: Medium Priority	Commonly found in arid uplands of California. Feeds on a variety of small flying insects. Seeks cover in caves, buildings, mines, crevices, and occasionally under bridges.	**Unlikely.** Study Area lacks suitable roosting habitat.
long-eared myotis *Myotis evotis*	WBWG: Medium Priority	Primarily a forest associated species. Day roosts in hollow trees, under exfoliating bark, rock outcrop crevices and buildings. Other roosts include caves, mines and under bridges.	**Moderate Potential.** Study Area contains suitable day roosts.
fringed myotis *Myotis thysanodes*	WBWG: High Priority	Associated with a wide variety of habitats including mixed coniferous-deciduous forest and redwood/sequoia groves. Buildings, mines and large snags are important day and night roosts.	**Moderate Potential.** Study Area contains suitable day roosts.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
long-legged myotis *Myotis volans*	WBWG: High Priority	Generally associated with woodlands and forested habitats. Large hollow trees, rock crevices and buildings are important day roosts. Other roosts include caves, mines and buildings.	**Moderate Potential.** Study Area contains suitable day roosts.
Yuma myotis *Myotis yumanensis*	WBWG: Low-Medium Priority	Known for its ability to survive in urbanized environments. Also found in heavily forested settings. Day roosts in buildings, trees, mines, caves, bridges and rock crevices. Night roosts associated with man-made structures.	**High Potential.** Study Area contains suitable day roosts and species is not sensitive to disturbances.
spotted bat *Euderma maculatum*	CSC	Prefers ponderosa pine forest or marshland. Roosts in small cracks found in cliffs and stony outcrops.	**Unlikely.** Study Area lacks suitable roosting habitat.
western mastiff bat *Eumops perotis californicus*	CSC	Found in a wide variety of habitat. Distribution appears to be tied to large rock structures which provide suitable roosting sites, including cliff crevices and cracks in boulders.	**Unlikely.** Study Area lacks suitable roosting habitat.
Mt. Lyell shrew *Sorex lyelli*	CSC	Found in high elevation riparian areas in the southern Sierra Nevada. Requires moist soils, lives in grass or under willows, uses logs for cover.	**Unlikely.** Only known to occur at high elevation in Yosemite National Park.
Sierra Nevada bighorn sheep *Ovis canadensis californiana*	FE	All bighorn sheep migrate between high mountain slopes in the summer and foothill slopes in winter. They live in areas that are rarely disturbed by humans.	**Unlikely.** Study Area is disturbed and surrounded by development.
Pygmy rabbit *Brachylagus idahoensis*	CSC	Requires tall, dense, large-shrub stages of sagebrush, greasewood, and rabbitbrush.	**Unlikely.** Study Area is south of known range.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
Mono Basin (Sierra Nevada) mountain beaver *Aplodontia rufa californica*	CSC	Typically occur in dense riparian-deciduous and open, brushy stages of most forest types. Typical habitat in the Sierra Nevada is montane riparian.	**Unlikely.** Typical habitat not present in Study Area.
Sierra Nevada snowshoe hare *Lepus americanus tahoensis*	CSC	Occurs in boreal zones of riparian communities. They typically occupy altitudes between 5000 and 8000 feet.	**Unlikely.** Study Area is south of known range.
Western white-tailed jackrabbit *Lepus townsendii*	CSC	Frequents pastures and cultivated grainfields, bordered by willow thickets and wild rose tangles, as well as the native short-grass sagebrush plains.	**Unlikely.** Typical habitat not present in Study Area.
Sierra Nevada red fox *Vulpes vulpes necator*	ST	Dense vegetation and rocky areas are used for cover and den sites. Prefer forests interspersed with meadows or alpine fields.	**Unlikely.** Rare species at higher elevations.
California wolverine *Gulo gulo luteus*	ST	Uses caves, logs, and burrows for den sites. Requires water source. Hunts in more open areas. Disperses long distances.	**Unlikely.** Study Area is disturbed and surrounded by development.
American marten *Martes americana*	CSC	Prefers mixed evergreen forests with more than 40% crown closure. Particularly likes old-growth conifers and snags with cavities for dens.	**Unlikely.** There are recorded occurrences in the mammoth ski area, however, the Study Area is disturbed and surrounded by development.
fisher *Martes pennanti*	CSC	Primarily inhabit mixed conifer forests composed of Douglas fir and associated conifers. They prefer heavy stands of mixed species of mature timber. They prey on a variety of small and medium sized mammals.	**Unlikely.** There are recorded occurrences in the mammoth ski area, however, the Study Area is disturbed and surrounded by development.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
American badger *Taxidea taxus*	CSC	This nocturnal carnivor prefers to live in dry, open grasslands, fields, and pastures.	**Unlikely.** Study Area is disturbed and surrounded by development.
Birds			
Double-crested Cormorant *Phalacrocorax auritus*	CSC	They require water for feeding and nearby perches, such as rocks, sandbars, pilings, , wires, trees or docks for resting on and drying out during the day.	**Unlikely.** Quality aquatic habitat not available.
American Bittern *Botaurus lentiginosus*	CSC	Occurs in fresh emergent wetlands, often hiding, resting, and roosting solitarily amidst tall, dense, emergent vegetation, on ground, or near ground on log, stump, or on emergent plants.	**Unlikely.** Dense emergent vegetation not present.
Snowy Egret (rookery) *Egretta thule*	SLC	Widespread along shores of coastal estuaries, fresh and saline emergent wetlands, ponds, slow-moving rivers, irrigation ditches, and wet fields. Feeds primarily on small fish, crustaceans and large insects.	**Unlikely.** Dense emergent vegetation not present.
Bald Eagle *Haliaeetus leucocephalus*	FT, SE, CFP	Requires large bodies of water, or free-flowing rivers with abundant fish adjacent snags or other perches. Nests in large, old-growth, or dominant live tree with open branchwork.	**Unlikely.** Suitable aquatic habitat not available.
Northern Harrier *Circus cyaneus*	CSC	Frequents meadows, grasslands, rangelands, fresh and saltwater emergent wetlands throughout California. Nests in shrubby vegetation on ground.	**Unlikely.** Study Area is disturbed and surrounded by development.
Sharp-shinned Hawk *Accipiter striatus*	CSC	Generally associated with woodland habitats. Typically nests in isolated areas away from human disturbance.	**Unlikely.** Study Area is disturbed and surrounded by development.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
Coopers Hawk *Accipiter cooperii*	CSC	Inhabits areas with dense tree stands or patchy woodlands. Usually nests in deciduous riparian areas or second-growth conifer stands near streams.	**Unlikely.** Study Area is disturbed and surrounded by development.
Ferruginous Hawk *Buteo regalis*	CSC	Frequents open grasslands, sagebrush flats, desert scrub, low foothills surrounding valleys and fringes of pinyon-juniper habitats.	**Unlikely.** Suitable nest trees are on site, but typical foraging area is not.
Swainson's Hawk *Buteo swainsoni*	ST	Breeds in stands with few trees in juniper-sage flats, riparian areas and oak savannah. Requires adjacent suitable foraging areas such as grasslands or grain fields supporting rodent populations.	**Unlikely.** Suitable nest trees are on site, but typical foraging area is not.
Northern Goshawk *Accipiter gentilis*	CSC	Prefers dense, mature conifer and deciduous forest usually near open space. Usually nests on north facing slopes near water.	**Unlikely.** Typical nesting habitat not available in the Study Area.
Prairie Falcon *Falco mexicanus*	CSC	Inhabits dry, open terrain. Breeding sites located on cliffs. Forages widely.	**Unlikely.** Suitable nesting habitat not available.
American Peregrine Falcon *Falco peregrinus anatum*	FD, SE, CFP	Winters throughout Central Valley. Requires protected cliffs and ledges for cover. Feeds on a variety of birds, and some mammals, insects, and fish.	**Unlikely.** Suitable nesting habitat not available.
Osprey *Pandion haliaetus*	CSC	Nests in tree tops near ocean shores, bays, fresh-water lakes, and larger streams.	**Unlikely.** Suitable aquatic habitat not available.
Long-billed Curlew *Numenius americanus*	CSC	Winters in large coastal estuaries, upland herbaceous areas, and croplands. Breeds in northeastern California in wet meadow habitat.	**Unlikely.** Suitable foraging habitat not available.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
California Gull *Larus californicus*	CSC	Overwinters on farmland and along the Pacific coast from southern Washington to Guatemala	**Moderate Potential.** Mono Lake is the second largest California Gull rookery in North America.
California Spotted Owl *Strix occidentalis occidentalis*	CSC	Resides in dense, old growth, multi-layered mixed conifer, redwood, and Douglas fir habitats.	**Unlikely.** Typical nesting habitat not present.
Short-eared Owl *Asio flammeus*	CSC	Found in open, treeless areas with elevated sites for perches and dense vegetation for roosting and nesting.	**Unlikely.** Typical nesting and foraging habitat not present.
Long-eared Owl *Asio otus*	CSC	Inhabit open woodlands, forest edges, riparian strips along rivers, hedgerows, juniper thickets, woodlots, and wooded ravines and gullies. Breeding habitat must include thickly wooded areas for nesting and roosting with nearby open spaces for hunting.	**Unlikely.** Typical nesting and foraging habitat not present.
Great Grey Owl *Strix nebulosa*	SE	Resident of mixed conifer or red fir forest habitat, in or near meadows. Requires large diameter snags with high canopy closure.	**Unlikely.** Typical nesting habitat not present.
Flammulated Owl *Otus flammeolus*	CSC	Prefers mature stands of ponderosa pines and Jeffrey pines with douglas fir understory.	**Unlikely.** Typical nesting and foraging habitat not present.
Western Burrowing Owl *Athene cunicularia hypugea*	CSC	Frequents open grasslands and shrublands with perches and burrows. Preys upon insects, small mammals, reptiles, birds, and carrion. Nests and roosts in old burrows of small mammals.	**Unlikely.** Typical nesting and foraging habitat not present.
Greater Sage Grouse *Centrocercus urophasianus*	CSC	They are typically found in areas with low, rolling hills adjacent to valleys. They prefer medium-density sagebrush mixed with a variety of other plants.	**Unlikely.** Typical sage brush habitat minimal within Study Area.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
Black Swift *Cypseloides niger*	CSC	Breeds in small colonies on cliffs behind or adjacent to waterfalls in deep canyons and sea-bluffs above surf. Forages widely.	**Unlikely.** Suitable nesting habitat not available.
Vaux's Swift *Chaetura vauxi*	CSC	Forages high in the air over most terrain and habitats but prefers rivers/lakes. Requires large hollow trees for nesting.	**Unlikely.** Preferred foraging habitat not available.
Lewis' Woodpecker *Melanerpes lewis*	FWS:BCC	Found in riparian areas, nests in cavities excavated by other woodpeckers.	**Moderate Potential.** Large snags present on Study Area.
White-headed Woodpecker *Picoides albolarvatus*	CSC	Strongly associated with pine forests of the Transition and lower Canadian life zones. Breed primarily between 4000 to 7500 feet in elevation.	**Moderate Potential.** Large snags present on Study Area.
Olive-sided Flycatcher *Contopus cooperi*	FWS:BCC	Most often found in montane conifer forests where tall trees overlook canyons, meadows, lakes or other open terrain	**Moderate Potential.** Possible summer resident.
Willow Flycatcher *Empidonax traillii adastus*	SE	Found in willow thickets and other brushy areas near streams, marshes, or other wetlands, and in clear-cuts and other open areas with nearby trees or brush.	**Moderate Potential.** Possible summer resident.
Southwestern Willow Flycatcher *Empidonax traillii extimus*	FE	Breeds in California from the Mexican border north to Independence in the Owens Valley, the South Fork Kern River, and the Santa Ynez River in Santa Barbara County.	**Moderate Potential.** Possible summer resident.
California Horned Lark *Eremophila alpestris actia*	CSC	The Horned Lark inhabits open ground with short grass or scattered bushes.	**Unlikely.** Typical open habitat not abundant in Study Area.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
Yellow-headed Blackbird *Xanthocephalus xanthocephalus*		Their habitat requirements are similar to those of Red-winged Blackbirds, but Yellow-headed Blackbirds require larger wetlands with deeper water.	**Unlikely.** Preferred large wetland areas not present in Study Area.
Bank Swallow *Riparia riparia*	ST	Migrant in riparian and other lowland habitats in western California. Nests in riparian areas with vertical cliffs and bands with fine-textured or sandy soils in which to nest.	**Unlikely.** Typical nesting area not present in Study Area.
LeConte's Thrasher *Toxostoma lecontei*	CSC	A ground nesting bird of successional-scrub habitat.	**Unlikely.** Typical nesting area not present in Study Area.
Loggerhead Shrike *Lanius ludovicianus*	CSC	Prefers open habitats with scattered shrubs, trees, pots, utility lines from which to forage for large insects. Nest well concealed above ground in densely-foliaged shrub or tree.	**Unlikely.** Typical open habitat not abundant in Study Area.
Yellow Warbler *Dendroica petechia*	CSC	Prefers areas of scattered trees, dense shrubbery, and any other moist, shady areas	**Unlikely.** Typical dense shrub habitat not abundant in Study Area.
Virginia Warbler *Vermivora virginiae*	CSC	Preferred habitats include scrub oak and other chaparral, pinyon-juniper brushland, pine and oak woodlands.	**Moderate Potential.** Suitable habitat present in Study Area.
Yellow-breasted Chat *Icteria virens*	CSC	Requires dense riparian thickets of willows, vine tangles, and dense brush associated with streams, swampy ground and the borders of small ponds	**Unlikely.** Typical dense shrub habitat not abundant in Study Area.
Brewer's Sparrow *Spizella breweri*	CSC	Prefers extensive, unbroken stands of sagebrush and bitterbrush.	**Unlikely.** Typical sage brush habitat minimal within Study Area.
Bell's Sage Sparrow *Amphispiza belli belli*	CSC	Nests in chaparral with dense stands of chamise. Nests beneath shrubs.	**Unlikely.** Typical brush habitat minimal within Study Area.
Reptiles and Amphibians			

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
Panamint alligator lizard *Elgaria panamintina*	CSC	Occurs only in Inyo and southeastern Mono counties.	**Unlikely.** Typical desert habitat not in Study Area.
northern sagebrush lizard *Sceloporus graciosus graciosus*	BLM: Sensitive	Ground dweller usually found near bushes, logs, or rocks. Needs good light, open ground, and scattered low bushes.	**Low Potential.** Suitable habitat not present in Study Area.
Owens Valley web-toed salamander *Hydromantes sp.*	CSC	Prefers granite rock exposures, talus, and rock fissures, near seepages from streams or melting snow	**Unlikely.** Typical granite rock outcroppings not present.
Mt. Lyell salamander *Hydromantes platycephalus*	CSC	Found in massive rock areas in mixed conifer, red fir, lodgepole pine, and subalpine habitats between 4000 to 11,600 feet in elevation. Active on the surface only when free water is available.	**Unlikely.** Typical granite rock outcroppings not present.
Yosemite toad *Bufo canorus*	CSC	Found in vicinity of central High Sierras 6400 to 11,300 feet in elevation. Prefers wet meadows and seasonal ponds associated with conifer forest.	**Unlikely.** Golf course ponds only aquatic habitat available.
Northern leopard frog *Rana pipiens*	CSC	It prefers to live where there is a permanent body of standing or slowly flowing water, and among the aquatic vegetation of such places. May be found in golf courses.	**Unlikely.** Golf course ponds may provide suitable habitat but there are no recorded occurrences near Study Area.
mountain yellow-legged frog *Rana muscosa*	CSC	Found in sunny riverbanks, meadow streams, and isolated pond of the High Sierra usually higher than 4500 feet in elevation. Always encountered within a few feet of water. Tadpoles may require up to two years to complete development.	**Unlikely.** Aquatic habitat in Study Area either unsuitable or highly disturbed.
Fishes			

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
Mountain sucker *Catostomus platyrhynchus*	CSC	The mountain sucker lives in mountain streams with clear cold water with sand,gravel, or boulder bottoms.	**Not Present**. Suitable aquatic habitat not available.
Owens sucker *Catostomus fumeiventris*	CSC	Inhabits silty to rocky pools and runs of creeks in Owens River drainage.	**Not Present.** Suitable aquatic habitat not available.
Amargosa pupfish *Cyprinodon nevadensis amargosa*	CSC	Found in the Amargosa River northwest of Saratoga Springs in Death Valley.	**Not Present**. Outside of range.
Owens tui chub *Gilia bicolor snyderi*	FE, SE	Prefer undercut banks or aquatic plants to provide cover from predatory birds. Owens tui chubs of all ages spend the winter in deeper waters.	**Not Present** Suitable aquatic habitat not available.
Owens pupfish *Cyprinodon radiosus*	FE, SE	Prefers habitats with good water quality, vegetation and a silt or sand-covered substrate along the Owens River.	**Not Present** Suitable aquatic habitat not available.
Owens speckled dace *Rhinichthys osculus*	CSC	Inhabits rocky riffles, runs and pools of headwaters, creeks and small to medium rivers.	**Not Present** Suitable aquatic habitat not available.
Lahontan cutthroat trout *Oncorhynchus clarki henshawi*	FT	Historically found in all accessible cold waters of the Lahonton Basin. Cannot tolerate other salmonids. Requires gravel riffles in streams for spawning.	**Not Present** Suitable aquatic habitat not available.
Paiute cutthroat trout *Oncorhynchus clarki seleniris*	FT	Requires cool well-oxygenated waters. Cannot tolerate the presence of other salmonids. Requires clean gravel for spawning.	**Not Present**. Suitable aquatic habitat not available.
Sacramento perch *Archoplites interruptus*	CSC	Originally occurs in vegetated sloughs, pools of sluggish rivers and lakes; now most common in ponds and impoundments	**Unlikely.** Suitable aquatic habitat consists of golf course pond.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
Longfin Smelt *Spirinchus thaleichthys*	CSC	Found close to shore, in bays and estuaries and ascends coastal streams to spawn however, there are landlocked populations.	**Not Present**. Suitable aquatic habitat not available.
Sacramento splittail *Pogonichthys macrolepidotus*	FT, CSC	Splittail are primarily freshwater fish, but are tolerant of moderate salinity (saltiness) and can live in water with salinities of 10-18 parts per thousand. Found in Sacramento Delta.	**Not Present** Suitable aquatic habitat not available.
Red Hills roach *Lavinia symmetricus*	CSC	Found in small streams near Sonora. Found in areas with serpentine soil.	**Not Present** Outside of range.
Invertebrates			
vernal pool fairy shrimp *Branchinecta lynchi*	FT	Inhabit small, clear-water sandstone-depression pools, grassy swales, slumps, or basalt-flow depression pools.	**Not Present.** Suitable habitat not present in Study Area.
vernal pool tadpole shrimp *Lepidurus packardi*	FE	Pools commonly found in grass bottomed swales of unplowed grasslands. Some pools are mud-bottomed and highly turbid.	**Not Present.** Suitable habitat not present in Study Area.
valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT	Occurs in mature elderberry bushes in the Central Valley. Adults are rarely encountered, but their presence is inferred by distinctive oval emergence holes in elderberry branches. Prefers to lay eggs in branches 2-8 inches in diameter.	**Not Present.** Suitable habitat not present in Study Area.
Plants			
Arabis cobrensis Masonic rock cress	List 2	Great Basin sagebrush scrub, pinyon and juniper woodland, on sandy soils. Blooming period June-July. 1375-2800 m.	**Not Present**. Species was not observed during July site visit.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
Arabis pinzliae Pinzl's rock cress	FSC, List 1B	Deep, loose, sandy to gravelly granitic scree or alluvium in mostly steeply-sloped dry drainages, avalanche chutes, and snow depressions on north to east aspects, in the subalpine conifer forest, subalpine sagebrush, and alpine fell-field zones. Blooming period July. 3000 - 3350 m.	**Not Present.** Site is below typical species elevation range and it does not support suitable subalpine or alpine habitats. Furthermore, species was not observed during July site visit.
Astragalus johannis-howellii Long Valley milk-vetch	SR, List 1B	Great Basin sagebrush scrub. In sandy volcanic ash or pumice with sagebrush scrub. 2030-2530m.	**Not Present**. Species was not observed during July site visit.
Astragalus lemmonii Lemmon's milk-vetch	List 1B	Great Basin sagebrush scrub, meadows and seeps, marshes and swamps. Lakeshores, meadows and seeps. Blooming period May-August. 1280-2200m.	**Not Present**. Species was not observed during July site visit.
Astragalus monoensis var. monoensis Mono milk-vetch	SR, List 1B	Great Basin scrub, and upper montane coniferous forest/ pumice, gravelly or sandy. Blooming period Jun-August. 2110 - 3355 m.	**Not Present**. Species was not observed during July site visit.
Botrichium ascendens upswept moonwort	List 2	Lower montane coniferous forest. Grassy fields, coniferous woods near springs and creeks. Blooming period July-August. 1500-2060m.	**Not Present**. Species was not observed during July site visit.
Carex scirpoidea ssp. *pseudoscirpoidea* single-spiked sedge	List 2	Alpine boulder and rock fields, meadows and seeps, subalpine coniferous forest (rocky)/mesic, often on carbonate soils. Blooming period July-September. 3200-3700 m.	**Not Present.** Site is below typical species elevation range and it does not support suitable subalpine or alpine habitats. Species was not observed during July site visit.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
Crepis runcinata ssp. *hallii* Hall's meadow hawksbeard	List 2	Mojave desert scrub, pinyon-juniper woodland. Moist, alkaline valley bottoms. Blooming period May-July. 375-2100m.	**Not Present.** Site is above typical species elevation range and it does not support suitable pinyon juniper or alkaline wetland habitat. Species was not observed during July site visit.
Draba breweri var. cana hoary draba	List 2	Alpine boulder, rock field, meadows, seeps, and subalpine coniferous forest. Blooming period July. 3000 - 3505 m.	**Not Present.** Site is below typical species elevation range does not support subalpine, alpine, or upper montane meadow habitats. Species was not observed during July site visit.
Draba incrassata Sweetwater Mountains draba	List 1B	Alpine boulder and rock field. Endemic to the rhyolite substrates of the Sweetwater Mtns, on loose, steep talus slopes. Blooming period July-August. 2500-3500m.	**Not Present.** Species was not observed during July site visit.
Draba lonchocarpa var. lonchocarpa spear-fruited draba	List 2	Alpine boulder and rock field. Blooming period Jun-July. 3000 - 3295 m.	**Not Present.** Site is below typical species elevation range and it does not support suitable subalpine or alpine habitats. Species was not observed during July site visit.
Draba praealta subalpine draba	List 2	Meadows and seeps. Blooming period Jul-August. 2500 - 3415 m.	**Not Present.** Site does not support suitable upper montane meadow and seep habitats. Disturbed site conditions would likely preclude the occurrence of this species.
Elymus scribneri Scribner's wheat grass	List 2	Alpine boulder and rock field. On rocky slopes. Blooming period July-August. 2900-4200m.	**Not Present.** Species was not observed during July site visit.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
Epilobium howellii subalpine fireweed	List 1B	Meadows, subalpine coniferous forest. Wet meadows, mossy seeps. Blooming period July-August. 1970-2700m.	**Not Present.** Species was not observed during July site visit.
Helodium blandowii Blandow's bog-moss	List 2	Meadows and seeps, subalpine coniferous forest. Moss growing on damp soil. Moss. 2000-2700m.	**Not Present.** Species was not observed during July site visit.
Hulsea brevifolia short-leaved hulsea	List 1B	Lower and upper montane coniferous forest/ granitic or volcanic, gravelly or sandy. Blooming period May-August. 1500 - 3200m.	**Not Present.** Species was not observed during July site visit..
Hulsea vestita ssp. inyoensis Inyo hulsea	SLC, List 2	Chenopod scrub, Great Basin scrub, pinyon and juniper woodland / rocky. Blooming period April - June. 1645 - 3000 m.	**Not present.** Site does not support chenopod scrub, or juniper woodland habitats. Species was not observed during July site visit.
Ivesia kingii var. *kingii* alkali ivesia	List 1B	Meadows, great basin scrub, playas. Alkaline meadows, alkaline flats, and low-lying alkaline basins; w/Distichlis, Sporobolus, Juncus, etc. Blooming period June-August. 1200-2130m.	**Not Present.** Species was not observed during July site visit.
Kobresia bellardii seep kobresia	List 2	Alpine boulder and rock field (mesic), meadows and seeps (carbonate), and subalpine coniferous forest. Blooming period August. 2955 - 3230 m.	**Not Present.** Site does not support suitable subalpine or alpine habitats. Species was not observed during July site visit.
Lupinus duranii Mono Lake lupine	List 1B	Great Basin scrub, subalpine coniferous forest, and upper montane coniferous forest/ volcanic pumice, gravelly Blooming period May-August 2000 - 3000 m.	**Not Present.** Species was not observed during July site visit.
Lupinus lepidus var. *culbertsonii* Hockett Meadows lupine	List 1B	Meadows and seeps, upper montane coniferous forest (mesic, rocky). Blooming period July-August. 2440-3000 m.	**Not Present.** Species was not observed during July site visit.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
Pedicularis crenulata scalloped-leaved lousewort	List 2	Meadows and seeps. Near streams in wet meadows. Blooming period June-July. 2100-2300m.	**Not Present.** Species was not observed during July site visit.
Phacelia inyoensis Inyo phacelia	List 1B	Meadows and seeps. Alkaline meadows. Blooming period April-August. 1025-3200m.	**Not Present.** Species was not observed during July site visit.
Potamogeton filiformis slender-leaved pondweed	List 2	Shallow, clear water of freshwater marshes and swamps, drainage channels, edges of ponds and lakes. 300-2150 m. Blooms May-July.	**Not Present.** Species was not observed during July site visit.
Potamogeton robbinsii Robbins's pondweed	List 2	Marshes and swamps (deep water, lakes). Blooming period July-August 1585 - 3300 m.	**Not Present.** Species was not observed during July site visit.
Salix brachycarpa ssp. brachycarpa short-fruited willow	List 2	Alpine dwarf scrub, meadows and seeps, subalpine coniferous forest/ carbonate soils. Blooming period June-July. 3200 - 3500 m.	**Not present.** Site is below typical species elevation range and it does not support suitable subalpine, alpine, or upper montane meadow habitats. Species was not observed during July site visit.
Salix nivalis snow willow	List 2	Alpine dwarf scrub. Blooming period July-August. 3100 - 3500 m.	**Not present.** Site is below typical species elevation range and it does not support suitable subalpine or alpine habitats. Species was not observed during July site visit.
Scirpus pumilus dwarf bulrush	List 2	Alpine dwarf scrub. Wet sites, limestone soils. Blooming period August. 2875-3250m.	**Not present.** Site is below typical species elevation range and it does not support suitable subalpine or alpine habitats. Species was not observed during July site visit.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
Sedum pinetorum Pine City sedum	List 3	Unknown habitat requirements. Known only from the type collection from deserted Pine City above Mammoth. Blooming period July. 2650 - 2650 m.	**Not present.** Species was not observed during July site visit.
Sphaeromeria potentilloides var. *nitrophila* alkali tansy-sage	List 2	Meadows and seeps, playas. Usually alkaline soils. Blooming period June-July. 2100-2400m.	**Not present.** Species was not observed during July site visit.

*** Key to status codes:**
Status codes used above are:
FE - Federal Endangered
FT - Federal Threatened
FC - Federal Candidate
FD - Federal Delisted
FSC - United States Fish and Wildlife Service Federal Species of Concern
USFWS BCC Fish and Wildlife Service Bird of Conservation Concern
NMFS - Species under the Jurisdiction of the National Marine Fisheries Service
SE - State Endangered, CFP - CDFG Fully Protected Animal
CSC - CDFG Species of Special Concern, CSC (Draft) - 4 April 2001 Draft CDFG Species of Special Concern
CFP - California Fully Protected
SLC - Species of Local Concern
WBGB- Western Bat Working Group
None - No status given but rookery sites are monitored by CDFG
List 1B - CNPS 1B List, Endangered, Threatened, or Rare in California

APPENDIX B

LIST OF OBSERVED PLANT AND ANIMAL SPECIES

Appendix B. List of animal and plant species observed in the Project Site during the site visit conducted on July 26, 2006.

SCIENTIFIC NAME	COMMON NAME
Wildlife	
Mammals	
Spermophilus lateralis	Golden-mantled Ground Squirrel
Sylvilagus nuttallii	Nuttall's Cottontail
Tamias sp.	Chipmunk
Tamiasciurus douglasii	Douglas's squirrel
Ursus americanus	American black bear (scat)
Birds	
Anas platyrhynchos	Mallard
Sphyrapicus ruber	Red-breasted Sapsucker
Colaptes auratus	Northern Flicker
Contopus sordidulus	Western Wood Peewee
Cyanocitta stelleri	Steller's Jay
Nucifraga columbiana	Clark's Nutcracker
Corvus brachyrhynchos	American Crow
Corvus corax	Common Raven
Poecile gambeli	Mountain Chickadee
Sitta canadensis	Red-breasted Nuthatch
Sitta pygmaea	Pygmy Nuthatch
Junco hyemalis	Dark-eyed Junco
Turdus migratorius	American Robin
Plants	
Abies magnifica	red fir
Abies concolor	white fir
Achillea millefolium	yarrow
Achnatherum hymenoides	rice grass

Agoseris retrorsa	spear-leaf agoseris
Agrostis idahoensis	Idaho bentgrass
Allium sp.	onion
Amsinckia menziesii var. *intermedia*	common fiddleneck
Angelica lineariloba	Sierra angelica
Antennaria rosea	pink pussytoes
Arabis platysperma	broad-seeded rock cress
Arabis rectissima	Bristly-leaved rock cress
Arctostaphylos patula	green leaf manzanita
Artemisia ludoviciana	tarragon
Artemisia tridentata	Great Basin sagebrush
Aster ascendens	long-leaved aster
Bromus japonicus	Japanese brome
Calochortus leichtlinii	subalpine Mariposa lily
Calyptridium umbellatum var. *umbellatum*	pussy paws
Camomila suaveolens	pineapple weed
Carex abrupta	abrupt-beaked sedge
Carex athrostachya	slender beaked sedge
Ceanothus cordulatus	snow bush
Ceanothus velutinus	tobacco bush
Chenopodium album	goosefoot
Chrysolepis chrysophylla	golden chinquapin
Chrysothamnus viscidiflorus	rabbit-brush
Corallorhiza striata	striped coral root
Crepis acuminatus	long-leaved hawksbeard
Daucus pusillus	rattlesnake weed
Delphinium nuttalianum	common larkspur
Descurania pinnata	western tansy mustard

Elymus elymoides	squirrel tail grass
Epilobium angustifolium	fireweed
Epilobium ciliatum	northern willow herb
Epilobium lactiflorum	white-flowered willow herb
Erigeron breweri var. *breweri*	Brewer’s daisy
Eriogonum nudum	slender buckwheat
Gayophytum diffusum var. *parviflorum*	diffuse gayophytum
Gilia capillaris	smooth-leaved gilia
Lactuca serriola	prickly lettuce
Lepidium nitidum	common peppergrass
Leymus triticoides	
Linanthus ciliatus	whisker brush
Linanthus nuttallii	Nutall’s linanthus
Linum perenne	western blue flax
Lolium perenne	Italian ryegrass
Lupinus breweri	Brewer’s lupine
Melica sp.	Melic grass
Melilotus indica	sourclover
Melilotus alba	white sweetclover
Minuartia douglasii	Douglas’ sandwort
Osmorhiza occidentalis	western sweetroot
Pedicularis canadensis	wood betony
Penstemon eatonii	firecracker penstemon
Perideridia bolanderi	Bolander’s yampah
Phlox hoodii	cushion phlox
Pinus jeffreyi	jeffrey pine
Pinus contorta	lodgepole pine
Plagiobothrys/Cryptantha sp.	
Poa annua	bluegrass

Poa secunda	pine bluegrass
Polygonum amphibum	water smartweed
Populus tremuloides	quaking aspen
Potentilla glandulosa	sticky cinquefoil
Potentilla gracilis	slender cinquefoil
Pterospora andromedea	pinedrops
Pursia tridentata	antelope bitterbrush
Ribes roeslii	Sierra gooseberry
Ribes nevadense	Sierra Nevada currant
Ribes cereum	wax currant
Rumex paucifolius	alpine sheep sorrel
Spergularia sp.	
Symphoricarpos albus	common snowberry
Tragopogon dubius	yellow salsify
Triteleia ixioides	golden brodiaea
Veratrum californicum	corn lily
Viola sp.	violet
Wyethia mollis	mules ears

APPENDIX C

PROJECT SITE PHOTOGRAPHS

Above: Typical Jeffrey pine forest habitat found within the Project Site.

Below: Detention basin located along Drainage A (Figure 2).

Photographs taken July 26, 2006.

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Above: Ephemeral Drainage B

Below: Potential wetland observed south of Minaret Road.

Photographs taken July 26, 2006.

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Above: Non-jurisdictional Drainage A; note lack of bed-and-bank topography and OHW mark.

Below: Jeffrey pine forest surrounded by development in southwestern portion of Project Site.

Photographs taken July 26, 2006.

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APPENDIX E

CULTURAL RESOURCES REPORT AND PEER REVIEW LETTER

Cultural Resources Study for the Sierra Star Master Plan, Mammoth Lakes, Mono County, California

Prepared for

Christopher A. Joseph & Associates

Prepared by

SWCA Environmental Consultants

May 2006

Cultural Resources Study for the Sierra Star Master Plan, Mammoth Lakes, Mono County, California

Prepared for

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USGS 7.5-Minute Old Mammoth, California, Quadrangle

SWCA Project No. 10904-168

SWCA Cultural Resources Report Database No. 2006-241

May 2006

MANAGEMENT SUMMARY/ABSTRACT

Purpose and Scope: Christopher A. Joseph & Associates (CAJA) retained SWCA Environmental Consultants (SWCA) to conduct a cultural resources study for the Sierra Star Master Plan (project) focused on five areas totaling approximately 40 acres. This study was conducted a part of the California Environmental Quality Act (CEQA) review process for a proposed residential development located in Mono County, California. Located within the town of Mammoth Lakes, the project area is bisected by Minaret Road and bounded by Main Street to the north and Meridian Boulevard to the south. SWCA conducted a literature review, records search, initial Native American consultation, and analysis of potential project impacts on cultural resources. This report documents the results of the study.

Dates of Investigation: SWCA initiated the literature review in January 2006. The California Native American Heritage Commission Sacred Lands File search was initiated on April 19, 2006; the results are pending. SWCA conducted the California Historical Resources Information System records search on April 26, 2006. This report was completed in May 2006.

Findings of the Investigation: The records and literature search indicated that two previously recorded cultural resources are located within the project area. An additional 13 previously recorded cultural resources are located within approximately 0.5 mile of the project area. Prior to this study, a total of 14 cultural resource studies had been previously conducted within 0.5 mile of the project area, several of which included a portion of the project area. The entire project area has been previously surveyed for cultural resources.

Undertaking Effects: The project will not result in significant impacts to the two previously recorded cultural resources located within the project area. Prehistoric archaeological site CA-MNO-2487 (P26-002487) has been previously determined ineligible for inclusion on the California Register of Historical Resources (CRHR). This site is not considered a unique archaeological resource under CEQA. As such, any project-related impacts to CA-MNO-2487 (P26-002487) would not be considered significant under CEQA. Prehistoric archaeological site CA-MNO-529 (P26-000529) was previously determined eligible for inclusion on the National Register of Historic Places; however, previous archaeological investigations at the site were considered to have exhausted the site’s data potential. As such, the site is not considered eligible for CRHR inclusion, nor is it considered a unique archaeological resource under CEQA. Therefore, any project-related impacts to CA-MNO-529 (P26-000529) would not be considered significant under CEQA.

The project area is sensitive for prehistoric and historic archaeological resources. It appears that ground-disturbing construction associated with the project has the potential to result in significant impacts to unrecorded buried archaeological deposits, features, or diagnostic artifacts. However, any such impacts can be mitigated to a less than significant level through the implementation of mitigation measures.

Recommendations: SWCA recommends that a Mitigation Monitoring and Reporting Plan be prepared prior to project construction and that a qualified archaeologist monitor all ground-disturbing construction in native soils. Previously unknown cultural resources identified during project construction should be protected until formally evaluated for significance under CEQA; if considered significant, such resources should be subjected to further treatment to mitigate project-related impacts to a less than significant level. Implementation of these mitigation measures will ensure that the project will not result in significant impacts to cultural resources under CEQA.

Disposition of Data: This report will be filed with the Eastern Information Center, located at University of California, Riverside; with CAJA; and with SWCA.

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UNDERTAKING INFORMATION/INTRODUCTION

Contracting Data: Christopher A. Joseph & Associates (CAJA) retained SWCA Environmental Consultants (SWCA) to conduct a cultural resources study for the Sierra Star Master Plan (project).

Purpose: This study was completed under the provisions of the California Environmental Quality Act (CEQA). Public Resources Code SS5024.1, Section 15064.5 of the Guidelines and Sections 21083.2 and 21084.1 of the Statutes of CEQA were also used as the basic guidelines for the cultural resources study (Governor's Office of Planning and Research 1998). Public Resources Code SS5024.1 requires evaluation of historical resources to determine their eligibility for listing on the California Register of Historical Resources (CRHR). The purposes of the CRHR are to maintain listings of the state's historical resources and to indicate which properties are to be protected from substantial adverse change (Office of Archaeology and Historic Preservation 1997).

According to Section 15064.5(a)(3)(A–D) in the revised CEQA guidelines (Governor's Office of Planning and Research 1998), a resource is considered *historically significant* if it meets at least one of the following criteria:

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.

In order to be considered a "unique archaeological resource" as described under California Public Resources Code 21083.2, it must be demonstrated that, without merely adding to the current body of knowledge, there is a high probability that the resource satisfies at least one of the following criteria:

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

A *nonunique archaeological resource* means an archaeological artifact, object, or site that does not meet one of the above criteria.

The format of this report follows Archaeological Resource Management Reports (ARMR): Recommended Contents and Format (Office of Historic Preservation 1990).

Undertaking: The proposed project entails construction of resort, multi-family, single family, and affordable housing units, as well as some mixed-use development.

Project Limits: Bounded by Main Street to the north and Meridian Boulevard to the south, and bisected by Minaret Road, the project area is located within the town of Mammoth Lakes in Mono County, California. The project area comprises five distinct and contiguous areas proposed for development (Development Areas 1, 2, 4, 5, and 7), totaling roughly 40 acres (Figure 1).

Personnel: The principal investigator for the project is SWCA Archaeologist James Clifford. SWCA Archaeologists Alex Wesson, Jim Clifford, and Shaina Seivers produced this report. SWCA GIS Specialists Burt McAlpine and Michael Agena created the figures, and Technical Editor Kimm Thompson edited and formatted the document.

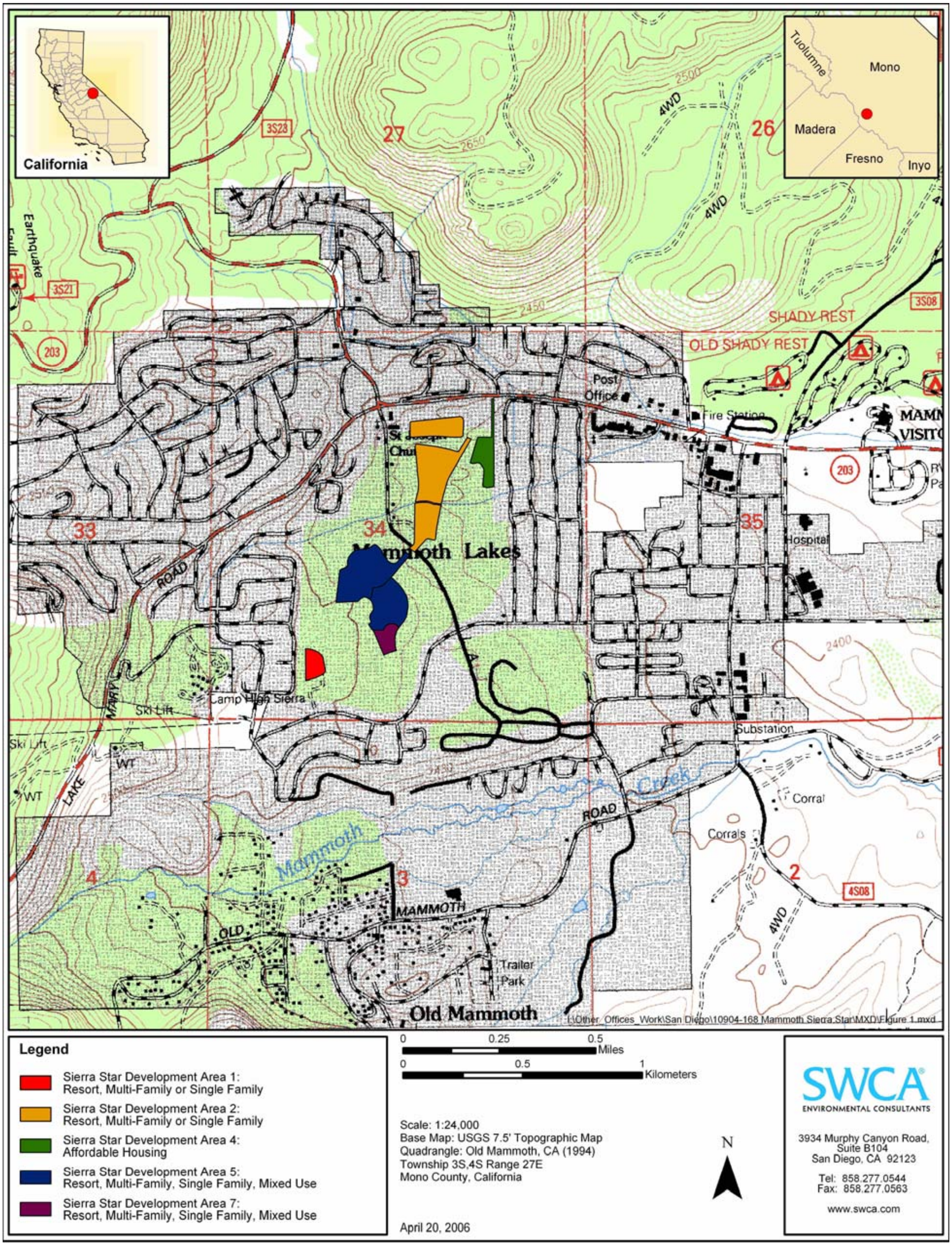

Figure 1. Project Location Map

SETTING

NATURAL SETTING

The study area is located in Mono County, California, within Section 34, Township 3S, Range 27E on the 1994 Old Mammoth, California, U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle, in the town of Mammoth Lakes (Figure 1). The project area is situated on a relatively flat terrace north of Mammoth Creek in Long Valley, which lies adjacent to the Sierra Nevada Mountains. Elevations within the project area range from approximately 2,410 to 2,460 meters (7,900 to 8,070 feet) above mean sea level. Portions of the project area have been previously disturbed by the construction of a golf course and residential development. The surrounding area is primarily characterized by residential and commercial development with scattered remnants of natural forest. Vegetation types present on the property reflect the previous development and primarily consist of non-native grasses and ornamental plants, with several areas of native forests remaining more or less intact. The natural vegetation of the area consists of a mixture of forest types containing many varieties of trees, shrubs, and grasses including Jeffrey pine (*Pinus Jeffreyi*), lodgepole pine (*Pinus murrayana*), red fir (*Abies magnifica*), white fir (*Abies concolor*), quaking aspen (*Populus tridentata*), basin sagebrush (*Atemesia tridentatda*), greenleaf manzanita (*Arctostaphylos patula),* snowberry (*Symphoricarpos vaccinoides*), tobacco brush (*Ceanothus velutinus*), bitter cherry (*Prunus emarginata*), buckwheat (*Eriogonum* spp.), clover (*Trifolium* sp.), lupine (*Lupinus* sp.), yarrow (*Achillea lanulosa*), wheatgrass (*Agropyron* sp.), and cheatgrass (*Bromus* sp.) (Kautz 1991).

CULTURAL SETTING

The archaeological record of central California is traditionally divided into temporal units based largely on changes in artifact types, styles, and frequencies of occurrence. This record reflects a progressive complexity in native cultures' economic and technological modes of subsisting within the context of California's notably diverse environments. Along the Pacific Coast, native cultures developed maritime economies augmented by terrestrial plants and animals, while further inland they adapted to a series of altitude-sensitive biotic zones, including the sage scrub, chaparral, riparian, oak woodland, and pine forest communities. Settlement patterns, population movement, trade, and other modes of social culture provided behavioral matrices for the use of material cultural to obtain and process natural resources.

Prehistoric Overview

The majority of archaeological researchers in east central California generally worked in isolation and gave localized names to the various archaeological periods they were studying. The result was a plethora of names for each segment of the archaeological sequence, even though the same broad characteristics could be found over a large region.

A generally accepted overall regional chronology was presented by Bettinger and Taylor (1974). More recent studies such as Gilreath and Hildebrandt's (1991) have correlated the Bettinger and Taylor cultural sequence with obsidian hydration data from numerous sites in the area, proposing six prehistoric periods. These periods include Little Lake (5500–3500 years before present [BP]); Newberry (3500-1275 BP), which is subdivided into Early (3500–2800 BP), Middle (2800–2300 BP), and Late (2300–1275 BP); Haiwee (1275–650 BP); and Marana (650–200 BP) (Gilreath and Hildebrandt 1997). Pre-Newberry evidence in the Long Valley area is relatively unknown and human activity in the area may have been sporadic. The Newberry Period saw the intensification of obsidian quarrying and biface production, possibly for trade. During the Haiwee and Marana Periods there is evidence of decreasing biface production and an increase in direct subsistence activity with occupation sites that were primarily associated with riparian settings (Burton 1990a). The intensification of resource use in the area concentrated primarily on seed collection and processing, supplemented by the hunting of small game, as evidenced from the many seed processing sites found from this period (Gilreath and Hildebrandt 1997). The pattern of direct subsistence persisted through the Marana Period, although there appears to have been a partial abandonment of the upland and desert scrub areas after A.D. 1000 (Bettinger 1977).

Ethnographic Overview

The study area is located within Long Valley, which lies near the intersection of several ethnic groups. The ethnic groups in the area include the Owens Valley Paiute to the south, Mono Lake Paiute to the north, Benton and Round Valley Paiute to the east, Monache to the west, and the Southern Sierra Miwok to the northwest. These groups represent two different language families: the Southern Sierra Miwok represent a branch of the Utian language family, while the Paiute groups and the Monache are Numic speakers of the Uto-Aztecan language family (Burton 1990).

Evidence suggests that the groups in the area, particularly the Northern Paiute groups, regarded their territorial borders as being fluid and that subsistence was heavily influenced by the seasonal availability of many resources. Also dictated by the seasons, trade between groups was very important; such activity most likely occurred primarily during the warm summer months when the high mountain passes were not covered in deep snow (Burton 1990a). Commonly traded items included piñon (pine) nuts, seeds, obsidian, baskets, pigments, salt, pumice stones, acorns arrows, and shell money (Hall 1983).

Historic Overview

The first strong European presence in the region occurred during the late 1850s after the discovery of the Comstock Lode silver ore in 1858, east of Lake Tahoe. Other gold and silver discoveries at Aurora and Bodie kept many prospectors searching the area for their lucky strike. In 1878 General George Dodge of Civil War fame bought a group of claims and organized the Mammoth Mining Company. Rumors claimed that the tunnels into Mineral Hill and construction of a tramway and 20-stamp mill signaled the "largest bonanza outside Virginia City." These rumors sparked a short-lived rush to the Mammoth gold mines; More than a thousand people flocked to Mammoth City the summer of 1878 and approximately 1,500 the following year. When the bonanza did not materialize, the Mammoth Mining Company shut down in early 1889 and the majority of the prospectors left the area (Doyle 1934). From this time until the early 1900s the only people in the Mammoth were ranchers who drove cattle from Owens Valley up into the mountain meadows for summer and fall grazing (City Concierge 2006). During the early 1900s, Old Mammoth began to be promoted as a tourist destination and resort community, and tourism became most important industry in the region (Burton 1990). The completion of a modern highway in 1937 made the area accessible to great numbers of people who continue to use the area for both summer and winter outdoor recreational activities.

LITERATURE REVIEW AND RECORDS SEARCH

LITERATURE REVIEW

SWCA conducted a cultural resources literature review of documents provided by CAJA to compile and synthesize pertinent previous cultural resources research within the project area and immediate vicinity. The purpose of the literature review was to obtain and review information regarding known cultural resources and previously conducted cultural resources studies within the project area.

CALIFORNIA HISTORICAL RESOURCES INFORMATION SYSTEM RECORDS SEARCH

SWCA conducted a search of the California Historical Resources Information System (CHRIS) records housed at the Eastern Information Center (EIC) at University of California, Riverside, in April 2006. The records search area included the project area and a 0.5-mile radius around it. The search included a review of all previously recorded historic and prehistoric archaeological sites as well as a review of all cultural resources studies filed with the EIC. The GeoFinder Historical Resource Database, which consolidates various lists of historic architectural resources, was also consulted. EIC sources reviewed include:

- The EIC's historical resources files (site records).
- National Register of Historic Places (NRHP) (Office of Archaeology and Historic Preservation 1997).
- California State Historic Resources Inventory.
- California Points of Historical Interest (California Department of Parks and Recreation 1992).
- California Historical Landmarks (California Department of Parks and Recreation 1990).
- USGS Quadrangles: Old Mammoth, CA 1994 (7.5 minute).
- GeoFinder Historical Resource Database.

LITERATURE REVIEW AND RECORDS SEARCH RESULTS

Prior to this study, a total of 14 cultural resource studies had been previously conducted within 0.5 mile of the project area, several of which included a portion of the project area. The entire project area has been previously surveyed for cultural resources. The previous studies include cultural resources surveys and testing programs, as well as large-scale data recovery excavations. These studies are presented in Table 1 on the following page.

Table 1. Previous Cultural Resources Studies within 0.5 Mile of the Project Area

Author(s)	Date	Study
Basgall, Mark E.	1982	The Archaeology of Camp High Sierra (CA-MNO-1529)
Basgall, Mark E.	1983	Archaeology of the Forest Service Forty Site (CA-MNO-529), Mono County, CA
Bettinger, Robert L.	1980	Archaeology of the Triple R Site FS-05-04-52-10 (CA-MNO-714) Mono County, CA
Burton, Jeffery F.	1989	An Archaeological Survey of the Minaret Road Extension, Mammoth Lakes, CA
Burton, Jeffery F.	1990a	An Archaeological Survey of the Lodestar Property, Mammoth Lakes, CA
Burton, Jeffery F.	1990b	Archaeological Testing at the Minaret Road Site (CA-MNO-2482), Mammoth Lakes, CA
Burton, Jeffery F.	2002	Archaeological Resources, Sierra Star Master Plan
Burton, Jeffery F.	2004a	Sierra Star Historic Site Evaluation
Burton, Jeffery F.	2004b	Archaeological Testing at the Sierra Star Site (CA-MNO-2487), Mammoth Lakes, CA
Hardesty, Donald L.	1991	A Class III Cultural Resources Inventory of the 493-Acre Bodie Study Area, Mono County, CA
Kautz, Robert R.	1991	Archaeological Testing Procedures at Six Sites in Mammoth Lakes, CA
Taylor, William T.	1980a	Archaeological Reconnaissance Report – Forest Service Forty Land Exchange
Taylor, William T.	1980b	Archaeological Reconnaissance Report – Mono County Park/Rayson
Taylor, William T.	1981	The Archaeology of Camp High Sierra (CA-MNO-1529)

The literature review and CHRIS records search revealed 15 previously recorded cultural resources located within 0.5 mile of the project area (see Table 2 and Figure 2). Two of these resources are located within the project area itself. The records and literature search indicated that two previously recorded cultural resources are located within the project area. An additional 13 previously recorded cultural resources are located within approximately 0.5 mile of the project area.

Table 2. Previously Recorded Archaeological Sites within the Project Area

Primary Number	Trinomial	Description	Recorder / Date
	CA-MNO-529	Prehistoric lithic artifact scatter; only a small portion within the project area; site was recommended significant and subjected to data recovery; data potential exhausted	Taylor / 1980
	CA-MNO-714	Prehistoric lithic artifact scatter	Derby and Rockwell / 1975 Bettinger / 1980
	CA-MNO-1529	Prehistoric lithic artifact scatter and milling station	Taylor / 1981
	CA-MNO-2480	Prehistoric lithic artifact scatter	Burton / 1989
	CA-MNO-2481	Prehistoric lithic artifact scatter in cut bank	Burton / 1989
	CA-MNO-2482	Prehistoric sparse lithic artifact scatter; site tested in 1990 recommended significant; site destroyed by road construction; later, in 1991, recommended not significant	Burton / 1990 Kautz / 1991
	CA-MNO-2485	Prehistoric lithic artifact scatter; tested in 1991, found subsurface deposit to 80 cm but not significant	Burton / 1989 Kautz / 1991
	CA-MNO-2486	Prehistoric lithic artifact scatter; testing in 1991 was limited although the site was recommended to be not significant	Burton / 1989 Kautz / 1991
	CA-MNO-2487	Prehistoric large dense lithic artifact scatter; tested in 1991; large-scale testing in 2004 in which research potential was exhausted	Burton / 1989 Kautz / 1991 Early / 2001
	CA-MNO-2720	Prehistoric lithic artifact scatter of obsidian debitage	Botti / 1991
26-3727	CA-MNO-3497	Prehistoric site modernized by the addition of a cement culvert	Hall / 2001
26-4215	CA-MNO-3749H	Prehistoric lithic artifact scatter	Burton / 2003
26-4357 26-3575	CA-MNO-3834	Historic household trash scatter; tested in 2004, recommended not significant	Kautz / 1991 Early / 2001 Burton / 2004
26-3728		Historic Hayden Cabin Site	1992

Twelve of the previously recorded cultural resources identified are prehistoric; two resources are from the historic period. The two historic resources consisted of a historic trash scatter and a cabin site. The high frequency of prehistoric sites present within the study area suggests that the area was intensively used and occupied by prehistoric inhabitants. Although a variety of activities are represented at several of these sites, it appears that lithic tool manufacture (biface production in particular) was the primary focus at the sites in the immediate area. All of the prehistoric sites are described as lithic artifact scatters consisting primarily of obsidian chipping waste with few associated tools. Each of the previously recorded cultural resources identified through the literature review and records search is discussed separately below.

CA-MNO-529 (P26-000529)

Site CA-MNO-529 was originally recorded by Taylor in 1980 as a temporary campsite located along Meridian Boulevard. No features were observed but one metate, one Cottonwood point, and many obsidian flakes were documented. Previous construction of condominiums and paved roads on private land may have destroyed the western end of this site. Site CA-MNO-529 was officially determined to be eligible for NRHP inclusion; however, data recovery excavations conducted at the site were considered to have exhausted the research potential of the site (Basgall 1983). The northernmost portion of this site lies within Sierra Star Development Areas 5F and 7F.

CA-MNO-714 (P26-000714)

Derby and Rockwell initially recorded site CA-MNO-714 in 1975 as a lithic artifact scatter with several features. Several large metates in granite boulders and a bedrock mortar were documented within the roughly 4-acre site. Throughout the area, many scattered obsidian flakes and tools were also found. Four years later in the summer of 1979, Bettinger updated records for site CA-MNO-714, describing it as a lithic artifact scatter with bedrock mortars and metates. Six boulders with milling features were recorded: two features comprised a combination of mortars and metates and four features were single metates. The same types of artifacts were noted: flakes, debitage, unifaces, and cores. The site is located outside of the project area.

CA-MNO-1529 (P26-001529)

Site CA-MNO-1529 was originally recorded by Taylor in 1981 as a lithic artifact scatter and milling station located adjacent to an ephemeral stream. Four bedrock mortars were documented on the side of a single granite boulder. Black obsidian flakes were noted but not collected. This site lies outside the project area.

CA-MNO-2480 (P26-002480)

Site CA-MNO-2480 was originally recorded by Burton in 1989 as a dense lithic artifact scatter located along an ephemeral drainage. The site consisted of more than 100 obsidian flakes in an area of approximately 24,200 square meters. Site CA-MNO-2480 is bisected by Minaret Road and lies outside the project area.

CA-MNO-2481 (P26-002481)

Site CA-MNO-2481 was originally recorded by Burton in 1989 as a dense lithic artifact scatter in a cut bank consisting of more than 100 obsidian flakes. This site, approximately 1,400 square meters in area, was characterized by lithic production waste of Casa Diablo and Mono Glass Mountain obsidian. In the densest portion of the site, a 1 × 1 m surface sample area contained five complete flakes (two with cortex), eight flake fragments, and one piece of black Casa Diablo obsidian debris (Burton 1989). This site lies alongside a road and tennis court north of the project area.

CA-MNO-2482 (P26-002482)

Site CA-MNO-2482 was originally recorded by Burton in 1989 as two lithic artifact scatters in a clearing within a forested area. One of the scatters (Locus 1) was focused around a cluster of granite boulders, and the other (Locus 2) was located approximately 30 meters north of a small drainage. Locus 1 was excavated to a depth of 50 cm, and 52 flakes were recovered. Locus 2 was also excavated to 50 cm, and 50 flakes were recovered. The majority of the flakes appeared to be of Casa Diablo obsidian (Burton 1990b). Site CA-MNO-2482 was subjected to a testing program in 1990 (Burton 1990b) and was recommended to be significant under CEQA; the site was subsequently destroyed by the construction of the Minaret Road extension.

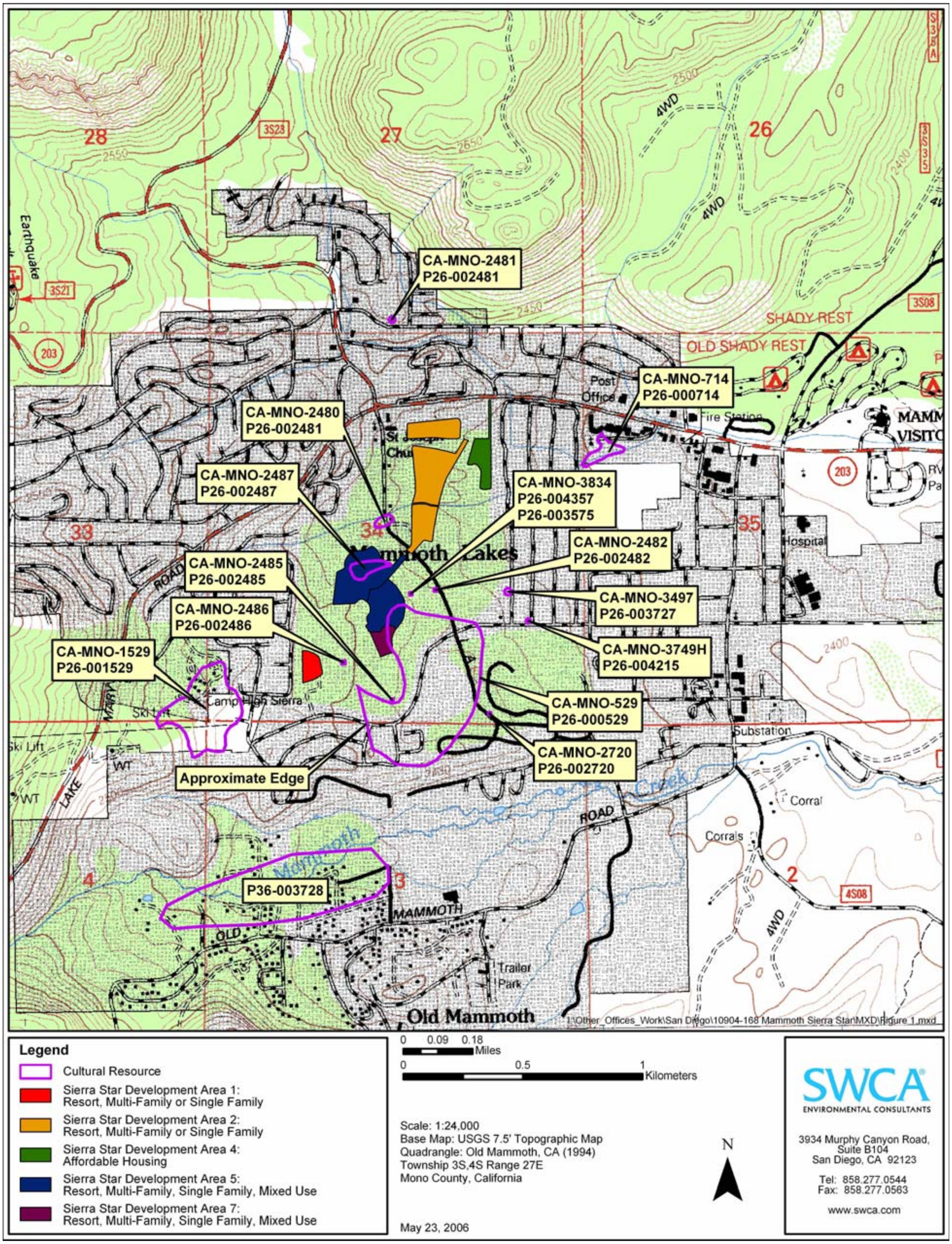

Figure 2. Previously Recorded Cultural Resources within Approximately 0.5 Mile of Project Area

In 1991, Kautz revisited the site, which had been badly disturbed by the construction of Minaret Road. Two shovel test pits were excavated revealing a small numbers of flakes. This site was considered ineligible for NRHP inclusion due to the degree of disturbance and resulting loss of resource integrity. Site CA-MNO-2482 is located outside of the project area.

CA-MNO-2485 (P26-002485)

Site CA-MNO-2485 was originally recorded by Burton in 1989 as a surface lithic artifact scatter consisting of 25 flakes and 1 biface fragment in an area of approximately 5,400 square meters (Burton 1990a). The site was subsequently subjected to a testing program in 1991 (Kautz 1991), which consisted of the excavation of five shovel tests and a single 1 × 1 m test unit. The unit was excavated to a maximum depth of 80 cm; more than 1,000 artifacts recovered, including several tools. Although a large amount of artifacts were recovered and no special studies or in-depth analysis were conducted, the site was recommended as not significant according to CEQA criteria (Kautz 1991). Site CA-MNO-2485 presently lies under an existing golf course outside the project area.

CA-MNO-2486 (P26-002486)

Site CA-MNO-2486 was originally recorded by Burton in 1989 as a small surface lithic artifact scatter consisting of 100 obsidian flakes in an area of approximately 75 square meters located at the intersection of two unpaved roads. Burton reported that the site was only visible in areas disturbed by the road; the surrounding undisturbed areas were heavily forested at the time of documentation (Burton 1990a).

A portion of the site was subsequently subjected to a testing program, which consisted of the excavation of two shallow shovel test pits near one of the unpaved roads (Kautz 1991). The shovel test excavations recovered 58 artifacts. Kautz recommended that the site was not significant; however, the testing was limited to a disturbed area near the road, and the excavations extended to a depth of only 20 cm. It appears that the site boundaries, as well as the nature and extent of the subsurface deposit, have not been completely defined. The site lies in a strip of trees within an existing golf course outside the project area.

CA-MNO-2487 (P26-002487)

Prehistoric site CA-MNO-2487 was originally recorded by Burton in 1989 as a dense lithic scatter. A reconnaissance survey revealed obsidian flake scatters over an area of roughly 2.5 acres; no artifacts were collected (Burton 1989). Kautz revisited the site in 1991 and noted four major flake concentrations. Three shovel test pits and a single 1 × 1 meter test unit were excavated, revealing a Stage III or IV biface and the base of a mahogany obsidian Stage III or IV biface. Site CA-MNO-2487 was recommended not eligible for NRHP inclusion due to the site’s similarity to other nearby sites and lack of assemblage diversity.

Site CA-MNO-2487 was subsequently subjected to a large-scale testing program in 2004, the results of which ultimately captured the research potential of the site and were sufficient to fulfill CEQA mitigation requirements (Burton 2004b). This site is almost entirely within the project area.

CA-MNO-2720 (P26-002720)

Prehistoric site CA-MNO-2720 was originally recorded by Botti in 1991 as a small lithic artifact scatter of obsidian debitage in a forest clearing. Approximately 118 square meters in area, the site was informally probed, revealing 19 obsidian flakes and 5 unidentifiable fragments; no artifacts were collected. This site was highly impacted due to disturbance associated with vehicular traffic. The site lies adjacent to Minaret Road outside the project area.

CA-MNO-3497 (P26-003497)

Hall originally recorded prehistoric site CA-MNO-3497 in 2001 during an intensive pedestrian survey. This site of 242 square meters is recorded as a small lithic artifact scatter of obsidian flakes and debitage. Additionally, one obsidian flake tool was also recovered. The entire site has been disturbed by road and culvert construction. This site lies outside of the project area.

CA-MNO-3749H (P26-003749)

Site CA-MNO-3749H[1] was originally recorded by Burton in 2003 as a very small and sparse lithic scatter observed in the immediate vicinity of a fire hydrant adjacent to Meridian Boulevard. The site is approximately 5 m in diameter. Burton (2003) suggested that this site might represent a single-use, short-term flaking episode; however, he also suggested that the flakes might have been brought to the surface when the hydrant was excavated. The site is located outside the project area.

CA-MNO-3834 (P26-003575 / P26-004357)

Historic archaeological site CA-MNO-3834, a trash scatter, was originally recorded by Kautz in 1991 and assigned the primary number P26-003575. A variety of historic artifacts were noted, including hole-in-top cans, ceramic fragments, multiple colored glass fragments, whiskey bottle remnants, and a metal bucket. Additionally, a shallow depression was recorded 12 m east of the trash scatter.

In 2001, Early visited this site and recorded it as a new site. Early recorded the site as a 25 ft × 60 ft (w × l) historic trash scatter site located approximately 100 feet east of Sierra Star Parkway. An 8-foot diameter depression was noted at the southern end of the trash scatter. The cultural constituents described by Early were very similar to those noted by Kautz. Early apparently revisited the site in 2004; he notes on the site record dated June 25, 2004, that the site had been excavated since his September 2001 visit. Upon receipt of this site record, the EIC assigned the resource a new number: CA-MNO-3834 (P26-004357).

On June 30, 2004, the same site was tested by Trans-Sierran Archaeological Research (Burton 2004a). Again, a similar suite of artifacts and features was described, as was a recently excavated percolation test pit, which is referenced in Early's site record as well. Burton prepared an updated site record, referencing the original primary number (P26-003575), as the newer number (CA-MNO-3834 [P26-004357]) had not yet been assigned by the EIC.

Although the EIC currently shows two separate site locations on their master site map and maintains the records for P26-003575 and CA-MNO-3834 (P26-004357) separately, it appears that both identifiers refer to the same resource. The location plotted by Burton, based on global positioning system (GPS) data, has been used for the purposes of the current study, and it is this location that is shown on Figure 2 and Figure 3. The site is located outside of the project area.

[1] Typically the "H" added to a trinomial denotes a historic period site; however, site CA-MNO-3749H is a prehistoric lithic artifact scatter lacking historic constituents. The "H" in the trinomial is apparently a mistake.

P26-3728

This historic cabin site is located outside of the project area. Construction of this cabin began in 1928 by Walter Emmet Hayden, Vincent Ruh, Jack Greth, and Norvil Aigner. Building additions and usage of this cabin was discontinued in 1940 for the duration of the war. Five years later, a kitchen, bathroom, and bunkroom were added. This cabin remains standing, and with the help of the Historical Society, a museum was started here. Today, the cabin is filled with memorabilia of Mammoth Lakes before there were paved roads and electricity (Mammoth Lakes 2006).

NATIVE AMERICAN CONSULTATION

SB-18 TRIBAL CONSULTATION

Government Code §65352.3 (Senate Bill [SB] 18) requires local governments to consult with California Native American tribes identified by the California Native American Heritage Commission (NAHC) prior to the adoption or amendment of a general plan or specific plan. The purpose of this consultation is to preserve or mitigate impacts to cultural places.

The Town of Mammoth Lakes (Town) contacted the NAHC on April 6, 2006 to request a Tribal Consultation List with contact information for the tribes identified by the NAHC as having traditional lands or cultural resources within the project vicinity.

The NAHC responded on April 13, 2006, with a list of four tribal entities:

- Benton Paiute Reservation
- Bridgeport Paiute Indian Colony
- Mono Lake Indian Community
- Walker River Reservation

The Town sent consultation letters to each of the four NAHC-listed tribal entities on April 28, 2006, inviting each group to consult with them directly regarding the potential for the presence of Native American cultural resources that may be impacted by the project. No responses have been received to date.

SACRED LANDS FILE SEARCH

SWCA contacted the NAHC on April 19, 2006, requesting identification of any areas or geographic features in the project area that are listed within the NAHC's Sacred Lands File. SWCA also requested that the NAHC provide a list of Native American groups or individuals listed by the NAHC for Mono County who may have more information on traditional cultural properties within or adjacent to the project area.

The NAHC responded on May 25, 2006, stating that their records search failed to indicate the presence of Native American cultural resources in the immediate project area but that the individuals identified on the provided list should also be asked if they are aware of any sacred lands or traditional cultural properties within the project area. SWCA will contact the listed individuals and include any responses in future drafts of this report.

DISCUSSION

The project area and immediate vicinity have been subjected to multiple cultural resources studies over the past 35 years, including several studies within the past 5 years. The entire project area has been previously surveyed for cultural resources. A total of 15 previously recorded cultural resources were identified within approximately 0.5 mile of the project area; however, only two known resources (CA-MNO-529 [P26-000529] and CA-MNO-2487 [P26-002487]) are located within the project area itself (Figure 3).

KNOWN RESOURCES

CA-MNO-529 (P26-000529)

The northernmost portion of this prehistoric archaeological site lies within the project area (Development Areas 5 and 7). Site CA-MNO-529 was previously determined to be eligible for NRHP inclusion; however, data recovery excavations conducted at the site were considered to have exhausted the research potential of the site (Basgall 1983). The site is not considered to constitute a unique archaeological resource under CEQA. As such, any project-related impacts to site CA-MNO-529 would not be considered significant under CEQA.

CA-MNO-2487 (P26-002487)

The westernmost portion of prehistoric archaeological site CA-MNO-2487 presently lies under an existing golf course, but the majority of the site area lies within the project area (Development Area 5). However the site was tested in 1991 and subsequently site CA-MNO-2487 was recommended not eligible for NRHP inclusion (Kautz 1991). Site CA-MNO-2487 was subsequently subjected to a large-scale testing program in 2004, the results of which ultimately captured the research potential of the site and were sufficient to fulfill CEQA mitigation requirements (Burton 2004b). The site is not considered to constitute a unique archaeological resource under CEQA. As such, any project-related impacts to site CA-MNO-529 would not be considered significant under CEQA.

Thus, the project will not result in significant impacts to the two previously recorded cultural resources located within the project area. The remaining thirteen resources identified through the literature review and records search lie outside of the project area and will not be affected by the project.

BURIED RESOURCES

The project area is sensitive for prehistoric and historic archaeological resources. Buried (previously unrecorded) prehistoric and historic archaeological deposits may be present within the project area. In addition, previously unidentified features and/or diagnostic artifacts within previously recorded sites may be present within the project area. Ground-disturbing construction associated with the project has the potential to result in significant impacts to unrecorded buried archaeological deposits. However, any such impacts can be mitigated to a less than significant level through the implementation of appropriate mitigation measures.

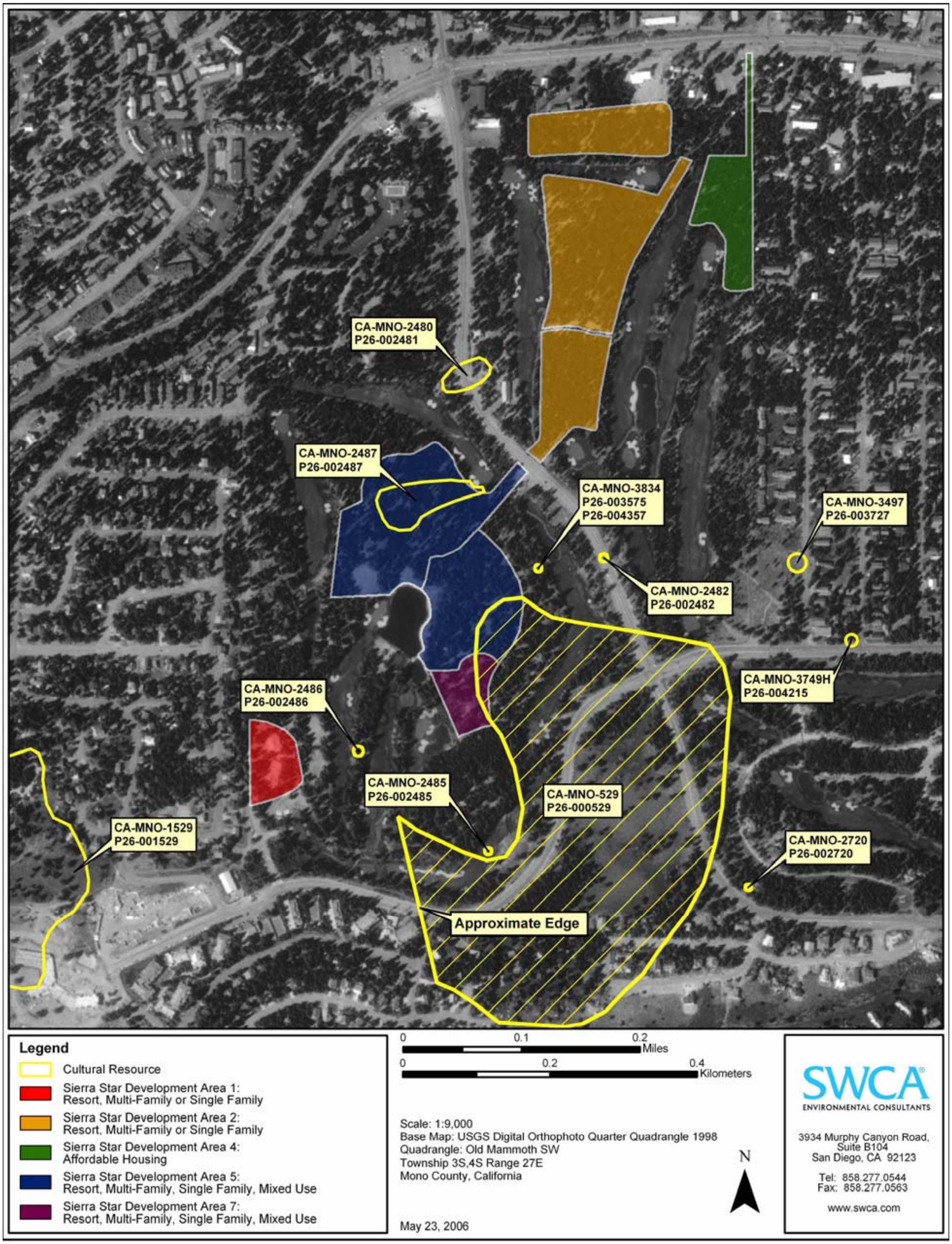

Figure 3. Previously Recorded Cultural Resources within and Adjacent to Project Area

RECOMMENDATIONS

As the project area is sensitive for buried prehistoric and historic archaeological resources, and ground-disturbing construction associated with the project has the potential to result in significant impacts to such resources, SWCA recommends the following mitigation measures to reduce project-related impacts to a less than significant level under CEQA.

MITIGATION MONITORING AND REPORTING PLAN

SWCA recommends that a Mitigation Monitoring and Reporting Plan (MMRP) be prepared prior to project construction. Prepared by a qualified archaeologist, the MMRP should outline the protocol for notification, temporary protection, documentation, and evaluation of previously unrecorded cultural resources encountered during construction, as well as mitigation of project-related impacts to any such resources that are considered significant under CEQA, and the curation of any artifacts or samples collected in the field. The MMRP should include a sample data recovery plan and a curation agreement. This document should be completed prior to commencement of any ground-disturbing activity associated with the project (including clearing, brushing, grubbing, vegetation removal, disking, grading, trenching, excavation, and/or boring).

MONITORING

SWCA recommends that a qualified archaeologist monitor all ground-disturbing construction in native soils. Construction work within stockpile material does not require monitoring. The construction monitor should be supplied with maps and site records for the previously recorded cultural resources within the project area, so that she/he can distinguish new resources from those that have been previously recorded and evaluated. The monitor should prepare a daily monitoring log recording the type of work monitored, soil conditions, discoveries, and general observations.

Discoveries

Previously unknown cultural resources identified during project construction should be protected through temporary redirection of work and possibly other methods such as fencing (to be outlined in the MMRP) until formally evaluated for significance under CEQA. In the event that previously unrecorded cultural resources are exposed during construction, the monitor must be empowered to temporarily halt construction in the immediate vicinity of the discovery while it is documented and evaluated for significance. Construction activities could continue in other areas. If the discovery is evaluated as significant under CEQA, additional work such as data recovery excavation may be warranted to mitigate project-related impacts to a less than significant level.

Human Remains

Procedures of conduct following the discovery of human remains have been mandated by Health and Safety Code §7050.5, Public Resources Code §5097.98 and the California Code of Regulations §15064.5(e) (CEQA). According to the provisions in CEQA, should human remains be encountered at the site, all work in the immediate vicinity of the discovery must cease, and any necessary steps to ensure the integrity of the immediate area must be taken. The Mono County Coroner must be immediately notified. The Coroner must then determine whether the remains are Native American. Once the Coroner determines the remains are Native American, the Coroner has 24 hours to notify the NAHC, who will, in turn, notify the person the NAHC identifies as the most likely descendent (MLD) of any human remains.

Further actions will be determined, in part, by the desires of the MLD. The MLD has 24 hours to make recommendations regarding the disposition of the remains following notification from the NAHC of the discovery. If the MLD does not make recommendations within 24 hours, the owner shall, with appropriate dignity, reinter the remains in an area of the property secure from further disturbance. Alternatively, if the owner does not accept the MLD's recommendations, the owner or the descendent may request mediation by the NAHC.

Reporting

A monitoring report should be prepared upon completion of construction monitoring, summarizing the results of the monitoring effort. Site records for any newly recorded or updated cultural resources should be appended to the monitoring report.

Curation

Artifacts or samples collected during the course of construction monitoring and any testing or data recovery associated with newly discovered resources must be curated in perpetuity in an appropriate facility upon completion of analysis and processing.

Implementation of these mitigation measures will ensure that the project will not result in significant impacts to cultural resources under CEQA.

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November 7, 2005

Scott Schoenfeld, P.E.
Director of Land Development
Interwest California Holdings, Inc.
6900 South McCarran Boulevard, Suite 3000
Reno, NV 89509

RE: Review of SWCA's Proposal to Perform Cultural Resources Services for the Sierra Star Master Plan, Mammoth Lakes, Mono County, California.

Dear Scott,

Thank you for the opportunity to review the proposal by SWCA to re-evaluate archaeological sites within the proposed Sierra Star Master Plan area. The situation is a little convoluted, because in this letter I will provide comments on SWCA's proposal, which was based on comments made by the Town of Mammoth Lakes, which were based on reports of previous archaeological work conducted for the project.

It appears that SWCA did not have all the previous reports and generated their proposal solely from Town comments on the Sierra Star Master Plan Environmental Initial Study, which concluded that all sites within the project area should be "re-evaluated using appropriate CEQA guidelines in the EIR." With this partial information, SWCA cautiously proposed a fairly large-scale investigation. However, most of the tasks in the SWCA proposal have already been completed to a standard equal to or greater than what they propose, and other tasks were not requested in the Town's comments.

Below are comments on the tasks listed in the SWCA proposal vis-a-vis the Town comments, incorporating information about what archaeological work has been completed and documented in previous reports. Following these comments are my own recommendations for addressing the Town comments and resolving the questions the Town has raised.

To summarize, I believe the Town comments can be addressed by applying the revised CEQA regulations to the site data already recovered, clarifying the recommendations made previously, and conducting a limited amount of additional work at sites CA-MNO-2485 and CA-MNO-2486. This approach will not only address the Town's concerns more efficiently and cost-effectively, it will better meet the general Native American concerns to minimize disturbance to archaeological sites.

E-mail: tsar@sprynet.com

Task 1. Records Search
A new records search is beyond the scope of Town comments; all necessary reports can be provided by the project proponent.

Task 2. Initial Native American Consultation
Not requested in the Town comments. In 2004 the California Department of Forestry (CDF) did consultation for Sierra Star's Timber Harvest Plan. Two tribes responded that all archaeological sites are sacred and should not be disturbed.

Task 3. Archaeological Survey
An archaeological survey of the entire 220-acre project area has been completed using standard methods (Burton 1990); a resurvey was not requested by the Town. In fact, well over half of the master plan area has already been developed, making re-survey problematic.

Task 4. Re-evaluation of Four Sites
All four sites have already been subject to archaeological testing, to varying degrees. Excavations at two of the sites, CA-MNO-529 and -2487, have been adequate to recover the scientifically consequential information from and about the resources, and therefore no further work would be required, per California Public Resources Code Section 21083.2(d). Testing at two of the sites, CA-MNO-2485 and -2486, involved field work and recovery of artifacts, but not the standard analyses usually conducted on artifacts from sites in Mono County to determine site age and function.

CA-MNO-529: This is a very large site that extends into the project area. Previous data recovery work discovered that the site had been primarily a stone-working camp, occupied intermittently over a period of some 5,000 years. Although CA-MNO-529 was determined eligible for the National Register of Historic Places, the previous investigations, which were conducted to mitigate effects when the site was exchanged out of federal ownership, effectively exhausted the data potential of the site. Further protection or preservation was considered unnecessary (Basgall 1983:166-167). The mitigation conducted would also meet CEQA mitigation requirements (California Public Resources Code Section 21083.2[d]). No further work is recommended for this site, regardless of development planned, but it should be noted that the Sierra Star Master Plan proposes no new impacts.

CA-MNO-2485 and CA-MNO-2486: Both of these sites were tested using the guidelines in CARIDAP:SLS, and both were recommended as not significant (Kautz 1991). However, neither obsidian hydration analysis nor debitage technological analysis was conducted on the material recovered in the initial testing. Without temporal and functional information, it is impossible to know whether or not the sites would meet CEQA criteria for historic resources. In addition, Kautz (1991) inferred both sites to be hunting related, because of the presence of bifaces and flakes, and because of the site settings, near ephemeral drainages where large granite outcrops could have been used as hunting blinds. If so, they would be rare within the Mammoth Lakes area, where the majority of sites are related to the manufacture of obsidian bifaces for trade. As examples of a rare site type, they may meet CEQA criterion D for their potential to provide information important in prehistory. Both sites are now under/within a golf course, and the presence of any intact cultural deposits is not known.

CA-MNO-2487: First tested by Kautz (1991), this site was subsequently subjected to large-scale excavations prior to road construction (Burton 2004b). CA-MNO-2487 was found to be a workshop site used intermittently during the Newberry, Haiwee, and Marana periods, where the occupants did some initial processing of obsidian obtained from the Casa Diablo quarries. Such workshop sites are common in the Mammoth Lakes area, and CA-MNO-2487 fits well-documented patterns in the Long Valley region. The data recovered would fulfill CEQA mitigation requirements (California Public Resources Code Section 21083.2[d]); no further archaeological work is recommended for this site.

Task 5. Report

The proposed SWCA report is a standard report based on work they propose, but most of this work has already been completed. For a summary what the Town comments would actually require, see "My Recommendations" below.

Optional Task 6. Re-Evaluation of Historic Site (primary number 26-3575)

This sparse trash dump has been tested and recorded in its entirety (Burton 2004a). It was determined not to be a significant resource using the criteria in Appendix K of CEQA. Appendix K has since been replaced by Section 15065.5 (archaeological and historical resources) and Section 21083.2 (unique archeological resources). One of the reasons the trash dump was considered not significant is that it was not at least 100 years old, as previously required in Appendix K. However, the age of the site was not the sole reason it was not considered significant, and the site would not meet the updated criteria for a historic resource. Representing a one-time dumping of household trash from elsewhere in Mammoth, the dump is not associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage (criterion A); it cannot be conclusively associated with the lives of persons important in our past (criterion B); it does not embody distinctive characteristics of a type, period, region, or method of construction or represent the work of an important creative individual, or possesses high artistic values (criterion C); nor is it likely to yield information important in prehistory or history (criterion D). The work already conducted has exhausted the site's research potential. No further work is recommended for this site.

Optional Task 7. Evaluation of "Sixth" Site

I believe this is referring to site CA-MNO-2482. This site was first recorded in 1989. It was tested in 1990 prior to the construction of an extension of Minaret Road and determined not to be a significant resource. The site was destroyed by the road construction. No further work is recommended for this site.

Optional Task 8. Agency Consultation

No consultation with other agencies was requested in the Town comments. A level of federal involvement sufficient to trigger applicability of the National Historic Preservation Act (NHPA) has not been identified. If it is in the future, the state (CEQA) and federal (NHPA) criteria for identifying and treating important historic resources are very similar, which should allow expedited compliance.

My Recommendations

The questions raised by the Town comments can be addressed by clarifying the existing status of archaeological work within the master plan area and conducting limited field testing and additional laboratory analyses for CA-MNO-2485 and -2486. Specific tasks would include:

1. Prepare a concise and clear summary of recent work and recommendations based on current CEQA criteria. This summary would document that the field work necessary to determine significance and effects has been completed for four of the six sites within the master plan area.

2. Conduct limited field work at CA-MNO-2485 and -2486, complete laboratory analyses, and prepare a report discussing whether the two sites meet CEQA criteria for historic resources and whether the master plan would have significant impacts to the sites. Comparing the site locations to the Sierra Star master plan, there would be no new impacts to CA-MNO-2485 and -2486 from proposed developments. However, the Town requested these sites be reevaluated against the revised CEQA criteria, and given the possibility of location errors for sites recorded before the widespread use of GPS technology, field inspection and possible auguring of both sites to confirm their locations is recommended. Debitage analysis, obsidian hydration, and X-ray fluorescence analyses of curated specimens should be done to determine whether the sites are historic or unique resources according to CEQA standards.

3. Clarify with the Town of Mammoth Lakes whether they wish the project proponent to initiate Native American consultation, as SWCA proposed.

If you have any further questions, please contact me.

Sincerely,

Jeff Burton

References Cited

Basgall, Mark E.

1983 Archaeology of the Forest Service Forty Site (CA-MNO-529), Mono County, California. Ms. on file, Inyo National Forest, Bishop, California.

Burton, Jeffery F.

1989 An Archaeological Survey of the Minaret Road Extension, Mammoth Lakes, California. *Contributions to Trans-sierran Archaeology 17*

1990a An Archaeological Survey of the Lodestar Property, Mammoth Lakes, California. *Contributions to Trans-sierran Archaeology* 19

1990b Archaeological Testing at the Minaret Road Site (CA-MNO-2482), Mammoth Lakes, California. *Contributions to Trans-sierran Archaeology* 25

2002 Archaeological Resources, Sierra Star Master Plan. Ms. on file, Interwest, Reno, Nevada.

2004a Sierra Star Historic Site Evaluation. Letter report on file, Interwest, Reno, Nevada.

2004b Archaeological Testing at the Sierra Star Site (CA-MNO-2487), Mammoth Lakes, California. *Contributions to Trans-sierran Archaeology* 54

Jackson, Robert, Michael Boynton, William Olsen, and Richard Weaver

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Kautz, Robert R.

1991 Archaeological Testing Procedures at Six Sites in Mammoth Lakes, California: The Lodestar Project. Mariah Associates, Inc., Reno, Nevada.

TRANS-SIERRAN ARCHAEOLOGICAL RESEARCH
332 EAST MABEL STREET, TUCSON, ARIZONA 85705 (520) 620-6804

July 8, 2004

Scott Schoenfeld
Director of Land Development
Southwest Region
Intrawest Resort Development Group
sschoenfeld@intrawest.com
775-332-1247

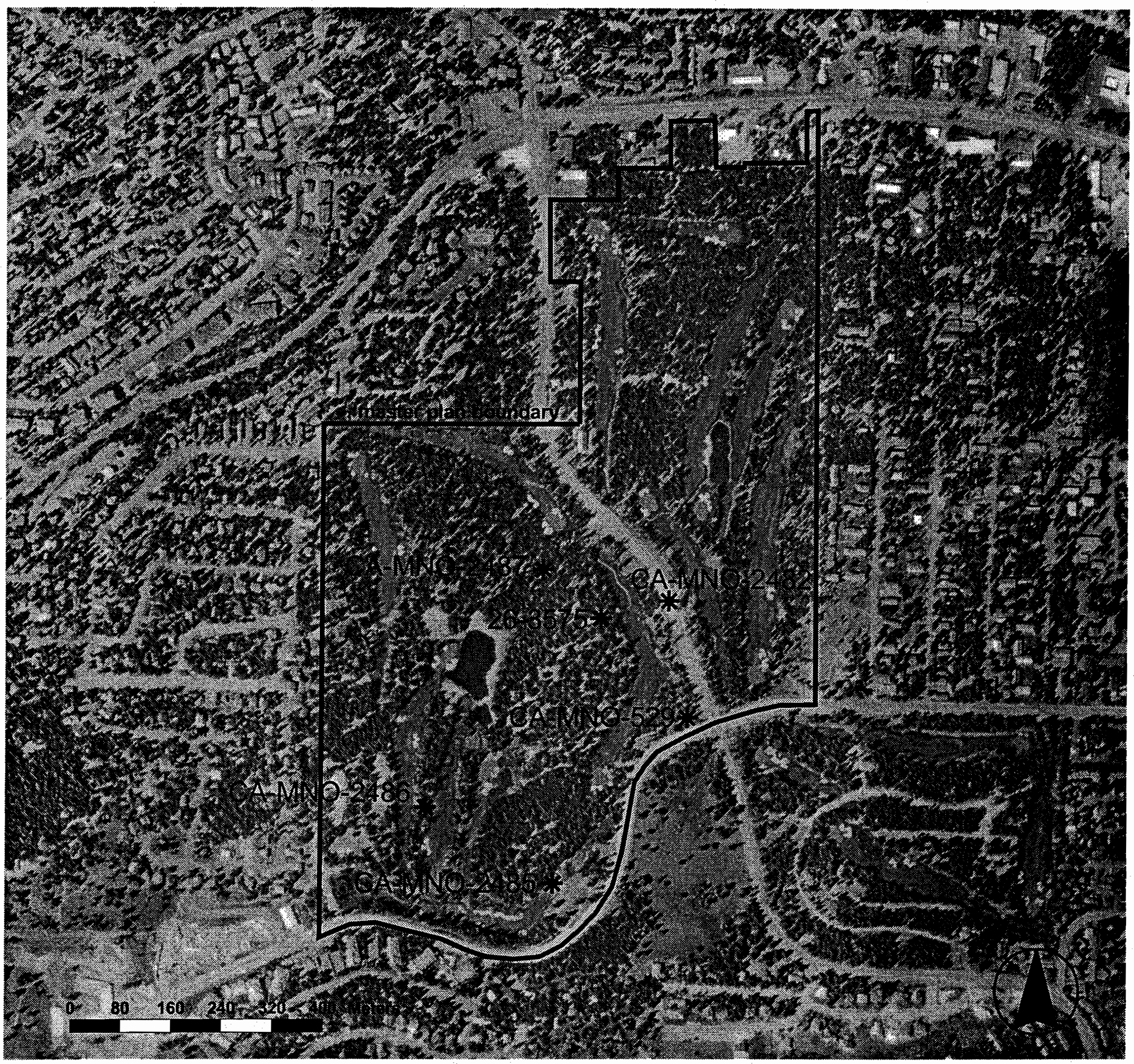
RE: Sierra Star Historic Site Evaluation

On June 30, 2004, Trans-Sierran Archaeological Research conducted a site assessment for Intrawest Development at Sierra Star, a residential and golf-course development in the town of Mammoth Lakes, California. In order to meet CEQA requirements for one proposed part of the development, one previously recorded archaeological site (primary number 26-3575) had to be evaluated to determine if it met CEQA criteria for a significant archaeological resource. Evaluation included relocation of the site, detailed recording of all artifacts, surface scrapes, mapping, photographs, and excavation of three backhoe pits.

Site 26-3575 was recorded in 1991 (Kautz 1991) as a small surface scatter of historic-period trash, predominantly cans and glass. A shallow depression 12 m to the east of the trash was recorded as possibly associated with the scatter. Total area of the site was estimated to be about 50 square meters. The site's location, within a forested area, suggested the site might have been related to logging. Sun-colored amethyst glass suggested a ca. 1900 date. The site was given only a primary number, rather than a permanent trinomial, because the site record lacked a site map.

During the June 30th assessment, the site location was examined by the author and one assistant. Present during the work were Scott Schoenfeld of Intrawest and Dave Early, forestry consultant for the project. Mr. Early had seen the site previously, and could locate it on the ground. The site's location was found to have been disturbed by a percolation test pit, reported to have been excavated in October 2003. In fact, only a couple of artifacts were visible on the ground surface; the site location was verified by the presence of the shallow depression, which matched photographs in the original site record (Figures 1 and 2).

Mr. Early had used a metal detector to relocate the can scatter, which had been buried by a few inches of loose sediments, likely generated by the percolation test. No other metal artifacts were noted by Mr. Early. The site was plotted by GPS, the area was mapped with compass and tape, and



Map 1. Archaeological Site Locations (adapted from USGS 7.5' orthophoto quad Old Mammoth SW, Calif. 1998).

selected artifacts were photographed. With today's GPS technology, it was determined that the site had been originally misplotted by a little over 200 m (Map 1). The discrepancy is not surprising, given that the relatively level terrain and forest vegetation provide few distinctive topographic clues for plotting.

The area of the can scatter was scraped with a trowel to uncover all of the artifacts. The depression was also scraped to mineral soil (less than an inch or two deep), but no artifacts were found there. Glass, ceramic, and metal artifacts were recovered during the scraping at the can scatter. Glass included 10 fragments of window glass, a small clear glass vial (Figure 3a), six fragments from at least two extract bottles, 17 fragments from an aqua glass canning jar, 14 fragments of a honey-colored embossed whiskey (or beer) bottle (Figure 4), and 18 fragments of a turned-pink jar with the basemark of the Diamond Glass Company, PA, used after 1924 (Figures 3b and 5; Toulouse 1971:550). Ceramics included two blue-on-white porcelain saucer (?) fragments (Figure 3c) and two plain white porcelain fragments. Metal included a bucket (?) fragment with brass rivets, a small metal band, eight rectangular meat cans or meat can tops (Figure 6; some embossed with "EST. 22"), 37 complete or nearly complete hole-in-cap food cans (Figure 7), three fragmentary sanitary seal food cans, eight can lids/tops, and 143 miscellaneous can fragments.

To determine whether there is any subsurface cultural material three backhoe pits were excavated. One pit, 3m by 3.5m by 50 cm deep (Test Pit "A" on Map 2, Figure 8), was located within the artifact scatter and overlapping the previous percolation test pit. Only a few artifacts were encountered, all apparently from disturbed contexts near the surface. The artifacts recovered from Test Pit A were similar to those already recovered. Glass artifacts included a clear extract bottle neck, three aqua canning jar fragments, and five honey-colored whiskey or beer bottle fragments. Ceramics recovered included five plain white ware bowl (?) fragments and one plain porcelain fragment. Metal artifacts included a small metal band, a sardine can, nine complete or nearly complete hole-in-cap food cans, two can tops, and a lithographed friction can lid.

Test Pit B was 1 m by 1 m by 50 cm deep; it was placed where there was some evidence of fresh disturbance, interpreted as a possible bottle-collector's excavation. No artifacts were found in Test Pit B. Test Pit C, excavated within the shallow depression, was 2m by 3m by 90 cm deep (Figure 9). Wood chunks were encountered, some of them burned, but none of them culturally modified; the depression was clearly where a tree stump had partially burned and rotted.

The artifacts at the site all appear to be household trash, representing a one-time dumping event sometime between 1910 and the 1930s. The glass that was originally recorded as sun-colored amethyst is actually "turned-pink" glass, which dates to between 1915 and 1930. Other dated artifacts include jar with a post-1924 basemark, a key-opened sardine can (post 1916), clear glass (generally post 1930), honey-colored glass (1910-1930), hole-in-cap cans (1810-1930s), and sanitary seal cans (in general use ca. 1922).

Fragments of window glass and decorated ceramics indicate household refuse, rather than trash left by campers. In addition, milk cans are one of the most ubiquitous artifacts at temporary campsites, and no milk cans were found at Site 26-3575. The source of the trash cannot be definitely determined, however it is likely from a residence in the local area. While there are no recorded historic sites with one-half mile of the site, the village of "Old Mammoth" which dates as early as 1915 is located three-quarters of a mile south and the 1920s-1937 town of Mammoth is located one mile southeast. Casual dumping of household trash was very common in rural areas up until the 1960s. Often trash would be dumped during other outdoor activities, such as woodcutting.

Site 26-3575 does not meet the CEQA criteria for a significant or important archaeological site. It is not 100 years old, associated with major events or persons in California history, nor is it unique. Further, this work has exhausted the site's research potential. No further archaeological work is recommended for this site.

Let me know if you need anything else,

/s/

Jeff Burton

attachments

cc w/attachments:
Dave Early
CHRIS, UC Riverside

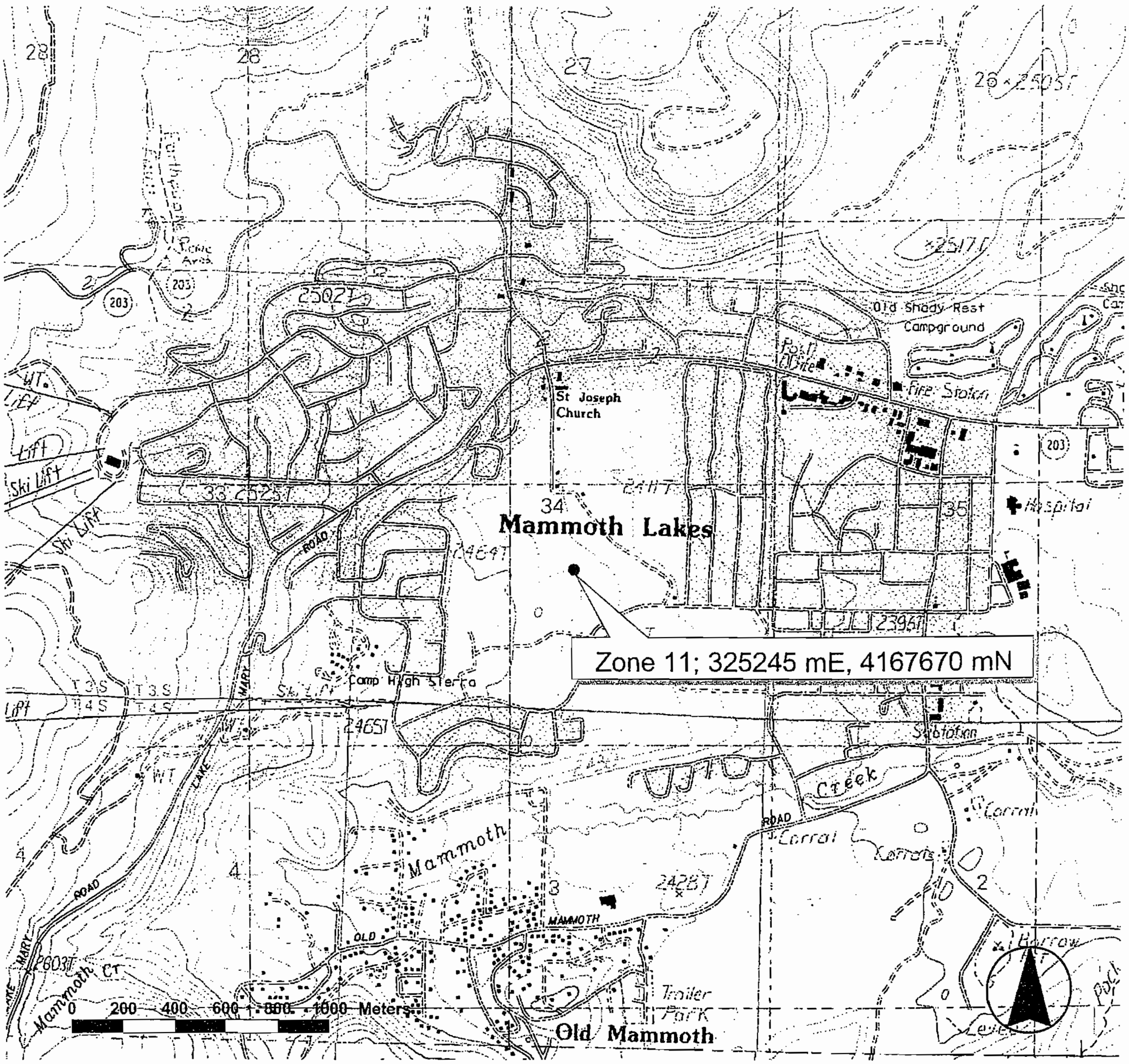
References Cited

Kautz, Robert R.

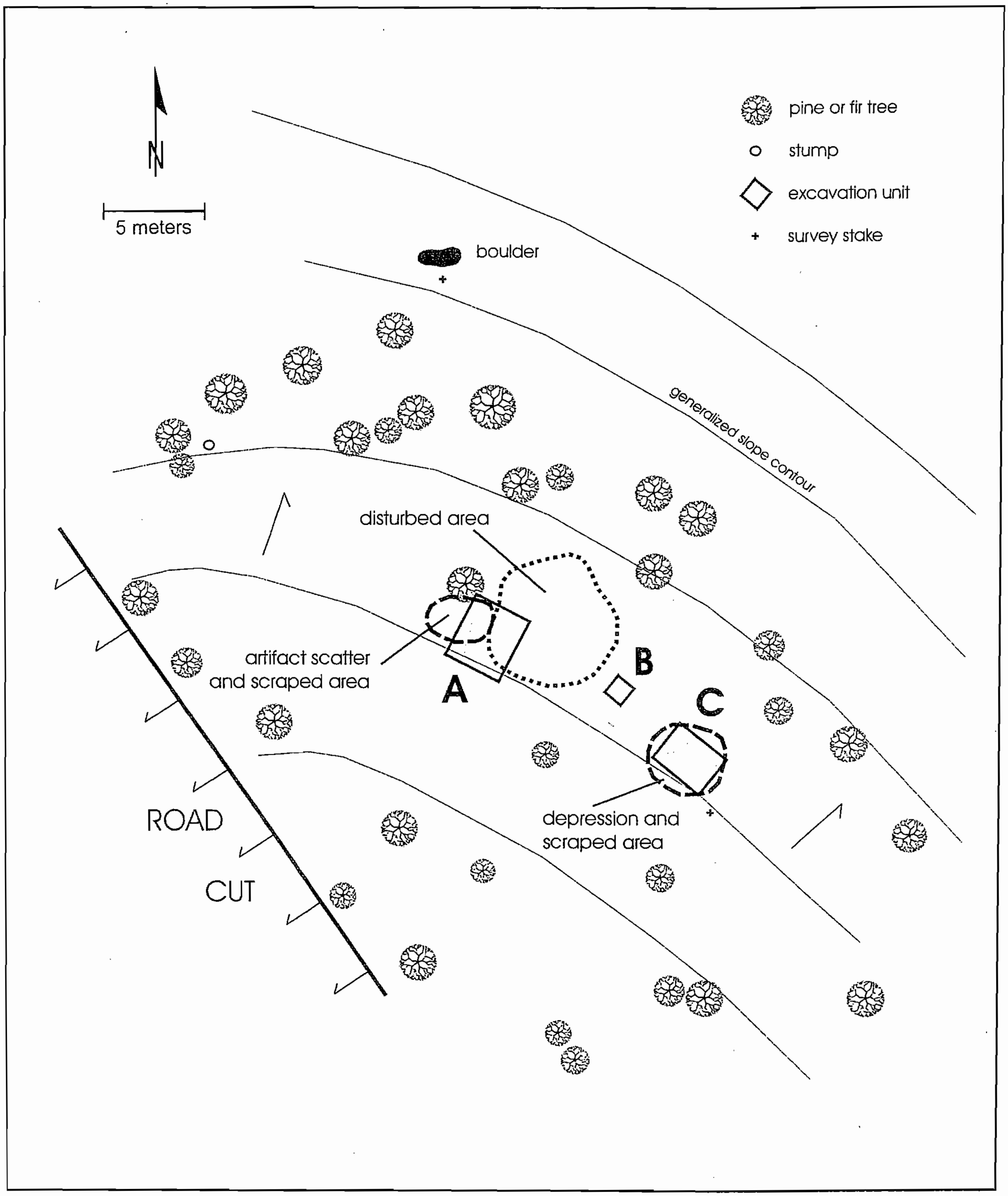
1991 Appendix A, Archaeological Testing Procedures at Six Sites in Mammoth Lakes, California: The Lodestar Project. Mariah Associates, Inc., Reno, Nevada.

Toulouse, Julian Harrison

1971 *Bottle Makers and Their Marks.* Thomas Nelson, New York.



Map 1. Archaeological Site Location (adapted from USGS 7.5' map Old Mammoth, CA).



Map 2. Map of Site 26-3575.

Figure 1. Site overview; percolation test to right, artifact scatter to left.

Figure 2. Depression.

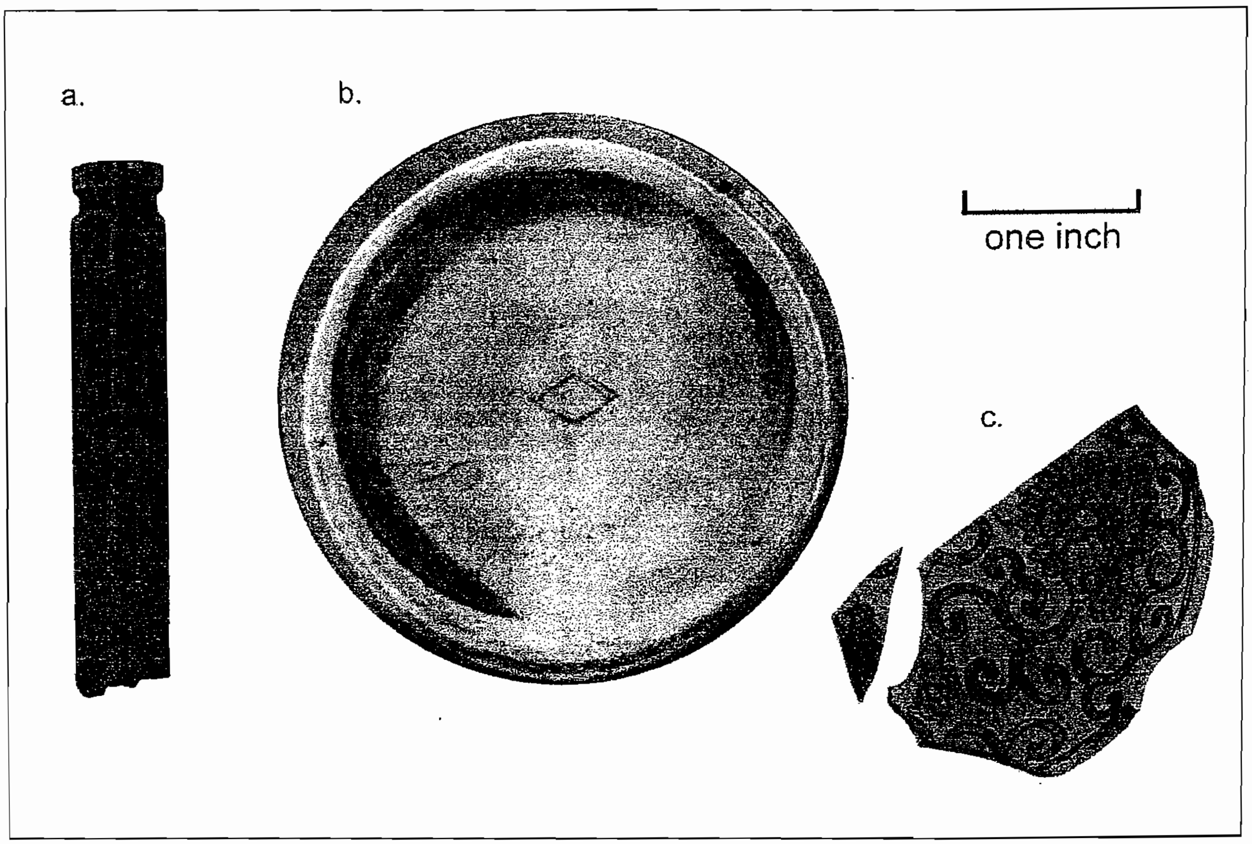


Figure 3. Items from artifact scatter; a. clear glass vial, b. "turned-pink" bottle base with Diamond Glass Company basemark, c. blue-on-white porcelain fragments.

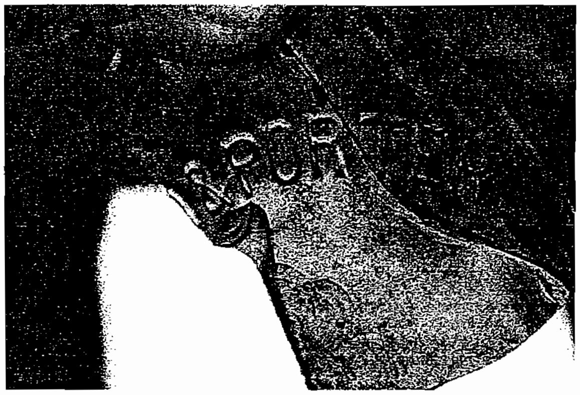


Figure 4. Embossed honey-colored whiskey or beer bottle fragments.

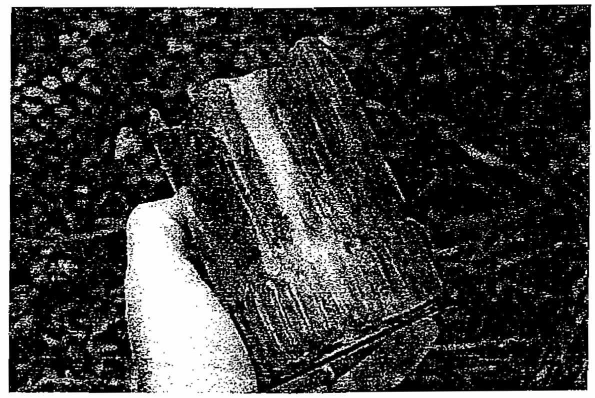


Figure 5. "Turned-pink" bottle base.

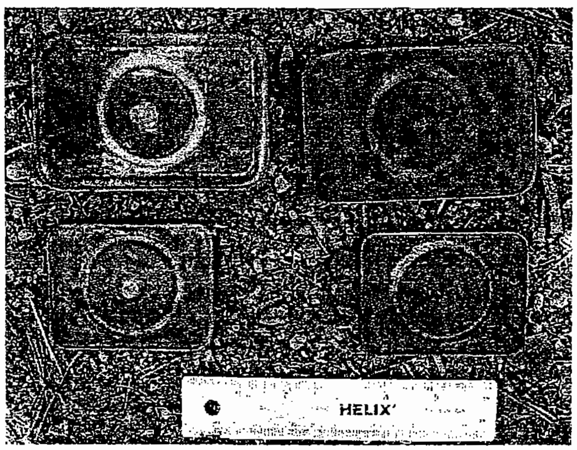


Figure 6. Meat can tops.

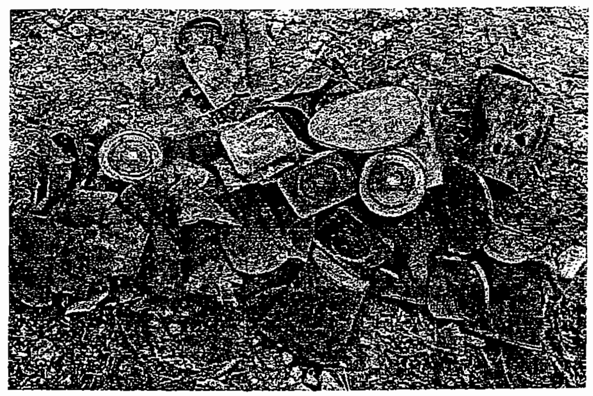


Figure 7. Cans from surface scrape.

Figure 8. Excavation of Test Pit A.

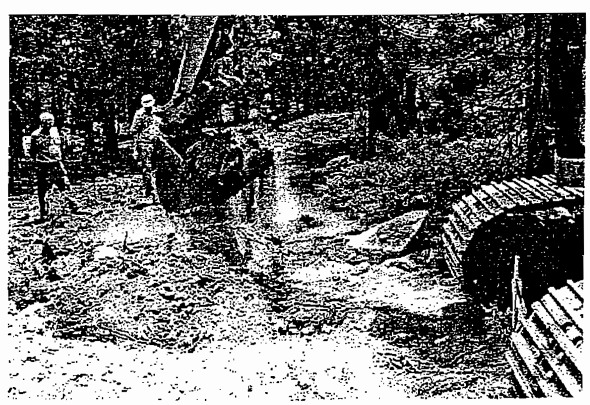


Figure 9. Excavation of Test Pit C.

Trans-Sierran Archaeological Research
332 East Mabel Street, Tucson, Arizona 85705

PRIMARY RECORD

Primary # 26-3575 (update)
HRI #
Trinomial CA-MNO-
NRHP Status Code
Other Listings
Review Code ____ Reviewer ____ Date ____

Resource Name/Number: Lodestar 7

P1. Other Identifier:

P2. Location: ☒ Not for Publication ☐ Unrestricted **a. County:** Mono
b. USGS 7.5' Quad: Old Mammoth, CA T3S, **R** 27E, SE¼ of the NE¼ of the SW¼ **of Section** 34, MDBM.
c. Address: n/a.
d. UTM: Zone 11; 325245 mE, 4167670 mN.
e. Other Locational Data: Within the Sierra Star development area, west of Minaret Road.

P3a. Description: On June 30, 2004, Trans-Sierran Archaeological Research conducted a site assessment for Intrawest Development at Sierra Star, a residential and golf-course development in the town of Mammoth Lakes, California. Work included re-location of the site, detailed recording of all artifacts, surface scrapes, mapping, photographs, and excavation of three backhoe pits.

The site, plotted by GPS, was determined to have been originally misplotted by a little over 200 m. The location was verified by the presence of the shallow depression, which matched photographs in the original site record.

A metal detector was used to relocate the can scatter, which had been buried by a few inches of loose sediments generated by a percolation test pit. No other metal artifacts were noted in the site area. The area of the can scatter was scraped with a trowel to uncover all artifacts. The depression was also scraped, to mineral soil (less than an inch or two deep). Glass, ceramic, and metal artifacts were recovered during the scraping at the can scatter (see list below). No artifacts were recovered during the scraping of the depression. ☐ **see continuation sheet** ☐

P3b. Resource Attributes (and Codes): Privies/dumps/scatters (AH4).

P4. Resources Present: ☐ Building ☐ Structure ☐ Object ☒ Site ☐ District ☐ Element of District ☐ Other:

P5a: Photograph or Drawing:

P5b. Description of Photograph: Overview of site area towards the southeast, artifact scatter is located between the person and the clipboard (in foreground).

P6. Date Const/Age and Sources: ☒ Historic ☐ Prehistoric ☐ Both

P7. Owner and Address: Intrawest Resort Development Group, Vancouver, British Columbia.

P8. Recorded by: Jeff and Dan Burton, Trans-Sierran Archaeological Research, 332 East Mabel Street, Tucson, Arizona 85705.

P9. Date Recorded: June 30, 2004.

P10. Survey Type: Testing and evaluation.

P11. Report Citation: Burton, Jeff (2004), Letter Report: Sierra Star Historic Site Evaluation. Intrawest Resort Development Group, Southwest Region, Reno, Nevada.

Attachments: ☐ None ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other:

Trans-Sierran Archaeological Research
332 East Mabel Street, Tucson, Arizona 85705

Primary # 26-3575 (update)
HRI #

CONTINUATION SHEET

Trinomial CA-MNO-

 Resource Name/Number: Lodestar 7

Recorded by: Jeff and Dan Burton **Date:** June 30, 2004 □Continuation ☒ Update

P3a. Description (continued): To determine whether there is any subsurface cultural material three backhoe pits were excavated. Test Pit A, 3m by 3.5m by 50 cm deep, was located within the can scatter and overlapping the percolation test pit. Only a few artifacts were encountered, all apparently from disturbed contexts near the surface (see list below).

Test Pit B, 1 m by 1 m by 50 cm deep, was placed where there was some evidence of fresh disturbance, interpreted as a possible bottle-collector□s excavation. No artifacts were found in this pit. Test Pit C, 2m by 3m by 90 cm deep, was excavated within the depression. Wood chunks were encountered, some of them burned, but none of them culturally modified; the depression was clearly where a tree stump had partially burned and rotted.

The artifacts at the site all appear to be household trash, representing a one-time dumping event sometime between 1910 and the 1930s. The glass that was originally recorded as sun-colored amethyst is actually □turned-pink□glass, which dates to between 1915 and 1930. Other dated artifacts include jar with a post-1924 basemark, a key-opened sardine can (post 1916), clear glass (generally post 1930), honey-colored glass (1910-1930), hole-in-cap cans (1810-1930s), and sanitary seal cans (in general use ca. 1922).

Artifacts from Surface Scrape

Glass

10 window glass fragments, slightly aqua, largest 4 by 4 inches

1 clear glass vial, 3 inches long by ½-inch diameter

6 clear glass fragments from at least two extract bottles, no embossing, rectangular base 1 by 1f inches

17 aqua glass fragments, likely from a canning jar, body fragment with embossing (in script □T...□) round base 3¼-inch diameter, embossed with □1□

14 honey-colored whiskey or beer bottle fragments, embossed □.. & PORTER/B&P (overlapped)□

18 clear/pink fragments including a 3 ½-inch diameter round base with Diamond Glass Company, PA, basemark used after 1924

Ceramics

2 blue-on-white porcelain saucer (?) fragments

2 plain white fragments with similar glaze

Metal

bucket (?) fragment with brass rivets

2 1/4-inch diameter metal band

2 rectangular meat can tops, 3c by 2d inch, key-opened, hole in cap (1¾-inch diameter), embossed □EST. 22□

2 rectangular meat can tops □EST. 22□2-inch diameter cap, 1¼ by 2¾ inch

2 rectangular meat can bases/body, 3¼ by 2c by 4c high

1 rectangular meat can base, 4c by 2¼ by 3¼ inch high

Resource Name/Number: Lodestar 7

Recorded by: Jeff and Dan Burton **Date:** June 30, 2004 ☐Continuation ☒ Update

Artifacts from Surface Scrape (continued)

1 rectangular meat can base, 1f by 3 by 2½ inch high

10 round hole-in-cap food cans, cut opened
- 2f by 4c inches
- 2f by 4d inches
- 2 - 3 by 4d inches
- 2 - 3 by 4¾ inches
- 3 by 4e inches
- 3 ½ by 4½ inches
- 4¾ by ___ inches (height unmeasurable)
- ___ by 4½ inches (diameter unmeasurable)

19 hole-in-cap can tops/fragments

3 sanitary seal can tops/fragments

8 large soldered can body fragments 6 cut can lids
- 4 - 2¾-inch diameter
- 3½-inch diameter
- 4-inch diameter

sanitary seal can top, 4c -inch diameter

solder can top, 5c -inch diameter

143 miscellaneous can fragments

Artifacts from Test Pit A

Glass

5 honey-colored whiskey or beer bottle fragments embossed □..A, CAL.□

3 aqua glass fragments, one with canning jar lip

1 clear extract bottle neck/lip

Ceramics

5 whiteware bowl (?) fragments

1 plain porcelain fragment

Metal

2¼-inch-diameter metal band

sardine can, 2¾ by 4 by ¾ inch high, key-opened

Trans-Sierran Archaeological Research
332 East Mabel Street, Tucson, Arizona 85705

CONTINUATION SHEET

Primary # 26-3575 (update)
HRI #
Trinomial CA-MNO-

Resource Name/Number: Lodestar 7

Recorded by: Jeff and Dan Burton **Date:** June 30, 2004 ☐Continuation ☒ Update

Artifacts from Test Pit A (continued)

5 hole-in-cap food cans (diameter by height)
- 2¾ by 4¼ inches
- 2f by 4d inches
- 3 by 4d inches
- ___ by 4d inches (diameter unmeasurable)
- ___ by 4½ inches (diameter unmeasurable)

4 hole-in-cap can fragments

solder can top, 5f -inch diameter

cut can lid, 3½-inch diameter

lithographed friction can lid, 2¼-inch diameter by ¼-inch high, traces of black, red, and gold

13 miscellaneous can fragments

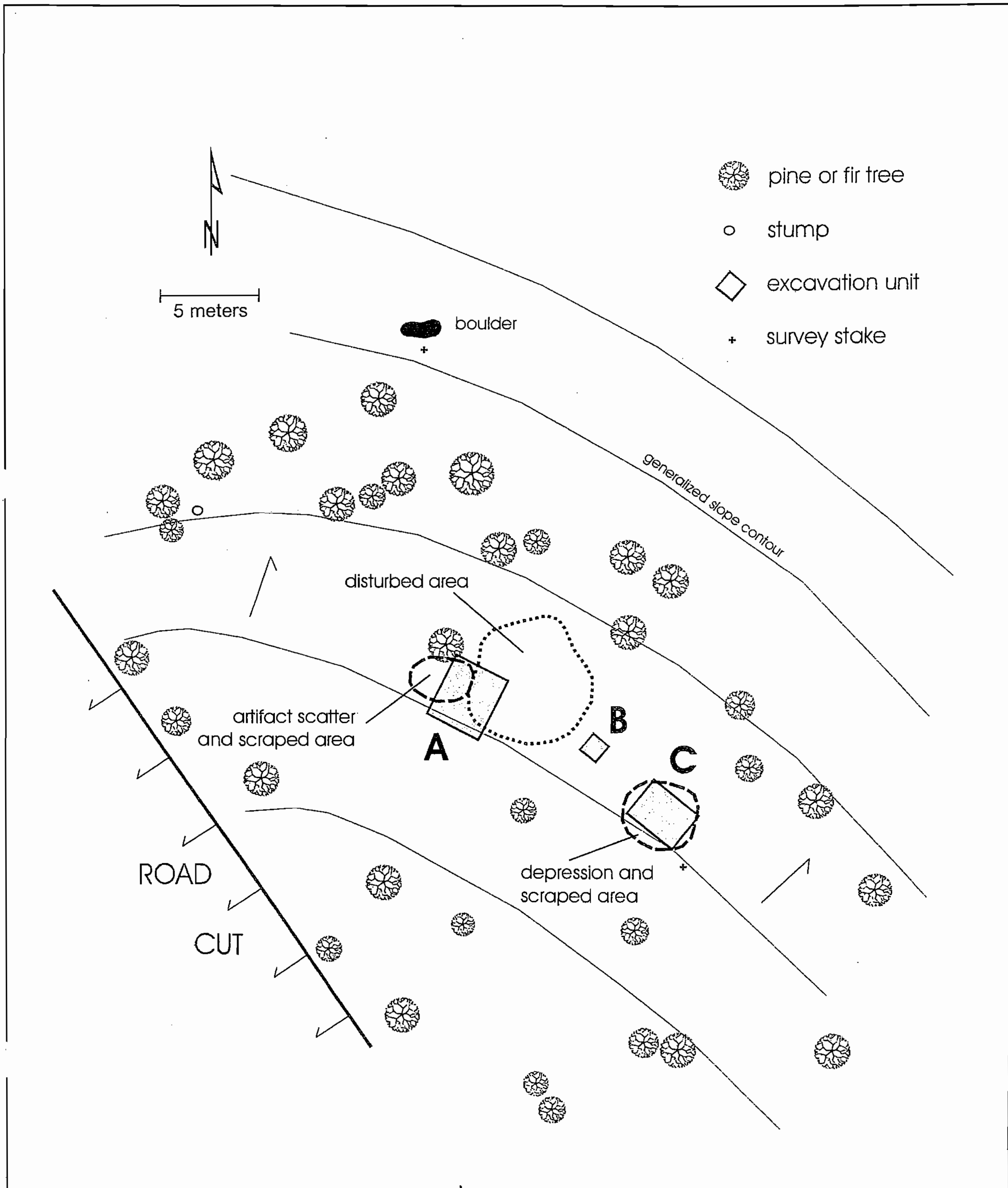
Trans-Sierran Archaeological Research
332 East Mabel Street, Tucson, Arizona 85705

SKETCH MAP

Primary # 26-3575 (update)
HRI #
Trinomial CA-MNO-

Resource Name/Number: Lodestar 7

Drawn by: Jeff and Dan Burton **Date:** June 30, 2004



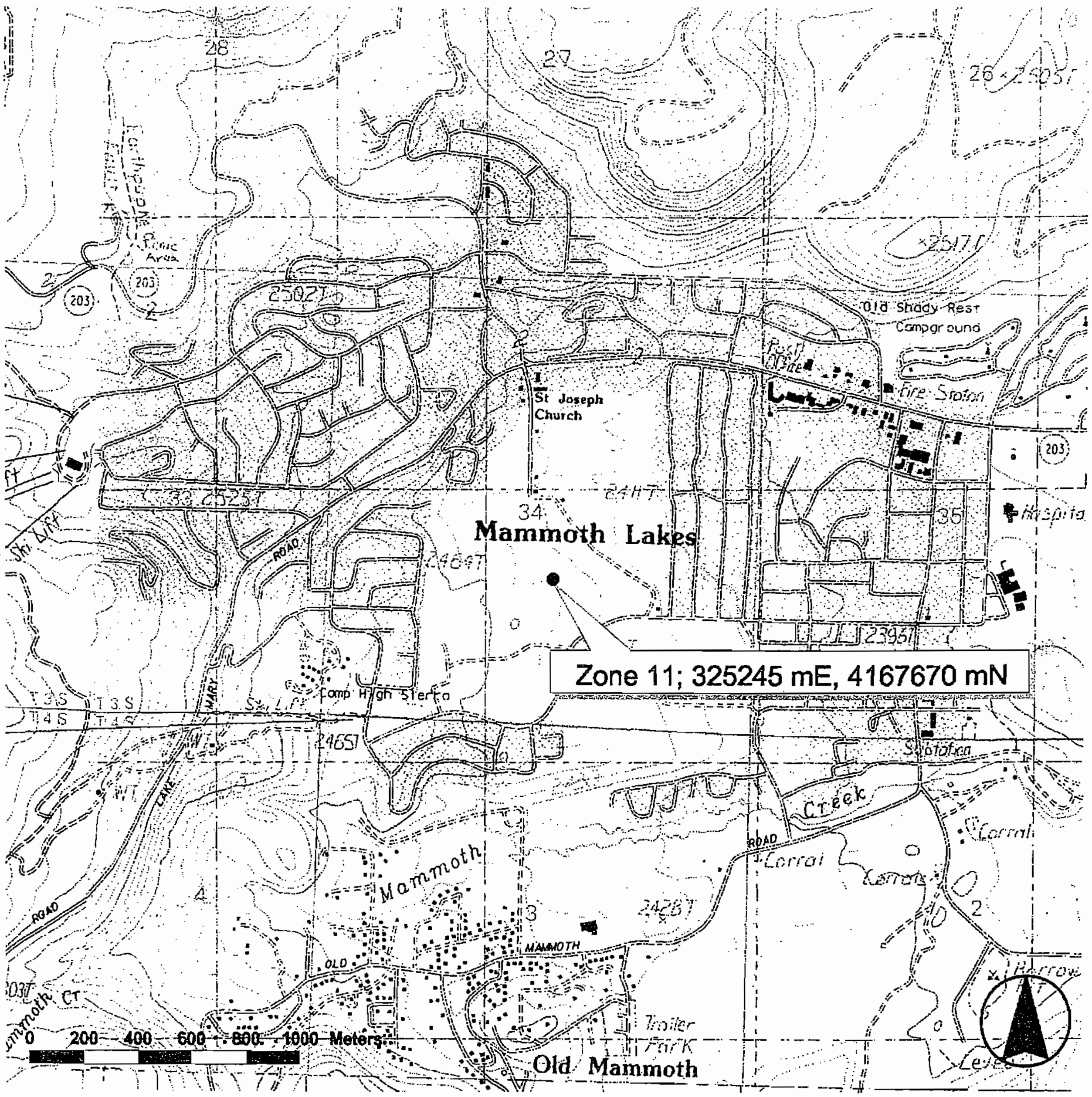
Trans-Sierran Archaeological Research
332 East Mabel Street, Tucson, Arizona 85705

LOCATION MAP

Primary # 26-3575 (update)
HRI #
Trinomial CA-MNO-

Resource Name/Number: Lodestar 7

Map Name: Old Mammoth, CA **Scale:** 7.5' **Date of Map:** 1987



MARIAH ASSOCIATES, INC. – RENO
ARCHAEOLOGICAL SITE RECORD

1. **Permanent Trinomial:** CA-Mno- **Update:**

2. **Agency Designation:**

3. **Temporary Designation/Common Name:** Lodestar #7

4. **County:** Mono **State:** California

5. **USGS Quad:** *Old Mammoth, Calif.* 7.5' Provisional Edition 1983

6. **UTM Coordinates:** Zone 11; 325,045 mE, 4,167,565 mN.

7. **National Grid Reference:** T3S, R27E, SE 1/4 NE 1/4 SW 1/4 of Section 34.

8. **Elevation:** 2442 m amsl.

9. **Location:** Within the Town of Mammoth Lakes near the center of the Lodestar property. Approximately 200m SW of Lodestar #6 along a footpath.

10. **Site Description:** (Prehistoric___ Contact___ Historic_X_) Small surface distributed can and glass scatter from turn-of-century logging(?) context.

11. **Site Integrity:** (Excellent___ Good_X_ Fair___ Poor___) A footpath crosses the site at its eastern edge, and some colluvial action on the west has moved historic debris downslope.

12. **Area:** 5m (N/S) X 13m (E/W); 51m^2

13. **Method of Determination:** Tape measurement.

14. **Features:** A shallow depression (7m in diameter, 30cm deep) of unknown function lies 12m east of the can scatter.

15. **Artifacts:** Hole-in-top cans with crimped seams (#65); squared and (copper) riveted white metal bucket with wire handle (#1); white ironstone with clear glaze ceramic fragments (cup, saucer)(#4); purple, amber, clear, aqua, glass fragments (#50); top of a square kerosene container (#1). Glass amber whiskey bottle base (with nipple) and neck (#2).

16. **Non-Artifactual Constituents:** None noted.

17. **Human Remains:** None noted.

18. **Nearest Water:** Mammoth Creek ca. 1000m to the south. Ephemeral drainage 100m west.

19. **Vegetation Community:** Immature stand of lodgepole and Jeffrey pine, with an occasional fir. Open areas contain sagebrush (*Artemisia*), manzanita, serviceberry, and occasional forbs and grasses.

20. **Soil:** Sandy gravel with sandy silt base overlain by forest duff.

21. **Geology:** Granitic boulder outcrops to the south.

22. **Landform:** Between a narrow ridge and drainage along gradual slope.

23. **Slope:** 9°

24. **Aspect:** 120° SE

25. **Exposure:** Open.

26. **Landowner and Address:** The Lodestar Company; 3034 South Orange Avenue; Santa Ana, California 92707.

27. **References:** See, for a discussion of local historic age economies, *Archaeological Test Excavations at the Snowcreek Site (CA-Mno-3) Mammoth Lakes, California.* Jeffery F. Burton and Mary M. Farrell. Trans-Sierran Archaeological Research Contribution #23. 1990. Tucson, AZ.

28. **Date Recorded:** June 26, 1991.

29. **Recorded by:** Robert R. Kautz, Ph.D.

30. **Affiliation:** Mariah Associates, Inc.; 5301 Longley Lane #H-120; Reno, NV 89511

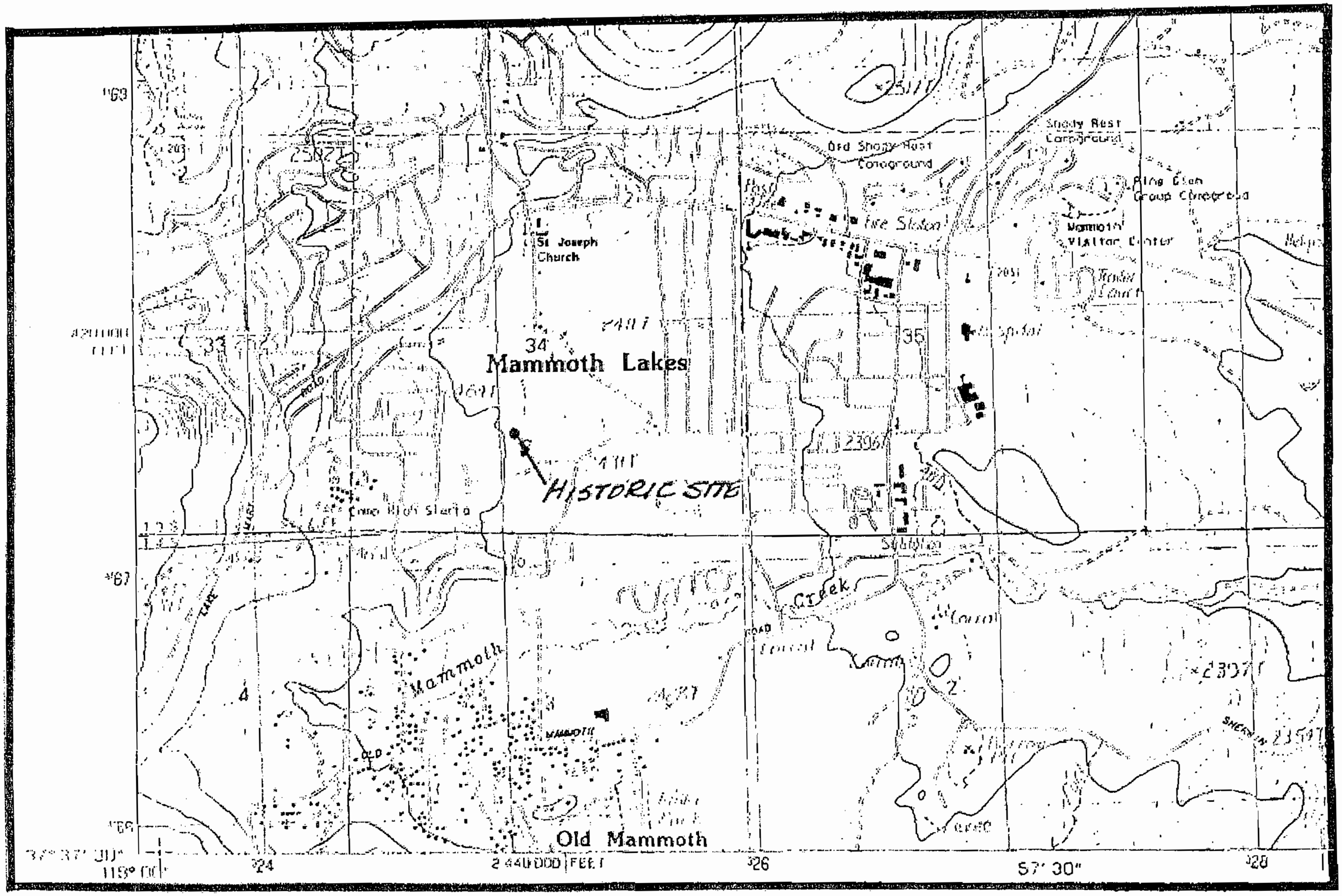
31. **Name of Project:** Lodestar Testing Project, 1991.

32. **Type of Project:** Archaeological Testing.

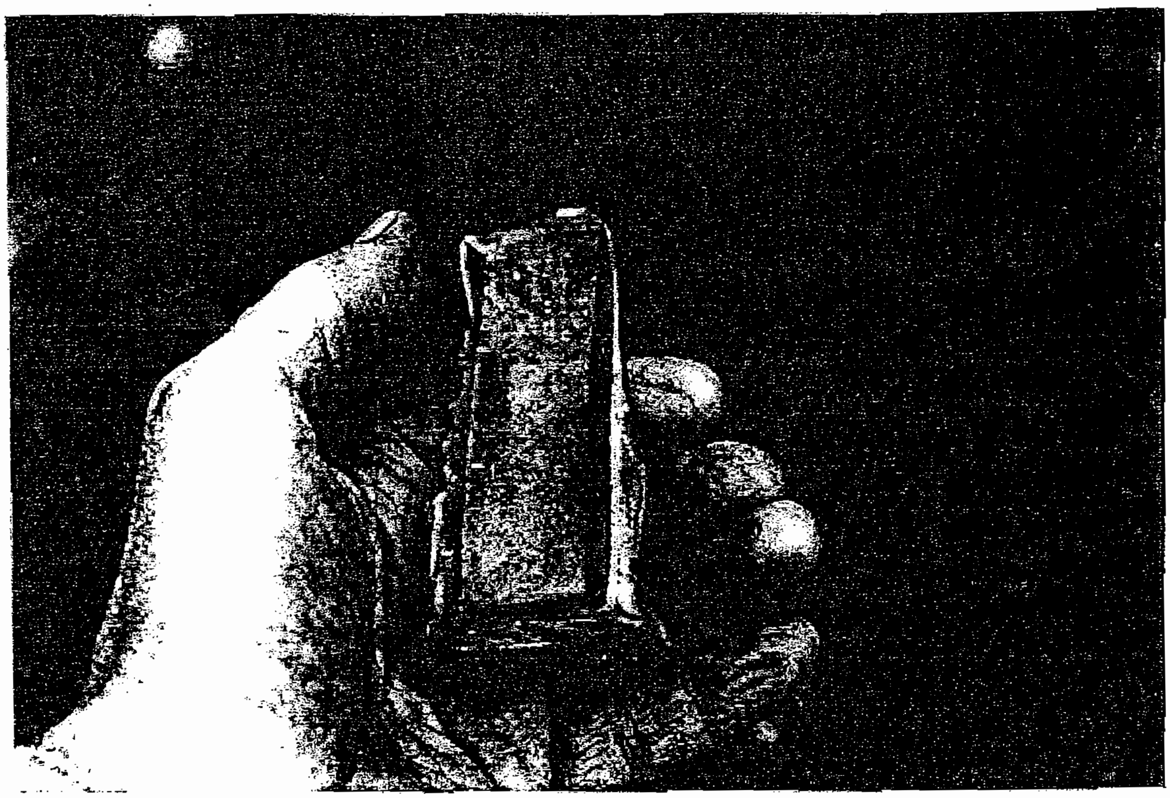
33. **Artifacts Curated at:** None Collected. **Accession No.:** N/A

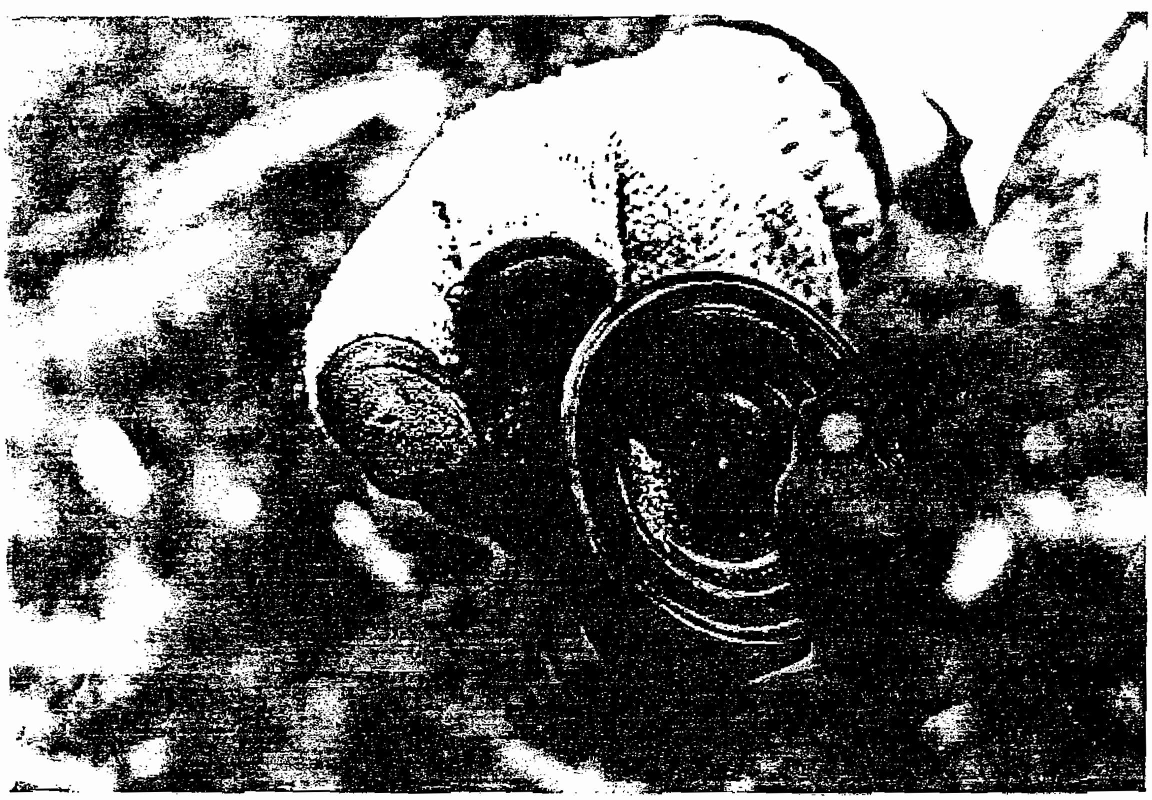
34. **Photos:** Four color prints (accompanying). **Taken by:** R. Kautz. **Negatives at:** Mariah Associates, Inc. 5301 Longley Lane #H-120; Reno, NV 89511.

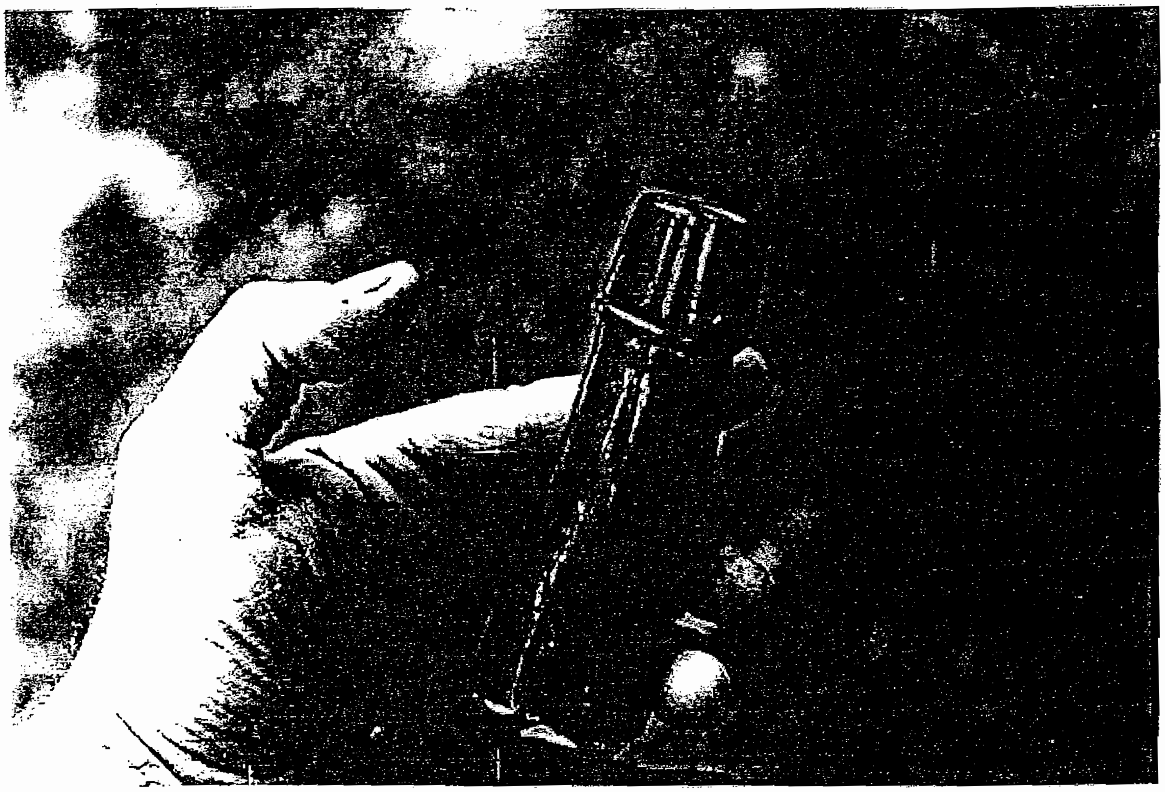
37. **Remarks:** None.

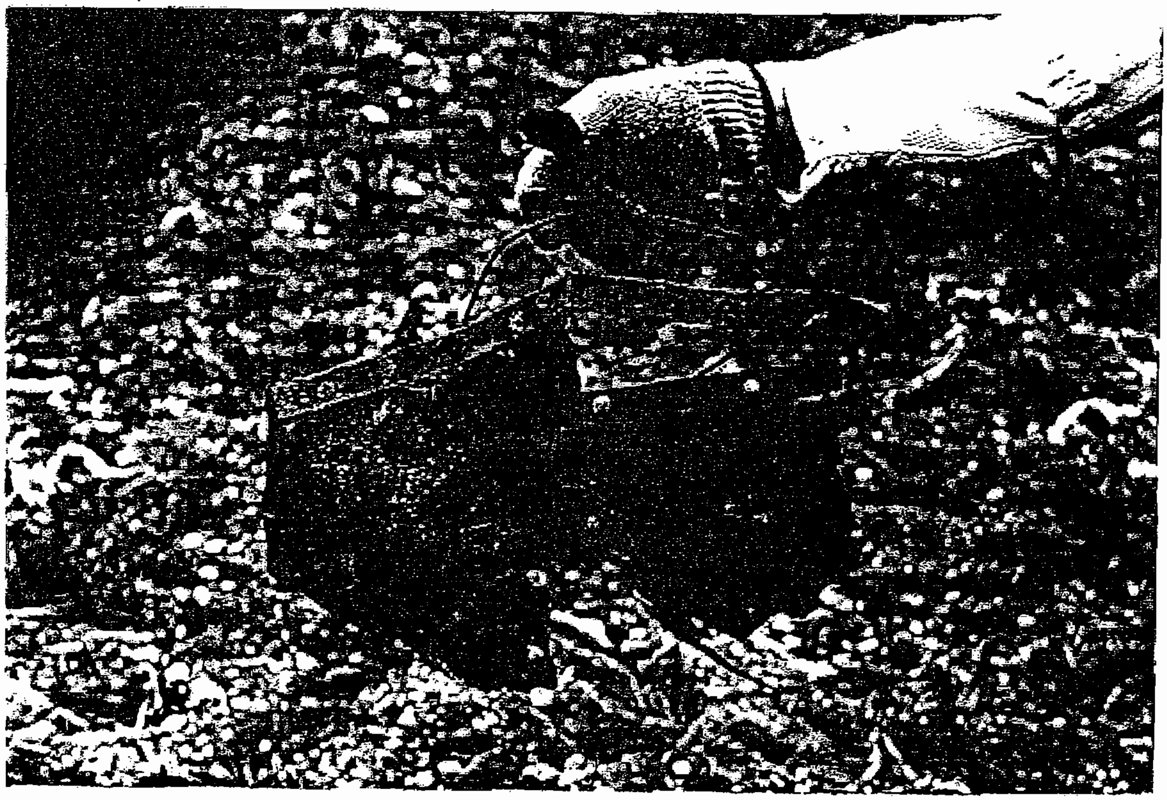


Location of Historic Site, Mammoth Lakes Testing Program, The Lodestar Project, 1991.
Base Map is *Old Mammoth, Calif.* 7.5' Provisional Edition (1983).









Possible Feature. Note Depression.

TRANS-SIERRAN ARCHAEOLOGICAL RESEARCH
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Archaeological Resources
Sierra Star Master Plan

Summary
Five prehistoric archaeological sites have been recorded within the area of the proposed Sierra Star Master Plan. Two have been investigated thoroughly for previous projects, and require no further consideration under the *California Environmental Quality Act (CEQA)*. The importance of the remaining three sites cannot be determined through the current data available. If impacts to these sites cannot be avoided, some additional excavation and comprehensive analysis of artifacts is recommended.

Consideration of Cultural Resources under *CEQA*
The Mammoth Lakes area has a rich legacy of historic and prehistoric cultural resources, with archaeological sites dating back thousands of years. *CEQA* requires the consideration of important archaeological resources, and if the project may cause damage to an important archaeological resource, the project may have a significant effect on the environment. As defined in Appendix K of *CEQA*, an "important archaeological resource" is one which:

A. Is associated with an event or person of:
   1. Recognized significance in California or American history, or
   2. Recognized scientific importance in prehistory.

B. Can provide information which is both of demonstrable public interest and useful in addressing scientifically consequential and reasonable archaeological research questions;

C. Has a special or particular quality such as oldest, best example, largest, or last surviving example of its kind;

D. Is at least 100 years old and possesses substantial stratigraphic integrity; or

E. Involves important research questions that historical research has shown can be answered only with archaeological methods.

When a project may cause damage to an important archaeological resource, *CEQA* also lists ways that the significant effect can be mitigated, through preservation or data recovery.

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ulturaI Resources within the Sierra Star Project Area

he entire project area has been surveyed for cultural resources, as documented in reports repared by Basgall (1983), Burton (1989, 1990a, 1990b), and Kautz (1991). Archaeological ıvestigations have discovered five prehistoric archaeological sites within the project boundaries Map 1). Complete data recovery has been conducted at two of the sites, and at least some ıreliminary subsurface testing has been conducted at the remaining three. More details about the ive sites are available in Basgall (1983), Burton (1989, 1990a, 1990b), and Kautz (1991).

ite CA-MNO-529 (Forest Service Forty) was a large (40-acre) lithic scatter bordering an extensive neadow area. The site was investigated intensively by the University of California and Far Western Anthropological Research Group, Inc., of Davis (Basgall 1983). Only a portion of the ite falls within the Sierra Star project area, including a light "background" scatter (designated Stratum 4) north and west of Meridian Boulevard and two artifact concentrations (Strata 1 and 5) within this light scatter. The subsurface deposit was found to be concentrated in a sandy loam deposit that was generally between 5 and 50 cm in depth. Time-sensitive projectile points indicate use of the site from Little Lake to Marana times (i.e., from as early as 3500 B.C. to A.D. 1200). The large number of bifaces encountered and a technological analysis of the debitage based on size and morphology indicated that stone-working of the local Casa Diablo obsidian was a primary activity at the site, beginning in the Newberry period (1200 B.C - A.D. 600). This stone- ing appears to have been focused on the production of bifaces for trade; there was a decline in stone-working activities after the Newberry period, although portions of the site continued to be used.

CA-MNO-2482, first discovered during a survey for an extension of Minaret Road (Burton 1989), consisted of two loci, each with a sparse scatter of obsidian flakes on the surface. Archaeological testing in 1990 (reported in Burton 1990b) indicated that there was very little subsurface cultural material; six flakes were encountered in five shovel tests in one locus, and fewer than 60 flakes were encountered in two shovel tests and one 1x1 m unit in the other locus. In the technological lithic analysis, the morphology, sizes, and amount of cortex remaining on flakes indicated the site was used for brief episodes of secondary reduction, apparently related to biface manufacture. The 34 specimens submitted for obsidian hydration analysis indicated use during the Newberry period, 1200 B.C. to A.D. 600, when biface production was common in the region. The site was determined not eligible for the National Register of Historic Places, nor was it considered a significant site under CEQA. The site has been largely obliterated by subsequent construction of the Minaret Road extension.

CA-MNO-2485 includes a surface scatter of some 25 flakes and a projectile point or biface fragment, in an area of about 5,400 square meters. During the initial recording, a retouched flake and five utilized flakes, all of Casa Diablo obsidian, were observed (Burton 1990a: Appendix A). initial subsurface testing conducted in 1991 by Mariah Associates, Inc. (Kautz 1991), five shovel test units and a 1x1 m excavation unit were excavated to depths of up to 80 cm, and over 1,000 artifacts were recovered. Additional tools noted during this testing phase included a ammerstone, a drill, a multifunctional scraper, a biface fragment and a projectile point tip, as well as a small core.

CA-MNO-2486 is a small site visible in the road bed at an intersection of two dirt roads. The site includes a surface scatter of approximately 100 obsidian flakes in an area of 75 square meters, with maximum surface density 15 artifacts per square meter. The site is only visible in areas disturbed by the road; it is not clear if thick duff and soil development in the pine forest adjacent to the road obscure additional cultural material. Fifty-eight artifacts were encountered in two shallow shovel test units excavated in 1991, which was extrapolated to average about 500 flakes per cubic meter, a relatively low density for sites in the region (Kautz 1991:18). However, subsurface testing extended to only 20 cm depth, and was confined to the visible area of the site adjacent to the roadbed, so that the horizontal and vertical dimensions of the site are still unknown.

CA-MNO-2487, located near an ephemeral drainage, includes biface fragments, biface retouch flakes, and thousands of flakes in an area of about 10,000 square meters. Maximum surface density of artifacts is 20 per square meter. Three shovel tests and one 1x1m excavation unit indicated that cultural material extends to up to 60 cm depth, with large retouched flakes and a biface fragment at the lower levels of the site. Over 4,800 artifacts were recovered, all of obsidian (Kautz 1991).

Consideration of Significant Effects

As mentioned above, only important cultural resources need to be considered under *CEQA*. Site CA-MNO-2482, which has been impacted by construction of the Minaret Road extension, was previously determined to not meet *CEQA* criteria for a significant site. In addition, *CEQA* states that data recovery is not required for a historical resource if studies already completed have adequately recovered the scientifically consequential information. The archaeological investigations undertaken at CA-MNO-529 (Forest Service Forty) recovered sufficient data to effectively exhaust the data potential of the site, and further protection or preservation was considered unnecessary (Basgall 1983:166-167). Both these findings should be documented in the Sierra Star Environmental Impact Report.

Significance of the other three sites within the Sierra Star project area is not yet clear. First, the limited testing at CA-MNO-2486 was not able to define either the vertical or horizontal extent of the site. Testing results at CA-MNO-2485 and -2487 do provide an estimate of their vertical extent, and indicate that the sediments exhibit mixing, which could limit their information potential. For example, no clearly defined occupation surfaces were encountered below the current ground surface. However, as excavations at CA-MNO-529 showed, significant information can be obtained from even mixed cultural deposits with adequate analysis of the tifacts.

Third, the intensity of the 1991 testing was based on the assumption that the sites fall within the esearch guidelines in the State Historic Preservation Office's document entitled *California Archaeological Resource Identification and Data Acquisition Program: Sparse Lithic Scatters (CARIDAP: SLS)* (Jackson et al. 1988). However, the four test units completed in 1991 at CA-MNO-2487 do not meet the minimum amount of investigation required by *CARIDAP:SLS* for a site of nearly 10,000 square meters. The *CARIDAP:SLS* guidelines recommend eight test units for sites between 5,000 and 10,000 square meters.

Fourth, neither obsidian hydration analysis nor debitage technological analysis has yet been conducted on the material recovered from the three sites in the initial testing. Without temporal and functional information, it is impossible to know whether or not the sites would meet the *CEQA* criterion C, that is, whether they have a special or particular quality such as oldest, best example, largest, or last surviving example of its kind. For example, Kautz (1991) inferred the three sites to be hunting related, because of the presence of projectile points and flakes, and because of the site settings, all near ephemeral drainages where large granite outcrops could have been used as hunting blinds. If so, they would be rare within the Mammoth Lakes area, where the majority of sites are related to the manufacture of obsidian bifaces for trade. As examples of a rare site type, they would potentially meet *CEQA* criteria B, C, and E.

ecommendations

The main questions remaining from the test results at these three sites, CA-MNO-2485, -2486, and -2487, is their age and function. Technological analysis of flakes already recovered could help determine site function. With ample obsidian for obsidian hydration dating at each, it would be possible to estimate the dates they were used with much more precision than is available from the time-sensitive projectile points. Additionally, the true vertical and horizontal extent of CA-MNO-2485 must be determined, and the nature of CA-MNO-2487 more fully documented.

Therefore, the following is recommended to determine whether these three sites are significant, and hence whether they would require further consideration under *CEQA*:

1. Excavation of additional shovel test units at CA-MNO-2486 to verify assumed horizontal and vertical extent. Shovel tests should be excavated in the duff-covered areas beyond the road, to refine the site boundaries, and to a depth that assures that the presence or absence of a cultural deposit is confirmed.

2. Excavation of at least four additional units at CA-MNO-2487 to meet the minimum required under *CARIDAP:SLS* to fully characterize the site.

3. Analysis of the artifacts collected from the three sites during the 1991 testing as well as during any additional testing, including obsidian hydration and technological analysis, to provide temporal and functional information about the sites.

is possible that at the conclusion of this additional analysis, the testing would have adequately :covered the scientifically consequential information from the archaeological resources, as rovided for in *CEQA* Title 14, Chapter 3, Article 9. That determination has to be documented ı the Environmental Impact Report and the studies must be deposited with the California Historical Resources Regional Information Center.

On the other hand, if testing results indicate that the sites are significant and warrant further protection or data recovery, *CEQA* also suggests mitigation, such as planning construction to avoid archaeological sites, incorporating sites within parks or other open space, covering the archaeological sites with a layer of chemically stable soil before building tennis courts, parking lots, or similar facilities on the site, or deeding the sites into a permanent conservation easement. If these methods of preserving an important site in place are not feasible, data recovery through excavation is recommended as mitigation.

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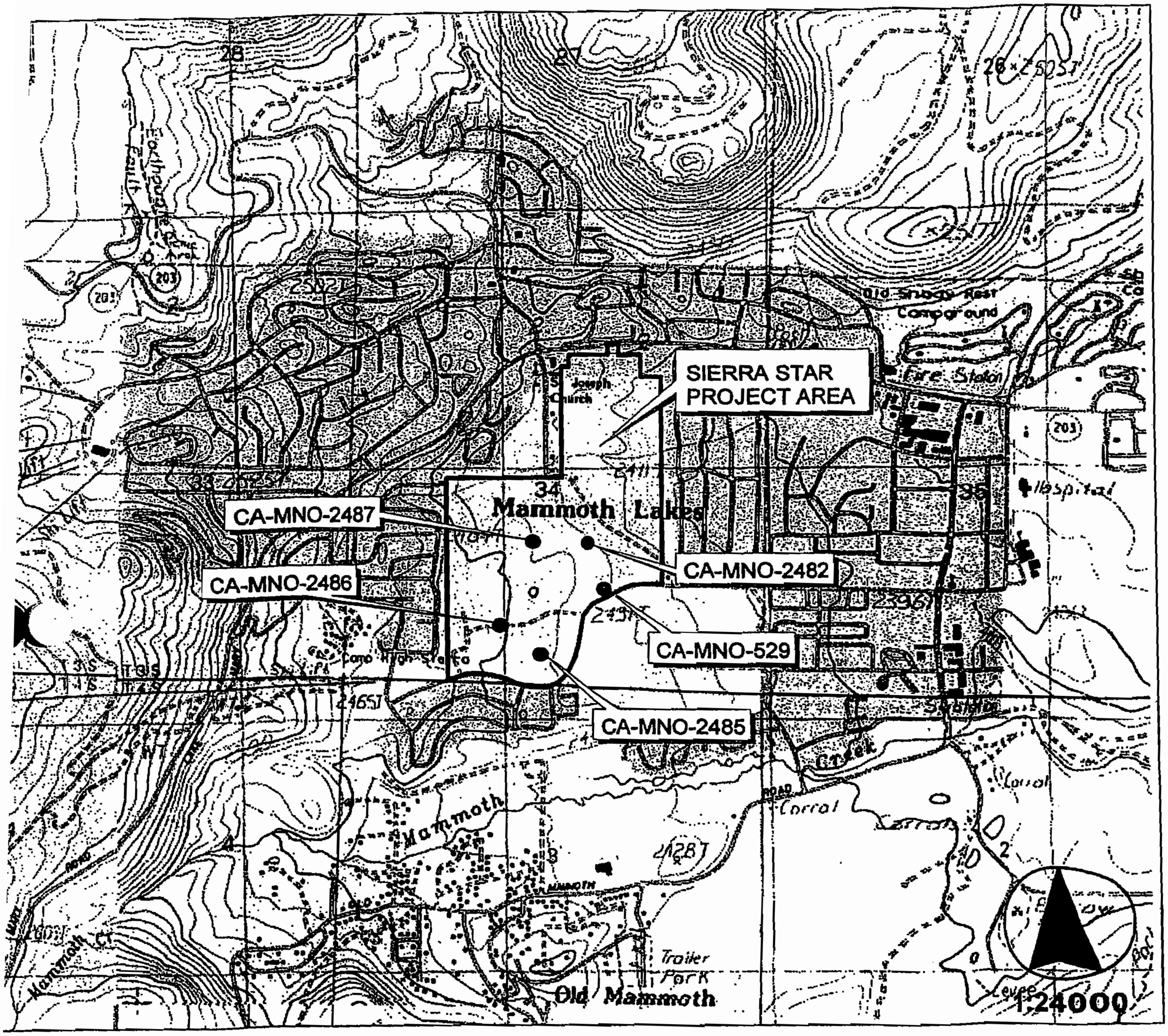

Map 1. Archaeological Sites Within the Sierra Star Project Area.

INTRAWEST

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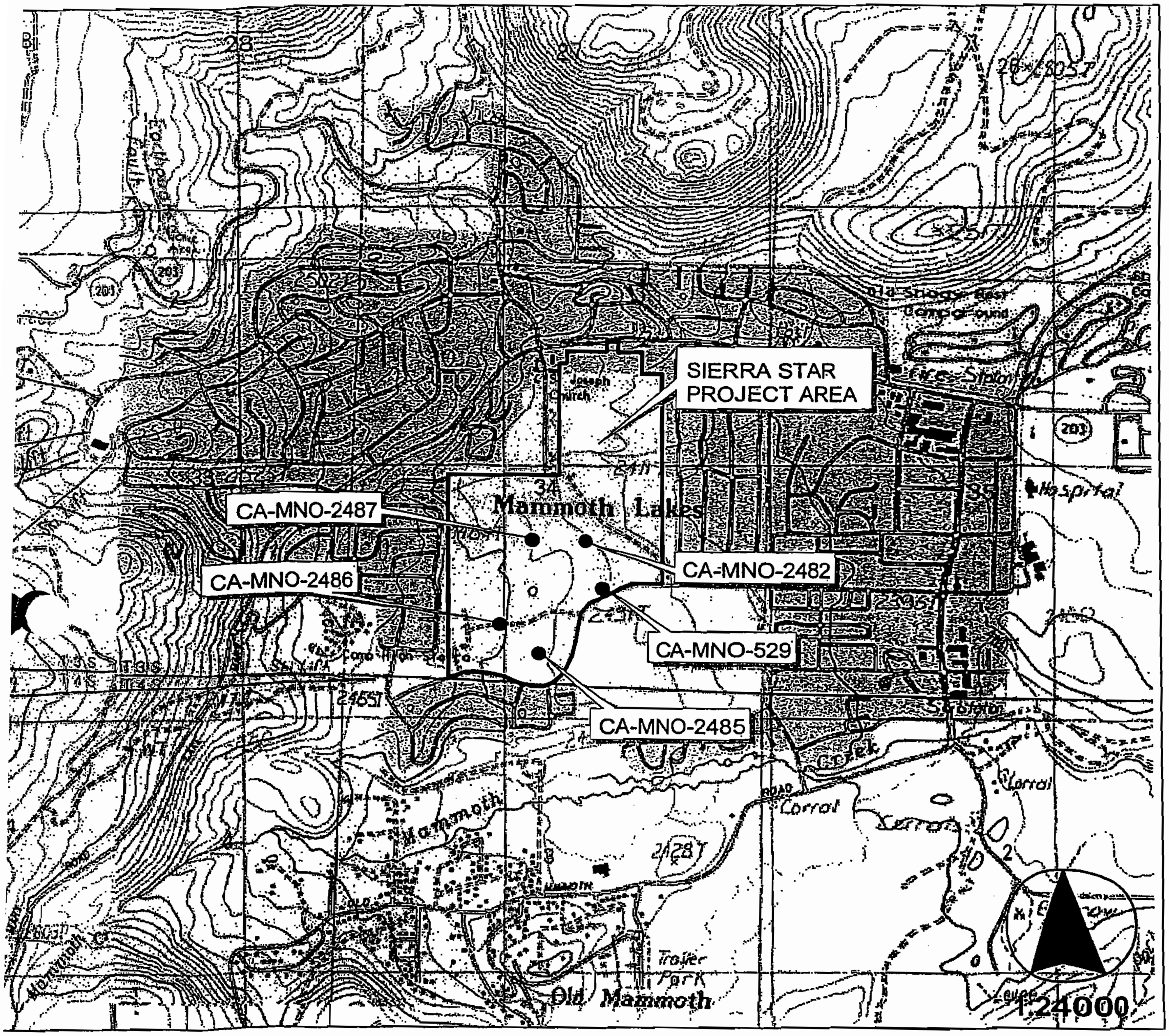

Map 1. Archaeological Sites Within the Sierra Star Project Area.

TRANS-SIERRAN ARCHAEOLOGICAL RESEARCH
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Firm Qualifications

Trans-Sierran Archaeological Research (TSAR) is a small independent consulting firm that specializes in cultural resource management, including archaeological survey and excavation, project monitoring, input for public documents such as *Environmental Impact Reports*, and consulting. TSAR retains experienced personnel of the highest professional caliber in all key positions on a project–by–project basis. Personnel have extensive knowledge of the environment and archaeology of California, the Great Basin, and the American Southwest, and expertise in state–of–the–art cultural resource management including data recovery, analysis, and report preparation.

The director of TSAR, Jeffery F. Burton (B.S., Northern Arizona University, 1979; M.A., University of Arizona, 1990), has over 20 years experience throughout California and the Southwest, specializing in the Great Basin and Sierra Nevada (Attachment 1). For over 15 years he has conducted and directed surveys, tests, and excavations within and surrounding Inyo-Mono region and has reported work at scores of sites in over 50 publications and technical reports. In April 2001 he received the *John C. Cotter Award for Excellence in National Park Service Archeology* for his work on WW II Japanese American Relocation Centers.

The company has completed over fifty projects since its inception in October 1982. The largest projects to date include large scale test excavations at prehistoric sites in Mono County, California (CA-MNO–3 and CA-MNO–458) and survey of the 185-mile-long CONTEL Mammoth Lakes to Inyokern fiber optics line. A list of past clients is included as Attachment 2. Offices and facilities are located in Tucson, Arizona, and Columbia, California. The company has equipment necessary for all phases of archaeological work, including 2– and 4–wheel drive vehicles, surveying equipment, excavation equipment, laboratory space and equipment, temporary storage facilities, field camp gear, drafting facilities and supplies, transit, digital and 35mm cameras, GPS units, desktop and field computers, printers, scanners, modems, and software. Curation facilities are arranged on a project–by–project basis to best fit the needs of the project and agency. Subcontractors for special analyses are selected for their proven ability to meet schedules, perform work within budget, and provide high–quality products.

Trans-Sierran Archaeological Research
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Past Clients (Inyo and Mono Counties)

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Bureau of Land Management
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Bishop, California 93514
(760) 872-4881

CONTEL
350 Lagoon Street
Bishop, California 93514
(760) 872-0814

Conway Ranch at Mono Lake
P.O. Box 179
June Lake, California 94529
(760) 648-7797

mpsey Construction Corporation
.O. Box 657
Mammoth Lakes, California 93546
(760) 934-6881

Harshbarger Construction Corporation
5928 Pascal Court, Suite 310
Carlsbad, California 92008
(760) 438-1159

Inyo National Forest
873 N. Main St.
Bishop, California 93514
(760) 873-5841

Larry K. Johnston and Associates
P.O. Box 1903
Mammoth Lakes, California 93546
(760) 934-4311

Lodestar Corporation
3034 S. Orange Ave.
Santa Ana, California 92707
(714) 760-1566

Mammoth Lakes Foundation
P.O. Box 1815
Mammoth Lakes, California 93546
(760) 934-3781

Mono County Planning Department
P.O. Box 8
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Neubauer-Jennision Construction
P.O. Box 8235
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P.O. Box 24
Mammoth Lakes, California 93546
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Owens Valley Radio Observatory
P.O. Box 968
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Royal Gold
9300 Spearhead
Reno, Nevada 89506
(702) 972-5002

TEAM Engineering
P.O. Box 1265
Bishop, California 93514
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Town of Mammoth Lakes
P.O. Box 1609
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RÉSUMÉ

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EDUCATION

ı990, Master of Arts, anthropology. University of Arizona, Tucson. Thesis: Obsidian Hydration and Archaeological Reality in the Western Great Basin.

1979, Bachelor of Science, major in anthropology, minor in cartography. Northern Arizona University, Flagstaff.

RESEARCH INTERESTS

Archaeology of hunter-gatherers, historical archaeology, rock art, chronometrics, cultural resource management, World War II Japanese American internment, Great Basin, California, and Southwestern U.S.

EXPERIENCE

I have worked intermittently for over 25 different firms and government agencies since 1978. Long-term employment during this time has included: Project Archeologist for the Western Archeological and Conservation Center, National Park Service, 1987 to present; Staff Archaeologist for INFOTEC Research Inc., 1983-1988; Staff Archaeologist for the Archaeological Study Center, California State University, Sacramento, 1983; and District Archaeologist for the Inyo National Forest, 1982. In addition, I have completed over 55 projects since 1982 as an archaeological consultant through my own company (Trans-Sierran Archaeological Research).

I have over 20 years of archaeological field experience in California, the Great Basin, and the American Southwest (see attached map), conducting and directing archaeological work at sites ranging from small artifact scatters to large villages. These sites represent a wide time span, from the early Archaic (Pinto period) through the Protohistoric and Historic periods. Reports I prepared for these projects have included archival research, discussions of previous research, identification of relevant research themes, interpretation of data, evaluation and re-evaluation of regional chronologies and reconstructions of prehistory, critiques of chronometric techniques and interpretations, analysis of formation processes affecting the archaeological record, and original research on ceramic craft specialization and on the functional and social correlates of style in the archaeological record. I have evaluated numerous sites for national, state, and local significance.

SKILLS

Excavation, Survey, and Site Recording: I have conducted and directed excavations at a variety of site types ranging ⁻ ›m small artifact scatters to large 125-room pueblos and conducted surveys in a variety of terrains and for projects ..nging from 1 to 13,000 acres. I have supervised up to fourteen people at a time, including both professional archaeologists and volunteers, in survey, mapping, excavation, and laboratory work. I have been responsible for all phases of archaeological work, from initial planning and budgeting, to hiring, training, and supervision of crews, to analysis and interpretation, to preparation of final reports. My research designs for survey, testing, and excavation projects have incorporated current archaeological method and theory as well as regional research, and determined the most efficient data recovery methods for different types of sites and environmental conditions.

Report Preparation: I have written technical reports on archaeological survey and excavation at historic and prehistoric sites ranging from Archaic camp sites to a 14th century Anasazi pueblo, from a 17th century Spanish mission to a World War II Japanese American Relocation Center. Besides monographs and reports, I have produced articles for publication and papers for professional meetings; designed museum displays, interpretive brochures, and signs for the public; and given informal presentations to avocational groups. Many of these projects include not only archaeological research, analyses, and syntheses, but also selection of graphics, design, and use of advanced word-processing and page-layout computer programs to prepare camera-ready publications.

Supervision: I have trained and supervised up to fourteen people at a time, including both professional archaeologists and volunteers, in survey, excavation, and laboratory work. In spite of remote locales, temperatures over 100 degrees and under 40, rain, snow, insects, and primitive living conditions, my crews have consistently had good morale, contributing to high productivity and timely completion of projects.

Contracting: To date I have completed over 65 projects as an archaeological consultant through my own company (Trans-Sierran Archaeological Research). I have been responsible for all phases of archaeological research, from initial planning and budgeting, to hiring and supervision of crews, to analysis and report preparation. I have authored a variety of research reports on inventory, testing, and data recovery projects, synthesizing previous research, determining reporting methods and statistical analyses, and arranging for and incorporating specialist studies, such as floral, faunal, pollen, lithic, soils, and ceramic analyses, radiocarbon and obsidian hydration dating, and obsidian sourcing.

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1986, Archaeological Investigations at Bajada Camp, CA-INY-2596, Inyo County, California. Report on file, Baxter Ranch, Independence, California.

1985, The Archaeology of the Chance Well Site, CA-MNO-458/630, Mono County, California. Report on file, Bonneville-Pacific Corporation, Salt Lake City, Utah.

1984, An Archaeological Assessment of the Chance Valley Geothermal Project Area. Report on file, Wood and Associates, Auburn, California.

1983, Archaeological Impact Report, Chance Valley Geothermal Power Plant. Report on file, Wood and Associates, Auburn, California.

1982, Convict Lake Archaeological Survey Report. Report on file, Inyo National Forest, Bishop, California.

1981, Overview and Management Recommendations for Piuga Collection Sites. Report on file, Mono Lake Ranger District, Lee Vining, California.

1980, An Archaeological Survey of a Proposed Housing Site near Kaibito, Arizona. Prepared for Navajo Housing Authority, Window Rock, Arizona.

1980, An Archaeological Survey of Fifty Acres near Crown Point, New Mexico, Conducted for Mobil Oil Corporation. Report on file, New Mexico State University.

In addition, I have written or coauthored over 50 other reports for a variety of smaller projects.

PUBLIC INTERPRETATION

)01, Brochure on Archeological Investigations at the Manzanar Relocation Center Cemetery, Manzanar National istoric Site. Distributed during the 26th Annual Manzanar Pilgrimage, Manzanar, California.

)00, Panelist, Making the System Work for you: Manzanar Case Study. A Mosaic in Motion: The National Park ervice – Embracing and Engaging all People, Santa Fe, New Mexico.

999, The World War II Internment of Japanese American in Arizona. Slide presentation, Arts Encounter, UA resents, University of Arizona.

999 (with Mary M. Farrell, Richard Lord, and Florence Lord), World War II Japanese American Relocation acilities. Photograph exhibit prepared for Manzanar Advisory Commission Meeting, Tucson Arizona.

998, Tour of Manzanar National Historic Site, 14th Annual Pacific Rim Anthropologists Meeting, Death Valley, California.

1996 (with Mary M. Farrell), Edited two unpublished World War II-era articles on Japanese American Internment or distribution during Manzanar General Management Plan Public Hearings.

1995-1998, The Archaeology of Manzanar National Historic Site. Slide presentation given at Japanese American National Museum (Los Angeles), Manzanar Advisory Commission meeting (Lone Pine), Independence Civic Club, Tucson Japan Society, and Manzanar General Management Plan Public Hearings held at Bishop, Independence, Los Angeles, and Gardena, California.

Tour of Manzanar National Historic Site. 26th Annual Manzanar Pilgrimage, Manzanar, California.

1995, Brochure on World War II-era Inscriptions at Manzanar National Historic Site. Distributed during the 26th Annual Manzanar Pilgrimage, Manzanar, California.

1993, Tour of Guevavi and Calabazas Missions. Arizona Archaeology Week, Western Archeological and Conservation Center, Tucson.

1992, Visions in Stone: The Rock Art of Southeastern Arizona. Slide presentation, Arizona Archaeological and Historical Society, Tucson.

1992, Excavations at Guevavi. Slide Presentation, Archaeological Conservancy, Westward Look Resort, Tucson.

1992, Rock art site tour, Coronado National Forest. Arizona Archaeological and Historical Society, Tucson.

1992, Poster display on archaeological excavations at Mission Guevavi, Tumacacori National Historical Park. Prepared for Arizona Archaeology Week, Western Archeological and Conservation Center Lobby, Tucson.

1991, Rock art site tour, Saguaro National Monument. Arizona Archaeology Week, Arizona Archaeological and Historical Society, Tucson.

1991, Poster display on archaeological excavations at Puerco Ruin, Petrified Forest National Park. Prepared for Arizona Archaeology Week, Western Archeological and Conservation Center Lobby, Tucson.

1990, Site bulletin on rock art recording at Newspaper Rock, Petrified Forest National Park. Distributed to park visitors during fieldwork in 1990 and 1991.

1990, Brochures on East Stronghold Canyon and Peña Blanca Cave pictographs. Prepared for Coronado National -est and distributed at American Rock Art Research Association Annual Meeting, Tucson.

1989, Site bulletin on excavations at Puerco Ruin, Petrified Forest National Park. Distributed to park visitors during excavations.

1988-present, Exhibit: Wildlife in Stone, Animals in the Prehistoric Indian Rock Art of Arizona. International Wildlife Museum, Tucson, Arizona.

.987, Poster display on the prehistoric rock art of southeast Arizona. Prepared for the Coronado National Forest, Tucson, Arizona.

GRANTS

2000, Travel expenses for being a panelist at "A Mosaic in Motion: The National Park Service — Embracing and Engaging all People," Santa Fe, New Mexico. Provided by National Parks Conservation Association.

1993, Radiocarbon dating of charcoal samples from eroding pithouses at two Adamana Phase sites. Provided by the Arizona Archaeological and Historical Society.

1992, Travel Expenses for presentation of "Dating Adamana Brown Ware: Implications for the Archaic to Basket-maker Transition in Northeastern Arizona" at the Society for American Archaeology 57th Annual Meeting, Pittsburgh, Pennsylvania. Provided by Robert Cooper, Hawthrone, California.

1988, Radiocarbon dating of artifacts from Tom Ketchum Cave. Provided by the Arizona Archaeological and Historical Society.

1987, Radiocarbon accelerator dating of rock art pigment from Tom Ketchum Cave. Provided by National Science Foundation Accelerator Facility for Radioisotope Analysis, Department of Physics, University of Arizona.

AWARDS

2001, John C. Cotter Award for Excellence in National Park Service Archeology.

2000, Time-off Award, Western Archeological and Conservation Center, National Park Service.

1999, Special Achievement Award, Manzanar Advisory Commission.

1994, Special Achievement Award, Western Archeological and Conservation Center, National Park Service.

1990, Special Achievement Award, Western Archeological and Conservation Center, National Park Service.

1983, Cash Bonus Award, INFOTEC Research Inc., Sonora, California.

PROFESSIONAL ORGANIZATIONS

Society for American Archaeology
Society for Historical Archaeology
Society for California Archaeology
Arizona Archaeological and Historical Society

REFERENCES

Dr. Michael J. Moratto, Principal Archaeologist, Applied Earthworks Inc., 5088 North Fruit Ave., Suite 101, Fresno, California 93711. (209) 229-1856.

J. Jefferson Reid, Professor, Department of Anthropology, University of Arizona, Tucson, Arizona 85721. (520) 621-2966.

Dr. George A. Teague, Archeologist, National Park Service, Western Archeological and Conservation Center, 1415 North Sixth Ave., Tucson, Arizona 95705. (520) 670-6501.

Dr. Judith D. Torduff, Historical Archaeologist, Environmental Analysis Division, CALTRANS, 650 Howe Ave., Suite 400, Sacramento, California 95825. (916) 654-2852.


Location of Archaeological Experience
Survey and Site Recording
Excavation
California
Arizona
New Mexico

TRANS-SIERRAN ARCHAEOLOGICAL RESEARCH
332 EAST MABEL STREET, TUCSON, ARIZONA 85705 520-620-6804

ugust 17, 2002

:hris Vollan
ntrawest
'.O. Box 2789
Mammoth Lakes, CA 93546

Dear Chris:

Enclosed is an updated archaeological resources report for the Sierra Star master plan project. As you'll see in my report, CEQA requirements are well-started: there has been a complete archaeological inventory of the parcel marked, and all five sites recorded have received at least preliminary testing. Two of the sites will require no further consideration under CEQA: vious data recovery at CA-MNO-529 has retrieved its significant information, and CA-O-2482 was determined not significant through a previous testing project. Determining the significance of the other three sites, and hence whether they will need further consideration (that is, protection or data recovery), would require additional work, as detailed in the report.

Sincerely,

Jeff Burton

email: burall@sprynet.com

APPENDIX F

GEOTECHNICAL/HAZARDS REPORTS

AND PEER REVIEW COMMENTS

Treadwell&Rollo

16 June 2006

Ms. Michele DiGirolamo Ross
Christopher A. Joseph & Associates
179 H Street
Petaluma, California 94952

Subject: Third Party Geotechnical/Geological Review
Environmental Impact Report
Mammoth Sierra Star
Mammoth Lakes, California

Dear Ms. Kaufman:

This letter presents Treadwell & Rollo's (T&R's) third party geotechnical and geological review comments for the proposed Mammoth Sierra Star project in Mammoth Lakes, California. The proposed project site is south of Main Street, north of Meridian Boulevard, and lies east and west of Minaret Road in the Town of Mammoth Lakes.

The proposed project will consist of creating transient occupancy units, establishing a more efficient transportation and circulation system, and developing additional affordable housing units. A total of 832 new dwelling units are proposed. Limited commercial development (subject to the Town's discretionary approval) is allowed in Areas 2, 4, and 5, and on the existing golf course. The *May 2005 Sierra Star Master Plan* also proposes a 200-foot height maximum in Area 5, with the intent of attracting a five-star hotel.

SCOPE OF SERVICES

Our scope of services consisted of:

- reviewing available geotechnical and geologic information submitted by the project applicant;
- compiling and reviewing readily available published and unpublished geologic and seismicity data for the site vicinity; and
- preparing a written letter describing the results of our study, including a discussion of potential geotechnical and geological concerns, such as local seismicity, strong shaking from nearby earthquakes on nearby active faults, volcanic hazards, soil liquefaction, ground subsidence, and expansive soil and rock.

Our scope of services did not include visiting the site, performing on-site geologic mapping, drilling borings, performing laboratory testing, or performing any type of subsurface exploration for this study.

Treadwell & Rollo, Inc. *Environmental & Geotechnical Consultants*
501 14th Street, Third Floor, Oakland, CA 94612
Telephone (510) 874-4500 Facsimile (510) 874-4507

During the preparation of this letter, T&R reviewed the following documents:

- *Update Geotechnical Investigation, Fairway 16, Mammoth Lakes, California,* prepared by Sierra Geotechnical Services Inc. (SGSI), dated 23 February 2004;
- *Preliminary Geotechnical Investigation, Fairways 4 and 5 Bungalows, Mammoth Lakes, Mono County, California*, prepared by SGSI, dated 19 October 2004; and
- *Preliminary Geotechnical Investigation, The Grove – Area 8C, Mammoth Lakes, California*, prepared by SGSI, dated 9 November 2005.

REGIONAL AND SITE GEOLOGY

The site is located at the southwestern edge of the Long Valley caldera, near the eastern flank of the Sierra Nevada. The caldera is an east-west elongated, oval depression formed approximately 760,000 years ago. The caldera experiences continued volcanic activity. The pre-volcanic basement rock in the Mammoth Lakes area is predominately Mesozoic granite rocks of the Sierra Nevada batholith. The batholith is a series of intrusions that displaced overlying ancient sedimentary sea floor rocks during the Jurasic and Cretaceous Periods. Episodic glaciation, as well as more recent volcanic eruptions occurred throughout the Pleistocene leaving a mantle of glacial till and pyroclastic deposits covering the older basement and volcanic rocks throughout the area now occupied by the Town of Mammoth Lakes.

SUBSURFACE CONDITIONS

SGSI performed a several exploratory test pits at the site and encountered the following:

<u>Alluvium</u>
Up to 5-1/2-feet of alluvium was encountered at the site. The alluvium generally consisted of loose, silty, very fine to coarse-grained sand and sand with silt, with abundant roots, rock fragments, cobbles, and boulders.

<u>Glacial Till Deposits</u>
Glacial till deposits were encountered below the alluvium. The glacial till consists of medium dense to dense, very fine to coarse sand and silty sand, with abundant gravels, cobbles, and boulders. The glacial till became denser at deeper depths.

Groundwater
Groundwater was not encountered during the SGSI investigation; however, mottling of on-site soil indicates the potential of perched groundwater. SGSI indicates that excavations completed in the spring and early summer may encounter some seepage.

REGIONAL SEISMICITY

A list of major active faults in the region, including the distance from the site and estimated maximum Moment magnitude are summarized on Table 1.

TABLE 1
Regional Faults and Seismicity

Fault Segment	Approximate Distance from Site (km)	Direction from Site	Maximum Magnitude
Hartley Springs	1.1	West	6.6
Hilton Creek	10	East	6.7
Round Valley	23	East	7.0
Mono Lake	34	North	6.6
Fish Slough	52	East	6.6
White Mountains	53	East	7.1
Robinson Creek	69	Northwest	6.4
Death Valley (N. of Cucamonga)	73	East	7.0
Owens Valley	73	Southeast	7.6
Birch Creek	79	Southeast	6.4
Deep Springs	94	East	6.6

SGSI performed deterministic and probabilistic seismic hazard analyses. SGSI's analyses indicate a magnitude 6.6 (Mw) earthquake occurring on the Hartley Springs faults located approximately 1.1 kilometers from the site could produce a deterministic peak ground acceleration (PGA) of approximately 0.46 times gravitation acceleration (0.46g).

Probabilistic analyses were performed for two levels of shaking. An Upper-Bound Earthquake with a 10 percent chance of exceedance in 100 years could produce a PGA of about 0.43g. The Design Basis Earthquake with a 10 percent chance of exceedance in 50 years could produce a PGA of about 0.34g.

GEOLOGIC AND SEISMIC HAZARDS

Potential geologic and seismic hazards at the project site include strong ground shaking, fault rupture, soil liquefaction, and avalanches. These hazards are discussed in the following sections.

Strong Ground Shaking

SGSI indicates that due to the proximity of the site to the Hartley Springs fault (Type B fault), the site will be subjected to very strong ground shaking. The proposed structures should be designed to withstand the effect of the anticipated strong ground shaking. For seismic design in accordance with the 2001 California Building Code (CBC), SGSI recommends the following parameters:

- Seismic Zone Factor 4
- Soil Profile Type S_c
- Near Source Factors N_a and N_v of 1.3 and 1.6, respectively
- Seismic Coefficients C_a and C_v of 0.52 and 0.90, respectively.

T&R concurs with SGSI's assessment of the potential for very strong shaking at the subject site. Also, T&R concurs with SGSI's preliminary recommendations for 2001 CBC seismic design parameters.

Fault Rupture

SGSI indicates there are no known active, potentially active, or inactive faults that transect the subject site. Therefore, the potential for fault rupture is very low.

T&R concurs with SGSI's assessment that the risk of ground rupture is low.

Seismic Hazards

During a major earthquake on one of the active or potentially active nearby faults, strong to very strong ground shaking is expected to occur at the project site. Strong shaking can result in ground failures, such as those associated with soil liquefaction[1], lateral spreading[2], post-liquefaction reconsolidation[3], and cyclic soil densification[4].

Soil Liquefaction

The SGSI report indicates that: 1) up to 5-1/2 feet of alluvial deposits consisting of loose sand and silty sand is present at the site, 2) perched water may develop at the site, 3) the upper 2 to 3 feet of loose alluvium will be excavated and removed from the site because it is considered unsuitable for reuse as structural fill, and 4) permanent perimeter subsurface drains will be installed to intercept perched water associated with snow melts. Based on these site conditions, the SGSI reports indicate the potential for liquefaction to occur is considered very low due to the lack of groundwater and the presence of medium dense to dense nature bearing soil at the site.

In general, where soil excavation and removal, and subsurface drainages are added, T&R concurs with SGSI's conclusion that the potential for soil liquefaction is very low. However, in areas where loose alluvial soil is left in place and subsurface drainage is not added, T&R

---

1 Liquefaction is a transformation of soil from a solid to a liquefied state during which saturated soil temporarily loses strength resulting from the buildup of excess pore water pressure, especially during earthquake-induced cyclic loading. Soil susceptible to liquefaction includes loose to medium dense sand and gravel, low-plasticity silt, and some low-plasticity clay deposits.

2 Lateral spreading is a phenomenon in which surficial soil displaces along a shear zone that has formed within an underlying liquefied layer. Upon reaching mobilization, the surficial blocks are transported downslope or in the direction of a free face by earthquake and gravitational forces.

3 Post-liquefaction reconsolidation is a phenomenon in which a previously liquefied sand layer settles into a denser soil arrangement after dissipation of pore water pressures.

4 Cyclic soil densification is a phenomenon in which non-saturated, cohesionless soil is densified by earthquake vibrations, resulting in ground surface settlement.

concludes that a small potential for soil liquefaction still exists. In order for soil liquefaction to occur at these locations, perched water would need to saturate the loose sandy alluvial soil and a large earthquake would need to occur on a nearby portion of one of the active faults. In general, only critical structures or very important site improvements would need to still consider this potential hazard. Because the potential for soil liquefaction to occur at the site is considered low, the potential for ground failures associated with soil liquefaction, i.e. lateral spreading, post-liquefaction reconsolidation, and sand boils, is also considered low.

Cyclic Densification

Cyclic densification should be considered a potential minor hazard at the project site. During major earthquake on a nearby portion of one of the active faults, strong ground shaking may cause the loose, unsaturated alluvial soil to densify and settle. We preliminarily estimate that upper to 1/4 inch of cyclic densification may occur at the site. This phenomenon may result is minor cracking foundations and surface improvements.

Seiches and Tsunamis

The potential for seiches and tsunamis are considered nil because there are no large bodies of water in close proximity to the site. T&R concurs with SGSI's conclusion.

Avalanches (Rockfall and Snow) and Landslides

SGSI concludes the potential for rockfall or snow avalanches to occur is low because the site is not adjacent to the base of a steep slope or within close proximity to an area of avalanche flow.

T&R concurs with SGSI's conclusion.

Volcanic Hazards

The SGSI report indicates that eastern California, including Long Valley Caldera and the Mono-Inyo Craters volcanic chain, has a long history of geologic activity that includes earthquakes and volcanic eruptions. SGSI's research indicates that massive eruptions are extremely rare and currently there is no evidence leading to the conclusion that a massive eruption is eminent. SGSI concludes that small to moderate volcanic eruptions could occur, resulting in pyroclastic flows and surges, as well as volcanic ash and pumice fallout, which could impact the site.

T&R concurs with SGSI's conclusions regarding the potential risk of volcanic hazards. T&R adds that U.S. Geological Survey (USGS) estimates that eruptions at the Mono-Inyo Craters volcanic field occurred at about 500-year intervals over the past 2,000 to 3,000 years. The most recent eruption in the region was at Mono Lake between 1720 and 1850. A dome grew on the lake floor and emerged to make Paoha Island. Also in 1980, four magnitude 6 events were recorded in a 2-day period. Volcanologists interpreted the earthquakes, accompanying ground deformations, and an increase in activity at fumaroles, as an indication of magma movement beneath the caldera. In 1994, geologists investigated an area of 75 acres that contained dying forest. They studied the gas in the soil and found carbon dioxide concentrations of 30 to 96 percent. The areas of *tree kills* are generally on or adjacent to Mammoth Mountain. The USGS indicates that when carbon dioxide gas can accumulate in snowbanks, depressions, and poorly ventilated enclosures, including structures, posing a potential danger to people. The USGS scientists closely monitor the volcanic activity in the region in order to provide the public with reliable and timely warning of volcanic unrest in the Long Valley area.

RECOMMENDATIONS BY SIERRA GEOTECHNICAL SERVICES INC.

Site Preparation, Fill Placement and Compaction

SGSI recommends removing deleterious materials, unsuitable materials, and existing improvements from areas where new improvements or new fills are planned. Earth fill material should not contain more than one percent of organic materials by volume. Nesting of organic materials is not allowed.

Any existing subsurface utilities that are to be abandoned should be removed and the trenches backfilled with compacted fill. If necessary, abandoned pipelines may be filled with grout or slurry cement as recommended by geotechnical engineer.

Site excavations including over-excavation and removal of unsuitable alluvial soil should be evaluated and approved by geotechnical engineer.

The onsite soils are suitable for reuse as compacted fill provided the organics, oversized rock (greater than 6-inches in diameter) and deleterious materials are removed. SGSI indicates that rocks greater than 6-inches and less than 2-feet in diameter can be placed in the bottom of deeper fills or approved areas provided they are selectively placed in such a manner that no large voids are created. All rocks should be placed a minimum of four feet below finished grade selection unless used for landscaping purposes. If imported soils are used, it should have an expansion index of no greater than 50 and approved in advance by geotechnical engineer.

SGSI recommends that after completing the excavation and removal of unsuitable soil, the exposed surface should be scarified to a depth of 12 inches, moisture conditioned as necessary, and compacted to at least 90 percent of the maximum dry density obtained using ASTM D1557-2000 procedure. Fill placed on surfaces steeper than 5:1 (horizontal to vertical) should be benched so that the fill placement occurs on relatively level ground.

For paved roadways, parking areas and other improvements, SGSI recommends the upper 12 inches of subgrade material along with the Class 2 aggregate base and asphaltic concrete should be compacted to a minimum of 95 percent of the material's maximum dry density as determined by ASTM D1557-2000. SGSI indicates new fill and backfill should be moisture-conditioned slightly above optimum moisture content, placed in horizontal lifts of appropriate thickness for the equipment used (but generally should not exceed eight inches in thickness), and compacted.

Additional recommendations are provided in *Appendix D – Earthwork and Grading Recommendations* in SGSI's report dated 19 October 2004.

T&R generally concurs with SGSI's recommendations, with the exception that fill consisting of clean sand (less than five percent fines by weight) should be compacted to at least 95 percent of the maximum dry density of the soil, and rock fill with dimensions greater than six inches should not be placed beneath site improvements and structures that are sensitive to ground settlement primarily due to difficulties associated with properly compacting fill containing large aggregate.

Foundations

SGSI preliminarily recommends the proposed buildings be supported on spread footings that gain support in compacted fill or competent native soil. Footing widths should be selected by the structural engineer. Exterior foundations should be embedded at least 24 inches below the outside adjacent grade. Interior foundation depths should be at least 18 inches below adjacent grade. SGSI should observe the footing excavations prior to placing steel and concrete. SGSI previously indicated that perimeter subdrains will be installed to intercept subsurface water from snow melts.

Allowable dead plus long term live load soil bearing pressures of 2,500 to 3,000 pounds per square foot are recommended by SGSI. However, the factors of safety associated with these values are not stated.

T&R does not take an exception to the SGSI recommendations.

Concrete Slabs-on-Grade

SGSI preliminarily recommends that interior slabs-on-grade be underlain by a water vapor retarder system consisting of at least a 2-inch-thick layer of sand overlain by water vapor retarder membrane that is at least 10 mils thick, which in turn is covered by 2-inches of sand.

T&R suggests that SGSI consider using a capillary break consisting of a 4-inch-thick layer of drain rock or crushed rock (1/2- to 3/4-inch gradation) instead of two inches of sand and using a vapor retarder membrane that meets the requirements for Class C vapor retarders as stated in ASTM E1745-97. Also, the vapor retarders should be placed in accordance with the requirements of ASTM E1643-98.

Pavement Design

SGSI preliminarily recommends using a pavement section consisting of three inches of asphalt concrete over four inches of Class 2 aggregate base. The resistance value for the near-surface soil is 79. Unsuitable soil will be removed from the proposed pavement areas and moisture controls should be provided, as necessary, to prevent the subsurface soils from becoming saturated.

T&R concurs with SGSI's recommendations.

Lateral Earth Pressures and Resistance

SGSI recommends that retaining walls that are free to rotate be designed to resist lateral pressures resulting from an active earth pressure of 30 to 45 pounds per cubic foot (pcf) for level backfill conditions. Retaining walls that are restrained from rotation should be designed for an at-rest earth pressure of 45 to 60 pcf.

Lateral resistance can be developed using a passive earth pressure of 250 pcf and a friction coefficient of 0.25 to 0.35.

In T&R's opinion, the recommendations for retaining wall design pressures are not clearly stated in the SGSI reports. In general, lateral pressures resulting from an active earth pressure of 35 to 45 pcf for level backfill conditions are typical. These values assume the walls are properly backdrained. Restrained walls are typically designed for higher at-rest lateral earth pressures on the order of 60 pcf. Lateral resistance values in cohesionless soils are contingent upon overburden pressures. Therefore, typically either the upper one foot of soil is ignored when computing lateral soil resistance or the soil adjacent to the footing is confined by concrete slabs or pavements. In addition, in areas susceptible to very strong earthquake ground shaking, a seismic increment is typically included in the wall design pressures to improve the seismic performance of retaining walls.

Surface Drainage Control

SGSI recommends that the areas adjacent to buildings be sloped to provide positive surface drainage away from the buildings. Slope gradients should be a minimum of two percent and extend at least five feet beyond the outline of the buildings. Ponding of water should not be permitted.

T&R concurs with SGSI's recommendations for surface drainage control.

CONCLUSIONS AND COMMENTS

Based on the review of the project documents, T&R concludes that the proposed project is feasible, but potentially constrained by: 1) strong ground shaking, 2) potential volcanic hazards, and 3) the presence of unsuitable near surface soil that is loose and contains organic matter. T&R reviewed SGSI's geotechnical recommendations and concur with a majority of the recommendations. Remaining issues that should be addressed or commented upon by the project applicant or applicant's consultants are summarized as follows:

Comment No. 1

T&R suggests the applicant develop an emergency evaluation plan in case the potential for volcanic hazards increases and residents need to vacate the property.

Comment No. 2

T&R generally concurs with SGSI's site preparation, fill placement and compaction recommendations. However, in T&R's opinion fill consisting of clean sand (less than five percent fines by weight) should be compacted wet of the optimum moisture content and to at least 95 percent of the maximum dry density of the fill. Also, T&R suggests that rock and cobble fill with dimensions greater that six inches should not be placed beneath site improvements and structures that are sensitive to ground settlement primarily due to difficulties associated with properly compacting the fill containing large aggregate.

Treadwell&Rollo

Comment No. 3

T&R suggests that SGSI indicate the factors of safety, if any, that are included in their allowable foundation bearing capacity recommendations.

Comment No. 4

T&R suggests using "drain rock" or "poorly graded crushed rock" as a capillary moisture break beneath the concrete slab-on-grade floors. Also, T&R suggests SGSI consider using the requirements and specifications provided in ASTM E1745-97 and ASTM E1643-98 for vapor retarders.

Comment No. 5

T&R suggests that SGSI should clarify the retaining wall design criteria. Also, T&R suggests that either the upper one foot of soil adjacent to the embedded footings be ignored for purposes of computing passive soil resistance or it be confined by a concrete slab or pavement. In addition, SGSI should consider including a seismic increment for the design of critical retaining walls.

In conclusion, T&R recommends the project applicant and/or applicant's consultant consider the comments presented above and provide a response or acknowledgement that the comments presented above will be addressed during the final design of the project. T&R appreciates the opportunity to assist you with the evaluation of geotechnical and geological issues for this project. If you have any questions or require additional information, please call.

Sincerely yours,
TREADWELL & ROLLO, INC.

REGISTERED PROFESSIONAL ENGINEER
DEAN H. IWASA
GE 2285
Exp. 3/31/08
GEOTECHNICAL
STATE OF CALIFORNIA

Dean H. Iwasa
Geotechnical Engineer

SIERRA GEOTECHNICAL SERVICES INC.

December 19, 2005 Project No. 3.30654

Intrawest Placemaking
6900 S. McCarran Ste. 3000
Reno, NV 89509

Attention: Mr. Lee Novak

Subject: **PRELIMINARY GEOTECHNICAL INVESTIGATION**
Affordable Housing 4A
Mammoth Lakes, California

Dear Mr. Novak:

In accordance with your authorization of our proposal dated October 28th 2005, we herein submit the results of our geotechnical investigation for the proposed multi-unit, multi-story affordable housing project. The purpose of this study was to assess the geotechnical constraints to development (if any) and provide geotechnical recommendations relative to the future development of the proposed project.

As part of this study, a Preliminary Site Plan prepared by Burrowes Huggins Architects dated 9/05, was reviewed. This investigation is however considered preliminary as detailed grading and foundation plans are currently not available. Sierra Geotechnical Services Inc. should review grading and foundation plans prior to construction in order to assure that they are in conformance with this report; some of the recommendations contained herein may need to be revised after reviewing.

The conclusions and recommendations presented herein are considered site specific and should not be extrapolated to other areas or used for other projects.

We appreciate the opportunity to be of service to you. Should you have any questions regarding this report, please do not hesitate to contact us.

Respectfully,

SIERRA GEOTECHNICAL SERVICES, INC.

Thomas A. Platz
President
PE C41039

REGISTERED PROFESSIONAL ENGINEER
THOMAS A. PLATZ
No. C 41039
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STATE OF CALIFORNIA

Joseph A. Adler
Principal Geologist
CEG 2198

PROFESSIONAL GEOLOGIST
JOSEPH
AARON ADLER
NO 2198
CERTIFIED
ENGINEERING
GEOLOGIST
3-31-07
STATE OF CALIFORNIA

(3) Addressee

PRELIMINARY GEOTECHNICAL INVESTIGATION

FOR

AFFORDABLE HOUSING 4A
MAMMOTH LAKES, CALIFORNIA

DECEMBER 19, 2005
PROJECT NO. 3.30654

Prepared By:

SIERRA GEOTECHNICAL SERVICES, INC.
P.O. Box 5024
Mammoth Lakes, California 93546
(760) 934-3992

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LIST OF ATTACHMENTS

1. PURPOSE AND SCOPE

This report presents the results of our preliminary geotechnical investigation for the proposed two building, multi-unit project to be located north of Sierra Star Golf Course, south of Main Street and west of Joaquin Drive in Mammoth Lakes, California (Figures 1 and 2). The purpose of this study was to assess the geotechnical constraints to development (if any), and provide geotechnical recommendations relative to the future development of the proposed project.

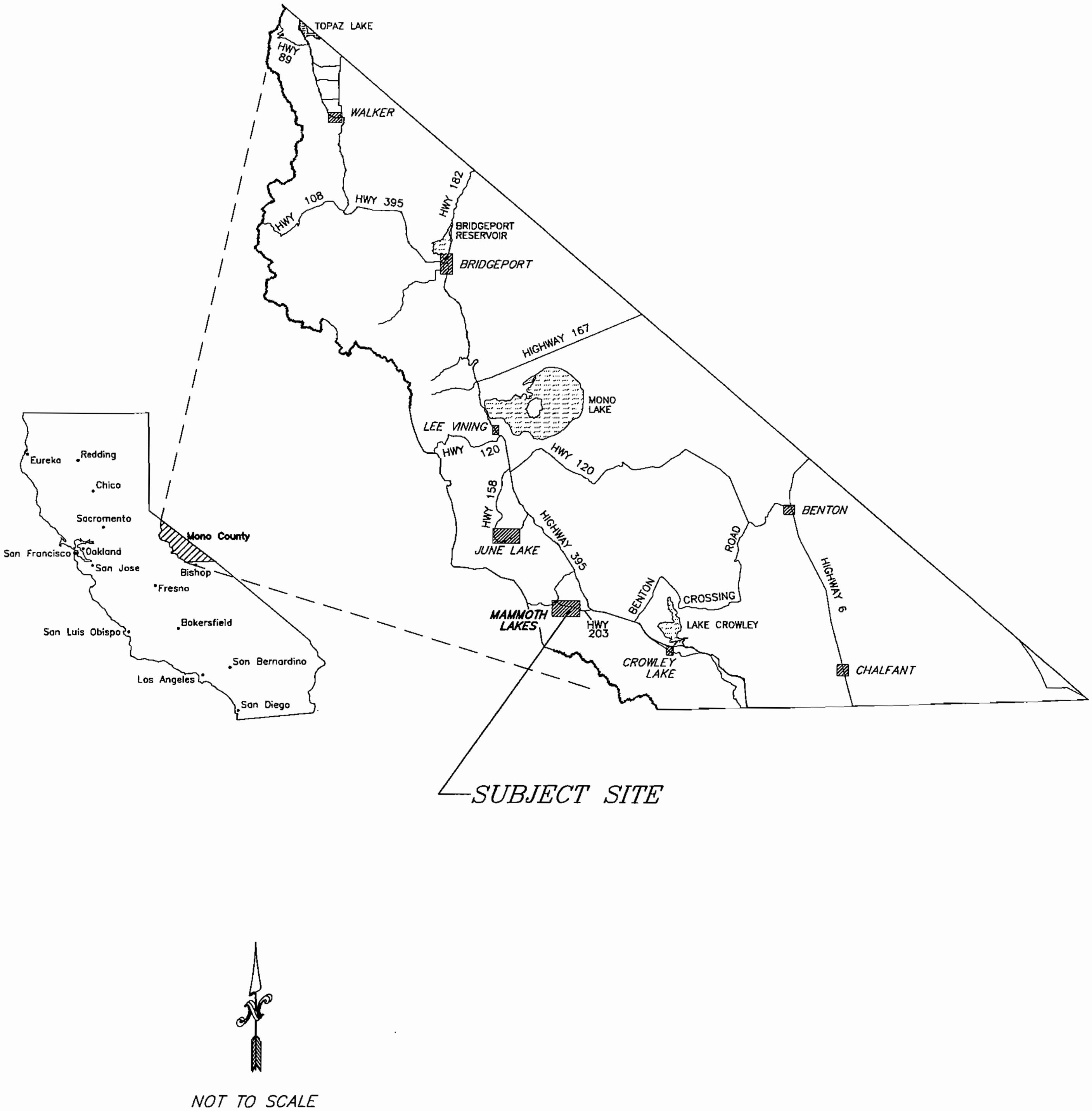
The scope of this investigation included a review of stereoscopic aerial photographs, readily available published and unpublished geologic literature, a subsurface field investigation, laboratory testing of representative soil samples obtained during our field investigation, geologic and geotechnical evaluation and analysis of the collected field and laboratory data, and preparation of this report presenting the results of our findings, conclusions, geotechnical recommendations and construction considerations for the proposed project.

The field investigation was performed on November 3rd, 2005 and included the excavation of five exploratory test pits within the proposed construction areas. A geologist from our office logged the excavations as they were advanced. Soil materials were visually classified in the field according to the Unified Soil Classification System (USCS). Bulk samples of the soils encountered were obtained during the field investigation for laboratory testing. Approximate locations of the exploratory test pits are shown on the Subsurface Location Map (Figure 3). Details of the laboratory testing are presented in Appendix B.

After the test pits were excavated and logged, they were loosely backfilled with the excavated soil and not compacted to the requirements typically specified for engineered fill. Prior to construction the test pit backfill material should be removed and compacted in accordance with the earthwork recommendations contained within this report. If the backfill materials are left "as-is" structures located over these areas may experience some degree of settlement.

2. SITE DESCRIPTION

The property includes the southern portion of APN 33-330-10 as well as property immediately to the south and east of Fairways 8 and 9 of the Sierra Star Golf Course (Figures 2 and 3). In general, topography across the site slopes gently from northwest to southeast. The site is



PROJECT: **REGIONAL MAP** AFFORDABLE HOUSING 4A	
SCALE: NTS	DATE: 12/2005
DRAWING: FIG1.DWG	DRAWN BY: JAA
JOB NO.: 3.30654	FIGURE: FIGURE 1

Sierra Geotechnical Services

currently vacant of structures. A shallow incised drainage bisects the site from west to east. Vegetation includes a moderate to dense growth of indigenous pines and shrubs.

3. PROPOSED DEVELOPMENT

It is our understanding that the design and layout of the proposed structures are in the planning stages but will likely include the construction of two, multi-unit, multi-story housing structures with at grade parking, associated appurtenances, and utilities. The foundations are anticipated to consist of concrete perimeter footings, with either concrete slab-on-grade or raised-wood-floors. Grading is expected to be minor with the buildings situated at or near existing grades.

Grading plans for the proposed project have been reviewed. SGSI should however review foundation plans prior to construction in order to assure that they will be in conformance with the recommendations contained within this report.

4. AERIAL PHOTOGRAPHIC REVIEW

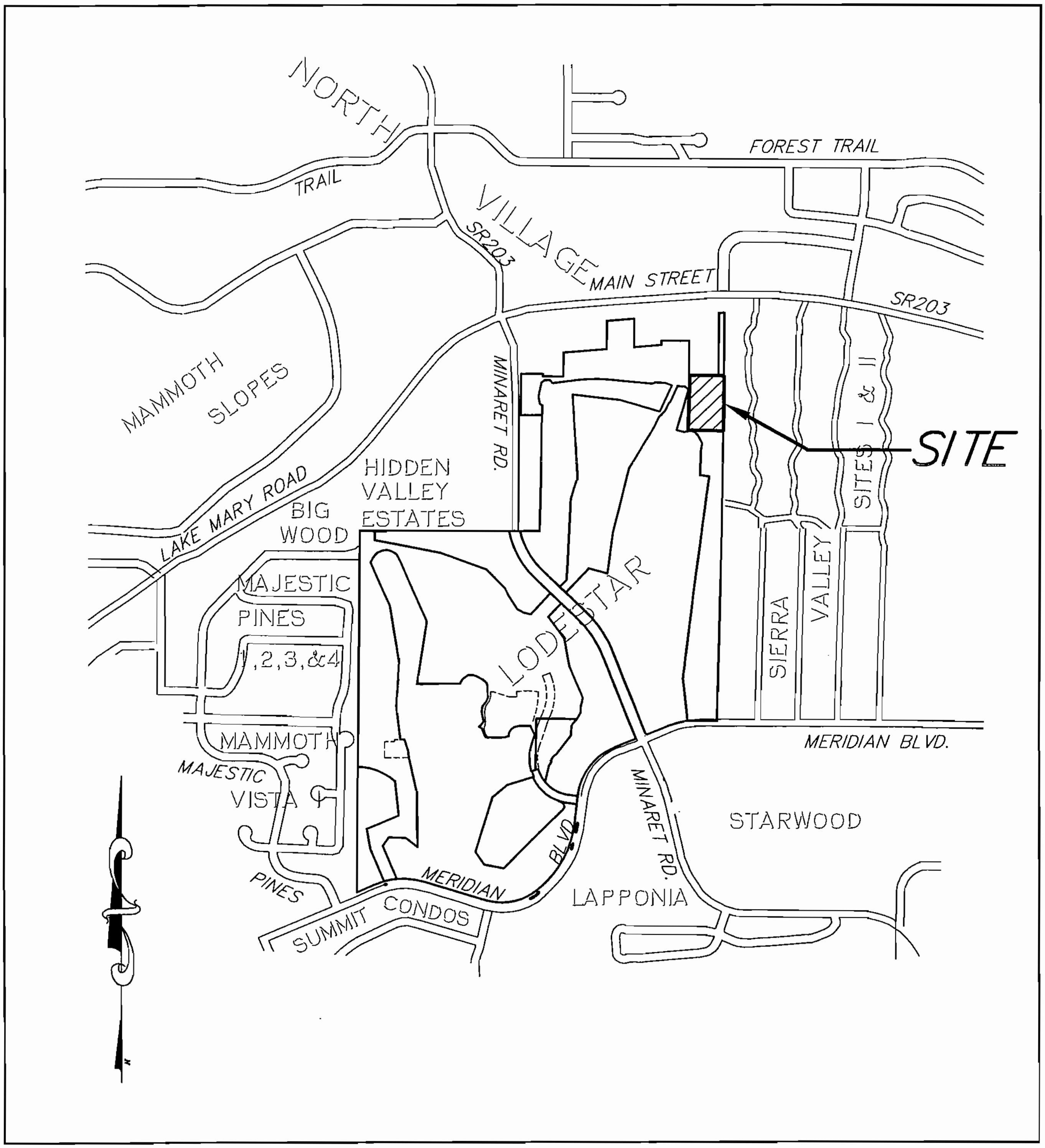
Prior to our field investigation, we acquired and reviewed aerial photographs to assist in our evaluation of geomorphic features that could be indicative of geologic hazards at the property. Details from the earliest available photographs (1944) did not show any evidence of lineations, scarps, or other ground-surface fault, landslide, or recent avalanche related features.

5. GEOLOGIC AND GEOTECHNICAL SITE CONSTRAINTS

Geotechnical constraints to development include the potential for moderate ground shaking (M_W~6.6) along the nearby Hartley Springs fault located approximately 0.9 mi (1.5 km) west/northwest of the subject parcel. The above concern is addressed in the site seismicity section (see Sections 8 and 9) of this report.

6. GEOLOGY AND SUBSURFACE CONDITIONS

The project site is located within the Sierra Nevada province, a generally north to northwesterly trending, asymmetric, and tilted fault-block, bordered on the east by the Sierra Nevada frontal-fault system. Predominant basement rock types of the Sierra Nevada include Cretaceous granitics with associated Paleozoic roof pendants along the west margin of Mono



PROJECT: **VICINITY MAP** AFFORDABLE HOUSING 4A	
SCALE: NTS	DATE: 12/2005
DRAWING: 3.30654FIG1.DWG	DRAWN BY: JAA
JOB NO.: 3.30654	FIGURE: FIGURE 2

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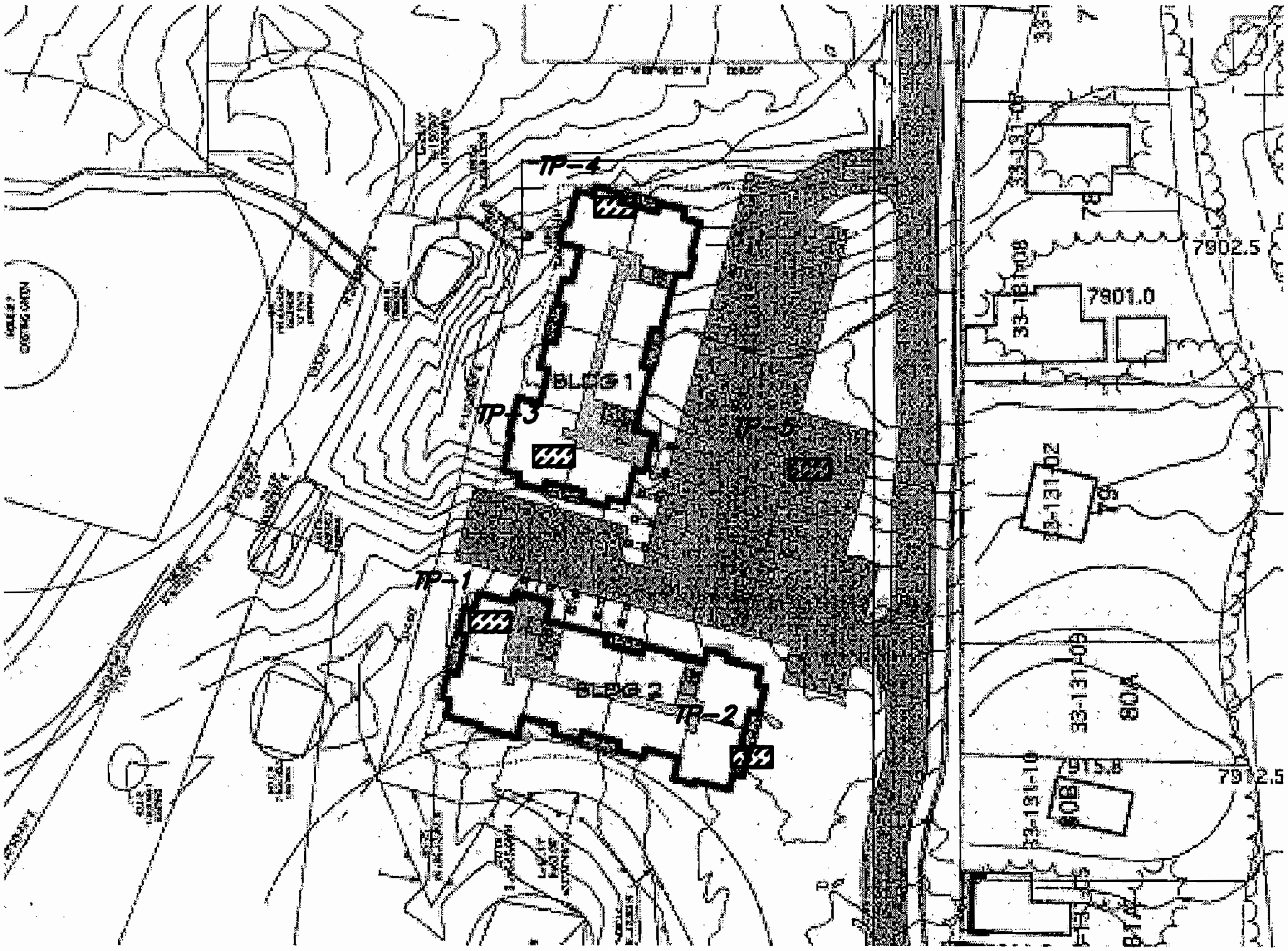
Basin, and to a lesser degree, Paleozoic meta-sedimentary formations mantled by Pleistocene glacial tills.

More specifically, the project site is located at the southwestern edge of the Long Valley caldera near the eastern flank of the Sierra Nevada. The caldera (collapsed volcano) is an east-west elongate, oval depression formed approximately 760,000 years ago with continued volcanic activity to the present (Bailey, 1989). The pre-volcanic basement rock in the Mammoth Lakes area is predominantly Mesozoic granitic rocks of the Sierra Nevada batholith. The batholith is a series of intrusions that displaced overlying ancient sedimentary sea floor rocks (roof pendants) during the Jurassic and Cretaceous Periods. Piedmont glaciation occurred throughout the Pleistocene leaving a mantle of glacial till covering the basement and volcanic rocks throughout the area now occupied by the Town of Mammoth Lakes.

As observed during this investigation, 2 general soil types underlie the site, consisting of Topsoil/Alluvium, and Glacial Till Deposits. Logs of the subsurface conditions encountered in the exploratory test pits are provided in Appendix A. Generalized descriptions of the materials encountered during this investigation follow.

6.1 Topsoil/Alluvium

Topsoil/Alluvium was encountered in all the test pits to an approximate depth of 4-feet below existing grades. In general, the topsoil/alluvium consisted of light to medium brown and grayish-brown, moist, loose, silty, very fine to medium-grained SAND (Unified Soil Classification Symbols: SM, and SP-SM), with abundant roots, and abundant cobble clasts. Rock contents comprise approximately 10 to 40-percent of the deposit. The topsoil/alluvium below approximately 3-feet from existing grades is considered suitable for additional fill and/or structural support provided the earthwork and grading recommendations included within this report are adhered to during site development.



LEGEND

TP-5

APPROXIMATE LOCATION OF EXPLORATORY TEST PIT

PROJECT: **SUBSURFACE GEOTECHNICAL MAP** AFFORDABLE HOUSING 4A	
SCALE: NTS	DATE: 12/2005
DRAWING: 3.30654	DRAWN BY: JAA
JOB NO.: 3.30654	FIGURE: FIGURE 3

6.2 Glacial Till

Glacial Till deposits were encountered in all the test pits below the topsoil/alluvium. In general, the Glacial Till deposits consisted of light brown to grayish-brown and gray to reddish-brown, moist, loose to dense, silty, very fine to coarse SAND (SM, SP and SP-SM) with abundant cobble clasts and boulders to approximately 30-inches diameter. The thickness of the Glacial Till deposits was not determined during this investigation. Rock contents comprise approximately 35 to 60-percent of the deposit. This deposit is considered suitable for additional fill and/or structural support provided the earthwork and grading recommendations included within this report are adhered to during site development.

6.3 Groundwater

Neither a groundwater table nor groundwater seepage was encountered during our field investigation. Groundwater levels in the Mammoth Lakes area are known to fluctuate seasonally. Excavations completed in the spring and early summer may encounter some seepage. Temporary "nuisance" groundwater may reach depths seasonally whereby it should be intercepted by a permanently installed subdrain or footing perimeter drain system.

Subsurface strata which would retard the flow of water downward were not observed during the investigation. However, any drywell(s) proposed to be embedded deeper than the depths explored should be monitored during construction to ensure that they do not interact with any shallow groundwater. Drywell design may need to be mitigated during construction.

7. FAULTING

Our discussion of faults on the site is prefaced with a discussion of California legislation and state policies concerning the classification and land-use criteria associated with faults. By definition of the California Geological Survey, an "active fault" is a fault that has had surface displacement within Holocene time (about the last 11,000 years); hence constituting a potential hazard to structures that might be located across it. This definition is used in delineating Earthquake Fault Zones as mandated by the Alquist-Priolo Geologic Hazards Zones Act of 1972, which is detailed in the California Geological Survey Special Publication SP-42 (Hart and Bryant, 1999). The intent of this act is to assure that unwise urban development does not occur across the traces of active faults. Based on our review, the site is not located within any "Earthquake Fault Zones" or Alquist-Priolo Hazard Zones as identified in this document.

8. SITE SEISMICITY

Site coordinates of latitude 37.6482° north and longitude 118.9780° west were estimated using the computer program **Microsoft Streets and Trips (2004)**. The computer programs **EQFAULT** and **EQSEARCH** (Blake, 2000) were used to estimate peak horizontal accelerations from regional faults and tabulate data from historical earthquakes.

A deterministic seismic analysis was performed within a 62.2 mi (100 km) radius of the site using the computer program **EQFAULT** (Blake, 2000). The results of the analysis indicate that the peak ground acceleration estimated for a maximum earthquake event within the specified radius is 0.46g. This acceleration represents deterministic peak ground accelerations and could occur from a magnitude 6.6 (Mw) earthquake on the Hartley Springs fault located approximately 0.9 mi (1.5 km) northwest the site. The Hilton Creek fault, located approximately 5.9 mi (9.5 km) from the site could produce a magnitude 6.7 (Mw) earthquake resulting in a peak horizontal ground acceleration of 0.29g at the site. The tabulated results of the deterministic seismic analysis are presented in Appendix C. The Fault Location Map, which depicts active faults within a 62.2 mi (100 km) radius of the site, is also presented in Appendix C.

The computed maximum site acceleration within a 62.2 mi (100 km) radius of the site was derived from **EQSEARCH** (Blake, 2000) during the time period of 1800 to 2004. The largest estimated site acceleration based on the Boore et al. (1997) model, was 0.25g, which occurred during the Mammoth Lakes Earthquake of January 7, 1983. This earthquake was located approximately 2.0 mi (3.2 km) from the site. The Modified Mercalli Intensity and earthquake magnitude were IX and 5.6 (M_w) respectively. The largest earthquake recorded within the specified distance and time period was a magnitude 6.6 (M_w) earthquake (Modified Mercalli Intensity of VII) which occurred in The Owens Valley on April 11, 1872. A site acceleration of 0.09g was estimated from this earthquake which was located approximately 28.1 mi (45.2 km) from the site.

The tabulated results of the historical analysis are presented in Appendix C. The Earthquake Epicenter Map, which depicts the epicenters and magnitudes of historical earthquakes that have affected the site, a Earthquake Recurrence Curve, and a plot depicting Earthquake Events versus Magnitude also presented in Appendix C.

The computer program **FRISKSP** (Blake, 2000) was used to perform a probabilistic analysis of seismicity at the subject site. The probabilistic analysis was used to define the Upper-Bound and Design Basis Earthquakes at the site for use in structural design. These results as well as Probability of Exceedance versus Acceleration graphs, and Return Period versus Acceleration graphs are presented in Appendix C. Based on the results of the probabilistic analysis, the Upper-Bound Earthquake (Non-Magnitude Weighted) for the site, defined as the ground motion that has a 10-percent chance of exceedance in 100 years, with a statistical return period of ~ 949 years, is 0.44g. The Design Basis Earthquake (Non-Magnitude Weighted) for the site, defined as the ground motion that has a 10-percent chance of exceedance in 50 years, with a statistical return period of ~ 475 years, is 0.35g.

8.1 Seismic Design Criteria

Table 1 presents the Seismic Parameters for use in preparing a Design Response Spectra for the site. The program used to obtain the seismic parameters is **UBCSEIS** which is based upon the 1997 Uniform Building Code (UBC) and 2001 California Building Code (CBC). The results of the UBC Seismic Design Parameters as well as the Design Response Spectra are presented in Appendix C.

TABLE 1

UBC-CHAPTER 16 TABLE NO.	SEISMIC PARAMETER	RECOMMENDED VALUE
16-I	Seismic Zone Factor Z	0.4
16-J	Soil Profile Type	S_C
16-Q	Seismic Coefficient C_a	0.52
16-R	Seismic Coefficient C_v	0.90
16-S	Near Source Factor N_a	1.3
16-T	Near Source Factor N_v	1.6
16-U	Seismic Source Type	B

The subject site is situated in Seismic Zone 4 (Z=0.4) based on the 1997 UBC, and the 2001 CBC. A geologic subgrade type S_C, "soft-rock or very dense soil" was assumed for the site based upon visual observations of the subsurface conditions as well previously existing seismic compression & shear refraction surveys, conducted in close proximity to the site (Sierra Geotechnical Services, 2004).

The Boore et al (1997) NEHRP C (520) acceleration-attenuation relation was used to estimate ground accelerations at the site based upon the shear wave velocity data. The seismic coefficients of acceleration and velocity C_a and C_v, as derived from the soil profile type and seismic zone factor, are 0.52 and 0.90 respectively.

The distance between the site and the nearest active fault is less than 2 km; therefore the near-source acceleration and velocity factors N_a and N_v are 1.3 and 1.6 respectively. The nearest known active fault is the Hartley Springs fault located approximately 0.9 mi (1.5 km) west/northwest of the site. The Hartley Springs fault is a Type B Seismic Source.

Conformance to the above criteria for strong ground shaking does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur during a large magnitude earthquake. Design of structures should comply with the requirements of the governing jurisdictions, building codes, and standard practices of the Association of Structural Engineers of California. A Design Civil or Structural Engineer in conjunction with the State Architect should determine what level of risk is acceptable for the project considering the recommendations contained in this report, economics, and safety.

9. SECONDARY EARTHQUAKE EFFECTS

Secondary effects that can be associated with severe ground shaking following a relatively large earthquake include shallow ground rupture; soil lurching, liquefaction, dynamic settlement, seiches and tsunamis, and avalanches (rockfall and snow). These secondary effects of seismic shaking are discussed in the following sections.

9.1 Shallow Ground Rupture

Ground surface rupture results when the movement along a fault is sufficient to cause a gap or break along the upper edge of the fault zone on the surface. Our review of available geologic literature indicated that there are no known active, potentially active, or inactive faults that transect the subject site. The nearest known active regional fault is the Hartley Springs Fault. The closest projected trace for this fault zone is located approximately 0.9 mi (1.5 km) northwest of the site.

9.2 Soil Lurching

Soil lurching refers to the rolling motion on the ground surface by the passage of seismic surface waves. Effects of this nature are likely to be most severe where the thickness of soft sediments varies appreciably under structures. In its present condition, the potential for lurching below the proposed structures is considered low to moderate due to the existence of potentially compressible soils within the upper few feet of material below existing grades. The potential for lurching may be greatly reduced if the potentially compressible soils, present on site, are removed and properly compacted during grading, as per the earthwork recommendations provided herein.

9.3 Liquefaction

Liquefaction of cohesionless soils can be caused by strong vibratory motion due to earthquakes. Research and historical data indicate that loose granular soils below a near-surface groundwater table are most susceptible to liquefaction. Liquefaction is characterized by a loss of shear strength in the affected soil layers, thereby causing the soil to behave as a viscous liquid. This effect may be manifested at the ground surface by settlement and, possibly, sand boils where insufficient confining overburden is present over layers. In order for the potential effects of liquefaction to be manifested at the ground surface, the soils generally have to be granular, loose to medium-dense and saturated relatively near the ground surface, and must be subjected to ground shaking of a sufficient magnitude and duration. The potential for liquefaction to occur is considered very low, given the lack of a water table and the very dense nature of bearing soils present on site.

9.4 Dynamic Settlement

Portions of the shallow granular on-site soils may be loose and susceptible to dynamic settlement if strongly shaken by the design level earthquake. The potential for dynamic settlement will be greatly reduced if the loose and compressible soils near the surface are removed and properly compacted in accordance with the earthwork and grading recommendations contained within this report.

9.5 Seiches and Tsunamis

The potential for tsunamis and seiches as the result of the design level earthquake in a nearby fault are considered non-existent, due to the distance of the ocean or large open bodies of water from the project site.

9.6 Avalanches (Rockfall and Snow)

Avalanches can occur as a result of moderate to large earthquakes in Alpine terrain, which can cause rock and snow to move vertically and laterally downslope. These hazards typically affect structures which are located at the base of slopes or within close proximity to the area of flow. The potential for rockfall or snow avalanches to occur at the subject site is considered very low, given the proximity of the site to a relatively steep slope area.

10. LANDSLIDES

Evidence of past landslides was not observed either during aerial photographic review or in the field.

11. VOLCANIC HAZARDS

The area of eastern California that includes the Long Valley Caldera and the Mono-Inyo Craters volcanic chain has a long history of geologic activity that includes earthquakes and volcanic eruptions. Studies within this area indicate that massive eruptions of the size that accompanied formation of Long Valley Caldera approximately 760,000 years ago are extremely rare (none have occurred during the period of written human history). Currently, there is no evidence that an eruption of such catastrophic proportions might be forming beneath the Long Valley caldera (Miller, 1985; 1989).

A small to moderate volcanic eruption could occur however; somewhere along Mono-Inyo Craters volcanic chain producing pyroclastic flows and surges, as well as volcanic ash and pumice fallout, which could significantly impact the subject site. The odds however, of such an eruption are roughly one in a thousand in a given year (Miller, 1985; 1989).

12. CONCLUSIONS

Based on the results of this investigation, it is our opinion that the construction of the proposed project is feasible from a geotechnical standpoint provided the following recommendations are incorporated into the design and construction. The following sections discuss the principal geotechnical concerns affecting site development and grading and provide preliminary grading and foundation design recommendations which should be implemented during site development to mitigate site geologic constraints. However, implementation of these recommendations and adherence to the 1997 UBC, and the 2001 CBC, does not preclude property damage during or following a significant seismic event.

- There are no known active, potentially active, or inactive faults that transect the subject site. Evidence of past soil failures, landslides, or active faulting on the site was not encountered. Seismic hazards at the site may be caused by ground shaking during seismic events on regional active faults. The nearest known active regional fault is the Hartley Springs fault located approximately 0.9 mi (1.5 km) northwest of the site.

- Based on the results of the probabilistic analysis, the Upper-Bound and Design Basis Earthquakes for the site yielded peak ground accelerations of 0.44g and 0.35g respectively.

- The project consultants and the Client should discuss various seismic design parameters and decide upon an appropriate design value based upon their seismic performance goals. A design value of 0.35g is the lowest value that should be considered.

- A volcanic eruption could occur somewhere along Mono-Inyo Craters volcanic chain producing pyroclastic flows and surges, as well as volcanic ash and pumice fallout, which could significantly impact the subject site. The odds however, of such an eruption are roughly one in a thousand in a given year (Miller, 1985; 1989).

- The subject property is situated on relatively flat terrain underlain by approximately 3-feet of loose surficial soils considered "unsuitable" for the support of new fill or structural loads. Where these soils will be subjected to increased loads from new fills, remedial grading consisting of overexcavation and compaction is recommended to improve the bearing capacity of those materials. Remedial grading recommendations are provided in this report.

- The depth of the unsuitable soils is based upon the areas observed during the field investigation. It should be anticipated that the overall depth of the unsuitable materials exposed during construction may vary from that encountered in the test pits. Reasonably continuous construction observation and review during site grading and foundation installation allows for evaluation of the actual soil conditions and the ability to provide appropriate revisions where required during construction.

- Reasonably continuous construction observation and review during site grading and foundation installation allows for evaluation of the actual soil conditions and the ability to provide appropriate revisions where required during construction.

- Neither a groundwater table nor groundwater seepage was encountered during our field investigation. Groundwater levels in the Mammoth Lakes area are known to fluctuate seasonally. Excavations completed in the spring and early summer may encounter some seepage. Temporary "nuisance" groundwater may reach depths seasonally whereby it should be intercepted by a permanently installed subdrain or footing perimeter drain system.

- Subsurface strata which would retard the flow of water downward were not observed during the investigation. However, any drywell(s) proposed to be embedded deeper than the depths explored should be monitored during construction to ensure that they do not interact with any shallow groundwater. Drywell design may need to be mitigated during construction.

- Site soils encountered during our field investigation generally consist of loose to dense, silty, and fine to coarse-grained sands deposits with cobbles and boulders to approximately 30-inches diameter.

- In general, excavations at the site should be achievable using standard earthmoving equipment.

13. RECOMMENDATIONS

The following recommendations should be adhered to during site development. These recommendations are based on empirical and analytical methods typical of the standard of practice in California. If these recommendations appear not to cover any specific feature of the project, please contact our office for additions or revisions to the recommendations.

13.1 Geotechnical Review

Geotechnical review is of paramount importance in engineering practice. The poor performance of many foundation and earthwork projects has been attributed to inadequate construction review. Sierra Geotechnical Services, Inc. should be provided the opportunity to review the following items or we waive all liability for any and all geotechnical issues associated with grading or construction relative to the subject site.

13.1.1 Plan and Specification Review

Detailed plans for construction and grading were not available at the time of this report. SGSI should review grading and foundation plans prior to construction in order to assure that they are in conformance with this report; some of the recommendations contained herein may need to be revised after reviewing.

13.2 Earthwork

Earthwork should be performed in accordance with the General Earthwork and Grading Specifications in Appendix D and the following recommendations. The recommendations contained in Appendix D are general grading specifications provided for typical grading projects. Some of the recommendations may not be strictly applicable to this project. The specific recommendations contained in the text of this report supersede the general recommendations in Appendix D. The contract between the developer and earthwork contractor should be worded such that it is the responsibility of the contractor to place the fill properly in accordance with the recommendations of this report and the specifications in Appendix D notwithstanding the testing and observation of the geotechnical consultant.

13.2.1 Site Preparation

Prior to grading, the proposed structural improvement areas (i.e. all structural fill, pavements areas and structural building, etc.) of the site should be cleared of surface and subsurface obstructions, including vegetation. Vegetation and debris should be disposed of off site. Holes resulting from removal of buried obstructions, which extend below the recommended removal depths described herein or below finished site grades (whichever is lower) should be filled with properly compacted soil. Should existing underground utilities be encountered they should be completely removed and properly backfilled. Alternatively if the utility is not within the influence zone of the foundation it may be abandoned in place by fully grouting the pipe.

13.2.2 Removals and Compaction

The subject property is underlain by up to approximately 3-feet of loose, moist, surficial deposits considered unsuitable for the support of new fill or structural loads. If grading will consist of the overexcavation and removal of "unsuitable" soils from within all structural areas, then excavations should extend below the unsuitable material and to a minimum horizontal distance of one-half the footing width or 5-feet (whichever is greater) horizontally outside the footing footprint. If earthwork will consist of foundation excavations only, then all footings shall be embedded at least 12-inches below the estimated removal depth (3-feet). These excavations will likely extend deeper than the minimum 18-inch depth below outside adjacent grade requirement (see section 13.4.1).

For the paved roadways, parking areas and other improvements a one to two-foot removal is recommended depending on site conditions (i.e. depth of root zone, and depth of disturbance which may have locally deeper removal depths). The removal should also extend a minimum horizontal distance of 2-feet beyond the back of curbs and pavement. In addition, the removal bottom should be observed (tested as needed) by the geotechnical consultant prior to placing fill soils. Removals and Compaction recommendations are provided in Appendix D.

13.3 Excavation and Grading Observation

Site grading and footing excavations should be observed by SGSI. Such observations are considered essential to identify field conditions that differ from those anticipated by the investigation, to adjust design to actual field conditions, and to determine that the grading is accomplished in general accordance with the recommendations of this report. Earthwork and grading recommendations which include guidelines for site preparation fill compaction, slopework, temporary excavations, and trench backfill are provided in Appendix D.

13.4 Preliminary Foundation Preparation and Design

The following preliminary recommendations are presented as minimum design recommendations; they are not intended to supercede design by the structural engineer. Preliminary foundations should be designed in accordance with structural considerations and the following recommendations. Upon the completion of the grading and structural plans, Sierra Geotechnical Services Inc. should review the foundation loads and embedment in order to confirm the implementation of the recommendations herein.

Continuous or pad footings may be used to support the proposed structures provided they are founded entirely upon properly compacted fill, competent alluvial deposits encountered below approximately 3-feet in depth. Continuous and isolated column foundations should be sized according to the allowable soil bearing pressures shown in Table II below. The pressures shown on Table II are for dead load plus long-term live load, including snow load, and for total load including wind and seismic forces.

Table II – Allowable Soil Bearing Pressures

Depth Below Existing Ground Surface	Allowable Soil Bearing Pressure (pcf)
Compacted Fill, or Competent Alluvium,	2,500
Glacial Till	3,000

The allowable pressure may be increased by one-third when considering loads of short duration such as wind or seismic forces. A friction coefficient for concrete of 0.35 may be employed to resist lateral loads. Continuous and isolated footings should be designed in accordance with the structural engineer requirements. Reinforcement of footings should be per the structural engineer's design.

13.4.1 Foundation Construction

Based upon our observations and past experience relative to the general site area, low expansive soils exist onsite. The following preliminary recommendations assume low expansive soils near finish pad grade.

- Footings should be designed in accordance with the structural engineer requirements regarding width. Exterior and interior foundations shall be founded within compacted fill or competent native soils. Exterior foundations shall have a minimum embedment depth of 18-inches below outside adjacent grade. If earthwork will consist of foundation excavations only, then all footings shall be embedded at least 12-inches below the estimated removal depth 3-feet).

- All footings should be reinforced to at least the minimum reinforcement for temperature as required in Chapter 19 of the 1997 UBC.

- All footing excavations should be observed by a representative of SGSI prior to placement of reinforcing steel, in order to assure proper embedment into suitable soils.

- Although no specific pre-saturation is required for these soil conditions, footing trench excavations should be well moistened prior to pouring concrete.

- Footing trenches should not have any rocks or boulders protruding into the trench bottom. Soft soil pockets created by rock removal during foundation excavation shall be replaced with approved fill material, and compacted to 95-percent of the material's maximum dry density.

13.5 Foundation Setback

We recommend a minimum 5-foot horizontal setback distance from the face of slopes for all structural footings and settlement-sensitive structures (i.e. fences, walls, signs, etc.). This distance is measured from the outside edge of the footing, horizontally to the slope face (or to the face of a retaining wall). We should note that the soils within a slope setback area possess poor long term lateral stability, and improvements (such as retaining wall, sidewalks, fences, pavement, underground utilities, etc.) constructed within this setback area may be subject to lateral movement and/or differential settlement.

Utility trenches that parallel or nearly parallel structure footings should not encroach within a 1:1 plane extending downward and outward from the outside edge of the footing.

13.6 Concrete Slab-on-Grade Floors

Compacted fill materials will provide adequate support for concrete slabs provided the on-site materials are prepared per our grading recommendations prior to placement of the slab.

Structural fill and subgrade soils underlying concrete slabs shall be compacted to a minimum of 95-percent of the material's maximum dry density for the upper 12-inches. Concrete slabs should be underlain by a 2-inch layer of clean sand (SE greater than 30) to aid in concrete curing, which is underlain by a 10-mil (or heavier) moisture barrier, which is, in turn, underlain by a 2-inch layer of clean sand to act as a capillary break. All penetrations and laps in the moisture barrier should be appropriately sealed.

Minimum slab reinforcement shall consist of #3 rebar placed at 18-inches on center each way. The slab reinforcement shall be placed, vertically, in the middle of the slab. Slab thickness shall be a minimum of 4-inches. In areas where heavy equipment or loading will stress the slab, the thickness and reinforcement will meet the requirements of the Structural Engineer of record. Our experience indicates that the use of reinforcement in slabs and foundations will generally reduce the potential for drying and shrinkage cracking. However, some cracking may be expected as the concrete cures. Concrete cracking and/or spalling is often aggravated by a high cement ratio, high or low concrete temperature at the time of placement, small nominal aggregate size and rapid moisture loss. The use of low slump concrete (not exceeding 4-inches at the time of placement) and proper curing methods can reduce the potential for shrinkage cracking.

Moisture barriers can retard, but not eliminate moisture vapor movement from the underlying soils up through the slab. We recommend that the floor coverings installer test the moisture vapor flux rate prior to attempting application of the flooring. "Breathable" floor coverings should be considered if the vapor flux rates are high. A slipsheet should be used if crack sensitive floor coverings are planned.

13.7 Preliminary Pavement Recommendations

For preliminary planning purposes, pavement sections are provided based on the results of R-value laboratory testing on a selected soil sample collected during our subsurface exploration. Final pavement design should be based on the results of R-Value testing performed on samples of the finished subgrade soils in pavement areas. Based on an R-Value of 63 (Appendix B), SGSI recommends the following pavement sections:

- <u>Standard Duty Parking Areas Including Parking Stalls (Traffic Index (TI)= 5.0)</u>
  3-inches Asphalt Concrete / 4-inches Class II Aggregate Base

- <u>Access Driveways, Bus traffic, Bus Parking, Loading Docks (TI = 8.0)</u>
  4-inches Asphalt Concrete / 6-inches Class II Aggregate Base

The upper 12-inches of subgrade material along with the Class II Aggregate Base and the Asphaltic concrete shall be compacted to a minimum of 95-percent of the materials maximum dry density as determined by ASTM D1557. The subgrade and aggregate base shall be moisture-conditioned and compacted to 95-percent of the material's maximum dry density as determined by ASTM D-1557 to a depth of 12-inches.

If pavement areas are adjacent to heavily watered landscape areas, some deterioration of the subgrade load bearing capacity may result. We recommend some measures of moisture control (such as deepened curbs or other moisture barrier materials) be provided to prevent the subgrade soils from becoming saturated.

13.8 Lateral Earth Pressures and Resistance

Embedded structural walls or cantilever retaining walls should be designed for lateral earth pressures exerted on them. The magnitude of these pressures depends on the amount of deformation that the wall can yield under load. If a wall can yield enough to mobilize the full shear strength of the soil; it can be designed for "active" pressure.

If a wall cannot yield under the applied load, the shear strength of the soil cannot be mobilized and the earth pressure will be higher. Such walls should be designed for "at rest" conditions. If a structure moves toward the soils, the resulting resistance developed by the soil is the "passive" resistance.

For design purposes, the recommended equivalent fluid pressure for each case for walls founded above the static ground water and backfilled with soils of very low to low expansion potential is provided. The equivalent fluid pressure values assume free-draining conditions. If conditions other than those assumed above are anticipated the equivalent fluid pressure values should be provided on an individual-case basis by the geotechnical engineer. Surcharge loading effects from the adjacent structures should be evaluated by the structural engineer. The select backfill should have an expansion index (EI) of no greater than 50 and a sand equivalent (SE) greater than 30. The backfill soils should be tested by the soils engineer prior to backfill operations starting for the retaining wall/basement wall structures.

Slope of Backfill Behind Retaining Wall	Lateral Earth Pressure in Equivalent Fluid Weight (pcf)	
	Active Case	Passive Case
Horizontal	25	350
At-Rest	40	

The earth pressures are given in terms of equivalent fluid pressures for walls having backfills of horizontal and 2 to 1 slopes. For sliding resistance, the friction coefficient of 0.35 may be used at the concrete and soil interface. In combining the total lateral resistance, the passive pressure or the frictional resistance should be reduced by 50-percent. Wall footings should be designed in accordance with structural considerations. The passive resistance value may be increased by one-third when considering loads of short duration, including wind or seismic loads. The horizontal distance between foundation elements providing passive resistance should be a minimum of three times the depth of the elements to allow full development of these passive pressures. The total depth of retained earth for design of cantilever walls should be the vertical distance below the ground surface measured at the wall face for stem design or measured at the heel of the footing for overturning and sliding.

Wall backcut excavations less than 5-feet in height can be made near vertical. All retaining wall structures should be provided with appropriate drainage and waterproofing. Drainage should consist of continuous drains installed along the base of the wall outletting to a storm drain system or the surface if grade allows.

13.9 Drainage

We recommend that measures be taken to properly finish grade the building area, such that drainage water from the building area is directed away from building foundations (2-percent minimum grade on soil or sod for a distance of 5-feet). Ponding of water should not be permitted. Erosion is possible surrounding the structures if left unprotected during the snowmelt run-off season.

13.10 Erosion

A Storm Water Pollution Prevention Plan (SWMP) will need to be prepared for this site in compliance the Town of Mammoth Lakes and State Water Quality Control Board – Lahontan Region requirements. Graded areas shall be protected against erosion once they are brought to final grade. No graded areas shall be left unstabilized between October 15th and April 15th.

14. LIMITATIONS

This report has been prepared for the sole use and benefit of our client. The conclusions of this report pertain only to the site investigated. The intent of the report is to advise our client of the geologic and geotechnical recommendations relative to the future development of the proposed project. It should be understood that the consulting provided and the contents of this report are not perfect. Any errors or omissions noted by any party reviewing this report, and/or any other geotechnical aspects of the project, should be reported to this office in a timely fashion. The client is the only party intended by this office to directly receive this advice. Unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Sierra Geotechnical Services Incorporated from and against any liability, which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Sierra Geotechnical Services Incorporated.

Conclusions and recommendations presented herein are based upon the evaluation of technical information gathered, experience, and professional judgment. Other consultants could arrive at different conclusions and recommendations. Final decisions on matters presented are the responsibility of the client and/or the governing agencies. No warranties in any respect are made as to the performance of the project.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings within this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

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Stereoscopic Aerial Photographs

OV, FL-1, 7-84 & 85; Dated 10/19/1944, 1:24,000

GS-QN, FL-3, 65 & 66; Dated 8/10/1951, 1:47,200

United States Department of Agriculture, Stereoscopic Aerial Photographs: EAD –19-131 to EAD-19-132; Dated 8/23/56, 1:24,000.

United States Department of Agriculture, Stereoscopic Aerial Photographs: EMG-7-147 to EMG-7-148; Dated 9/10/63, 1:12,500

United States Department of Agriculture, Stereoscopic Aerial Photographs: FL-7, 483-36&39; Dated 8/06/84, 1:12,000

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SIERRA GEOTECHNICAL SERVICES INC.

November 9, 2005 | Project No. 3.30651

Intrawest Placemaking
6900 S. McCarran Ste. 3000
Reno, NV 89509

Attention: Mr. Mark Rodeheaver

Subject: **PRELIMINARY GEOTECHNICAL INVESTIGATION**
The Grove - Area 8C
Mammoth Lakes, California

Dear Mr. Rodeheaver:

In accordance with your authorization of our proposal dated October 24, 2005 we herein submit the results of our geotechnical investigation for the proposed multi-unit, multi-story affordable housing project. The purpose of this study was to assess the geotechnical constraints to development (if any) and provide geotechnical recommendations relative to the future development of the proposed project. Our work consisted of a subsurface exploration, laboratory testing, engineering and geologic analyses and the preparation of this report.

As part of this study SGSI reviewed a Conceptual Plan for Sierra Star East for which Area 8C is a part. This plan was prepared by CFA Inc., dated July, 2005. This study is considered preliminary, as detailed plans for construction and grading are currently unavailable for our review. Sierra Geotechnical Services Inc. should review grading and foundation plans prior to construction in order to assure that they are in conformance with this report; some of the recommendations contained herein may need to be revised after reviewing.

P.O. BOX 5024 • MAMMOTH LAKES, CA 93546 • (760) 934-3992 • FAX (760) 934-8832
214 W. LINE STREET, SUITE E • BISHOP, CA 93514 • (760) 873-4273 • FAX (760) 873-8024

We appreciate the opportunity to be of service to you. Should you have any questions regarding this report, please do not hesitate to contact us.

Respectfully,

SIERRA GEOTECHNICAL SERVICES, INC.

Thomas A. Platz
President
PE C41039

REGISTERED PROFESSIONAL ENGINEER
THOMAS A. PLATZ
No. C 41039
Exp. 3/31/07
CIVIL
STATE OF CALIFORNIA

Joseph A. Adler
Principal Geologist
CEG 2198

PROFESSIONAL GEOLOGIST
JOSEPH AARON ADLER
NO 2198
CERTIFIED ENGINEERING GEOLOGIST
3-31-07
STATE OF CALIFORNIA

(3) Addressee

PRELIMINARY GEOTECHNICAL INVESTIGATION

FOR

THE GROVE – AREA 8C
MAMMOTH LAKES, CALIFORNIA

NOVEMBER 9, 2005
PROJECT NO. 3.30651

Prepared By:

SIERRA GEOTECHNICAL SERVICES, INC.
P.O. Box 5024
Mammoth Lakes, California 93546
(760) 934-3992

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LIST OF ATTACHMENTS

1. PURPOSE AND SCOPE

This report presents the results of our geotechnical investigation for The Grove at Sierra Star (Area 8C) project to be located northeast of Minaret Road and west of Sierra Star Golf Course Fairway 8 within the Town of Mammoth Lakes, California (Figures 1 and 2). The purpose of this study was to assess the geotechnical constraints to development (if any), and provide geotechnical recommendations relative to the future development of the proposed project.

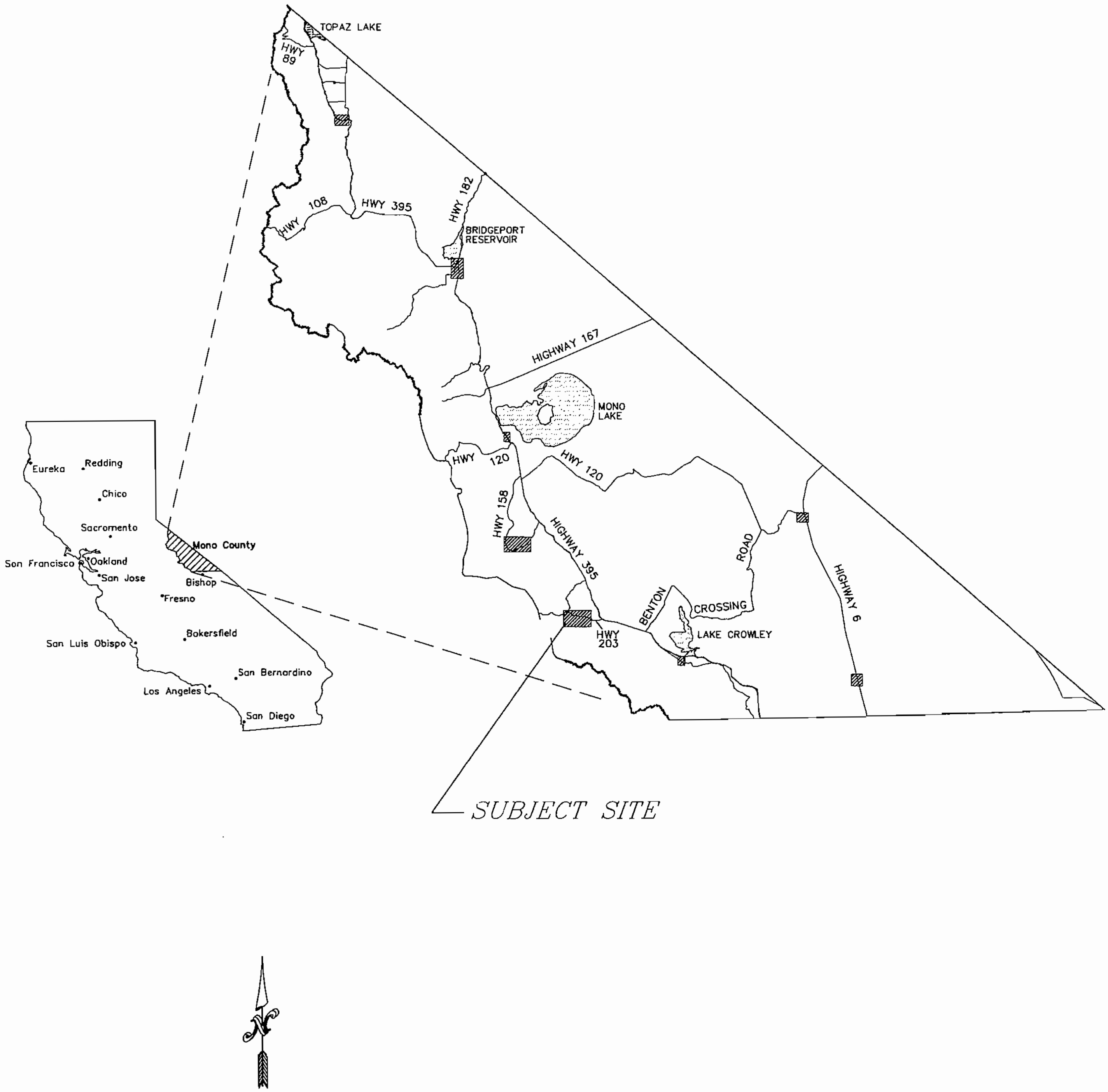
The scope of this investigation included a review of stereoscopic aerial photographs, readily available published and unpublished geologic literature, a subsurface field investigation, laboratory testing of representative soil samples obtained during our field investigation, geologic and geotechnical evaluation and analysis of the collected field and laboratory data, and preparation of this report presenting the results of our findings, conclusions, geotechnical recommendations and construction considerations for the proposed project.

The field investigation was performed on October 27, 2005 and included the excavation of four exploratory test pits within the proposed construction areas. A geologist from our office logged the excavations as they were advanced. Bulk samples of the soils encountered were obtained during the field investigation. Approximate locations of the exploratory test pits are shown on the Subsurface Location Map (Figure 3). Details of the laboratory testing are presented in Appendix B.

After the test pits were excavated and logged, they were loosely backfilled with the excavated soil and not compacted to the requirements typically specified for engineered fill. Prior to construction the test pit backfill material should be removed and compacted in accordance with the earthwork recommendations contained within this report. If the backfill materials are left “as-is” structures located over these areas may experience some degree of settlement.

2. SITE DESCRIPTION

The approximate 1.44-acre site is located within the Sierra Star development south of Fairway 7, west of Fairway 8, and northeast of Minaret Road. In general, topography across the site slopes gently from southwest to northeast. Ground surface elevations range from approximately 7944’ MSL near the southwest property corner to approximately 7927’ MSL



Sierra Geotechnical Services

PROJECT:	REGIONAL MAP THE GROVE		
SCALE:	NTS	DATE:	11/2005
DRAWING:	FIG1.DWG	DRAWN BY:	JAA
JOB NO.:	3.30651	FIGURE:	FIGURE 1

near the northeast property boundary. The site is currently vacant of structures. Vegetation on the site includes a dense growth of indigenous pines and shrubs.

3. PROPOSED DEVELOPMENT

Based upon our conversations with you, and a review of the Conceptual Plan prepared by CFA it is our understanding that the proposed project will likely include the construction of five multi-story (ten unit) residential structures with at attached garages, at grade parking, associated appurtenances, and utilities. The foundations are anticipated to consist of a concrete perimeter footing, concrete slab-on-grade garage slabs and raised-wood-floors. Grading is expected to be minor with the buildings situated at or near existing grades.

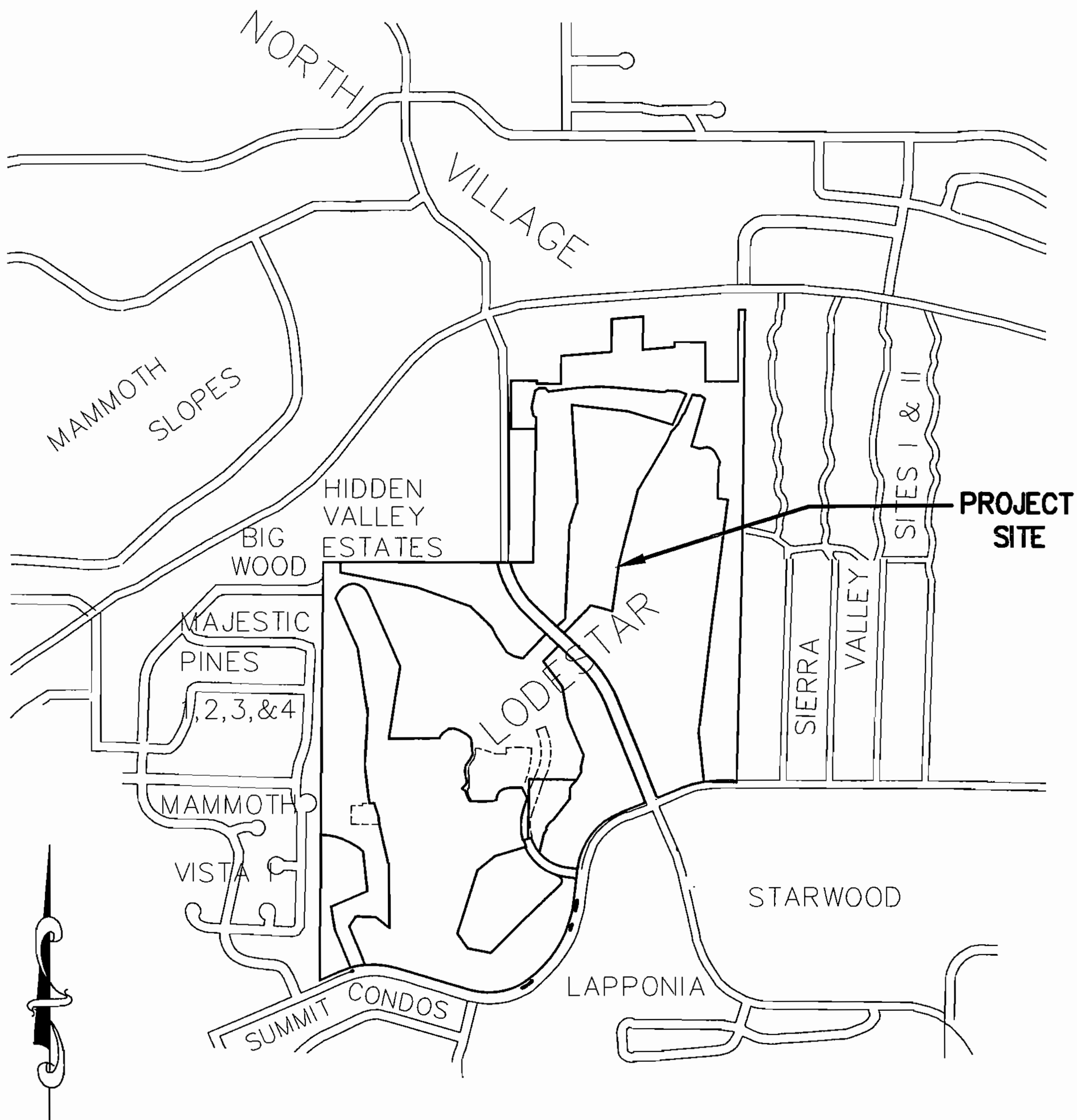
Preliminary grading and foundation design plans were not provided prior to the preparation of this report. Sierra Geotechnical Services, Inc. has assumed that grading will be relatively minor and that the proposed site grades and finished pad elevations will be at or near existing grades. SGSI should review grading and foundation plans prior to construction in order to assure that they will be in conformance with our recommendations.

4. AERIAL PHOTOGRAPHIC REVIEW

Prior to our field investigation, we acquired and reviewed aerial photographs to assist in our evaluation of geomorphic features that could be indicative of geologic hazards at the property. Details from the earliest available photographs (1944) did not show any evidence of lineations, scarps, or other ground-surface fault, landslide, or recent avalanche related features.

5. GEOLOGIC AND GEOTECHNICAL SITE CONSTRAINTS

Geotechnical constraints to development include the potential for moderate ground shaking (M_W~6.6) along the nearby Hartley Springs fault located approximately 0.9 mi (1.4 km) northwest of the subject parcel. The above concern is addressed in the site seismicity section (see Sections 8 and 9) of this report.



VICINITY MAP

Sierra
Geotechnical
Services

PROJECT:	*VICINITY MAP* *THE GROVE*		
SCALE:	*NTS*	DATE:	*11/2005*
DRAWING:	*3.30651FIG2.DWG*	DRAWN BY:	*JAA*
JOB NO.:	*3.30651*	FIGURE:	*FIGURE 2*

6. GEOLOGY AND SUBSURFACE CONDITIONS

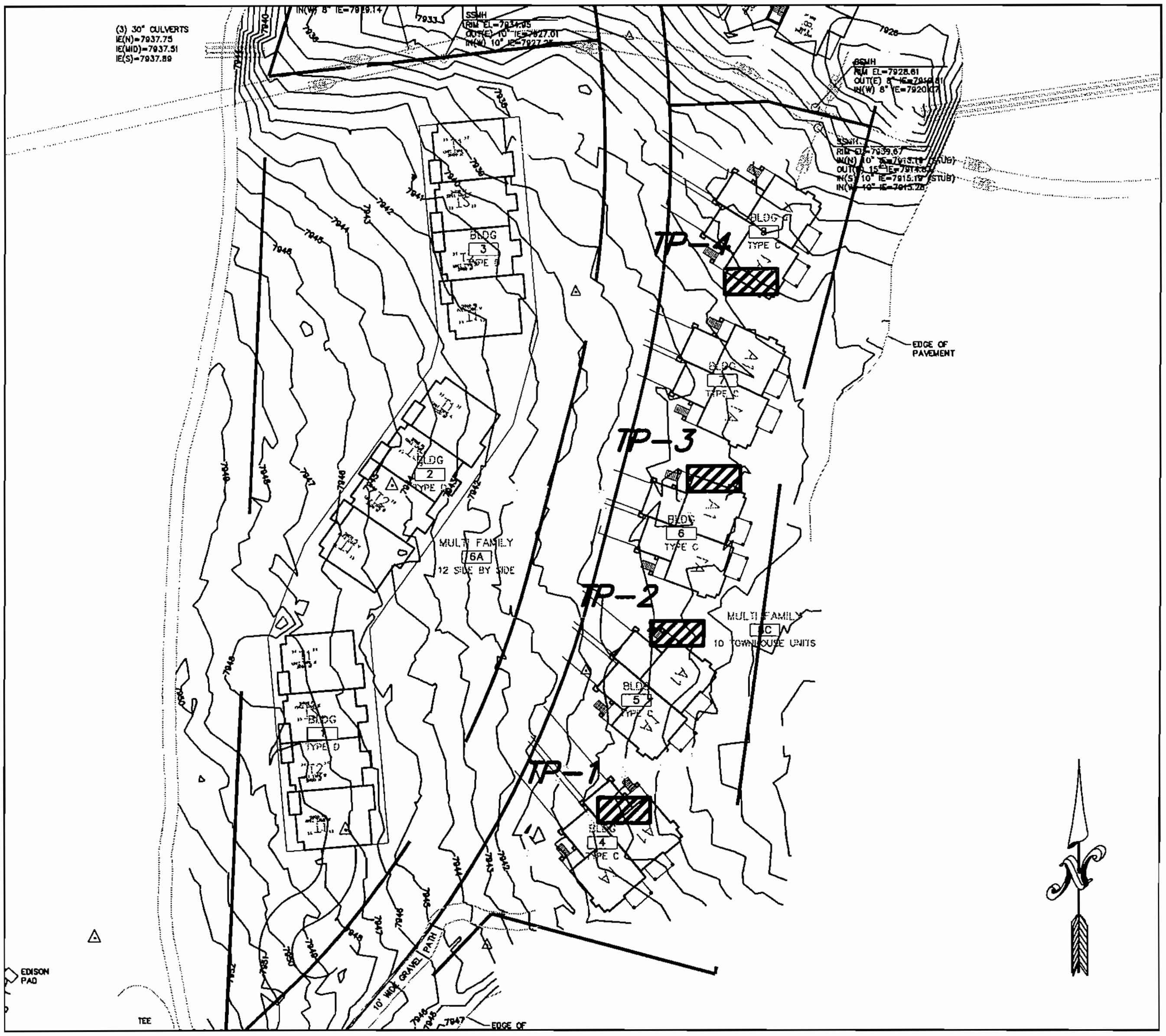
The project site is located within the Sierra Nevada province, a generally north to northwesterly trending, asymmetric, and tilted fault-block, bordered on the east by the Sierra Nevada frontal-fault system. Predominant basement rock types of the Sierra Nevada include Cretaceous granitics with associated Paleozoic roof pendants along the west margin of Mono Basin, and to a lesser degree, Paleozoic meta-sedimentary formations mantled by Pleistocene glacial tills.

More specifically, the project site is located at the southwestern edge of the Long Valley caldera near the eastern flank of the Sierra Nevada. The caldera (collapsed volcano) is an east-west elongate, oval depression formed approximately 760,000 years ago with continued volcanic activity to the present (Bailey, 1989). The pre-volcanic basement rock in the Mammoth Lakes area is predominantly Mesozoic granitic rocks of the Sierra Nevada batholith. The batholith is a series of intrusions that displaced overlying ancient sedimentary sea floor rocks (roof pendants) during the Jurassic and Cretaceous Periods. Piedmont glaciation occurred throughout the Pleistocene leaving a mantle of glacial till covering the basement and volcanic rocks throughout the area now occupied by the Town of Mammoth Lakes.

As observed during this investigation, 3 general soil types underlie the site, consisting of Undocumented Fill, Topsoil/Colluvium, and Glacial Till Deposits. Logs of the subsurface conditions encountered in the exploratory test pits are provided in Appendix A. Generalized descriptions of the materials encountered during this investigation follow.

6.1 Undocumented Fill

Undocumented fill was encountered in Test Pit TP-1 to an approximate depth of 1½-feet below grade. This apparent "spoil" fill consisted of a brown, moist, loose, silty very fine to coarse SAND (Unified Soil Classification Symbol: SM), with few cobbles and boulders. This material was observed scattered in a small mound and was likely dumped on-site during work performed for the adjacent golf course.



LEGEND

TP-4

APPROXIMATE LOCATION OF EXPLORATORY TEST PIT

Sierra Geotechnical Services

PROJECT: SUBSURFACE GEOTECHNICAL MAP THE GROVE (AREA 8C)	
SCALE: NTS	DATE: 11/2005
DRAWING: FIG3.DWG	DRAWN BY: JAA
JOB NO.: 3.30651	FIGURE: FIGURE 3

6.2 Topsoil/Colluvium

Topsoil/Colluvium was encountered in all the test pits to an approximate depth of 3½ to 4-feet below existing grades. In general, the topsoil/colluvium consisted of a light brown to grayish-brown, moist, loose to medium dense, silty, very fine to medium-grained SAND (SM), with abundant roots, and abundant cobble clasts and boulders to approximately 24-inches diameter. Rock contents comprise approximately 25 to 40-percent of the deposit. The topsoil/colluvium from below approximately 3-feet below existing grade is considered suitable for additional fill and/or structural support provided the earthwork and grading recommendations included within this report are adhered to during site development.

6.3 Glacial Till Deposits

Glacial Till deposits were encountered in all the test pits below the topsoil/colluvium. In general, the Glacial Till deposits consisted of reddish to grayish-brown, and gray, moist, medium dense to dense, silty, very fine to coarse SAND (SM) with abundant cobble clasts and boulders to approximately 36-inches diameter. Rock contents comprise approximately 35 to 60-percent of the deposit. The thickness of the Glacial Till deposits was not determined during this investigation. This deposit is considered suitable for additional fill and/or structural support provided the earthwork and grading recommendations included within this report are adhered to during site development.

6.4 Groundwater

Neither a groundwater table nor groundwater seepage was encountered during this field investigation. However, slight to moderate mottling of the on-site soils was observed in test pits TP-1 at approximately 4½-feet which indicates that seasonally high and temporarily perched groundwater from snowmelt can be anticipated on the site. Groundwater levels in the Mammoth Lakes area are known to fluctuate seasonally. Excavations completed in the spring and early summer should anticipate some seepage. Temporary "nuisance" groundwater may reach depths seasonally whereby it should be intercepted by a permanently installed subdrain or footing perimeter drain system.

Subsurface strata which would retard the flow of water downward were not observed during the investigation. However, any drywell(s) proposed to be embedded deeper than the depths explored should be monitored during construction to ensure that they do not interact with any shallow seasonal run-off. Drywell design may need to be mitigated during construction.

7. FAULTING

Our discussion of faults on the site is prefaced with a discussion of California legislation and state policies concerning the classification and land-use criteria associated with faults. By definition of the California Geological Survey, an "active fault" is a fault that has had surface displacement within Holocene time (about the last 11,000 years); hence constituting a potential hazard to structures that might be located across it. This definition is used in delineating Earthquake Fault Zones as mandated by the Alquist-Priolo Geologic Hazards Zones Act of 1972, which is detailed in the California Geological Survey Special Publication SP-42 (Hart and Bryant, 1999). The intent of this act is to assure that unwise urban development does not occur across the traces of active faults. Based on our review, the site is not located within any "Earthquake Fault Zones" or Alquist-Priolo Hazard Zones as identified in this document.

8. SITE SEISMICITY

Site coordinates of latitude 37.6427° north and longitude 118.9812° west were estimated using the computer program **Microsoft Streets and Trips (2004)**. The computer programs **EQFAULT** and **EQSEARCH** (Blake, 2000) were used to estimate peak horizontal accelerations from regional faults and tabulate data from historical earthquakes.

A deterministic seismic analysis was performed within a 62.2 mi (100 km) radius of the site using the computer program **EQFAULT** (Blake, 2000). The results of the analysis indicate that the peak ground acceleration estimated for a maximum earthquake event within the specified radius is 0.46g. This acceleration represents deterministic peak ground accelerations and could occur from a magnitude 6.6 (Mw) earthquake on the Hartley Springs fault located approximately 0.9 mi (1.4 km) northwest the site. The Hilton Creek fault, located approximately 6.3 mi (10.1 km) from the site could produce a magnitude 6.7 (Mw) earthquake resulting in a peak horizontal ground acceleration of 0.28g at the site. The tabulated results of the deterministic seismic analysis are presented in Appendix C. The Fault Location Map, which depicts active faults within a 62.2 mi (100 km) radius of the site, is also presented in Appendix C.

The computed maximum site acceleration within a 62.2 mi (100 km) radius of the site was derived from **EQSEARCH** (Blake, 2000) during the time period of 1800 to 2004. The largest estimated site acceleration based on the Boore et al. (1997) model, was 0.24g, which occurred during the Mammoth Lakes Earthquake of January 7, 1983. This earthquake was located approximately 2.1 mi (3.3 km) from the site. The Modified Mercalli Intensity and earthquake magnitude were IX and 5.6 (M_w) respectively. The largest earthquake recorded within the specified distance and time period was a magnitude 6.6 (M_w) earthquake (Modified Mercalli Intensity of VII) which occurred in The Owens Valley on April 11, 1872. A site acceleration of 0.09g was estimated from this earthquake which was located approximately 28.1 mi (45.2 km) from the site.

The tabulated results of the historical analysis are presented in Appendix C. The Earthquake Epicenter Map, which depicts the epicenters and magnitudes of historical earthquakes that have affected the site, an Earthquake Recurrence Curve, and a plot depicting Earthquake Events versus Magnitude also presented in Appendix C.

The computer program **FRISKSP** (Blake, 2000) was used to perform a probabilistic analysis of seismicity at the subject site. The probabilistic analysis was used to define the Upper-Bound and Design Basis Earthquakes at the site for use in structural design. These results as well as Probability of Exceedance versus Acceleration graphs, and Return Period versus Acceleration graphs are presented in Appendix C. Based on the results of the probabilistic analysis, the Upper-Bound Earthquake (Non-Magnitude Weighted) for the site, defined as the ground motion that has a 10-percent chance of exceedance in 100 years, with a statistical return period of ~ 949 years, is 0.43g. The Design Basis Earthquake (Non-Magnitude Weighted) for the site, defined as the ground motion that has a 10-percent chance of exceedance in 50 years, with a statistical return period of ~ 475 years, is 0.34g.

8.1 Seismic Design Criteria

Table 1 presents the Seismic Parameters for use in preparing a Design Response Spectra for the site. The program used to obtain the seismic parameters is **UBCSEIS** which is based upon the 1997 Uniform .Building Code (UBC) and 2001 California Building Code (CBC). The results of the UBC Seismic Design Parameters as well as the Design Response Spectra are presented in Appendix C.

TABLE 1

UBC-CHAPTER 16 TABLE NO.	SEISMIC PARAMETER	RECOMMENDED VALUE
16-I	Seismic Zone Factor Z	0.4
16-J	Soil Profile Type	S_C
16-Q	Seismic Coefficient C_a	0.52
16-R	Seismic Coefficient C_v	0.90
16-S	Near Source Factor N_a	1.3
16-T	Near Source Factor N_v	1.6
16-U	Seismic Source Type	B

The subject site is situated in Seismic Zone 4 (Z=0.4) based on the 1997 UBC, and the 2001 CBC. A geologic subgrade type S_C, "soft-rock or very dense soil" was assumed for the site based upon visual observations of the subsurface conditions as well previously existing seismic compression & shear refraction surveys, conducted in close proximity to the site (Sierra Geotechnical Services, 2004).

The Boore et al (1997) NEHRP C (520) acceleration-attenuation relation was used to estimate ground accelerations at the site based upon the shear wave velocity data. The seismic coefficients of acceleration and velocity C_a and C_v, as derived from the soil profile type and seismic zone factor, are 0.52 and 0.90 respectively.

The distance between the site and the nearest active fault is less than 2 km; therefore the near-source acceleration and velocity factors N_a and N_v are 1.3 and 1.6 respectively. The nearest known active fault is the Hartley Springs fault located approximately 0.9

mi (1.4 km) northwest of the site. The Hartley Springs fault is a Type B Seismic Source.

Conformance to the above criteria for strong ground shaking does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur during a large magnitude earthquake. Design of structures should comply with the requirements of the governing jurisdictions, building codes, and standard practices of the Association of Structural Engineers of California. A Design Civil or Structural Engineer in conjunction with the State Architect should determine what level of risk is acceptable for the project considering the recommendations contained in this report, economics, and safety.

9. SECONDARY EARTHQUAKE EFFECTS

Secondary effects that can be associated with severe ground shaking following a relatively large earthquake include shallow ground rupture; soil lurching, liquefaction, dynamic settlement, seiches and tsunamis, and avalanches (rockfall and snow). These secondary effects of seismic shaking are discussed in the following sections.

9.1 Shallow Ground Rupture

Ground surface rupture results when the movement along a fault is sufficient to cause a gap or break along the upper edge of the fault zone on the surface. Our review of available geologic literature indicated that there are no known active, potentially active, or inactive faults that transect the subject site. The nearest known active regional fault is the Hartley Springs fault. The closest projected trace for this fault zone is located approximately 0.9 mi (1.4 km) northwest of the site.

9.2 Soil Lurching

Soil lurching refers to the rolling motion on the ground surface by the passage of seismic surface waves. Effects of this nature are likely to be most severe where the thickness of soft sediments varies appreciably under structures. In its present condition, the potential for lurching below the proposed structures is considered low due to the existence of potentially compressible soils within the upper few feet of material below existing grades. The potential for lurching may be further reduced if the potentially compressible soils, present on site, are removed and properly compacted during grading, as per the earthwork recommendations provided herein.

9.3 Liquefaction

Liquefaction of cohesionless soils can be caused by strong vibratory motion due to earthquakes. Research and historical data indicate that loose granular soils below a near-surface groundwater table are most susceptible to liquefaction. Liquefaction is characterized by a loss of shear strength in the affected soil layers, thereby causing the soil to behave as a viscous liquid. This effect may be manifested at the ground surface by settlement and, possibly, sand boils where insufficient confining overburden is present over layers. In order for the potential effects of liquefaction to be manifested at the ground surface, the soils generally have to be granular, loose to medium-dense and saturated relatively near the ground surface, and must be subjected to ground shaking of a sufficient magnitude and duration. The potential for liquefaction to occur is considered very low, given the lack of a water table and the very dense nature of bearing soils present on site.

9.4 Dynamic Settlement

Portions of the shallow granular on-site soils may be loose and susceptible to dynamic settlement if strongly shaken by the design level earthquake. The potential for dynamic settlement will be greatly reduced if the loose and compressible soils near the surface are removed and properly compacted in accordance with the earthwork and grading recommendations contained within this report.

9.5 Seiches and Tsunamis

The potential for tsunamis and seiches as the result of the design level earthquake in a nearby fault are considered non-existent, due to the distance of the ocean or large open bodies of water from the project site.

9.6 Avalanches (Rockfall and Snow)

Avalanches can occur as a result of moderate to large earthquakes in Alpine terrain, which can cause rock and snow to move vertically and laterally downslope. These hazards typically affect structures which are located at the base of slopes or within close proximity to the area of flow. The potential for rockfall or snow avalanches to occur at the subject site is considered remote, given the proximity of the site to a relatively steep slope area.

10. LANDSLIDES

Evidence of past landslides was not observed either during aerial photographic review or in the field.

11. VOLCANIC HAZARDS

The area of eastern California that includes the Long Valley Caldera and the Mono-Inyo Craters volcanic chain has a long history of geologic activity that includes earthquakes and volcanic eruptions. Studies within this area indicate that massive eruptions of the size that accompanied formation of Long Valley Caldera approximately 760,000 years ago are extremely rare (none have occurred during the period of written human history). Currently, there is no evidence that an eruption of such catastrophic proportions might be forming beneath the Long Valley caldera (Miller, 1985; 1989).

The pattern of volcanic activity over the past 5,000 years suggests that the next eruption in the Long Valley area will most likely happen somewhere along the Mono-Inyo volcanic chain. However, the probability of such an eruption occurring in any given year is less than 1%. This is comparable to the annual chance of a magnitude 8 earthquake (like the Great 1906 San Francisco Earthquake) along the San Andreas Fault in coastal California or of an eruption from one of the more active Cascade Range volcanoes in the Pacific Northwest, such as Mount Rainier (Hill and others U.S. Geological Survey Fact Sheet 073-97).

In the past 5,000 years, eruptions from several sites along the Mono-Inyo chain have produced narrow, tongue-like pyroclastic flows that extended more than 5 miles. Fortunately, the main population centers in the Long Valley area are far enough from probable eruption sites that they are unlikely to be directly impacted by future pyroclastic flows (Hill and others U.S. Geological Survey Fact Sheet 073-97).

12. CONCLUSIONS

Based on the results of this investigation, it is our opinion that the construction of the proposed project is feasible from a geotechnical standpoint provided the following recommendations are incorporated into the design and construction. The following sections discuss the principal geotechnical concerns affecting site development and grading and provide preliminary grading and foundation design recommendations which should be implemented during site development to mitigate site geologic constraints. However, implementation of these recommendations and adherence to the 1997 UBC, and the 2001 CBC, does not preclude property damage during or following a significant seismic event.

- There are no known active, potentially active, or inactive faults that transect the subject site. Evidence of past soil failures, landslides, or active faulting on the site was not encountered. Seismic hazards at the site may be caused by ground shaking during seismic events on regional active faults. The nearest known active regional fault is the Hartley Springs fault located approximately 0.9 mi (1.4 km) northwest of the site.

- Based on the results of the probabilistic analysis, the Upper-Bound and Design Basis Earthquakes for the site yielded peak ground accelerations of 0.43g and 0.34g respectively.

- The project consultants and the Client should discuss various seismic design parameters and decide upon an appropriate design value based upon their seismic performance goals. A design value of 0.34g is the lowest value that should be considered.

- A volcanic eruption could occur somewhere along Mono-Inyo Craters volcanic chain producing pyroclastic flows and surges, as well as volcanic ash and pumice fallout, which could significantly impact the subject site. The probability however of such an eruption occurring in any given year is less than 1%. This is comparable to the annual chance of a magnitude 8 earthquake (like the Great 1906 San Francisco Earthquake) along the San Andreas Fault in coastal California or of an eruption from one of the more active Cascade Range volcanoes in the Pacific Northwest, such as Mount Rainier (Hill and others U.S. Geological Survey Fact Sheet 073-97).

- The subject property is situated on a relatively flat terrain underlain by approximately 3-feet of loose surficial soils considered "unsuitable" for the support of new fill or structural loads. Where these soils will be subjected to increased loads from new fills, remedial grading consisting of overexcavation and compaction is recommended to improve the bearing capacity of those materials. Remedial grading recommendations are provided in this report.

- Site soils encountered during our field investigation generally consist of loose to dense, silty, very fine to coarse-grained sand deposits with cobbles and boulders to approximately 36-inches diameter.

- The depth of the unsuitable soils is based upon the areas observed during the field investigation. It should be anticipated that the overall depth of the unsuitable materials exposed during construction may vary from that encountered in the test pits. Reasonably continuous construction observation and review during site grading and foundation installation allows for evaluation of the actual soil conditions and the ability to provide appropriate revisions where required during construction.

- Slight to moderate groundwater mottling was encountered during our field investigation which may indicate that seasonally high and/or temporarily perched groundwater from snowmelt should be anticipated on the site.

- Subsurface strata which would retard the flow of water downward were not observed during the investigation. However, any drywell(s) proposed to be embedded deeper than the depths explored should be monitored during construction to ensure that they do not interact with any seasonal shallow groundwater. Drywell design may need to be mitigated during construction.

- In general, excavations at the site should be achievable using standard earthmoving equipment.

- Reasonably continuous construction observation and review during site grading and foundation installation allows for evaluation of the actual soil conditions and the ability to provide appropriate revisions where required during construction.

13. RECOMMENDATIONS

The following recommendations should be adhered to during site development. These recommendations are based on empirical and analytical methods typical of the standard of practice in California. If these recommendations appear not to cover any specific feature of the project, please contact our office for additions or revisions to the recommendations.

13.1 Geotechnical Review

Geotechnical review is of paramount importance in engineering practice. The poor performance of many foundation and earthwork projects has been attributed to inadequate construction review. Sierra Geotechnical Services, Inc. should be provided the opportunity to review the following items or we waive all liability for any and all geotechnical issues associated with grading or construction relative to the subject site.

13.1.1 Plan and Specification Review

Detailed plans for construction and grading were not available at the time of this report. SGSI should review grading and foundation plans prior to construction in order to assure that they are in conformance with this report; some of the recommendations contained herein may need to be revised after reviewing.

13.2 Earthwork

Earthwork should be performed in accordance with the General Earthwork and Grading Specifications in Appendix D and the following recommendations. The recommendations contained in Appendix D are general grading specifications provided for typical grading projects. Some of the recommendations may not be strictly applicable to this project. The specific recommendations contained in the text of this report supersede the general recommendations in Appendix D. The contract between the developer and earthwork contractor should be worded such that it is the responsibility of the contractor to place the fill properly in accordance with the recommendations of this report and the specifications in Appendix D notwithstanding the testing and observation of the geotechnical consultant.

13.2.1 Site Preparation

Prior to grading, the proposed structural improvement areas (i.e. all structural fill, pavements areas and structural building, etc.) of the site should be cleared of surface and subsurface obstructions, including vegetation. Vegetation and debris should be disposed of off site. Holes resulting from removal of buried obstructions, which extend below the recommended removal depths described herein or below finished site grades (whichever is lower) should be filled with properly compacted soil. Should existing underground utilities be encountered they should be completely removed and properly backfilled. Alternatively if the utility is not within the influence zone of the foundation it may be abandoned in place by fully grouting the pipe.

13.2.2 Removals and Compaction

The subject property is underlain by up to approximately 3-feet of loose, moist, surficial deposits considered unsuitable for the support of new fill or structural loads. If grading will consist of the overexcavation and removal of "unsuitable" soils from within all structural areas, then excavations should extend below the unsuitable material and to a minimum horizontal distance of one-half the footing width or 5-feet (whichever is greater) horizontally outside the footing footprint. If earthwork will consist of foundation excavations only, then all footings shall be embedded at least 12-inches below the estimated removal depth (3½ to 4-feet). These excavations will likely extend deeper than the minimum 18-inch depth below outside adjacent grade requirement (see section 13.4.1).

For the paved roadways, parking areas and other improvements a one to two-foot removal is recommended depending on site conditions (i.e. depth of root zone, and depth of disturbance which may have locally deeper removal depths). The removal should also extend a minimum horizontal distance of 2-feet beyond the back of curbs and pavement. In addition, the removal bottom should be observed (tested as needed) by the geotechnical consultant prior to placing fill soils. Removals and Compaction recommendations are provided in Appendix D.

13.3 Excavation and Grading Observation

Site grading and footing excavations should be observed by SGSI. Such observations are considered essential to identify field conditions that differ from those anticipated by the investigation, to adjust design to actual field conditions, and to determine that the grading is accomplished in general accordance with the recommendations of this report. Earthwork and grading recommendations which include guidelines for site preparation fill compaction, slopework, temporary excavations, and trench backfill are provided in Appendix D.

13.4 Preliminary Foundation Preparation and Design

The following preliminary recommendations are presented as minimum design recommendations; they are not intended to supercede design by the structural engineer. Preliminary foundations should be designed in accordance with structural considerations and the following recommendations. Upon the completion of the grading and structural plans, Sierra Geotechnical Services Inc. should review the foundation loads and embedment in order to confirm the implementation of the recommendations herein.

Continuous or pad footings may be used to support the proposed structures provided they are founded entirely upon properly compacted fill, competent Colluvial deposits or competent Glacial Till deposits. Continuous and isolated column foundations should be sized according to the allowable soil bearing pressures shown in Table II below. The pressures shown on Table II are for dead load plus long-term live load, including snow load, and for total load including wind and seismic forces.

Table II – Allowable Soil Bearing Pressures

Depth Below Existing Ground Surface	Allowable Soil Bearing Pressure (pcf)
Compacted Fill, or Competent Colluvium	2,500
Glacial Till	3,000

The allowable pressure may be increased by one-third when considering loads of short duration such as wind or seismic forces. A friction coefficient for concrete of 0.35 may be employed to resist lateral loads. Continuous and isolated footings should be designed in accordance with the structural engineer requirements. Reinforcement of footings should be per the structural engineer's design.

13.4.1 Foundation Construction

Based upon our observations and past experience relative to the general site area, low expansive soils exist onsite. The following preliminary recommendations assume low expansive soils near finish pad grade.

- Footings should be designed in accordance with the structural engineer requirements regarding width. Exterior and interior foundations shall be founded within compacted fill or competent native soils. Exterior foundations shall have a minimum embedment depth of 18-inches below outside adjacent grade. If earthwork will consist of foundation excavations only, then all footings shall be embedded at least 12-inches below the estimated removal depth (3-feet).

- All footings should be reinforced to at least the minimum reinforcement for temperature as required in Chapter 19 of the 1997 UBC.

- All footing excavations should be observed by a representative of SGSI prior to placement of reinforcing steel, in order to assure proper embedment into suitable soils.

- Although no specific pre-saturation is required for these soil conditions, footing trench excavations should be well moistened prior to pouring concrete.

- Footing trenches should not have any rocks or boulders protruding into the trench bottom. Soft soil pockets created by rock removal during foundation excavation shall be replaced with approved fill material, and compacted to 95-percent of the material's maximum dry density.

13.5 Foundation Setback

We recommend a minimum horizontal setback distance from the face of slopes for all structural footings and settlement-sensitive structures (i.e. fences, walls, signs, etc.). This distance is measured from the outside edge of the footing, horizontally to the slope face (or to the face of a retaining wall). A 5-foot minimum setback should be established for the outside footing face (bearing elevation) to the finished grade slope face. We should note that the soils within a slope setback area possess poor long term lateral stability, and improvements (such as retaining wall, sidewalks, fences, pavement, underground utilities, etc.) constructed within this setback area may be subject to lateral movement and/or differential settlement.

Utility trenches that parallel or nearly parallel structure footings should not encroach within a 1:1 plane extending downward and outward from the outside edge of the footing.

13.6 Concrete Slab-on-Grade Floors

Compacted fill materials will provide adequate support for concrete slabs provided the on-site materials are prepared per our grading recommendations prior to placement of the slab.

Structural fill and subgrade soils underlying concrete slabs shall be compacted to a minimum of 95-percent of the material's maximum dry density for the upper 12-inches. Concrete slabs should be underlain by a 1-inch layer of clean sand (SE greater than 30) to aid in concrete curing, which is underlain by a 10-mil (or heavier) moisture barrier, which is, in turn, underlain by a 1-inch layer of clean sand to act as a capillary break. All penetrations and laps in the moisture barrier should be appropriately sealed.

Minimum slab reinforcement shall consist of #3 rebar placed at 18-inches on center each way. The slab reinforcement shall be placed, vertically, in the middle of the slab. Slab thickness shall be a minimum of 4-inches. In areas where heavy equipment or loading will stress the slab, the thickness and reinforcement will meet the requirements of the Structural Engineer of record. Our experience indicates that the use of reinforcement in slabs and foundations will generally reduce the potential for drying and shrinkage cracking. However, some cracking may be expected as the concrete cures. Concrete cracking and/or spalling is often aggravated by a high cement ratio, high or low concrete temperature at the time of placement, small nominal aggregate size and rapid moisture loss. The use of low slump concrete (not exceeding 4-inches at the time of placement) and proper curing methods can reduce the potential for shrinkage cracking.

Moisture barriers can retard, but not eliminate moisture vapor movement from the underlying soils up through the slab. We recommend that the floor coverings installer test the moisture vapor flux rate prior to attempting application of the flooring. "Breathable" floor coverings should be considered if the vapor flux rates are high. A slipsheet should be used if crack sensitive floor coverings are planned.

13.7 Preliminary Pavement Recommendations

A preliminary pavement section of 3-inch asphalt concrete underlain by 4-inches of compacted Class II aggregate base may adequately support any driveways. The upper 12-inches of subgrade material along with the Class II aggregate base and the Asphaltic concrete shall be compacted to a minimum of 95-percent of the material's maximum dry density as determined by ASTM D1557-2000. The subgrade and aggregate base shall be moisture-conditioned and compacted to 95-percent of the material's maximum dry density as determined by ASTM D-1557-2000 to a depth of 12-inches.

Based upon our experience in the Mammoth Lakes area, environmental conditions such as freeze-thaw and thermal cracking will most likely govern the life of the asphalt pavement. Therefore, a 3-inch AC section is the minimum recommended.

As an alternative, a minimum 5-inch paving section of reinforced concrete (minimum 4,000 psi) may be used. The concrete section should be underlain by a 1-inch layer of clean sand (SE greater than 30) to aid in concrete curing. Minimum reinforcement shall consist of #3 rebar placed at 24-inches on center each way. In addition full depth expansion joints should be placed every 10-feet on center.

If pavement areas are adjacent to heavily watered landscape areas, some deterioration of the subgrade load bearing capacity may result. We recommend some measures of moisture control (such as deepened curbs or other moisture barrier materials) be provided to prevent the subgrade soils from becoming saturated.

13.8 Lateral Earth Pressures and Resistance

Embedded structural walls or cantilever retaining walls should be designed for lateral earth pressures exerted on them. The magnitude of these pressures depends on the amount of deformation that the wall can yield under load. If a wall can yield enough to mobilize the full shear strength of the soil; it can be designed for "active" pressure.

If a wall cannot yield under the applied load, the shear strength of the soil cannot be mobilized and the earth pressure will be higher. Such walls should be designed for "at rest" conditions. If a structure moves toward the soils, the resulting resistance developed by the soil is the "passive" resistance.

For design purposes, the recommended equivalent fluid pressure for each case for walls founded above the static ground water and backfilled with soils of very low to low expansion potential is provided. The equivalent fluid pressure values assume free-draining conditions. If conditions other than those assumed above are anticipated, the equivalent fluid pressure values should be provided on an individual-case basis by the geotechnical engineer. Surcharge loading effects from the adjacent structures should be evaluated by the structural engineer. The select backfill should have an expansion index (EI) of no greater than 50 and a sand equivalent (SE) greater than 30. The backfill soils should be tested by the soils engineer prior to backfill operations starting for the retaining wall/basement wall structures.

Slope of Backfill Behind Retaining Wall	**Lateral Earth Pressure in Equivalent Fluid Weight (pcf)**	
	Active Case	Passive Case
Horizontal	30	370
At-Rest	45	

The earth pressures are given in terms of equivalent fluid pressures for walls having backfills of horizontal and 2 to 1 slopes. For sliding resistance, the friction coefficient of 0.35 may be used at the concrete and soil interface. In combining the total lateral resistance, the passive pressure or the frictional resistance should be reduced by 50-

percent. Wall footings should be designed in accordance with structural considerations. The passive resistance value may be increased by one-third when considering loads of short duration, including wind or seismic loads. The horizontal distance between foundation elements providing passive resistance should be a minimum of three times the depth of the elements to allow full development of these passive pressures. The total depth of retained earth for design of cantilever walls should be the vertical distance below the ground surface measured at the wall face for stem design or measured at the heel of the footing for overturning and sliding.

Wall backcut excavations less than 5-feet in height can be made near vertical. Wall backcuts greater than 5-feet should conform to CALOSHA Regulations – 1926 Subpart P, Appendices A and B for a type "B" soil (min 1:1 slope). All retaining wall structures should be provided with appropriate drainage and waterproofing. Drainage should consist of continuous drains installed along the base of the wall outletting to a storm drain system or the surface if grade allows.

13.9 Drainage

We recommend that measures be taken to properly finish grade the building area, such that drainage water from the building area is directed away from building foundations (2-percent minimum grade on soil or sod for a distance of 5-feet). Ponding of water should not be permitted. Erosion is possible surrounding the structures if left unprotected during the snowmelt run-off season.

14. LIMITATIONS

This report has been prepared for the sole use and benefit of our client. The conclusions of this report pertain only to the site investigated. The intent of the report is to advise our client of the geologic and geotechnical recommendations relative to the future development of the proposed project. It should be understood that the consulting provided and the contents of this report are not perfect. Any errors or omissions noted by any party reviewing this report, and/or any other geotechnical aspects of the project, should be reported to this office in a timely fashion. The client is the only party intended by this office to directly receive this advice. Unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Sierra Geotechnical Services Incorporated from and against any liability, which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Sierra Geotechnical Services Incorporated.

Conclusions and recommendations presented herein are based upon the evaluation of technical information gathered, experience, and professional judgment. Other consultants could arrive at different conclusions and recommendations. Final decisions on matters presented are the responsibility of the client and/or the governing agencies. No warranties in any respect are made as to the performance of the project.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings within this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

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Stereoscopic Aerial Photographs

OV, FL-1, 7-84 & 85; Dated 10/19/1944, 1:24,000

GS-QN, FL-3, 65 & 66; Dated 8/10/1951, 1:47,200

United States Department of Agriculture, Stereoscopic Aerial Photographs: EAD –19-131 to EAD-19-132; Dated 8/23/56, 1:24,000.

United States Department of Agriculture, Stereoscopic Aerial Photographs: EMG-7-147 to EMG-7-148; Dated 9/10/63, 1:12,500

United States Department of Agriculture, Stereoscopic Aerial Photographs: FL-7, 483-36&39; Dated 8/06/84, 1:12,000

United States Department of Agriculture, Stereoscopic Aerial Photographs: 615040: 501-86 to 501-87; Dated 7/14/01, 1:12,500

SIERRA GEOTECHNICAL SERVICES INC.

August 2, 2005 Project No. 3.30514

Intrawest Resort Development Group
6900 S. McCarran Ste. 3000
Reno, NV 89509

Attention: Mr. Larry Kerr

Subject: **GEOTECHNICAL INVESTIGATION**
Affordable Housing 4B
Mammoth Lakes, California

Dear Mr. Kerr:

In accordance with your authorization of our proposal dated April 5, 2004 we herein submit the results of our geotechnical investigation for the proposed multi-unit, multi-story affordable housing project. The purpose of this study was to assess the geotechnical constraints to development (if any) and provide geotechnical recommendations relative to the future development of the proposed project.

As part of this study, a Grading and Drainage Plan prepared by CFA, dated 6/15/05 was reviewed. We appreciate the opportunity to be of service to you. Should you have any questions regarding this report, please do not hesitate to contact us.

Respectfully,

SIERRA GEOTECHNICAL SERVICES, INC.

Thomas A. Platz
President
PE C41039

REGISTERED PROFESSIONAL ENGINEER
THOMAS A. PLATZ
No. C 41039
Exp. 3/31/07
CIVIL
STATE OF CALIFORNIA

Joseph A. Adler
Principal Geologist
CEG 2198

(3) Addressee

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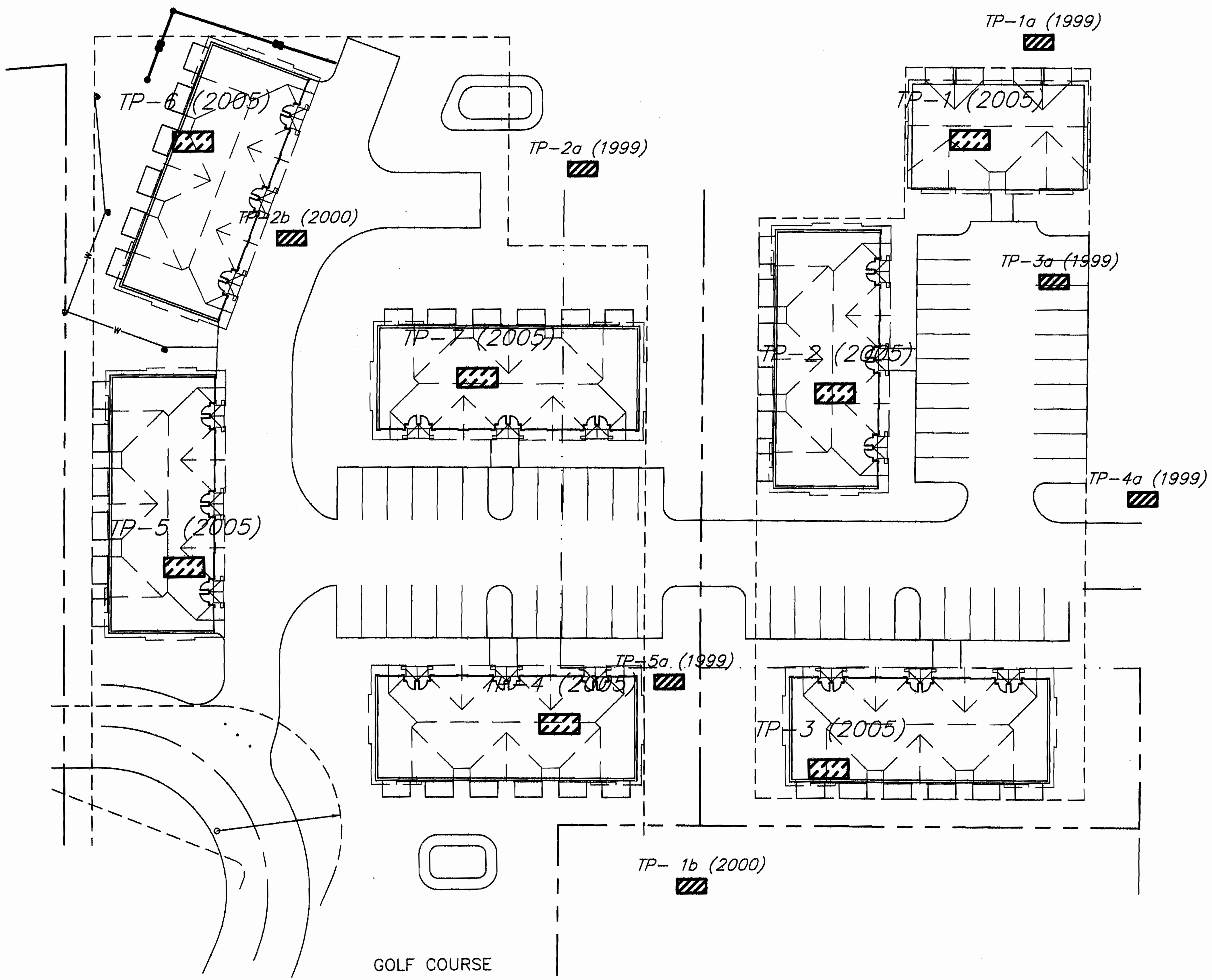

LEGEND

TP-5a (1999)
APPROXIMATE LOCATION OF EXPLORATORY TEST PIT

TP-2b (2000)
APPROXIMATE LOCATION OF EXPLORATORY TEST PIT

TP-7 (2005)
APPROXIMATE LOCATION OF EXPLORATORY TEST PIT

PROJECT: **SUBSURFACE GEOTECHNICAL MAP** AFFORDABLE HOUSING 4B	
SCALE: NTS	DATE: 8/2005
DRAWING: 3.30514	DRAWN BY: JAA
JOB NO.: 3.30514	FIGURE: FIGURE 3

PRELIMINARY GEOTECHNICAL INVESTIGATION

FOR

AFFORDABLE HOUSING 4B
MAMMOTH LAKES, CALIFORNIA

AUGUST 2, 2005
PROJECT NO. 3.30514

Prepared By:

SIERRA GEOTECHNICAL SERVICES, INC.
P.O. Box 5024
Mammoth Lakes, California 93546
(760) 934-3992

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LIST OF ATTACHMENTS

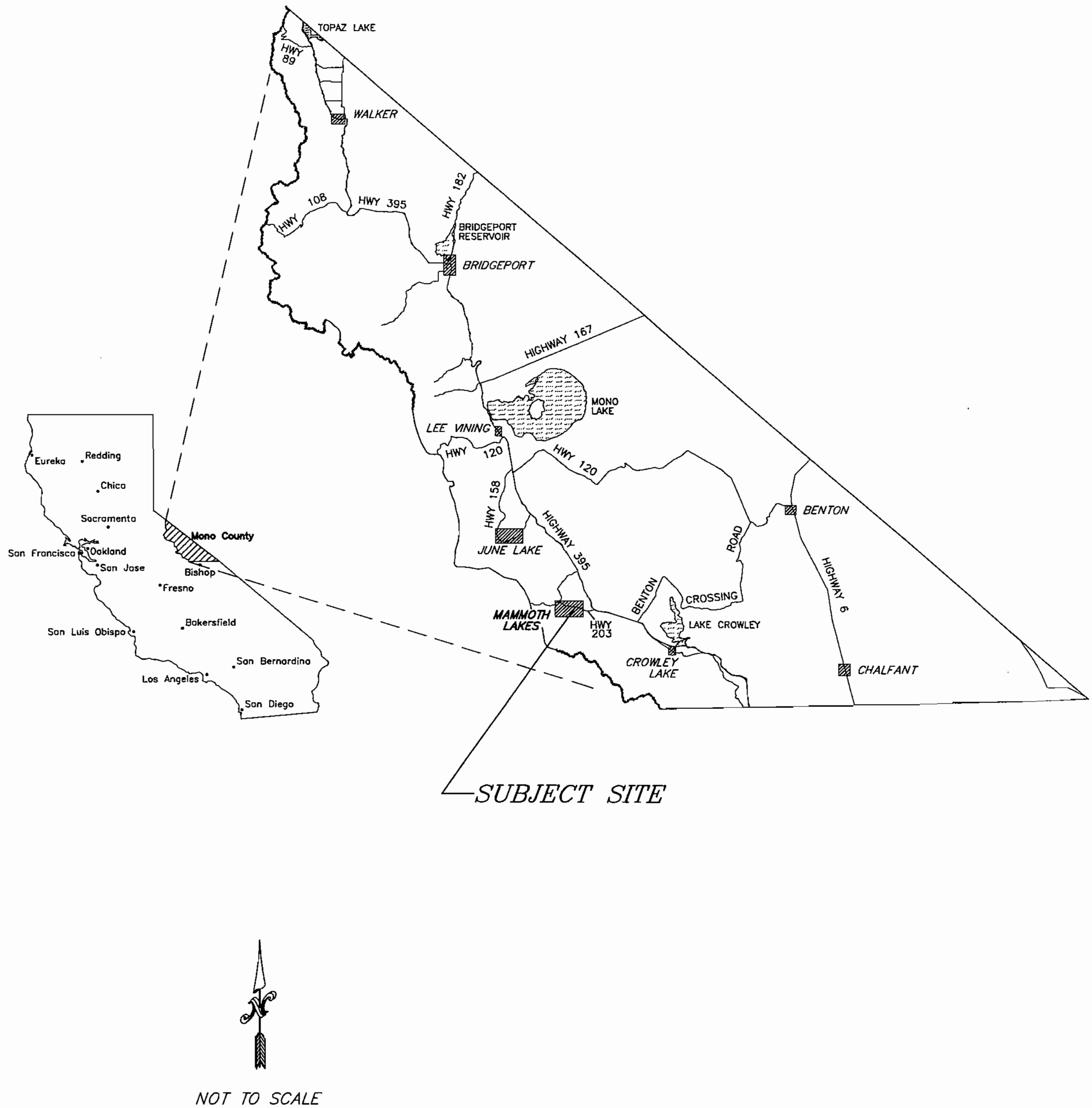
1. PURPOSE AND SCOPE

This report presents the results of our geotechnical investigation for the multi-story, multi-unit project to be located north of Sierra Star Golf Course, south of Main Street and west of Joaquin Drive in Mammoth Lakes, California (Figures 1 and 2). The purpose of this study was to assess the geotechnical constraints to development (if any), and provide geotechnical recommendations relative to the future development of the proposed project.

The scope of this investigation included a review of stereoscopic aerial photographs, readily available published and unpublished geologic literature, a subsurface field investigation, laboratory testing of representative soil samples obtained during our field investigation, geologic and geotechnical evaluation and analysis of the collected field and laboratory data, and preparation of this report presenting the results of our findings, conclusions, geotechnical recommendations and construction considerations for the proposed project. Sierra Geotechnical Services Inc. has previously performed two subsurface investigations (June 1999 and October 2000) within and immediately adjacent to the site area. Several of the exploratory test pit logs specifically relevant to the subject site are presented in Appendix A. Test Pits TP-1a through TP-5a were excavated in 1999. Test Pits TP-1b and TP-2b were excavated in 2000. Soil materials were visually classified in the field according to the Unified Soil Classification System (USCS). In-place nuclear density tests were obtained during the field investigation. Results of the in-place nuclear density tests are presented on the logs of the exploratory test pits. The approximate locations of the exploratory test pits are shown on the Subsurface Geotechnical Map (Figure 3).

A recent field investigation was performed on June 21, 2005 for the newly proposed development and included seven exploratory test pits excavated within the proposed construction area. A geologist from our office logged the excavations as they were advanced. Bulk samples of the soils encountered were obtained during the field investigation for laboratory testing. Approximate locations of the exploratory test pits are shown on the Subsurface Geotechnical Map (Figure 3). Details of the laboratory testing are presented in Appendix B.

After the test pits were excavated and logged, they were loosely backfilled with the excavated soil and not compacted to the requirements typically specified for engineered fill. Prior to construction the test pit backfill material should be removed and compacted in accordance



Sierra Geotechnical Services

PROJECT: **REGIONAL MAP** AFFORDABLE HOUSING 4B	
SCALE: NTS	DATE: 8/2005
DRAWING: FIG1.DWG	DRAWN BY: JAA
JOB NO.: 3.30514	FIGURE: FIGURE 1

with the earthwork recommendations contained within this report. If the backfill materials are left "as-is" structures located over these areas may experience some degree of settlement.

2. SITE DESCRIPTION

The property includes the approximate 1.01-acre town site (APN'S: 33-110-07 through 10) as well as the 1.65-acre Intrawest site (portion of APN 33-330-10). In general, topography across the site slopes gently from northwest to southeast. Ground surface elevations range from approximately 7938' MSL near the northwest property corner to approximately 7914' MSL near the southeast property boundary. The site is currently vacant of structures. An existing sewer line is located along the northern portion of the property and runs in a generally east-west direction. Vegetation on the site includes a moderate to dense growth of indigenous pines and shrubs.

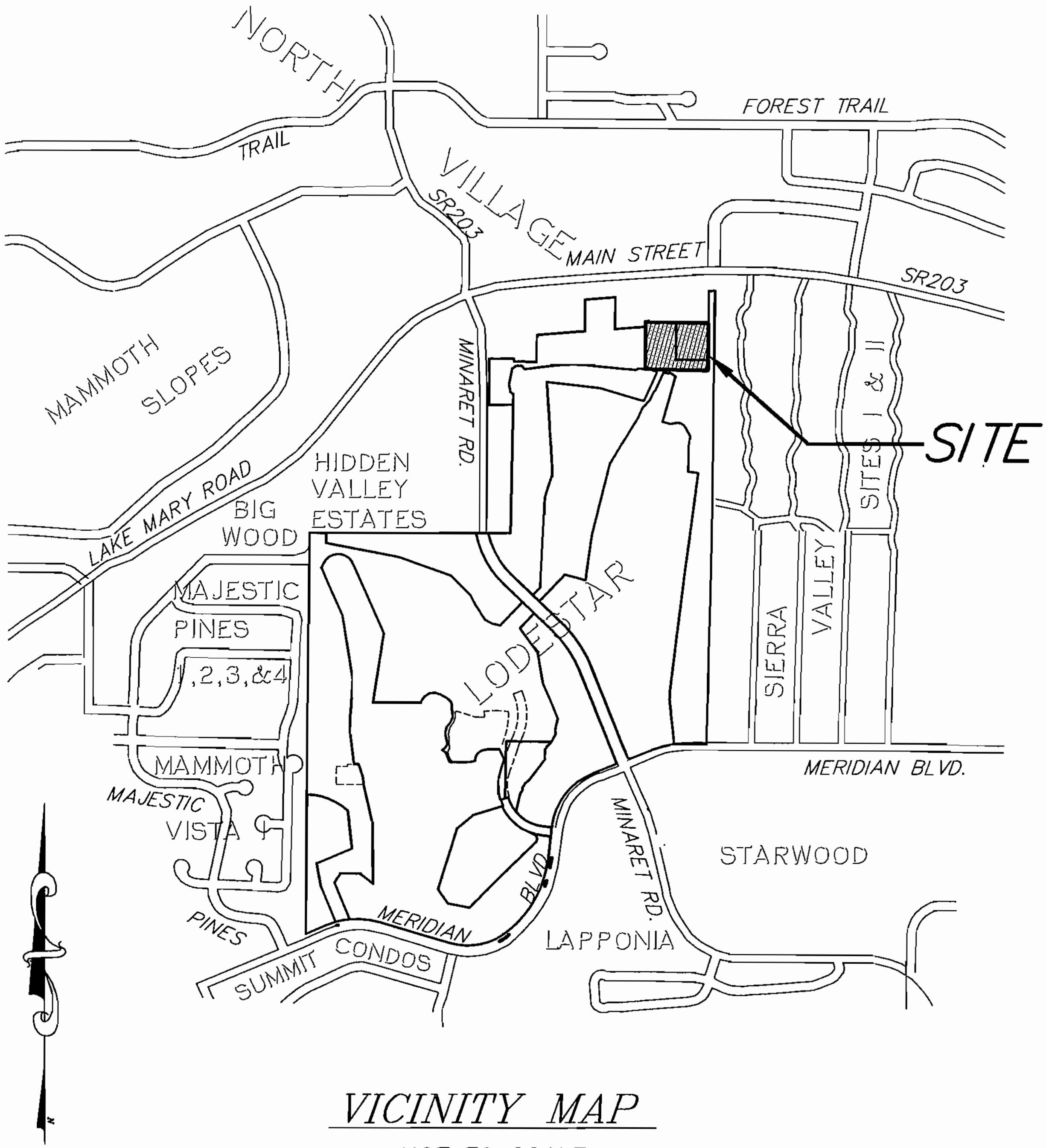
3. PROPOSED DEVELOPMENT

It is our understanding that the design and layout of the proposed structures are in the planning stages but will likely include the construction of seven, at least two-story housing structures with at grade parking, associated appurtenances, and utilities. At least two of the structures will have attached "tuck" under parking. The foundations are anticipated to consist of a concrete perimeter footing, concrete slab-on-grade garage slabs and raised-wood-floors. Grading is expected to be minor with the buildings situated at or near existing grades.

Grading plans for the proposed project have been reviewed. SGSI should however review foundation plans prior to construction in order to assure that they will be in conformance with the recommendations contained within this report.

4. AERIAL PHOTOGRAPHIC REVIEW

Prior to our field investigation, we acquired and reviewed aerial photographs to assist in our evaluation of geomorphic features that could be indicative of geologic hazards at the property. Details from the earliest available photographs (1944) did not show any evidence of lineations, scarps, or other ground-surface fault, landslide, or recent avalanche related features.



VICINITY MAP

NOT TO SCALE

Sierra Geotechnical Services

PROJECT:	**VICINITY MAP** AFFORDABLE HOUSING 4B
SCALE: NTS	DATE: 8/2005
DRAWING: 3.30514FIG1.DWG	DRAWN BY: JAA
JOB NO.: 3.30514	FIGURE: FIGURE 2

5. GEOLOGIC AND GEOTECHNICAL SITE CONSTRAINTS

Geotechnical constraints to development include the potential for moderate ground shaking (M_w~6.6) along the nearby Hartley Springs fault located approximately 0.9 mi (1.5 km) west/northwest of the subject parcel. The above concern is addressed in the site seismicity section (see Sections 8 and 9) of this report.

6. GEOLOGY AND SUBSURFACE CONDITIONS

The project site is located at the southwestern edge of the Long Valley caldera near the eastern flank of the Sierra Nevada. The caldera (collapsed volcano) is an east-west elongate, oval depression formed approximately 760,000 years ago with continued volcanic activity to the present (Bailey, 1989). The pre-volcanic basement rock in the Mammoth Lakes area is predominantly Mesozoic granitic rocks of the Sierra Nevada batholith. The batholith is a series of intrusions that displaced overlying ancient sedimentary sea floor rocks (roof pendants) during the Jurassic and Cretaceous Periods. Piedmont glaciation occurred throughout the Pleistocene leaving a mantle of glacial till covering the basement and volcanic rocks throughout the area now occupied by the Town of Mammoth Lakes.

As observed during this investigation, 3 general soil types underlie the site, consisting of Undocumented Fill, Topsoil/Colluvium, and Glacial Till Deposits. Logs of the subsurface conditions encountered in the exploratory test pits are provided in Appendix A. Generalized descriptions of the materials encountered during this investigation follow.

6.1 Undocumented Fill

Undocumented fill was encountered in Test Pit TP-1 to an approximate depth of 10-inches below grade. This apparent "spoil" fill consisted of a brown, moist, loose, very fine to medium SAND, with moderate gravels and cobbles as well as debris.

6.2 Topsoil/Colluvium

Topsoil/Colluvium was encountered in all the test pits to an approximate depth of 6-feet below existing grades. In general, the topsoil/colluvium consisted of dark to medium brown, moist, loose to dense, silty, fine to coarse-grained SAND (Unified Soil

Classification Symbols: SM, SP, and SP-SM), with moderate to abundant roots, and with few to abundant cobble clasts and boulders to approximately 36-inches diameter. Rock contents comprise approximately 20 to 75-percent of the deposit. The topsoil/colluvium from below approximately 2½ to 3-feet below existing grade is considered suitable for additional fill and/or structural support provided the earthwork and grading recommendations included within this report are adhered to during site development.

6.3 Glacial Till

Glacial Till deposits were encountered in all the test pits below the topsoil/colluvium. In general, the Glacial Till deposits consisted of gray to grayish-brown, moist, medium dense to dense, massive, silty, fine to coarse SAND (SP and SP-SM) with abundant cobble clasts and boulders to approximately 36-inches diameter. The thickness of the Glacial Till deposits was not determined during this investigation. This deposit is considered suitable for additional fill and/or structural support provided the earthwork and grading recommendations included within this report are adhered to during site development.

6.4 Groundwater

Neither a groundwater table nor groundwater seepage was encountered during our field investigation. However, slight to moderate mottling of the on-site soils was observed during previous investigations which indicates that seasonally high and temporarily perched groundwater from snowmelt should be anticipated on the site. Groundwater levels in the Mammoth Lakes area are known to fluctuate seasonally. Excavations completed in the spring and early summer should anticipate some seepage. Since the prediction of the location of such conditions is difficult to determine, they are typically mitigated if and when they occur during construction.

Subsurface strata which would retard the flow of water downward were not observed during the investigation. However, any drywell(s) proposed to be embedded deeper than the depths explored should be monitored during construction to ensure that they do not interact with any shallow groundwater. Drywell design may need to be mitigated during construction.

7. FAULTING

Our discussion of faults on the site is prefaced with a discussion of California legislation and state policies concerning the classification and land-use criteria associated with faults. By definition of the California Geological Survey, an "active fault" is a fault that has had surface displacement within Holocene time (about the last 11,000 years); hence constituting a potential hazard to structures that might be located across it. This definition is used in delineating Earthquake Fault Zones as mandated by the Alquist-Priolo Geologic Hazards Zones Act of 1972, which is detailed in the California Geological Survey Special Publication SP-42 (Hart and Bryant, 1999). The intent of this act is to assure that unwise urban development does not occur across the traces of active faults. Based on our review, the site is not located within any "Earthquake Fault Zones" or Alquist-Priolo Hazard Zones as identified in this document.

8. SITE SEISMICITY

Site coordinates of latitude 37.6482° north and longitude 118.9780° west were estimated using the computer program **Microsoft Streets and Trips (2004)**. The computer programs **EQFAULT** and **EQSEARCH** (Blake, 2000) were used to estimate peak horizontal accelerations from regional faults and tabulate data from historical earthquakes.

A deterministic seismic analysis was performed within a 62.2 mi (100 km) radius of the site using the computer program **EQFAULT** (Blake, 2000). The results of the analysis indicate that the peak ground acceleration estimated for a maximum earthquake event within the specified radius is 0.46g. This acceleration represents deterministic peak ground accelerations and could occur from a magnitude 6.6 (Mw) earthquake on the Hartley Springs fault located approximately 0.9 mi (1.5 km) northwest the site. The Hilton Creek fault, located approximately 5.9 mi (9.5 km) from the site could produce a magnitude 6.7 (Mw) earthquake resulting in a peak horizontal ground acceleration of 0.29g at the site. The tabulated results of the deterministic seismic analysis are presented in Appendix C. The Fault Location Map, which depicts active faults within a 62.2 mi (100 km) radius of the site, is also presented in Appendix C.

The computed maximum site acceleration within a 62.2 mi (100 km) radius of the site was derived from **EQSEARCH** (Blake, 2000) during the time period of 1800 to 2004. The largest estimated site acceleration based on the Boore et al. (1997) model, was 0.25g, which occurred during the Mammoth Lakes Earthquake of January 7, 1983. This earthquake was located approximately 2.0 mi (3.2 km) from the site. The Modified Mercalli Intensity and earthquake magnitude were IX and 5.6 (M_w) respectively. The largest earthquake recorded within the specified distance and time period was a magnitude 6.6 (M_w) earthquake (Modified Mercalli Intensity of VII) which occurred in The Owens Valley on April 11, 1872. A site acceleration of 0.09g was estimated from this earthquake which was located approximately 28.1 mi (45.2 km) from the site.

The tabulated results of the historical analysis are presented in Appendix C. The Earthquake Epicenter Map, which depicts the epicenters and magnitudes of historical earthquakes that have affected the site, a Earthquake Recurrence Curve, and a plot depicting Earthquake Events versus Magnitude also presented in Appendix C.

The computer program **FRISKSP** (Blake, 2000) was used to perform a probabilistic analysis of seismicity at the subject site. The probabilistic analysis was used to define the Upper-Bound and Design Basis Earthquakes at the site for use in structural design. These results as well as Probability of Exceedance versus Acceleration graphs, and Return Period versus Acceleration graphs are presented in Appendix C. Based on the results of the probabilistic analysis, the Upper-Bound Earthquake (Non-Magnitude Weighted) for the site, defined as the ground motion that has a 10-percent chance of exceedance in 100 years, with a statistical return period of ~ 949 years, is 0.44g. The Design Basis Earthquake (Non-Magnitude Weighted) for the site, defined as the ground motion that has a 10-percent chance of exceedance in 50 years, with a statistical return period of ~ 475 years, is 0.35g.

8.1 Seismic Design Criteria

Table 1 presents the Seismic Parameters for use in preparing a Design Response Spectra for the site. The program used to obtain the seismic parameters is **UBCSEIS** which is based upon the 1997 Uniform Building Code (UBC) and 2001 California Building Code (CBC). The results of the UBC Seismic Design Parameters as well as the Design Response Spectra are presented in Appendix C.

TABLE 1

UBC-CHAPTER 16 TABLE NO.	SEISMIC PARAMETER	RECOMMENDED VALUE
16-I	Seismic Zone Factor Z	0.4
16-J	Soil Profile Type	S_C
16-Q	Seismic Coefficient C_a	0.52
16-R	Seismic Coefficient C_v	0.90
16-S	Near Source Factor N_a	1.3
16-T	Near Source Factor N_v	1.6
16-U	Seismic Source Type	B

The subject site is situated in Seismic Zone 4 (Z=0.4) based on the 1997 UBC, and the 2001 CBC. A geologic subgrade type S_C, "soft-rock or very dense soil" was assumed for the site based upon visual observations of the subsurface conditions as well previously existing seismic compression & shear refraction surveys, conducted in close proximity to the site (Sierra Geotechnical Services, 2004).

The Boore et al (1997) NEHRP C (520) acceleration-attenuation relation was used to estimate ground accelerations at the site based upon the shear wave velocity data. The seismic coefficients of acceleration and velocity C_a and C_v, as derived from the soil profile type and seismic zone factor, are 0.52 and 0.90 respectively.

The distance between the site and the nearest active fault is less than 2 km; therefore the near-source acceleration and velocity factors N_a and N_v are 1.3 and 1.6 respectively. The nearest known active fault is the Hartley Springs fault located approximately 0.9 mi (1.5 km) west/northwest of the site. The Hartley Springs fault is a Type B Seismic Source.

Conformance to the above criteria for strong ground shaking does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur during a large magnitude earthquake. Design of structures should comply with the requirements of the governing jurisdictions, building codes, and standard practices of the Association of Structural Engineers of California. A Design Civil or Structural Engineer in conjunction with the State Architect should determine what level of risk is acceptable for the project considering the recommendations contained in this report, economics, and safety.

9. SECONDARY EARTHQUAKE EFFECTS

Secondary effects that can be associated with severe ground shaking following a relatively large earthquake include ground lurching, faulting and shallow ground rupture, soil lurching liquefaction, seiches and tsunamis, avalanches (rockfall and snow). These secondary effects of seismic shaking are discussed in the following sections.

9.1 Shallow Ground Rupture

Ground surface rupture results when the movement along a fault is sufficient to cause a gap or break along the upper edge of the fault zone on the surface. Our review of available geologic literature indicated that there are no known active, potentially active, or inactive faults that transect the subject site. The nearest known active regional fault is the Hartley Springs Fault. The closest projected trace for this fault zone is located approximately 0.9 mi (1.5 km) northwest of the site.

9.2 Soil Lurching

Soil lurching refers to the rolling motion on the ground surface by the passage of seismic surface waves. Effects of this nature are likely to be most severe where the thickness of soft sediments varies appreciably under structures. In its present condition, the potential for lurching below the proposed structures is considered low to moderate due to the existence of potentially compressible soils within the upper few feet of material below existing grades. The potential for lurching may be greatly reduced if the potentially compressible soils, present on site, are removed and properly compacted during grading, as per the earthwork recommendations provided herein.

9.3 Liquefaction

Liquefaction of cohesionless soils can be caused by strong vibratory motion due to earthquakes. Research and historical data indicate that loose granular soils below a near-surface groundwater table are most susceptible to liquefaction. Liquefaction is characterized by a loss of shear strength in the affected soil layers, thereby causing the soil to behave as a viscous liquid. This effect may be manifested at the ground surface by settlement and, possibly, sand boils where insufficient confining overburden is present over layers. In order for the potential effects of liquefaction to be manifested at the ground surface, the soils generally have to be granular, loose to medium-dense and saturated relatively near the ground surface, and must be subjected to ground shaking of a sufficient magnitude and duration. The potential for liquefaction to occur is considered very low, given the lack of a water table and the very dense nature of bearing soils present on site.

9.4 Dynamic Settlement

Portions of the shallow granular on-site soils may be loose and susceptible to dynamic settlement if strongly shaken by the design level earthquake. The potential for dynamic settlement will be greatly reduced if the loose and compressible soils near the surface are removed and properly compacted in accordance with the earthwork and grading recommendations contained within this report.

9.5 Seiches and Tsunamis

The potential for tsunamis and seiches as the result of the design level earthquake in a nearby fault are considered non-existent, due to the distance of the ocean or large open bodies of water from the project site.

9.6 Avalanches (Rockfall and Snow)

Avalanches can occur as a result of moderate to large earthquakes in Alpine terrain, which can cause rock and snow to move vertically and laterally downslope. These hazards typically affect structures which are located at the base of slopes or within close proximity to the area of flow. The potential for rockfall or snow avalanches to occur at the subject site is considered very low, given the proximity of the site to a relatively steep slope area.

10. LANDSLIDES

Evidence of past landslides was not observed either during aerial photographic review or in the field.

11. VOLCANIC HAZARDS

The area of eastern California that includes the Long Valley Caldera and the Mono-Inyo Craters volcanic chain has a long history of geologic activity that includes earthquakes and volcanic eruptions. Studies within this area indicate that massive eruptions of the size that accompanied formation of Long Valley Caldera approximately 760,000 years ago are extremely rare (none have occurred during the period of written human history). Currently, there is no evidence that an eruption of such catastrophic proportions might be forming beneath the Long Valley caldera (Miller, 1985; 1989).

A small to moderate volcanic eruption could occur however; somewhere along Mono-Inyo Craters volcanic chain producing pyroclastic flows and surges, as well as volcanic ash and pumice fallout, which could significantly impact the subject site. The odds however, of such an eruption are roughly one in a thousand in a given year (Miller, 1985; 1989).

12. CONCLUSIONS

Based on the results of this investigation, it is our opinion that the construction of the proposed project is feasible from a geotechnical standpoint provided the following recommendations are incorporated into the design and construction. The following sections discuss the principal geotechnical concerns affecting site development and grading and provide preliminary grading and foundation design recommendations which should be implemented during site development to mitigate site geologic constraints. However, implementation of these recommendations and adherence to the 1997 UBC, and the 2001 CBC, does not preclude property damage during or following a significant seismic event.

- The proposed development is feasible from a geotechnical standpoint and may be constructed as planned provided the recommendations contained within this report are incorporated into the design and construction.

- There are no known active, potentially active, or inactive faults that transect the subject site. Evidence of past soil failures, landslides, or active faulting on the site was not encountered. Seismic hazards at the site may be caused by ground shaking during seismic events on regional active faults. The nearest known active regional fault is the Hartley Springs fault located approximately 0.9 mi (1.5 km) northwest of the site.

- Based on the results of the probabilistic analysis, the Upper-Bound and Design Basis Earthquakes for the site yielded peak ground accelerations of 0.44g and 0.35g respectively.

- The project consultants and the Client should discuss various seismic design parameters and decide upon an appropriate design value based upon their seismic performance goals. A design value of 0.35g is the lowest value that should be considered.

- A volcanic eruption could occur somewhere along Mono-Inyo Craters volcanic chain producing pyroclastic flows and surges, as well as volcanic ash and pumice fallout, which could significantly impact the subject site. The odds however, of such an eruption are roughly one in a thousand in a given year (Miller, 1985; 1989).

- The subject property is situated on a relatively flat terrain underlain by approximately 3-feet of loose surficial soils considered "unsuitable" for the support of new fill or structural loads. Where these soils will be subjected to increased loads from new fills, remedial grading consisting of overexcavation and compaction is recommended to improve the bearing capacity of those materials. Remedial grading recommendations are provided in this report.

- The depth of the unsuitable soils is based upon the areas observed during the field investigation. It should be anticipated that the overall depth of the unsuitable materials exposed during construction may vary from that encountered in the test pits. Reasonably continuous construction observation and review during site grading and foundation installation allows for evaluation of the actual soil conditions and the ability to provide appropriate revisions where required during construction.

- Reasonably continuous construction observation and review during site grading and foundation installation allows for evaluation of the actual soil conditions and the ability to provide appropriate revisions where required during construction.

- Neither a groundwater table nor groundwater seepage was encountered during our field investigation. However, slight to moderate mottling of the on-site soils was observed during previous investigations which indicates that seasonally high and temporarily perched groundwater from snowmelt should be anticipated on the site.

- Subsurface strata which would retard the flow of water downward were not observed during the investigation. However, any drywell(s) proposed to be embedded deeper than the depths explored should be monitored during construction to ensure that they do not interact with any shallow groundwater. Drywell design may need to be mitigated during construction.

- Site soils encountered during our field investigation generally consist of loose to dense, silty, and fine to coarse-grained sands deposits with cobbles and boulders to approximately 36-inches diameter.

- In general, excavations at the site should be achievable using standard earthmoving equipment.

13. RECOMMENDATIONS

The following recommendations should be adhered to during site development. These recommendations are based on empirical and analytical methods typical of the standard of practice in California. If these recommendations appear not to cover any specific feature of the project, please contact our office for additions or revisions to the recommendations.

13.1 Geotechnical Review

Geotechnical review is of paramount importance in engineering practice. The poor performance of many foundation and earthwork projects has been attributed to inadequate construction review. Sierra Geotechnical Services, Inc. should be provided the opportunity to review the following items or we waive all liability for any and all geotechnical issues associated with grading or construction relative to the subject site.

13.1.1 Plan and Specification Review

Detailed plans for construction and grading were not available at the time of this report. SGSI should review grading and foundation plans prior to construction in order to assure that they are in conformance with this report; some of the recommendations contained herein may need to be revised after reviewing.

13.2 Earthwork

Earthwork should be performed in accordance with the General Earthwork and Grading Specifications in Appendix D and the following recommendations. The recommendations contained in Appendix D are general grading specifications provided for typical grading projects. Some of the recommendations may not be strictly applicable to this project. The specific recommendations contained in the text of this report supersede the general recommendations in Appendix D. The contract between the developer and earthwork contractor should be worded such that it is the responsibility of the contractor to place the fill properly in accordance with the recommendations of this report and the specifications in Appendix D notwithstanding the testing and observation of the geotechnical consultant.

13.2.1 Site Preparation

Prior to grading, the proposed structural improvement areas (i.e. all structural fill, pavements areas and structural building, etc.) of the site should be cleared of surface and subsurface obstructions, including vegetation. Vegetation and debris should be disposed of off site. Holes resulting from removal of buried obstructions, which extend below the recommended removal depths described herein or below finished site grades (whichever is lower) should be filled with properly compacted soil. Should existing underground utilities be encountered they should be completely removed and properly backfilled. Alternatively if the utility is not within the influence zone of the foundation it may be abandoned in place by fully grouting the pipe.

13.2.2 Removals and Compaction

The subject property is underlain by up to approximately 3-feet of loose, moist, surficial deposits considered unsuitable for the support of new fill or structural loads. If grading will consist of the overexcavation and removal of "unsuitable" soils from within all structural areas, then excavations should extend below the unsuitable material and to a minimum horizontal distance of one-half the footing width or 5-feet (whichever is greater) horizontally outside the footing footprint. If earthwork will consist of foundation excavations only, then all footings shall be embedded at least 12-inches below the estimated removal depth (3-feet). These excavations will likely extend deeper than the minimum 18-inch depth below outside adjacent grade requirement (see section 13.4.1).

For the paved roadways, parking areas and other improvements a one to two-foot removal is recommended depending on site conditions (i.e. depth of root zone, and depth of disturbance which may have locally deeper removal depths). The removal should also extend a minimum horizontal distance of 2-feet beyond the back of curbs and pavement. In addition, the removal bottom should be observed (tested as needed) by the geotechnical consultant prior to placing fill soils. Removals and Compaction recommendations are provided in Appendix D.

13.3 Excavation and Grading Observation

Site grading and footing excavations should be observed by SGSI. Such observations are considered essential to identify field conditions that differ from those anticipated by the investigation, to adjust design to actual field conditions, and to determine that the grading is accomplished in general accordance with the recommendations of this report. Earthwork and grading recommendations which include guidelines for site preparation fill compaction, slopework, temporary excavations, and trench backfill are provided in Appendix D.

13.4 Preliminary Foundation Preparation and Design

The following preliminary recommendations are presented as minimum design recommendations; they are not intended to supercede design by the structural engineer. Preliminary foundations should be designed in accordance with structural considerations and the following recommendations. Upon the completion of the grading and structural plans, Sierra Geotechnical Services Inc. should review the foundation loads and embedment in order to confirm the implementation of the recommendations herein.

Continuous or pad footings may be used to support the proposed structures provided they are founded entirely upon properly compacted fill, competent colluvial deposits encountered below approximately 3-feet in depth. Continuous and isolated column foundations should be sized according to the allowable soil bearing pressures shown in Table II below. The pressures shown on Table II are for dead load plus long-term live load, including snow load, and for total load including wind and seismic forces.

Table II – Allowable Soil Bearing Pressures

Depth Below Existing Ground Surface	**Allowable Soil Bearing Pressure (pcf)**
Compacted Fill, or Competent Colluvium,	2,500
Glacial Till	5,000

The allowable pressure may be increased by one-third when considering loads of short duration such as wind or seismic forces. A friction coefficient for concrete of 0.35 may be employed to resist lateral loads. Continuous and isolated footings should be designed in accordance with the structural engineer requirements. Reinforcement of footings should be per the structural engineer's design.

13.4.1 Foundation Construction

Based upon our observations and past experience relative to the general site area, low expansive soils exist onsite. The following preliminary recommendations assume low expansive soils near finish pad grade.

- Footings should be designed in accordance with the structural engineer requirements regarding width. Exterior and interior foundations shall be founded within compacted fill or competent native soils. Exterior foundations shall have a minimum embedment depth of 18-inches below outside adjacent grade. If earthwork will consist of foundation excavations only, then all footings shall be embedded at least 12-inches below the estimated removal depth 3-feet).

- All footings should be reinforced to at least the minimum reinforcement for temperature as required in Chapter 19 of the 1997 UBC.

- All footing excavations should be observed by a representative of SGSI prior to placement of reinforcing steel, in order to assure proper embedment into suitable soils.

- Although no specific pre-saturation is required for these soil conditions, footing trench excavations should be well moistened prior to pouring concrete.

- Footing trenches should not have any rocks or boulders protruding into the trench bottom. Soft soil pockets created by rock removal during foundation excavation shall be replaced with approved fill material, and compacted to 95-percent of the material's maximum dry density.

13.5 Foundation Setback

We recommend a minimum 5-foot horizontal setback distance from the face of slopes for all structural footings and settlement-sensitive structures (i.e. fences, walls, signs, etc.). This distance is measured from the outside edge of the footing, horizontally to the slope face (or to the face of a retaining wall). We should note that the soils within a slope setback area possess poor long term lateral stability, and improvements (such as retaining wall, sidewalks, fences, pavement, underground utilities, etc.) constructed within this setback area may be subject to lateral movement and/or differential settlement.

Utility trenches that parallel or nearly parallel structure footings should not encroach within a 1:1 plane extending downward and outward from the outside edge of the footing.

13.6 Concrete Slab-on-Grade Floors

Compacted fill materials will provide adequate support for concrete slabs provided the on-site materials are prepared per our grading recommendations prior to placement of the slab.

Structural fill and subgrade soils underlying concrete slabs shall be compacted to a minimum of 95-percent of the material's maximum dry density for the upper 12-inches. Concrete slabs should be underlain by a 2-inch layer of clean sand (SE greater than 30) to aid in concrete curing, which is underlain by a 10-mil (or heavier) moisture barrier, which is, in turn, underlain by a 2-inch layer of clean sand to act as a capillary break. All penetrations and laps in the moisture barrier should be appropriately sealed.

Minimum slab reinforcement shall consist of #3 rebar placed at 18-inches on center each way. The slab reinforcement shall be placed, vertically, in the middle of the slab. Slab thickness shall be a minimum of 4-inches. In areas where heavy equipment or loading will stress the slab, the thickness and reinforcement will meet the requirements of the Structural Engineer of record. Our experience indicates that the use of reinforcement in slabs and foundations will generally reduce the potential for drying and shrinkage cracking. However, some cracking may be expected as the concrete cures. Concrete cracking and/or spalling is often aggravated by a high cement ratio, high or low concrete temperature at the time of placement, small nominal aggregate size and rapid moisture loss. The use of low slump concrete (not exceeding 4-inches at the time of placement) and proper curing methods can reduce the potential for shrinkage cracking.

Moisture barriers can retard, but not eliminate moisture vapor movement from the underlying soils up through the slab. We recommend that the floor coverings installer test the moisture vapor flux rate prior to attempting application of the flooring. "Breathable" floor coverings should be considered if the vapor flux rates are high. A slipsheet should be used if crack sensitive floor coverings are planned.

13.7 Pavement Recommendations

For preliminary planning purposes, pavement sections are provided based on the results of R-value laboratory testing on a selected soil sample collected during our subsurface exploration. Final pavement design should be based on the results of R-Value testing performed on samples of the finished subgrade soils in pavement areas. Based on an R-Value of 51 (Appendix B), SGSI recommends the following pavement sections:

- <u>Standard Duty Parking Areas Including Parking Stalls (Traffic Index (TI)= 5.0)</u>
  3-inches Asphalt Concrete / 4-inches Class II Aggregate Base

- <u>Access Driveways, Bus traffic, Bus Parking, Loading Docks (TI = 8.0)</u>
  4-inches Asphalt Concrete / 6-inches Class II Aggregate Base

The upper 12-inches of subgrade material along with the Class II Aggregate Base and the Asphaltic concrete shall be compacted to a minimum of 95-percent of the materials maximum dry density as determined by ASTM D1557. The subgrade and aggregate base shall be moisture-conditioned and compacted to 95-percent of the material's maximum dry density as determined by ASTM D-1557 to a depth of 12-inches.

If pavement areas are adjacent to heavily watered landscape areas, some deterioration of the subgrade load bearing capacity may result. We recommend some measures of moisture control (such as deepened curbs or other moisture barrier materials) be provided to prevent the subgrade soils from becoming saturated.

13.8 Lateral Earth Pressures and Resistance

Embedded structural walls or cantilever retaining walls should be designed for lateral earth pressures exerted on them. The magnitude of these pressures depends on the amount of deformation that the wall can yield under load. If a wall can yield enough to mobilize the full shear strength of the soil; it can be designed for "active" pressure.

If a wall cannot yield under the applied load, the shear strength of the soil cannot be mobilized and the earth pressure will be higher. Such walls should be designed for "at rest" conditions. If a structure moves toward the soils, the resulting resistance developed by the soil is the "passive" resistance.

For design purposes, the recommended equivalent fluid pressure for each case for walls founded above the static ground water and backfilled with soils of very low to low expansion potential is provided. The equivalent fluid pressure values assume free-draining conditions. If conditions other than those assumed above are anticipated the equivalent fluid pressure values should be provided on an individual-case basis by the geotechnical engineer. Surcharge loading effects from the adjacent structures should be evaluated by the structural engineer. The select backfill should have an expansion index (EI) of no greater than 50 and a sand equivalent (SE) greater than 30. The backfill soils should be tested by the soils engineer prior to backfill operations starting for the retaining wall/basement wall structures.

Slope of Backfill Behind Retaining Wall	**Lateral Earth Pressure in Equivalent Fluid Weight (pcf)**	
	Active Case	Passive Case
Horizontal	35	255
At-Rest	50	

The earth pressures are given in terms of equivalent fluid pressures for walls having backfills of horizontal and 2 to 1 slopes. For sliding resistance, the friction coefficient of 0.35 may be used at the concrete and soil interface. In combining the total lateral resistance, the passive pressure or the frictional resistance should be reduced by 50-percent. Wall footings should be designed in accordance with structural considerations. The passive resistance value may be increased by one-third when considering loads of short duration, including wind or seismic loads. The horizontal distance between foundation elements providing passive resistance should be a minimum of three times the depth of the elements to allow full development of these passive pressures. The total depth of retained earth for design of cantilever walls should be the vertical distance below the ground surface measured at the wall face for stem design or measured at the heel of the footing for overturning and sliding.

Wall backcut excavations less than 5-feet in height can be made near vertical. All retaining wall structures should be provided with appropriate drainage and waterproofing. Drainage should consist of continuous drains installed along the base of the wall outletting to a storm drain system or the surface if grade allows.

13.9 Drainage

We recommend that measures be taken to properly finish grade the building area, such that drainage water from the building area is directed away from building foundations (2-percent minimum grade on soil or sod for a distance of 5-feet). Ponding of water should not be permitted. Erosion is possible surrounding the structures if left unprotected during the snowmelt run-off season.

14. LIMITATIONS

This report has been prepared for the sole use and benefit of our client. The conclusions of this report pertain only to the site investigated. The intent of the report is to advise our client of the geologic and geotechnical recommendations relative to the future development of the proposed project. It should be understood that the consulting provided and the contents of this report are not perfect. Any errors or omissions noted by any party reviewing this report, and/or any other geotechnical aspects of the project, should be reported to this office in a timely fashion. The client is the only party intended by this office to directly receive this advice. Unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Sierra Geotechnical Services Incorporated from and against any liability, which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Sierra Geotechnical Services Incorporated.

Conclusions and recommendations presented herein are based upon the evaluation of technical information gathered, experience, and professional judgment. Other consultants could arrive at different conclusions and recommendations. Final decisions on matters presented are the responsibility of the client and/or the governing agencies. No warranties in any respect are made as to the performance of the project.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings within this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

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SIERRA GEOTECHNICAL SERVICES INC.

October 19, 2004

Project No. 3.30554

Intrawest Placemaking
6900 S. McCarran Ste, 3000
Reno, NV 89509

ATTN: Mr. Chris Vollan

Subject: **PRELIMINARY GEOTECHNICAL INVESTIGATION**
Fairways 4 and 5 Bungalows
Mammoth Lakes, Mono County, California

Dear Mr. Vollan:

In accordance with your authorization of our work order agreement dated July 27, 2004, we herein submit the results of our preliminary geotechnical investigation for the proposed Fairway 4/5 Bungalows project to be located in Mammoth Lakes, Mono County, California. The purpose of this study was to assess the geotechnical constraints to development (if any) and provide geotechnical recommendations relative to the future development of the proposed project.

As part of this study, a Preliminary Overall Site Plan prepared by CFA Inc. was reviewed. This investigation however, is considered preliminary as foundation and grading plans are currently not available. SGSI should review grading and foundation plans prior to construction in order to assure that they are in conformance with this report; some of the geotechnical recommendations contained herein may need to be revised after reviewing.

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We appreciate the opportunity to be of service to you. Should you have any questions regarding this report, please do not hesitate to contact us.

Respectfully,

SIERRA GEOTECHNICAL SERVICES, INC.

Thomas A. Platz
President
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CEG 2198

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(3) Addressee

PRELIMINARY GEOTECHNICAL INVESTIGATION

FOR

FAIRWAY 4/5 BUNGALOWS
MAMMOTH LAKES, MONO COUNTY, CALIFORNIA

OCTOBER 19, 2004
PROJECT NO. 3.30554

Prepared By:

SIERRA GEOTECHNICAL SERVICES, INC.
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1. PURPOSE AND SCOPE

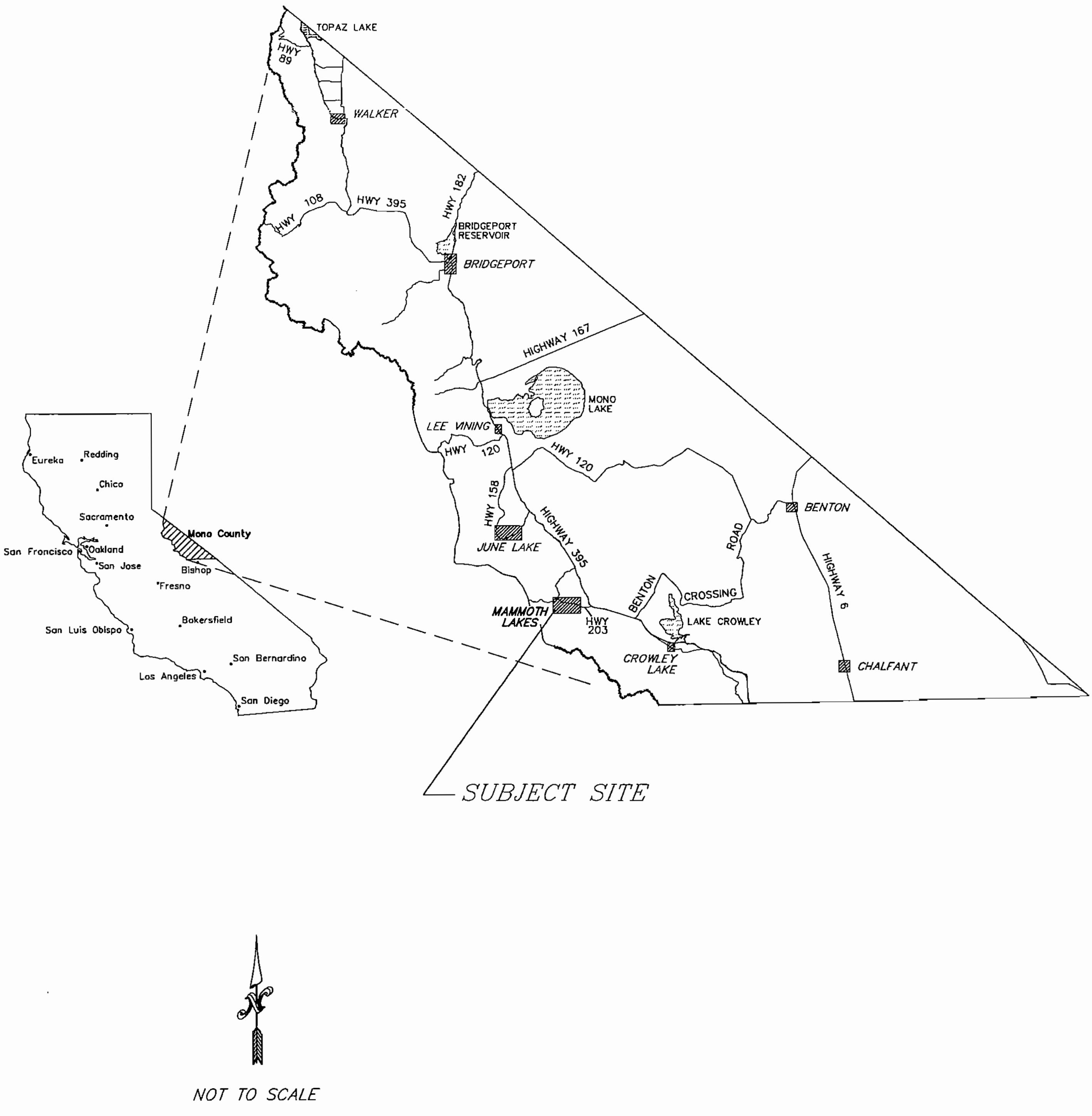
This report presents the results of a preliminary geotechnical investigation for the proposed Fairway 4/5 Bungalows project to be located within the Lodestar area approximately 1000-feet northwest of the intersection of Minaret Road and Meridian Boulevard in Mammoth Lakes, California (Figures 1 and 2). The purpose of this study was to assess the geotechnical constraints to development (if any) and provide preliminary geotechnical recommendations relative to the future development of the proposed project.

The scope of this investigation included: a review of stereoscopic aerial photographs, readily available published and unpublished geologic literature, a subsurface field investigation that included the excavation of six exploratory test pits in the proposed construction areas, laboratory testing of representative soil samples obtained during our field investigation, geologic and geotechnical evaluation and analysis of the collected field and laboratory data, and preparation of this report presenting the results of our findings, conclusions, geotechnical recommendations for site grading, and construction considerations for the proposed development.

The field investigation was performed on August 18, 2004. Logs of the exploratory test pits are presented in Appendix A. The approximate locations of the exploratory test pits are shown on the Subsurface Geotechnical Map (Figure 3). In-place nuclear density tests and bulk samples of the soils encountered were obtained during the field investigation. Results of the in-place nuclear density tests are presented on the logs of the exploratory test pits, Appendix A. Details of the laboratory testing are presented in Appendix B.

2. SITE DESCRIPTION

The project site is located approximately 1000-feet northwest of the intersection of Minaret Road and Meridian Boulevard and situated in an undeveloped area between Fairways 4 and 5 of the Sierra Star Golf Course within the Town of Mammoth Lakes, California (Figure 2). The site is accessible via dirt roads emanating from the northern portion of the recently graded Sierra Star Parkway. In general, the site drains from west to east and slopes from approximately 5 to 12-percent. Vegetation on the site includes indigenous pines, aspens, grasses and sagebrush.



Sierra Geotechnical Services

PROJECT: REGIONAL MAP FAIRWAY 4/5 BUNGALOWS	
SCALE: NTS	DATE: 10/2004
DRAWING: FIG1.DWG	DRAWN BY: JAA
JOB NO.: 3.30554	FIGURE: FIGURE 1

3. PROPOSED DEVELOPMENT

Based upon a review of the project site plan and our conversations with you, it is our understanding that the proposed residential development will consist of at least eight, three-story townhome units, a paved roadway, utilities, associated appurtenances, and the extension of Sierra Star Parkway. We further understand that parking for the proposed structures will be either "tuck under" or at grade.

Preliminary grading and foundation design plans were not provided prior to the preparation of this report. Sierra Geotechnical Services, Inc. has assumed that grading will be relatively minor and that the proposed site grades and finished pad elevations will be at or near existing grades. SGSI should review grading and foundation plans prior to construction in order to assure that they will be in conformance with our recommendations.

4. AERIAL PHOTOGRAPHIC REVIEW

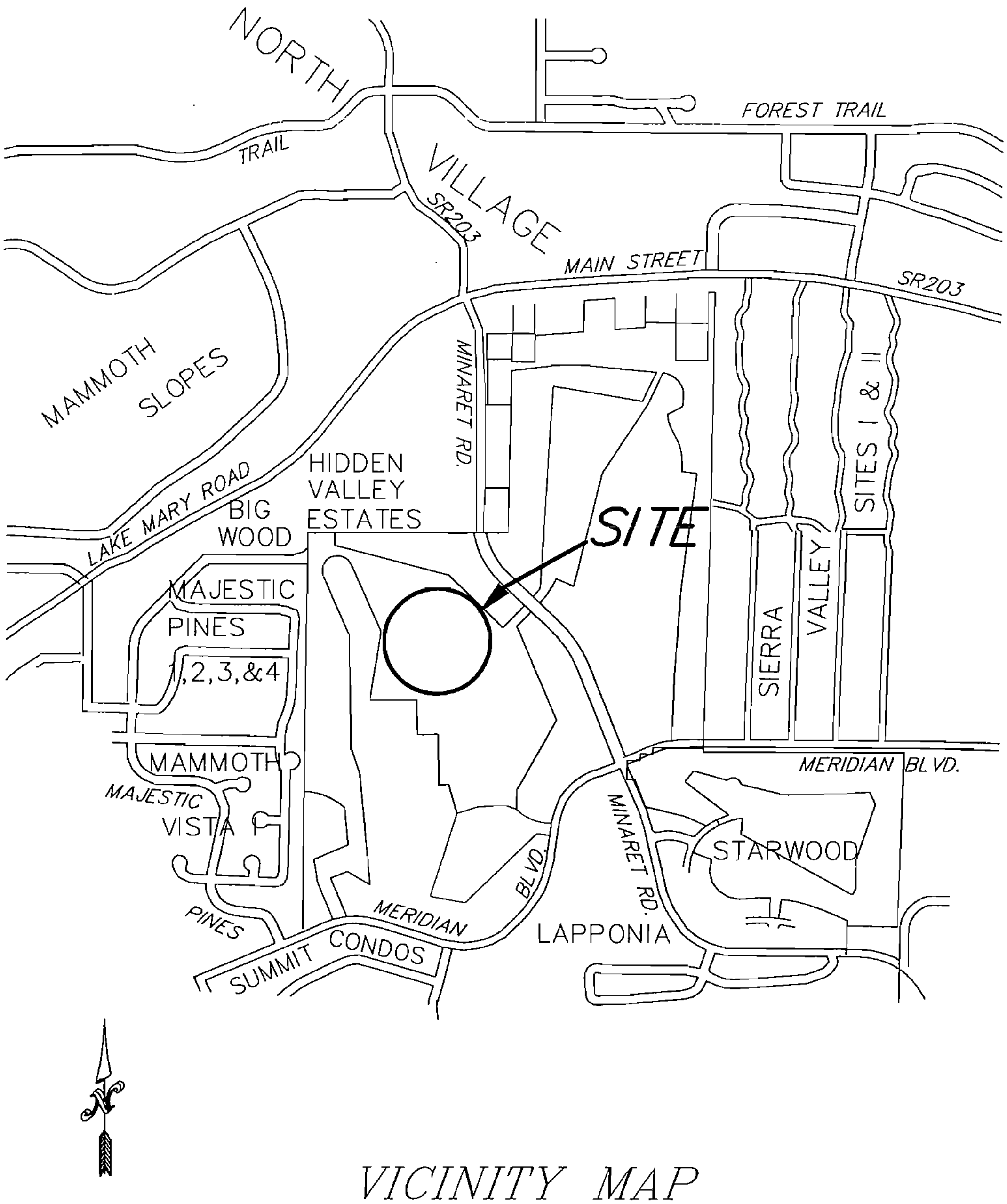
Prior to our field investigation, we acquired and reviewed aerial photographs to assist in our evaluation of geomorphic features that could be indicative of geologic hazards at the property. Details from the earliest available photographs (1944) did not show any evidence of lineations, scarps, or other ground-surface fault, landslide, or recent avalanche related features.

5. GEOLOGIC AND GEOTECHNICAL SITE CONSTRAINTS

Geotechnical constraints to development include the potential for moderate ground shaking (M_w~6.6) along the nearby Hartley Springs fault located approximately 1.1 northwest of the subject parcel. The above concern is addressed in the site seismicity section (see Sections 8 and 9) of this report.

6. GEOLOGY AND SUBSURFACE CONDITIONS

The project site is located at the southwestern edge of the Long Valley caldera near the eastern flank of the Sierra Nevada. The caldera (collapsed volcano) is an east-west elongate, oval depression formed approximately 760,000 years ago with continued volcanic activity to the present (Bailey, 1989). The pre-volcanic basement rock in the Mammoth Lakes area is predominantly Mesozoic granitic rocks of the Sierra Nevada batholith. The batholith is a series



VICINITY MAP

NOT TO SCALE

Sierra
Geotechnical
Services

PROJECT: VICINITY MAP FAIRWAY 4/5 BUNGALOWS	
SCALE: NTS	DATE: 10/2004
DRAWING: 3.30554.DWG	DRAWN BY: JAA
JOB NO.: 3.30554	FIGURE: FIGURE 2

of intrusions that displaced overlying ancient sedimentary sea floor rocks (roof pendants) during the Jurassic and Cretaceous Periods. Episodic glaciation as well as more recent volcanic eruptions occurred throughout the Pleistocene leaving a mantle of glacial till and pyroclastic deposits covering the older basement and volcanic rocks throughout the area now occupied by the Town of Mammoth Lakes.

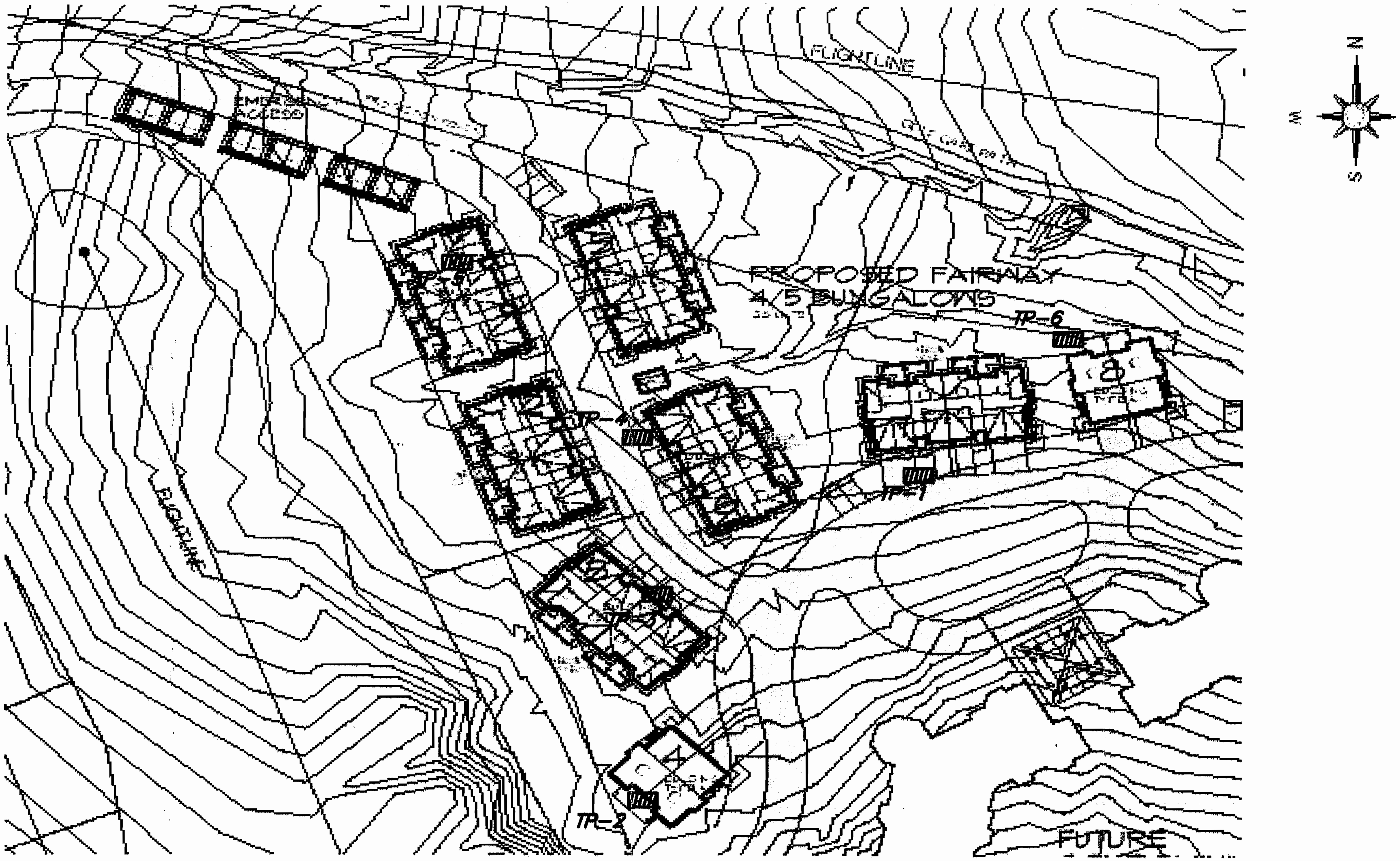
As observed during this investigation, Alluvium, and Glacial Till deposits underlie the site. Logs of the subsurface conditions encountered in exploratory test pits are provided in Appendix A. The approximate locations of the exploratory test pits are shown on the Subsurface Geotechnical Map (Figure 3). Generalized descriptions of the materials encountered during this investigation follow.

6.1 Alluvium

Alluvium was encountered in all the test pits to an approximate maximum depth of 5½-feet below existing grades. In general, the alluvium consisted of a light brown to grayish-brown and light gray, moist, loose, silty, very fine to coarse-grained SAND (Unified Soil Classification Symbols: SM and SP-SM), with abundant roots, few cobbles and abundant rock fragments and boulders to approximately 36-inches diameter. The alluvium from below approximately 2 to 3-feet below existing grade is considered suitable for additional fill and/or structural support provided the earthwork and grading recommendations included within this report are adhered to during site development.

6.2 Glacial Till Deposits

Glacial Till deposits were encountered in all the test pits below the alluvium. In general, the Glacial Till deposits consisted of a light brown to gray and reddish-brown, moist, medium dense to dense, very fine to coarse SAND (Unified Soil Classification Symbols: SM and SP-SM), with few to abundant gravels, cobble clasts and boulders to approximately 36-inches diameter. The Glacial Till was moderate to well indurated at depth. Backhoe refusal was encountered at approximately 7-feet in TP-6. The total thickness of this deposit was not determined during this investigation. This deposit is considered suitable for additional fill and/or structural support provided the earthwork



LEGEND

TP-6 APPROXIMATE LOCATION OF EXPLORATORY TEST PIT

Sierra Geotechnical Services

PROJECT: SUSURFACE GEOTECHNICAL MAP FAIRWAY 4/5 BUNGALOWS	
SCALE: N.T.S	DATE: 10/2004
DRAWING: FIG3.DWG	DRAWN BY: JAA
JOB NO.: 3.30554	FIGURE: FIGURE 3

and grading recommendations included within this report are adhered to during site development.

6.3 Groundwater

Neither a groundwater table nor groundwater seepage was encountered during this field investigation. However, slight to moderate mottling of the on-site soils was observed in test pits TP-1 and TP-3 which indicates that seasonally high and temporarily perched groundwater from snowmelt can be anticipated on the site. Groundwater levels in the Mammoth Lakes area are known to fluctuate seasonally. Excavations completed in the spring and early summer should anticipate some seepage. Temporary "nuisance" groundwater may reach depths seasonally whereby it should be intercepted by a permanently installed subdrain or footing perimeter drain system.

7. FAULTING

Our discussion of faults on the site is prefaced with a discussion of California legislation and state policies concerning the classification and land-use criteria associated with faults. By definition of the California Geological Survey, an "active fault" is a fault that has had surface displacement within Holocene time (about the last 11,000 years); hence constituting a potential hazard to structures that might be located across it. This definition is used in delineating Earthquake Fault Zones as mandated by the Alquist-Priolo Geologic Hazards Zones Act of 1972, which is detailed in the California Geological Survey Special Publication SP-42 (Hart and Bryant, 1999). The intent of this act is to assure that unwise urban development does not occur across the traces of active faults. Based on our review, the site is not located within any "Earthquake Fault Zones" or Alquist-Priolo Hazard Zones as identified in this document.

8. SITE SEISMICITY

Site coordinates of latitude 37.6417° north and longitude 118.9847° west were obtained for the project site from the internet site **Topozone.Com.** The computer programs **EQFAULT** and **EQSEARCH** (Blake, 2000) were used to estimate peak horizontal accelerations from regional faults and tabulate data from historical earthquakes.

A deterministic seismic analysis was performed within a 100 km radius of the site using the computer program **EQFAULT** (Blake, 2000). The results of the analysis indicate that the peak ground acceleration estimated for a maximum earthquake event within the specified radius is approximately 0.46g. This acceleration represents deterministic peak ground accelerations and could occur from a magnitude 6.6 (Mw) earthquake on the Hartley Springs fault located approximately 1.1 km northwest the site. The Hilton Creek fault, located approximately 10.4 km from the site could produce a magnitude 6.7 (Mw) earthquake resulting in a peak horizontal ground acceleration of approximately 0.27g at the site. The tabulated results of the deterministic seismic analysis are presented in Appendix C. The Fault Location Map, which depicts active faults within a 100 km radius of the site, is also presented in Appendix C.

The computed maximum site acceleration within a 100 km radius of the site was derived from **EQSEARCH** (Blake, 2000) during the time period of 1800 to 2003. The largest estimated site acceleration based on the Boore et al. (1997) model, was 0.24g, which occurred during the Mammoth Lakes Earthquake of January 7, 1983. This earthquake was located approximately 3.2 km from the site. The Modified Mercalli Intensity and earthquake magnitude were IX and 5.6 (M_w) respectively. The largest earthquake recorded within the specified distance and time period was a magnitude 6.6 (M_w) earthquake (Modified Mercalli Intensity of VII) which occurred in The Owens Valley on April 11, 1872. A site acceleration of 0.09g was estimated from this earthquake which was located approximately 46 km from the site.

The tabulated results of the historical analysis are presented in Appendix C. The Earthquake Epicenter Map, which depicts the epicenters and magnitudes of historical earthquakes that have affected the site, a Earthquake Recurrence Curve, and a plot depicting Earthquake Events versus Magnitude also presented in Appendix C.

The computer program **FRISKSP** (Blake, 2000) was used to perform a probabilistic analysis of seismicity at the subject site. The probabilistic analysis was used to define the Upper-Bound and Design Basis Earthquakes at the site for use in structural design. These results as well as Probability of Exceedance versus Acceleration graphs, and Return Period versus Acceleration graphs are presented in Appendix C. Based on the results of the probabilistic analysis, the Upper-Bound Earthquake (Non-Magnitude Weighted) for the site, defined as the ground motion that has a 10 percent chance of exceedance in 100 years, with a statistical return period of ~ 949 years, is 0.43g. The Design Basis Earthquake (Non-Magnitude Weighted) for the site, defined as the ground motion that has a 10 percent chance of exceedance in 50 years, with a statistical return period of ~ 475 years, is 0.34g.

8.1 Seismic Design Criteria

Table 1 presents the Seismic Parameters for use in preparing a Design Response Spectra for the site. The program used to obtain the seismic parameters is UBCSEIS which is based upon the 1997 Uniform Building Code (UBC) and 2001 California Building Code (CBC). The results of the UBC Seismic Design Parameters as well as the Design Response Spectra are presented in Appendix C.

TABLE 1

UBC-CHAPTER 16 TABLE NO.	SEISMIC PARAMETER	RECOMMENDED VALUE
16-I	Seismic Zone Factor Z	0.4
16-J	Soil Profile Type	S_C
16-Q	Seismic Coefficient C_a	0.52
16-R	Seismic Coefficient C_v	0.90
16-S	Near Source Factor N_a	1.3
16-T	Near Source Factor N_v	1.6
16-U	Seismic Source Type	B

The subject site is situated in Seismic Zone 4 (Z=0.4) based on the 1997 UBC, and the 2001 CBC. A geologic subgrade type S_C, "very dense soil and soft-rock" was assumed for the site based upon previously existing seismic compression & shear refraction surveys, as well as "blow counts" obtained from standard penetration tests in similarly categorized deposits, conducted in close proximity to the site (Sierra Geotechnical Services, 2004).

The Boore et al (1997) NEHRP C (520) acceleration-attenuation relation was used to estimate ground accelerations at the site based upon the shear wave velocity data. The seismic coefficients of acceleration and velocity C_a and C_v, as derived from the soil profile type and seismic zone factor, are 0.52 and 0.90 respectively.

The distance between the site and the nearest active fault is less than 2 km; therefore the near-source acceleration and velocity factors N_a and N_v are 1.3 and 1.6 respectively. The nearest known active fault is the Hartley Springs fault located approximately 1.1 km northwest of the site. The Hartley Springs fault is a Type B Seismic Source.

Conformance to the above criteria for strong ground shaking does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur during a large magnitude earthquake. Design of structures should comply with the requirements of the governing jurisdictions, building codes, and standard practices of the Association of Structural Engineers of California. A Design Civil or Structural Engineer in conjunction with the State Architect should determine what level of risk is acceptable for the project considering the recommendations contained in this report, economics, and safety.

9. SECONDARY EARTHQUAKE EFFECTS

Secondary effects that can be associated with severe ground shaking following a relatively large earthquake include shallow ground rupture, soil lurching, liquefaction, seiches and tsunamis, and avalanches (rockfall and snow). These secondary effects of seismic shaking are discussed in the following sections.

9.1 Shallow Ground Rupture

Ground surface rupture results when the movement along a fault is sufficient to cause a gap or break along the upper edge of the fault zone on the surface. Our review of available geologic literature indicated that there are no known active, potentially active, or inactive faults that transect the subject site. Therefore the potential for ground rupture is considered very low.

9.2 Soil Lurching

Soil lurching refers to the rolling motion on the ground surface by the passage of seismic surface waves. Effects of this nature are likely to be most severe where the thickness of soft sediments varies appreciably under structures. In its present condition, the potential for lurching below the proposed structures is considered low due to the presence of potentially compressible relatively shallow alluvial soils below existing grades. The potential for lurching will be greatly reduced if the potentially compressible soils, present on site, are removed and properly compacted during grading, as per the earthwork recommendations provided herein.

9.3 Liquefaction

Liquefaction of cohesionless soils can be caused by strong vibratory motion due to earthquakes. Research and historical data indicate that loose granular soils below a near-surface groundwater table are most susceptible to liquefaction. Liquefaction is characterized by a loss of shear strength in the affected soil layers, thereby causing the soil to behave as a viscous liquid. This effect may be manifested at the ground surface by settlement and, possibly, sand boils where insufficient confining overburden is present over layers. In order for the potential effects of liquefaction to be manifested at the ground surface, the soils generally have to be granular, loose to medium-dense and saturated relatively near the ground surface, and must be subjected to ground shaking of a sufficient magnitude and duration. The potential for liquefaction to occur is considered very low, given the lack of a water table and the medium-dense to dense nature of bearing soils present on site.

9.4 Seiches and Tsunamis

The potential for tsunamis and seiches as the result of the design level earthquake in a nearby fault are considered non-existent, due to the distance of the ocean or large open bodies of water from the project site.

9.5 Avalanches (Rockfall and Snow)

Avalanches can occur as a result of moderate to large earthquakes in Alpine terrain, which can cause rock and snow to move vertically and laterally downslope. These hazards typically affect structures which are located at the base of slopes or within close proximity to the area of flow. The potential for rockfall or snow avalanches to occur at the subject site is considered low, given the proximity of the site to a relatively steep slope area.

10. LANDSLIDES

Evidence of past landslides was not observed either during aerial photographic review or in the field.

11. VOLCANIC HAZARDS

The area of eastern California that includes the Long Valley Caldera and the Mono-Inyo Craters volcanic chain has a long history of geologic activity that includes earthquakes and volcanic eruptions. Studies within this area indicate that massive eruptions of the size that accompanied formation of Long Valley Caldera approximately 760,000 years ago are extremely rare (none have occurred during the period of written human history). Currently, there is no evidence that an eruption of such catastrophic proportions might be forming beneath the Long Valley Caldera (Miller, 1985; 1989). A small to moderate volcanic eruption could occur however; somewhere along Mono-Inyo Craters volcanic chain producing pyroclastic flows and surges, as well as volcanic ash and pumice fallout, which could significantly impact the subject site. The odds however, of such an eruption are roughly one in a thousand in a given year (Miller, 1985; 1989).

12. CONCLUSIONS

Based on the results of this investigation, it is our opinion that the construction of the proposed project is feasible from a geotechnical standpoint provided the following recommendations are incorporated into the design and construction. The following sections discuss the principal geotechnical concerns affecting site development and grading and provide preliminary grading and foundation design recommendations which should be implemented during site development to mitigate site geologic constraints. Implementation of these recommendations and adherence to the 1997 UBC, and the 2001 CBC, does not however preclude property damage during or following a significant seismic event.

- There are no known active, potentially active, or inactive faults that transect the subject site. Evidence of past soil failures, landslides, or active faulting on the site was not encountered. Seismic hazards at the site may be caused by ground shaking during seismic events on regional active faults. The nearest known active regional fault is the Hartley Springs fault located approximately 1.1 km northwest of the site.

- Based on the results of the probabilistic analysis, the Upper-Bound and Design Basis Earthquakes for the site yielded peak ground accelerations of 0.43g and 0.34g respectively.

- The project consultants and the Client should discuss various seismic design parameters and decide upon an appropriate design value based upon their seismic performance goals. A design value of 0.34g is the lowest value that should be considered.

- A volcanic eruption could occur somewhere along Mono-Inyo Craters volcanic chain producing pyroclastic flows and surges, as well as volcanic ash and pumice fallout, which could significantly impact the subject site. The odds however, of such an eruption are roughly one in a thousand in a given year (Miller, 1985; 1989).

- Groundwater seepage was not encountered during our field investigation however, mottling of the on-site soils was observed which indicates that seasonally high and temporarily perched groundwater from snowmelt can be anticipated on the site. Excavations completed in the spring and early summer should anticipate some seepage.

- Temporary "nuisance" groundwater may reach depths seasonally whereby it should be intercepted by a permanently installed subdrain or footing perimeter drain system.

- Site soils encountered during our field investigation generally consist of loose to dense, silty, fine to coarse-grained sands, with abundant cobble clasts and large boulders. These materials are suitable for use as fill or backfill provided the organics, oversized rock (greater than 6-inches in diameter) and deleterious materials are removed (*See Appendix D - Fill Compaction and Compaction*).

- Based upon field observations and in-place density tests taken during the subsurface field investigation the subject site may be underlain by up to a maximum depth of approximately 2 to 3-feet of loose alluvial soils considered unsuitable for the support of new fill or structural loads. Where these soils will be subjected to increased loads from new fills, remedial grading consisting of overexcavation and compaction is recommended to improve the bearing capacity of those materials. Remedial grading recommendations are provided in this report.

- For the roadways and other improvements a 1 to 2-foot removal is recommended depending on site conditions (i.e. depth of root zone, and depth of disturbance which may have locally deeper removal depths).

- The depth of the unsuitable soils is based upon the areas observed. It should be anticipated that the overall depth of the unsuitable materials exposed during construction may vary from that encountered in the test pits. Reasonably continuous construction observation and review during site grading and foundation installation allows for evaluation of the actual soil conditions and the ability to provide appropriate revisions where required during construction.

- In general, excavations at the site should be achievable using standard earthmoving equipment.

13. RECOMMENDATIONS

The following recommendations should be adhered to during site development. These recommendations are based on empirical and analytical methods typical of the standard of practice in California. If these recommendations appear not to cover any specific feature of the project, please contact our office for additions or revisions to the recommendations.

13.1 Geotechnical Review

Geotechnical review is of paramount importance in engineering practice. The poor performance of many foundation and earthwork projects has been attributed to inadequate construction review. Sierra Geotechnical Services, Inc. should be provided the opportunity to review the following items or we waive all liability for any and all geotechnical issues associated with grading or construction relative to the subject site.

13.1.1 Plan and Specification Review

Detailed plans for construction and grading were not available at the time of this report. SGSI should review grading and foundation plans prior to construction in order to assure that they are in conformance with this report; some of the recommendations contained herein may need to be revised after reviewing.

13.2 Earthwork

Earthwork should be performed in accordance with the General Earthwork and Grading Specifications in Appendix D and the following recommendations. The recommendations contained in Appendix D are general grading specifications provided for typical grading projects. Some of the recommendations may not be strictly applicable to this project. The specific recommendations contained in the text of this report supersede the general recommendations in Appendix D. The contract between the developer and earthwork contractor should be worded such that it is the responsibility of the contractor to place the fill properly in accordance with the recommendations of this report and the specifications in Appendix E notwithstanding the testing and observation of the geotechnical consultant.

13.2.1 Site Preparation

The subject property is situated on relatively flat terrain underlain by up to approximately 2 to 3-feet of loose surficial soils considered unsuitable for the support of new fill or structural loads. Where these soils will be subjected to increased loads from new fills, remedial grading consisting of overexcavation and compaction is recommended to improve the bearing capacity of those materials. Remedial grading recommendations are provided in this report.

The depth of the unsuitable soils is based upon the areas observed. It should be anticipated that the overall depth of the unsuitable materials exposed during construction may vary from that encountered in the test pits. Reasonably continuous construction observation and review during site grading and foundation installation allows for evaluation of the actual soil conditions and the ability to provide appropriate revisions where required during construction.

Prior to grading, the proposed structural improvement areas (i.e. all structural fill, pavements areas and structural building, etc.) of the site should be cleared of surface and subsurface obstructions, including vegetation. Vegetation and debris should be disposed of off-site. Holes resulting from removal of buried obstructions, which extend below the recommended removal depths described herein or below finished site grades (whichever is lower) should be filled with properly compacted soil. Should existing underground utilities be encountered they should be completely removed and properly backfilled. Alternatively if the utility is not within the influence zone of the foundation it may be abandoned in place by fully grouting the pipe.

13.3 Excavation and Grading Observation

Site grading and footing excavations should be observed by SGSI. Such observations are considered essential to identify field conditions that differ from those anticipated by the investigation, to adjust design to actual field conditions, and to determine that the grading is accomplished in general accordance with the recommendations of this report. Earthwork and grading recommendations which include guidelines for site preparation fill compaction, slopework, temporary excavations, and trench backfill are provided in Appendix D.

13.4 Preliminary Foundation Preparation and Design

The following preliminary recommendations are presented as minimum design recommendations; they are not intended to supercede design by the structural engineer. Preliminary foundations should be designed in accordance with structural considerations and the following recommendations. Upon the completion of the grading and structural plans, Sierra Geotechnical Services Inc. should review the foundation loads and embedment in order to confirm the implementation of the recommendations herein.

Continuous or pad footings may be used to support the proposed structures provided they are founded entirely upon either competent structural fill or competent native materials. Continuous and isolated column foundations should be sized according to the allowable soil bearing pressures shown in Table II below. The pressures shown on Table II are for dead load plus long-term live load, including snow load, and for total load including wind and seismic forces. Passive soil resistance to lateral footing pressure may be calculated using an equivalent fluid weight or a base coefficient of friction as given in Table II. It is recommended that the friction of coefficient be reduced by one-half if both passive and frictional resistances are assumed to act simultaneously.

Table II – Allowable Soil Bearing Pressures

Depth Below Existing Ground Surface	Allowable Soil Bearing Pressure (psf)
Compacted Fill or Alluvial Deposits	2,500
Competent Glacial Till Deposits	3,000

The allowable pressure may be increased by one-third when considering loads of short duration such as wind or seismic forces. Continuous and isolated footings should be designed in accordance with the structural engineer requirements. Reinforcement of footings should be per the structural engineer's design.

13.4. 1 Foundation Construction

Based upon our observations and past experience relative to the general site area, low expansive soils exist onsite. The following preliminary recommendations assume low expansive soils near finish pad grade.

- Footings should be designed in accordance with the structural engineer requirements regarding width. Exterior and interior foundations shall be founded within compacted fill or competent native soils. Exterior foundations shall have a minimum embedment depth of 24-inches below outside adjacent grade. Interior foundation depths shall be a minimum of 18-inches below adjacent grade.

- All footings should be reinforced with at least the minimum reinforcement required for temperature as required in Chapter 19 of the 1997 UBC.

- All footing excavations should be observed by a representative of SGSI prior to placement of reinforcing steel, in order to assure proper embedment into suitable soils.

- Although no specific pre-saturation is required for these soil conditions, footing trench excavations should be well moistened prior to pouring concrete.

- Footing trenches should not have any rocks or boulders protruding into the trench bottom. Soft soil pockets created by rock removal during foundation excavation shall be replaced with approved fill material, and compacted to 95-percent of the material's maximum dry density.

13.5 Foundation Setback

We recommend a minimum horizontal setback distance from the face of slopes for all structural footings and settlement-sensitive structures (i.e. fences, walls, signs, etc.). This distance is measured from the outside edge of the footing, horizontally to the slope face (or to the face of a retaining wall). The 2001 CBC recommends that a 5-foot minimum setback be established for the outside footing face (bearing elevation) to the finished grade slope face. We should note that the soils within a slope setback area possess poor long term lateral stability, and improvements (such as retaining wall, sidewalks, fences, pavement, underground utilities, etc.) constructed within this setback area may be subject to lateral movement and/or differential settlement.

Utility trenches that parallel or nearly parallel structure footings should not encroach within a 1:1 plane extending downward and outward from the outside edge of the footing.

13.6 Concrete Slab-on-Grade Floors

Compacted fill materials will provide adequate support for concrete slabs provided the on-site materials are prepared per our grading recommendations prior to placement of the slab. Structural fill and subgrade soils underlying concrete slabs shall be compacted to a minimum of 90-percent of the material's maximum dry density for the upper 12-inches. Concrete slabs should be underlain by a 2-inch layer of clean sand (SE greater than 30) to aid in concrete curing, which is underlain by a 10-mil (or heavier) moisture barrier, which is, in turn, underlain by a 2-inch layer of clean sand to act as a capillary break. All penetrations and laps in the moisture barrier should be appropriately sealed.

Minimum slab reinforcement shall consist of #3 rebar placed at 18-inches on center each way. The slab reinforcement shall be placed, vertically, in the middle of the slab. Slab thickness shall be a minimum of 4-inches. In areas where heavy equipment or loading will stress the slab, the thickness and reinforcement will meet the requirements of the Structural Engineer of record. Our experience indicates that the use of reinforcement in slabs and foundations will generally reduce the potential for drying and shrinkage cracking. However, some cracking should be expected as the concrete cures. Minor cracking is considered normal; however, it is often aggravated by a high cement ratio, high concrete temperature at the time of placement, small nominal aggregate size and rapid moisture loss due to hot, dry, and/or windy weather conditions during placement and curing.

Cracking due to temperature and moisture fluctuations can also be expected. The use of low slump concrete (not exceeding 4-inches at the time of placement) can reduce the potential for shrinkage cracking.

Moisture barriers can retard, but not eliminate moisture vapor movement from the underlying soils up through the slab. We recommend that the floor coverings installer test the moisture vapor flux rate prior to attempting application of the flooring. "Breathable" floor coverings should be considered if the vapor flux rates are high. A slipsheet should be used if crack sensitive floor coverings are planned.

13.7 Pavement Recommendations

For preliminary planning purposes, pavement sections are provided based on the results of R-value laboratory testing on a selected soil sample collected during the subsurface exploration. Final pavement design should be based on the results of R-Value testing performed on samples of the finished subgrade soils in pavement areas. Based on an R-Value of 79 (Appendix B), SGSI recommends the following pavement sections:

- Standard Duty Roadway and Parking Areas
  3-inches Asphalt Concrete / 4-inches Class II Aggregate Base

For the paved roadway, parking areas and other improvements a 1 to 2-foot removal is recommended depending on site conditions (i.e. depth of root zone, and depth of disturbance which may have locally deeper removal depths). The removal bottom should be observed (tested as needed) by the geotechnical consultant prior to placing fill soils. Removals and Compaction recommendations are provided in Appendix D.

The upper 12-inches of subgrade material along with the Class II Aggregate Base and the Asphaltic concrete shall be compacted to a minimum of 95-percent of the material's maximum dry density as determined by ASTM D1557-2000. The subgrade and aggregate base shall be moisture-conditioned and compacted to 95-percent of the material's maximum dry density as determined by ASTM D-1557-2000 to a depth of 12-inches.

The preliminary pavement sections were designed for the assumed traffic loading and environmental conditions. Based upon our experience in the Mammoth Lakes area, environmental conditions such as freeze-thaw and thermal cracking will most likely govern the life of the pavement.

If pavement areas are adjacent to heavily watered landscape areas, some deterioration of the subgrade load bearing capacity may result. We recommend some measures of moisture control (such as deepened curbs or other moisture barrier materials) be provided to prevent the subgrade soils from becoming saturated.

13.8 Lateral Earth Pressures and Resistance

Embedded structural walls or cantilever retaining walls should be designed for lateral earth pressures exerted on them. The magnitude of these pressures depends on the amount of deformation that the wall can yield under load. If a wall can yield enough to mobilize the full shear strength of the soil; it can be designed for "active" pressure. If a wall cannot yield under the applied load, the shear strength of the soil cannot be mobilized and the earth pressure will be higher. Such walls should be designed for "at rest" conditions. If a structure moves toward the soils, the resulting resistance developed by the soil is the "passive" resistance.

For design purposes, the recommended equivalent fluid pressure for each case for walls founded above the static ground water and backfilled with soils of very low to low expansion potential is provided. The equivalent fluid pressure values assume free-draining conditions. If conditions other than those assumed above are anticipated the equivalent fluid pressure values should be provided on an individual-case basis by the geotechnical engineer. Surcharge loading effects from the adjacent structures should be evaluated by the structural engineer. The select backfill should have an expansion index

(EI) of no greater than 50 and a sand equivalent (SE) greater than 15. The backfill soils should be tested by the soils engineer prior to backfill operations starting for the retaining wall/basement wall structures.

Slope of Backfill Behind Retaining Wall	**Lateral Earth Pressure in Equivalent Fluid Weight (pcf)**	
	Active Case	Passive Case
Horizontal	45	250
At-Rest	60	

For sliding resistance, the friction coefficient of 0.25 may be used at the concrete and soil interface. Wall footings should be designed in accordance with structural considerations. In combining the total lateral resistance, the passive pressure or the frictional resistance should be reduced by one-third. The passive resistance value may be increased by one-third when considering loads of short duration, including wind or seismic loads. The horizontal distance between foundation elements providing passive resistance should be a minimum of three times the depth of the elements to allow full development of these passive pressures. The total depth of retained earth for design of cantilever walls should be the vertical distance below the ground surface measured at the wall face for stem design or measured at the heel of the footing for overturning and sliding.

Wall backcut excavations less than 5-feet in height can be made near vertical. All retaining wall structures should be provided with appropriate drainage and waterproofing. Drainage should consist of continuous drains installed along the base of the wall outletting to a storm drain system or the surface if grade allows.

13.9 Estimated Settlement

Post construction settlement is estimated to be one-half inch or less if the foundation recommendations provided in this report are conformed too. Post-construction differential settlements should be one-quarter inch or less. Settlements for similarly loaded footings located on varying thicknesses of fill may experience differential settlements on the order of 0.5 percent of the difference in fill thickness beneath the footings. We recommend that the foundation plans be reviewed once detailed loading conditions are known to confirm the estimated settlements mentioned above.

13.10 Drainage

We recommend that measures be taken to properly finish grade the building area, such that drainage water from the building area is directed away from building foundations (2-percent minimum grade on soil or sod for a distance of 5-feet). Ponding of water should not be permitted. Erosion is possible on the pad and slopes if left unprotected during the snowmelt run-off season.

14. LIMITATIONS

This report has been prepared for the sole use and benefit of our client. The conclusions of this report pertain only to the site investigated. The intent of the report is to advise our client of the geologic and geotechnical recommendations relative to the future development of the proposed project. It should be understood that the consulting provided and the contents of this report are not perfect. Any errors or omissions noted by any party reviewing this report, and/or any other geotechnical aspects of the project, should be reported to this office in a timely fashion. The client is the only party intended by this office to directly receive this advice. Unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Sierra Geotechnical Services Incorporated from and against any liability, which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Sierra Geotechnical Services Incorporated.

Conclusions and recommendations presented herein are based upon the evaluation of technical information gathered, experience, and professional judgment. Other consultants could arrive at different conclusions and recommendations. Final decisions on matters presented are the responsibility of the client and/or the governing agencies. No warranties in any respect are made as to the performance of the project.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings within this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

15. REFERENCES

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SIERRA GEOTECHNICAL SERVICES INC.

February 23, 2004 Project No. 3.01703.1

Intrawest Resort Development Group
6900 S. McCarran Ste, 3000
Reno, NV 89509

ATTN: Mr. Chris Vollan

Subject: **UPDATE GEOTECHNICAL INVESTIGATION**
Fairway 16
Mammoth Lakes, California

Reference: **SOILS ENGINEERING REPORT FOR FAIRWAY 16 TOWNHOMES AND SIERRA STAR PARKWAY (7/30/99)**
Mammoth Lakes, California

Dear Mr. Vollan:

In accordance with your authorization of our proposal dated December 8, 2003, we herein submit the results of our update geotechnical investigation for the proposed Fairway 16 project to be located approximately 600 feet southwest of the intersection of Minaret Road and Meridian Boulevard in Mammoth Lakes, California. The purpose of this investigation was to update the foundation and grading recommendations due to a change in site design, as well as update the site seismicity to conform to the 2001 California Building Code (CBC), and the 1997 Uniform Building Code (UBC). Our work consisted of a review of the above referenced report including the results of our previous investigation, a review of the *Preliminary Site Plan,* prepared by CFA Incorporated, a review of the *Sierra Star Parkway Road Improvement Plans*, prepared by Triad/Holmes Associates, dated 5/27/1999, engineering and geologic analyses, and the preparation of this update report.

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We appreciate the opportunity to be of service to you. Should you have any questions regarding this report, please do not hesitate to contact us.

Respectfully,

SIERRA GEOTECHNICAL SERVICES, INC.

Thomas A. Platz
President
PE C41039

REGISTERED PROFESSIONAL ENGINEER
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UPDATE GEOTECHNICAL INVESTIGATION

FOR

FAIRWAY 16

MAMMOTH LAKES, CALIFORNIA

FEBRUARY 23, 2004
PROJECT NO. 3.01703.1

Prepared By:

SIERRA GEOTECHNICAL SERVICES, INC.
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LIST OF ATTACHMENTS

1. PURPOSE AND SCOPE

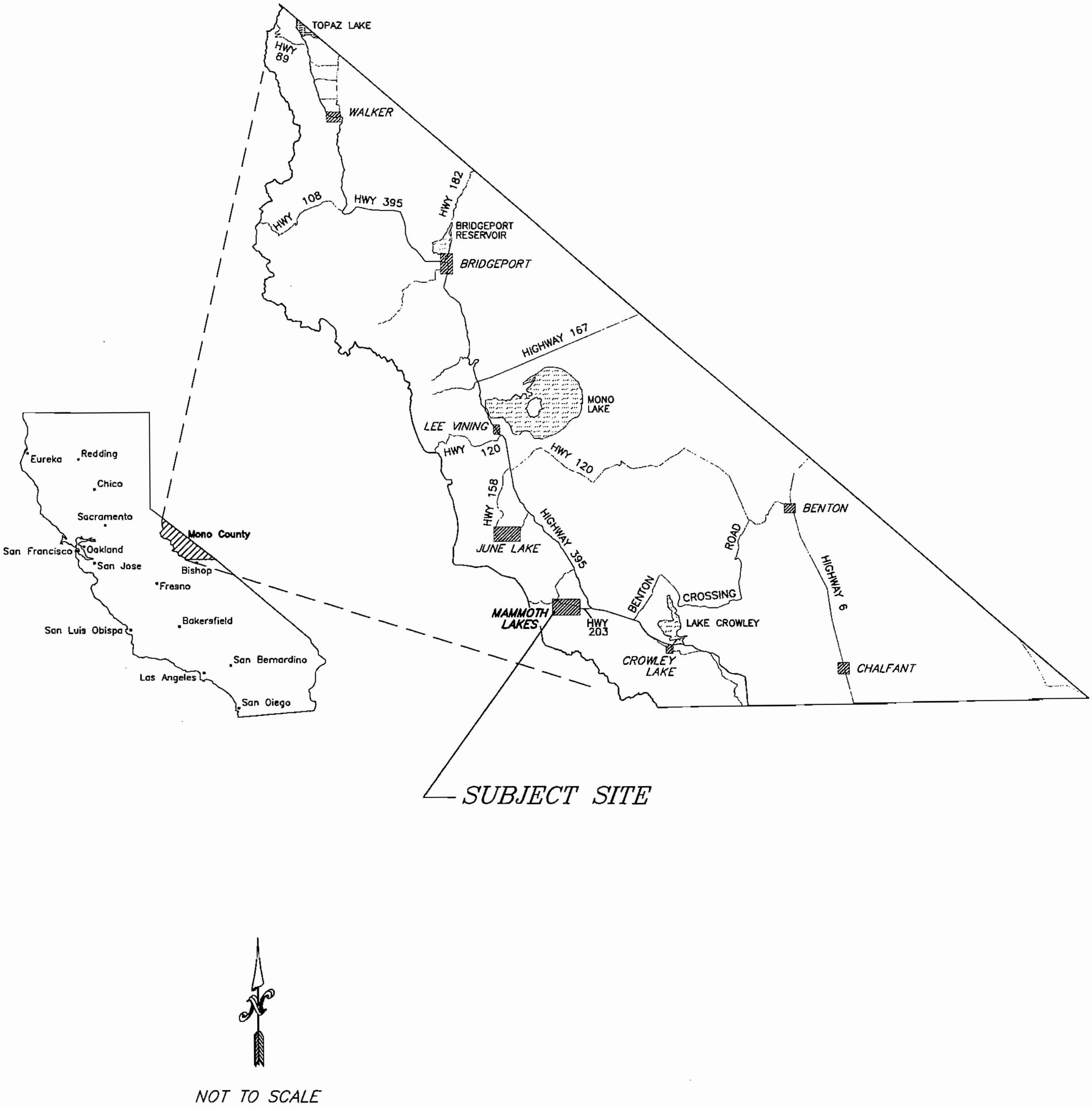
This report presents the results of an updated geotechnical investigation for the proposed Fairway 16 project to be located within the Town of Mammoth Lakes, approximately 600-feet southwest of the intersection of Minaret Road and Meridian Boulevard in Mammoth Lakes, California (Figures 1 and 2). The purpose of this study was to assess the geotechnical constraints to development (if any) and provide updated geotechnical recommendations relative to the future development of the proposed project. A report entitled *Soils Engineering Report for Fairway 16 Townhomes and Sierra Star Parkway,* was prepared by Sierra Geotechnical Services Inc., on July 30, 1999. Since that report was issued, the proposed conceptual design of the structures as well as their layout relative to the site has changed. It is our understanding that the proposed residential site will now include at least nine, three-story townhome units with one level of underground parking, a paved roadway, utilities, associated appurtenances, and the extension of Sierra Star Parkway.

The scope of this investigation included review of the above referenced report including the results of our previous investigation, a review of the *Preliminary Site Plan,* prepared by CFA Incorporated, a review of the *Sierra Star Parkway Road Improvement Plans*, prepared by Triad/Holmes Associates, dated 5/27/1999, engineering and geologic analyses, and the preparation of this update report presenting updated geotechnical recommendations including site seismicity, foundation design, site grading, and construction considerations for the proposed residential development.

A field investigation consisting of the excavation of four exploratory test pits was performed on December 17, 2003. Logs of the exploratory test pits are presented in Appendix A. The approximate locations of the exploratory test pits are shown on the Geologic Map (Figure 3). Bulk samples of the soils encountered were obtained during the field investigation. Details of the laboratory testing are presented in Appendix B.

2. SITE DESCRIPTION

The approximate 9-acre project site is located approximately 600-feet southwest of the intersection of Minaret Road and Meridian Boulevard in Mammoth Lakes, California (Figure 2) and is accessible via a previously constructed portion of Sierra Star Parkway, approximately



PROJECT: **REGIONAL MAP** FAIRWAY 16	
SCALE: NTS	DATE: 2/2004
DRAWING: 3.01703.1FIG1.DWG	DRAWN BY: JAA
JOB NO.: 3.01703.1	FIGURE: FIGURE 1

Sierra Geotechnical Services

300-feet in length beginning at Meridian Blvd. The currently vacant site drains from west to east over the southern half of the property and from northwest to southeast over the northern half. Slopes within the project site range from approximately 5 to 12-percent. Vegetation on the site includes indigenous pines, aspens, grasses and sagebrush.

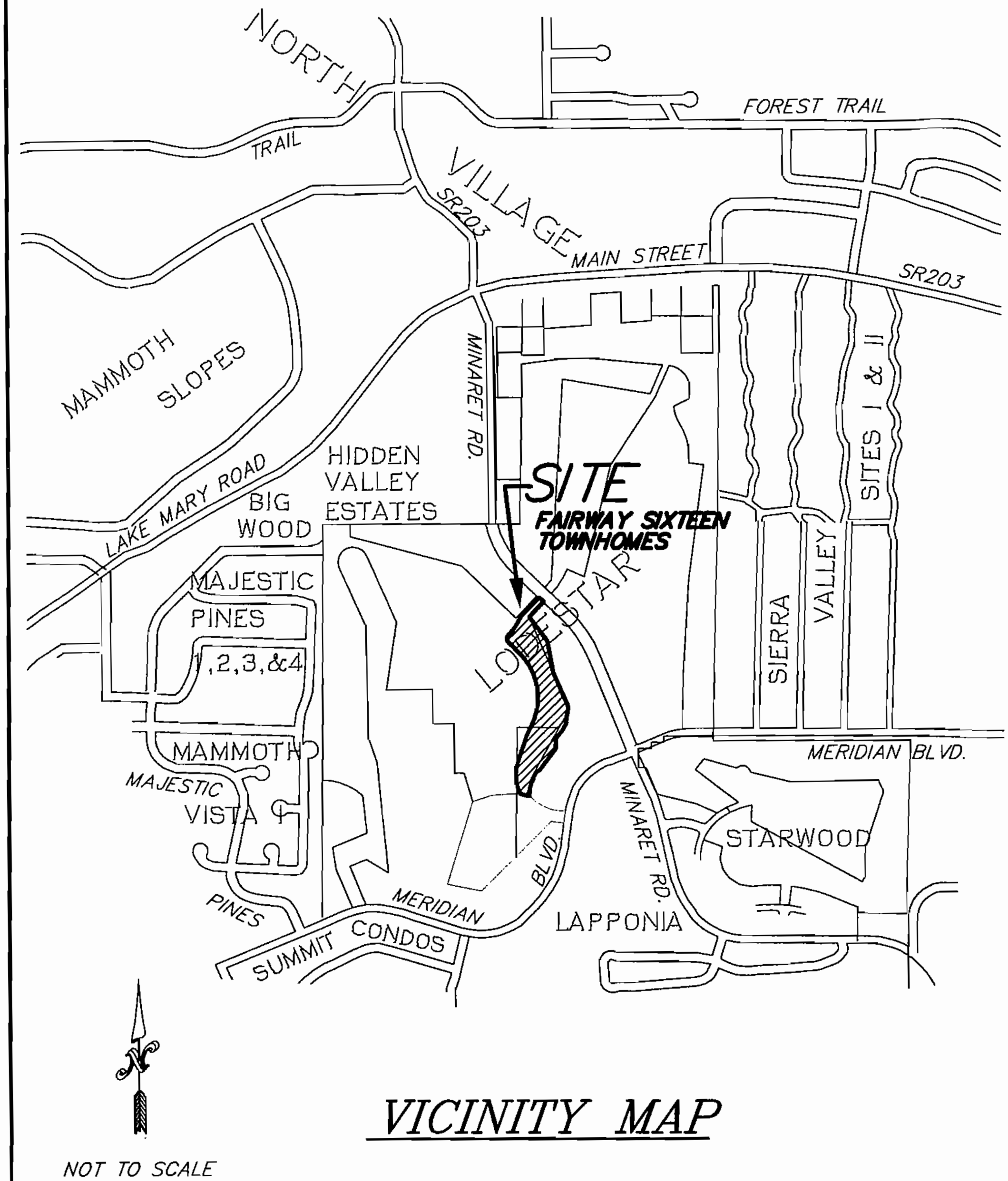
3. AERIAL PHOTOGRAPHIC REVIEW

Prior to our field investigation, we acquired and reviewed aerial photographs to assist in our evaluation of geomorphic features that could be indicative of geologic hazards at the property. Details from the earliest available photographs (1944) did not show any evidence of lineations, scarps, or other ground-surface fault, landslide, or recent avalanche related features.

4. GEOLOGY AND SUBSURFACE CONDITIONS

The project site is located at the southwestern edge of the Long Valley caldera near the eastern flank of the Sierra Nevada. The caldera (collapsed volcano) is an east-west elongate, oval depression formed approximately 760,000 years ago with continued volcanic activity to the present (Bailey, 1989). The pre-volcanic basement rock in the Mammoth Lakes area is predominantly Mesozoic granitic rocks of the Sierra Nevada batholith. The batholith is a series of intrusions that displaced overlying ancient sedimentary sea floor rocks (roof pendants) during the Jurassic and Cretaceous Periods. Piedmont glaciation occurred throughout the Pleistocene leaving a mantle of glacial till covering the basement and volcanic rocks throughout the area now occupied by the Town of Mammoth Lakes.

As observed during this investigation, 2 general soil types underlie the site, consisting of Topsoil/Colluvium, and Glacial Till Deposits. Logs of the subsurface conditions encountered in exploratory test pits are provided in Appendix A. Logs of the test pits from the previous investigation are provided in Appendix B. The approximate locations of the exploratory test pits are shown on the Geologic Map (Figure 3). Generalized descriptions of the materials encountered during this investigation follow.



VICINITY MAP

PROJECT: VICINITY MAP FAIRWAY 16	
SCALE: NTS	DATE: 2/2004
DRAWING: 3.01703.1.DWG	DRAWN BY: JAA
JOB NO.: 3.01703.1	FIGURE: FIGURE 2

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4.1 Topsoil/Colluvium (Unmapped)

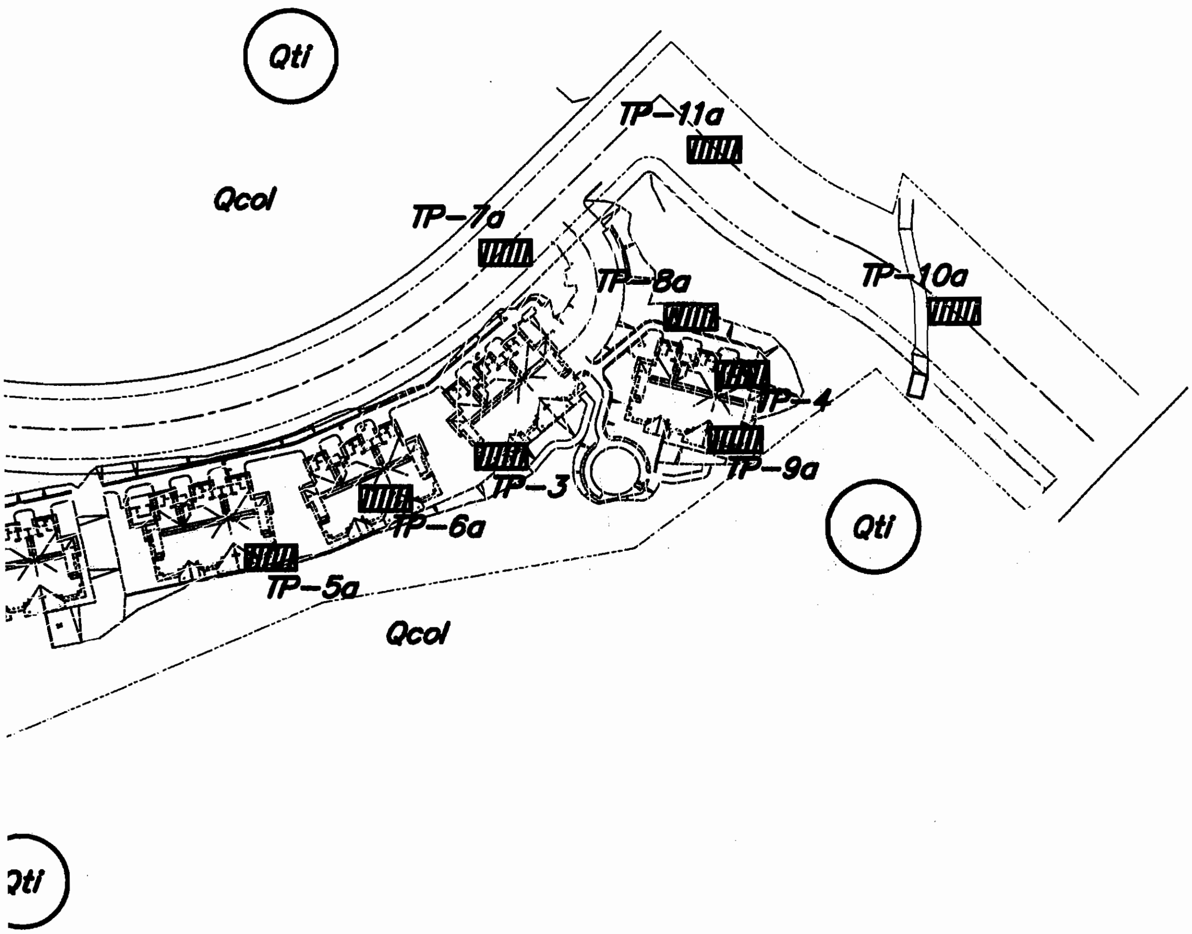
Topsoil/Colluvium was encountered in all the test pits to an approximate depth of 5½-feet below existing grades. In general, the Topsoil/Colluvium consisted of light brown to brown, and light reddish-brown, moist, loose to medium dense, silty, very fine to coarse-grained SAND (Unified Soil Classification Symbols: SM, SP, and SM/SP), with abundant roots extending to approximately 2-feet below grade, and with few to abundant cobble clasts and boulders to approximately 48-inches diameter.

4.2 Glacial Till (Qti)

Glacial Till deposits were encountered in all the test pits below the Topsoil/Colluvium. In general, the Glacial Till deposits consisted of a gray to light reddish-brown, and light brown to light grayish-brown, moist, medium dense to dense, very fine to coarse SAND (SM,SP, and SM/SP) with few to abundant gravels, cobble clasts and boulders to approximately 72-inches diameter. Boulder refusal was encountered at approximately 10-feet in TP-2. In addition, the Glacial Till deposits encountered in TP-4 was very dense at approximately 10-feet. The total thickness of this deposit was not determined during this investigation.

4.3 Groundwater

Neither a groundwater table nor groundwater seepage was encountered during this field investigation. However, slight to moderate mottling of the on-site soils was observed in test pits TP-1 through TP-4 which indicates that seasonally high and temporarily perched groundwater from snowmelt can be anticipated on the site. In addition, a slight amount of groundwater seepage was encountered in TP-11 at a depth of 6- feet during the field investigation conducted in 1999. Groundwater levels in the Mammoth Lakes area are known to fluctuate seasonally. Excavations completed in the spring and early summer should anticipate some seepage. Temporary "nuisance" groundwater may reach depths seasonally whereby it should be intercepted by a permanently installed subdrain or footing perimeter drain system.



PROJECT: **GEOLOGIC MAP** FAIRWAY 16	
SCALE: N.T.S	DATE: 2/2004
DRAWING: FIG3.DWG	DRAWN BY: JAA
JOB NO.: 3.01703.1	FIGURE: FIGURE 3

5. FAULTING

Our discussion of faults on the site is prefaced with a discussion of California legislation and state policies concerning the classification and land-use criteria associated with faults. By definition of the California Geological Survey, an "active fault" is a fault that has had surface displacement within Holocene time (about the last 11,000 years); hence constituting a potential hazard to structures that might be located across it. This definition is used in delineating Earthquake Fault Zones as mandated by the Alquist-Priolo Geologic Hazards Zones Act of 1972, which is detailed in the California Geological Survey Special Publication SP-42 (Hart and Bryant, 1999). The intent of this act is to assure that unwise urban development does not occur across the traces of active faults. Based on our review, the site is not located within any "Earthquake Fault Zones" or Alquist-Priolo Hazard Zones as identified in this document.

6. SITE SEISMICITY

Site coordinates of latitude 37.6409° north and longitude 118.9786° west were estimated using the computer program **Global Mapper**. The computer programs **EQFAULT** and **EQSEARCH** (Blake, 2000) were used to estimate peak horizontal accelerations from regional faults and tabulate data from historical earthquakes.

A deterministic seismic analysis was performed within a 100 km radius of the site using the computer program **EQFAULT** (Blake, 2000). The results of the analysis indicate that the peak ground acceleration estimated for a maximum earthquake event within the specified radius is 0.45g. This acceleration represents deterministic peak ground accelerations and could occur from a magnitude 6.6 (Mw) earthquake on the Hartley Springs Fault located approximately 1.5 km northwest the site. The Hilton Creek Fault, located approximately 9.9 km from the site could produce a magnitude 6.7 (Mw) earthquake resulting in a peak horizontal ground acceleration of 0.28g at the site. The tabulated results of the deterministic seismic analysis are presented in Appendix C. The Fault Location Map, which depicts active faults within a 100 km radius of the site, is also presented in Appendix C.

The computed maximum site acceleration within a 100 km radius of the site was derived from **EQSEARCH** (Blake, 2000) during the time period of 1800 to 2003. The largest estimated site acceleration based on the Boore et al. (1997) model, was 0.24g, which occurred during the Mammoth Lakes Earthquake of January 7, 1983. This earthquake was located approximately 4.6 km from the site. The Modified Mercalli Intensity and earthquake magnitude were IX and 5.7 (M_w) respectively. The largest earthquake recorded within the specified distance and time period was a magnitude 6.6 (M_w) earthquake (Modified Mercalli Intensity of VII) which occurred in The Owens Valley on April 11, 1872. A site acceleration of 0.09g was estimated from this earthquake which was located approximately 45 km from the site.

The tabulated results of the historical analysis are presented in Appendix C. The Earthquake Epicenter Map, which depicts the epicenters and magnitudes of historical earthquakes that have affected the site, a Earthquake Recurrence Curve, and a plot depicting Earthquake Events versus Magnitude also presented in Appendix C.

The computer program **FRISKSP** (Blake, 2000) was used to perform a probabilistic analysis of seismicity at the subject site. The probabilistic analysis was used to define the Upper-Bound and Design Basis Earthquakes at the site for use in structural design. These results as well as Probability of Exceedance versus Acceleration graphs, and Return Period versus Acceleration graphs are presented in Appendix C. Based on the results of the probabilistic analysis, the Upper-Bound Earthquake (Non-Magnitude Weighted) for the site, defined as the ground motion that has a 10 percent chance of exceedance in 100 years, with a statistical return period of ~ 949 years, is 0.44g. The Design Basis Earthquake (Non-Magnitude Weighted) for the site, defined as the ground motion that has a 10 percent chance of exceedance in 50 years, with a statistical return period of ~ 475 years, is 0.35g.

6.1 Seismic Design Criteria

Table 1 presents the Seismic Parameters for use in preparing a Design Response Spectra for the site. The program used to obtain the seismic parameters is UBCSEIS which is based upon the 1997 Uniform Building Code (UBC) and 2001 California Building Code (CBC). The results of the UBC Seismic Design Parameters as well as the Design Response Spectra are presented in Appendix C.

TABLE 1

UBC-CHAPTER 16 TABLE NO.	SEISMIC PARAMETER	RECOMMENDED VALUE
16-I	Seismic Zone Factor Z	0.4
16-J	Soil Profile Type	S_C
16-Q	Seismic Coefficient C_a	0.52
16-R	Seismic Coefficient C_v	0.90
16-S	Near Source Factor N_a	1.3
16-T	Near Source Factor N_v	1.6
16-U	Seismic Source Type	B

The subject site is situated in Seismic Zone 4 (Z=0.4) based on the 1997 UBC, and the 2001 CBC. A geologic subgrade type S_C, "soft-rock or very dense soil" was assumed for the site based upon previously existing seismic compression & shear refraction surveys, conducted in close proximity to the site (Sierra Geotechnical Services, 2004; Chase, 1972).

The Boore et al (1997) NEHRP C (520) acceleration-attenuation relation was used to estimate ground accelerations at the site based upon the shear wave velocity data. The seismic coefficients of acceleration and velocity C_a and C_v, as derived from the soil profile type and seismic zone factor, are 0.52 and 0.90 respectively.

The distance between the site and the nearest active fault is less than 2 km; therefore the near-source acceleration and velocity factors N_a and N_v are 1.3 and 1.6 respectively. The nearest known active fault is the Hartley Springs Fault located approximately 1.5 km northwest of the site. The Hartley Springs Fault is a Type B Seismic Source.

Conformance to the above criteria for strong ground shaking does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur during a large magnitude earthquake. Design of structures should comply with the requirements of the governing jurisdictions, building codes, and standard practices of the Association of Structural Engineers of California. A Design Civil or Structural Engineer in conjunction with the State Architect should determine what level of risk is acceptable for the project considering the recommendations contained in this report, economics, and safety.

7. SECONDARY EARTHQUAKE EFFECTS

Secondary effects that can be associated with severe ground shaking following a relatively large earthquake include ground lurching, faulting and shallow ground rupture, soil lurching liquefaction, seiches and tsunamis, avalanches (rockfall and snow). These secondary effects of seismic shaking are discussed in the following sections.

7.1 Shallow Ground Rupture

Ground surface rupture results when the movement along a fault is sufficient to cause a gap or break along the upper edge of the fault zone on the surface. Our review of available geologic literature indicated that there are no known active, potentially active, or inactive faults that transect the subject site. The nearest known active regional fault is the Hartley Springs Fault. The closest projected trace for this fault zone is located approximately 1.5 km northwest of the site.

7.2 Soil Lurching

Soil lurching refers to the rolling motion on the ground surface by the passage of seismic surface waves. Effects of this nature are likely to be most severe where the thickness of soft sediments varies appreciably under structures. In its present condition, the potential for lurching below the proposed structures is considered low because the potentially compressible soils within the upper few feet of material below existing grades will be excavated during construction of the underground parking areas.

7.3 Liquefaction

Liquefiable soils typically consist of cohesionless sands and silts that are loose to medium-dense and saturated. To liquefy, these soils must be subjected to a ground shaking of sufficient magnitude and duration. The potential for liquefaction to occur is considered low, given the lack of a water table and the dense nature of bearing soils present on site.

7.4 Seiches and Tsunamis

The potential for tsunamis and seiches as the result of the design level earthquake in a nearby fault are considered non-existent, due to the distance of the ocean or large open bodies of water from the project site.

7.5 Avalanches (Rockfall and Snow)

Avalanches can occur as a result of moderate to large earthquakes in Alpine terrain, which can cause rock and snow to move vertically and laterally downslope. These hazards typically affect structures which are located at the base of slopes or within close proximity to the area of flow. The potential for rockfall or snow avalanches to occur at the subject site is considered low, given the proximity of the site to a relatively steep slope area.

8. LANDSLIDES

Evidence of past landslides was not observed either during aerial photographic review or in the field.

9. VOLCANIC HAZARDS

The area of eastern California that includes the Long Valley Caldera and the Mono-Inyo Craters volcanic chain has a long history of geologic activity that includes earthquakes and volcanic eruptions. Studies within this area indicate that massive eruptions of the size that accompanied formation of Long Valley Caldera approximately 760,000 years ago are extremely rare (none have occurred during the period of written human history). Currently, there is no evidence that an eruption of such catastrophic proportions might be forming beneath the Long Valley Caldera (Miller, 1985; 1989).

A small to moderate volcanic eruption could occur however; somewhere along Mono-Inyo Craters volcanic chain producing pyroclastic flows and surges, as well as volcanic ash and pumice fallout, which could significantly impact the subject site. The odds however, of such an eruption are roughly one in a thousand in a given year (Miller, 1985; 1989).

10. CONCLUSIONS

Based on the results of this investigation, it is our opinion that the construction of the proposed project is feasible from a geotechnical standpoint provided the following recommendations are incorporated into the design and construction. The following sections discuss the principal geotechnical concerns affecting site development and grading and provide preliminary grading and foundation design recommendations which should be implemented during site development to mitigate site geologic constraints. However, implementation of these recommendations and adherence to the 1997 UBC, and the 2001 CBC, does not preclude property damage during or following a significant seismic event.

- The proposed development is feasible from a geotechnical standpoint and may be constructed as planned provided the recommendations contained within this report are incorporated into the design and construction.

- There are no known active, potentially active, or inactive faults that transect the subject site. Evidence of past soil failures, landslides, or active faulting on the site was not encountered. Seismic hazards at the site may be caused by ground shaking during seismic events on regional active faults. The nearest known active regional fault is the Hartley Springs Fault located approximately 1.5 km northwest of the site.

- Based on the results of the probabilistic analysis, the Upper-Bound and Design Basis Earthquakes for the site yielded peak ground accelerations of 0.44g and 0.35g respectively.

- The project consultants and the Client should discuss various seismic design parameters and decide upon an appropriate design value based upon their seismic performance goals. A design value of 0.35g is the lowest value that should be considered.

- A volcanic eruption could occur somewhere along Mono-Inyo Craters volcanic chain producing pryoclastic flows and surges, as well as volcanic ash and pumice fallout, which could significantly impact the subject site. The odds however, of such an eruption are roughly one in a thousand in a given year (Miller, 1985; 1989).

- Groundwater seepage was not encountered during our field investigation however, mottling of the on-site soils was observed which indicates that seasonally high and temporarily perched groundwater from snowmelt can be anticipated on the site. Excavations completed in the spring and early summer should anticipate some seepage.

- Temporary "nuisance" groundwater may reach depths seasonally whereby it should be intercepted by a permanently installed subdrain or footing perimeter drain system.

- Site soils encountered during our field investigation generally consist of medium dense to dense, silty, fine to coarse-grained sands, with abundant cobble clasts and large boulders.

- The subject property is situated on low sloping terrain underlain by up to approximately 2 to 4-feet of loose Topsoil/Colluvium considered unsuitable for the support of new fill or structural loads. In structural areas not associated with the underground parking garages the unsuitable deposits should be removed.

- The depth of the unsuitable soils is based upon the areas observed. It should be anticipated that the overall depth of the unsuitable materials exposed during construction may vary from that encountered in the test pits. Reasonably continuous construction observation and review during site grading and foundation installation allows for evaluation of the actual soil conditions and the ability to provide appropriate revisions where required during construction.

- In general, excavations at the site should be achievable using standard earthmoving equipment. However, large boulders were observed at-depth and may require the use of a hydraulic ram to excavate.

- Due to the cohesionless nature of the site soils, sloughing may occur during the excavations for the underground garage areas. Shoring or forming may be required.

11. RECOMMENDATIONS

The following recommendations should be adhered to during site development. These recommendations are based on empirical and analytical methods typical of the standard of practice in California. If these recommendations appear not to cover any specific feature of the project, please contact our office for additions or revisions to the recommendations.

11.1 Geotechnical Review

Geotechnical review is of paramount importance in engineering practice. The poor performance of many foundation and earthwork projects has been attributed to inadequate construction review. Sierra Geotechnical Services, Inc. should be provided the opportunity to review the following items or we waive all liability for any and all geotechnical issues associated with grading or construction relative to the subject site.

11.1.1 Plan and Specification Review

Detailed plans for construction and grading were not available at the time of this report. SGSI should review grading and foundation plans prior to construction in order to assure that they are in conformance with this report; some of the recommendations contained herein may need to be revised after reviewing.

11.2 Earthwork

Earthwork should be performed in accordance with the General Earthwork and Grading Specifications in Appendix E and the following recommendations. The recommendations contained in Appendix E are general grading specifications provided for typical grading projects. Some of the recommendations may not be strictly applicable to this project. The specific recommendations contained in the text of this report supersede the general recommendations in Appendix E. The contract between the developer and earthwork contractor should be worded such that it is the responsibility of the contractor to place the fill properly in accordance with the recommendations of this report and the specifications in Appendix E notwithstanding the testing and observation of the geotechnical consultant.

11.2.1 Site Preparation

The subject property is situated on low sloping terrain underlain by up to approximately 2 to 4-feet of loose Topsoil/Colluvium considered unsuitable for the support of new fill or structural loads. In structural areas not associated with the underground parking garages, the loose Topsoil/Colluvium should be removed.

The depth of the unsuitable soils is based upon the areas observed. It should be anticipated that the overall depth of the unsuitable materials exposed during construction may vary from that encountered in the test pits. Reasonably continuous construction observation and review during site grading and foundation installation allows for evaluation of the actual soil conditions and the ability to provide appropriate revisions where required during construction.

Prior to grading, the proposed structural improvement areas (i.e. all structural fill, pavements areas and structural building, etc.) of the site should be cleared of surface and subsurface obstructions, including vegetation. Vegetation and debris should be disposed of off-site. Holes resulting from removal of buried obstructions, which extend below the recommended removal depths described herein or below finished site grades (whichever is lower) should be filled with properly compacted soil. Should existing underground utilities be encountered they should be completely removed and properly backfilled. Alternatively if the utility is not within the influence zone of the foundation it may be abandoned in place by fully grouting the pipe.

11.3 Excavation and Grading Observation

Site grading and footing excavations should be observed by SGSI. Such observations are considered essential to identify field conditions that differ from those anticipated by the investigation, to adjust design to actual field conditions, and to determine that the grading is accomplished in general accordance with the recommendations of this report. Earthwork and grading recommendations which include guidelines for site preparation fill compaction, slopework, temporary excavations, and trench backfill are provided in Appendix D.

11.4 Preliminary Foundation Preparation and Design

The following preliminary recommendations are presented as minimum design recommendations; they are not intended to supercede design by the structural engineer. Preliminary foundations should be designed in accordance with structural considerations and the following recommendations. Upon the completion of the grading and structural plans, Sierra Geotechnical Services Inc. should review the foundation loads and embedment in order to confirm the implementation of the recommendations herein.

Continuous or pad footings may be used to support the proposed structures provided they are founded entirely upon either competent fill or competent native materials. Continuous and isolated column foundations should be sized according to the allowable soil bearing pressures shown in Table II below. The pressures shown on Table II are for dead load plus long-term live load, including snow load, and for total load including wind and seismic forces. Passive soil resistance to lateral footing pressure may be calculated using an equivalent fluid weight or a base coefficient of friction as given in Table II. It is recommended that the friction of coefficient be reduced by one-half if both passive and frictional resistances are assumed to act simultaneously.

Table II – Allowable Soil Bearing Pressures

Depth Below Existing Ground Surface	Allowable Soil Bearing Pressure (pcf)
Upper 5-feet or compacted fill	3,000
5 to 15-feet	4,500

The allowable pressure may be increased by one-third when considering loads of short duration such as wind or seismic forces. Continuous and isolated footings should be designed in accordance with the structural engineer requirements. Reinforcement of footings should be per the structural engineer's design.

11.4.1 Foundation Construction

Based upon our observations and past experience relative to the general site area, low expansive soils exist onsite. The following preliminary recommendations assume low expansive soils near finish pad grade.

- Footings should be designed in accordance with the structural engineer requirements regarding width. Exterior and interior foundations shall be founded within compacted fill or competent native soils. Exterior foundations shall have a minimum embedment depth of 24-inches below outside adjacent grade. Interior foundation depths shall be a minimum of 18-inches below adjacent grade.

- All footings should be reinforced with at least the minimum reinforcement required for temperature as required in Chapter 19 of the 1997 UBC.

- All footing excavations should be observed by a representative of SGSI prior to placement of reinforcing steel, in order to assure proper embedment into suitable soils.

- Although no specific pre-saturation is required for these soil conditions, footing trench excavations should be well moistened prior to pouring concrete.

- Footing trenches should not have any rocks or boulders protruding into the trench bottom. Soft soil pockets created by rock removal during foundation excavation shall be replaced with approved fill material, and compacted to 95-percent of the material's maximum dry density.

11.4.2 Light and Utility Pole Foundation

Columns embedded entirely within either competent certified fill, competent native materials, or concrete footings embedded in either competent certified fill, or competent native materials may be used to resist both axial and lateral loads. The depth to resist lateral loads shall be determined the structural engineer in accordance with California Building Codes Section 1806.8. Lateral soil-bearing pressures included in Section 12.9 may be utilized for the design of the Light and Utility Pole Foundations.

11.5 Foundation Setback

We recommend a minimum horizontal setback distance from the face of slopes for all structural footings and settlement-sensitive structures (i.e. fences, walls, signs, etc.). This distance is measured from the outside edge of the footing, horizontally to the slope face (or to the face of a retaining wall). The 2001 CBC recommends that a 5-foot minimum setback be established for the outside footing face (bearing elevation) to the finished grade slope face. We should note that the soils within a slope setback area possess poor long term lateral stability, and improvements (such as retaining wall, sidewalks, fences, pavement, underground utilities, etc.) constructed within this setback area may be subject to lateral movement and/or differential settlement.

Utility trenches that parallel or nearly parallel structure footings should not encroach within a 1:1 plane extending downward and outward from the outside edge of the footing.

11.6 Concrete Slab-on-Grade Floors

Compacted fill materials will provide adequate support for concrete slabs provided the on-site materials are prepared per our grading recommendations prior to placement of the slab.

Structural fill and subgrade soils underlying concrete slabs shall be compacted to a minimum of 90-percent of the material's maximum dry density for the upper 12-inches. Concrete slabs should be underlain by a 2-inch layer of clean sand (SE greater than 30) to aid in concrete curing, which is underlain by a 10-mil (or heavier) moisture barrier, which is, in turn, underlain by a 2-inch layer of clean sand to act as a capillary break. All penetrations and laps in the moisture barrier should be appropriately sealed.

Minimum slab reinforcement shall consist of #3 rebar placed at 18-inches on center each way. The slab reinforcement shall be placed, vertically, in the middle of the slab. Slab thickness shall be a minimum of 4-inches. In areas where heavy equipment or loading will stress the slab, the thickness and reinforcement will meet the requirements of the Structural Engineer of record. Our experience indicates that the use of reinforcement in slabs and foundations will generally reduce the potential for drying and shrinkage cracking. However, some cracking should be expected as the concrete cures. Minor cracking is considered normal; however, it is often aggravated by a high cement ratio, high concrete temperature at the time of placement, small nominal aggregate size and rapid moisture loss due to hot, dry, and/or windy weather conditions during placement and curing.

Cracking due to temperature and moisture fluctuations can also be expected. The use of low slump concrete (not exceeding 4-inches at the time of placement) can reduce the potential for shrinkage cracking.

Moisture barriers can retard, but not eliminate moisture vapor movement from the underlying soils up through the slab. We recommend that the floor coverings installer test the moisture vapor flux rate prior to attempting application of the flooring.

"Breathable" floor coverings should be considered if the vapor flux rates are high. A slipsheet should be used if crack sensitive floor coverings are planned.

12.7 Corrosivity of Soils to Concrete and Steel

Geochemical screening of the onsite soils was performed. The screening is meant to serve as an indicator for determining the level of input necessary from a qualified corrosion engineer.

The National Association of Corrosion Engineers (NACE) defines corrosion as "a deterioration of a substance or its properties because of a reaction with its environment." From a geotechnical viewpoint, the "environment" is the prevailing foundation soils and the "substances" are reinforced concrete foundations or various types of metallic buried elements such as piles, pipes, etc., which are in contact with or within close vicinity of the soil.

In general, soil environments that are detrimental to concrete have high concentrations of soluble sulfates and/or pH values of less than 5.5. Table 19-A-4 of the 2001 CBC provides specific guidelines for the concrete mix design when the soluble sulfate content of the soils exceed 0.1 percent or 150 parts per million (ppm). The minimum amount of chloride content in the soil environment that are corrosive to concrete and steel, either in the form of reinforcement protected by concrete cover, or plain steel substructures such as steel pipes or piles is .05 percent (500ppm) per California Test Method 532. Results of laboratory corrosivity test conducted on near surface samples yielded soluble sulfate contents of less than 150 ppm, chloride contents of less than 25 ppm, a pH value of 8, and an electrical resistivity of 68,167 ohm-cm.

Based on these results, concrete in contact with the existing earth material at the site is expected to be subject to negligible sulfate exposure (as per Table 19-A-4 of 2001 CBC). Metal components in contact with soils at the site are expected to be subject to negligible corrosion due to a relatively high soil resistivity value. In general, soils having minimum electrical resistivity values less than 2,000 ohm-cm are considered corrosive to metals in contact; the effect of corrosivity is particularly pronounced in soils having minimum electrical resistivity values less than 1,000 ohm-cm.

11.8 Pavement Recommendations

For preliminary planning purposes, pavement sections are provided based on the results of R-value laboratory testing on a selected soil sample collected during the 1999 subsurface exploration. Final pavement design should be based on the results of R-Value testing performed on samples of the finished subgrade soils in pavement areas. Based on an R-Value of 74 (Appendix B), SGSI recommends the following pavement sections:

- Standard Duty Roadway and Parking Areas (Traffic Index (TI)= 7.5)
  3-inches Asphalt Concrete / 6-inches Class II Aggregate Base

For the paved roadway, parking areas and other improvements a one-foot removal is recommended depending on site conditions (i.e. depth of root zone, and depth of disturbance which may have locally deeper removal depths). The removal bottom should be observed (tested as needed) by the geotechnical consultant prior to placing fill soils. Removals and Compaction recommendations are provided in Appendix D.

The upper 12-inches of subgrade material along with the Class II Aggregate Base and the Asphaltic concrete shall be compacted to a minimum of 95-percent of the material's maximum dry density as determined by ASTM D1557-2000. The subgrade and aggregate base shall be moisture-conditioned and compacted to 95-percent of the material's maximum dry density as determined by ASTM D-1557-2000 to a depth of 12-inches.

The preliminary pavement sections were designed for the assumed traffic loading and environmental conditions. Based upon our experience in the Mammoth Lakes area, environmental conditions such as freeze-thaw and thermal cracking will most likely govern the life of the pavement.

If pavement areas are adjacent to heavily watered landscape areas, some deterioration of the subgrade load bearing capacity may result. We recommend some measures of moisture control (such as deepened curbs or other moisture barrier materials) be provided to prevent the subgrade soils from becoming saturated.

11.9 Lateral Earth Pressures and Resistance

Embedded structural walls or cantilever retaining walls should be designed for lateral earth pressures exerted on them. The magnitude of these pressures depends on the amount of deformation that the wall can yield under load. If a wall can yield enough to mobilize the full shear strength of the soil; it can be designed for "active" pressure.

If a wall cannot yield under the applied load, the shear strength of the soil cannot be mobilized and the earth pressure will be higher. Such walls should be designed for "at rest" conditions. If a structure moves toward the soils, the resulting resistance developed by the soil is the "passive" resistance.

For design purposes, the recommended equivalent fluid pressure for each case for walls founded above the static ground water and backfilled with soils of very low to low expansion potential is provided. The equivalent fluid pressure values assume free-draining conditions. If conditions other than those assumed above are anticipated the equivalent fluid pressure values should be provided on an individual-case basis by the geotechnical engineer. Surcharge loading effects from the adjacent structures should be evaluated by the structural engineer. The select backfill should have an expansion index (EI) of no greater than 50 and a sand equivalent (SE) greater than 15. The backfill soils should be tested by the soils engineer prior to backfill operations starting for the retaining wall/basement wall structures.

Slope of Backfill Behind Retaining Wall	**Lateral Earth Pressure in Equivalent Fluid Weight (pcf)**	
	Active Case	Passive Case
Horizontal	45	310
2:1 (H:V)	80	685

The earth pressures are given in terms of equivalent fluid pressures for walls having backfills of horizontal and 2 to 1 slopes. For sliding resistance, the friction coefficient of 0.35 may be used at the concrete and soil interface. In combining the total lateral resistance, the passive pressure or the frictional resistance should be reduced by 50-percent. Wall footings should be designed in accordance with structural considerations.

The passive resistance value may be increased by one-third when considering loads of short duration, including wind or seismic loads. The horizontal distance between foundation elements providing passive resistance should be a minimum of three times the depth of the elements to allow full development of these passive pressures. The total depth of retained earth for design of cantilever walls should be the vertical distance below the ground surface measured at the wall face for stem design or measured at the heel of the footing for overturning and sliding.

Wall backcut excavations less than 5-feet in height can be made near vertical. All retaining wall structures should be provided with appropriate drainage and waterproofing. Drainage should consist of continuous drains installed along the base of the wall outletting to a storm drain system or the surface if grade allows.

11.10 Estimated Settlement

Post construction settlement is estimated to be one-half inch or less if the foundation recommendations provided in this report are conformed too. Post-construction differential settlements should be one-quarter inch or less. Settlements for similarly loaded footings located on varying thicknesses of fill may experience differential settlements on the order of 0.5 percent of the difference in fill thickness beneath the footings. We recommend that the foundation plans be reviewed once detailed loading conditions are known to confirm the estimated settlements mentioned above.

11.11 Drainage

We recommend that measures be taken to properly finish grade the building area, such that drainage water from the building area is directed away from building foundations (2-percent minimum grade on soil or sod for a distance of 5-feet). Ponding of water should not be permitted. Erosion is possible on the pad and slopes if left unprotected during the snowmelt run-off season.

12. LIMITATIONS

This report has been prepared for the sole use and benefit of our client. The intent of the report is to advise our client on the geotechnical recommendations relative to the future development of the proposed project. It should be understood that the consulting provided and the contents of this report are not perfect. Any errors or omissions noted by any party reviewing this report, and/or any other geotechnical aspects of the project, should be reported to this office in a timely fashion. The client is the only party intended by this office to directly receive this advice. Unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Sierra Geotechnical Services Incorporated from and against any liability, which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Sierra Geotechnical Services Incorporated.

Conclusions and recommendations presented herein are based upon the evaluation of technical information gathered, experience, and professional judgment. Other consultants could arrive at different conclusions and recommendations. Final decisions on matters presented are the responsibility of the client and/or the governing agencies. No warranties in any respect are made as to the performance of the project.

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OV, FL-1, 7-84 & 85; Dated 10/19/1944, 1:24,000

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
MAMMOTH GREEN AT SIERRA STAR
LOT 1 OF TRACT 36-191
APNs: 33-330-32 and 33-330-34
2001 LODESTAR DRIVE
MAMMOTH LAKES
MONO COUNTY, CALIFORNIA

June 20, 2000
JN: 3.01746

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1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

Sierra Geotechnical Services, Inc. (SGSI) has been contracted by Intrawest Mammoth Corporation to provide environmental consulting for a Phase I Environmental Site Assessment of the property known as Mammoth Green as Sierra Star, Lot 1 of Tract 36-191, Mammoth Lakes, Mono County, California, herein referred to as the Property. The Property is currently owned by Mammoth Intrawest Corporation having been recently purchased from Acuff Properties LLC.

An assessment was performed to evaluate areas of potential environmental concern including those that may have arisen as a result of past hazardous or other materials use, handling or storage on or near the Property. The scope of work was performed in accordance with our Agreement and Work Order executed on May 22, 2000. A copy of this contract is included in Appendix A. This assessment consisted of the following:

- a computerized environmental-record database search of reported environmental concerns and hazardous material operating permit holders within a 1-mile radius of the Property,
- telephone interviews with the Mono County Environmental Health Department (MCEHD), the U.S. Department of Agriculture, Division of Forestry (USFS), the California Division of Mines and Geology (CDMG), and the Mammoth Community Water District (MCWD) personnel regarding the environmental status of the Property and any nearby environmental concerns,
- review of aerial photographs of the Property and surrounding vicinity,
- an interview with the current owner of the Property,
- a property reconnaissance, and
- preparation of this report presenting our findings and conclusions.

2.0 PROPERTY DESCRIPTION

2.1 LOCATION AND VICINITY CHARACTERISTICS

The Property encompasses approximately 4.3 acres and is located approximately 300 feet east and 600 feet north of the intersection of Meridian Boulevard and Majestic Pines Drive in Mammoth Lakes, California (Figure 1). The Property is situated within the southwest portion of the Lodestar Master Plan property and is bounded on the north, east, and south by Fairways #4, #3, and #2 of the Sierra Star Golf Course, respectively (Figure 2). An existing Lodestar condominium project is located along the east boundary. Access to the Property is from an eastern continuation of an existing driveway that accesses the Lodestar condominium project on the east.

2.2 EXISTING TOPOGRAPHY AND DRAINAGE

The Property slopes from west to east toward Majestic Pines Drive which borders the easterly edge of the property. The westerly half of the Property slopes at a grade of approximately ten-percent. The Property ranges in elevation between 8,060 and 8,035 feet above mean sea level with a gentle slope towards the east. General Property drainage is from west to east at an approximate grade ranging from 2 to 6 percent. Property drainage consists of sheet flow runoff of incidental rainfall and snowmelt into a small, seasonal flowing creek that crosses the southern end of the Property.

2.3 PROPERTY IMPROVEMENTS

The Property prior to construction was in a natural state covered by indigenous sagebrush and pine trees. A majority of the Property was cleared of trees several years ago during initial site development for the Lodestar condominium and golf course project. According to a Preliminary Report prepared by Inyo-Mono Title Company issued September 23, 1999 (Appendix B), three timberland conversion permits were executed by the State Department of Forestry and Fire Protection dated May June 5, 1991, December 28, 1992, and April 17, 1995. An existing underground Southern California Edison power line, a sewer line, and an 8-inch P.V.C. water line traverse portions of the Property all providing service to Lot 2. A stormdrain system has also been constructed across the Property that diverts drainage on Lot 2 over the golf course at the southern end of the Property.

2.4 CURRENT AND HISTORICAL USE OF THE PROPERTY

The Property prior to any construction the Property had remained in a natural state. According to Mr. Bob White with Mammoth Properties, a small portion of the Property was used for heavy equipment parking and general maintenance operations during the construction of the Sierra Star Golf Course. Mr. White indicated that crankcase oil was changed periodically and that waste oil was stored onsite in 55-gallon drums. The portion of property used for these operations was located near the center of the tract map, south of the existing underground parking foundation located offsite on Lot 2 (Figure 2). Photos of the maintenance area were taken in Fall of 1998 by Triad/Holmes Associates and are provided in Appendix J (Photos 1 and 2).

Construction operations for the proposed condominium project began in May of 2000 following issuance of the Town of Mammoth Lakes Grading Permit No. 2000-02 dated May 16, 2000 (Appendix C).

2.5 GEOLOGY AND HYDROGEOLOGY

The Property is located in the western portion of the Long Valley caldera near the eastern flank of the Sierra Nevada. The Long Valley caldera (collapsed volcano) is an elongate feature formed approximately 760,000 years ago. Volcanic eruptions of vents on Mammoth Mountain immediately to the northwest, occurred between 300,000 and 10,000 years ago.

In late Quaternary time a series of alpine glaciation events occurred in the Sierra resulting in sculpting of local volcanic, granitic and mete-sedimentary rock and deposition of glacial till in and around the city limits. The Property is located entirely on glacial till from the Tioga glaciation event (Bailey, 1989). Several recent faults (surface rupture less than 11,000 years ago) and historic faults (surface rupture less than 200 years ago) are located in the area of the resurgent dome near the center of the caldera and along the eastern Sierran escarpment. However, no faults have been mapped within the Town of Mammoth Lakes. As such, the Property is not located within a designated Alquist-Priolo Earthquake Fault Zone (Special Studies Zones Map, N.W. 1/4 Mt. Morrison Quadrangle); however, the closest study zone is for the Hartley Springs fault located approximately one-half mile west of the Property where deformation was detected during the 1980 Long Valley Caldera earthquake swarm.

Depth to perched ground water beneath the Property was found to be approximately 3 to 4 feet below the surface based on the soils investigation report prepared by SGSI in April of 1999. Groundwater levels in the Mammoth Lakes area are known to fluctuate seasonally. Depth to permanent groundwater beneath the Property is estimated at about 30 feet below the ground surface with a flow gradient that trends approximately due east (Coe, 1973).

3.0 RECORD SEARCHES

3.1 ENVIRONMENTAL RECORD REVIEW

A computerized environmental record search was performed Vista Information Solutions, Inc., of San Diego, a private database vender. The environmental search was performed for reported current and historical environmental concerns and operating permits involving hazardous materials within a 1-mile radius. The Vista report conforms to ASTM criteria for database standards, including but not limited to searches on CERCLIS and EPA lists. The Vista report dated May 22, 2000 is presented in Appendix D. The database report is discussed with regards to mappable and unmappable sites. Mappable sites are those that can be reasonably to accurately located on the Vista Site Maps.

3.1.1 Environmental Concerns – Mappable Sites

Eight USGS and State water wells were mapped on the Vista Site Map and found to be within one-half mile of the Property. No other sites of adverse environmental concern were denoted.

3.1.2 Environmental Concerns – Unmappable Sites

Of the 83 unmappable sites listed in the Vista report, only four sites were determined to be within one-half mile of the Property. All four are sites with registered with the Mono County Environmental Health

Department as underground or aboveground fuel storage tanks. The nearest site is located immediately south of the Property within the Summit Condominiums development. The next nearest UST site is located due west of the Property at Camp High Sierra. Another UST site is located in the Big Woods Homeowners Association at 1629 Majestic Pines Road northwest of the Property. The fourth UST is located northeast of the Property at the Lodestar Maintenance Facility at 5700 Minaret Road. None of the sites are considered to be of adverse environmental concern to the Property.

3.2 REGULATORY PERSONNEL INTERVIEWS

Mr. Martin Schleich with the Mono County Environmental Health Department (MCEHD) was contacted regarding the Property. Mr. Schleich reported that the MCEHD was unaware of any environmental problems or violations in regards to the Property, however he did provide a notice of closure for the proper removal of the previously mentioned UST from the Summit condominium community. A copy of the closure notice is enclosed in Appendix E.

Mr. Rick Murray and Mr. Vern MacLean of the USFS were contacted regarding their knowledge of any environmental permits on file for the Property. Although the USFS has environmental concern for their public lands, Mr. Murray refers most permitting and enforcement thereof to Mono County. Mr. MacLean was questioned about any history of radon and/or the extraction of radioactive elements within or near the town of Mammoth Lakes, but he had no knowledge of any unacceptable levels of radon detection or of any radioactive extraction operations historically or presently.

Ms. Blair Hafner of the MCWD was contacted regarding their knowledge of any radon content in the local water supply. Ms. Hafner replied that no unacceptable levels radon or radon progeny have been detected in the Lake Mary reservoir nor in the MCWD’s eight ground water production wells, all of which supply the Mammoth Lakes community with water. The water supply is regularly tested by the MCWD for gross alpha radioactivity, uranium and combined radium, but the level of detection for these contaminants has always remained non-detect or at levels far below the allowable limits. The MCWD publishes an Annual Drinking Water Quality Report, and a copy of the 1998 annual report dated April, 1999, is provided in Appendix F.

Mr. Robert Sydnor of the State of California, The Resources Agency, Department of Conservation, Division of Mines and Geology (CDMG) was contacted about his knowledge of recent carbon dioxide detections near the Property. Mr. Sydnor provided a document dated September 29, 1999, addressed to the Town of Mammoth Lakes specifying that volcanic gases primarily in the form of carbon dioxide are both an ‘air quality’ issue and a ‘geologic hazard’ with respect to health-and-safety for the Mammoth Mountain area. Recent emissions of carbon dioxide have been responsible for tree-kills on the southern and western flanks of Mammoth Mountain. The nearest tree-kill area is approximately 2 miles away to the southwest near the Horseshoe Lake area. A copy of the CDMG document is included in Appendix G.

Robert “Cass” Casteneda with Southern California Edison in Mammoth Lakes was contacted regarding his knowledge of the possible presence of PCB-containing transformers on or near the Property. According to Cass, only one transformer is located near the Property on Lot 2 (offsite) with PCB amounts tested at less than 50 parts-per-million. This is a level that is acceptable and below the Mono County action level for PCB. The transformer is situated on the concrete floor of the existing garage structure south of the existing Lodestar Apartments. No other transformers were reported to be or located on the Property.

3.3 AERIAL PHOTOGRAPH REVIEW

Aerial photographs were reviewed at the USFS office in Lee Vining, California. Other sources contacted, but which did not have appropriate aerial photographs or from which photographs were not readily available, included the Los Angeles Department of Water and Power (DWP), the California Department of Transportation (Caltrans), and the Bureau of Land Management (BLM). The information below is a summary of the review of four photographic stereo pairs of the Property and surrounding area taken between 1944 and 1996. Also reviewed was a 1978 blueline orthophoto of the Property on file with SGSI. Copies of the photos are provided in Appendix H. Scales of the photographs are indicated. The following summaries are interpretive and are valid only for the dates indicated.

9/22/44, FL-58, DDE 12-111 & 112; 1:20,000, stereo pair, black & white, good resolution.

Property and vicinity all in natural state; High Sierra Rd. (dirt) traverses northwesterly to the north nearby.

8/23/56, FL-109, EAD 19-131 & 132, 1:15,000, stereo pair, black & white, excellent resolution.

No noticeable changes.

9/10/63, EMG, FL-27, 7-145 & 146, 1:15,840, stereo pair, black & white, good resolution.

No noticeable changes.

8/17/72, INO4, FL-14, 3-152 & 153, 1:15,840, stereo pair, color, good resolution.

Portion of High Sierra Rd. has been replaced by new Meridian Blvd. under construction; Property and surrounding area still in a natural state; condos under construction south of Meridian Blvd.

7/29/78, American Aerial Surveys, Mono County Road Dept., Minaret (sic-Meridian) Road Extension Project, Orthophoto-OR-1, Sheets 1 and 2 of 8, 1”=200’, Contour Interval = 10’, blue-line, fair resolution.

No noticeable changes.

6/30/93, FL-13S; USDA-F 593-160 & 161, 1:15,840, color, stereo pair, good resolution.

Meridian Blvd. paved; Sierra Star golf course under construction with fairways cleared of trees; Property and vicinity still in natural state.

9/20/96, Western Aerial, 16-96 Mylar Orthophoto, 1”=100’, black & white, excellent resolution.

No changes.

4.0 PROPERTY MANAGER INTERVIEW

A questionnaire regarding environmental aspects of the Property was completed by Mr. Steve R. Mercer, the current Property manager. The questionnaire is taken from ASTM Practice E1528 – 96. The completed questionnaire is included in Appendix I. According to the questionnaire, Mr. Mercer was not aware of any previous or present environmental concerns regarding the Property.

5.0 PROPERTY RECONNAISSANCE

The Property and surrounding vicinity was visited periodically by the undersigned on November 11, 1999 and throughout the construction operations beginning in May, 2000 and up to the present date. Photographs of the Property taken before and during construction operations are enclosed in Appendix J.

5.1 GENERAL OBSERVATIONS

Based on the observations made across the entire property, nothing was found on the ground surface to indicate any adverse environmental concerns regarding the Property, particularly in the area where the 55-gallon drums were stored. Observations made June 15, 2000 were documented with a digital camera. Photographs were made around the perimeter of the Property during the construction operations, and the photos are included in Appendix J.

The Property at all times appeared free from unusual odors, stains, and hazardous materials. No large quantities of any chemicals or paints were observed other than what was observed on the 1998 photographs and what is being used immediately for construction. No UST fill pipes, UST vent pipes, PCB-containing transformers, asbestos, barrel drums, long-term standing water, pits, ponds or lagoons, storm drains, septic systems, fill spouts or sumps were observed.

The Material Safety Data Sheets on file within the mobile construction office were reviewed and found to be organized and consistent with the products being utilized for construction of the lodge facility. Common semi-toxic products in use on the Property include various paints, adhesives and solvents.

5.2 SURROUNDING VICINITY

Industrial development was not observed within the surrounding vicinity. Nothing of adverse environmental concern was readily observed in any of the areas surrounding the Property.

6.0 FINDINGS AND CONCLUSIONS

The Property is locate in the town of Mammoth Lakes within the southwest portion of the Lodestar Master Plan adjacent to the Sierra Star Golf Course.

Depth to perched ground water on the Property was found to be approximately between 3 and 4 feet below the ground surface.

The southern portion of the Property was as a maintenance yard for heavy equipment during construction of the Sierra Star Golf Course. 55-gallon drums of waste oil were temporarily stored at this site. Visual examination of this area did not reveal any evidence of any significant staining or contamination of the surface soils.

The CDMG and the USGS jointly advised the Town of Mammoth Lakes of a significant health-and-safety issue regarding the hazard of carbon dioxide emissions at Mammoth Mountain. The nearest tree-kill site related to carbon dioxide is about 2 miles to the southwest.

One transformer is located near the Property on Lot 2 (offsite) with PCB amounts tested at less than 50 parts-per-million, which is a level that is acceptable and below the Mono County action level for PCB.

Based on the interviews, observations, and the information gathered during the time frame for this assessment, no evidence of significant adverse or remediated environmental conditions in connection with the Property or the vicinity were revealed. It is our professional opinion based on the information discovered to date that environmentally adverse conditions do not exist on the Property.

SGSI performed this Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practices E1527 and E1528. Any exceptions to, or deletions from, these practices are described in Section 7.0 of this report.

7.0 LIMITATIONS OF THE ASSESSMENT

SGSI has reviewed information concerning the potential presence of contamination on the Property and has prepared this report in a professional manner using that degree of skill and care exercised for similar projects under similar conditions by reputable and competent environmental consultants. The information contained in this report, including its conclusions, is based on the information that was made available to SGSI during the investigation and upon the services described, which were performed within the time and budgetary requirements of the Client. Because this report is based on available information, some of its conclusions could be different if the information upon which it is based is determined to be false, inaccurate, misleading or contradicted by additional information.

SGSI makes no representation concerning the legal significance of its findings or of the value of the Property investigated. This report is not intended to satisfy the requirements of the National Contingency Plan.

8.0 REFERENCES

Bailey, R.A., 1989, Geologic map of the Long Valley caldera, Mono-Inyo craters volcanic chain, and vicinity, eastern California, U.S. Geological Survey, map I-1933.

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Sierra Geotechnical Services, Inc., 1999, Phase I Environmental Site Assessment, The Timbers at Sierra Star, Tract No. 36-182, APNs 33-340-1 through 32, 34, 35 and 36, 2800 Meridian Boulevard, Mammoth Lakes, Mono County, California, W.O. 3.10865, September, 10 pages.

PHASE I and LIMITED PHASE II ENVIRONMENTAL SITE ASSESSMENT

LA SIERRA'S RESTAURANT SITE

Tax Assessor's Nos. 33-110-03

3789 Main Street

MAMMOTH LAKES, MONO COUNTY, CALIFORNIA

March 19, 2004
Revised March 30, 2004
Work Order No. 3.00680

Prepared For: *Ms. Mariella Voorhees*
C/o Mr. Nick Pavlovich
P.O. Box 373
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1.0. INTRODUCTION

This report presents the findings, opinions, and conclusions of Sierra Geotechnical Services, Inc. (SGSI) Phase I and Limited Phase II Environmental Site Assessment (ESA) of the La Sierra's Restaurant Site, herein referred to as the Site, located in the Town of Mammoth Lakes, Mono County, California. SGSI was contracted by Mr. Nick Pavlovich (User) and his realtor, Mr. Mark McLean, to prepare this ESA, which is required by the User for the purpose of a potential real estate transaction.

1.1. PURPOSE

The purpose of this ESA is to:

1. Identify, to the extent feasible pursuant to the processes prescribed in ASTM Practice E 1527-00, "*Standard Practice for Environmental Site Assessment: Phase 1 Environmental Site Assessment Process,"* any recognized environmental conditions (REC), historical recognized conditions (HREC), and *de minimus* environmental conditions (DMEC) in connection with the Site and the surrounding areas;
2. Identify any RECs, HRECs, and/or DMECs in connection with the Site pursuant to ASTM Practice E 1528-00, "*Standard Practice for Environmental Site Assessments: Transaction Screen Process,"* as determined by both the User and the undersigned via interview and site reconnaissance;
3. Perform limited soil sampling and laboratory testing pursuant to the guidelines suggested in ASTM Practice E 1903-97, *"Guide for Environmental Site Assessments: Phase II Environmental Site Assessment,"* in order to detect the presence of any hydrocarbons on the Site;
4. Evaluate the Site and surrounding areas with respect to the range of hazardous materials within the scope of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, including amendment by the Superfund Amendments and Reauthorization Act (SARA);
5. Provide the minimum level of appropriate inquiry that CERCLA requires to qualify the User for the "innocent landowner defense";
6. Summarize the environmental conditions that could materially, or otherwise adversely impact the User's operation of the business proposed for the Site; and
7. Present SGSI's professional conclusions and opinions regarding the impact of known or suspect environmental conditions on the Site and surrounding areas based on the documented findings.

1.2. DETAILED SCOPE OF SERVICES

This Phase I and Limited Phase II ESA was performed to evaluate areas of potential environmental concern, including those that may have arisen as a result of past hazardous or other materials use, handling or storage on or near the Site that have occurred in the past. The scope of work was performed in accordance with our Proposal and Cost Estimate dated February 18, 2004, and with our Agreement and Work Order signed by both SGSI and the User on February 18, 2004 (Appendix A). Our scope of work consisted of the following:

1. review of a database search of reported environmental conditions and hazardous materials operating permit holders within an approximate minimum search distance of one mile of the Site's boundaries,
2. review of any previous ESA work for the Site and for adjacent properties in the immediate vicinity,
3. interviews with the following regulatory entities:
   - Regional Water Quality Control Board, Lahontan Region (Lahontan),
   - Great Basin Unified Air Pollution Control District (GBUAPCD),
   - U.S. Department of Agriculture, Division of Forestry (USFS),
   - U.S. Department of the Interior, Bureau of Land Management (BLM)
   - U.S. Department of the Interior, U.S. Geological Survey (USGS),
   - The Resources Agency, California Geological Survey (CGS),
   - California Department of Transportation, District 9 (Caltrans),
   - California Division of Oil, Gas, and Geothermal Resources (DOGGR),
   - Mono County Department of Agriculture (MCDA),
   - Mono County Building Department (MCBD),
   - Mono County Environmental Health Department (MCEHD),
   - Town of Mammoth Lakes (TOML),
   - Mammoth Community Water District (MCWD), and
   - Mammoth Lakes Fire Protection District (MLFPD),
4. stereo review of aerial photographs of the Site and surrounding vicinity,
5. an interview with the Owner/Key Site Manager,
6. a preliminary reconnaissance of the Site, and
7. preparation of this ESA report.

1.3. LIMITATIONS AND EXCEPTIONS TO THE ASSESSMENT

The material evidence gathered from the sources used in this ESA is only as complete as the sources themselves. Some events resulting in potential environmental contamination are not reported to the federal, state, county, and local agencies, and therefore are not available for review in the public records. SGSI cannot warrant the accuracy, validity, or completeness of the information maintained in the records investigated. Because this ESA is based on readily available information, some of SGSI's conclusions could be considered irrelevant if the information upon which they are based is determined to be false, inaccurate, misleading or contradicted by additional information. SGSI's conclusions, opinions, and recommendations in this ESA are true, accurate, and certified subject to, limited by, and disclaimed as the underlying accuracy and veracity of this information. Specifically not included in this ESA are issues outside the scope and requirements of ASTM E 1527-00. Typical non-scope issues include the following:

1. Asbestos-containing materials
2. Radon
3. Lead-based paint
4. Lead in drinking water
5. Wetlands
6. Regulatory compliance
7. Archaeological preserves

SGSI performed this ESA in a professional manner using that degree of skill and care exercised for similar projects under similar conditions by environmental consultants. Nonetheless, there are several major qualifications that are inherent in the conduct of this or any other environmental due diligence examination:

1. It is difficult to predict which, if any, identified potential problems will become actual problems in the future. Governmental agencies and their regulations continually change over time as do the enforcement priorities of the applicable

agencies involved;

2. There is always the distinct possibility that major sources of future environmental liability have yet to manifest themselves to the point where they are reasonably identifiable through an external investigation such as the one conducted for this ESA;
3. The results of SGSI's investigation represent the applications of a variety of technical disciplines to materials, facts, and conditions associated with the Site. Many of these are subject to change over time; accordingly, the summary, conclusions, opinions, and recommendations must be viewed within this context;
4. SGSI shall not be held responsible for limiting conditions (i.e. snow coverage) or consequences arising from relevant facts that were concealed, withheld, or not fully disclosed at the time this ESA was performed;
5. Properties adjoining the Site were only unobtrusively and visually inspected; therefore, SGSI does not warranty the integrity of adjoining properties in this ESA; however, SGSI made every effort to view as much of these properties as possible;
6. SGSI makes no representation concerning the legal significance of its findings or of the value of the Site investigated; and
7. This ESA is not intended to satisfy the requirements of the National Contingency Plan.

1.4. USER RELIANCE

This ESA was prepared solely for the benefit and reliance of the User. Any use of, or reliance upon, this information by a party other than the User shall be solely at the risk of such third party and without legal recourse against SGSI or their respective employees, officers, or owners, regardless of whether the action in which recovery of damages is sought based on contract, tort, (including the sole, concurrent, or other negligence and strict liability of SGSI), statute, or otherwise.

2.0. SITE DESCRIPTION

2.1. LEGAL DESCRIPTIONS AND ADDRESS

The Mono County Tax Assessor's Parcel No. for the Site is recorded as 33-110-03.

The legal address for the Site is 3789 Main Street, Mammoth Lakes, California 93546.

Legal description for the Site is described in the title record enclosed in Appendix B (see Section 3.1).

2.2. SITE LOCATION AND VICINITY CHARACTERISTICS

The Site is regionally located in east-central California, in the southwest portion of Mono County, south of Mono Lake and west of Crowley Lake (Figure 1), and it is centered on the approximate map coordinates of latitude 37.6482°N and longitude 118.9793°W. The Site is located an the western edge of the Town of Mammoth Lakes city limits, approximately 4.5 miles west of the intersection between U.S. Highway 395 and State Route 203 (Figure 2). More specifically, the Site encompasses approximately 0.96 acres and occupies a parcel on the south side of Main Street (Figure 3). It is bound on the north by Main Street, on the east by Mammoth Gateway Village Condominiums project, on the west by The Chutes Affordable Housing project, and on the south by Lodestar Golf Course. Vehicular access to the Site is obtained via a driveway extending south from Main Street. One restaurant building currently exists on the Site, and it is known as La Sierra's.

2.3. EXISTING TOPOGRAPHY AND DRAINAGE

Overall topography on the Site slopes predominantly to the southeast between elevations of approximately 7956 feet and 7940 feet above mean sea level (Figure 4). Graded pads and driveways from past development are found on the Site.

2.4. HISTORICAL AND CURRENT USE OF SITE

Historically, the Site was in a natural state up until sometime between 1951 and 1954, which is about when the first building was constructed. Later, commercial lodging was constructed at three other locations on the Site, but by about 1992 these were all demolished. Currently, only the restaurant remains.

3.0. USER/OWNER PROVIDED INFORMATION

3.1. TITLE RECORDS

The User provided a copy of a Preliminary Report dated January 26, 2004 prepared by Inyo-Mono Title Company. According to this document, title to this portion of the Site is vested in Mariella Voorhees, a married woman, as her separate property. A copy of this report is enclosed in Appendix B.

3.2. ENVIRONMENTAL LIENS

SGSI searched for but did not find any environmental liens listed in the title report, and no uses or ownerships were listed that would indicate any past industrial practice on the Site. Nothing was disclosed in the title record that would indicate any RECs or HRECs related to contamination due to hazardous waste and/or petroleum hydrocarbons on the Site.

3.3. SPECIALIZED KNOWLEDGE

The Owner/User indicated that an underground gasoline storage tank was at one time located near the northeast corner of the Site, and that a mobile above-ground diesel tank was parked at a number of locations on the Site. Records of the UST installation and removal were not provided for this ESA; however, the User vaguely recollects that the UST was removed sometime in the mid- to late-1970's.

4.0. RECORDS REVIEW

4.1. STANDARD ENVIRONMENTAL RECORDS SOURCE

SGSI subcontracted with Environmental Data Resources, Inc. (EDR) to perform a computerized environmental database record search. EDR, of Southport, Connecticut, is a private database vender. The environmental search was performed for reported current and historical environmental conditions (REC, HREC, and DMEC) and operating permits involving hazardous materials within an approximate minimum search distance of one mile of the Site. EDR® provided a Radius Map with GeoCheck® report that meets the ASTM International Standard Practice for Environmental Site Assessments, E 1527-00, including but not limited to searches on CERCLIS and EPA lists. The EDR® report dated February 18, 2004 is presented with regards to mappable and unmappable (orphan) facilities (Appendix C). Mappable facilities are those that can be reasonably to accurately located on the EDR® Site Maps. GeoCheck® is an addendum that includes physical setting source information in accordance with ASTM Practice E 1527-00.

4.1.1. Mappable Facilities

Of the 4 mappable facilities in the EDR® report, 3 facilities with known reported environmental conditions were determined to be within one-half mile or less of the Site, and they are denoted on Figure 3. All MCEHD status reports and/or closure letters addressing the environmental conditions on these facilities are enclosed in Appendix D. These sites are as follows:

1. Map ID 1 – The Norco Service Center facility (EDR ID #S102434423 and #U001586937) is listed as a HAZNET and HIST UST site, and is also listed with the Leaking Underground Storage Tank Information System (LUST) and with the Cortese Hazardous Waste & Substance Sites List (CORTESE). The service center is located at 3670 Main Street, approximately 565 feet northeast of and down gradient from the Site. The site is currently permitted handle waste and mixed oils. A gasoline leak into soils was discovered on May 1, 1996 and reported on June 14, 1996, and the contaminated material was excavated and disposed of under purview of MCEHD, who closed the case on October 8, 1996; therefore, the unauthorized release at the Norco Service Center is considered to be a DMEC with respect to the Site.

2. Map ID A2 – The former Exxon Mini-Mart (EDR ID #S1024299506), which was replaced by the existing Napa Auto Parts, is located approximately 2185 feet to the east at 3280 Main Street. Exxon Mini-Mart is listed as both a LUST and a Cortese site. A diesel fuel leak into soil occurred on January 13, 1992, and the MCEHD closed the case after treatment on December 22, 1998. The Napa facility discovered a gasoline leak into soil on December 23, 1993, and the MCEHD closed the case on December 23, 1993 after treatment.

3. Map ID A3 – The former Mammoth Mobil Mo-Mart (EDR ID #S102554148) located at 3275 Main Street is listed as both a LUST and a Cortese site. This

site is located approximately 2505 feet east of the Site and is currently known as Center Street Shell. A diesel fuel leak into soils was discovered on September 2, 1987 and reported on May 24, 1994, and on April 24, 1997 a diesel fuel leak into groundwater was discovered and subsequently reported on May 5, 1997, and the contamination is currently being monitored under purview of Lahontan and TOML.

4.1.2. Unmappable (orphan) Facilities

Of the 30 orphan facilities listed in the EDR® report, 8 facilities with known reported environmental conditions were determined to be within a one-half mile of the Site. All MCEHD status reports and/or closure letters addressing the environmental conditions on these facilities are enclosed in Appendix D. The orphan sites are presented as follows:

4. The Village at Mammoth facility (EDR ID #S105694713) is listed as a LUST site. Recent construction operations for new gondola lift station exposed two underground fuel storage tanks and one sump that previously served a Union 76 station, then a Texaco station, and then Caesar's Garage, all formerly at 6155 Minaret Road, approximately 1445 feet northeast of and up-gradient from the Site. All apparently used the same building over time, which was demolished sometime between 1972 and 1988 (Figure 3). Petroleum contaminated soils were discovered during removal of tanks between November 2001 and January 2002. The contaminated soils were excavated and disposed of in compliance with MCEHD, as described in their closure letter dated October 29, 2002; therefore, the unauthorized release that happened prior to the current development for The Village at Mammoth is considered to be a DMEC with respect to the Site.

5. The Mammoth Lakes Old Town Yard facility (EDR ID #S101299020) is listed as a LUST and a CORTESE site, which was at one time located at 140 Berner Street, approximately 1465 feet northeast of and up-gradient from the Site (Figure 3). It was at one time utilized as a maintenance yard for both the TOML and the MCRD prior to that. A leak of fuel into soils was confirmed on October 28, 1993. The contaminated soils were disposed of under the purview of the MCEHD, who subsequently issued a closure letter dated January 11, 2001; therefore, the unauthorized release at this facility is considered to be a DMEC with respect to the Site.

6. Chevron #9-1861 "Mammoth Lakes Chevron" (EDR ID #S106116517) located at 3236 Main Street is listed as a LUST site. This site is located approximately

2280 feet northeast of the Site. The extent of contamination is currently being investigated under the purview of Lahontan. It is not known if the aquifer was affected.

4.2. ADDITIONAL ENVIRONMENTAL RECORD SOURCES

4.2.1. Previous Environmental Assessments

No known previous environmental site assessments have been prepared for the Site.

4.3. PHYSICAL SETTING SOURCES

In addition to the GeoCheck® addendum in the EDR® report, the following physical setting sources were reviewed:

4.3.1. Mandatory Standard Physical Setting Source

The following local small-scale and/or site-specific topographic maps of the Site were reviewed:

Figure 4. A 2000 topographic map of Mammoth Lakes created by the MCWD and the TOML;

Figure 5. A 1996 topographic map created by Western Aerial Surveys for the adjacent Lodestar Golf Course;

Figure 6. A 1988 site-specific topographic map created by Triad Engineering; this map denotes a gas pump on the Site at a location consistent with the former UST site;

Figure 7. A 1974 topographic map created by Caltrans for Main Street improvements; and

Figure 8. A 1965 topographic map created by MCWD for sanitary sewer improvements along Main Street (State Highway 112-A; now State Highway 203).

A comparison of the topography between Map 1 and Map 5 reveals that a significant amount of fill material was added to the Site. Map 2 denotes a “Gas Pump” at the eastern side of the Site; otherwise, nothing else of any potential adverse environmental concern was revealed from a review of these maps.

The following agency-published topographic maps containing the Site were also reviewed:

Figure 9. The 1914 USGS 15-Minute Topographic Map for the Mt. Morrison Quadrangle; according to the 1914 map, no infrastructure or development was observed on or near the Site; however, the old Sawmill Trail appears to traverse near the north side of the Site.

Figure 10. The 1915 USFS Folios Map of Inyo County (now Mono County), Sheet 6; according to the 1915 map, the Site is located within a darker brown-shaded area denoted as "Private Land"; no infrastructure or development was observed on or near the Site.

Figure 11. The 1936 Topographic Map of the Mammoth Embayment, Mono County, California (Kesseli, 1941); according to the 1936 map, the proposed alignment for the then "New Highway" (now Main Street) is shown passing through the Site.

Figure 12. The 1939 USGS topographic Map of the Mono Basin and Vicinity; according to the 1939 map, although no infrastructure or development was observed on or near the Site, Main Street/Lake Mary Road is known to have been completed by 1938.

Figure 13. The 1953 USGS 15-Minute Topographic Map for the Mt. Morrison Quadrangle; according to the 1953 map, green color-coding indicates that forested areas cover the land where the Site is currently located; two buildings are shown as black squares adjacent to the Site boundaries, and although slightly miss-plotted, the building to the left is presumed to be the original restaurant.

Figure 14. The 1978 USGS/USFS 7.5-Minute Topographic Maps for the Mount Morrison NW and SW Quadrangles; according to the 1978 map, the Site is located within a shaded area denoted as "Alienated lands within the National Forest boundary;" two buildings are shown as black squares adjacent to the Site boundaries, and although slightly miss-plotted, the building to the left is presumed to be the original restaurant.

Figure 15. The 1983 USGS 7.5-Minute Series Topographic Map of the Old Mammoth Quadrangle; according to the 1983 map, the Site is located within a shaded area denoted as "Alienated lands within the National Forest boundary; no buildings denoting the restaurant are shown on this map.

Figure 16. The current 1994 USGS 7.5-Minute Topographic Maps of the Old Mammoth, and Bloody Mountain Quadrangles; according to the 1994 map, the Site is plotted within an area denoted as "Non-National Forest System lands within the National Forest".

4.3.2. Discretionary and Non-Standard Physical Setting Sources

4.3.2.1. Geologic Setting

According to USGS Miscellaneous Investigation Series Map I-1933 (Bailey, 1989), the Site is located in an area that is regionally dominated by faulting, volcanism, and glaciation. More specifically, it is located in the western portion of the Long Valley caldera between the western margin of the caldera's resurgent dome and the eastern flank of the Sierra Nevada fault escarpment (Figure 17). The Site is located entirely on glacial till from the Tioga glaciation dating >20,000 years B.P. (Bailey, 1989). A review of USGS Open-File Report 90-460 indicates that an exploratory geothermal well revealed unconsolidated glacial till, basalt, and rhyolite colluvium/rubble overlies basalt bedrock with a contact measured at about 232 feet below the ground surface at a site approximately 1,585 feet to the northwest (Diment and Urban, 1990; Figure 3).

4.3.2.2. Volcanic Setting

USGS Miscellaneous Investigation Series Map I-1933 (Bailey, 1989) also indicates that the Site is located within the Long Valley caldera (collapsed volcano), an elongate crater-like feature that formed from a cataclysmic volcanic eruption approximately 760,000 years ago. Subsequent volcanic eruptions on nearby Mammoth Mountain and Lincoln Peak located west of the Site occurred between 215,000 and 52,000 years BP. Volcanic eruptions as recent as 500±200 years B.P. occurred as phreatic explosions along the Mono-Inyo volcanic chain approximately 1.0 miles to the west. A review of USGS Bulletin 1847 (Miller, 1989) illustrates that the Site is located in a volcanic-vent area potentially subject to volcanic hazards associated with explosion, flowage, pyroclastic fall, debris flow, and base surge events (Figure 18). A review of USGS Bulletin 2185 (Hill et al., 2002) describes a comprehensive four-level community response plan for these hazards and for future episodes of volcanic unrest within the area.

4.3.2.3. Tectonic Setting

A review of the CGS Alquist-Priolo Earthquake Fault Zone Map for the 1985 NE ¼ Devils Postpile Quadrangle and the 1982 NW ¼ of the Mount Morrison Quadrangle (Davis, 1982) indicates that several recent faults (surface rupture less than 11,000 years ago) and historic faults (less than 200 years ago) are located on either side of the Site. Distance from the Site to the boundary of the nearest zoned faults are approximately 1,500 feet to the west and 4.8 miles to the east (Figure 19). No known active faults are mapped across the Site. According to the 1997 Uniform Building Code (CGS, 1998), page L-18 of "Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada", the Site is located within 2 kilometers of the Hartley Springs fault. The Hartley Springs fault is classified as a Type 'B' causative fault with an estimated maximum magnitude earthquake M_{MAX}=6.6. Ground deformation and surface rupture was detected along this fault zone as a result of the 1980 Long Valley Caldera earthquake swarm (Clark et al., 1980; Sherburne, 1980; Davis, 1982).

4.3.2.4. Mining District Setting

A review of USGS Professional Paper 385 (Rinehart and Ross, 1966) indicates that the historic Lake Mining District of Mammoth Lakes lies directly southwest of the Site. Gold, silver, copper, and lead-bearing veins were discovered here in 1877-78, primarily in the Old Mammoth Mine, which yielded $200,000 from 1878 through 1881 (Clark, 1998). Lake Mining district organized in 1887 and included other mines, notably the Monte Cristo ($100,000) and Mammoth Consolidated mines ($100,000). Mining was performed periodically up through the 1930's, and on nearby prospects as late as 1958. Mining was performed predominantly on the northwest-trending metavolcanic ridge named "Mineral Hill" or "Gold Mountain" or "Red Mountain", located just south and west of Mammoth Rock.

Old Mammoth Mine originally consisted of five claims, but by 1940 had increased to twenty-six, and was later abandoned in 1956. Old Mammoth Mine is composed primarily of five adits on the north slope of Mineral Hill. Monte Cristo Mine opened with three patented claims in 1927 with ore being extracted up until 1941. The mine was abandoned shortly thereafter. Mammoth Consolidated Mine originally produced gold in 1918 and included 27 claims by 1955, and it too was abandoned shortly thereafter. All three mines are located several miles southwest the Site (Figure 3).

4.3.2.4. Groundwater Setting

The "Mammoth Basin Water Resources Environmental Study" prepared by the California Department of Water Resources (CDWR, 1973) in cooperation with the MCWD, indicates that depth to permanent groundwater beneath the Site is estimated at about 100 feet. According to USGS Water Resources Investigations Report 85-4183, depth to permanent groundwater beneath the Site is estimated at about 250 feet (Farrar et al., 1985). The most accurate depth to groundwater is provided by Diment and Urban (1990) in Mammoth Lakes Geothermal Reservoir Assessment Project (MLGRAP) Well #1 located 1,585 feet to the northwest on the adjacent property, which was measured at 459 feet below the ground surface (bgs). The nearest municipal production well is MCWD Well 20, located approximately 1,640 feet to the southwest (Figure 3), with depth to static groundwater at 412 feet bgs. The nearest artesian groundwater is Juniper Springs located over a mile to the southwest. The groundwater gradient generally trends easterly towards Murphy Gulch (Figure 3). Both permanent and perched groundwater levels on the Site fluctuate seasonally at a minimum.

4.3.2.5. Hydrologic Setting

A review of the CDWR report (CWDR, 1973) indicates that surface waters on the Site are regionally confined to the 71-square mile east-draining Mammoth Hydrologic Basin, which contains six distinct major watersheds, all of which are ultimately tributary to Owens River and Crowley Lake. The Site is located in Watershed III, commonly known as the Murphy Gulch watershed.

A review of the Water Quality Control Plan for the Lahontan Region (CRWQCB, 1994) indicates that the Site is regionally confined to the northern groundwater basin of Lahontan Region No. 6, Owens Hydrologic Unit No. 3, within Long Subunit No. 10, which corresponds to the numeric designation of "603.10," as denoted in the report. According to the Lahontan report, the Site is located upstream of Crowley Lake, which is listed as a water body having impaired water quality according to the List of Water Quality Limited Segments, as outlined in Section 303(d) of the federal Clean Water Act (P.L. 92-500, as amended).

According to the Flood Insurance Rate Map for the Town of Mammoth Lakes (FEMA, 1992), the Site has been determined to be within "Other Areas Zone X," which are areas determined to be outside the 500-year flood plain boundary. The nearest 100- and 500-year special flood zone hazard areas are located along Mammoth Creek to the south.

4.3.2.6. Stormwater Drainage Setting

A review of the Mammoth Lakes Storm Drainage Master Plan (Brown and Caldwell Consulting Engineers and Triad Engineering, 1984) illustrates that the Watershed III has been subdivided into nine tributary subareas, with the Site located in Tributary Subarea III-5. More specifically, the Site is located within an area denoted as A1 of Tributary Subarea III-5. Storm water on the Site flows south and east offsite onto the Lodestar Golf Course. All drainage from these points is eventually tributary to the naturally established flow course of Murphy Gulch east of the Town of Mammoth Lakes.

4.3.2.7. Surficial Soils Setting

A review of the USDA Soil Survey of Benton-Owens Valley Area, California, Parts of Inyo and Mono Counties (Tallyn, 2002) indicates that soils underlying the Site are classified as Chesaw family at slopes of 5 to 15 percent, which are soils that are generally glacial outwash in origin derived from granitic rock containing 15 percent contrasting inclusions, and with properties that include rapid permeability and very low or low water capacity. A typical soil profile contains 0 to 5 inches of grayish brown gravelly loamy sand underlain by light grayish brown gravelly loamy sand and yellowish brown gravelly loamy sand to depths of approximately 60 inches.

A review of the Mammoth Lakes Storm Drain Master Plan (Brown and Caldwell and Triad Engineering, 1984) and the General Plan for the Town of Mammoth Lakes (TOML, 1987) indicates that the soil underlying the Site is classified as Outwash Till, which is composed of undifferentiated glacial outwash and coarse till in moderate to steep terrain. The soil profile on the Site is mapped as B322, which has low runoff potential, more than 36 inches of soil depth, a moderate hazard of inherent erosion potential, and a medium potential for vegetative productivity.

4.3.2.8. Air Quality Setting

A review of the "Air Quality Management Plan for the Town of Mammoth Lakes" and of the latest "Progress Report on the Implementation of the Mammoth Lakes Air Quality Management Plan" (GBUAPCD, 1990; 1995) indicates that there were 26 days with measured values that exceeded both the federal and town air pollution threshold standard (150 $\mu m/m^3$ for PM-10) between the time period of 1990 and 1995. This air pollution problem was found to be caused primarily by woodsmoke and road cinders used as anti-skid material during snow storms, particularly during the winter months. The nearest air quality monitoring station is located at State Highway 203 (Main Street) and Old Mammoth Road above the Rite Aid building in the Gateway Center shopping area located over a mile east of the Site.

A review of U.S. Geological Survey Water-Resources Investigations Report 98-4217 (Farrar et al., 1999) indicates that recent volcanic gas emissions, particularly carbon dioxide (CO_2), have been responsible for tree-kills on the southern and western flanks of Mammoth Mountain. The nearest known locations of CO_2 emissions are the Shady Rest, Mammoth Mountain, and Casa Diablo fumaroles. With respect to the Site, the Shady Rest fumarole is located at approximately 1.7 miles to the east, the Horseshoe Lake fumarole is approximately 2.1 miles to the southwest, the Mammoth Mountain fumarole is located approximately 2.5 miles to the west, and the Casa Diablo fumarole is approximately 2.7 miles to the east. Prevailing wind across the Site is predominantly towards the east.

4.4. HISTORICAL USE INFORMATION SOURCES

4.4.1. Aerial Photographs

Aerial photographs were reviewed from the USFS offices in both Lee Vining and Mammoth Lakes, the Triad/Holmes Associates office in Mammoth Lakes, the MCWD office in Mammoth Lakes, the World Wide Web, and from the Caltrans District 9 office in Bishop, California. The information below is a summary of the stereo review of photographic pairs and of orthophotos of the Site and surrounding area taken between 1944 and 2003. Original scales of the photographs are indicated. The following summaries are interpretive and are valid only for the dates indicated; photocopies are provided as Plates 1 through 26 in Appendix E:

Plate 1. USFS, 9/22/1944, DDE, FL-58, 12-111, 1:24,000 scale, stereo pair, black & white, fair resolution:
Site is in a natural state with Main Street located to the north; a northwest-southeast trending trail observed across the Site; otherwise, nothing of potential adverse environmental concern noted.

Plate 2. USFS, 8/10/1951, GS-QN, FL-3, 1-65, 1:47,200 scale, stereo pair, black & white, poor resolution:
Site still in a natural state, but with two trails/dirt roads traversing the Site – the first trail being more established; Mammoth View Lodge and Mammoth Lumber yard constructed offsite to the east; linear trail (?) sewer line (?) is visible and aligned with the Site's southern property line.

Plate 3. USFS, 7/21/1954, GS-VDL, FL-1, 1-1, 1:37,400 scale, stereo pair, black & white, poor resolution:
No apparent changes.

Plate 4. USFS, 8/23/1956, EMG, FL-109, 19-130, 1:15,000 scale, stereo pair, black & white, good resolution:
No apparent changes.

Plate 5. USFS, 9/5/1958, IN, FL-6, 2-127, 1:10,000 scale, stereo pair, black & white, excellent resolution:
Two buildings added to the Site being a 3-story office/employee housing apartment building at the northeast property corner and a chalet motel at the western property line; a small structure (narrow-gauge train car?) is observed at southeast corner of La Sierra's building.

Plate 6. USFS, 9/10/1963, EMG, FL-27, 7-146, 1:15,840 scale, stereo pair, black & white, good resolution:
One more building added to the Site being a 40-bed dormitory located at the southeast property corner; the Chalet building has been extended to the south; a butane/propane-powered generator is located just south of the employee housing apartment building on the eastern property line.

Plate 7. MCWD, 10/4/1965, TOML, 32, stereo pair, black & white, excellent resolution:
No significant changes.

Plate 8. Triad, 7/10/1967, Orthophoto L-4, 2099-19, 1:4,800 scale, black & white, good resolution:
No significant changes.

Plate 9. Caltrans, 7/10/1968, 09-Mno-203, 1-30, 1:7,200 scale, stereo pair, black & white, excellent resolution:
A cleared area west of the La Sierra's building is apparently being used as a parking area; an addition to the La Sierra's building is observed at the west end.

Plate 10. Caltrans, 7/25/1970, 09-Mno-203, 28-14, 1:2,400 scale, color, excellent resolution:
No significant changes.

Plate 11. Caltrans, 4/27/1972, 09-Mno-203, 1-16, 1:12,000 scale, black & white, excellent resolution:
No significant changes

Plate 12. USFS, 8/17/1972, INO4, FL-14, 372-153, 1:15,840 scale, color, fair resolution:
No significant changes.

Plate 13. Caltrans, 8/9/1974, 09-Mno-203, 1-3, 1:3,000 scale, black & white, excellent resolution:
No significant changes.

Plate 14. Triad, 7/29/1978, MCRD, Orthophoto Sheets 1&2 of 8, 1:2,400 scale, black & white, fair resolution:
The 44-unit dormitory appears to be gone.

Plate 15. USFS, 8/29/1983, USDA, FL-6, 183-102, 1:12,000 scale, stereo pair, color, good resolution:
A smaller building (or truck?) is located at the former 44-unit dormitory location; another addition has been constructed at the southwest corner of the La Sierra's building; a new building (presumably the commercial Laundromat) has been constructed offsite between the employee housing apartment and the offsite Mammoth View Lodge; Main Street has been widened to four lanes; Mammoth Lumber yard two lots to the east has been removed.

Plate 16. USFS, 6/29/1984, USDA, FL-7, 384-3764, 1:8,000 scale, stereo pair, color, excellent resolution:
No discernible changes.

Plate 17. Triad, 7/21/1988, Lodestar Orthophoto, 1:2,400 scale, black & white, excellent resolution:
Both the 18-unit chalet motel and the employee housing apartment buildings have been removed, and a new access driveway into the Site has been constructed from Main Street to the east side of La Sierra's.

Plate 18. Triad, 6/23/1989, TOML, 2-35, 1:2,400 scale, black and white, fair resolution:
No discernible changes.

Plate 19. Caltrans, 10/12/1992, 09-Mno-203, 14-89, 1:2,400 scale, black & white, excellent resolution:
No discernible changes.

Plate 20. USFS, 6/30/1993, USDA, FL-13S, 593-161, 1:15,840 scale, stereo pair, color, good resolution:
No discernible changes.

Plate 21. Triad, 9/02/1996, TOML, Lodestar Orthophoto, 1:1,200 scale, black & white, excellent resolution:
Some delivery trucks (?) observed at the southwest corner of the La Sierra's building.

Plate 22. Caltrans, 9/24/1997, 12-5, 1:2,400 scale, black & white, excellent resolution:

Three stockpiles of fill material located within the center of the Site.

Plate 23. USGS, 9/18/1998, http:// www.terraserver.com, 1-meter resolution, black & white, fair resolution:
Fill material from the 1996 photo has presumably been spread around to create an elevated parking pad.

Plate 24. MCWD, 7/25/2000, FL-4, A009, 1:3,600 scale, stereo pair, color, excellent resolution:
Rectangular dark area south of the La Sierra's building is a new grass lawn; the adjacent offsite Mammoth View Lodge buildings have been removed.

Plate 25. USFS, 7/14/2001, USDA, FL-15, 501-87, 1:15,840 scale, color, good resolution:
No significant changes.

Plate 26. MCWD, 7/16/2003, FL-4, A002, 1:7,200 scale, stereo pair, color, good resolution:
Construction operations offsite to the west for The Chutes has been initiated.

Based on a detailed review of these aerial photographs, observation of RECs on the Site were not apparent.

4.4.2. Fire Insurance Maps

According to the Sanborn® Report produced by EDR, fire insurance maps do not exist for the Site and surrounding areas (Appendix C).

4.4.3. Topographic Maps

(See Section 4.3.1 and Figures 4 thru 19)

4.4.3. Property Tax Files

Property tax files were sought for but not readily available for the Site and surrounding areas.

4.4.4. Local Street Directories

Local street directories were sought for but not readily available for the Site and surrounding areas.

4.4.5. Building Department Records

Building Department records were requested from the TOML, but none were made readily available for this ESA.

4.4.6. Zoning and Land Use Records

According to a review of “The Town of Mammoth Lakes General Plan” (TOML, 1987), the Site is shown to be located on the Mammoth Lakes Land Use Map in an area denoted as “C-H” for Commercial-Highway. A review of the Mammoth Lakes Urban Planning District Boundary Map indicates that the Site is located within Urban Planning District 4 “Main Street,” which has been zoned for commercial use. A review of the “Town of Mammoth Lakes Zoning Map” revised September of 1994 also indicates that the Site is located within an area designated as “C” (commercial). Copies of these zoning and land use records are provided in Appendix F.

5.0. SITE RECONNAISSANCE

5.1. METHODOLOGY AND LIMITING CONDITIONS

A reconnaissance of the Site was performed by Mr. Dean Dougherty of SGSI on March 11, 2004. A total of 10 digital photographs were taken while observing during a traverse by foot around the perimeter of the Site (Appendix G). Limited soil sampling was performed at the location of the former UST. The general weather conditions were sunny and windless with an approximate temperature of about 70 degrees Fahrenheit. Due to the snow coverage on the Site from the recent winter storms, a thorough observation of the Site was limited.

A second reconnaissance was performed following snowmelt on March 30, 2004. A total of 5 additional digital photographs were obtained and are provided in Appendix G.

5.2. GENERAL SITE SETTING

The Site is orthorhombic in shape with pine trees scattered along the margins. One building was observed on the Site at the northwest property corner, and a large, open lot is located to the south. Accumulations of snow were observed everywhere (Photos 1 – 12).

5.3. EXTERIOR OBSERVATIONS

5.3.1. Access

Vehicular access to the Site is located off of Main Street (Photos 1 & 2).

5.3.2. Potable Water Supply

Potable water for the Site is provided by MCWD via an underground water main.

5.3.3. Heating Fuel

Heating fuel for the Site is provided by propane tanks (Photos 9, 10 & 11.

5.3.4. Sewage Disposal

Sewage disposal for the Site is currently by public sewer, with the connection for the Site located at the southeast property corner at MCWD sewer main Station 6+19.

5.3.5. Electrical Transformers

SGSI sought for but did not find any electrical transformers on the Site; however one new pad-mount transformer was observed offsite a few feet west of the northwest property corner (Photo 12). The transformer appeared clean and did not exhibit any evidence of past or current staining due to leakage.

5.3.6. Heavy Equipment and Machinery

Heavy equipment, including a loader and two old delivery trucks were observed in the south parking area along the southern property line (Photos 3 & 7).

5.3.7. Drums and Containers

Two 55-gallon drums and three 5-gallon plastic buckets were observed at two locations on the Site; the 55-gallon drums at the northeast corner of the Site near the propane tanks (Photo 11), and the 5-gallon buckets at the south wall of the La Sierra's building addition (Photo 17). None of the containers were properly labeled for content. A refuse container and restaurant grease storage receptacle were also observed at the eastern margin of the Site (Photo 15). The second reconnaissance of this area did not indicate the presence of any significantly stained soils (Photo 24).

5.3.8. Fuel Storage Tanks

The former UST location on the Site was observed for confirmation based on information provided by the current owner. An assortment of machine parts, construction material scrap, and snow was observed (Photos 9 & 10) covering the ground at this site. The second reconnaissance of this area did not reveal any new information (Photo 23).

5.3.9. Stained Soils

Due to the limiting conditions of snow coverage and wet ground during the initial reconnaissance, SGSI was not able to perform an adequate search for stained soils on the Site during the initial Site reconnaissance. The second reconnaissance indicated the presence of some minor stained soils found within the southeast property corner (Photo 22).

5.3.10. Odors

SGSI smelled for but did not detect any petroleum-based, unusual or foul odors on the Site.

5.3.11. Imported Fill Materials

Due to the limiting conditions of snow coverage during the initial reconnaissance, SGSI was not able to perform an adequate search for imported soils on the Site. The second reconnaissance confirmed the presence of imported earth-fill material within the areas as delineated on Figure 4 (Photos 20 & 21).

5.3.12. Pits, Ponds, and Lagoons

Due to the limiting conditions of snow coverage during the initial reconnaissance, SGSI was not able to perform an adequate search for long-term standing water, pits, ponds, pools of liquid, lagoons, or sumps on the Site. The second reconnaissance did not reveal any long-term standing water, pits, ponds, pools of liquid, lagoons, or sumps on the Site.

5.3.13. Dry Wells, Storm Drain Inlets, Floor Drains, and Sumps

Due to the limiting conditions of snow coverage during the initial reconnaissance, SGSI was not able to perform an adequate search for any dry wells, storm drain inlets, floor drains, or sumps on the Site. The second reconnaissance did not reveal any dry wells, storm drain inlets, floor drains, or sumps on the Site.

5.4. LIMITED SOIL SAMPLING

During the Site visit one 6-foot deep backhoe pit trench was excavated in the location of the former UST site (Photo 18). The location of the UST was determined by the owner. Inspection of the trench indicated the presence of 5 feet of old backfill, which is consistent with the burial depth of a 4 foot diameter (500 gallon) tank. Two soil samples were obtained from the bottom foot of undisturbed native soil, one from either side of the trench. No unusual odors were detected during the sampling. Groundwater was not encountered in the trench. The soil samples were placed in specially cleaned 4-ounce amber glass jars with Teflon-coated lids. The jars were placed in an ice chest with “blue-ice” (Photo 19) and transported under chain-of-custody to a California certified laboratory for analysis. All equipment was cleaned before and after sampling with a non-phosphate detergent and thoroughly rinsed with clean water. Following the soil sampling, the exploratory trench was backfilled with the excavated material. It should be noted that no compaction was performed on the trench backfill. In the event that construction/grading is planned on the Site in the future, it is recommended that the in-place densities of backfill and the old UST site backfill be determined prior construction design. If the densities are inadequate, removal and re-compaction may be required.

5.5. SOIL ANALYTICAL RESULTS

The samples collected were analyzed by Great Basin Laboratories of Reno, Nevada. The soil samples were analyzed utilizing the Environmental Protection Agency (EPA) Method 8260 for detection of VTPH. The laboratory results indicate that hydrocarbons within this spectrum were detected at concentrations far below the allowable limits in both samples. The laboratory report is presented in Appendix H.

6.0. INTERVIEWS

6.1. Interview with Owner and Key Site Manager

SGSI interviewed Mr. Nick Pavlovich, the current owner and key Site manager for the Site. Other than his recollection of the former UST, Mr. Pavlovich was not aware of any past or present adverse environmental conditions associated with Site, and he completed a questionnaire regarding the Site's environmental aspects. The questionnaire is taken from ASTM Practice E 1528 – 00, and it is included in Appendix I.

When asked about the former UST, Mr. Pavlovich indicated that it was pulled out and hauled off to Benton sometime between 1976 and 1978 without County purview. When asked about the past use of any onsite sewage disposal systems, Mr. Pavlovich indicated that the Site was connected to a public sewer in approximately 1968, which was also when the sewage disposal system was removed from the south side of the La Sierra's building (Figure 4). The sewer connection is located near the southeastern property corner. When asked about the contents of the 55-gallon drums and the 5-gallon buckets, Mr. Pavlovich indicated that the drums hold old crankcase waste oil, and that the buckets hold antifreeze/coolant. When asked about the potential for asbestos containing materials on the Site, particularly the inside the building, Mr. Pavlovich indicated that no acoustic insulation had been sprayed in the building, and he was unaware of the presence of any other such materials elsewhere. When asked about the imported fill material, Mr. Pavlovich recalled that the material was derived from the Mammoth High School site during initial grading operations, that the fill was spread without observation or compaction testing, and that nothing was buried or 'hidden' within the body of fill. When asked about the minor stained soils on the Site, Mr. Pavlovich reported that they were produced by nuisance dripping and leakage of hydraulic oil from his heavy equipment-loader that he parked in this area.

When asked about prior ownership of the Site, Mr. Pavlovich indicated that he and Mr. Arnds purchased it in 1982 from Jack and Maria Patten, who had purchased it from the California-Nevada Land Co., who had purchased from the Summer's family sometime in the 1940's. When asked about the building history on the Site, Mr. Pavlovich indicated that the La Sierra's restaurant had been originally known as the Arlsburg Restaurant, which had caught fire sometime in the 1970's due to an adjacent outdoor dumpster. It was eventually rebuilt into a 3-story structure. Three other buildings were subsequently built on the Site, including a 3-story office/employee apartment, an 18-unit chalet motel, and a 40-bed dormitory, but all were eventually demolished and removed (Appendix E). When asked about adjacent offsite property use, Mr. Pavlovich indicated that the former Mammoth View Lodge located offsite to the northeast once operated as a commercial cleaner/laundromat approximately between the years 1975 and 1977, and on the next lot to the east was the former Mammoth Lumber yard facility.

6.2. Interviews with Agency and District Officials

6.2.1. Mono County Environmental Health Department (MCEHD)

Mr. Dennis Lampson with the MCEHD was contacted regarding the Site, but was not aware of any specific environmental concerns, including any documentation regarding the former UST. Mr. Lampson did, however, provide all pertinent MCEHD documentation related to the former UST closures on adjacent sites within ½-mile (Appendix D).

6.2.2. California State Water Resources Control Board – Lahontan Region (Lahontan)

Mr. Douglas Feay with Lahontan was contacted regarding his knowledge of any environmental concerns on or adjacent to the Site. Mr. Feay was unaware of any violations or concerns on the Site.

6.2.3. Town of Mammoth Lakes (TOML)

Ms. Gretta Boyer with the TOML was contacted regarding his knowledge of any past environmental violations on or near the Site. According to Ms. Boyer, no records of violations for the Site were found in their files. Mr. Dick Distell also with the TOML was contacted regarding his knowledge of any historical address listings for the Mammoth Lakes community and surrounding area, but to his knowledge, no such listings exist.

6.2.4. U.S. Department of the Interior – Bureau of Land Management (BLM)

Mr. David Conklin of the BLM was contacted regarding his knowledge of any mining or survey history, environmental violations or concerns on file for the Site, but he reported that other than the Mount Diablo Meridian being surveyed in by the USGS in 1855, nothing specific was found in their files.

6.2.5. U.S. Department of Agriculture – Forest Service (USFS)

Mr. Rick Murray of the USFS was contacted regarding his knowledge of any environmental violations on file for the Site. Mr. Murray had no knowledge of any environmental violations on the Site.

Ms. Sheila Irons of the USFS (Inyo National Forest – White Mountain Ranger District) was contacted regarding records of any environmental violations or concerns on file for the Site. Ms. Irons reported that the USFS Land Status Atlas did not have any information unique to the Site.

6.2.6. Mammoth Community Water District (MCWD)

Mr. John Pederson of the MCWD was contacted regarding his knowledge of environmental concerns or violations on the Site, particularly with respect to sewage disposal and to the levels radon in the Lake Mary reservoir or in the their ground water production wells, all of which supply the Mammoth Lakes community with water. Mr. Pederson reported that a 6-inch “Y” is located at the southeast corner of the Site at sewer main Station 6+19, according to a December 1965 as-built map (Figure 8) prepared by Engineering – Science, Inc. He also provided three sewer connection permits; two for Mr. Herbert Sauer dated 1960 and 1966 for the offsite Mammoth View Lodge, and one for Mr. Ed Armstrong dated 1978 for the offsite commercial Laundromat at the Mammoth View Lodge (Appendix J).

With respect to potable water on the Site, Mr. Pederson reported that raw well water is treated for excess fluoride, arsenic, manganese, and iron prior to public distribution, and that the water supply is regularly tested for gross alpha radioactivity, uranium and combined radium. The MCWD publishes an Annual Drinking Water Quality Report, and the most recent issue is also enclosed in Appendix J.

6.2.7. California Division of Oil, Gas, and Geothermal Resources (DOGGR)

Ms. Liz Johnson of the DOGGR was asked regarding her knowledge of any geothermal wells on or nearby the Site. Ms. Johnson provided the documents for MLGRAP #1, the geothermal well previously described. The exploratory well was drilled in 1987-88 and was subsequently sealed, capped, and abandoned in compliance with MCWD and DOGGR regulations at that time. The geothermal well is considered to be a DMEC with respect to the Site.

6.2.8. Mono County Department of Agriculture (MCDA)

Ms. Robin Conklin of the MCDA was interviewed regarding her knowledge of any environmental concerns or violations on the Site. Ms. Conklin reported that there was nothing in their files for the Site; however, she did provide information that the neighboring Sierra Star (Lodestar) golf course to the south was in compliance with county specifications for the application rates of pesticides, fungicides, and herbicides.

6.2.9. California Geological Survey (CGS)

Mr. Robert Sydnor of the CGS was contacted about the State's knowledge or records of any environmental concerns or violations on the Site. Mr. Sydnor had no files specifically for the Site; however, he informed SGSI of recent carbon dioxide detections near the Site. Mr. Sydnor provided a document dated September 29, 1999, addressed to the TOML specifying that volcanic gases primarily in the form of carbon dioxide are both an 'air quality' issue and a 'geologic hazard' with respect to health-and-safety for the Mammoth Mountain area. A copy of the CGS document is included in Appendix K.

6.2.10. United States Geological Survey (USGS)

Dr. David P. Hill and Dr. Michael L. Sorey of the USGS were contacted about their knowledge of any anticipated volcanic related hazards that might adversely affect the Site. Dr. Hill and Dr. Sorey provided five fact sheets discussing CO_2-related tree kills, future volcanic eruptions, ash fall, scientific drilling, and the planned USGS response for future unrest in Long Valley caldera (Appendix L). These sheets describe the potential hazards that exist regionally for the Site and the Town of Mammoth Lakes.

6.2.11. Mammoth Lakes Fire Protection District (MLFPD)

Mr. Marty Larson, Assistant Chief/Fire Marshal with the MLFPD was contacted regarding the fire department's knowledge of any past fires, fire regulation violations, or Hazmat responses on or near the Site. Mr. Larson provided a Comprehensive Occupancy History (Appendix M) that indicated no incidents of any adverse environmental concern for the Site.

6.2.12. Great Basin Unified Air Pollution Control District (GBUAPCD)

Mr. Chris Lanane with the GBUAPCD was contacted regarding his knowledge of any past violations to the Federal Clean Air Act's National Ambient Air Quality Standard of PM-10 (particulate matter less than 10 microns) for the Site. This standard was adopted by the Town of Mammoth Lakes in their Air Quality Management Plan dated November 30, 1990. Mr. Lanane provided the latest progress report dated April of 1995, which indicates 26 days with measured values that exceeded the federal and town threshold standard (150 $\mu m/m^3$ for PM-10) between the time period of 1990 and 1995. According to this report, this air pollution problem was found to be caused primarily by woodsmoke and road cinders used as anti-skid material during snow storms, particularly during the winter months. Mr. Lanane could not provide any more current information, nor did he note any direct air quality violations for the Site.

6.2.13. Edison International – Southern California Edison (SCE)

Mr. Bob Ziegler with SCE in Mammoth Lakes, California was contacted regarding his knowledge of the possible presence of polychlorinated biphenyls (PCBs) found in the pad-mount transformer located offsite at the northwest property corner. According to Mr. Zigler, the transformer was installed after 1978, the year when PCB's were initially phased out of electrical transformer oils.

7.0. FINDINGS

Based on SGSI's investigation performed for this ESA, SGSI presents the following findings:

7.1. Recognized Environmental Conditions (RECs)

Although there was a limiting condition related to an accumulation of snow, SGSI sought for but did not identify any RECs on the Site.

7.2. Historical Recognized Environmental Conditions (HRECs)

SGSI sought for but did not identify any HRECs on the Site.

7.3. De Minimus Environmental Conditions (DMECs)

SGSI sought for and has identified the following DMECs on and adjacent to the Site:

7.3.1. The former UST location at the east-center edge of the Site.

7.3.2. The 55-gallon drum storage area at the northeast corner of the Site.

7.3.3. The minor stained soil area at the southeast corner of the Site.

7.3.4. The imported undocumented fill material area throughout the Site.

7.3.5. All offsite LUST, CORTESE, HAZNET, CHMRIS, and HIST UST locations that were identified in the EDR® Radius Report.

7.3.6. The potential volcanic, seismic, and gas emission hazards to the Town of Mammoth Lakes as described by published literature.

7.3.7. The air quality guideline threshold exceedances brought about by air pollution derived primarily by woodsmoke and road cinders during the winter months.

8.0. OPINIONS

Based on the findings listed above, SGSI provides the following opinions for the Site:

8.1. A limiting condition related to snow accumulations does not necessarily mean that a REC is immanent on the Site. Rather, it has been SGSI's experience from our observations, engineering and subsurface explorations, particularly during the recent development of the surrounding North Village area, that the Site has a relatively low potential for containing any adverse environmental condition. Furthermore, from all the Site-specific research and interviews conducted, nothing was disclosed to indicate any past contamination from petroleum hydrocarbons or hazardous materials. This has been confirmed from a second Site reconnaissance following snowmelt.

8.2. Analyses of the soil samples did not detect the presence of any hydrocarbon contamination; therefore, the former UST location is to be considered as a *de minimus* environmental condition relative to the Site.

8.3. The 55-gallon drum storage area is to be considered as a *de minimus* environmental condition.

8.4. The undocumented fill material imported to the Site was imported from a non-contaminated source area; therefore, it is to be considered as a *de minimus* environmental condition; however, this material and the underlying topsoil will most likely have to be removed and replaced under the observation and testing of a Geotechnical Engineer prior to development.

8.5. The potential volcanic, seismic, and gas emission hazards and the air quality exceedances are broad and regional hazards. Attempts to project any of these hazards specifically to the Site cannot be accurately performed at this time; therefore, they are to be considered as *de minimus* environmental conditions relative to the Site, until otherwise warned and instructed by those public agencies that continuously monitor for these hazards.

9.0. CONCLUSIONS

SGSI has performed a Phase I and Limited Phase II Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-00 of the Site. Any exceptions to, or deletions from, this practice are described in Sections 1.4 and 10.0 of this report. Based on the findings and opinions from this ESA, SGSI concludes the following:

9.1. That no RECs were identified on the Site.

9.2. That no HRECs were identified on the Site.

9.3. That although the Site has some minor stained soils, imported fill material, and previously had a UST, these are *de minimus* environmental conditions that should not warrant further environmental investigation, subsurface or otherwise, prior to completion of a commercial real estate transaction.

9.4. That although the CGS and the USGS have jointly advised the Town of Mammoth Lakes of a significant health-and-safety issue regarding the hazard of carbon dioxide emissions and the future hazard of volcanic eruptions, emergency response procedures have been adopted and established by the TOML and the California Office of Emergency Services.

10.0. DEVIATIONS

SGSI, to the best of our knowledge, did not deviate (or intentionally deviate) from the standard of practice as presented in ASTM E1527-00.

11.0. ADDITIONAL SERVICES

Additional services beyond the scope of ASTM E 1527-00 were agreed upon as a term of engagement between SGSI and the User. SGSI provided the following additional service:

11.1. The Transaction Screen Questionnaire as taken from ASTM Practice E 1528-00, which was provided to the Key Site Manager to be a part of the required Owner Interview for this ESA.

11.2. The limited soil sampling and laboratory analysis pursuant to the guidelines suggested in ASTM Practice E 1903-97, which was provided to simply determine whether-or-not there was a presence of hydrocarbons in the UST site only. No quantification with respect to hydrocarbon depth and areal extent was attempted for the ESA.

12.0. REFERENCES

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13.0. SIGNATURE OF ENVIRONMENTAL PROFESSIONAL

The following environmental professional for SGSI was responsible for the entire preparation of this ESA:

REGISTERED GEOLOGIST
H. DEAN DOUGHERTY, III
No. 6497
Exp. 8/31/06
STATE OF CALIFORNIA

H. Dean Dougherty, III, Principal

Environmental Professional
RG 6497

14.0. QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONAL

The following brief resumé summarizes the qualifications of the environmental professional who was responsible for this ESA:

H. Dean Dougherty, III

Mr. Dougherty has a total of 17 years of professional experience as an environmental professional, a consulting geologist, and an engineering geologist:

Education
B.S., Geology, University of Southern California, Los Angeles, 1987
A.A., Science, Cuesta College, San Luis Obispo, 1984

Continuing Education
Field Geology, Indiana University, Bloomington, 1987
Hydrogeology, California State University, Los Angeles, 1994
Seismic Hazard Analysis, AEG Short Course, 1994
Excavation Safety, OSHA 10-Hour Course, 1999
Environmental Site Assessments: Phase I and Phase II, ASTM International, 2003

Registration
California Registered Geologist No. 6497, 1995

Certifications
Nuclear Gauge Operation, 1997
Radiation Safety Officer, 2002

Experience
Environmental Sites Assessments
Environmental monitoring
Groundwater investigations
Water well design and construction
Seismic hazards evaluations
Earthwork supervision
Grading and foundation design recommendations

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STATE OF CALIFORNIA – THE RESOURCES AGENCY Gray Davis, *Governor*

Department of Conservation
Division of Mines & Geology
801 K Street, MS 12-31
Sacramento, CA 95814-3531

Robert H. Sydnor
RG 3267, CHG 6, CEG 968
Senior Engineering Geologist

Office Phone: (916) 323-4399
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Office fax: (916) 322-4765
CDMG home page: www.consrv.ca.gov/dmg

RECEIVED
OCT - 4 1999
TOWN OF MAMMOTH LAKES
PLANNING DIVISION

September 29, 1999

Ms. Karen Johnson, *Senior Planner*
Planning Division
Community Development Department
Town of Mammoth Lakes
437 Old Mammoth Road
Post Office Box 1609
Mammoth Lakes, CA 93546
telephone (619) 934-8989

Subject: Carbon Dioxide Hazard at Mammoth Mountain
Town of Mammoth Lakes, Mono County

Dear Ms. Johnson:

The California Division of Mines & Geology is the state's geological survey and the publisher of *California Geology* magazine. In the current September/October 1999 issue of California Geology is a report by an interdisciplinary team of five federal geologists, geochemists, atmospheric physicists, and ecologists regarding the hazard of carbon dioxide at Mammoth Mountain, on the southwest side of the Town of Mammoth Lakes.

The principal government agency that performed this research is the U.S. Geological Survey, with assistance from the University of California national laboratories (sponsored by the U.S. Department Energy) at Livermore and Berkeley. The chief scientist at the Long Valley Caldera is Dr. David P. Hill, a U.S. Geological Survey seismologist stationed at 345 Middlefield Road, Menlo Park, CA 94025. It is recommended that you be in periodic contact with Dr. Hill by mail, e-mail < hill@andreas.wr.usgs.gov >, and telephone (650-329-4795) regarding volcanic hazards, seismology hazards, and carbon dioxide hazards associated with the Long Valley Caldera. Dr. Hill has been studying the Mammoth Lakes – Long Valley area for about 25 years, so he is very experienced with the recent history of this active volcanic area and its geologic hazards.

The California Division of Mines & Geology and the U.S. Geological Survey jointly advise you that there is a significant health-and-safety issue outlined in this report. It is recommended that this report and related USGS reports be used and cited for planning documents prepared under the California Environmental Quality Act (CEQA). There is both an "air quality" aspect to carbon dioxide and a "geologic hazard" aspect to this volcanic gas, so it should be repeated twice in any CEQA document for the Town of Mammoth Lakes. The bibliography in the back of the report will lead you to pertinent geology and seismology publications by the U.S. Geological Survey and academia regarding the Long Valley Caldera. You can also download pertinent seismology information about Long Valley Caldera and the Mammoth Lakes area from the USGS website at: < www.quake.wr.usgs.gov/volcanoes/Long Valley/index.html > Dr. Hill will be pleased to put your town planning office on his quarterly mailing list for the USGS Long Valley Caldera report.

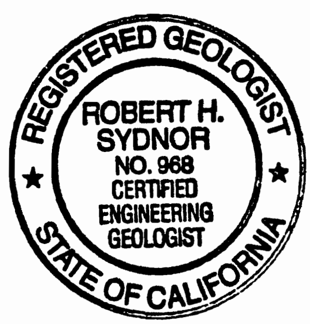
In addition to the *California Geology* publication we are sending the following USGS Fact Sheets that pertain to the Town of Mammoth Lakes:

USGS Fact Sheet 172-96
Invisible CO_2 Gas Killing Trees at Mammoth Mountain, California

USGS Fact Sheet 108-96 (revised 1997)
Living With a Restless Caldera – Long Valley, California
Please use and cite this in all your CEQA documents.

USGS Fact Sheet 073-97
Future Eruptions in California's Long Valley Area – What's Likely?
Please use and cite this in all your CEQA documents.

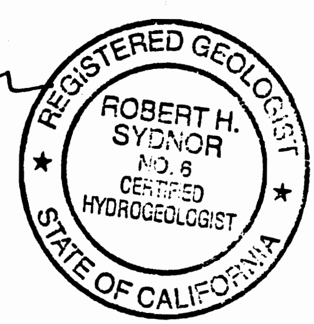
We trust that the USGS Fact Sheets and the USGS report published in *California Geology* on the hazard of carbon dioxide will be *used and cited* for Environmental Impact Reports pertaining to current and future projects within the Town of Mammoth Lakes. All of these reports contain ready-made figures, maps, and diagrams that can be spliced directly into your CEQA documents for quick, efficient, and reliable graphics at no cost. Proper scientific credit should be given to the USGS for all graphics used in environmental documents by the Town of Mammoth. Simply put the authors, USGS, year, and document number in the corner of each illustration. If you have further questions, please call me at 916-323-4399.



Sincerely yours,

Robert H. Sydnor

Robert H. Sydnor
Senior Engineering Geologist
RG 3267, CHG 6, CEG 968



Cc:
Dr. David P. Hill, *USGS Menlo Park*

Attachments:
3 copies of Sept/Oct 1999 issue of *California Geology*
USGS Fact Sheets (colored original versions are available by mail from the USGS at no charge)

(1/28/2000)

In Brief

USDA Forest Service • Pacific Southwest Region • Inyo National Forest

Horseshoe Lake And Vicinity C02 Phenomenon

Overview

Since 1990, carbon dioxide gas (CO2) has been discharging through the soil in six areas on the flanks of Mammoth Mountain. One of the largest of these areas is located on the northwest side to Horseshoe Lake. Other areas where gas discharge is currently significant are scattered around Mammoth Mountain, generally outside of the Mammoth Mountain Ski Area boundary. Mammoth Mountain Ski Area implements a winter closure for the few small areas where C02 concentrations are potentially dangerous within the ski area boundary. Areas of gas discharge are also located outside the groomed trails of Tamarack Cross-country Ski Center. The most noticeable effect of this discharge has been tree mortality. Approximately 120 acres of trees have died, 30 of those acres are near Horseshoe Lake. The source of the C02 is located deep underground and is related to long-term magmatic degassing beneath Mammoth Mountain. Measurements show that since 1995 there has been no additional spread of C02 discharge. Although it~~s~~ is widely reported in the media that this discharge is a sign of an impending eruption, U.S. Geological Survey (USGS) scientists believe that the CO2 is being released from a large gas reservoir that has existed for much longer than the current period of unrest in the Mammoth region. This conclusion, combined with the current lack of seismic activity directly beneath Mammoth Mountain indicating magmatic movement, shows there is little scientific evidence to support the prediction of an imminent eruption.

Present Status

The first priority for the Forest Service is to evaluate the potential for public health and safety concerns in the areas of discharge. This involves working with the USGS and the Mammoth Mountain Ski Area to monitor gas discharge around Horseshoe Lake and the Mammoth Mountain Ski Area, and their facilities. In May and June 1998, U.S. Geological Survey scientists measured C02 concentrations that were at unhealthy levels in depressions surrounding tree wells and one restroom. Prior to this time, it was thought the largest areas of danger were enclosed areas beneath the snow such as basements, snow caves, and inside restrooms. When C02 discharges from the ground, it normally mixes with the air and dissipates rapidly. C02 is heavier than air, however, and can collect at high concentrations in depressions and enclosures, posing a potential danger to people. Poorly ventilated areas above and below ground can be dangerous in areas of C02 discharge. Where thick snowpacks accumulate in winter, the C02 moves from the ground surface through the snow. Dangerous levels of C02 have been measured in pits dug in the snowpack in tree kill areas. The C02 concentrations are highly variable depending on wind and weather conditions and a variety of other factors, making the area subject to unpredictable changes. Concentrations of C02 measured in depressions, around trees, restrooms and natural snowdrifts have contained up to 60% concentrations of C02, making these areas extremely dangerous. Breathing C02 at such concentrations can cause death within minutes. Consequently, the Forest Service recommends staying out of the tree-kill area during the winter months due to the possibility of inadvertently falling face-first or entering holes and depressions where there are high concentrations of C02. The Forest Service is taking a stronger, educational approach to signing the area to the C02 hazards in the vicinity of Horseshoe Lake. Currently, the Horseshoe Lake vicinity is signed during the winter requesting winter users "keep out" of the highest affected areas. During the summer, we are advised by USGS that it is safe to pass through the tree-kill area whether on foot or biking. However, the Forest Service does not recommended spending any appreciable amount of time near the ground such as while picnicking or sunbathing on the northwest shore of Horseshoe Lake. Young children and dogs should be closely supervised in the tree-kill area and are not advised to dig holes or play in holes where gas concentrations might be high.

The second priority for the Forest Service is to dispose of the hazardous trees, those trees that might cause injury or property damage if they fall. The three remaining campsites in the Horseshoe Group Campground were closed in September of 1998 for this reason. Although summertime C02 concentrations in the campground were not at unhealthy levels, tree mortality was encroaching into every site except one. As the trees die, they become a hazard, potentially falling unexpectedly on people and/or vehicles. Since it was not economically feasible to open the campground for the one remaining site, it was closed to use.

The third priority for the Forest Service is to answer questions from the visiting public and the media on the situation in the area. Considerable media interest has resulted from this phenomenon. The USGS and the Forest Service have prepared displays and handouts to explain this unusual situation to visitors.

(1/28/2000)

Questions and Answers

USDA Forest Service • Pacific Southwest Region • Inyo National Forest

Horseshoe Lake And Vicinity C02 Phenomenon

Is it safe to recreate in the Lakes Basin during the winter?
Yes, with the specific exception of the tree-kill area along the northwest shore of Horseshoe Lake, the Lakes Basin is safe for cross-country skiing, snowmobiling (during the open time period), sledding, snowshoeing, and other winter activities. Within the tree-kill area near Horseshoe Lake, no winter activities should be considered safe due to the potential of falling or inadvertently entering holes and depressions where high concentrations of C02 exist. Unsafe activities include cross-country skiing, snowplay of any sort, snowmobiling and snowshoeing. Young children and dogs should be closely supervised and not allowed to enter the tree-kill area, or any roped-off or signed area adjacent to the tree-kill area.

Is Mammoth Mountain Ski Area and Tamarack Cross-country Ski Center affected?
Areas where gas discharge is currently significant are generally located outside of the Mammoth Mountain Ski Area boundary. Mammoth Mountain has closed a few small areas within the ski area where C02 concentration are potentially dangerous. Areas of gas discharge are outside the groomed trails of Tamarack Cross-country Ski Center.

Why is C02 present?
C02 has been discharging from the ground in the vicinity of Horseshoe Lake and around other parts of the flanks of Mammoth Mountain since 1990. The most noticeable effect of the discharge has been tree mortality. Although the source of these emissions is deep underground and related to long term magmatic degassing, the rate of gas reaching the surface increased significantly following a period of earthquakes beneath Mammoth Mountain in 1989. Measurements show that since 1995 there has been no additional spread of the area of C02 discharge. Although it is widely reported in the media that the discharge is a sign of a pending eruption, U.S. Geological Survey (USGS) scientists believe that the C02 is being released from a large gas reservoir that has existed for much longer than the current period of unrest in the Mammoth region. This conclusion, combined with the current lack of seismic activity directly beneath Mammoth Mountain indicating magmatic movement, shows that there is currently no scientific evidence to support that an eruption is imminent.

Have there been any deaths related to the C02 at Horseshoe Lake?
In May of 1998, a death occurred in the Horseshoe Lake area. The extent to which C02 played a role in this death cannot be adequately determined. The Mono County Coroner's report cites Pulmonary Edema as the cause of the death secondary to asphyxiation or airway obstruction by snow or possible C02 toxicity. More information on this accident can be obtained from the Mono County Sheriff's Department.

Why is the Forest Service taking stronger precautionary measures now?
Although the area has been monitored since the phenomenon began, it wasn't until testing by USGS during May and June 1998 that potentially dangerous levels of C02 were detected in and around tree wells and one restroom while snow was on the ground. Prior to this time, it was thought the largest areas of danger were enclosed areas beneath the snow such as basements, snow caves, and inside restrooms.

Is the Lakes Basin safe to recreate during the summer?
Yes, with the specific exception of the tree-kill area and a small area of ground cracks along the northwest shore of Horseshoe Lake, the Lakes Basin is safe for camping, hiking, horseback riding, fishing, boating and other summer activities. The tree-kill area is safe for adults to walk, bike, and pass through in the summer but activities that occur close to the ground such as sunbathing and picnicking should not be considered safe. The Forest Service does not recommend that small children, dogs, or other small pets enter the tree-kill area or adjacent roped-off areas at all as they are closer to the ground where C02 concentrations are most dense. Caution signs and interpretive signs explaining the situation and advising visitors of the presence of the C02 gas, its potential effects and how to avoid the hazards are posted in the tree-kill area in the summer months.

How will I know if C02 gas is affecting me?
The symptoms are similar to high altitude sickness and include dizziness, shortness of breath, and rapid pulse. C02 is odorless, colorless, tasteless, and is heavier than air. During the winter, discharge of C02 can cause high concentrations around restrooms, tree wells, and natural depressions. The levels of C02 vary depending on wind and weather and a variety of other factors, making the area subject to unpredictable changes. Concentrations as high as 60% were measured in some depressions in June of 1998 when 5-10 feet of snow was still on the ground. Such conditions are extremely dangerous and could cause death within minutes.

PHASE I ENVIRONMENTAL SITE ASSESSMENT

PER ASTM INTERNATIONAL PRACTICE E 1527-00

HILLMAN PARCEL – OLD LUMBER YARD SITE

3721 Main Street, Mammoth Lakes

Tax Assessor Parcel No. 33-110-05

MAMMOTH LAKES, MONO COUNTY, CALIFORNIA

December 5, 2005

Work Order No. 3.00543

Prepared For: *Dr. Daniel Hillman*
PO Box 2005
Malibu, California 90265
Phn: 310-456-3371
Fax: 310-456-3372

Prepared By: *SIERRA GEOTECHNICAL SERVICES, INC.*
214 West Line Street, Suite F
Bishop, California 93514
Phn: 760-873-6800
Fax: 760-873-6888
Email: sgsi@usamedia.tv

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APPENDICES

1.0. INTRODUCTION

This report presents the findings, opinions, and conclusions of Sierra Geotechnical Services, Inc. (SGSI) for the Phase I Environmental Site Assessment (ESA) of The Hillman Parcel, herein referred to as the Site, which is located in the Town of Mammoth Lakes, Mono County, California. SGSI was contracted by Dr. Daniel Hillman (User) to prepare this ESA, which is required by the User for purposes of escrow.

1.1. PURPOSE

The purpose of this ESA is to:

1.1.1. Identify, to the extent feasible pursuant to the processes prescribed in ASTM Practice E 1527-00, any recognized environmental conditions (REC), historical recognized environmental conditions (HREC), and/or *de minimus* environmental conditions (DMEC) in connection with the Site and the surrounding areas;

1.1.2. Evaluate the Site and surrounding areas with respect to the range of hazardous materials within the scope of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, including amendment by the Superfund Amendments and Reauthorization Act (SARA);

1.1.3. Provide the minimum level of appropriate inquiry that CERCLA requires to qualify the User for the “innocent landowner defense”;

1.1.4. Summarize the environmental conditions that could materially, or otherwise adversely impact the User’s operation of the business proposed for the Site; and

1.1.5. Present SGSI’s professional conclusions and opinions regarding the impact of known or suspect environmental conditions on the Site and surrounding areas based on the documented findings.

1.2. DETAILED SCOPE OF SERVICES

This Phase I ESA was performed to evaluate areas of potential environmental concern, including those that may have arisen as a result of past hazardous or other materials use, handling or storage on or near the Site that have occurred in the past. The scope of work was performed in accordance with SGSI’s original Proposal and Cost Estimate and with SGSI’s Agreement and Work Order signed and approved by the User on

November 4, 2005. Copies of these documents are provided in Appendix A. The scope of work consisted of the following:

1.2.1. review of a database search of reported environmental conditions and hazardous materials operating permit holders within an approximate minimum search distance of one mile of the Site's boundaries,

1.2.2. review of any previous ESA work for the Site and for adjacent properties in the immediate vicinity,

1.2.3. interviews with the following regulatory entities:

- Regional Water Quality Control Board, Lahontan Region (Lahontan),
- Great Basin Unified Air Pollution Control District (GBUAPCD),
- U.S. Department of Agriculture, Division of Forestry (USFS),
- U.S. Department of the Interior, Bureau of Land Management (BLM),
- U.S. Department of the Interior, U.S. Geological Survey (USGS),
- The Resources Agency, California Geological Survey (CGS),
- California Department of Transportation, District 9 (Caltrans),
- California Division of Oil, Gas, and Geothermal Resources (DOGGR),
- Mono County Building Department (MCBD),
- Mono County Department of Agriculture (MCDA),
- Mono County Planning Department (MCPD),
- Mono County Environmental Health Department (MCEHD),
- Town of Mammoth Lakes (TOML),
- Mammoth Community Water District (MCWD),
- Edison International – Southern California Edison (SCE), and
- Mammoth Lakes Fire Protection District (MLFPD),

1.2.4. stereo analysis of aerial photographs of the Site and surrounding vicinity,

1.2.5. an interview with the Owner/Key Site Manager,

1.2.6. a preliminary reconnaissance of the Site, and

1.2.7. preparation of this ESA report.

1.3. SIGNIFICANT ASSUMPTIONS

The User should assume that SGSI performed this ESA to the specifications of ASTM International Test Designation E 1527-00: Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process for the Site. The User should also assume that SGSI used a level of environmental inquiry into the previous ownership and uses of the Site considered appropriate for this commercial real estate transaction as prescribed by CERCLA.

1.4. LIMITATIONS AND EXCEPTIONS TO THE ASSESSMENT

The material evidence gathered from the sources used in this ESA is only as complete as the sources themselves. Some events resulting in potential environmental contamination are not reported to the federal, state, county, and local agencies, and therefore are not available for review in the public records. SGSI cannot warrant the accuracy, validity, or completeness of the information maintained in the records investigated. Because this ESA is based on readily available information, some of SGSI's conclusions could be considered irrelevant if the information upon which they are based is determined to be false, inaccurate, misleading or contradicted by additional information. SGSI's findings, conclusions and opinions in this ESA are true, accurate, and certified subject to, limited by, and disclaimed as the underlying accuracy and veracity of this information. Specifically not included in this ESA are issues outside the scope and requirements of ASTM E 1527-00. Typical non-scope issues include the following:

1. Asbestos-containing materials
2. Radon
3. Lead in paint or drinking water
4. High voltage power lines
5. Wetlands
6. Regulatory compliance
7. Archaeological or cultural preserves
8. Carbon Dioxide
9. Flood Plain
10. Fire Hazard Potential
11. Light Ballasts
12. Infectious Diseases

SGSI performed this ESA in a professional manner using that degree of skill and care exercised for similar projects under similar conditions by environmental consultants. Nonetheless, there are several major qualifications that are inherent in the conduct of this or any other environmental due diligence examination:

1.4.1. It is difficult to predict which, if any, identified potential problems will become actual problems in the future. Governmental agencies and their regulations continually change over time as do the enforcement priorities of the applicable agencies involved;

1.4.2. There is always the distinct possibility that major sources of future environmental liability have yet to manifest themselves to the point where they are reasonably identifiable through an external investigation such as the one conducted for this ESA;

1.4.3. The results of SGSI's investigation represent the applications of a variety of technical disciplines to materials, facts, and conditions associated with the Site. Many of these are subject to change over time; accordingly, the summary, conclusions, opinions, and recommendations must be viewed within this context;

1.4.4. SGSI shall not be held responsible for limiting conditions (i.e. snow coverage, gated access, blocked entry, etc.) or consequences arising from relevant facts that were concealed, withheld, or not fully disclosed at the time this ESA was performed;

1.4.5. Properties adjoining the Site were only unobtrusively and visually inspected; therefore, SGSI does not warrant the integrity of adjoining properties in this ESA; however, SGSI made every effort to view as much of these properties as possible;

1.4.6. SGSI makes no representation concerning the legal significance of its findings or of the value of the Site investigated; and

1.4.7. This ESA is not intended to satisfy the requirements of the National Contingency Plan.

1.5. USER RELIANCE

This ESA was prepared solely for the benefit and reliance of the User and may be delivered or otherwise shown to and relied on by any of the User's "Designated Parties and Recipients", hereby described as respective affiliates, subsidiaries, participants, lenders, successors and assigns, vested partnerships, any rating agency rating securities issued in connection with the securitization of any loan or loans pertaining to the property that is the subject of this report and any underwriters, placement agents or similar parties in connection with the issuance of securities in connection with the securitization of any loan or loans pertaining to the Site, and any holder of securities backed by any loan or loans pertaining to the Site. SGSI acknowledges that this report may be included in or referred to in an offering memorandum, prospectus or any other disclosure document or otherwise made available in the form of photocopies, computer diskettes or CD-ROMs in connection with a securitization of a pool of mortgage loans. Reliance is contingent upon acceptance of the terms and conditions, which are an integral part of the contract between SGSI and the User for this assessment. This report may be delivered or shown to parties other than the "Designated Parties and Recipients"; however, reliance on this document by any party is forbidden without the express written consent of SGSI. Use of this report for purposes beyond those reasonably intended by the "Designated Parties and Recipients" will be at the sole risk of the user. Any use of, or reliance upon, this information by a party other than the User and its "Designated Parties and Recipients" shall be solely at their own risk and without legal recourse against SGSI or their respective employees, officers, or owners, regardless of whether the action in which recovery of damages is sought based on contract, tort (including the sole, concurrent, or other negligence and strict liability of SGSI), statute, or otherwise.

2.0. SITE DESCRIPTION

2.1. LEGAL DESCRIPTION AND ADDRESS

The legal description of the Site is:

> That portion of land found in the west half of the northeast quarter of Section 34, Township 3 south, Range 27 east, M.D.B. & M., in the County of Mono, State of California, described as beginning at a point of intersection of the east line of the west half of the northeast quarter with the south line of California State Highway 203, 200 feet wide, as now established; thence south along said east line 209 feet; thence west a right angles 40 feet to the true pint of beginning; thence continuing west 209 feet; thence north at right angles 209 feet, more or less, to the south line of said State Highway; thence easterly along the south line of the said State Highway to a point thereof distant 40 feet measured at right angles from the said

east line and distant 40 feet therefrom 209 feet, more or less, to the true point of beginning, excepting therefrom the easterly 50 feet of the above-described land.

The address for the Site is: 3721 Main Street, Mammoth Lakes, California 93546.

2.2. SITE LOCATION AND VICINITY CHARACTERISTICS

The Site is regionally located in east-central California, in the southwest portion of Mono County, south of Mono Lake and west of Crowley Lake (Figure 1), and it is centered on the approximate map coordinates of latitude 37.6484°N and longitude 118.9781°W on the USGS Old Mammoth 7.5-minute Quadrangle Map. The Site is located on the near the northern edge of the Town of Mammoth Lakes city limits, approximately 4.8 miles west of the intersection of U.S. Highway 395 and State Route 203 (Figure 2). More specifically, the Site encompasses approximately 0.72 acres of land on the south edge of State Highway 203 (Main Street), approximately 1,265 feet east of the intersection with Minaret Road (Figure 3). It is bound on the north by a paved frontage road, on the east by commercial restaurant property, on the south by private residential property, and on the west by private condominium property. Vehicular access to the Site is from the frontage road and Main Street on the north and from a private unpaved road on the south.

2.3. EXISTING TOPOGRAPHY AND DRAINAGE

Topography on the Site is characterized by a gentle uniform ground surface that slopes south to southeast ranging in elevation from 7936 at the northwest property corner to 7918 at the southeast property corner. Details of the topography are shown on enclosed Figures. Drainage is controlled by the topography such that Site runoff flows southeast at approximately 6.8 percent. Storm runoff and drainage flows are not collected or controlled by any improvements. Information concerning the Site's location with respect to nearby storm drainage systems is discussed in Section 4.3.2.8.

2.4. HISTORICAL AND CURRENT USE OF SITE

Historically, the Site had remained in a natural state up until after 1944 but before 1951, which was when the Site was initially developed for commercial purposes by way of a lumber yard facility. Over the course of time this facility contained a multi-room warehouse, a lumber mill, a detached hardware store with upstairs lodging, and two small lodge cabins. Lumber yard operations continued up until about 1972. The hardware store remained operational until 1973. All buildings on the Site were subsequently demolished and removed in 1980 with remnant footings removed in 1990, and the Site has remained vacant and unused since.

3.0. USER PROVIDED INFORMATION

3.1. TITLE RECORDS

The User provided a copy of a Preliminary Title Report dated February 27, 2003 for the Site. According to this report, title to the Site is vested in Daniel D. Hillman, trustee of the Daniel D. Hillman Trust, dated October 15, 1986, as to an undivided 51 percent interest: Karen Eve Hillman Chester, a married woman as her sole and separate property, Jana Alison Hillman, a single woman, and Kimberly Elizabeth Hillman, a single woman, all as joint tenants, as to an undivided 49 percent interest, subject to exception No. 4 of said report. A copy of this record is enclosed in Appendix B.

3.2. TECHNICAL DOCUMENTS

Among the technical documents that the User provided (Appendix M), four were considered relevant for this Phase 1 ESA. Two of the documents are maps of the Site, the first being a sketch attachment to a Caltrans “Permit to Enter” dated October 10, 1980, and the second being a Survey Map of the “Hardware Store Property” dated September 14, 1973 with a revision date of October 15, 1973. Both maps depict building structures on the Site, with the latter denoting names and descriptions for each building. The 1973 Survey Map shows five buildings on the Site, one of which appears to be an offsite encroachment across the southern property line at the southwest corner; two of which appear to be small, one-story houses located next to the western property line; one of which is labeled “Hardware Store” near the northern property line; and the last of which is labeled “Warehouse” located on the southeast corner of the Site. Based on a review of these two maps, SGSI noted nothing of any potential adverse environmental concern.

Two other technical documents worth noting indicate the MCBD’s acknowledgement of a “Completion of Demolition” for the Site in their memorandum dated August 8, 1980, with a subsequent letter from the demolition contractor, T.H. Quealy Construction, dated August 16, 1980. Based on a review of these two documents, SGSI noted nothing of any potential adverse environmental concern.

3.3. ENVIRONMENTAL LIENS

SGSI sought for but did not find any Site-specific environmental liens.

3.4. SPECIALIZED KNOWLEDGE

SGSI sought for but did not find and Site-specific specialized knowledge.

4.0. RECORDS REVIEW

4.1. STANDARD ENVIRONMENTAL RECORDS SOURCE

SGSI subcontracted with Environmental Data Resources™, Inc. (EDR) to perform a computerized environmental database record search. EDR, of Southport, Connecticut, is a private database vender. The environmental search was performed for reported current and historical environmental site conditions (RECs, HRECs, and DMECs) and operating permits involving hazardous materials within an approximate minimum search distance of one mile of the Site. EDR provided a Radius Map that meets the ASTM International Standard Practice for Environmental Site Assessments, E 1527-00, including, but not limited to, searches for sites on CERCLIS and EPA lists. An EDR report dated November 14, 2005 is presented with regards to mappable and unmappable (orphan) facilities, a copy of which is provided in Appendix C. Mappable facilities are those that can be reasonably to accurately located on the EDR Site Maps.

4.1.1. Mappable Facilities

Of the five mappable facilities presented in the EDR report, four with known reported environmental conditions were determined to be within one-half mile or less of the Site, and they are denoted on Figure 3. These facilities are described as follows:

Facility 1. Map ID A1 – The former Exxon Mini-Mart, which was formerly an ARCO AM/PM Mini-Mart, and prior to that a Texaco service station, and is now the existing Napa Auto Parts facility, is located at 3280 Main Street, approximately 2,120 feet east of and down slope from the Site. This facility is listed on the LUST and Cortese databases. A diesel fuel leak into soil occurred at the former Exxon facility on January 13, 1992, and the MCEHD closed the case after treatment on December 22, 1998. The Napa site discovered a gasoline leak into soil on May 15, 1992, and the MCEHD closed the case on December 23, 1993 after treatment.

Facility 2. Map ID A2 – The former Mammoth Mobil Mo-Mart facility is listed on the LUST and Cortese databases. The facility is located at 3275 Main Street, approximately 2,160 feet southeast of and down slope from the Site. This facility was formerly known as a BP station, and it is currently known as Center Street Shell. A diesel fuel leak into soils was discovered on September 2, 1987 and reported on May 24, 1994, and on April 24, 1997 a diesel fuel leak into the aquifer was discovered and subsequently reported on May 5, 1997. The contamination is currently being monitored under purview of Lahontan and TOML.

Facility 3. Map ID 2 – The Norco Service Center facility is listed on the HAZNET, LUST, CORTESE, and HIST UST databases. The service center is located at 3670 Main Street, approximately 250 feet northeast of and upslope from the Site. This facility is currently permitted to handle waste and mixed oils. A gasoline leak into soils was discovered on May 1, 1996 and reported on June 14, 1996, and the contaminated material was excavated and disposed of under purview of MCEHD, who closed the case on October 8, 1996.

Facility 4. Map ID 5 – The former Contel facility is listed on the UST, LUST and Cortese databases. This facility is located at 39 Pinecrest Avenue, approximately 2,170 feet east of and down slope from the Site. This facility subsequently became owned by GTE, and it is currently operated by Verizon.

Diesel fuel was discovered in soil on February 2, 1992. During tank removals, contaminated soils were excavated and removed, and MCEHD closed the case (Case #6B2600778T) per closure letter dated October 16, 1996.

4.1.2. Unmappable (orphan) Facilities

Of the thirty-four orphan facilities listed in the EDR report, only three with known reported environmental conditions were determined to be within a one-half mile of the Site, as shown on Figure 3. The remainder are either greater than one-mile or they are duplicate facilities with those listed in Section 4.1.1. In the order that they appear in the EDR report, they are described as follows:

Facility 5. The Village at Mammoth facility is listed on the LUST database. Recent construction operations for a new gondola lift station exposed two underground fuel storage tanks and one sump that previously served a Union 76 service station, then a Texaco service station, and then Caesar's Garage service facility, all formerly at 6155 Minaret Road, approximately 1,875 feet northwest of and upslope from the Site. All apparently used the same building over time, which was demolished sometime between 1972 and 1988. Petroleum contaminated soils were discovered during removal of tanks between November 2001 and January 2002 during construction of The Village at Mammoth. The contaminated soils were excavated and disposed of in compliance with MCEHD, as described in their closure letter dated October 29, 2002.

Facility 6. The Mammoth Lakes Chevron #9-1861 facility located at 3236 Main Street is listed on the LUST, Cortese, RCRIS-SQG, FINDS, and HAZNET databases. This service station facility is located approximately 2,260 feet east of and down slope from the Site. Gasoline leaks were discovered and reported on two separate occasions, on March 28, 1994 and on August 11, 1995. The extent of contamination is currently being investigated under the purview of Lahontan. It is currently not known if the aquifer was affected.

Facility 7. The Royal Pines Resort facility is located at 3814 View Point Road off of Main Street, approximately 405 northwest of and upslope from the Site. According to an MCEHD closure letter dated December 22, 1994, a 500-gallon gasoline tank was removed from this facility sometime in 1986. No unauthorized release of product was detected by MCEHD staff at the time of the UST removal.

4.2. ADDITIONAL ENVIRONMENTAL RECORD SOURCES

According to past record and database searches, fifteen additional documented facilities not identified in the EDR report were determined to be within a one-half mile of the Site, and they are also plotted on Figure 3. In order of proximity to the Site, they are described as follows:

4.2.1. Unreported Facilities

Facility 8. The Lodestar Golf Course facility (MCDA Site I.D. #26-03-2600175) is located upslope from the Site and just offsite from the southwest property corner. This facility currently employs MCDA-qualified personnel for the application of fertilizers, herbicides, and pesticides in compliance with application rates specified by the Mono County Agricultural Commissioner's Office.

Facility 9. The Mammoth View Lodge (defunct) was located at 3771 Main Street, approximately 100 feet west of and upslope from the Site. This facility was at one time in operation as the old "Chinese Laundry" between the years 1975 and 1977. No reports of any dry cleaning or contamination are known for this facility.

Facility 10. The La Sierra's Restaurant facility is located at 3789 Main Street, approximately 200 feet west of and upslope from the Site. A UST was at one time located near the northeast property corner, and a mobile above-ground diesel tank was used on the facility. The UST was removed sometime between 1976 and 1978 without MCEHD purview. A recent analysis performed March 11, 2004 indicated that native soil was not contaminated beneath the old UST backfill material.

Facility 11. The Holiday Haus Motel located at 3863 Main Street is listed as a CHMIRS site. It is located approximately 600 feet west of and upslope from the Site. Fifty-four pounds of a pesticide in the form of calcium hypochlorate was released as a gas into the air on March 7, 1989. No remedial action was undertaken by any agency since the release, and no documentation for this facility was provided by the County. With respect to prevailing wind, the motel is down gradient.

Facility 12. The former Ronning Loader Service facility was once located at 239 Joaquin Road, approximately 1,035 feet southeast of and down slope from the Site. According to MCEHD records, a 1000-gallon UST was removed from this facility on July 29, 1993, and no contamination of the underlying soils was determined after sampling and analysis.

Facility 13. The Absentee Homeowner's Service incident is reported to have been located at 27 Lake Mary Road, approximately 1,330 feet west of and upslope from the Site. According to an MCEHD letter dated August 27, 1992, three to four cubic yards of diesel/oil saturated dirt was removed from the premises and hauled off site to a permitted facility according to their specifications.

Facility 14. The Ted Berner facility located at 62, 94, 100 and 128 Berner Street is located approximately 1,390 feet northwest of and upslope from the Site. This facility is listed on the HIST UST database. Diesel fuel was stored underground at three separate locations on the facility between approximately 1974 and 1994. MCEHD issued a closure letter dated June 23, 1994 for the UST that at one time was located east of the welding shop and immediately west of the Site. MCEHD also provided an "Application for Permit to Abandon Underground Hazardous Material Storage Tank" submitted by Mr. Berner, dated May 3, 1991, and signed May 28, 1991 for the UST that was located northeast of the private garage; no closure record could be produced by MCEHD for this UST; nor could any records be found for a small diesel tank with a hand pump that was at one time located adjacent to the driveway entrance up to the Berner residence sometime between approximately 1974 and 1988. Subsequent soil sampling and testing performed on October 8, 2004 at this location indicated that hydrocarbons were not present.

Facility 15. The Mullins Laundry & Cleaners facility is located at 145 Center Street, approximately 1,555 southeast of and down slope from the Site. No known records of any contamination or mishandling of dry cleaning chemicals have been reported for this facility.

Facility 16. The Minaret Lodge facility (now defunct) was located at 6156 Minaret Road, approximately 1,675 feet northwest of and upslope from the Site. An application for permit to abandon a 500-gallon underground hazardous materials storage tank was filed with the MCEHD on May 23, 1988. No unauthorized releases were noted.

Facility 17. The Mammoth Lakes Old Town Yard facility is listed on the HIST UST, LUST and CORTESE databases, and it was at one time was located at 140 Berner Street, approximately 1,750 feet northwest of and upslope from the Site. This facility was at one time utilized as a maintenance yard for the TOML between 1986 and 1990, and it was used by Mono County for full maintenance of their highway equipment prior to that. A leak of fuel into soils was confirmed on October 28, 1993. The contaminated soils were excavated and disposed of under the purview of the MCEHD, who subsequently issued a closure letter dated January 11, 2001 following remediation.

Facility 18. The Ledcor Industries USA, Inc. facility has been listed on the HAZNET database, and it is located at 126 Berner Street, approximately 1,750 feet northwest of and upslope from the Site. It is essentially the same location as the former Old Town/County Yard. Manifest records from Ledcor's recycling program for handling petroleum product deliveries and disposals have exceeded a minimum of 350,000 shipments. Mr. Mike Barrett of Ledcor, provided a copy of their Hazardous Materials Transportation License issued by the California Highway Patrol dated September 25, 2003 and expiring November 30, 2004, and a copy of their company “Health, Safety, and Environmental Policy” dated January 2003.

Facility 19. The Lodestar Maintenance facility is located at 5500 Meridian Boulevard, approximately 1,915 feet southwest of and down slope from the Site. This facility is listed on the LUST database. The maintenance facility is still in operation for the Lodestar Golf Course. Diesel fuel was reported having leaked into soils on June 30, 1988, and again on May 22, 1997. No closure letter has yet been written, and the site is currently under permitted for fuel storage by the MCEHD.

Facility 20. The Frank’s Liquor and Gas facility is listed on the HIST UST database. It was formerly located at 6220 Minaret Road, approximately 1,950 feet northwest of and upslope from the Site. A leak into soils was reported December 7, 1993. It is our understanding that the underground fuel storage tanks were pulled and all contaminated soil was removed under the purview and satisfaction of MCEHD, who issued a letter of closure dated December 7, 1993.

Facility 21. The Ponderosa Lodge facility (now defunct) facility was located at 15 Canyon Boulevard, approximately 1,980 feet west of and upslope from the Site. A 500-gallon UST containing motor vehicle fuel was removed from the lodge premises according to an application for permit to abandon a 500-gallon underground hazardous materials storage tank dated November 23, 1988 on file at the MCEHD. No unauthorized releases were noted; furthermore, the former site was over-excavated in its entirety to provide underground parking for The Village at Mammoth project.

Facility 22. The Alpine Medical Clinic facility (now defunct) was located at 6175 Minaret Road, approximately 2,030 feet northwest of and upslope from the Site. The clinic has been listed on the HAZNET database having at one time handled photochemicals and photo processing waste. No unauthorized releases are known, and no County documentation for this facility was provided; furthermore, the facility was over-excavated in its entirety to provide underground parking for The Village at Mammoth project that was recently developed.

Facility 23. The Chaparral Apartments facility is located at 380 Chaparral Road, approximately 2,360 feet southeast of and down slope from the Site. According to MCEHD records, a 550-gallon UST was removed from this facility in 1993, and no record of soil contamination was found in their files.

Facility 24. The Alpine Lodge facility (now defunct) was located at 6209 Minaret Road, approximately 2,370 feet northwest of and upslope from the Site. A 500-

gallon leaded gasoline tank was pulled from the premises according to an MCEHD application for permit to abandon an underground hazardous materials storage tank dated December 9, 1991. No unauthorized release was noted, and no closure letter was produced.

4.2.2. Previous Environmental Assessments

SGSI asked for and searched for but did not receive or find any previous environmental assessments for the Site.

4.3. PHYSICAL SETTING SOURCES

SGSI reviewed the following physical setting sources:

4.3.1. Mandatory Standard Physical Setting Sources

Mandatory standard physical setting sources, including all known historical topographic maps up through to the most current map containing the Site, are enclosed in Appendix D. Each source has been reviewed and summarized as follows:

Figure 4. The 1914 USGS Topographic Map for the Mt. Morrison Quadrangle; according to this map, no infrastructure or development was observed on or near the Site; however, the old Deadman and Sawmill Trails appear to traverse near the Site; a blue-line stream traverses just south of the Site; green shading indicates forested areas; nothing else of significant environmental concern noted.

Figure 5. The 1915 USFS Folios Map of Inyo County (now Mono County); according to this map, the Site is located within a shaded area denoted as "Public Land"; a blue-line stream traverses just south of the Site; no infrastructure or development is shown on or near the Site; nothing else of significant environmental concern noted.

Figure 6. The 1928 reprint of the 1914 USGS Topographic Map for the Mt. Morrison Quadrangle; according to this map, nothing of significant environmental concern was noted.

Figure 7. The 1934 USDA reprint of the 1914 USGS Topographic Map for the Mt. Morrison Quadrangle; according to this map, green lines representing new roads were added; a green road traverses just north of the Site; nothing else of significant environmental concern noted.

Figure 8. The 1936 Topographic Map of the Mammoth Embayment, Mono County, California (Kesseli, 1941); according to this map, Lake Mary Road (Main Street) was being planned just north of the Site; Alpine Circle and Mountain Boulevard

are also located just to the north; nothing else of significant environmental concern noted.

Figure 9. The 1939 USGS topographic Map of the Mono Basin and Vicinity; no infrastructure or development is shown on or near the Site; however, it is known that construction of Lake Mary Road/Main Street was completed by 1938; nothing else of significant environmental concern noted.

Figure 10. The 1953 USGS 15-Minute Topographic Map for the Mt. Morrison Quadrangle; according to this map, a building is plotted on the Site; the Site is located in an area color-coded green, which indicates forested cover; Joaquin Road is shown offsite to the east; nothing else of significant environmental concern noted.

Figure 11. A 1965 topographic map of the Town of Mammoth Lakes created by Miller Engineering Co. for East Sierra Development Associates; according to this map, three buildings are shown throughout the Site, one of which appears to be an encroachment; the largest building is the original lumber house; three dirt roads access the Site – one from the north, one from the northwest and one from the south; nothing else of significant environmental concern noted.

Figure 12. A 1974 topographic map of the State Highway Route 203 alignment created by Caltrans; according to this map, three buildings are shown on the Site and appear to be the same as those shown in Figure 11; a power pole is plotted just north and offsite; nothing else of significant environmental concern noted.

Figure 13. The 1978 USGS/USFS 7.5-Minute Topographic Map for the Mount Morrison NW Quadrangle; according to this map, one building is plotted on the Site; the Site is plotted within the shaded area indicating “Lands within the National Forest boundary”; nothing else of significant environmental concern noted.

Figure 14. The 1983 USGS 7.5-Minute Series Topographic Map of the Old Mammoth Quadrangle; according to this map, the Site is plotted within a gray-shaded area denoted as “Alienated lands within the National Forest boundary”; nothing else of significant environmental concern noted.

Figure 15. The 1984 USGS 7.5-Minute Series Topographic Map of the Old Mammoth Quadrangle; according to this map, the Site is plotted within a gray-shaded area indicating “Lands within the National Forest boundary”; nothing else of significant environmental concern noted.

Figure 16. The current 1994 USGS 7.5-Minute Topographic Maps of the Old Mammoth, and Bloody Mountain Quadrangles; according to this map, the Site is plotted within a gray-shaded area indicating “National Forest System lands within the National Forest”; nothing else of significant environmental concern noted.

Figure 17. A 2000 topographic map of the Town of Mammoth Lakes created by North American Mapping for the MCWD and the TOML; according to this map, no buildings are shown on Site; nothing else of significant environmental concern noted.

SGSI noted nothing of any potential adverse environmental concern on any of these maps.

4.3.2. Discretionary and Non-Standard Physical Setting Sources

Discretionary and non-standard physical setting sources include any known pertinent published public reports that address potential natural environmental hazards that are regional to the Site. Each source has been reviewed and summarized as follows:

4.3.2.1. Geologic Setting

According to *USGS Miscellaneous Investigation Series Map I-1933* (Bailey, 1989), the Site is located in an area that is regionally dominated by faulting, volcanism, and glaciation. More specifically, it is located in the western portion of the Long Valley caldera between the western margin of the caldera's resurgent dome and the eastern flank of the Sierra Nevada fault escarpment. The Site is located entirely on glacial till from the Tioga glaciation that dates from approximately 20,000 years ago. A copy of the Site Geologic Setting Map is shown as Figure 18.

A review of USGS Open-File Report 90-460 indicates that nearest exploratory geothermal well drilled through a layer of unconsolidated glacial till and colluvium that overlies basalt bedrock with a contact measured at about 232 feet below the ground surface at a location approximately 1,860 feet to the northeast (Diment and Urban, 1990).

4.3.2.2. Volcanic Setting

A review of *USGS Bulletin 1847* (Miller, 1989) indicates that the Site is located in a volcanic-vent area potentially subject to volcanic hazards associated with explosion, flowage, pyroclastic fall, debris flow, and base surge events. A review of *USGS Bulletin*

2185 (Hill et al., 2002) describes a comprehensive four-level community response plan for these hazards and for future episodes of volcanic unrest within the area. A copy of the abbreviated version of this response plan is enclosed as *USGS Fact Sheet 108-96* in Appendix Q. A review of *USGS Miscellaneous Investigation Series Map I-1933* (Bailey, 1989) further indicates that the Site is located inside the Long Valley caldera (collapsed volcano), an elongate crater-like feature that formed from a cataclysmic volcanic eruption sequence between approximately 760,000 through 730,000 years ago. Subsequent volcanic eruptions between 215,000 and 52,000 years ago occurred on nearby Mammoth Mountain and Lincoln Peak approximately 2.9 and 2.3 miles west of the Site, respectively. Phreatic explosions as recent as 500 years ago (plus or minus 200 years) occurred along the Mono-Inyo volcanic chain with the nearest phreatic cone located approximately 3.4 miles to the northwest. A copy of the Site Volcanic Setting Map is shown as Figure 19.

4.3.2.3. Tectonic Setting

A review of the CGS *Alquist-Priolo Earthquake Fault Zone Map* for the 1985 NE ¼ Devils Postpile Quadrangle and the 1982 NW ¼ of the Mount Morrison Quadrangle (Davis, 1982) indicates that several recent faults (surface rupture less than 11,000 years ago) and historic faults (less than 200 years ago) are located nearby the Site. Distance from the Site to the boundary of the nearest zoned faults are approximately 1.1 miles to the west and 2.0 miles to the east. No known active faults are mapped across the Site. According to the *1997 Uniform Building Code* (CGS, 1998), page L-18 of “Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada”, the Site is located within 2 kilometers of the Hartley Springs fault. The Hartley Springs fault is classified as a Type ‘B’ causative fault with an estimated maximum magnitude earthquake M_{MAX}=6.6. Ground deformation and surface rupture was detected along this fault zone as a result of the 1980 Long Valley Caldera earthquake swarm (Clark et al., 1980; Sherburne, 1980; Davis, 1982). A copy of the Site Tectonic Setting Map is enclosed as Figure 20.

4.3.2.4. Mining District Setting

A review of *USGS Professional Paper 385* (Rinehart and Ross, 1966) indicates that the historic Lake Mining District of Mammoth Lakes lies several miles southwest of the Site in a different groundwater basin (Figure 2). Gold, silver, copper, and lead-bearing veins were discovered here in 1877-78, primarily in the Old Mammoth Mine (Clark, 1998). Lake Mining district organized in 1887 and included other mines, notably the Monte Cristo and Mammoth Consolidated mines. Mining was performed periodically up through the 1930's and on nearby prospects as late as 1958. Mining developed predominantly on the northwest-trending metavolcanic ridge named "Mineral Hill" or "Gold Mountain" or "Red Mountain", which is located just south and west of Mammoth Rock. Old Mammoth Mine originally consisted of five claims, but increased to twenty-six by 1940, and it was later abandoned in 1956. Old Mammoth Mine is composed primarily of five adits on the north slope of Mineral Hill. Monte Cristo Mine opened with three patented claims in 1927 with ore being extracted up through 1941. The mine was abandoned shortly thereafter. Mammoth Consolidated Mine originally produced gold in 1918 and included 27 claims by 1955, and it too was abandoned shortly thereafter.

4.3.2.5. Groundwater Setting

The *Mammoth Basin Water Resources Environmental Study* prepared by the California Department of Water Resources (CDWR, 1973), depth to permanent groundwater beneath the Site is estimated at about 100 feet. According to USGS Water Resources Investigations Report 85-4183, depth to permanent groundwater beneath the Site is estimated at about 250 feet (Farrar et al., 1985). The most accurate depth to groundwater is provided by Diment and Urban (1990) in their report *Mammoth Lakes Geothermal Reservoir Assessment Project (MLGRAP) Well #1* located 1,860 feet to the east at 459 feet below the ground surface (bgs). The nearest municipal production well is MCWD Well 20, located approximately 1,935 feet to the southwest (Figure 3) at 412 feet bgs. The groundwater gradient generally trends in the direction of the topographic gradient, which in this case is easterly and parallel with Murphy Gulch. Both permanent and perched groundwater levels in the Mammoth Lakes area tend to fluctuate seasonally through time.

4.3.2.6. Hydrologic Setting

A review of the CDWR report (CWDR, 1973) indicates that surface waters on the Site are regionally confined to the 71 square mile east-draining Mammoth Hydrologic Basin, which contains six distinct major watersheds, all of which are ultimately tributary to Owens River and Crowley Lake. The Site is located in Watershed III, commonly known as the Murphy Gulch watershed. The nearest natural springs are located to the south in the Juniper Springs area, just east of Lake Mary Road.

A review of the *Water Quality Control Plan* for the Lahontan Region (CRWQCB, 1994) indicates that the Site is regionally confined to the northern groundwater basin of Lahontan Region No. 6, Owens Hydrologic Unit No. 3, within Long Subunit No. 10, which corresponds to the numeric designation of “603.10,” as denoted in the report. According to the Lahontan report, the Site is located upstream of Crowley Lake, which is listed as a water body having impaired water quality according to the List of Water Quality Limited Segments, as outlined in Section 303(d) of the federal Clean Water Act (P.L. 92-500, as amended).

4.3.2.7. Floodwater Setting

A review of the *Flood Insurance Rate Map for the Town of Mammoth Lakes* prepared by the Federal Emergency Management Agency (FEMA, 1992), illustrates that the Site located within “Other Areas Zone X,” which are areas determined to be outside the 500-year flood plain boundary. According to Flood Insurance Rate Map (FIRM) Community-Panel No. 060724 0002 B, the nearest 100- and 500-year special flood zone hazard areas are located along Mammoth Creek to the south. A copy of the Site Flood Setting Map is enclosed as Figure 21.

4.3.2.8. Stormwater Setting

A review of the *Mammoth Lakes Storm Drainage Master Plan* (Brown and Caldwell Consulting Engineers and Triad Engineering, 1984) illustrates that the Site is located in Tributary Subarea III-5. According to this plan, the Site is located within an area denoted as “A1” of Tributary Subarea III-5, which drains by surface runoff to the southeast into a stormdrain that flow underneath Joaquin Road, which is eventually tributary to the natural flow course of Murphy Gulch. A copy of the Site Storm Drainage Setting Map is enclosed as Figure 22.

4.3.2.9. Surficial Soils Setting

A review of the *USDA Soil Survey of Benton-Owens Valley Area, California, Parts of Inyo and Mono Counties* (Tallyn, 2002) indicates that soils underlying the Site are classified as Chesaw family at slopes of 5 to 15 percent, which are soils that are generally glacial outwash in origin derived from granitic rock sources containing 15 percent contrasting inclusions, and with properties that include rapid permeability and very low or low water capacity. A typical soil profile contains 0 to 5 inches of grayish brown gravelly loamy sand underlain by grayish brown very gravelly loamy sand and yellowish brown gravelly loamy sand to depths of approximately 60 inches.

A review of the *Mammoth Lakes Storm Drain Master Plan* (Brown and Caldwell and Triad Engineering, 1984) and the *General Plan for the Town of Mammoth Lakes* (TOML, 1987) indicates that the soil underlying the Site is classified as Outwash Till, which is composed of undifferentiated glacial outwash and coarse till in moderate to steep terrain. The soil profile on the Site is mapped as B322, which has low runoff potential, more than 36 inches of soil depth, a moderate hazard of inherent erosion potential, and a medium potential for vegetative productivity.

4.3.2.10. Air Quality Setting

A review of the *Air Quality Management Plan for the Town of Mammoth Lakes* and of the latest *Progress Report on the Implementation of the Mammoth Lakes Air Quality Management Plan* (GBUAPCD, 1990; 1995) indicates that there were 26 days with measured values that exceeded both the federal and town air pollution threshold standard (150 µm/m^3 for PM-10) between the time period of 1990 and 1995. This air pollution problem was found to be caused primarily by wood smoke and road cinders used as anti-skid material during snow storms, particularly during the winter months. The nearest air quality monitoring station is located at State Highway 203 (Main Street) and Old Mammoth Road above the Rite Aid building in the Gateway Center shopping area located over a mile east of the Site.

A review of *USGS Water-Resources Investigations Report 98-4217* (Farrar et al., 1999) indicates that volcanic gas emissions, particularly carbon dioxide (CO_2), have been responsible for tree-kills on the southern and western flanks of Mammoth Mountain. The nearest known locations of CO_2 emissions are the Shady Rest, Horseshoe Lake, Mammoth Mountain, and Casa Diablo fumaroles. With respect to the Site, the Shady Rest fumarole is located at approximately 1.9 miles to the east, the Horseshoe Lake fumarole is approximately 3.3 miles to the southwest, the Mammoth Mountain fumarole is located approximately 2.9 miles to the west, and the Casa Diablo fumarole is approximately 2.6 miles to the east. Prevailing wind across the Site is predominantly toward the east.

4.4. HISTORICAL USE INFORMATION SOURCES

4.4.1. Aerial Photographs

Aerial photographs were reviewed or purchased from the USFS offices in Bishop, Lee Vining and Mammoth Lakes, the BLM office in Bishop, the Triad/Holmes Associates office in Mammoth Lakes, the USGS's Earth Resources Observation & Science (EROS) Data Center facility in Sioux Falls, South Dakota, the MCDPW in Bridgeport, the

LADWP office in Bishop, the Mono Lake Committee in Lee Vining, the Fairchild Aerial Photograph Collection at Whittier College, National Aerial Resources (NAR) in New York, and from the Caltrans District 9 office in Bishop, California. The information below is a summary description of photographs that include the Site and surrounding area taken between 1942 and 2003. The photographs shown in boldface type indicate the frame that is provided as a plate. The original scales of the photographs are indicated. The following summaries are interpretive and are valid only for the dates indicated; photocopies are provided as Plates 1 through 43 in Appendix E:

Plate 1. NAR, 5/27/1942, USGS, Frames IV-24 & **25**, 1:20,000 scale, stereo pair, black & white, poor resolution:
The Site is in a natural state; State Highway 203 and Alpine Circle are constructed offsite to the north; patches of snow apparent on the north-facing slopes and shadows; northeast-southwest trending lineations are scratches inherent on the photograph's negative; no potential adverse environmental concern noted.

Plate 2. USFS, 9/22/1944, DDE Series, Flight Line 58, Frames 12-**111** & 112, 1:20,000 scale, stereo pair, black & white, fair resolution:
No changes to the Site noted.

Plate 3. USFS, 8/10/1951, GS-QN Series, Flight Line 3, Frames 1-**65** & 66, 1:47,200 scale, stereo pair, black & white, poor resolution:
Development is noted on the Site and on adjacent properties; no potential adverse environmental concern noted.

Plate 4. USFS, 7/21/1954, GS-VDL Series, Flight Line 1, Frames 1-**1**, 1:37,400 scale, single photo, black & white, poor resolution:
No changes to the Site noted.

Plate 5. NAR, 8/26/1955, USGS, Frames 93-7036 & **7037**, 1:48,000 scale, stereo pair, black & white, poor resolution:
No changes to the Site noted.

Plate 6. USFS, 8/23/1956, EMG Series, Flight Line 108, Frames 20-**15** & 16, 1:15,000 scale, stereo pair, black & white, good resolution:
Six buildings are discernible on the Site with vehicles scattered about on the unpaved parking lot; nothing of environmental concern noted.

Plate 7. USFS, 9/5/1958, IN Series, Flight Line 6, Frames 2-125 & **126**, 1:10,000 scale, stereo pair, black & white, excellent resolution:
No significant changes to the Site noted.

Plate 8. USFS, 9/10/1963, EMG Series, Flight Line 27, Frames 7-**146** & 147, 1:15,840 scale, stereo pair, black & white, fair resolution:
No significant changes to the Site noted.

Plate 9. MCWD, 10/4/1965, TOML, Frames **32** & 33, 1:18,000, stereo pair, black & white, very good resolution:
The center building has been removed from the Site; stacks of lumber are discernible in the center of the open area; no other significant changes noted.

Plate 10. Triad, 7/10/1967, Orthophoto, 2099-**19**, 1:4,800 scale, single orthophoto, black & white, good resolution:
No significant changes to the Site noted.

Plate 11. Caltrans, 7/10/1968, 09-Mno-203, 1-**13** & 14, 1:7,200 scale, stereo pair, black & white, good resolution:
No significant changes to the Site noted.

Plate 12. Caltrans, 7/25/1970, 09-Mno-203, Frame 28-**16**, 1:2,400 scale, single photo, black & white, excellent resolution:
No changes to the Site noted.

Plate 13. Caltrans, 4/27/1972, 09-Mno-203, Frames 1-15 & **16**, 1:12,000 scale, stereo pair, black & white, good resolution:
No significant changes to the Site noted; snow is apparent on north-facing slopes and shadows; grading and initial construction of the Norco Texaco Service Center facility is discernible on property offsite to the north.

Plate 14. MCPWD, 8/16/1972, Monoplan-Mammoth, 9-**4** & 5, 1:18,000 scale, stereo pair, black & white, good resolution:
No significant changes to the Site noted; the Norco/Texaco Service Center facility appears to be operational offsite to the east.

Plate 15. USFS, 8/17/1972, INO4 Series, Flight Line 14, Frames 372-**153** & 154, 1:15,840 scale, stereo pair, color, fair resolution:
No significant changes to the Site noted.

Plate 16. Caltrans, 8/9/1974, 09-Mno-203, Frames 1-**11** & 12, 1:3,000 scale, stereo pair, black & white, excellent resolution:

Building and grading discernible on Viewpoint Condominium property offsite to the west of Lot 14A; restaurant and commercial building is constructed on property offsite and adjacent to Lot 2; soil stains are apparent offsite at the Norco/Texaco Service Center facility; no more significant changes noted.

Plate 17. Caltrans, 9/5/1974, 09-Mno-203, Frames 1-**10** & 11, 1:6,000 scale, stereo pair, black & white, excellent resolution:
No significant changes to the Site noted.

Plate 18. Caltrans, 7/6/1977, 09-Mno-203, Frame 54, 1:3,600 scale, single photo, black & white, excellent resolution:
Some buildings at southeast corner of Site have been removed; no other significant changes to the Site noted.

Plate 19. EROS, 8/22/1977, USGS, Frames 02573-220 & **221**, 1:29,000 scale, stereo pair, black & white, poor resolution:
No significant changes to the Site noted.

Plate 20. EROS, 8/30/1977, USGS, Frames 02543-161 & **162**, 1:40,000 scale, stereo pair, black & white, poor resolution:
No significant changes to the Site noted.

Plate 21. MCRD, 7/29/1978, Minaret Road Extension Project, Sheets **1** & **2** of 8, 1:1200 scale, orthophotos, sepia, good resolution.
No significant changes to the Site noted.

Plate 22. EROS, 9/11/1979, USGS, Frames 02822-**144** & 145, 1:29,600 scale, stereo pair, black & white, poor resolution:
No significant changes to the Site noted.

Plate 23. USFS, 8/29/1983, USDA, Flight Line 6, Frames 183-**101** & 102, 1:12,000 scale, stereo pair, color, good resolution:
All buildings have been removed from the Site; a paved frontage road is located along the northern property line of the Site; Main Street has been improved to four lanes.

Plate 24. USFS, 6/29/1984, USDA, Flight Line 7, Frames 384-**3764** & 3765, 1:8,000 scale, stereo pair, black & white, fair resolution:
No significant changes to the Site noted.

Plate 25. NAR, 1985, USGS, Frames 3517-**37** & 38, 1:40,000 scale, stereo pair, black & white, fair resolution:
No significant changes to the Site noted.

Plate 26. EROS, 7/18/1987, USGS-NAPP Series, Frames 483-**22** & 23, 1:40,000 scale, stereo pair, black & white, poor resolution:
No significant changes to the Site noted; a new garage is discernible on the Norco/Texaco Service Center facility offsite to the east.

Plate 27. EROS, 7/18/1988, USGS-NAPP Series, Frames 493-**70** & 71, 1:40,000 scale, stereo pair, black & white, poor resolution:
No significant changes to the Site noted.

Plate 28. Triad, 7/21/1988, North Village, Frame **1**, 1:2,400 scale, single photo, black & white, excellent resolution:
Some vegetation beginning to fill in the vacant lot; no other significant changes to the Site noted.

Plate 29. EROS, 8/9/1988, USGS-NAPP Series, Frames 496-**77** & 78, 1:40,000 scale, stereo pair, black & white, poor resolution:
No significant changes to the Site noted.

Plate 30. Caltrans, 9/7/1988, 09-Mno-203, Frame 1-**46**, 1:2,400 scale, single photo, black & white, excellent resolution:
No significant changes to the Site noted.

Plate 31. MCWD, 6/23/1989, Mammoth Lakes, Frames 1-36 & **37**, 1:2,400 scale, stereo pair, black and white, excellent resolution:
No significant changes to the Site noted.

Plate 32. Caltrans, 10/12/1992, 09-Mno-203, Frames 14-89 & **90**, 1:2,400 scale, black & white, stereo pair, excellent resolution:
No significant changes to the Site noted.

Plate 33. USFS, 6/30/1993, USDA, Flight Line 13S, Frames 593-161 & **162**, 1:15,840 scale, stereo pair, black & white, fair resolution:
No significant changes to the Site noted.

Plate 34. EROS, 9/25/1993, USGS-NAPP Series, Frames 6310-**148** & 149, 1:40,000 scale, stereo pair, black & white, poor resolution:
No significant changes to the Site noted.

Plate 35. EROS, 7/15/1995, USGS, Frames 04984-**277** & 278, 1:11,000 scale, stereo pair, black & white, good resolution:
No significant changes to the Site noted.

Plate 36. Triad, 9/20/1996, MMSA, Frames **2** & 3, 1:24,000 scale, stereo pair, black & white, fair resolution:
No significant changes to the Site noted; a new canopy structure is discernible on the Norco/Texaco Service Center facility offsite to the east.

Plate 37. Caltrans, 9/24/1997, 09-Mno-203, Frames 12-**16** & **17**, 1:2,400 scale, single photo, black & white, excellent resolution:
No significant changes to the Site noted.

Plate 38. EROS, 8/26/1998, USGS-NAPP Series, 10556-198 & **199**, 1:40,000, stereo pair, black & white, poor resolution:
No significant changes to the Site noted.

Plate 39. MCWD, 7/25/2000, Mammoth Lakes, Flight Line 4, Frames **A008** & A009, 1:3,600 scale, stereo pair, black & white, excellent resolution:
No significant changes to the Site noted.

Plate 40. USFS, 7/14/2001, USDA, Flight Line 15, Frames 501-**87** & 88, 1:15,840 scale, stereo pair, color, good resolution:
No significant changes to the Site noted.

Plate 41. MCWD, 8/13/2001, Mammoth Town, Frames 4-**11** & 12, 1:24,000 scale, stereo pair, color, fair resolution:
No significant changes to the Site noted.

Plate 42. Caltrans, 11/3/2001, 09-Mno-203, Orthophoto, 1”=3 meters scale, single photo, color, excellent resolution:
No significant changes to the Site noted.

Plate 43. MCWD, 7/16/2003, Flight Line 4, Frames **A007** & A008, 1:7,200 scale, stereo pair, color, excellent resolution:
No significant changes to the Site noted.

In summary, observation of RECs or HRECs were not apparent on the Site; however, observation of an HREC was identified on offsite adjacent property as evidenced by Plates 13 through 43 for the Norco/Texaco Service Center facility.

4.4.2. Fire Insurance Maps

According to EDR, fire insurance maps are not known to exist for the Site or the surrounding areas (Appendix F).

4.4.3. Topographic Maps

(See Section 4.3.1 and Figures 4 thru 17)

4.4.4. Property Tax Files

Property tax files for the Site were requested from the MCTA and made available by Mr. Pete Eilertson. Review of these records indicates tax transaction dates between 10/18/1973 and 12/16/1999 under the last name of Hillman, and deed/patent documents recorded as follows: 17-277, 21-425, 102-452, N-474, S-79, and S-611. A 1964 photograph of the Site was also provided. Copies of the submitted property tax files are enclosed in Appendix I, and a copy of the 1964 Site photograph is provided as Photo 1 in Appendix K.

4.4.5. Local Street Directories

Local street directories were sought for but were not made readily available for this Phase 1 ESA.

4.4.6. Building Department Records

Building department records for the Site were requested from the TOML and made available by Ms. Gretta Boyer. Review of this record indicates that nuisance foundations were removed from the Site on September 15, 1990. A copy of the TOML record is enclosed in Appendix G.

4.4.7. Zoning and Land Use Records

According to a review of "The Town of Mammoth Lakes General Plan" (TOML, 1987), the Site is shown to be located on the *Mammoth Lakes Land Use Map* in an area denoted as "C-H" for Commercial-Highway, and is also located on the Land Use Element map in an area denoted "C" for commercial use. Likewise, for the *Mammoth Lakes Urban Planning District Boundary Map*, the Site is shown to be located within

Urban Planning District 4 “Main Street,” which is zoned “C” for commercial use. Copies of these zoning and land use records are provided in Appendix H.

5.0. SITE RECONNAISSANCE

5.1. METHODOLOGY AND LIMITING CONDITIONS

A reconnaissance of the Site was performed by Mr. H. Dean Dougherty, III, of SGSI on November 21, 2005. A total of eighteen digital photographs were taken while observing during a traverse by foot throughout and around the perimeter of the Site (Appendix J). The general weather conditions were sunny and windless with an approximate temperature of about 55 degrees Fahrenheit. Limiting conditions were not apparent.

5.2. GENERAL SITE SETTING

The general setting of the Site is characterized by a vacant lot with pine trees around the perimeter. The ground appeared disturbed and devoid of topsoil, which had most likely been removed during the past lumber yard operations and more recent demolition.

5.3. EXTERIOR OBSERVATIONS

5.3.1. Access

Vehicular accesses to the Site are from the pave frontage road along the northern property line (Photos 2 & 5) and an unpaved road along the southern property line (Photos 10 & 14).

5.3.2. Potable Water Supply

Potable water was sought for on the Site but not observed.

5.3.3. Heating Fuel

Heating fuel was sought for on the Site but not observed.

5.3.4. Sewage Disposal

Sewage disposal were sought for on the Site but not observed.

5.3.5. Electrical Transformers

Electrical transformers were not observed on the Site; two electrical transformers were found on offsite property adjacent to the northwest property corner (Photos 16–18). No stains or signs of leaking were apparent on these transformers.

5.3.6. Heavy Equipment and Machinery

Heavy equipment and machinery were sought for on the Site, but none were observed.

5.3.7. Tires

Tires were sought for on the Site, but none were observed.

5.3.8. Drums and Containers

Drums and containers were sought for on the Site, but none were observed.

5.3.9. Storage Tanks

Storage tanks were sought for on the Site, but none were observed.

5.3.10. Fill Pipes and Vent Pipes

Fill and vent pipes were sought for on the Site, but none were observed.

5.3.11. Stained Soils

Stained soils were sought for on the Site, but none were observed.

5.3.12. Odors

SGSI smelled for but did not detect unusual odors on the Site.

5.3.13. Imported Fill Materials

SGSI sought for but did not observe any imported fill materials on the Site.

5.3.14. Pits, Ponds, and Lagoons

SGSI sought for but did not observe any long-term standing water, pits, ponds, pools of liquid, or lagoons on the Site.

5.3.15. Dry Wells, Storm Drain Inlets, Floor Drains, and Sumps

SGSI sought for but did not observe any dry wells, storm drain inlets, floor drains or sumps on the Site. One new storm drain inlet was observed on offsite property adjacent to the southwest property corner having been recently constructed for the Mammoth Gateway condominium project (Photo 9).

5.4. INTERIOR OBSERVATIONS

Buildings were not present on the Site; therefore interior observations are outside the scope of this Phase 1 ESA.

5.5. SCREEN TRANSACTION QUESTIONNAIRE

SGSI verified the Site reconnaissance by completing “Site Visit” portion of a questionnaire taken from ASTM Practice E 1528-00 regarding the Site’s environmental aspects. SGSI answered affirmative to Questions 2a and 2b, specifically that the Site and the west adjoining property were each used for industrial use in the past as a lumber yard and a laundry facility, respectively. An affirmative was also given to Question 22, specifically that state record systems report that leaking UST facilities are located within 0.5 miles of the Site, particularly the Norco Service and the Center Street Shell facilities. SGSI answered negative for the remainder of the questionnaire. A copy of this completed questionnaire is included in Appendix L.

6.0. INTERVIEWS

6.1. INTERVIEW WITH OWNER AND KEY SITE MANAGER

SGSI interviewed the owner, Dr. Daniel Hillman, and the current key Site manager, Mr. Mike Jones. Dr. Hillman and Mr. Jones were unaware of any past or present adverse environmental conditions associated with the Site. Dr. Hillman verified this by completing the “Owner” portion of the questionnaire described in Section 5.5. Dr. Hillman answered affirmative to questions 2a and 2b, specifically that the Site and the west adjoining property were each used for industrial use in the past as a lumber yard and a laundry facility, respectively. Dr. Hillman answered negative to the remainder of the questionnaire, a copy of which is included in Appendix L.

Dr. Hillman also provided a package of information pertinent to the environmental aspects of the Site. Of particular interest were copies of survey maps, building department records and photographs that document the former buildings on the Site. A review of these documents did not indicate any potential adverse environmental conditions on the Site. Copies of the photographs are provided in Appendix K and copies of the maps are provided in Appendix M.

6.2. INTERVIEWS WITH AGENCY AND DISTRICT OFFICIALS

6.2.1. Mono County Environmental Health Department (MCEHD)

Mr. Dennis Lampson with the MCEHD was contacted regarding the Site, but he could not find any Site-specific file documents; however, he did provide pertinent MCEHD documentation for the adjacent UST sites to within one-half mile of the Site (Appendix N).

6.2.2. State Water Resources Control Board – Lahontan Region (Lahontan)

Mr. Douglas Feay with Lahontan was contacted regarding his knowledge of any environmental concerns on or adjacent to the Site. Mr. Feay could not find any Site-specific file documents; however, he did provide pertinent Lahontan documentation for the adjacent UST sites to within one-half mile of the Site (Appendix N).

6.2.3. Town of Mammoth Lakes (TOML)

Ms. Gretta Boyer with the TOML was contacted regarding her knowledge of any past environmental violations on or near the Site. According to Ms. Boyer, no records of environmental violations for the Site were found in their files; however, Ms. Boyer did provide a “Parcel History Details” document dated 7/15/1990, which indicates that nuisance foundations were removed from the Site (Appendix G).

6.2.4. Mono County Building Department (MCBD)

Ms. Kelly Garcia with the MCBD was contacted regarding her knowledge of any past environmental violations on or near the Site. According to Ms. Boyer, no records of environmental violations for the Site were found in their files; additionally, Ms. Garcia indicated that all County documents were transferred to the TOML when the Town of Mammoth Lakes incorporated in 1984.

6.2.5. U.S. Department of the Interior – Bureau of Land Management (BLM)

Mr. David Conklin of the BLM was contacted regarding his knowledge of any mining or survey history, environmental violations or concerns on file for the Site, but he reported that other than the Mount Diablo Meridian being surveyed in by the USGS in 1855, nothing specific was found in their files.

6.2.5. U.S. Department of Agriculture – Forest Service (USFS/INF)

Mr. Vern MacLean of the USFS/INF White Mountain Ranger District was contacted regarding his knowledge of any environmental violations on file for the Site. Mr. MacLean had no knowledge of any unacceptable levels of radon detection or of any radioactive mining extraction operations historically or presently within one mile of the Site.

Mr. Scott Kusumoto of the USFS/INF Mammoth Ranger District was contacted regarding his knowledge of any environmental violations on file for the Site, and he had no knowledge or records of any environmental violations on the Site.

Ms. Sheila Irons of the USFS/INF Mammoth Ranger District was contacted regarding records of any environmental violations or concerns on file for the Site. Ms. Irons reported that the USFS/INF Land Status Atlas did not have any information unique to the Site.

6.2.6. Mammoth Community Water District (MCWD)

Ms. Gail Smith and Mr. John Pederson of the MCWD were contacted regarding their knowledge of environmental concerns or violations on the Site, particularly with respect to sewage disposal and to the levels of radon in the Lake Mary reservoir or in the their ground water production wells, which supply the Mammoth Lakes community with potable water. Ms. Smith reported that no specific records exist on the Site for conversion from onsite sewage disposal to public sewer; however, she did provide some as-built records indicating that a sewer utility was provided to the Site sometime in the mid-1960s. One such record delineates a "Sewage Leaching Field" on adjoining property directly to the south, just to the north of the Quonset hut. The same record also denotes a four-inch diameter sewer lateral for the Site at sewer main Station 3+78. A copy of this information is enclosed in Appendix N.

Mr. Pederson reported that raw well water is treated for excess fluoride, arsenic, manganese, and iron prior to public distribution, and that the water supply is regularly tested for gross alpha radioactivity, uranium and combined radium. The MCWD publishes an Annual Drinking Water Quality Report, and the most recent 2004 issue is enclosed in Appendix O.

6.2.7. California Division of Oil, Gas, and Geothermal Resources (DOGGR)

Ms. Liz Johnson of the DOGGR was asked regarding her knowledge of any geothermal wells on or nearby the Site. Ms. Johnson provided the documents for MLGRAP #1, the geothermal well previously described and located to the east on the Old County/Town Maintenance Yard property. The exploratory well was drilled in 1987-88 and was subsequently sealed, capped, and abandoned in compliance with MCWD and DOGGR regulations at that time. MLGRAP #1 is currently beneath the Town's temporary parking lot for The Village at Mammoth (Figure 3).

6.2.8. Mono County Department of Agriculture (MCDA)

Ms. Robin Conklin of the MCDA was interviewed regarding her knowledge of any environmental concerns or violations on the Site. Ms. Conklin provided updated copies of Restricted Materials Permit # 26-04-2600175 dated 2/11/2004 for the Lodestar/Sierra Star Golf Club (Appendix N). According to Ms. Conklin, there are no violations regarding the application of the chemicals used on the golf course for controlling weeds, pond algae, insects and rodents.

6.2.9. California Geological Survey (CGS)

Mr. Robert Sydnor of the CGS was contacted about the State's knowledge or records of any environmental concerns or violations on the Site. Mr. Sydnor had no files specifically for the Site; however, he informed SGSI of past carbon dioxide detections near the Site. Mr. Sydnor provided a document dated September 29, 1999, addressed to the TOML specifying that volcanic gases primarily in the form of carbon dioxide are both an 'air quality' issue and a 'geologic hazard' with respect to health-and-safety for the Mammoth Mountain area. A copy of the CGS document is included in Appendix P.

6.2.10. United States Geological Survey (USGS)

Dr. David P. Hill and Dr. Michael L. Sorey of the USGS were contacted about their knowledge of any anticipated volcanic related hazards that might adversely affect the Site. Dr. Hill and Dr. Sorey provided five fact sheets that discuss the following:

1. "Invisible CO_2 Gas Killing Trees at Mammoth Mountain, California," USGS Fact Sheet 172-96;
2. "Future Eruptions in California's Long Valley Area – What's Likely?" USGS Fact Sheet 73-97;
3. "Living With a Restless Caldera – Long Valley, California," USGS Fact Sheet 108-96, version 2.1, revised May 2000;
4. "Scientific Drilling in Long Valley, California – What Will We Learn?" USGS Fact Sheet 77-98; and
5. "Volcanic Ash Fall – A "Hard Rain" of Abrasive Particles," USGS Fact Sheet 27-00.

All of these sheets describe the potential hazards that exist regionally for the Site and for the Town of Mammoth Lakes. Copies of the fact sheets are provided in Appendix Q.

6.2.11. Edison International – Southern California Edison (SCE)

Mr. Steve Cochran with SCE in Mammoth Lakes, California was contacted regarding his knowledge of the possible presence of polychlorinated biphenyls (PCBs) found in two electrical transformers mounted on one power pole located near the Site. According to Mr. Cochran, both transformers were installed on 8/25/1987 with no subsequent modifications or maintenance, and that the transformer with Serial No. 692012993 was a replacement for a previous one that was pulled on 5/30/1978. No files or records were found regarding this previous transformer.

6.2.12. Mammoth Lakes Fire Protection District (MLFPD)

Mr. Thom Heller with the MLFPD was contacted regarding the fire department's knowledge of any past fires, fire regulation violations, or Hazmat responses on or near the Site. Mr. Heller reported by verbal communication that the department had nothing in their files regarding the Site.

6.2.13. Great Basin Unified Air Pollution Control District (GBUAPCD)

Mr. Chris Lanane with the GBUAPCD was contacted regarding his knowledge of any past violations to the Federal Clean Air Act's National Ambient Air Quality Standard of PM-10 (particulate matter size less than 10 microns) for the Site. This standard was adopted by the Town of Mammoth Lakes in their Air Quality Management Plan dated November 30, 1990. Mr. Lanane provided the latest progress report dated April of 1995 that indicates 26 days with measured values that exceeded the federal and town threshold standard (150 $\mu m/m^3$ for PM-10) between the time period of 1990 and 1995. According to this report, this air pollution problem was found to be caused primarily by woodsmoke and road cinders used as anti-skid material during snow storms, particularly during the winter months. Mr. Lanane could not provide any more current information, nor did he note any direct air quality violations for the Site.

7.0. FINDINGS

Based on SGSI's investigation performed for this ESA, SGSI presents the following findings:

7.1. RECOGNIZED ENVIRONMENTAL CONDITIONS (RECs)

SGSI sought for but did not identify any RECs on the Site.

7.2. HISTORICAL RECOGNIZED ENVIRONMENTAL CONDITIONS (HRECs)

SGSI sought for but did not identify any HRECs on the Site.

7.3. DE MINIMUS ENVIRONMENTAL CONDITIONS (DMECs)

SGSI sought for and has identified the following DMECs on and adjacent to the Site:

7.3.1. The current and former LUST facilities located within ½-mile as identified in the EDR Radius Report and from other sources.

7.3.2. The potential volcanic, seismic, and gas emission hazards to the Town of Mammoth Lakes as described by published literature.

7.3.3. The air quality guideline threshold exceedances brought about by air pollution derived primarily by woodsmoke and road cinders during the winter months.

8.0. OPINIONS

Based on the findings listed above, SGSI provides the following opinions for the Site:

8.1. Because Lahontan purview documentation was provided the for the LUST facilities within in ½ mile of the Site, and because MCEHD closure documentation was provided for the remaining LUST facilities, and because depth to permanent groundwater is at least several hundred feet below the ground surface, it is our professional opinion that these facilities do not pose as immediate adverse environmental hazards to the Site.

8.2. Because the potential volcanic, seismic and gas emission hazards and the air quality exceedances are broad and regional, any attempt to project these hazards specifically to the Site cannot be accurately predicted at this time; therefore, it is our professional opinion that they do not pose as immediate adverse environmental hazards to the Site.

9.0. CONCLUSIONS

SGSI has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-00 of the Site. Any exceptions to, or deletions from, this practice are described in Sections 1.4 and 10.0 of this report. Based on the findings and opinions listed above, SGSI concludes the following:

9.1. Based on the environmental sources interviewed and reviewed, no account or record identifies the Site as having been contaminated in the past or present; therefore, recommendations for further environmental review and testing are not warranted.

9.2. Based on the CGS and USGS having advised the public of the significant health-and-safety issues regarding the potential volcanic, seismic, and gas emission hazards, emergency response procedures have been adopted and established by the Town of Mammoth Lakes and the California Office of Emergency Services. It should be noted, however, that neither the time, the location nor the magnitude of these events can be accurately predicted at this time.

10.0. DEVIATIONS

SGSI, to the best of our knowledge, did not deviate (or intentionally deviate) from the standard of practice as presented in ASTM E1527-00.

11.0. ADDITIONAL SERVICES

Additional services beyond the scope of ASTM E 1527-00 were agreed upon as a term of engagement between SGSI and the User. SGSI provided the following additional services:

11.1. A Transaction Screen Questionnaire as taken from ASTM E 1528-00, which was made part of the required Site Visit and part of the required Owner Interview for this ESA.

12.0. REFERENCES

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13.0. SIGNATURE OF ENVIRONMENTAL PROFESSIONAL

The following environmental professional for SGSI was responsible for the entire preparation of this ESA:

PROFESSIONAL GEOLOGIST
H. DEAN DOUGHERTY, III
No. 6497
Exp. 8/31/06
STATE OF CALIFORNIA

H. Dean Dougherty, III, Principal
Environmental Professional
PG 6497

14.0. QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONAL

The following brief resumé summarizes the qualifications of the environmental professional who was responsible for this ESA:

H. Dean Dougherty, III

Mr. Dougherty has over 18 years of professional experience as an environmental professional and a professional geologist:

Education
B.S., Geology, University of Southern California, Los Angeles, 1987
A.A., Science, Cuesta College, San Luis Obispo, 1984

Continuing Education
Field Geology, Indiana University, Bloomington, 1987
Hydrogeology, California State University, Los Angeles, 1994
Seismic Hazard Analysis, AEG Short Course, 1994
Excavation Safety, OSHA 10-Hour Course, 1999
Environmental Site Assessments: Phase I and Phase II, ASTM International, 2003

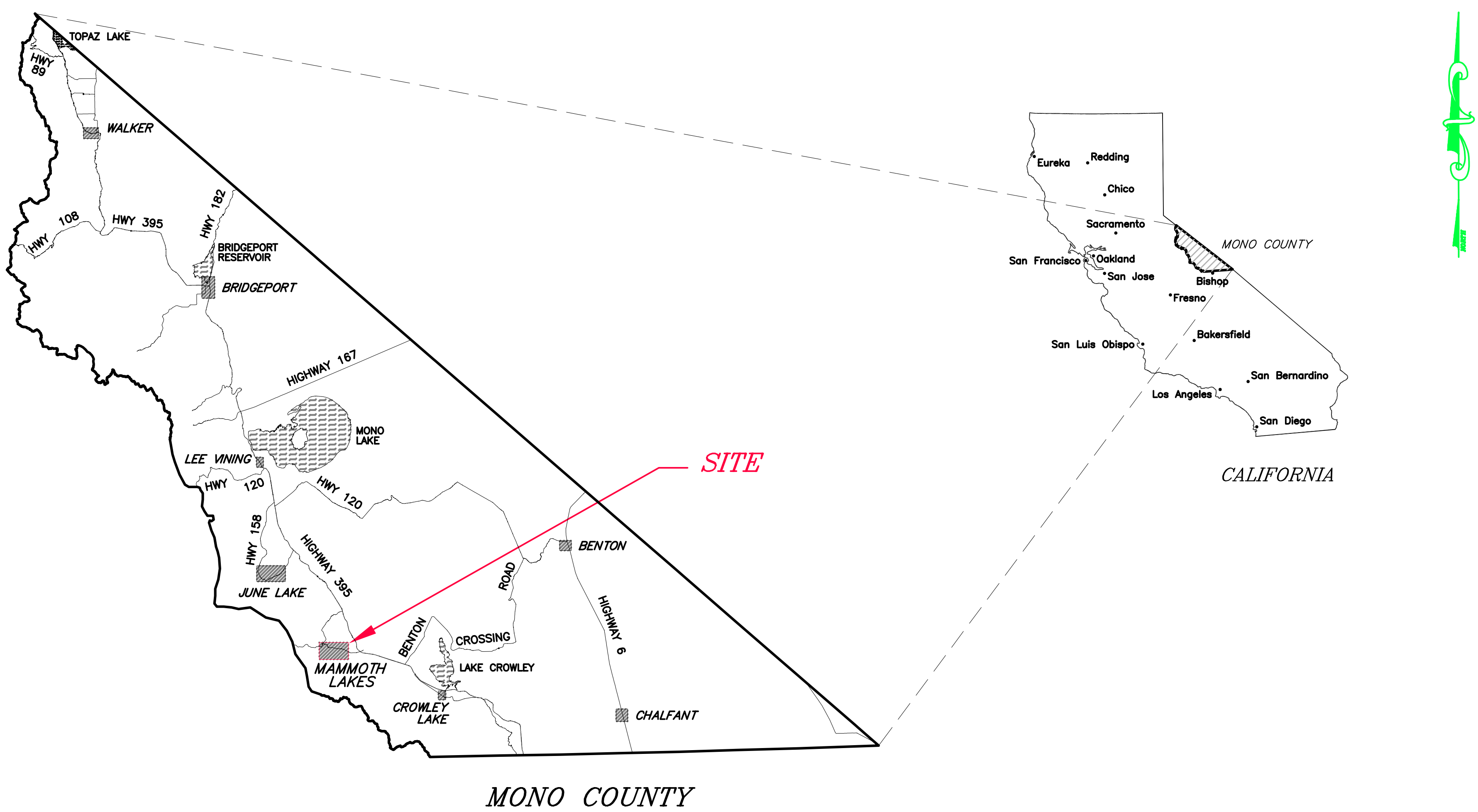
Registration
California Professional Geologist No. 6497, 1995

Certifications
Nuclear Gauge Operation, 1997
Radiation Safety Officer, 2002

Experience
Environmental Sites Assessments
Environmental monitoring
Groundwater investigations
Water well design and construction
Seismic hazards evaluations
Earthwork supervision
Grading and foundation design recommendations

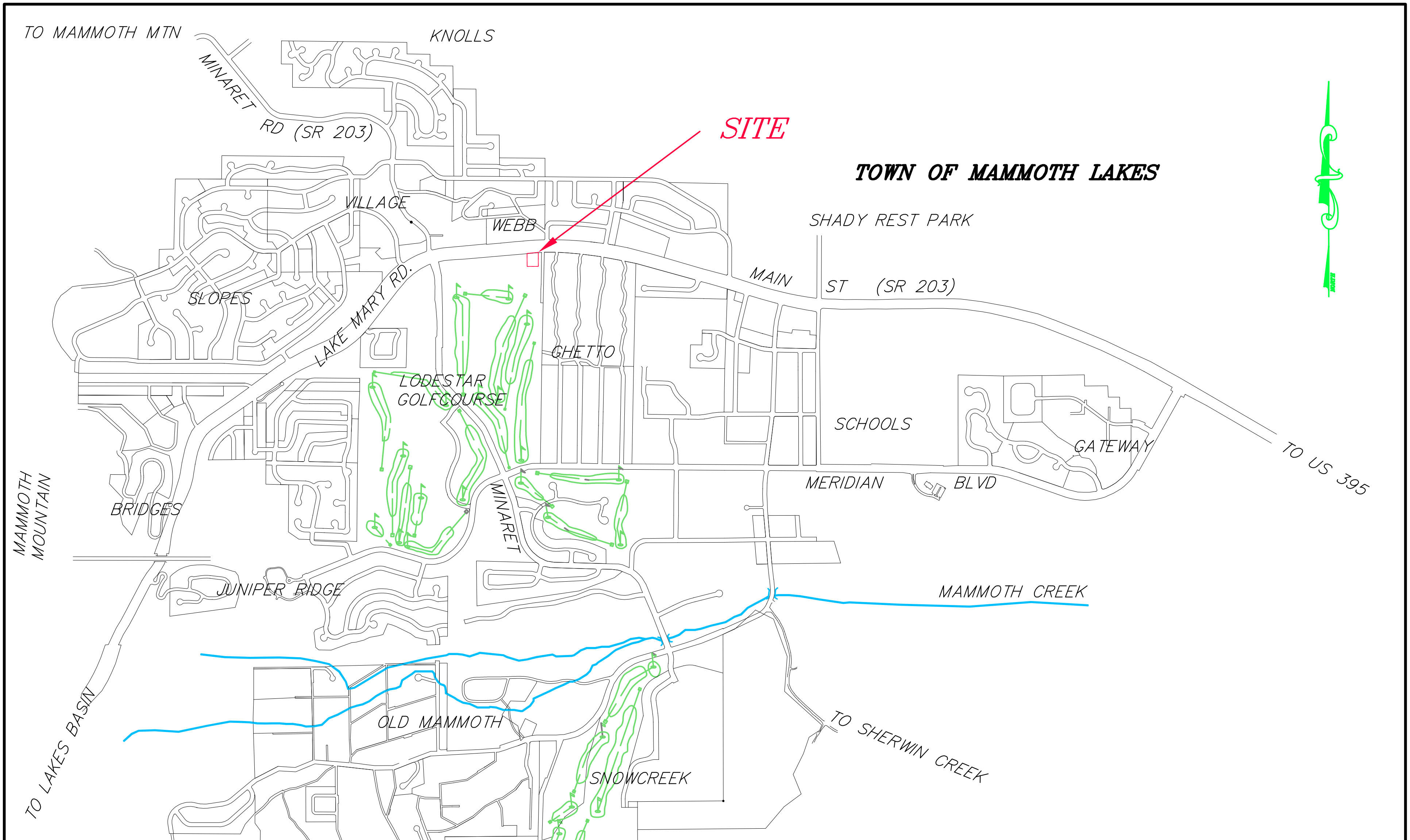
FIGURES

FIGURES 1 THRU 3

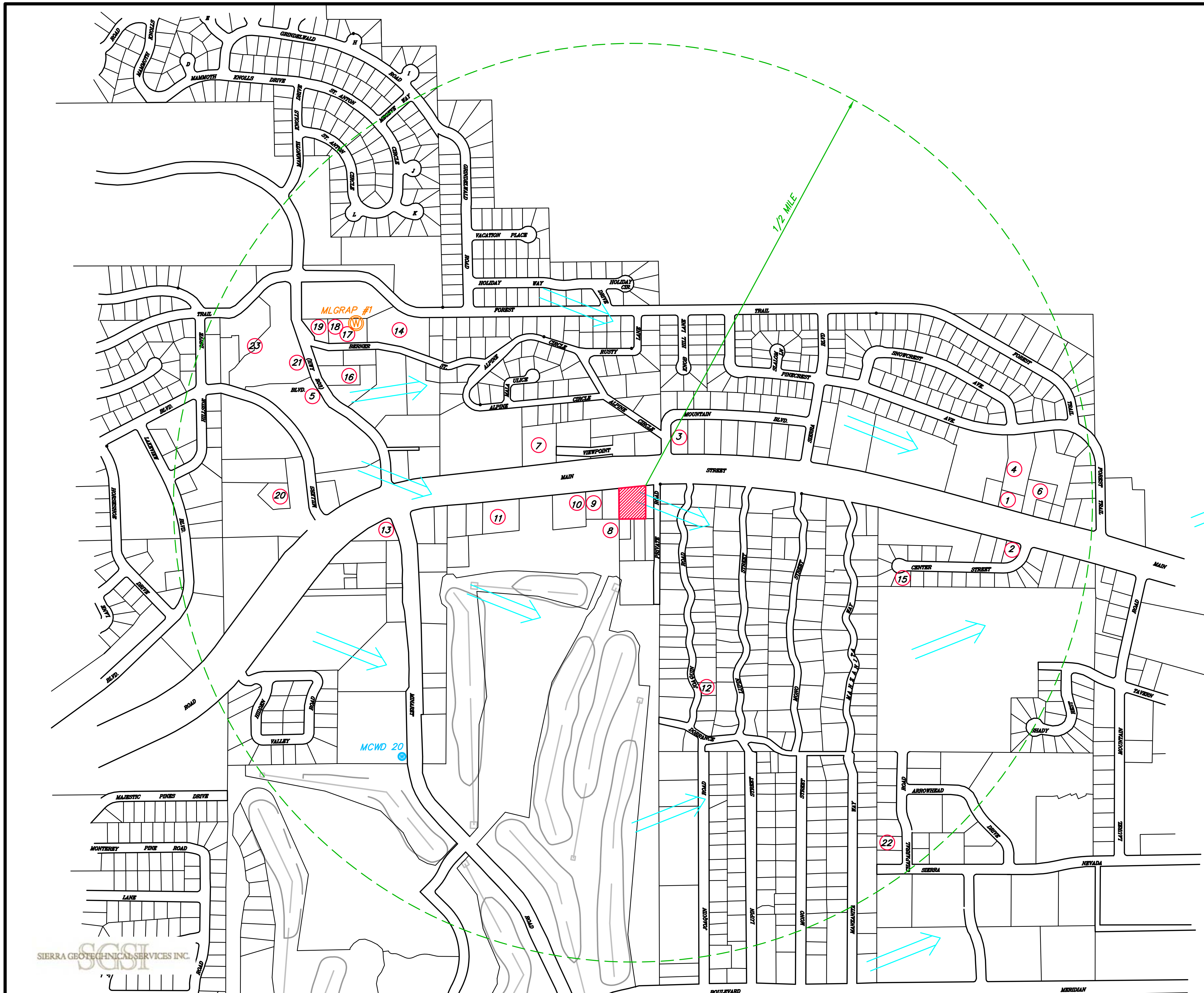


SIERRA GEOTECHNICAL SERVICES INC.

PROJECT: **SITE REGIONAL MAP** HILLMAN PARCEL ESA	
SCALE: NTS	DATE: 12/2005
DRAWING: 3.00543_FIG1.DWG	DRAWN BY: HDD
JOB NO.: 3.00543	FIGURE: FIGURE 1



PROJECT: **SITE TOWN MAP** HILLMAN PARCEL ESA	
SCALE: 1"=2000'	DATE: 12/2005
DRAWING: 3.00543_FIGURES.DWG	DRAWN BY: HDD
JOB NO.: 3.00543	FIGURE: FIGURE 2



EXPLANATION

1. EXXON MINI-MART/NAPA AUTO PARTS
2. MAMMOTH MOBIL MO-MART/BP/CENTER ST. SHELL
3. NORCO SERVICE CENTER
4. CONTEL/GTE/VERIZON
5. VILLAGE AT MAMMOTH/UNION 76/TEXACO/CAESAR'S GARAGE
6. MAMMOTH LAKES CHEVRON #9-1861
7. ROYAL PINES RESORT
8. LODESTAR GOLFCOURSE
9. MAMMOTH VIEW LODGE/CHINESE LAUNDRY
10. LA SIERRAS RESTAURANT
11. HOLIDAY HAUS MOTEL
12. RONNING LOADER SERVICE
13. ABSENTEE HOMEOWNER'S SERVICE
14. TED BERNER
15. MULLINS LAUNDRY AND CLEANERS
16. MINARET LODGE
17. MAMMOTH LAKES OLD TOWN YARD/OLD COUNTY YARD
18. LEDCOR INDUSTRIES USA, INC.
19. FRANK'S LIQUOR AND GAS
20. PONDEROSA LODGE
21. ALPINE MEDICAL CLINIC
22. CHAPARRAL APARTMENTS
23. ALPINE LODGE

APPROXIMATE DIRECTION OF GROUNDWATER FLOW

W APPROXIMATE LOCATION OF WATER WELL

W APPROXIMATE LOCATION OF GEOTHERMAL WELL

PROJECT: **SITE MINIMUM DISTANCE SEARCH MAP** HILLMAN PARCEL ESA	
SOURCE: TRIAD/HOLMES ASSOCIATES	
SCALE: 1"=600'	DATE: 12/2005
DRAWING: 3.00543_FIGURE 3.DWG	DRAWN BY: HDD
JOB NO.: 3.00543	TITLE: **FIGURE 3**

SIERRA GEOTECHNICAL SERVICES INC.

ENVIRONMENTAL • GEOTECHNICAL • GEOLOGY • HYDROGEOLOGY • MATERIALS

April 3, 2006 Job No. 3.00543

Dr. Daniel Hillman
P.O. Box 2005
Malibu, California 90265

RE: **Additional Environmental Information**
Phase 1 Environmental Site Assessment
Assessor Parcel No. 33-110-05
3721 Main Street, Mammoth Lakes
Mono County, California

Dr. Hillman:

I am in receipt of additional environmental information regarding the referenced Site. Based on a telephone conversation held this morning with Mr. Russ Howell, a former property owner, there is a potential that the Site still contains an underground fuel storage tank (UST), which had a capacity of about 700 gallons and contained gasoline. Together with his now deceased partner Mr. Lloyd Nichols, Mr. Howell claims to have sold you the parcel in 1973, and he recalls that the UST is buried at the northeast corner of the parcel next to Matsu's, a restaurant immediately adjacent and offsite to the east. In an effort to get more information regarding this UST, I made a telephone call to Herbst Station Repair in Yerington, Nevada, and spoke with Mr. George Herbst (owner), who has pulled thousands of USTs from Mono County. Mr. Herbst did not recall removing any gasoline tank from the Site, but he did recall pulling one 350-gallon waste oil UST and one 500-gallon heating oil UST from the rear (south) side of the Site, behind the former lumber mill house on the southern property line. Mr. Herbst vaguely recalled that Mr. Ralph Morrisette (now deceased) was the general contractor that performed these two tank removals in the early- to mid-1970s. I have also since placed additional phone calls in to Mr. Dennis Lampson with the Mono County Health Department, and I have yet to hear back from him.

The foregoing information should be made supplemental to my previous Phase 1 Environmental Site Assessment report dated December 5, 2005, and as such, I recommend that additional discovery be performed in order to verify the validity of these claims and the extent of contamination, if any.

I hope the foregoing satisfies your needs at this time.

Respectfully,
SIERRA GEOTECHNICAL SERVICES, INC.

PROFESSIONAL GEOLOGIST
H. DEAN DOUGHERTY, III
No. 6497
Exp. 8/31/06
STATE OF CALIFORNIA

H. Dean Dougherty, III, Principal
Environmental Professional, PG 6497

.

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Email: sgsi@usamedia.tv

April 4, 2006 Job No. 3.00543

Dr. Daniel Hillman
P.O. Box 2005
Malibu, California 90265

SUBJECT: **MEMORANDUM**
Phase 1 Environmental Site Assessment
Assessor Parcel No. 33-110-05
3721 Main Street, Mammoth Lakes
Mono County, California

Dear Dr. Hillman:

Regarding the potential for contamination from hydrocarbons on the referenced site, this letter provides a clarification of my professional opinions of the following:

1. The presence of an underground storage tank on the referenced site is suspect at this time.
2. The suspect tank is abandoned and has not been used during the last thirty-three years.
3. The suspect tank is of nominal size (approximately 700 gals.).
4. Tanks of this era were typically metal, and considering the period of time that has passed since its placement, the tank has likely rusted through and has been in-filled with water and/or soil; therefore, any gasoline product left in the tank after its use has very likely evaporated to non-detect levels.

The foregoing opinions should be made supplemental to my previous letter titled, "Additional Information" dated April 3, 2006, the recommendations of which remain applicable. I hope the foregoing satisfies your needs at this time.

Respectfully,

SIERRA GEOTECHNICAL SERVICES, INC.

PROFESSIONAL GEOLOGIST
H. DEAN DOUGHERTY, III
No. 6497
Exp. 8/31/06
STATE OF CALIFORNIA

H. Dean Dougherty, III, Principal
Environmental Professional, PG 6497

APPENDIX G

HYDROLOGY DATA

DRAINAGE REPORT

FOR

SIERRA STAR WORKFORCE HOUSING PROJECT

AND

UNIT 2 ROADWAY

TOWN OF MAMMOTH LAKES,
CALIFORNIA

PREPARED BY:
CFA, INC.
1150 CORPORATE BLVD
RENO, NV 89502
(775) 856-1150

AUGUST 11, 2005

REGISTERED PROFESSIONAL ENGINEER
PATRICK E. FRITCHEL
No. C 047293
Exp. 12/31/05
CIVIL
STATE OF CALIFORNIA

8/11/05

cfa

PLANNERS ENGINEERS SURVEYORS LANDSCAPE ARCHITECTS
1150 CORPORATE BLVD RENO NV (775) 856-1150 FAX (775) 856-1160

INTRODUCTION

This report presents the results of a hydrologic study for the proposed improvements of the Sierra Star Workforce Housing project located in Mammoth Lakes, California. The purpose of this study is to estimate storm water flows for the existing and the developed conditions in order to prepare a design for the proposed drainage system.

SITE DESCRIPTION

The project consists of two parcels, one currently owned by Intrawest and the other by the Town of Mammoth Lakes. The Intrawest parcel is approximately 1.65 acres in size and has an Assessor's Parcel Number of 33-330-50. The Town of Mammoth Lakes parcel is approximately 1.01 acres in size and has an Assessor's Parcel Number of 33-330-44. The total combined acreage for both parcels is approximately 2.66 acres. This project is located roughly 275' south of Main Street (State Route 203) and approximately 1200' east of Minaret Road (Refer to the Vicinity Map, Figure 1). Main access for the site will be provided from Main Street. Secondary emergency access will be provided from Minaret Road via the Unit 2 Roadway. The groundcover of the site consists of mainly fir and pine trees, with low grasses and pine needles.

PROJECT DESCRIPTION

The Town Home project will include the construction of 40 town home units within six structures for the proposed improvements. Parking lot, access drives, several paths, recreational area, retaining walls, utilities, and drainage facilities are additional site improvements required to access and service these aforementioned structures (Refer to Figure 3-A).

EXISTING DRAINAGE

The site is divided into four existing drainage basins: E1, E2, E3 and E4 (Refer to Figure 2). Basin E1 drains from the west side of the property toward the east and into a swale located approximately at the middle of the Town of Mammoth Lakes parcel. This swale then carries flow offsite to the east and discharges to the Sierra Valley subdivision (Control Point 1). Basin E2, located south of basin E1, drains from the west toward the east and southeast towards the Sierra Star Golf Course and Sierra Valley subdivision via overland flow (Control Point 2). Basin E3, located northeast of basin E1, generally drains from the northwest to the southeast via overland flow and discharges to the Sierra Valley subdivision in a sheet flow manner (Control Point 3). Drainage facilities throughout the Sierra Valley site appear to have no definitive flow path. Basin E4, which is located directly west of basins E1 and E2, drains from the northwest towards southeast via overland flow. Flows from this basin drain toward the Sierra Star Golf Course (Control Point 4).

The elevation drop from the west end of the Intrawest parcel to the east side of the Town of Mammoth Lakes parcel is approximately 28 feet with slopes ranging from 2% to 45%.

The secondary access to Minaret Road crosses two existing drainage ways. Per the "Master Drainage Study" by Boyle Engineering Corporation, the flows to the northern and central drainageways are 46 cfs and 92 cfs. for the 100-year event (Refer to Figures 2 and 3-B).

PROPOSED DRAINAGE

The proposed drainage system for the project was designed to convey the 100-year peak discharges for both on-site and off-site runoff (Refer to Figure 3-A and 3-B). Drainage swales collect offsite flows and direct these flows around the proposed structures. These flows are then collected in a storm drain system using drop inlets or catch basins, and routed to one of two proposed detention facilities. Runoff will then be released from the detention facilities in a manner that is similar to the existing condition. In addition, seven "Rainstore 3" infiltration systems (or approved equal) are planned to collect runoff from onsite basins P4A, P4B, P4C, P4D, P4E, P10A, P10B, and P7; and roadway basins P11, P12, and P13. The infiltrated areas include all paved driveways and some connected paths, landscaped areas, and existing terrain. Two detention basins are planned to help mitigate increases in runoff due to development. Flow spread devices (i.e. outlet aprons and flow dissipating swales) are planned to be constructed at the discharge points to mitigate erosive velocities.

In addition, storm drain culverts provided under the secondary access to Minaret Road are planned to convey the 100-year storm event. Data and detailed calculations are included in the Appendix section.

HYDROLOGIC AND HYDRAULIC METHODOLOGY

Time of concentration values for both existing and post-development conditions were calculated using the design guidelines found on the "Mammoth Lakes Storm Drainage and Erosion Control Design Manual" (1984).

Runoff for Existing and Post-development conditions were modeled using both the Rational Method and SCS Curve Number Methodology. The US Army Corps of Engineers HEC-HMS (Hydrologic Modeling System) program was utilized in detention basin modeling.

Precipitation values were taken from Figure 1-4 of the "Mammoth Lakes Storm Drainage and Erosion Control Design Manual" (1984). A 24-hour hyetograph was constructed in HEC-HMS using the frequency storm method for the 100-year storm event. This duration would be more typical of a winter storm, which would be the controlling event.

Approximate peak flows for existing conditions were calculated using the rational method per the design manual procedure. The existing conditions HMS model was then calibrated to these peak flows by varying the curve number parameters. Curve numbers obtained for each existing basin varied from 68 to 79, which appears to reasonably correspond to existing soil and ground cover conditions.

The post-development hydrographs for each sub-basin were then obtained through HEC-HMS simulation by using similar curve numbers obtained from the existing conditions, and accounting for the newly impervious areas built under developed conditions.

Based on the post-development hydrographs, proposed drainage structures were designed using exceedance intervals found in the manual. Infiltration devices were designed in accordance to the design manual and Lahontan Regional Water Quality Control Board (LRWQB) design guidelines.

Storm drain hydraulic calculations were performed with Flow Master and StormCAD. "Rainstore 3" and detention pond standpipe design were performed using Excel.

HYDROLOGIC AND HYDRAULIC RESULTS

Refer to the Appendix section for detailed technical results and figures on hydrologic and hydraulic calculations.

Table A shows comparisons for both the existing and post-development condition discharges using a 24-hour 100-year storm event.

Table A1: On-site Peak Flow Runoff Comparison

Design Point	Existing Condition		Post Development (Undetained)		Post Development (Detained)	
	Contributing Basins	Q_{100} (cfs)	Contributing Basins	Q_{100} (cfs)	Contributing Basins	Q_{100} (cfs)
Control Point 1	E1	7.30	P3, P5, P6, P10A, P4B, P7	7.32	P3, P5, P6, P10A, P4B, P7	6.84
Control Point 2	E2	1.52	P4C, P4A, P10B, P2B, P8	1.82	1217	1.37
Control Point 3	E3	0.80	-	0	-	0
Control Point 4	E4	5.08	P1, P2A, P4D, P4E	7.03	P1, P2A	**5.08

** Target value for detention with the future development of basin area E4

Table A2: Detention Pond Storage Comparison

	Detention Pond 1	Detention Pond 2
Maximum Volume Provided (ac-ft)	0.1136	0.0532
Volume Required at Q_{100} (ac-ft)	0.0786	0.0314

Two detention pond structures were modeled to mitigate the peak flow for both Control Point 1 and 2. Detention Pond 1 detains flows contributing to Control Point 1, while Detention Pond 2 detains flows contributing to Control Point 2. The detention ponds have the following characteristics:

Detention Pond 1:

- Maximum pond depth = 6 ft.
- Maximum pond area = 1460 sq. ft. @ top elevation
- Outflow structure = Standpipe:
  - Horizontal inlet diameter = 2 ft. (Grate type: Neenah R-4350-E)
  - Height above flow line = 5 ft. (Elev. = 7920 ft)
  - Vertical orifice diameter = 9 in.
- Peak water surface elevation = 7919.86 ft (100-year)
- Top Pond Elevation = 7921 ft

Detention Pond 2:

- Maximum pond depth = 4.5 ft.
- Maximum pond area = 990 sq. ft. @ top elevation
- Outflow structure = Standpipe:

  Horizontal inlet diameter = 1.5 ft. (Grate type: Neenah R-4350-D)

  Height above flow line = 4 ft. (Elev. = 7914.50 ft)

  Vertical orifice diameter = 5 in.
- Peak water surface elevation = 7913.90 ft (100-year)
- Top Pond Elevation = 7915 ft

Table A3: Summary of Inflow and Outflow for Detention Ponds

Detention Pond 1			Detention Pond 2		
Time (hour)	**Inflow (cfs)**	**Outflow (cfs)**	**Time (hour)**	**Inflow (cfs)**	**Outflow (cfs)**
0	0.0000	0.0080	0	0.0000	0.0040
1	0.0014	0.0011	1	0.1344	0.1337
2	0.0055	0.0052	2	0.1413	0.1410
3	0.0077	0.0076	3	0.1487	0.1483
4	0.0170	0.0152	4	0.1574	0.1569
5	0.0776	0.0711	5	0.1678	0.1672
6	0.1821	0.1735	6	0.1812	0.1804
7	0.2976	0.2934	7	0.1856	0.1846
8	0.4094	0.4049	8	0.2080	0.2066
9	0.5466	0.5410	9	0.2401	0.2380
10	0.7276	0.7162	10	0.3025	0.2989
11	1.0268	1.0024	11	0.5856	0.5000
12	1.8017	1.6571	12	0.9173	0.7000
13	3.4943	2.8777	13	0.6684	0.9000
14	3.7711	3.6317	14	0.3965	0.6736
15	2.7330	3.2711	15	0.2869	0.2919
16	1.8781	2.1390	16	0.2327	0.2346
17	1.4256	1.4808	17	0.2045	0.2058
18	1.1806	1.1973	18	0.1844	0.1853
19	1.0422	1.0475	19	0.1820	0.1827
20	0.9773	0.9805	20	0.1698	0.1704
21	0.9209	0.9240	21	0.1567	0.1602
22	0.8687	0.8714	22	0.1512	0.1517
23	0.8232	0.8255	23	0.1440	0.1444
24	0.7838	0.7859	24	0.1377	0.1380

Both detention pond structures should reduce developed peak inflows less than or equal to the existing conditions for the 100-year storm event (7.32 cfs to 6.84 cfs at Control Point 1, and 1.82 cfs to 1.37 cfs at Control Point 2).

The peak flow released at Control Point 3 in existing conditions will be eliminated in the post-development conditions, due to flows being diverted onsite and routed to Control Point 1.

Runoff from basin E4 was calculated in order to size the storm drain in the Unit 2 roadway. The peak runoff at Control Point 4 in the existing and post-development conditions is 5.08 cfs and 7.03 cfs, respectively. This is largely due to increases from impervious areas from future development. Refer to the Appendix for StormCAD results.

Infiltration volumes for onsite basins P4A, P4B, P4C, P4D, P4E, P10A, P10B, and P7; and roadway basins P11, P12, and P13 for the 20 year-one hour event can be found in the Appendix.

EROSION AND SEDIMENTATION CONTROL

Erosion control and storm water treatment measures should be in place throughout this project. Riprap and rock cobble are planned to be placed in areas of possible erosion. For a more detailed description of the erosion control and stormwater treatment measures, refer to the Storm Water Pollution Prevention Plan.

CONCLUSION

The hydrologic calculations show that the project can be developed as planned without major drainage increases to downstream properties. 100-year peak flow increases should be mitigated with the construction of the detention structures onsite. Future increase in flows from basin E4 should be re-evaluated with its development.

REFERENCES

Preliminary Storm Water Retention Design for Lodestar Golf Course, Triad Engineering, January 1991, revised June 1993.

Storm Drainage Master Plan Report, Town of Mammoth Lakes, Kennedy/Jenks/Chilton, September 1990.

Washoe County Urban Storm Water Management Program Volume IV, CH2M Hill, Robert Pitt, Cooper and Associates Inc, Consulting Engineering Services Inc., June 1983.

Mammoth Lakes Storm Drainage and Erosion Control Design Manual, Brown & Caldwell and Triad Engineering, July 1984.

Drainage Report

For

Solstice at Sierra Star

Town of Mammoth Lakes,
California

Prepared By:
CFA, Inc.
1150 Corporate Blvd.
Reno, NV 89502
(775) 856-1150

May, 2004

Revised August, 2004

INTRODUCTION

This report presents the hydrologic calculations for the proposed improvements for the Solstice at Sierra Star condominium project. The purpose of this study is to calculate storm water flows for the existing and the developed conditions in order to evaluate the proposed drainage systems.

SITE DESCRIPTION

The Solstice at Sierra site is approximately 4.6 acres in size and has Assessor Parcel Number's of 33-330-36 & 33-330-39. The site is located on Sierra Star Parkway, which bounds the site on the west parcel line. Golf hole #16 of the Sierra Star golf course bounds the site on the east. (Refer to the Vicinity Map, Figure 1). The groundcover consists of pine and fir trees, as well as low grasses, and pine needles.

PROJECT DESCRIPTION

The proposed improvements for the project include nine 3-story town homes with 6-8 units per building (58 units total). In addition, two underground parking structures will be located below 6 of the 9 town homes. Access to the parking structures will be achieved from Sierra Star Parkway at the north and south ends of the parcel. Other improvements around the site include three spas, recreational areas, and walking paths.

EXISTING DRAINAGE

The north section of this site drains toward the north and east. The south portion of the site drains toward the east and south. Overland drainage to the north is collected in an intermittent natural drainage channel that carries storm flow to an existing culvert. These flows are then conveyed under Minaret Road to the east. Overland drainage to the east and to the south drains directly onto the golf course. There is an existing 18" culvert located in the northwest corner of the site that conveys flows under Sierra Star Parkway and onto the Fairway 16 site. Drainage from this culvert passes through the north portion of the site via the existing drainage channel (as noted above). According to the "Report of Waste Discharge for Lodestar Golf Course", by Triad Engineering Corporation, revised June 1993, the total amount of runoff that can be expect to pass through this drainage channel is approximately 24,950 cubic feet (based on the 20 year-one hour storm). Refer to Figure 2 for a display of the existing drainage pattern.

PROPOSED DRAINAGE

The overall drainage for the Solstice at Sierra Star site utilizes drop inlets, swales, and grading to direct flows away from structures. The proposed drainage system was designed to resemble the natural drainage patterns. Approximately one third of the area will be collected in a storm drain system and transported to one of the three proposed "Rainstore 3" infiltration systems located throughout the site. The infiltrated areas include paved driveways, roofs, paths and landscaped areas. Calculations for the "Rainstore 3" infiltration devices can be found in the technical appendix. Proposed Basins 1, 2 & 3 drain non-concentrated overland flows to the golf course. These basins resemble Existing Basins 1 & 2 on Figure 2. Proposed Basin 4 drains to the existing drainage channel on the north end of the site. The flows are then transported to the existing culvert as mentioned in the Existing Drainage section of this report. Refer to Figure 3 for a display of the proposed drainage.

Overall storm water peak flows were calculated for the exceedence interval storms of 10 and 100. The calculated existing and developed condition peak flows for these storm intervals are shown in Table 1. The developed basin areas do not sum up to the existing drainage area because the portion of the site that is infiltrated is not released as overland flow. The peak flow calculations indicate negligible increases (of 10% or less) in storm flows that are released from the site during the 10-year event in Proposed Basins 1, 2 & 3. Flows released from the site during the 100-year event have been decreased in all basins.

HYDROLOGY AND HYDRAULICS

The Mammoth Lakes Storm Drainage and Erosion Control Design Manual was used for design guidelines and calculation methods in this project. Approximate peak flows were calculated using the rational method presented in the design manual. Storm drain, drop inlets, and ditches were all designed using the exceedence intervals found in the manual. The infiltration devices were also designed in accordance with this design manual, as well as the Lahontan Regional Water Quality Control Board (LRWQB) design guidelines. Refer to the appendix for all calculations and details.

EROSION AND SEDIMENTATION CONTROL

Erosion control and storm water treatment measures will be in place throughout this project. Riprap and rock cobble will be placed in areas of possible erosion. The "Rainstore 3" infiltration systems will treat storm runoff from the paved driveway and roofed areas. For a more detailed description of the erosion control and storm water treatment measures for this project refer to the Storm Water Pollution Prevention Plan for Solstice at Sierra Star, dated May 2004.

CONCLUSIONS

Based on the peak flow calculations presented in this hydrologic analysis, it appears that the Solstice at Sierra Star project can be developed as planned without adverse impacts to downstream properties with respect to storm drainage.

REFERENCES

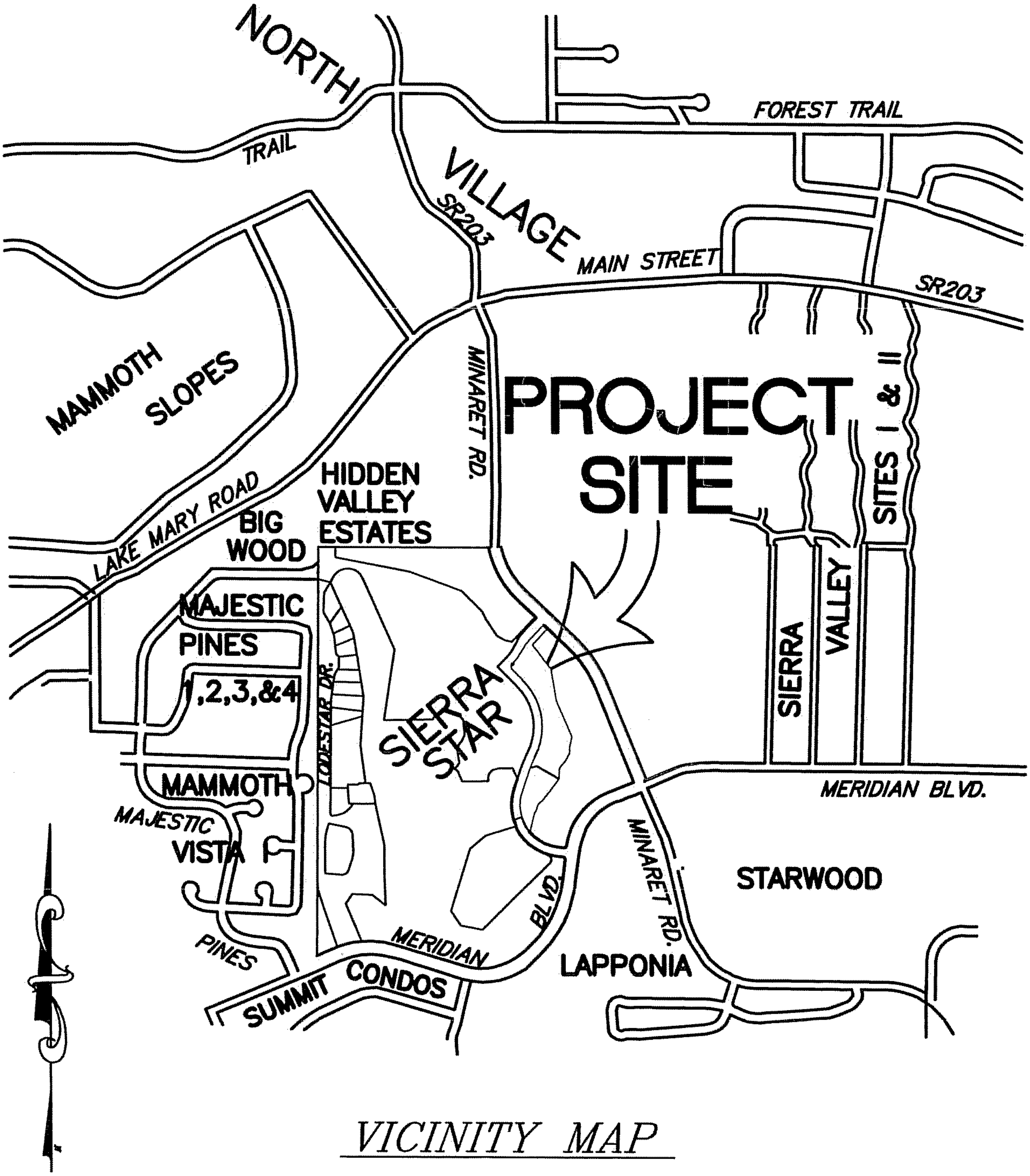
Mammoth Lakes Storm Drainage and Erosion Control Design Manual, Brown & Caldwell and Triad Engineering, July 1984.

Report of Waste Discharge for Lodestar Golf Course, Triad Engineering Corporation, January 1991.

Storm Drainage Master Plan Report, Town of Mammoth Lakes, Kennedy/Jenks/Chilton, September 1990.

Washoe County Urban Stormwater Management Program Volume IV, CH2M Hill, Robert Pitt, Cooper and Associates Inc, Consulting Engineering Services Inc., June 1983

Waste Discharge Report for Fairway 16 Town Homes at Sierra Star Golf Course, Triad/Holmes Associates, January 2000.



VICINITY MAP

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FIGURE 1

VICINITY MAP

SOLSTICE – PHASE 1 & 2

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TABLE 1

OVERALL HYDROLOGY RESULTS

Sub-area	Exceedence Interval	Peak Flow (cfs)
Existing 1	10	0.30
Proposed 1	10	0.34
Existing 2	10	0.76
Proposed 2,3	10	0.82
Existing 3	10	0.24
Proposed 4	10	0.18
Existing 1	100	0.92
Proposed 1	100	0.64
Existing 2	100	2.34
Proposed 2,3	100	1.59
Existing 3	100	0.74
Proposed 4	100	0.44

FINAL DRAINAGE REPORT

FOR

THE WOODWINDS (FAIRWAY 4/5)
at
SIERRA STAR

TOWN OF MAMMOTH LAKES,
CALIFORNIA

PREPARED BY:
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AUGUST 26, 2005

TABLE OF CONTENTS

INTRODUCTION

This report presents the hydrologic calculations for the proposed improvements of the Woodwinds at Sierra Star project (previously named Fairway 4/5) located in Mammoth Lakes, California. The purpose of this study is to estimate storm water flows for the existing and the post - developed conditions in order to prepare a final design for the proposed drainage system.

SITE DESCRIPTION

The Woodwinds site is roughly 6.0 acres in size and has an Assessor's Parcel Number of 33-330-46. The site is situated approximately 700 feet west of Minaret Road and about 300 feet south of the Hidden Valley Estates. Golf holes number four and five of the Sierra Star Golf Course bound the site on the west and northeast sides of the parcel (Refer to the Vicinity Map, Figure 1). Access for the site will be achieved from the south via Sierra Star Parkway. Secondary emergency access will be provided from east through Majestic Pines. Site groundcover consists of mainly fir and pine trees, low grasses, and pine needles.

The elevation drop from the southwest end of the parcel to the northeast side is approximately 22 feet with an average slope between from 5% to 7%.

PROJECT DESCRIPTION

Proposed improvements for this project will include the construction of 28 townhome units, located within eight structures. Additional site improvements required to access and service these structures will include a roadway, an access drive, paths, retaining walls, utilities, and drainage facilities (Refer to Proposed Hydrology map-sheet 2 of 2).

EXISTING DRAINAGE

The site lies within Tributary Subarea III – 5 of the Mammoth Lakes Storm Drainage Master Plan. This study divides a portion of the tributary subarea into three existing drainage basins: E1, E2 and E3 (Refer to the Existing Hydrology map – sheet 1 of 2).

Existing basin E1 accepts runoff from offsite basins T1 and T2 (Refer to Crooked Pines drainage study) and generally drains from the southwest toward the north/northeast via two existing drainage swales located in the basin. Both of the existing swales in this basin carry concentrated offsite flows through the parcel and discharge to an existing 36" culvert located on the north side of the site. This culvert carries flows under golf hole number five of the Sierra Star Golf Course and discharges to the northeast toward a culvert crossing (2-36" diameter pipes) at Minaret Road.

Existing basin E2 (located east of existing basin E1) generally drains from the southwest toward the northeast via overland flow. This basin sheetflows towards the fairway of golf hole number five.

Existing basin E3 (located north of existing basin E1) generally drains from the west to the east. This basin accepts runoff from two existing pipe outlets located at the east end of Majestic Pines. From the Drainage Majestic Plan, Majestic Pines conveys approximately 200 cfs in 100 yr storm. From our estimate, approximately 70 cfs is discharged through the northern 30" pipe, 20 cfs through the southern 30" pipe, and the balance of 110 cfs by overland flow along the north side of Majestic Pines (Refer to Table 1 - C). The flow from the pipes (approximately 90 cfs) is discharged to an existing drainageway which extends to a 36" culvert located under golf hole number five. The above mentioned drainageway has a capacity of between 2 and 40 cfs, therefore, it would have a potential of spilling at least 50 cfs along its length.

PROPOSED DRAINAGE

The site lies within Watersheds B2a, B2b, and B2c of Tributary Subarea III – 5 as shown in the Mammoth Lakes Storm Drain Master Plan.

The proposed drainage system for the Woodwinds at Sierra Star project was designed to simulate the natural drainage patterns. Drainage swales collect offsite flows and direct these flows around the proposed structures. These flows are then collected in a storm drain system using drop inlets, catch basins, or flared end sections and routed to the discharge points, where it is planned to be released in a manner that is similar to the existing condition (Refer to the Proposed Hydrology map - sheet 2 of 2). In addition, three "Rainstore 3" infiltration systems (or approved equal) are to be located throughout the site to collect runoff from proposed basins P4A, P4B, P4C, and P4D. The infiltrated areas include all paved roadways and driveways. Calculations for the "Rainstore 3" can be found in calculations and details in the attachment C. Flow spread devices (i.e. outlet aprons and flow dissipating swales) are planned to be constructed at the discharge points to mitigate erosive velocities.

As part of an offsite Stream Mitigation (Solstice), the drainageway from Majestic Pines to the golf hole 5 culvert is planned to be restored (Refer to Attachment B). The restoration will consist of reconstructing the drainageway to increase the capacity, reduce erosion, facilitate plant growth and improve water quality. Additionally, the 24" culvert under existing golf cart path is planned to be replaced with a 64-inch x 43-inch CMP arch pipe culvert to perpetuate drainage from majestic Pines. A similar sized culvert is planned to be constructed under the secondary emergency access road. These culverts and channel improvements will convey a portion of the flow (approximately 40 cfs) that is currently released from the two existing 30-inch culverts located at the east end of Majestic Pines.

HYDROLOGY AND HYDRAULICS

The "Mammoth Lakes Storm Drainage and Erosion Control Design Manual" was used for design guidelines and calculation methods on this project. Approximate peak flows were calculated using the rational method that was presented in this design manual (Attachment C). Storm drain, drop inlets, and ditches were all designed with the aid of Haestad StormCad, FlowMaster, and CulvertMaster. The infiltration devices were designed in accordance to the design manual and Lahontan Regional Water Quality Control Board (LRWQB) design guidelines (Attachment E).

RESULTS

Overall storm water peak flows were calculated for the exceedence interval storms of 10, 50, and 100 years for all subbasins (Table 2, Attachment C). The calculated existing and developed condition peak flow for key control points are shown in Table 1 below. As shown in Table 1-A, there is a slight increase in peak discharge with development for Control Points 1 and 2. Those results were generated using Rational Method methodology, which does not adequately address hydrograph timing. To improve the modeling, a HEC-HMS model was developed which shows a reduction in 100 yr. flow (52.3 cfs to 51.7 cfs) for control point 1 and a negligible increase for control point 2 (4.23 cfs to 4.47 cfs)(Refer to Attachment A). In addition, peak flows in basins P4A, P4B, P4C and P4D are planned to be infiltrated for all storm events less than the 20 year-one hour event.

A flow split analysis was performed for drainage down Majestic Pines. The total offsite 100 yr. peak flow of 200 cfs is split between the existing 30" northern pipe (± 70 cfs), the existing 30" southern pipe (± 20 cfs) and the balance of ± 110 cfs along north side of Majestic Pines (Refer to Table 1 - C). The flow estimate for the northern pipe was based on the inlet capacity at the catch basin located in majestic Pines ± 500 ft west of the site. At about 70 cfs, the catch basin would flood to the north side of Majestic Pines.

The proposed channel from Majestic Pines to control point 1 has a top width of is roughly 12 feet wide and depth of 1.5 feet and was designed to carry approximately 40 cfs to the existing 36" culvert under golf hole number five. An erosion mat with seeding is recommended to stabilize the channel during the "grow-in" period (Refer to Attachment B).

Results for all pipe and channel hydraulics may be found in attachment D.

TABLE 1-A
PEAK DISCHARGE COMPARISIONS

Design Point	Existing Peak (cfs)			Design Point	Post Development Peak (cfs)		
	10	50	100		10	50	100
Existing 1	4.12	8.69	11.12	Developed 1	4.84	9.43	11.95
Offsite 1[B]	3.20	6.24	7.86	Offsite 1[B]	3.20	6.24	7.86
Offsite 2[C]	12.09	25.21	33.32	Offsite 2[C]	12.09	25.21	33.32
Existing 1 + Offsite 1[B] + Offsite 2[C] (Control Point 1)	**19.41**	**40.14**	**52.30**	**Developed 1 + Offsite 1[B] + Offsite 2[C] (Control Point 1)**	**20.13**	**40.88**	**53.13**
Existing 2 (Control Point 2)	**1.43**	**3.20**	**4.23**	**Developed 2 (Control Point 2)**	**2.13**	**3.84**	**4.71**
Existing 3			**200.0**	**Developed 3**			**200.0**

TABLE 1-B
ADDITIONAL HYDROLOGIC RESULTS

Design Point	Post Development Peak (cfs) for 100 yr. Storm
FES (P1C)	4.58
Offsite 2[A]	33.72
FES (P1C) + Offsite 2[A] (Control Point 3)	**38.30**
FES (P3B)	2.01
Offsite	50.00
FES (P1C) + Offsite (Control Point 4)	**52.01**
FES (P1E)	2.33
Offsite1[D] (T1)	8.09
FES(P1E) + Offsite 1[D] (Control Point 5)	**10.42**

TABLE 1-C
FLOW SPLIT CALCULATIONS RESULTS FOR MAJESTIC PINES

Item	Flow (cfs)
Total Offsite flow from Tributary Subarea III - 5(Refer to Mammoth Lakes Storm Drainage Master Plan)	200
Flow Through Southern 30" Existing Pipe **Calculations:** Basin area = 576804 SF Basin E_3/P_3 = 6022375 SF Flow in 30" Pipe = 576804*200/6022375 = 20 cfs	(20)
Capacity of Northern 30" Existing Pipe from Stormcad (Refer to Stormcad Calculation in Attachment D)	(70)
Balance Flow Estimated North Side of Majestic Pine	110

TABLE FOOTNOTES:

A - Offsite flows from "Drainage Study Crooked Pines Lot 1, Tract Map 36-200" adjusted to determine flow rate at Control Point 3.

B - Offsite flows from "Drainage Study Crooked Pines Lot 1, Tract Map 36-200" adjusted to determine flow rate at Control Point 1.

C - Offsite flows from "Drainage Study Crooked Pines Lot 1, Tract Map 36-200" adjusted to determine flow rate at Control Point 1.

D - Offsite flows from "Drainage Study Crooked Pines Lot 1, Tract Map 36-200" adjusted to determine flow rate at Control Point 5.

EROSION AND SEDIMENTATION CONTROL

Temporary Erosion control and storm water treatment measures are recommended to be in place throughout the construction of this project. Permanent treatment measures such as riprap and erosion control mat armouring are planned in areas of possible erosion. The "Rainstore 3" infiltration system will treat storm runoff from the paved driveways, as well as a portion of the roof areas. For a more detail description of the erosion control and storm water treatment measures for this project refer to the Storm Water Pollution Prevention Plan.

CONCLUSIONS

Based on the peak flow calculations presented in this hydrologic analysis, it appears that the Woodwinds at Sierra Star project can be developed as planned without adverse impacts to downstream properties with respect to storm drainage.

A subsequent study was performed to evaluate the need for detention onsite (Refer to the attachment A). The results of the study confirmed that detention should not be required for the development of this project.

The hydraulic analysis (Refer to the attachment D) showed that the proposed storm drainage system is capable of handling the 100 year storm event.

REFERENCES AND PREVIOUS STUDIES

Drainage Study Crooked Pines Lot 1, Tract Map 36-200, Triad/Holmes Associates, August 2001.

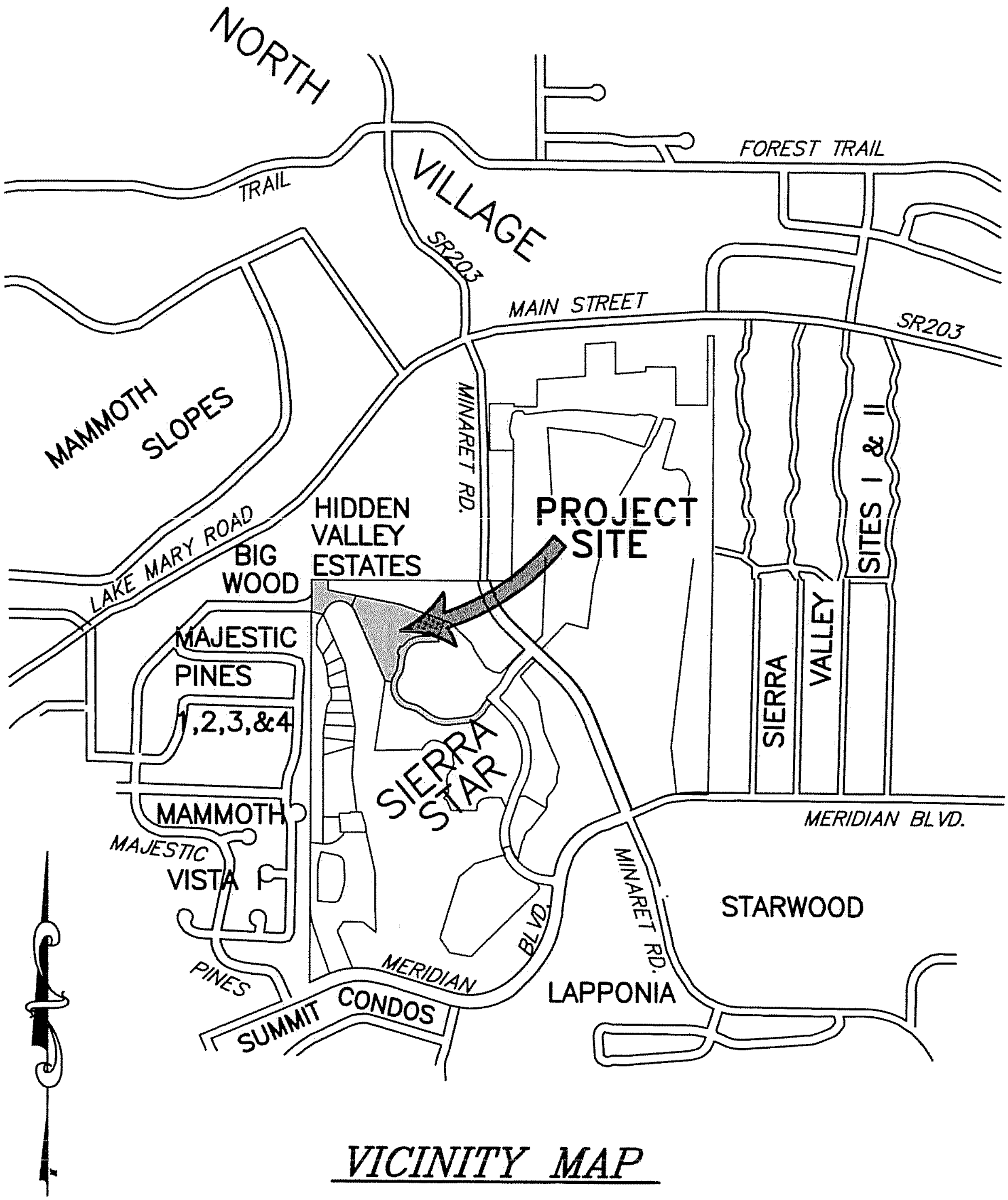
Mammoth Lakes Storm Drainage and Erosion Control Design Manual, Brown & Caldwell and Triad Engineering, July 1984.

Mammoth Lakes Storm Drainage Master Plan, Brown & Caldwell and Triad Engineering, July 1984.

Preliminary Stormwater Retention Design for Lodestar Golf Course, Triad Engineering, January 1991, revised June 1993

Storm Drainage Master Plan Report, Town of Mammoth Lakes, Kennedy/Jenks/Chilton, September 1990.

Washoe County Urban Stormwater Management Program Volume IV, CH2M Hill, Robert Pitt, Cooper and Associates Inc, Consulting Engineering Services Inc., June 1983



VICINITY MAP

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FIGURE 1

VICINITY MAP

THE WOODWINDS at SIERRA STAR

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LAHONTAN GUIDELINES

4.8 LAND DEVELOPMENT

The construction and maintenance of urban and commercial developments can impact water quality in many ways. Construction activities inherently disturb soil and vegetation, often resulting in accelerated erosion and sedimentation. Stormwater runoff from developed areas can also contain petroleum products, nutrients, and other contaminants.

This section contains a discussion of the potential water quality impacts expected to result from land development activities, followed by control measures to reduce or offset water quality impacts from such activities.

Construction Activities and Guidelines

Construction activities often produce erosion by disturbing the natural ground surface through scarifying, grading, and filling. Floodplain and wetland disturbances often reduce the ability of the natural environment to retain sediment and assimilate nutrients. Construction materials such as concrete, paints, petroleum products, and other chemicals can contaminate nearby water bodies. Construction impacts such as these are typically associated with subdivisions, commercial developments, and industrial developments.

Control Measures for Construction Activities

The Regional Board regulates the construction of subdivisions, commercial developments, industrial developments, and roadways based upon the level of threat to water quality. The Regional Board will request a Report of Waste Discharge and consider the issuance of an appropriate permit for any proposed project where water quality concerns are identified in the California Environmental Quality Act (CEQA) review process. Any construction activity whose land disturbance activities exceed five acres must also comply with the statewide general NPDES permit for stormwater discharges (see "Stormwater" section of this Chapter).

The following are guidelines for construction projects regulated by the Regional Board, particularly for projects located in portions of the Region where erosion and stormwater threaten sensitive watersheds. The Regional Board recommends that each county within the Region adopt a grading/erosion control ordinance to require implementation of these same guidelines for all soil disturbing activities:

1. Surplus or waste material should not be placed in drainageways or within the 100-year floodplain of any surface water.

2. All loose piles of soil, silt, clay, sand, debris, or other earthen materials should be protected in a reasonable manner to prevent any discharge to waters of the State.

3. Dewatering should be performed in a manner so as to prevent the discharge of earthen material from the site.

4. All disturbed areas should be stabilized by appropriate soil stabilization measures by October 15th of each year.

5. All work performed during the wet season of each year should be conducted in such a manner that the project can be winterized (all soils stabilized to prevent runoff) within 48 hours if necessary. The wet season typically extends from October 15th through May 1st in the higher elevations of the Lahontan Region. The season may be truncated in the desert areas of the Region.

6. Where possible, existing drainage patterns should not be significantly modified.

7. After completion of a construction project, all surplus or waste earthen material should be removed from the site and deposited in an approved disposal location.

8. Drainage swales disturbed by construction activities should be stabilized by appropriate soil stabilization measures to prevent erosion.

9. All non-construction areas should be protected by fencing or other means to prevent unnecessary disturbance.

10. During construction, temporary protected gravel dikes, protected earthen dikes, or sand bag dikes should be used as necessary to prevent discharge of earthen materials from the site during periods of precipitation or runoff.

11. Impervious areas should be constructed with infiltration trenches along the downgradient sides to dispose of all runoff greater than background levels of the undisturbed site. Infiltration trenches are not recommended in areas where infiltration poses a risk of ground water contamination.

12. Infiltration trenches or similar protection facilities should be constructed on the downgradient side of all structural drip lines.

13. Revegetated areas should be continually maintained in order to assure adequate growth and root development. Physical erosion control facilities should be placed on a routine maintenance and inspection program to provide continued erosion control integrity.

14. Waste drainage waters in excess of that which can be adequately retained on the property should be collected before such waters have a chance to degrade. Collected water shall be treated, if necessary, before discharge from the property.

15. Where construction activities involve the crossing and/or alteration of a stream channel, such activities should be timed to occur during the period in which stream flow is expected to be lowest for the year.

16. Use of materials other than potable water for dust control (i.e., reclaimed wastewater, chemicals such as magnesium chloride, etc.) is strongly encouraged but must have prior Regional Board approval before its use.

Specific Policy and Guidelines for Mammoth Lakes Area

To control erosion and drainage in the Mammoth Lakes watershed at an elevation above 7,000 feet (Figure 4.8-1), the following policy and guidelines apply:

Policy:

A Report of Waste Discharge is required not less than 90 days before the intended start of construction activities of a **new development** of either (a) six or more dwelling units, or (b) commercial developments involving soil disturbance on one-quarter acre or more.

The Report of Waste Discharge shall contain a description of, and time schedule for implementation, for both the **interim erosion control measures** to be applied during project construction, and **short- and long-term erosion control measures** to be employed after the construction phase of the project. The descriptions shall include appropriate engineering drawings, criteria, and design calculations.

Guidelines:

1. Drainage collection, retention, and infiltration facilities shall be constructed and maintained to prevent transport of the runoff from a 20-year, 1-hour design storm from the project site. A 20-year, 1-hour design storm for the Mammoth Lakes area is equal to 1.0 inch (2.5 cm) of rainfall.

2. Surplus or waste materials shall not be placed in drainageways or within the 100-year flood plain of surface waters.

3. All loose piles of soil, silt, clay, sand, debris, or earthen materials shall be protected in a reasonable manner to prevent any discharge to waters of the State.

4. Dewatering shall be done in a manner so as to prevent the discharge of earthen materials from the site.

5. All disturbed areas shall be stabilized by appropriate soil stabilization measures by October 15 of each year.

6. All work performed between October 15th and May 1st of each year shall be conducted in such a manner that the project can be winterized within 48 hours.

7. Where possible, existing drainage patterns shall not be significantly modified.

8. After completion of a construction project, all surplus or waste earthen material shall be removed from the site and deposited at a legal point of disposal.

9. Drainage swales disturbed by construction activities shall be stabilized by the addition of crushed rock or riprap, as necessary, or other appropriate stabilization methods.

10. All nonconstruction areas shall be protected by fencing or other means to prevent unnecessary disturbance.

11. During construction, temporary erosion control facilities (e.g., impermeable dikes, filter fences, hay bales, etc.) shall be used as necessary to prevent discharge of earthen materials from the site during periods of precipitation or runoff.

12. Revegetated areas shall be regularly and continually maintained in order to assure adequate growth and root development. Physical erosion control facilities shall be placed on a routine maintenance and inspection program to provide continued erosion control integrity.

13. Where construction activities involve the crossing and/or alteration of a stream channel, such activities shall be timed to occur during the period in which streamflow is expected to be lowest for the year.

Land Development/Urban Runoff Control Actions for Susan River Watershed

1. To protect riparian vegetation and wetlands from land disturbance activities, the Regional Board shall recommend that Lassen County and the City of Susanville require new development or any land disturbing activities to include buffer strips of undisturbed land, especially along the Susan River and its tributaries.

2. The Regional Board, with assistance from the City of Susanville and the California Department of Transportation (Caltrans), should conduct monitoring of the Susan River and Piute Creek within the City of Susanville to assess impacts from urban runoff. Control measures should be planned and implemented based on the results of the monitoring. The monitoring plan should be developed to identify nonpoint sources needing control. Monitoring proposals will be submitted by the Regional Board, and work will be conducted as resources allow and as the Susan River gains priority.

3. The Regional Board shall encourage and assist other agencies in watershed restoration efforts along the Susan River.

4. The Regional Board shall encourage the City of Susanville and Lassen County to adopt a comprehensive grading ordinance. These ordinances should require, for all proposed land disturbing activities, the use of Best Management Practices to reduce erosion and stormwater runoff, including but not limited to temporary and permanent erosion control measures.

5. The Regional Board shall encourage the City of Susanville, Lassen County and Caltrans to implement Best Management Practices to reduce erosion and stormwater runoff when constructing and maintaining roads, both paved and unpaved, under their jurisdiction.

Road Construction and Maintenance

Road construction activities often involve extensive earth moving, including clearing, scarifying, excavating for bridge abutments, disturbing or modifying floodplains, cutting, and filling. Additionally, the potential for land disturbance exists from construction materials, equipment maintenance, fuel storage facilities, and general equipment use.

Once constructed, impervious road surfaces create another source of water pollution. Oils, greases, and other petroleum products, along with such toxic materials as battery acid, antifreeze, etc., may be deposited along the road surfaces. These contaminants become suspended or dissolved in any stormwater runoff that is generated on the road surfaces. Unless otherwise treated, these contaminants will flow toward local surface or ground waters. (See "Stormwater" section of this Chapter.)

Road maintenance can be potentially threatening to water quality in a number of ways. Below-grade culverts slowly fill with sediment and are cleaned out periodically, sometimes by flushing accumulated sediment into downstream drainageways. Grading of shoulders and drainageways can detach sediments and increase the risk of erosion into nearby surface waters. Road surfaces may be repainted or resealed with materials that harden quickly, but which can be washed off while still fresh by stormwater runoff.

In the winter, roads are often snowy, icy, or wet. To reduce winter road hazards, maintenance crews may remove the snow or ice, apply sand to provide added traction, and/or apply deicing chemicals to melt the snow and ice. Sand is rapidly dissipated or crushed by the traffic, and must be replaced frequently. Great quantities of sediment enter drainageways and/or surface waters due to this practice. Snow may be removed mechanically via snowplow or snowblower. This practice is not particularly detrimental to water quality in itself, but the snow often carries substances from the roadway when removed. Sediments, chemical deicers, and vehicle fluids may travel much farther than they would otherwise, possibly reaching area surface waters. Ice and small accumulations of snow may be removed with chemical deicers. The deicer in widest use is rock salt (sodium chloride), due to its low cost, high availability, and predictable results.

Winter road maintenance was brought to the forefront in 1989 when significant numbers of roadside trees in the Lake Tahoe Basin suddenly started dying. The public outcry caused many environmental groups and regulatory agencies, including the Regional Board, to look more closely at what had been a more or less unscrutinized, unregulated process in the past. Data began to show that Caltrans was using very high amounts of salt each winter, and the figure seemed to increase from one year to the next. The consensus of the various regulatory agencies was that Caltrans should reduce salt use, explore various alternate deicers, and monitor the impacts of salt applications on soil, water, and vegetation. Salt use decreased significantly from 1989-1992, due to more careful application procedures and to drought conditions.

At least three alternate deicers have been explored: calcium magnesium acetate, potassium acetate, and magnesium chloride with corrosion inhibitors. These products have shown some promise, but further study is required. The cost to switch to an alternate deicer will be significant. The road departments are unwilling to make the switch unless an alternate deicer is demonstrably better environmentally, will not require too much adjustment on the part of the maintenance crews and equipment, and will actually do an effective and predictable job when applied.

However, Caltrans' monitoring of vegetation showed minimal and temporary salt accumulation within the vegetation. During the spring, any salt that had accumulated in the vegetation was flushed out from the plant material. The impacts of chemical deicers on fish and wildlife within the Lahontan Region have not been studied.

Control Measures for Road Construction and Maintenance

(Additional control measures for roads are included in the "Stormwater" section of this Chapter.)

The Regional Board regulates road construction and maintenance projects within the Lahontan Region, concentrating efforts on major construction and construction in sensitive areas. Major construction projects and those projects in sensitive areas are most often regulated under individual WDRs, and are routinely inspected. Less significant projects may be issued conditional waivers of WDRs. The Regional Board has also adopted road maintenance waste discharge requirements for some county governments in the Region. Road construction and maintenance in the Lake Tahoe Basin is also regulated under municipal NPDES Stormwater Permits (see Chapter 5).

For all road projects, the Board requires that construction be conducted in a manner which is protective to water quality, and that, at the end of a given project, the site be restabilized and revegetated. These requirements are detailed in a Management Agency Agreement with Caltrans regarding the implementation of BMPs. Additionally, all road projects are to be in compliance with the Caltrans Statewide 208 Plan (CA Dept. of Transportation 1980), which was approved by the State Board in 1979. This Plan contains a commitment to implement BMPs, but does not include great detail on the BMPs themselves. The State Board should encourage Caltrans to update its 208 plan to provide such detail, with particular attention to:

- stormwater/erosion control along existing highways
- erosion control during highway construction and maintenance

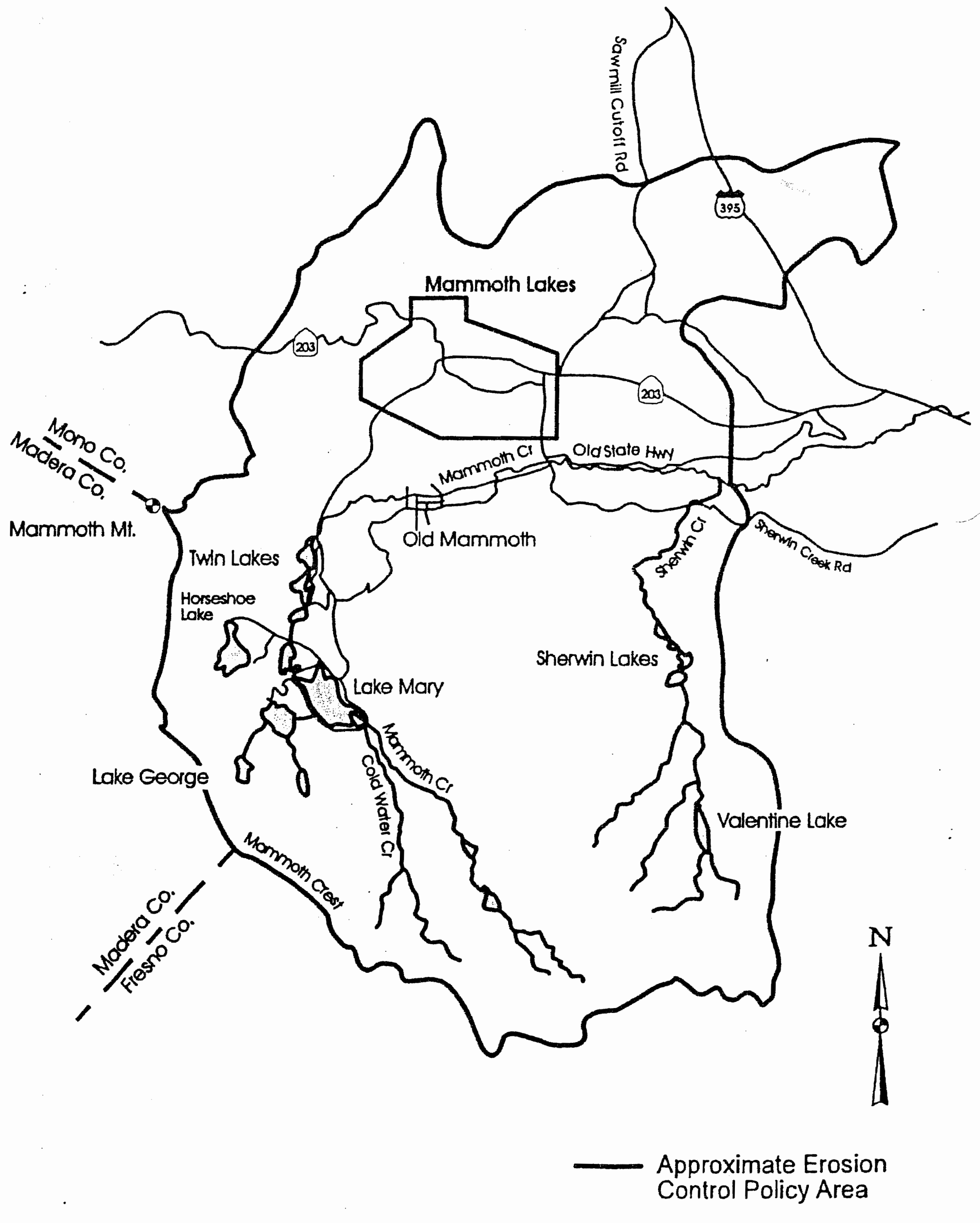
- reduction of direct discharges (e.g., through culverts)
- reduction of runoff velocity
- infiltration, detention and retention practices
- management of deicing compounds, fertilizer, and herbicide use
- spill cleanup measures
- treatment of toxic stormwater pollutants

Since much of the implementation of BMPs on highways is done by Caltrans' contractors, the selection of qualified contractors and ongoing education of construction and maintenance personnel on BMP techniques are particularly important.

In the Lake Tahoe Basin, all governmental agencies assigned to maintain roads are required to bring all roads in the Lake Tahoe Basin into compliance with current "208" standards within a specified time schedule. That is, all existing facilities must be retrofitted to handle the stormwater runoff from the 20-year, 1-hour storm, and to restabilize all eroding slopes. The twenty-year time frame for this compliance process ends in 2008.

The Regional Board should allow salt use to continue as one component of a comprehensive winter maintenance program. However, the Regional Board should continue to require that it be applied in a careful, well-planned manner, by competent, trained crews. Should even the "proper" application of salt be shown to cause adverse water quality impacts, the Regional Board should then require that it no longer be used in environmentally sensitive areas, such as the Lake Tahoe Basin. Similarly, should an alternate deicer be shown to be effective, environmentally safe, and economically feasible, its use should be encouraged in lieu of salt.

Figure 4.8-1
OWENS HYDROLOGIC UNIT



DRAFT

MASTER DRAINAGE REPORT FOR SIERRA STAR AREAS 2 AND 4

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Table of Contents

INTRODUCTION

This report presents the result of our master drainage study for the Sierra Star Areas 2 & 4 located in Mammoth Lakes, California. The primary purpose of this study is to perform a detailed hydrologic study to estimate the impact in existing basin flow due to the Intrawest developments and prepare alternative drainage options for the proposed drainage system to have a minimal impact down stream.

The study objectives are to

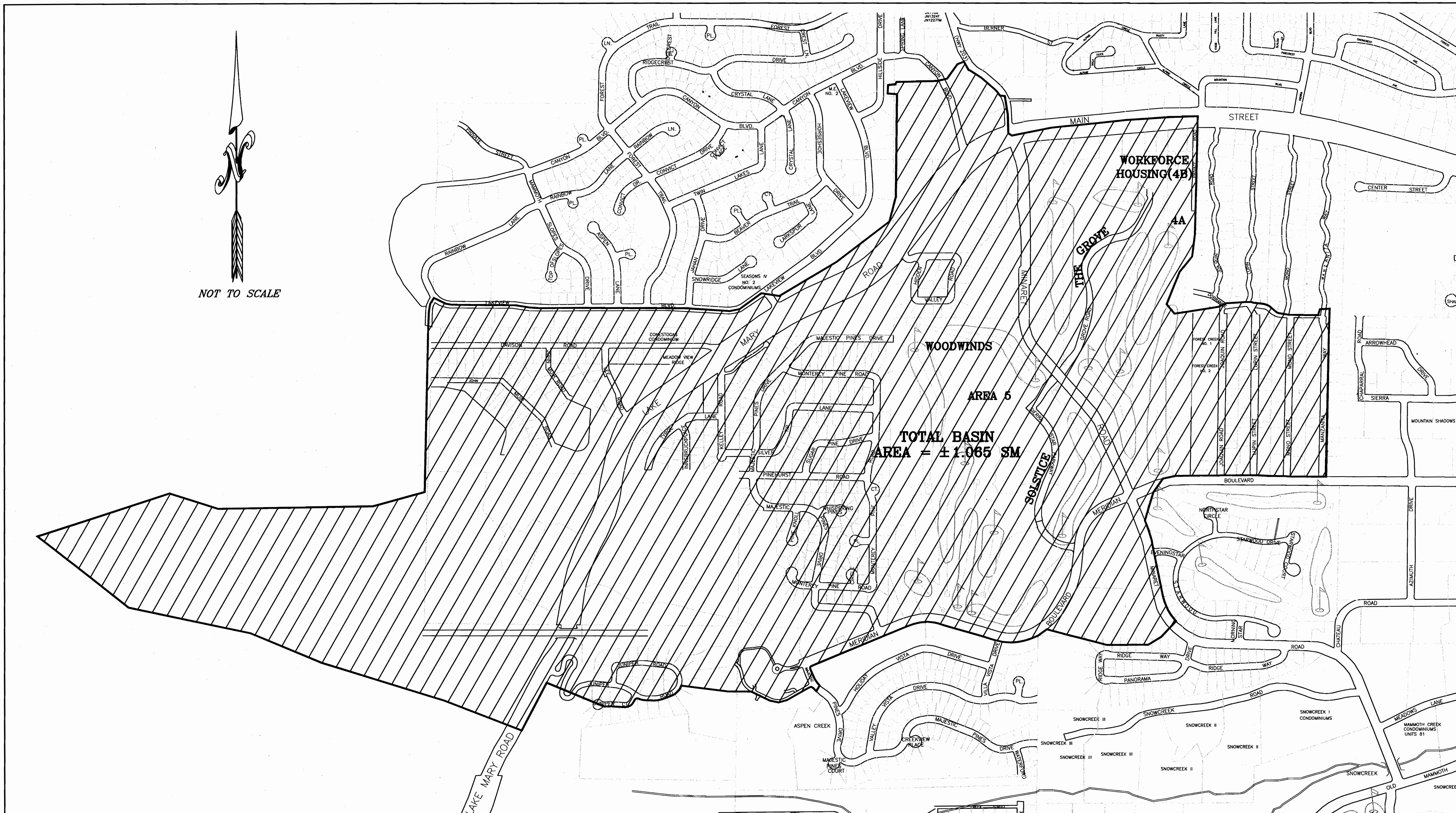
1. Estimate runoff for existing conditions.
2. Estimate runoff for the post development conditions
3. Investigate potential drainage alternatives (i.e., detention and diversion)

SITE DESCRIPTION

The total drainage area is approximately 1.065 sq.miles in size and lies between latitude 37º38' and 37º39' and longitude 118º58'20" and 119º00'40" (Refer to the Vicinity Map, Figure 1). In the unimproved areas, groundcover consists of mainly fir and pine trees, low grasses, and pine needles. Development in the area includes golf courses, residential, and commercial buildings.

HYDROLOGIC METHODS

The basin was modeled using the Corps of Engineers HEC-HMS computer program and the SCS Curve Number Method. The basin flows were calculated using the unit flowrate values (cfs/acre) from the of Mammoth Lakes 2005 Storm Drain Master Plan Update (Boyle, 2005). The HMS model was calibrated to these flow rates and run to estimate the 100 yr/24 hr, 50 yr/24 hr and 10 yr/24 hr storm events per Mammoth Lakes Storm Drainage and Erosion Control Design Manual. Hydraulic calculations were performed with the Haestad StormCad and FlowMaster computer programs.



cfa

FIGURE 1
BASIN VICINITY MAP
SIERRA STAR AREAS 2 & 4

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MODEL INPUT AND PARAMETERS

Basins. The Unit 2 Area basin lies within Tributary Subarea III – 5 of the Mammoth Lakes Storm Drainage Master Plan (1984) and similar to drainage basin 3.6 of Town of Mammoth Lakes 2005 Storm Drain Master Plan Update (Boyle, 2005). The basin slopes range from 1% to 60%.

The existing basin was divided into six subbasins (i.e., E1A, E1B, E2A, E2B, E3A, E3B and E3C) to simulate the natural drainage patterns (Refer to Figure 2). Subbasin 3C was further split into E3C.1, E3C.2, E3C.3, and E3C.4. Subbasins E1 and E3 runoff generally drains toward the east/northeast via natural and paved areas, swales, pipes and natural streams. Flows were calculated at the low point of the basins at control points 1 and 3.4 respectively. Subbasin E2 generally drains toward the east via natural and paved areas, existing drainage swales and pipes located in the basin. This basin was analyzed at control point 2.

The post-development drainage basins, except subbasin P2B, were delineated similar to existing basins with the incorporation Intrawest's proposed developments. Subbasin P2B was further divided into P2B.1, P2B.2, and P2B.3 (Refer to Figure 3). Drainage patterns generally remain the same with some modifications in the drainage mitigation alternatives.

Precipitation Depths and Distribution. The storm distributions for winter and summer were obtained/developed from the Mammoth Lakes Storm Drainage and Erosion Control Design Manual (1984).

The winter storm hyetograph was utilized in this study since it appeared to be most conservative. For comparison, the 100 year / 24 hour design storm is plotted for summer and winter. As shown in Figure 5, the winter storm is more intense than the summer storm, which would result in a higher peakflow.

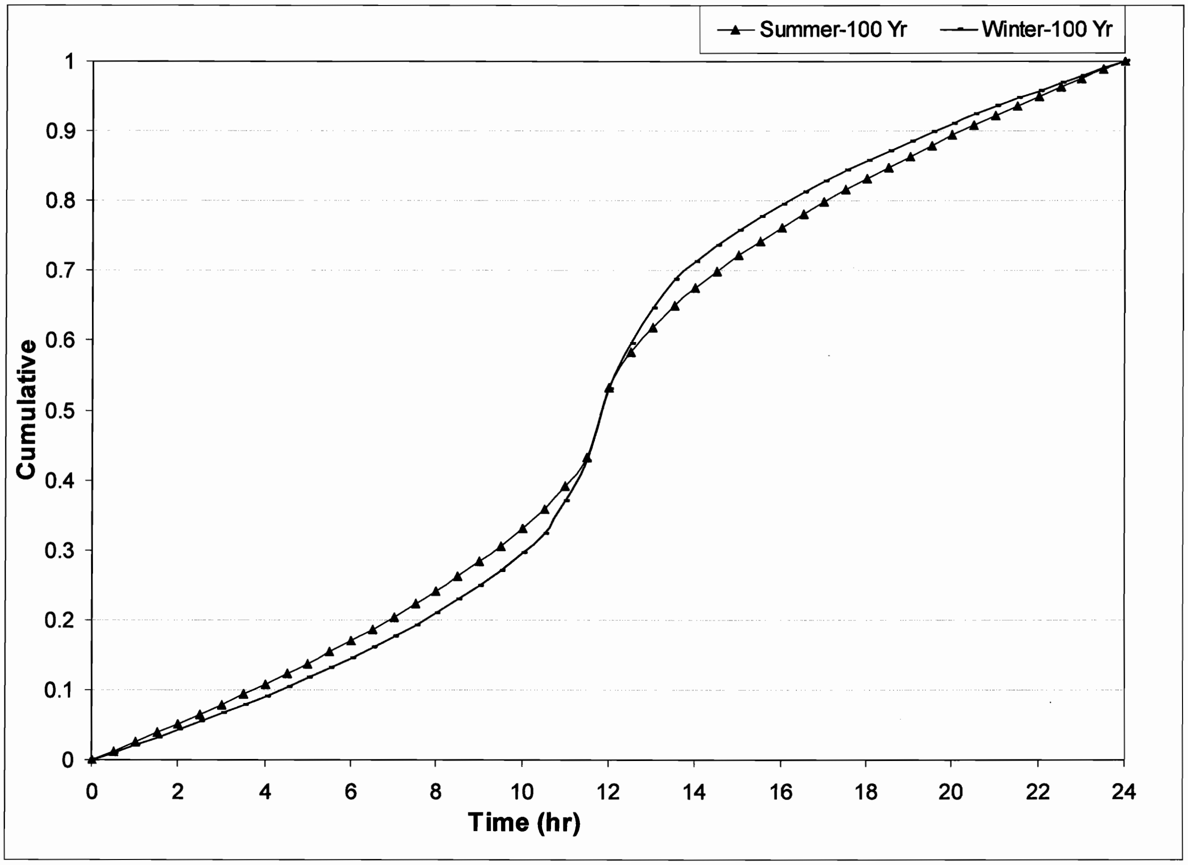

Figure 5. Hyetograph Comparison (100 year-24 hour)

Lag Time. The SCS upland method was used to estimate lagtime for the subbasins (Refer to Appendix B).

SCS Curve Number. The curve number (CN) was estimated by calibrating the model to the flowrates obtained in 2005 Master Plan Update (Boyle, 2005). The CNs were then adjusted for impervious areas in the post-development models to evaluate the change due to the development. As shown in Table C.1, curve numbers range from 54 to 86, which appears reasonable for the basin soils and ground cover.

HYDROLOGIC MODEL RESULTS

SCS Models. SCS models were developed to estimate peak flows for existing and post-development conditions. Overall storm water peak flows were calculated for the exceedence interval of 10, 50, and 100 years for all basins. Three different post-development models were run for the following scenarios.

1. Developed conditions without a detention pond.
2. Developed conditions with a detention pond in the subbasin P2B.2 (4A site).
3. Developed condition with flow diversion from basins 1 and 2 to the storm drain in Dorrance.

Developed Condition without a Detention Pond. A model was developed to estimate peakflows without detention pond (Refer to Figure 7). The calculated existing and developed condition peak flow for key control points are shown in Table 1. As shown in Table 1, there is a negligible increase in peak discharge with development for Control Points 1 and 3.4. There is an increase in peakflows as high as 3.5 cfs at control point 2.

Developed Condition with a Detention Pond in Subbasin P2B.2. A model was developed to estimate peakflows with a detention pond (Refer to Figure 8). The calculated existing and developed condition peak flow for key control points are shown in Table 2. As shown in Table 2, there is a negligible increase in peak discharge with development for Control Points 1 and 3.4. The pond does not effectively reduce the peakflow at control point 2 because of its very low capacity of ±0.48 ac-ft.

Developed Condition with Flow Diversion from Bbasins 1 and 2 to 48" Storm Drain in Joaquin and Dorrance. The existing drainage from subbasins E2A, E2B & E2C sheetflow toward the east into the existing subdivision. Through visual inspection of the flow routes through the subdivision, it is apparent that the drainage facilities are insufficient to carry the estimated flows. Drainage from subbasins E1A and E1B also discharge to the east by way of a natural drainageway. However, the culverts crossing the subdivision roadways are not sufficiently sized to convey the estimated existing or post-development flows.

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Table 1. Summary of Peakflows for developed Condition without a Detention Pond

Control Point	Peak Flowrate (cfs) without Detention Pond								
	100 Year Storm Event			50 Year Storm Event			10 Year Storm Event		
	Existing	Proposed	Increase	Existing	Proposed	Increase	Existing	Proposed	Increase
1	131.61	130.81	**-0.61%**	95.81	95.96	**0.16%**	44.41	46.20	**4.03%**
2	47.89	51.54	**7.62%**	37.12	40.63	**9.46%**	19.95	22.86	**14.59%**
3.4	152.82	153.67	**0.56%**	122.75	123.56	**0.66%**	72.13	72.81	**0.94%**

Table 2. Summary of Peakflows for developed Condition with a Detention Pond

Control Point	Peak Flowrate (cfs) with Detention Pond								
	100 Year Storm Event			50 Year Storm Event			10 Year Storm Event		
	Existing	Proposed	Increase	Existing	Proposed	Increase	Existing	Proposed	Increase
1	131.61	130.81	**-0.61%**	95.81	95.96	**0.16%**	44.41	46.20	**4.03%**
2	47.89	51.40	**7.33%**	37.12	40.53	**9.19%**	19.95	20.75	**4.01%**
3.4	152.82	153.67	**0.56%**	122.75	123.56	**0.66%**	72.13	72.81	**0.94%**

Table 3. Summary of Peakflows for Developed Condition with Flow Diversion from Basins 1 and 2 to 48" Storm Drain in Joaquin and Dorrance

Control Point	Peak Flowrate (cfs) with Flow Diversions								
	100 Year Storm Event			50 Year Storm Event			10 Year Storm Event		
	Existing	Proposed	Increase	Existing	Proposed	Increase	Existing	Proposed	Increase
1	131.61	118.67	**-9.83%**	95.81	87.31	**-8.87%**	44.41	42.82	**-3.58%**
2	47.89	41.70	**-12.93%**	37.12	33.26	**-10.40%**	19.95	19.26	**-3.46%**
3.4	152.82	171.12	**11.97%**	122.75	136.28	**11.02%**	72.13	79.51	**10.23%**
Total (Σ)	332.32	331.49	**-0.25%**	255.68	256.85	**0.46%**	136.49	141.59	**3.60%**

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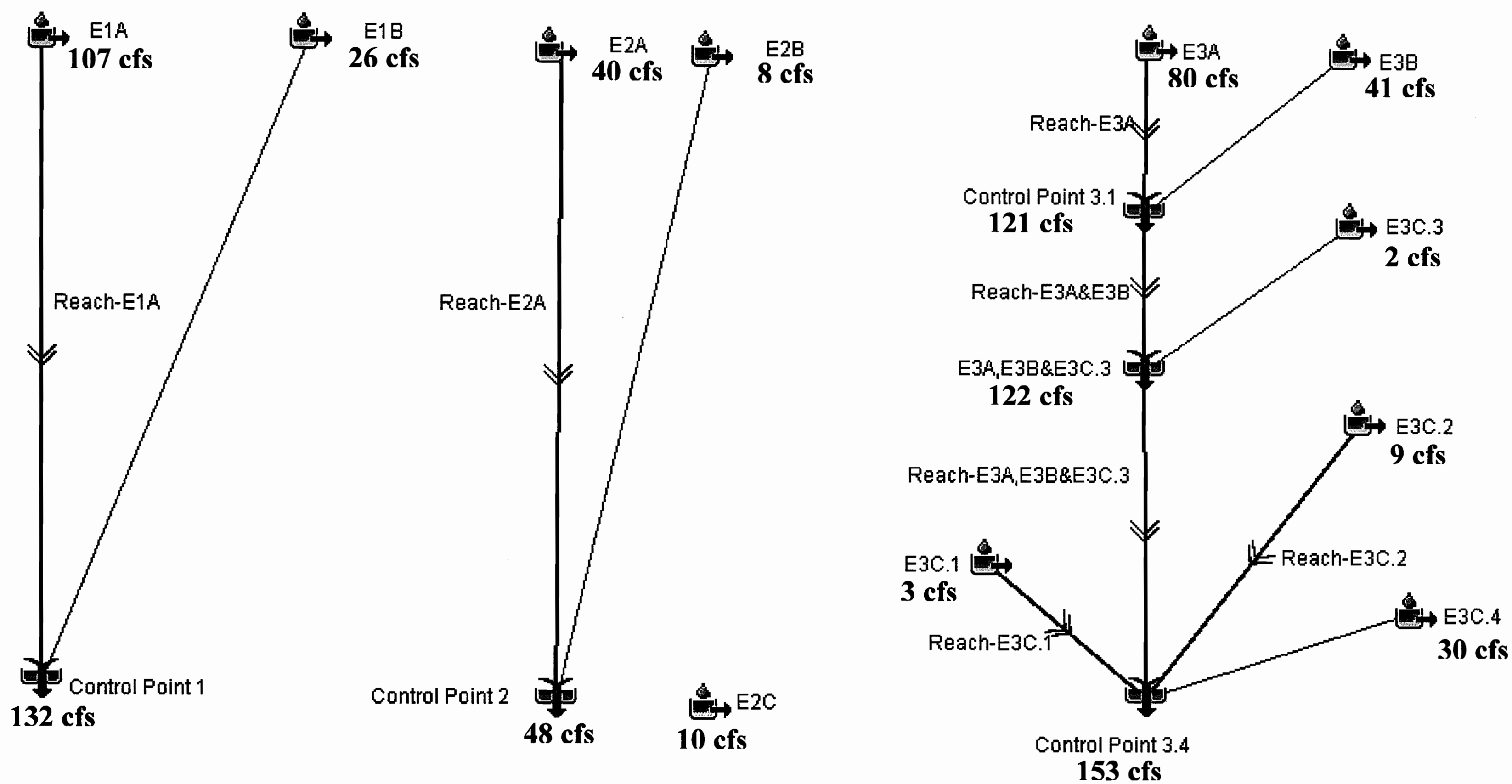

Figure 6. 100 year-24 hour Peak Flow Summary for Existing Conditions using SCS Method

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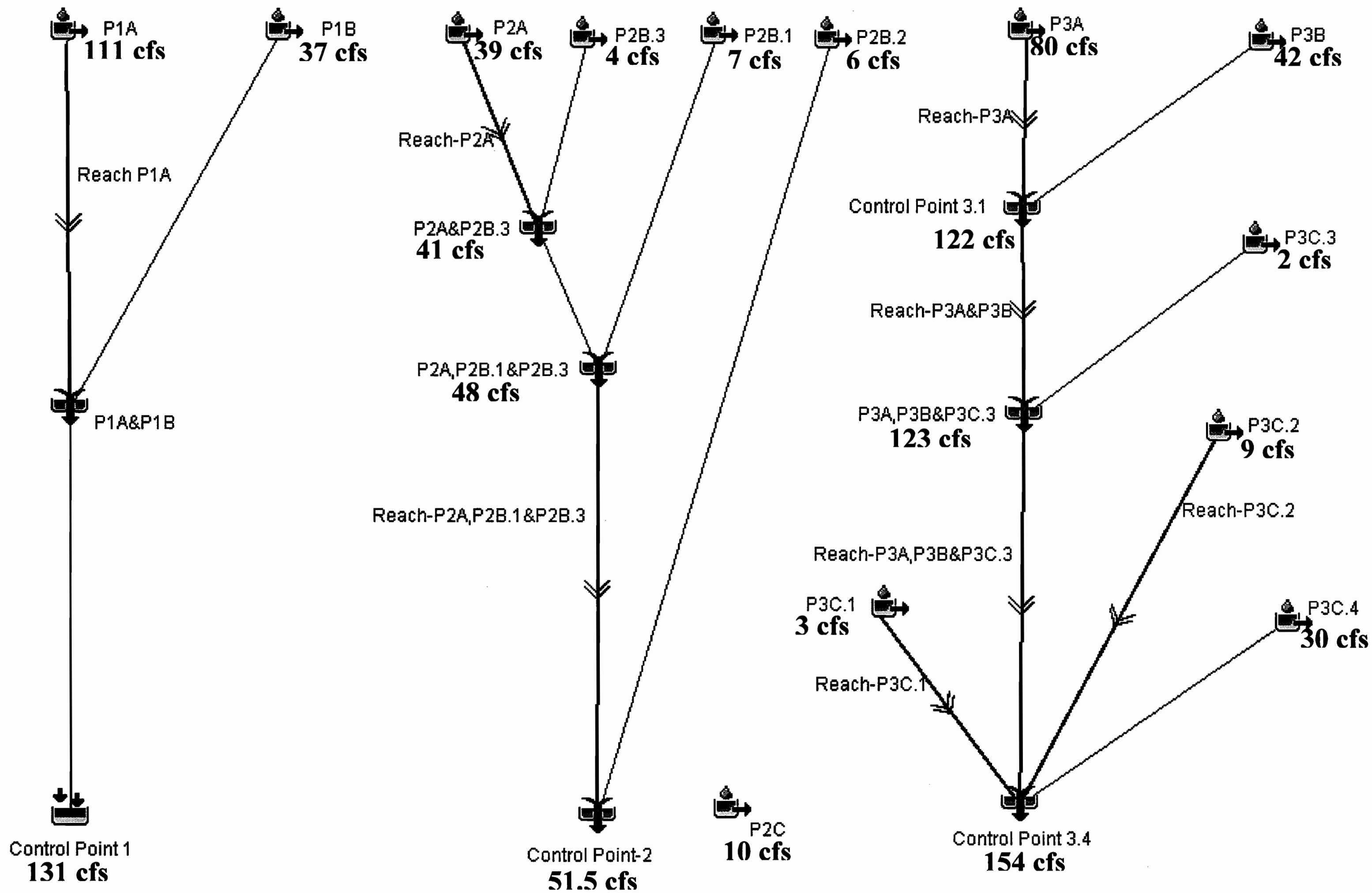

Figure 7. 100 year-24 hour Peak Flow Summary for Developed Conditions without a Detention Pond using SCS Method

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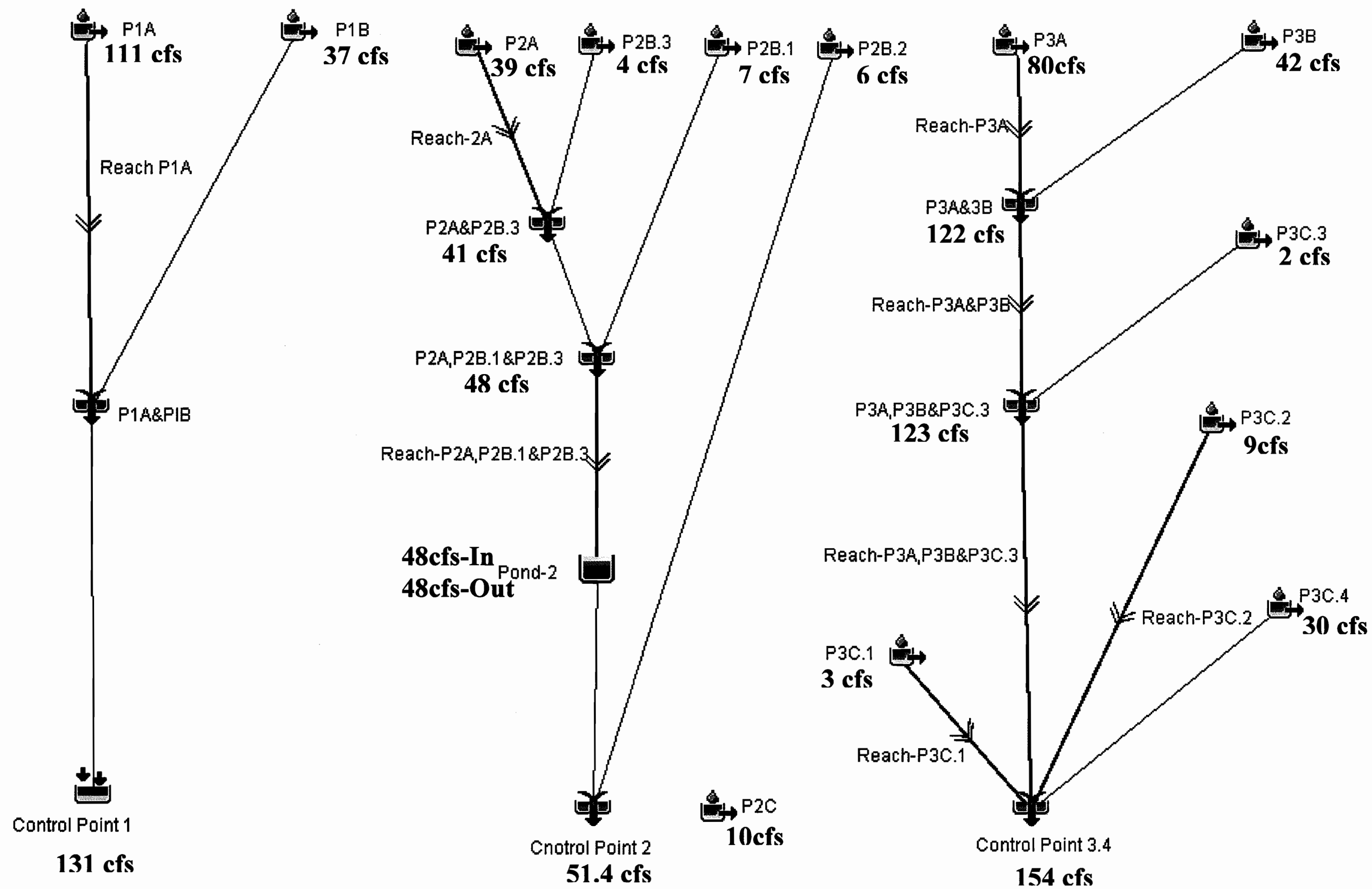

Figure 8. 100 year-24 hour Peak Flow Summary for Developed Conditions with a Detention Pond using SCS Method

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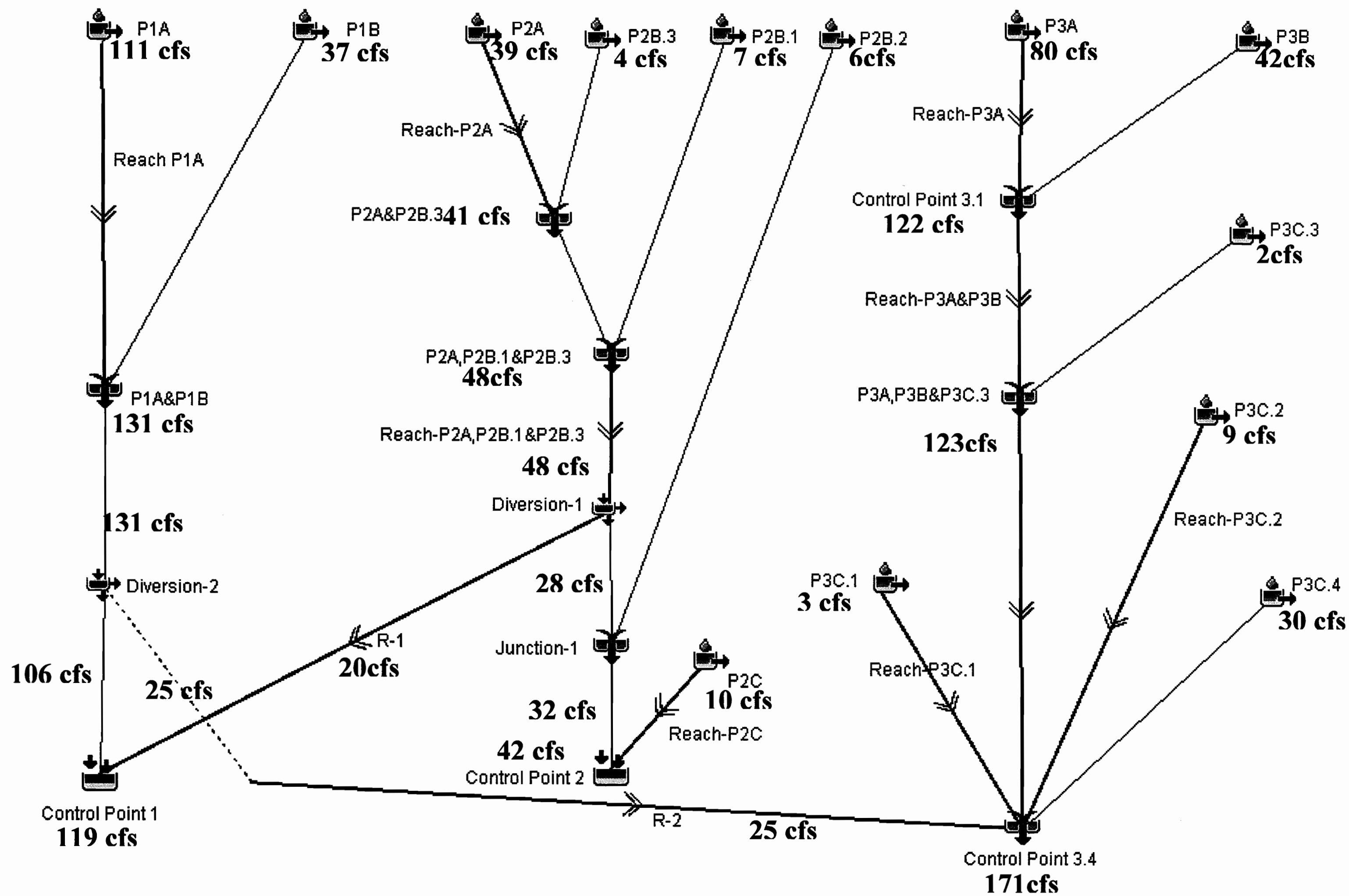


Figure 9. 100 year-24 hour Peak Flow Summary for Developed Conditions with Diversions using SCS Method

To mitigate the drainage impact to these downstream properties, a portion of the flows would be diverted from Basin E1 and Basin E2 to Basin E3, where there is excess storm drain capacity (48" storm drain in Dorrance).

Flow from subbasin P2C is routed to subbasin P2B.3 where it is combined with flow from subbasins P2A and P2B. A portion of this flow (20 cfs) is diverted to control point 1 at Basin 1. From control point 1, 25 cfs is diverted south to the 48" stormdrain in Dorrance (Basin 3). As a result, the 100 year flow at control point 1 is decreased from 132 cfs to 119 cfs. The flow at control point 2 is decreased from 48 cfs to 41.7 cfs. The flow in the 48" storm drain is increased from 121 cfs to 146 cfs. However, the 48" storm drain has an approximate capacity of 187 cfs.

According to the Storm Drain Master Plan (Boyle, 2005) a future 36" storm drain in Meridian Blvd. will further reduce the storm flow in the 48" Dorrance storm drain.

HYDRAULIC ANALYSIS

Heastad (Stormcad) program was used to develop the water surface profiles due to diversion in 48" storm drain at Dorrance. As shown in the results in Appendix D, the additional flow from diversion can be conveyed through 42"/48" storm drain without surcharging above the street level.

DISCUSSION

Discussion. This study has shown that peak flow increases at control point 1 due to the Intrawest development for 100 year, 50 year 10 year storm events are -0.8 cfs, 0.15 cfs and 1.79 cfs respectively. For control point 3, the respective increases are 0.85 cfs, 0.81 cfs and 0.68 cfs. The peak flow increments at control points 1 and 2 are negligible. Peak flow increments in control point 2 the same storm events are 3.65 cfs, 3.51 cfs and 2.91 cfs respectively, which values are relative considerable. Putting detention in the basin P2B.3 has not helped to reduce the peak flow at control point 2 because of its small storage capacity (±0.47 ac-ft).

The flow diversion to 42"/48" storm drain reduces peak flow of control points 1 and 2 by 12.94 cfs and 6.19 cfs during the 100 yr storm event. This reduction peak flow will be benefit to residents who are living downstream to those control points and having flooding problems. The diverted flow to the storm drain can be conveyed with out reaching the pipe capacity at 100 yr/ 24 hr storm event. The additional flow to the control point 3.4 due to diversion is 18.3 cfs; this could be conveyed without exceeding the capacity of downstream hydraulic structures.

REFERENCES

Army Corps of Engineers (2000), "HEC-HMS Technical Reference Manual".

Boyle (2005), "Town of Mammoth Lakes 2005 Storm Drain Master Plan Update".

Brown and Caldwell and Triad Engineering (1984), "Mammoth Lakes Storm Drainage Master Plan".

Brown and Caldwell and Triad Engineering (1984), "Mammoth Lakes Storm Drainage and Erosion Control Design Manual".

Hydrology Report

For

Main Street Affordable Housing

Project #5

Town of Mammoth Lakes,
California

Prepared By:
CFA, Inc.
1150 Corporate Blvd.
Reno, NV 89502
(775) 856-1150

February 25, 2003

INTRODUCTION

This report presents the hydrologic and hydraulic calculations for the proposed improvements of the Main Street Affordable Housing project. The purpose of this study is to calculate storm water flows for the existing and the developed conditions to evaluate the proposed drainage system.

SITE DESCRIPTION

The Main Street Affordable Housing site is approximately one acre and has an Assessor's Parcel Number of 33-330-22. The site is located east of the intersection of Main Street (State Route 203) and Minaret Road and is bounded on the north by Caltrans' property for Main Street. Private properties bound the site on the south, west, and east side. La Sierras restaurant is located in the adjacent property to the east (Refer to the Vicinity Map, Figure 1). The access for the site will be from Main Street. The groundcover consists of pine trees, low grasses, and pine needles.

PROJECT DESCRIPTION

The proposed improvements for the project include a 3-story wood framed building with approximately a 7000 sqft. footprint, a paved parking lot and access drive, and a fire turn-around.

EXISTING DRAINAGE

The site drains toward the east to a low point approximately in the middle of its eastern boundary. The elevation drop from west to east is approximately 25 feet with slopes ranging from 40% to 2%. The topography of the site reflects a natural gully that runs through the center of the site, which directs the storm flows to the previously mentioned low point. Upon visual inspection, it did not appear that there were any signs of concentrated flow in the gully. Offsite runoff from the west and north drain onto the site primarily as overland flow. It is assumed that storm water discharges off the site to the east when flow volumes exceed the storage capacity of the low point. Refer to Figures 2 and 3 for a display of the existing drainage.

PROPOSED DRAINAGE

The proposed drainage system for Main Street Affordable Housing was designed to imitate the natural drainage pattern. Drainage swales collect offsite flows and direct these flows around the building. These flows are then collected in a storm drain system, either a culvert or a drop inlet, and then routed to a storage and sedimentation pond. When the storage capacity of the pond has been exceeded, the storm water is released offsite to the east at approximately the same location as the existing drainage. There is a rip-raped weir on the east edge of the pond to allow for this overflow. An infiltration trench collects runoff from the paved parking area. This storm runoff is not released off the site by overland flow. Refer to Figures 2 and 3 for a display of the proposed drainage.

Overall storm water peak flows at Design Point 1 (storage pond) were calculated for the exceedence interval storms of 10, 50, and 100 years. The calculated existing and developed condition peak flows for these storm intervals are shown in Table 1. The developed calculations do not have the entire drainage basin contributing flows because there is a portion of the basin that is infiltrated and not release as overland flow. The peak flow calculations indicate a very slight increase from existing conditions to developed conditions in the 10-year storm. The increase is 0.12 cfs. The peak flow calculations indicate a decrease in the 50-year and 100-year storms. These values do not take into account any routing or infiltration from the storage pond. If the pond was analyzed it would most likely lower the developed condition peak flows.

HYDROLOGY AND HYDRAULICS

Mammoth Lakes Storm Drainage and Erosion Control Design Manual was used for design guidelines and calculation methods in this project. Approximate peak flows were calculated using the rational method that was presented in the design manual. Storm drain, drop inlets, culverts, and ditches were all designed using the exceedence intervals found in the manual. Riprap is to be installed on all swales and ditches that exceed a slope of 7%. The infiltration trench was designed in accordance to the design manual and Lahontan Regional Water Quality Control Board (LRWQB) design guidelines. Refer to the appendix for all calculations and details.

EROSION AND SEDIMENTATION CONTROL

Erosion control and storm water treatment measures are in place through out this project. Riprap and rock mulch are placed in areas of possible erosion. The sedimentation basin is in place to treat storm water prior to its discharge offsite. The infiltration trench treats storm runoff from the paved parking areas. For a more detail description of the erosion control and storm water treatment measures of refer to the Storm Water Pollution Prevention Plan.

CONCLUSIONS

Based on the peak flow calculations presented in this hydrologic analysis, it appears that Main Street Affordable Housing project can be developed as planned without adverse impacts to downstream properties with respect to storm drainage.

REFERENCES

Mammoth Lakes Storm Drainage and Erosion Control Design Manual, Brown & Caldwell and Triad Engineering, July 1984.

Storm Drainage Master Plan Report, Town of Mammoth Lakes, Kennedy/Jenks/Chilton, September 1990.

Washoe County Hydrology Criteria and Drainage Design Manual, December 1996.

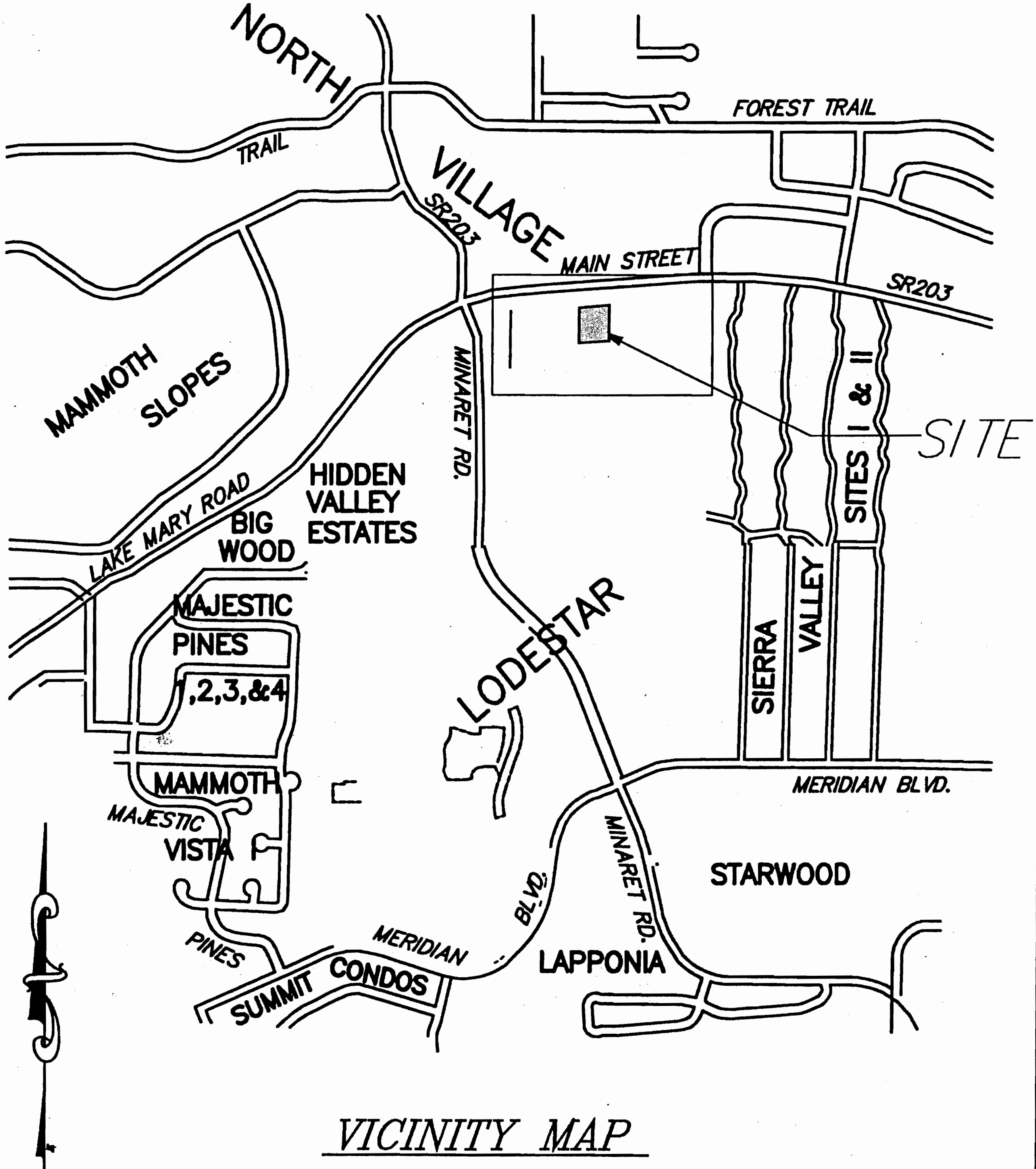
Washoe County Urban Stormwater Management Program Volume IV, CH2M Hill, Robert Pitt, Cooper and Associates Inc, Consulting Engineering Services Inc., June 1983

TABLE 1
OVERALL HYDROLOGY RESULTS
DESIGN POINT 1 (STORAGE POND)

	Peak flow (cfs)	
Exceedence Interval	Existing	Developed
10	0.98	1.10
50	1.72	1.62
100	2.14	2.04

TABLE 2
SWALE, CULVERT & STORM DRAIN
DESIGN CALCULATIONS SUMMARY

Item	Watershed	Area, acres	Exceedence Interval, (years)	Peak flow, Q (cfs)
SWALE 1A	1A	0.86	50	0.56
SWALE 1B & 1C	1A & 1B	1.48	50	1.03
SWALE 1D	1C	0.18	50	0.19
12" RCP CULVERT	1C	0.18	100	0.24
SWALE 2A	2A	0.20	50	0.16
SWALE 2B	2A & 2B	0.39	50	0.36
15" CMP CULVERT	2A & 2B	0.39	100	0.45
SWALE 3	2A, 2B & 3	0.50	50	0.38
SWALE 4	4	0.05	50	0.06
12" RCP SD	1A, 1B, 1C, 5A & 5B	1.80	50	1.42
RETENTION TRENCH	6	0.34	20	0.27



VICINITY MAP

NOT TO SCALE

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FIGURE 1

VICINITY MAP

MAIN STREET AFFORDABLE HOUSING

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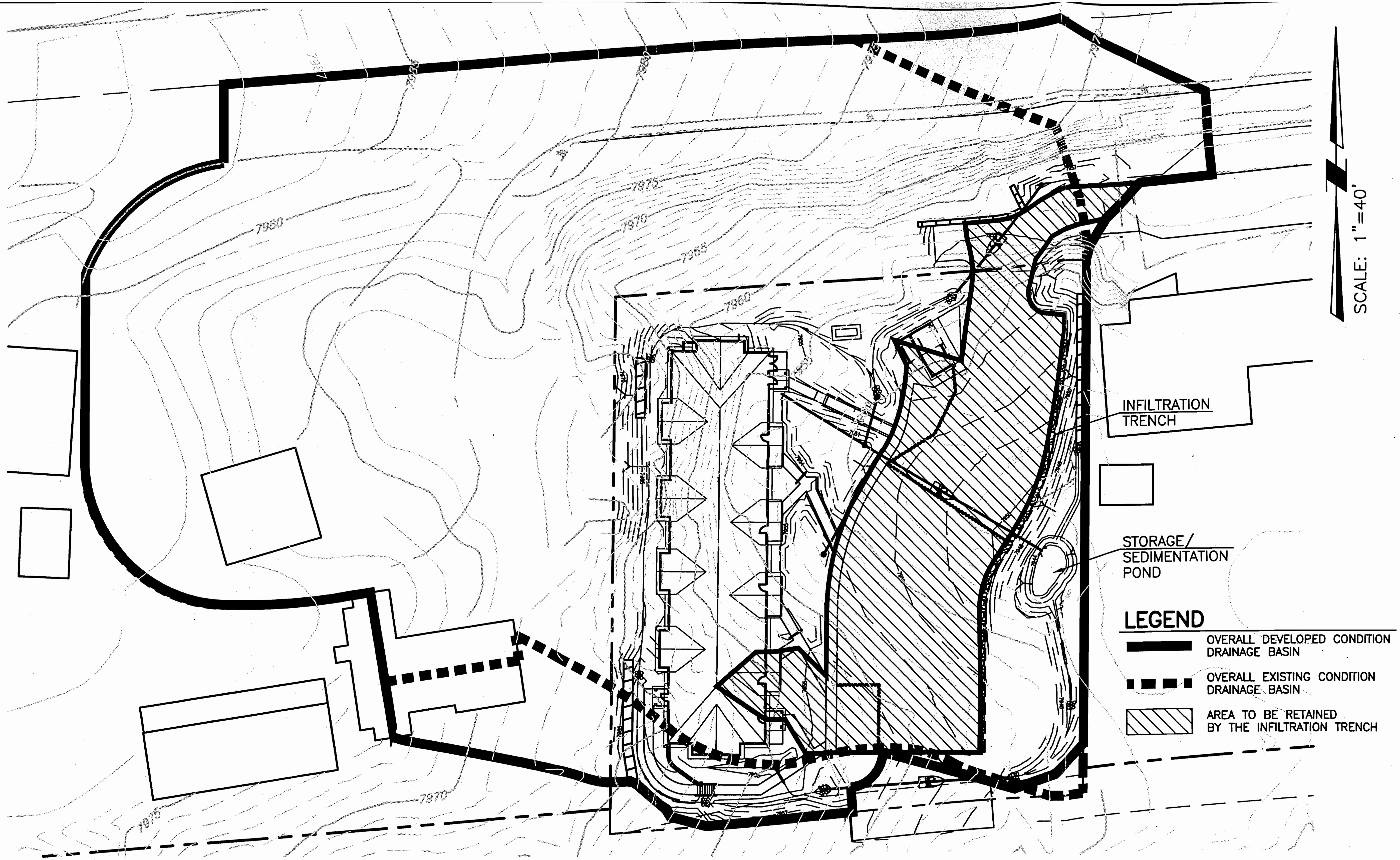

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FIGURE 2

OVERALL HYDROLOGY CONDITIONS MAP

MAIN STREET AFFORDABLE HOUSING

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HYDROLOGY LEGEND

(1X) SUBAREA

➡ DESIGN POINT

OVERALL HYDROLOGY
DESIGN POINT #1

EXCEEDENCE INTERVAL (YEARS)	PEAK FLOW (CFS) EXISTING	DEVELOPED
10	0.98	1.10
50	1.72	1.62
100	2.14	2.04

REFER TO FIGURE #2

SUB-BASIN HYDROLOGY

ITEM	WATERSHED	AREA, (ACRES)	EXCEEDENCE INTERVAL	Q (cfs)
SWALE 1A	1A	0.86	50 YEARS	0.56
SWALE 1B, 1C	1A+1B	1.48	50 YEARS	1.03
SWALE 1D	1C	0.18	50 YEARS	0.19
12" RCP CULVERT	1C	0.18	100 YEARS	0.24
SWALE 2A	2A	0.20	50 YEARS	0.16
SWALE 2B	2A+2B	0.39	50 YEARS	0.36
15" CMP CULVERT	2A+2B	0.39	100 YEARS	0.45
SWALE 3	2A+2B+3	0.50	50 YEARS	0.38
SWALE 4	4	0.05	50 YEARS	0.06
12" CMP SD	1A,1B,1C,5A,5B	1.80	50 YEARS	1.42
INFILTRATION TRENCH	6	0.34	20 YEARS	0.27

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JOB NO. 02054.01
DESIGNED BY DCP
DRAWN BY CWM

SHEET 3 OF 3

MAIN STREET AFFORDABLE HOUSING PROJECT #5
HYDROLOGY MAP 3

MAMMOTH 100% CONSTRUCTION DOCUMENTS CALIFORNIA

PLANNERS • ENGINEERS • LANDSCAPE ARCHITECTS
SURVEYORS • CONSTRUCTION INSPECTION
1150 CORPORATE BLVD. RENO, NV 89502
(775) 856-1150 FAX: (775) 856-1160

STATUS OF PLANS

- ☐ PRELIMINARY DATE:
- ☒ INITIAL SUBMITTAL DATE: 2/18/03
- ☒ FINAL SUBMITTAL DATE: 3/11/03

PLANS ARE PRELIMINARY AND SUBJECT TO CHANGE UNTIL STAMPED AND SIGNED APPROVED BY ALL APPROPRIATE GOVERNING AGENCIES.

DATE	MARK	REVISIONS	BY

MAIN STREET AFFORDABLE HOUSING

TECHNICAL APPENDIX

FOR

DRAINAGE REPORT

AUGUST 16, 2002

CFA, Inc.
Prepared By: CWM, DCP

RATIONAL METHOD CALCULATIONS

TABLE 3
STORM DRAINAGE PEAK FLOW CALCULATION FORM

Design Point	Watershed	Season	Area, acres	Exceedence interval, years	t_c[A], hours	Design Precipitation[B] inch	Design Precipitation[B] i, in/hr	Runoff Coefficient: Natural[C] RF[D]	RR	NF	C_n	Natural %/100	Roofs C_{roof}	Roof %/100	Paved C_{paved}	Paved %/100	Other C_{other}	Other %/100	C	Q=1.008 x CiA (cfs)
Point	EXISTING	Winter	2.40	10	1.0	0.88	0.88	0.35	0.85	1	0.30	0.77	0.9	0.03	0.9	0.20			0.44	0.928
#1		Summer	2.40	10	0.39	0.49	1.26	0.18	0.85	1	0.15	0.77	0.9	0.03	0.9	0.20			0.32	**0.977**
Point	EXISTING	Winter	2.40	50	1.0	1.2	1.20	0.59	0.85	1	0.50	0.77	0.9	0.03	0.9	0.20			0.59	**1.722**
#1		Summer	2.40	50	0.39	0.50	1.28	0.22	0.85	1	0.19	0.77	0.9	0.03	0.9	0.20			0.35	1.089
Point	EXISTING	Winter	2.40	100	1.0	1.4	1.40	0.65	0.85	1	0.55	0.77	0.9	0.03	0.9	0.20			0.63	**2.142**
#1		Summer	2.40	100	0.39	0.82	2.10	0.30	0.85	1	0.26	0.77	0.9	0.03	0.9	0.20			0.40	2.052
Ditch	1A	Winter	0.857	50	0.93	1.1	1.18	0.59	0.82	1	0.48	0.58	0.9	0.07	0.9	0.07	0.50	0.27	0.55	**0.561**
		Summer	0.857	50	0.32	0.52	1.63	0.22	0.82	1	0.18	0.58	0.9	0.07	0.9	0.07	0.50	0.27	0.37	0.525
Ditch	1A & 1B	Winter	1.48	50	0.94	1.1	1.17	0.59	0.88	1	0.52	0.59	0.9	0.06	0.9	0.14	0.50	0.21	0.59	**1.033**
(1C)		Summer	1.48	50	0.33	0.52	1.58	0.22	0.88	1	0.19	0.59	0.9	0.06	0.9	0.14	0.50	0.21	0.40	0.936
Ditch	1C	Winter	0.183	50	0.85	1.05	1.24	0.59	0.98	1	0.58	0.35			0.9	0.45	0.50	0.20	0.71	0.161
(1D)		Summer	0.183	50	0.25	0.45	1.80	0.22	0.98	1	0.22	0.35			0.9	0.45	0.50	0.20	0.58	**0.193**
Culvert 12"	1C	Winter	0.183	100	0.85	1.2	1.41	0.65	0.98	1	0.64	0.35			0.9	0.45	0.50	0.20	0.73	0.190
(RCP)		Summer	0.183	100	0.25	0.53	2.12	0.30	0.98	1	0.29	0.35			0.9	0.45	0.50	0.20	0.61	**0.238**
Ditch	2A	Winter	0.198	50	0.86	1.05	1.22	0.59	0.91	1	0.54	0.69	0.9	0.31					0.65	**0.158**
		Summer	0.198	50	0.25	0.45	1.80	0.22	0.91	1	0.20	0.69	0.9	0.31					0.42	0.150
Ditch	2A & 2B	Winter	0.392	50	0.87	1.05	1.21	0.59	0.88	1	0.52	0.47	0.9	0.37			0.50	0.16	0.66	0.313
		Summer	0.392	50	0.25	0.45	1.80	0.22	0.88	1	0.19	0.47	0.9	0.37			0.50	0.16	0.50	**0.358**
Culvert 15"	2A & 2B	Winter	0.392	100	0.87	1.25	1.44	0.65	0.88	1	0.57	0.47	0.9	0.37			0.50	0.16	0.68	0.387
		Summer	0.392	100	0.25	0.53	2.12	0.30	0.88	1	0.26	0.47	0.9	0.37			0.50	0.16	0.54	**0.450**
Ditch	2A, 2B & 3	Winter	0.499	50	0.86	1.05	1.22	0.59	0.88	1	0.52	0.43	0.9	0.16			0.50	0.38	0.56	0.342
		Summer	0.499	50	0.25	0.45	1.80	0.22	0.88	1	0.19	0.43	0.9	0.16			0.50	0.38	0.42	**0.378**
Ditch	4	Winter	0.052	50	0.81	1.0	1.23										0.65	1.00	0.65	0.042
		Summer	0.052	50	0.25	0.45	1.80										0.65	1.00	0.65	**0.061**
Ditch	5A & 5B	Winter	0.140	50	0.87	1.1	1.26						0.9	0.40	0.9	0.10	0.50	0.54	0.72	0.128
		Summer	0.140	50	0.25	0.45	1.80						0.9	0.40	0.9	0.10	0.50	0.54	0.72	**0.182**
Storm Drain	1A, 1B, 1C, & 5A, 5B	Winter	1.80	50	0.94	1.2	1.28	Weighted average of C-values for 1A, 1B, 1C, & 5A, 5B											0.61	**1.420**
		Summer	1.80	50	0.33	0.52	1.58												0.44	1.262
Retention	6	Winter	0.338	20	1	0.93	0.93								0.9	0.90	0.50	0.10	0.86	**0.272**
		Summer	0.338	20	1	0.86	0.86								0.9	0.90	0.50	0.10	0.86	0.252
Point	DEVELOPED[E]	Winter	2.33	10	0.93	0.72	0.77	0.35	0.89	1	0.31	0.50	0.9	0.09	0.9	0.10	0.50	0.31	0.48	0.878
#1		Summer	2.33	10	0.34	0.39	1.15	0.18	0.89	1	0.16	0.50	0.9	0.09	0.9	0.10	0.50	0.31	0.41	**1.097**
Point	DEVELOPED[E]	Winter	2.33	50	0.93	1.05	1.13	0.59	0.89	1	0.53	0.50	0.9	0.09	0.9	0.10	0.50	0.31	0.59	1.564
#1		Summer	2.33	50	0.34	0.55	1.62	0.22	0.89	1	0.20	0.50	0.9	0.09	0.9	0.10	0.50	0.31	0.43	**1.615**
Point	DEVELOPED[E]	Winter	2.33	100	0.93	1.25	1.34	0.65	0.89	1	0.58	0.50	0.9	0.09	0.9	0.10	0.50	0.31	0.62	1.946
#1		Summer	2.33	100	0.34	0.64	1.88	0.30	0.89	1	0.27	0.50	0.9	0.09	0.9	0.10	0.50	0.31	0.46	**2.037**

FOOTNOTES:

A See Table 4

B See Figures 1-4 and 1-5 (Design Manual, Mammoth Lakes Storm Drainage and Erosion Conrol, July 1984)

C See Figure 1-6 (Design Manual, Mammoth Lakes Storm Drainage and Erosion Conrol, July 1984)

D One-hour precipitation values (inches): 10(W,S) = 0.72, 0.71
50(W,S) = 1.15, 1.05
100(W,S) = 1.35, 1.20

E Developed watershed area to be released as overland flow includes sub-areas 1A, 1B, 2A, 2B, 3, 4A, 4B, 5A, AND 5,B. Sub-area 6 will be retained.

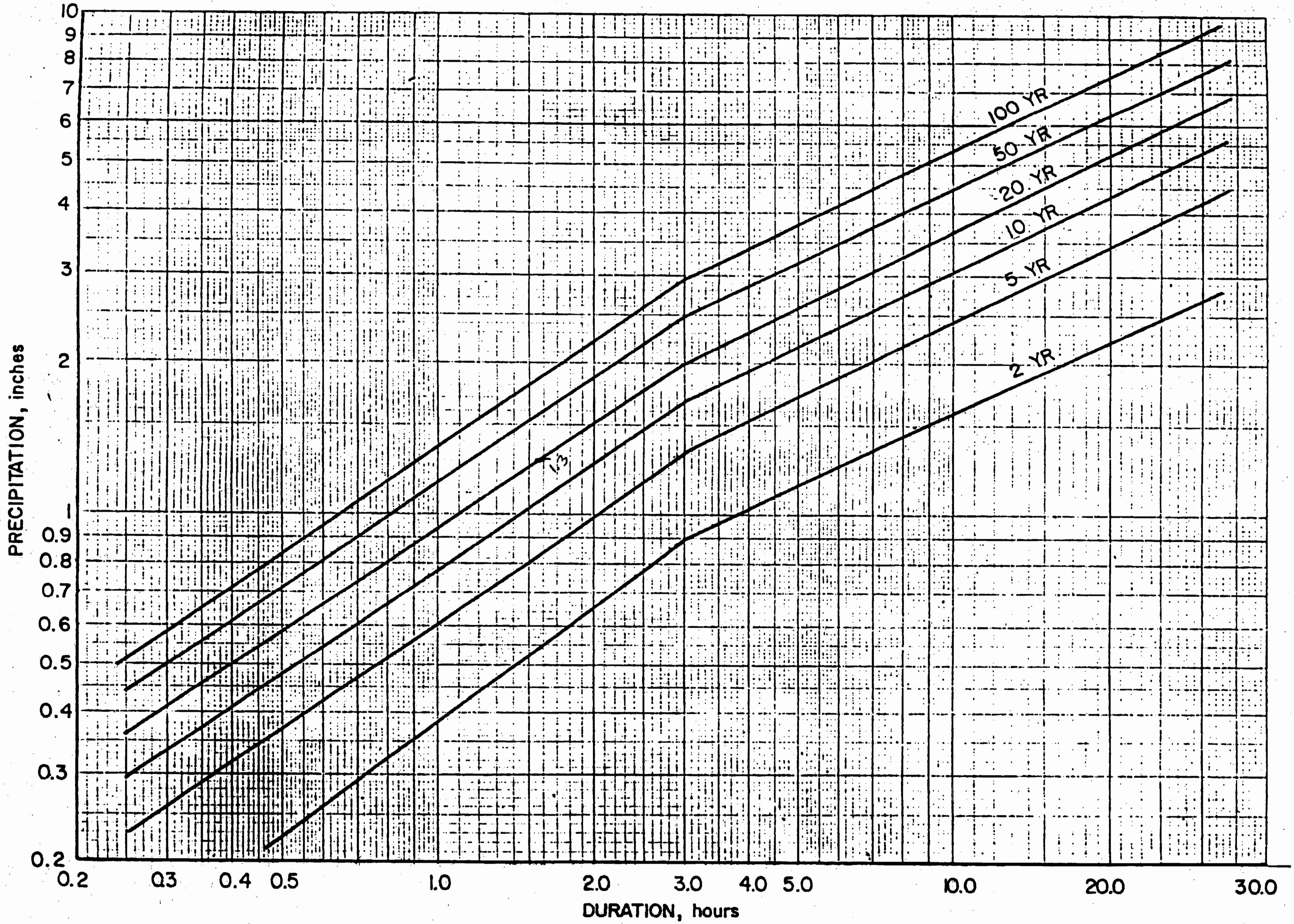


Figure 1-4 Winter Precipitation Design Curve

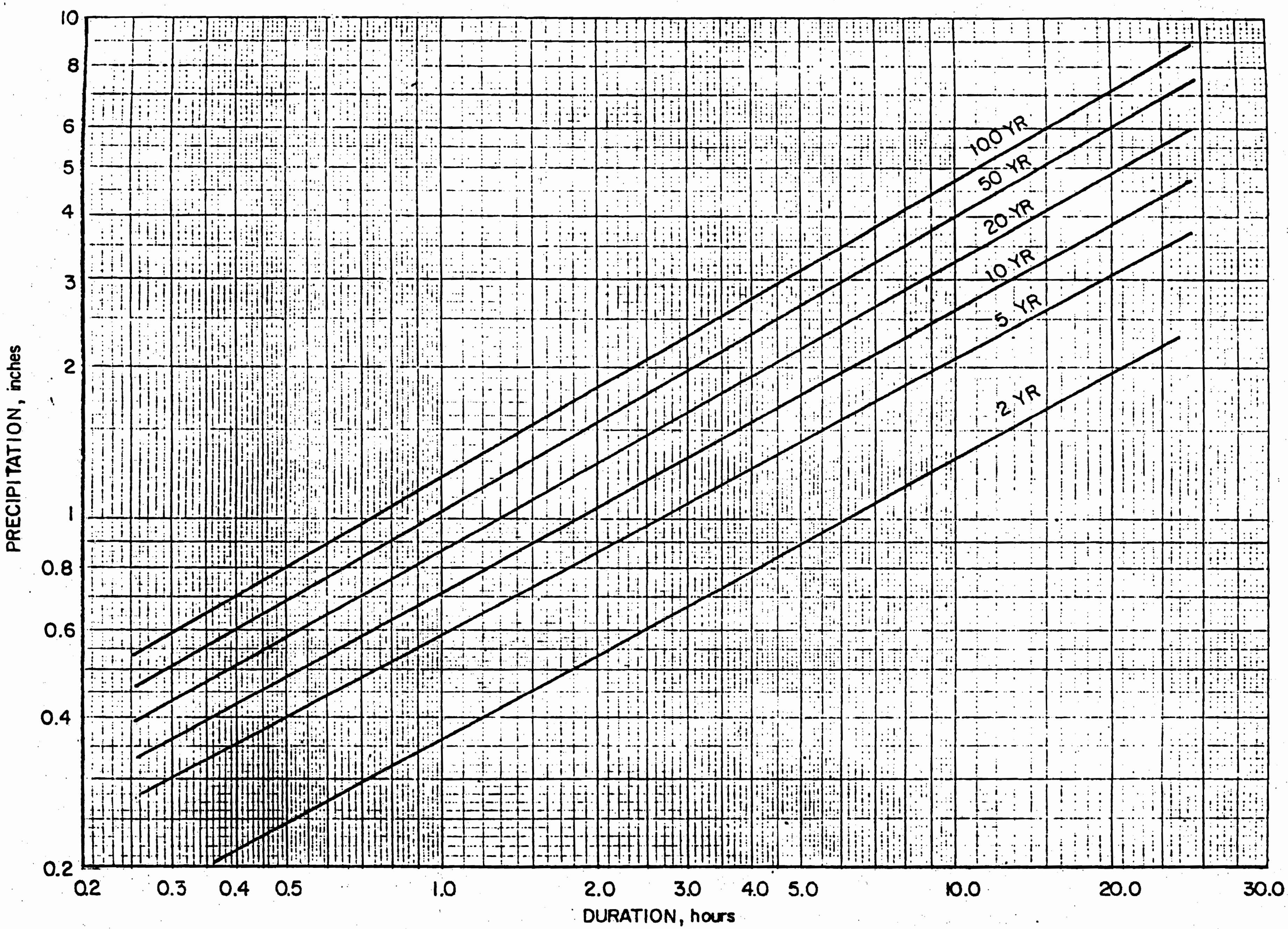


Figure I-5 Summer Precipitation Design Curve

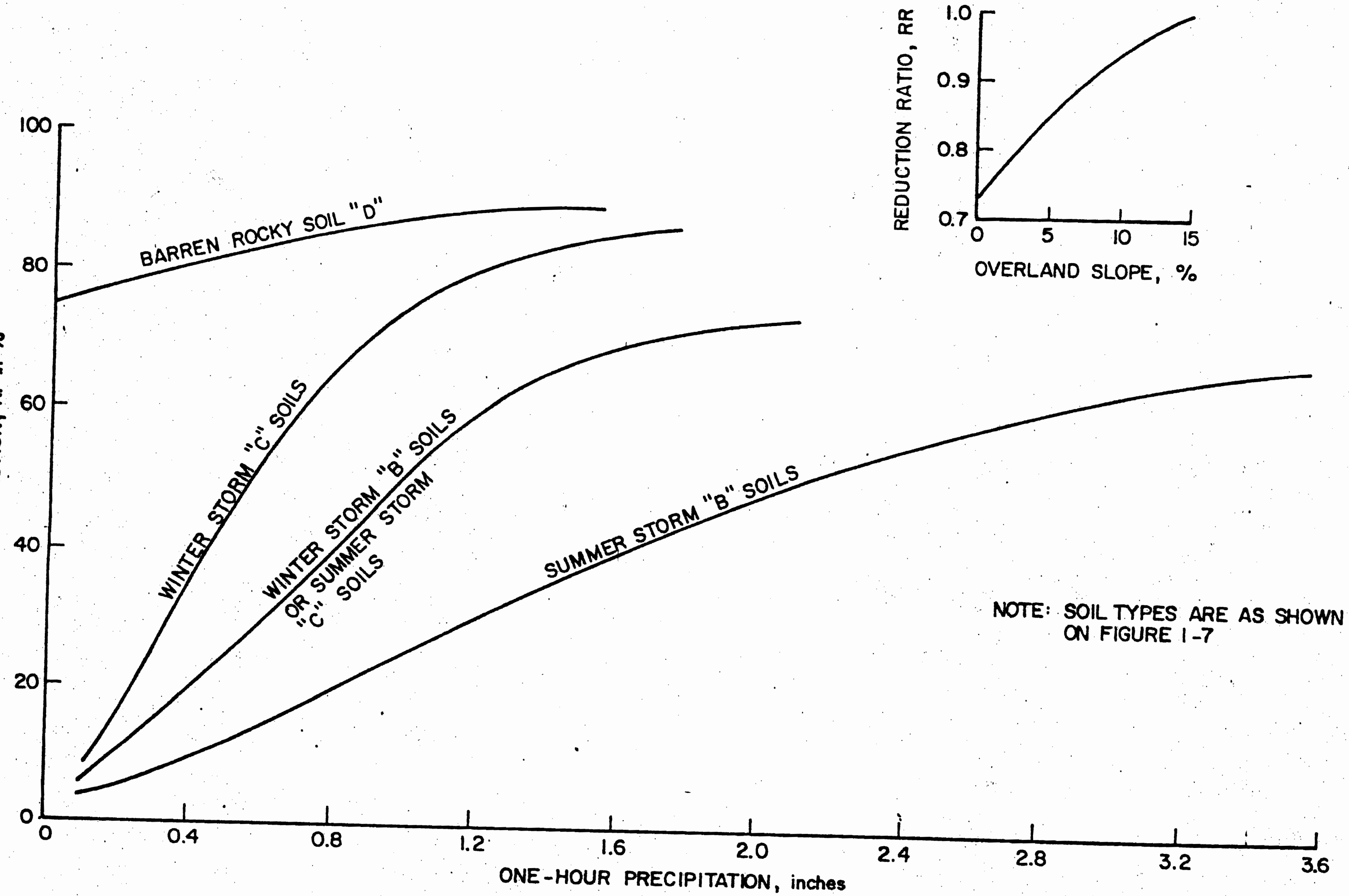


Figure I-6 Natural Area Runoff Factor, RF, and Reduction Ratio, RR

RATIONAL METHOD

TIME OF CONCENTRATION

TABLE 4
WATERSHED TIME OF CONCENTRATION FORM

Watershed	Season	Area, acres	Exceedence interval, years	Overland Flow: Unpaved Area L_o, feet	Unpaved Area S_o, ft/ft	Unpaved Area $t_{co}{}^A$, hours	Paved Area L_o, feet	Paved Area S_o, ft/ft	Paved Area $t_{co}{}^A$, hours	Total t_{co}, hours	Channel Flow: Channel L_c, feet	Channel S_c, ft/ft	Channel $t_{cc}{}^{B,C}$, hours	Pipe L_c, feet	Pipe S_c, ft/ft	Pipe t_{cc}, hours	Total t_{cc}, hours	Total t_c, hours	
EXISTING	Winter	2.40	10,50,100	300	0.055	0.98				0.98	190	0.115	0.02				0.02	1.0	
	Summer	2.40	10,50,100	300	0.055	0.37				0.37	190	0.115	0.02				0.02	0.39	
1A	Winter	0.857	50	245	0.078	0.92	75	0.05	0.01	0.93								0.93	
	Summer	0.857	50	245	0.078	0.31	75	0.05	0.01	0.32								0.32	
1A & 1B	Winter	1.48	50	245	0.078	0.92	75	0.05	0.01	0.93	120	0.117	0.01				0.01	0.94	
	Summer	1.48	50	245	0.078	0.31	75	0.05	0.01	0.32	120	0.117	0.01				0.01	0.33	
1C	Winter	0.183	50,100	150	0.133	0.84				0.84				30	0.005	0.01	0.01	0.85	
	Summer	0.183	50,100	150	0.133	0.23				0.23				30	0.005	0.01	0.01	0.24	Use .25[D]
1A, 1B, & 1C	Winter	1.66	50	245	0.078	0.92	75	0.05	0.01	0.93	120	0.117	0.01				0.01	0.94	
	Summer	1.66	50	245	0.078	0.31	75	0.05	0.01	0.32	120	0.117	0.01				0.01	0.33	
2A	Winter	0.198	50	135	0.104	0.86				0.86								0.86	
	Summer	0.198	50	135	0.104	0.24				0.24								0.24	Use .25[D]
2A & 2B	Winter	0.392	50,100	135	0.104	0.86				0.86	120	0.073	0.01				0.01	0.87	
	Summer	0.392	50,100	135	0.104	0.24				0.24	120	0.073	0.01				0.01	0.25	
2A, 2B & 3	Winter	0.499	50	135	0.104	0.86				0.86	210	0.074	0.01	76	0.027	0.01	0.02	0.88	
	Summer	0.499	50	135	0.104	0.24				0.24	210	0.074	0.01	76	0.027	0.01	0.02	0.26	
4	Winter	0.052	50	90	0.111	0.80				0.8	35	0.005	0.01				0.01	0.81	
	Summer	0.052	50	90	0.111	0.21				0.21	35	0.005	0.01				0.01	0.22	Use .25[D]
5A & 5B	Winter	0.140	50	75	0.054	0.86				0.86				50	0.05	0.01	0.01	0.87	
	Summer	0.140	50	75	0.054	0.24				0.24				50	0.05	0.01	0.01	0.25	
1A, 1B, 1C, & 5A, 5B	Winter	1.80	50	245	0.078	0.90	75	0.05	0.01	0.91	120	0.117	0.01				0.01	0.94	
	Summer	1.80	50	245	0.078	0.31	75	0.05	0.01	0.32	120	0.117	0.01				0.01	0.33	
6	Winter	0.338	20															1[E]	
	Summer	0.338	20															1[E]	
TOTAL[F]	Winter	2.33	10,50,100	245	0.078	0.90	75	0.05	0.01	0.91	120	0.117	0.01	108	0.031	0.01	0.02	0.93	
DEVELOPED	Summer	2.33	10,50,100	245	0.078	0.31	75	0.05	0.01	0.32	120	0.117	0.01	108	0.031	0.01	0.02	0.34	

FOOTNOTES:
- A Figure 1-2 (Design Manual, Mammoth Lakes Storm Drainage and Erosion Control, July 1984)
- B Figure 1-3 (Design Manual, Mammoth Lakes Storm Drainage and Erosion Control, July 1984)
- C Figure 701 (Washoe County Hydrologic Criteria and Drainage Design Manual)
- D For a minimum Tc use 0.25. (Page 1-4, Design Manual, Mammoth Lakes Storm Drainage and Erosion Control, July 1984)
- E Watershed 6 shall be retained and the design volume is for the 20 year 1 hour storm. (Page 1-2, Design Manual, Mammoth Lakes Storm Drainage and Erosion Control, July 1984)
- F The total developed watershed is 2.67 acres; however, 0.32 acres will be retained so the total drainage area to be released down stream is 2.33 acres (2.67-0.34).

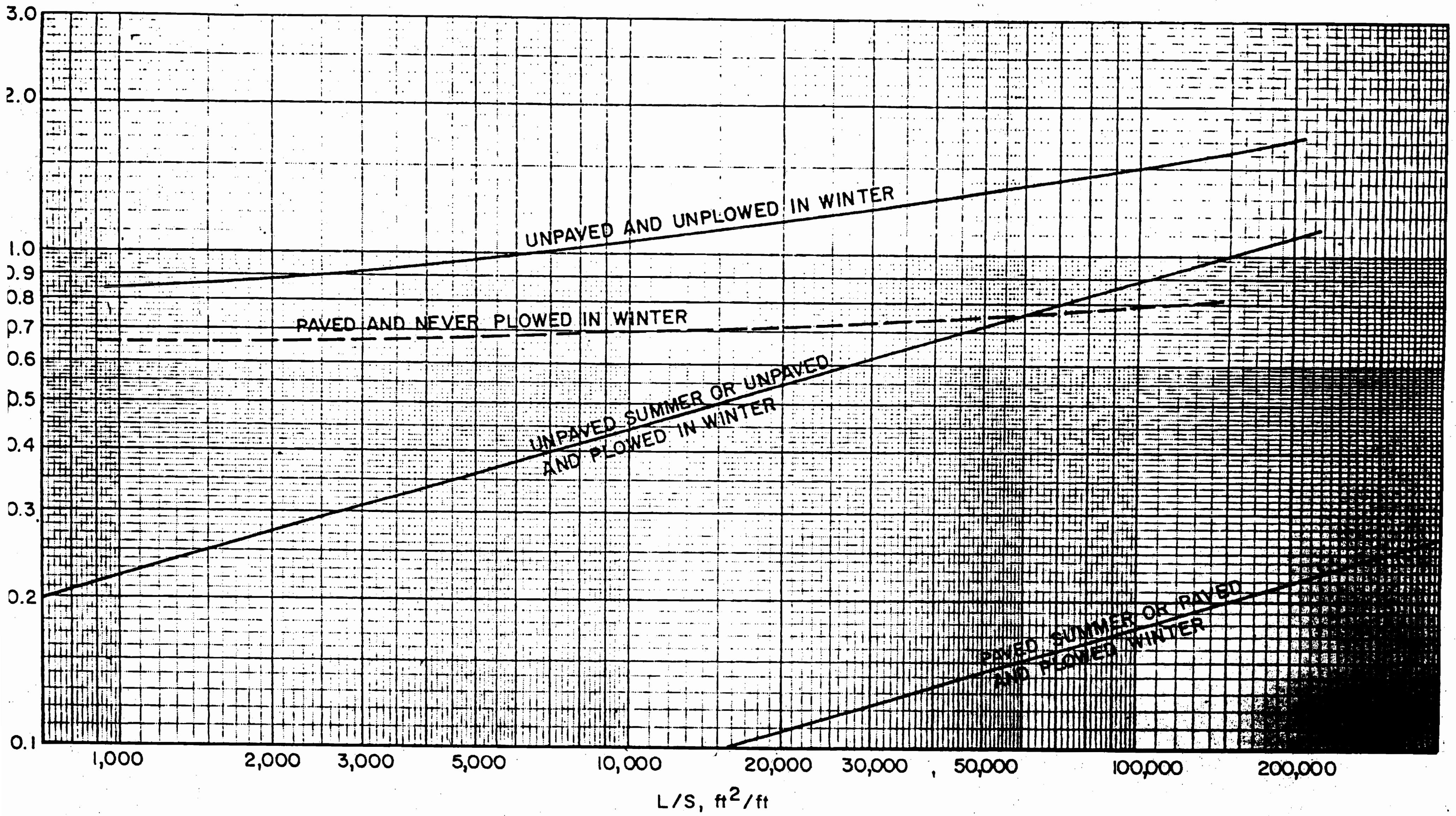


Figure 1-2 Overland Flow tc Component, tco

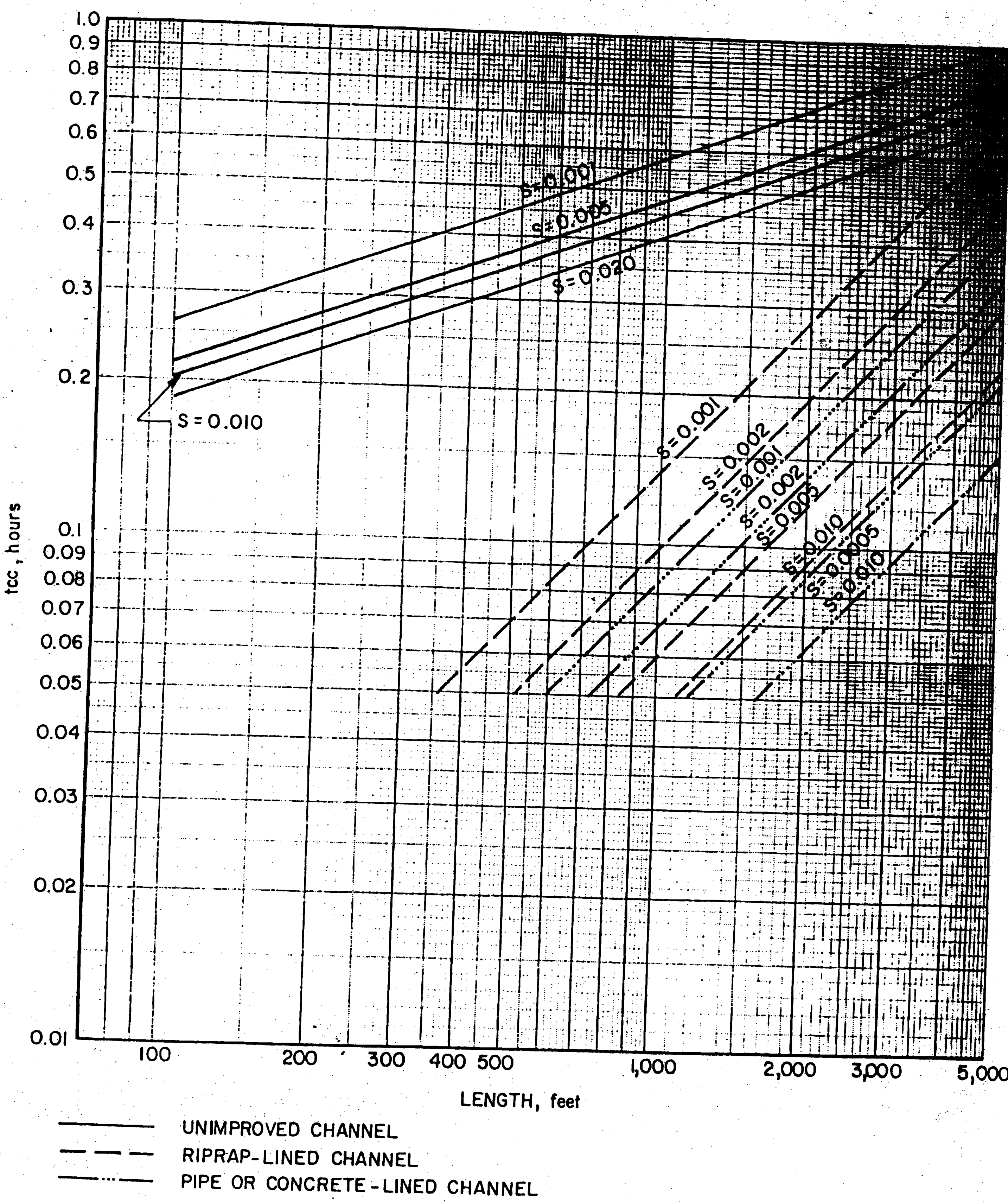
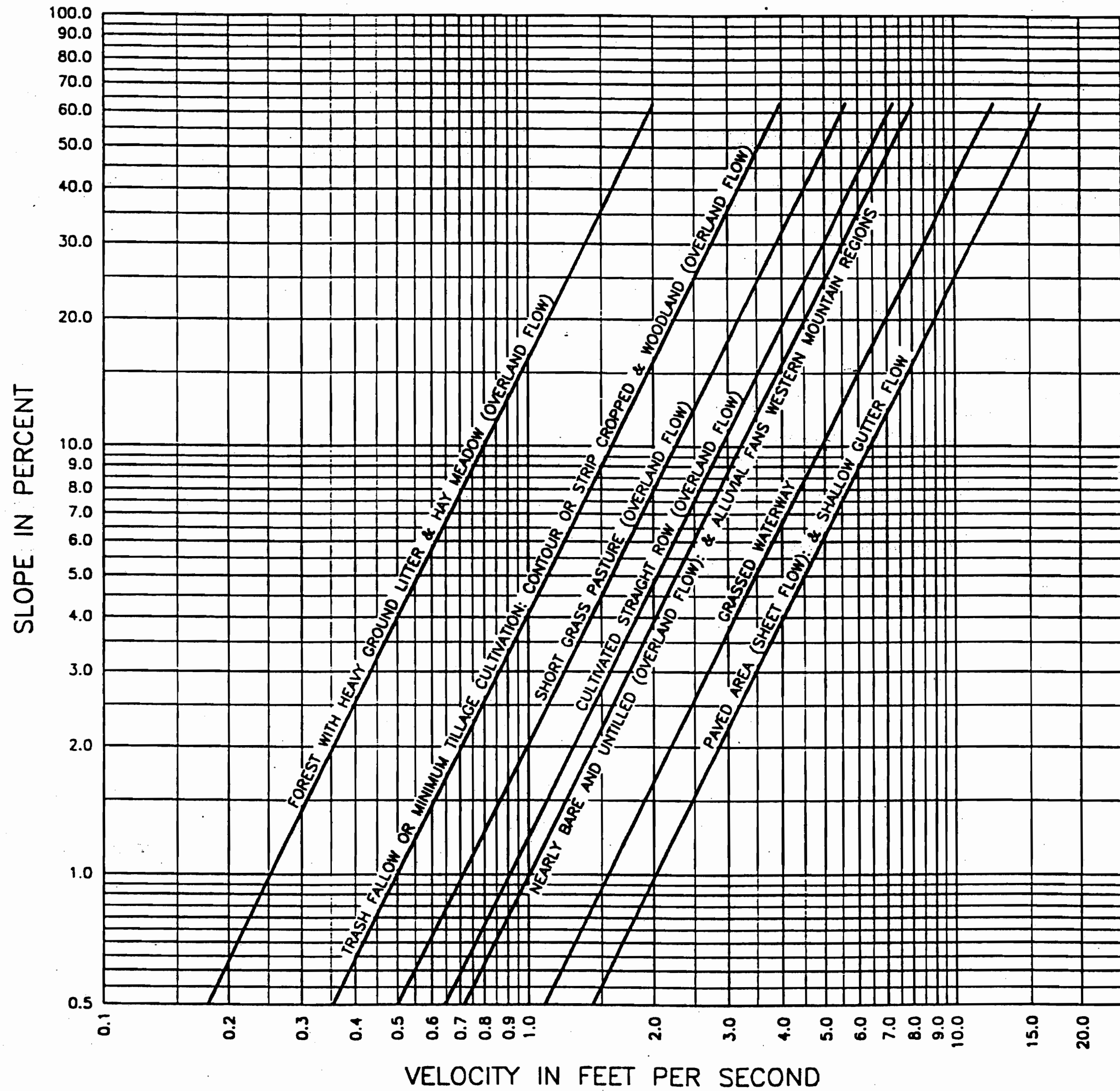


Figure 1-3 Channel Flow tc Component, tcc

TRAVEL TIME VELOCITY

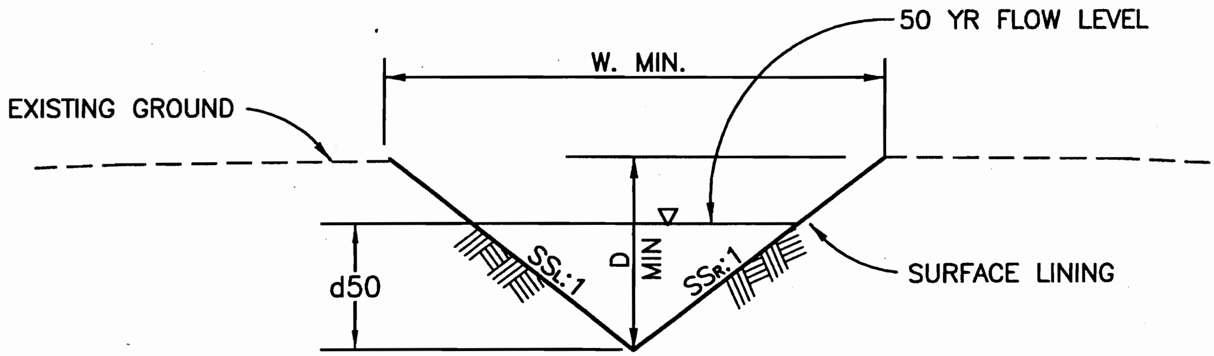


CALCULATIONS
AND
DETAILS

SWALE SECTION	SLOPE[1] %	n-VALUE[4]	Q_{50} (CFS)	V_{50} (FPS)	d_{50} (FT)	D[3] (FT)	W[3] (FT)	SS_L:1 (FT)	SS_R:1 (FT)	SURFACE[2] LINING
1A	1.0	0.040	0.56	1.03	0.30	0.5	11	2.0	10.0	REVEGATATION
1B	13.0	0.040	1.03	3.56	0.29	1.0	7.0	2.0	5.0	RIP-RAP
1C	7.0	0.040	1.03	2.82	0.32	1.0	4.0	2.0	2.0	RIP-RAP
1D	1.0	0.040	0.19	0.99	0.31	1.0	4.0	2.0	2.0	REVEGATATION
2A	1.0	0.040	0.16	0.95	0.29	0.5	11	2.0	2.0	REVEGATATION
2B	0.5	0.040	0.36	0.90	0.45	1.0	4.0	2.0	2.0	REVEGETATION
3	7.8	0.040	0.38	2.55	0.27	1.0	4.0	2.0	2.0	RIP-RAP
3	0.5	0.040	0.38	0.91	0.46	1.0	4.0	2.0	2.0	REVEGETATION
4	0.5	0.040	0.06	0.57	0.23	1.0	4.0	2.0	2.0	REVEGETATION

NOTES

1. SLOPES MAY VARY. REFER TO GRADING PLAN
2. SURFACE LINING MAY VARY. REFER TO GRADING PLAN.
3. DEPTH AND WIDTH ARE MINIMUM DIMENSIONS.
4. REFERENCE MAMMOTH DESIGN MANUAL, PAGE 2-13.
5. 10% (10:1) MIN CROSS SLOPE FOR SWALE 1A.



LOOKING DOWNSTREAM

FIGURE 4
DITCHES
MAIN STREET AFFORDABLE HOUSING

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Infiltration Sizing Calculations

Volume Calculation:

Area =	14726	sf
Surface Type =	pavement	
Percent Impervious =	90	%
Rainfall Intensity =	0.083	ft/hr

Runoff Volume = (area) x (Intensity in 1 hour) x (Percent Impervious)
= **1100 cf**

Infiltration Size:

Type =	**Trench**	
Length (L) =	**178**	**ft**
Width (W) =	**2.5**	**ft**
Depth (D) =	**4.75**	**ft**

Percolation Rate =	5	in/hr	(moderate)
Percent of Voids =	33.33	%	

Equation: Capacity = perc[(L x W) + 2(L x D)/3] + (W x D x L)/3
= **1124.9 cf**

Footnotes:

1. The surface type is pavement.
2. The 20 year 1 hour storm needs to be retained per Lahontan Regional Water Quality Control Board. The design intensity per Lahontan RWQB is 1.0 in/hr (0.083 ft/hr)

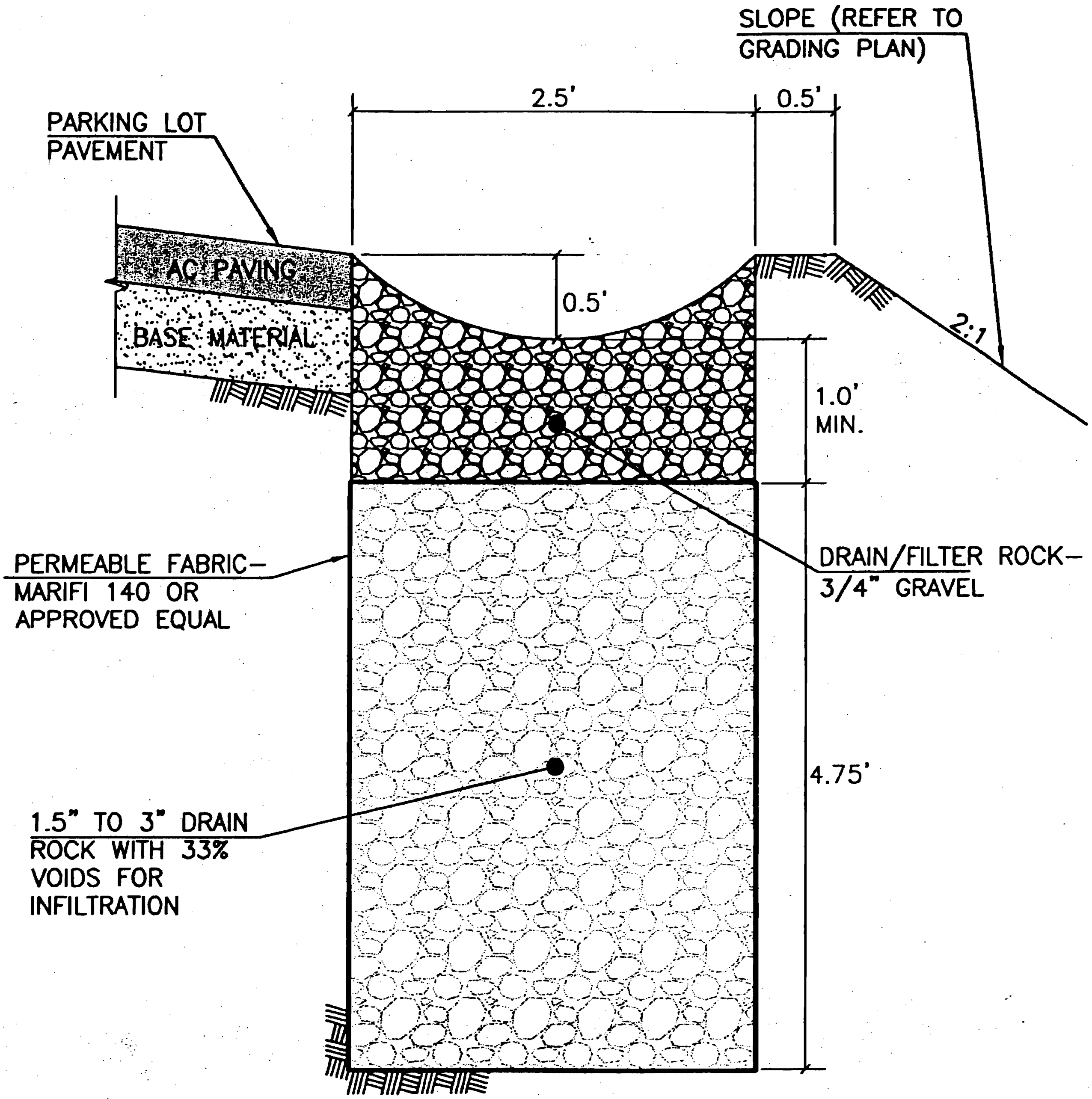

FIGURE 5

INFILTRATION TRENCH

MAIN STREET AFFORDABLE HOUSING

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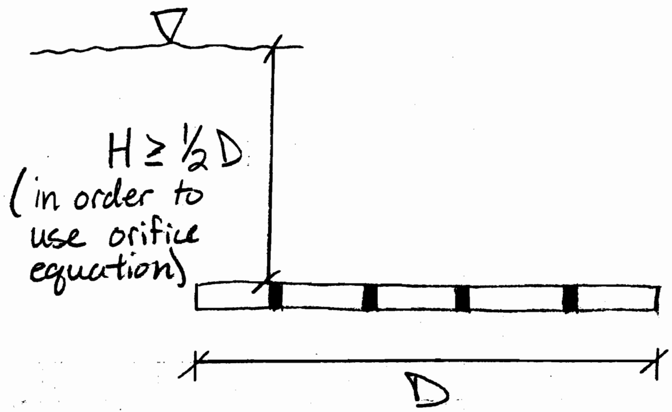
Catch Basin Capacity

Orifice Equation $= CA(2gH)^{0.5}$

C = Coef = 0.6
A = Opening Sqft
g = 32.2 ft/s²
H = Head, ft
(reference grading plan)



⇒ H = 1.04 ft (DI #4) (This is the minimum head found on all 4 drop inlets)

Inlet Diameter = 12"

Grate = Neenah R-4380-8 (or approved equal)
Opening = 0.3 ft²

Calculation ∴ $(0.6)(0.3)[2(32.2)(1.04)]^{0.5}$
$= 1.47$ cfs (no clogging)

With a 30% clogging factor the minimum capacity is
$Q = 1.03$ cfs

⇒ H = 3.30 ft (DI #1)

∴ $(0.6)(0.3)[2(32.2)(3.30)]^{0.5}$
$= 2.62$ cfs
$2.62(0.70)$

$Q = 1.83$ cfs

The calculated peak flow at DI #1 is 1.22 cfs

Hydrology Report

For

The Cabins at Crooked Pines

Town of Mammoth Lakes,
California

Prepared By:
CFA, Inc.
1150 Corporate Blvd.
Reno, NV 89502
(775) 856-1150

July, 2003

INTRODUCTION

This report presents the hydrologic calculations for the proposed improvements of The Cabins at Crooked Pines condominium project. The purpose of this study is to calculate storm water flows for the existing and the developed conditions to evaluate the proposed drainage system.

SITE DESCRIPTION

The Cabins site is approximately two acres and has an Assessor's Parcel Number of 33-360-11. The site is located on Lodestar Drive, which bounds the site on its west parcel line. Private properties bound the site on the north and south and the Sierra Star golf course bounds the site on the east (Refer to the Vicinity Map, Figure 1). The groundcover consists of pine trees, low grasses, and pine needles.

PROJECT DESCRIPTION

The proposed improvements for the project include four 3-story town homes with 6 units per building and an underground parking garage. The underground parking is located below 3 of the 4 town homes. Other improvements around the site include a spa, barbecue and fire pit, and walking paths.

EXISTING DRAINAGE

The site drains toward the north and east. Overland drainage to the north is collected in a swale that carries storm flows to an existing 36" storm drain. The flows are then piped under the golf course to the east. Overland drainage to the east drains directly onto the golf course. There is an existing asphalt parking area located in the southwest corner of the site. Drainage from this area is collected in an existing drop inlet and then transported through storm drain to a dry well located in the northeast corner of the site. The drainage from the parking lot is combined with flows from Lodestar Drive. Refer to Figure 2 for a display of the existing drainage pattern.

PROPOSED DRAINAGE

The overall drainage for The Cabins site utilizes drop inlets, swales, and grading to direct flows away from structures. The proposed drainage system was designed to resemble the natural drainage pattern. Approximately one third of the developed area will be collected in a storm drain system and transported to a proposed dry well located in the northeast section of the site. This area includes the paved driveway, roofs, paths and landscaped areas. Calculations for the dry well can be found in the technical appendix. Proposed Basin 1 drains non-concentrated overland flows to the golf course. This basin resembles Existing Basin 1 on Figure 2. Proposed Basin 2 drains to the existing swale on the north property line of the site and the flows are transported to the existing 36" pipe mentioned in the Existing Drainage section of this report. Refer to Figure 3 for a display of the proposed drainage.

Overall storm water peak flows were calculated for the exceedence interval storms of 10 and 100 years. The calculated existing and developed condition peak flows for these storm intervals are shown in Table 1. The developed basin areas do not sum up to the existing drainage area because the portion of the site that is infiltrated is not release as overland flow. The peak flow calculations indicate all decreases and one negligible increase in storm flows that are released from the site.

HYDROLOGY AND HYDRAULICS

Mammoth Lakes Storm Drainage and Erosion Control Design Manual was used for design guidelines and calculation methods in this project. Approximate peak flows were calculated using the rational method that was presented in the design manual. Storm drain, drop inlets, and ditches were all designed using the exceedence intervals found in the manual. The infiltration trench was designed in accordance to the design manual and Lahontan Regional Water Quality Control Board (LRWQB) design guidelines. Refer to the appendix for all calculations and details.

EROSION AND SEDIMENTATION CONTROL

Erosion control and storm water treatment measures are in place through out this project. Riprap and rock cobble are placed in areas of possible erosion. The dry well treats storm runoff from the paved driveway and roofed areas. For a more detail description of the erosion control and storm water treatment measures for this project refer to the Storm Water Pollution Prevention Plan.

CONCLUSIONS

Based on the peak flow calculations presented in this hydrologic analysis, it appears that the Cabins at Crooked Pines project can be developed as planned without adverse impacts to downstream properties with respect to storm drainage.

REFERENCES

Drainage Study of Crooked Pines Lot 1, Tract Map 36-200, Triad/Holmes Associates, August 2001.

Mammoth Lakes Storm Drainage and Erosion Control Design Manual, Brown & Caldwell and Triad Engineering, July 1984.

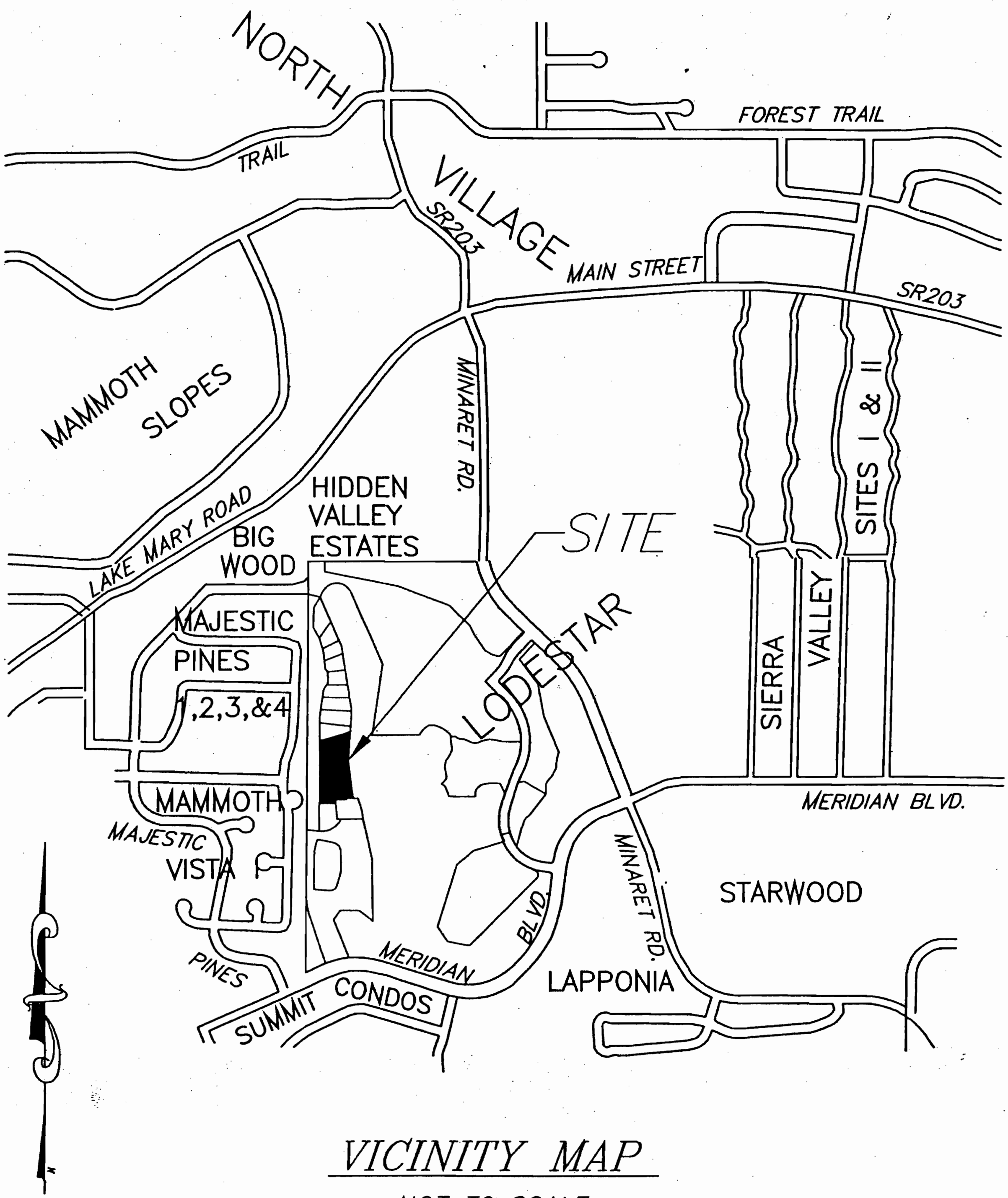
Storm Drainage Master Plan Report, Town of Mammoth Lakes, Kennedy/Jenks/Chilton, September 1990.

Washoe County Urban Stormwater Management Program Volume IV, CH2M Hill, Robert Pitt, Cooper and Associates Inc, Consulting Engineering Services Inc., June 1983

TABLE 1

OVERALL HYDROLOGY RESULTS

Sub-area	Exceedence Interval	Peak Flow (cfs)
Existing 1	10	0.12
Proposed 1	10	0.15
Existing 2	10	0.35
Proposed 2	10	0.33
Existing 1	100	0.36
Proposed 1	100	0.33
Existing 2	100	1.10
Proposed 2	100	0.65



VICINITY MAP

NOT TO SCALE

FIGURE 1

VICINITY MAP

THE CABINS AT CROOKED PINES

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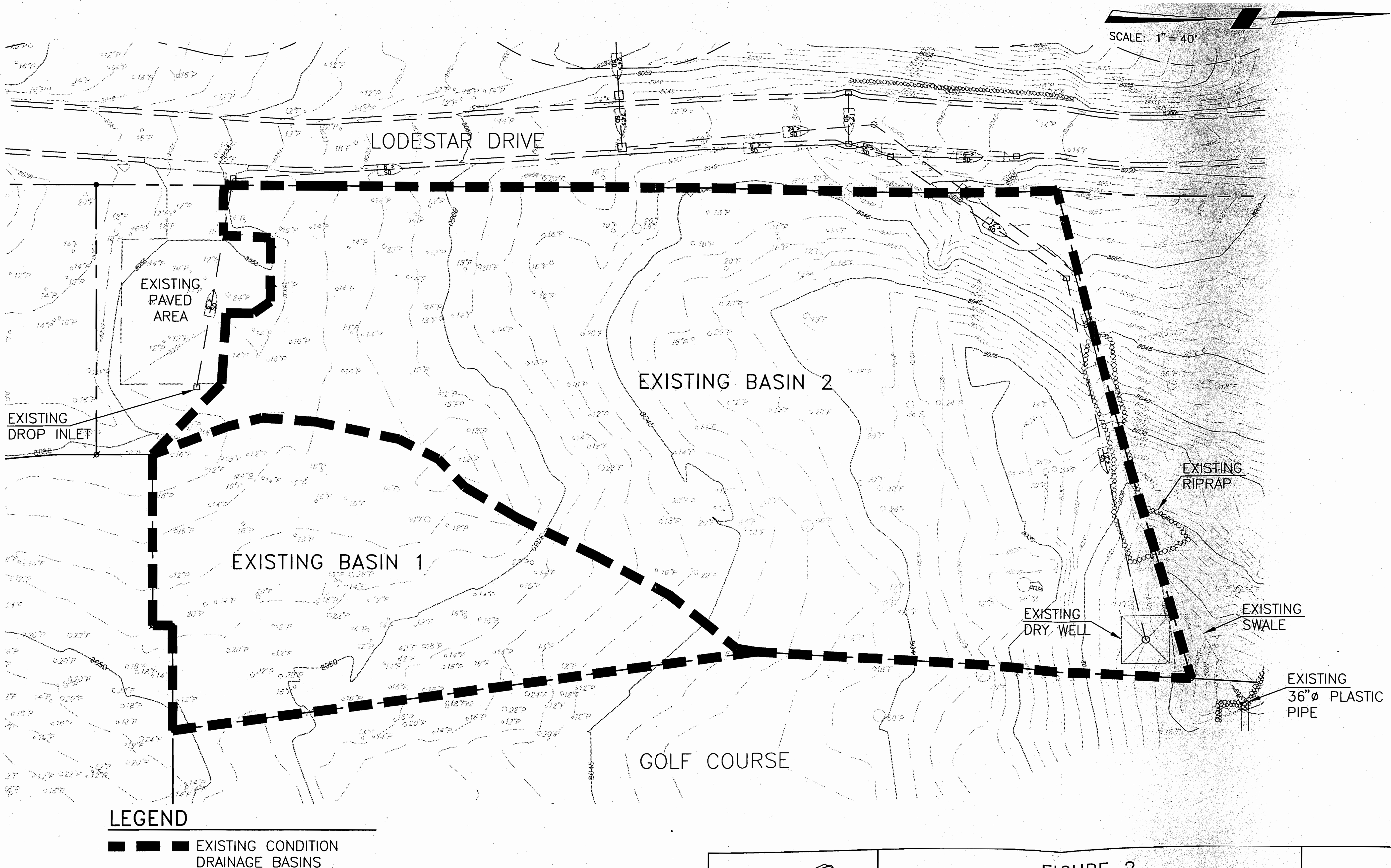

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FIGURE 2
EXISTING CONDITIONS HYDROLOGY MAP
THE CABINS at CROOKED PINES

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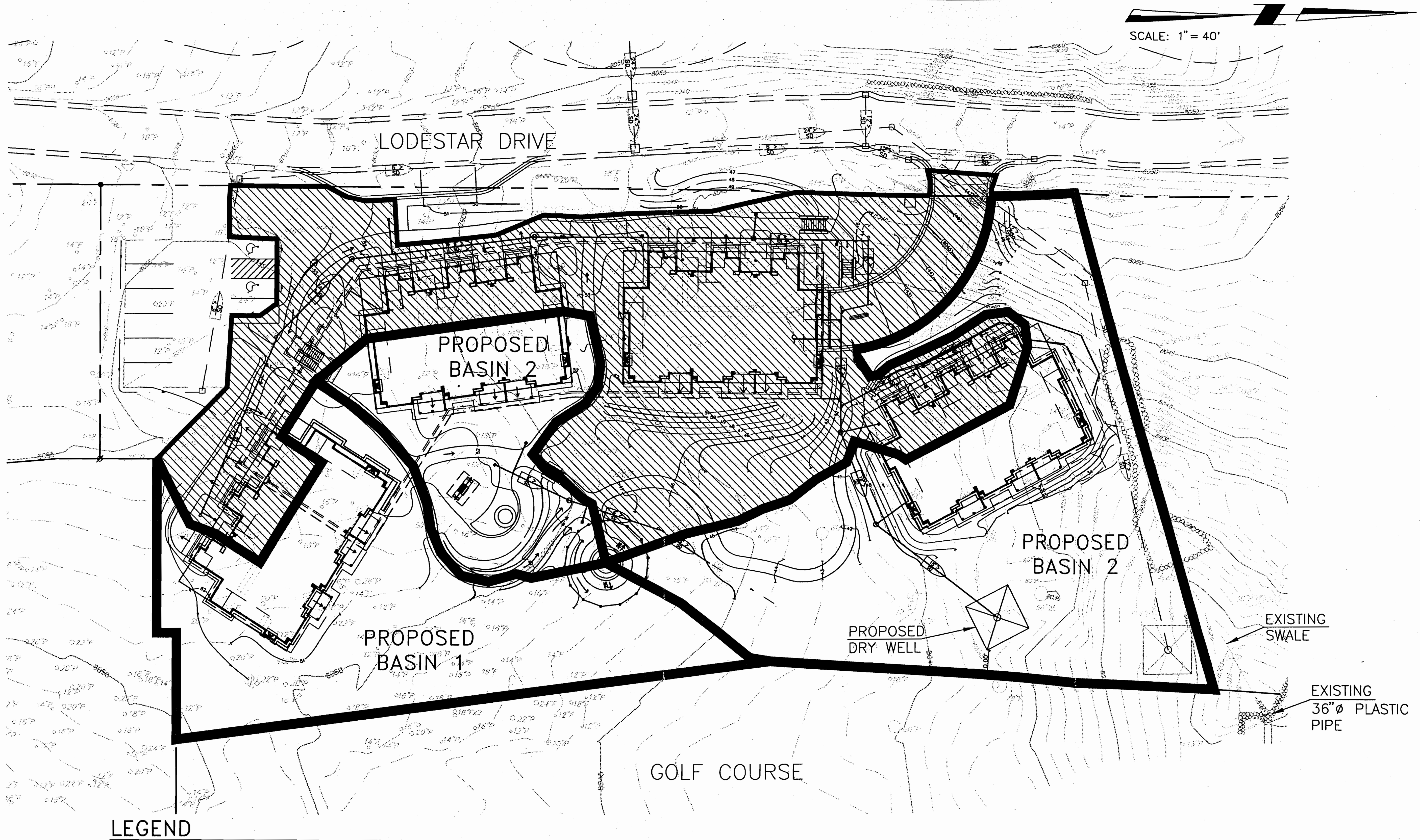

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FIGURE 3

PROPOSED CONDITIONS HYDROLOGY MAP

THE CABINS at CROOKED PINES

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THE CABINS
at
CROOKED PINES

TECHNICAL APPENDIX

FOR

DRAINAGE REPORT

JULY, 2003

CFA, Inc.
Prepared By: CWM, DCP

RATIONAL METHOD CALCULATIONS

TABLE 2

STORM DRAINAGE PEAK FLOW CALCULATION FORM

					Design Precipitation[B]		Runoff Coefficient												
							Natural[C]					Roofs		Paved		Other			
Watershed	Season	Area, acres	Exceedence interval, years	t_c[A], hours	inch	i, in/hr	RF[D]	RR	NF	C_n	Natural %/100	C_{roof}	Roof %/100	C_{paved}	Paved %/100	C_{other}	Other %/100	C	Q=1.008 x CiA (cfs)
EXISTING 1	Winter	0.461	10	0.98	0.78	0.80	0.38	0.83	1.0	0.32	1.00							0.32	**0.117**
	Summer	0.461	10	0.37	0.42	1.14	0.15	0.83	1.0	0.12	1.00							0.12	0.066
EXISTING 1	Winter	0.461	100	0.98	1.40	1.43	0.66	0.83	1.0	0.55	1.00							0.55	**0.364**
	Summer	0.461	100	0.37	0.68	1.84	0.30	0.83	1.0	0.25	1.00							0.25	0.213
EXISTING 2	Winter	1.389	10	1.06	0.80	0.75	0.38	0.87	1.0	0.33	1.00							0.33	**0.349**
	Summer	1.389	10	0.43	0.45	1.05	0.15	0.87	1.0	0.13	1.00							0.13	0.191
EXISTING 2	Winter	1.389	100	1.06	1.45	1.37	0.66	0.87	1.0	0.57	1.00							0.57	**1.100**
	Summer	1.389	100	0.43	0.73	1.70	0.30	0.87	1.0	0.26	1.00							0.26	0.620
PROPOSED 1	Winter	0.377	10	1.00	0.78	0.78	0.38	0.80	1.0	0.30	0.60	0.9	0.21	0.9	0.03	0.50	0.16	0.48	0.142
	Summer	0.377	10	0.41	0.43	1.05	0.15	0.80	1.0	0.12	0.60	0.9	0.21	0.9	0.03	0.50	0.16	0.37	**0.147**
PROPOSED 1	Winter	0.377	100	1.00	1.40	1.40	0.66	0.80	1.0	0.53	0.60	0.9	0.21	0.9	0.03	0.50	0.16	0.61	**0.326**
	Summer	0.377	100	0.41	0.71	1.73	0.30	0.80	1.0	0.24	0.60	0.9	0.21	0.9	0.03	0.50	0.16	0.44	0.290
PROPOSED 2	Winter	0.727	10	0.97	0.76	0.78	0.38	0.88	1.0	0.33	0.52	0.9	0.18	0.9	0.06	0.50	0.23	0.51	0.295
	Summer	0.727	10	0.36	0.40	1.11	0.15	0.88	1.0	0.13	0.52	0.9	0.18	0.9	0.06	0.50	0.23	0.41	**0.332**
PROPOSED 2	Winter	0.727	100	0.97	1.35	1.39	0.66	0.88	1.0	0.58	0.52	0.9	0.18	0.9	0.06	0.50	0.23	0.64	**0.654**
	Summer	0.727	100	0.36	0.67	1.86	0.30	0.88	1.0	0.26	0.52	0.9	0.18	0.9	0.06	0.50	0.23	0.48	0.650

FOOTNOTES:

A See Table 3

B See Figures 1-4 and 1-5 (Design Manual, Mammoth Lakes Storm Drainage and Erosion Conrol, July 1984)

C See Figure 1-6 (Design Manual, Mammoth Lakes Storm Drainage and Erosion Conrol, July 1984)

D One-hour precipitation values (inches): 10(W,S) = 0.78, 0.71
100(W,S) = 1.40, 1.20

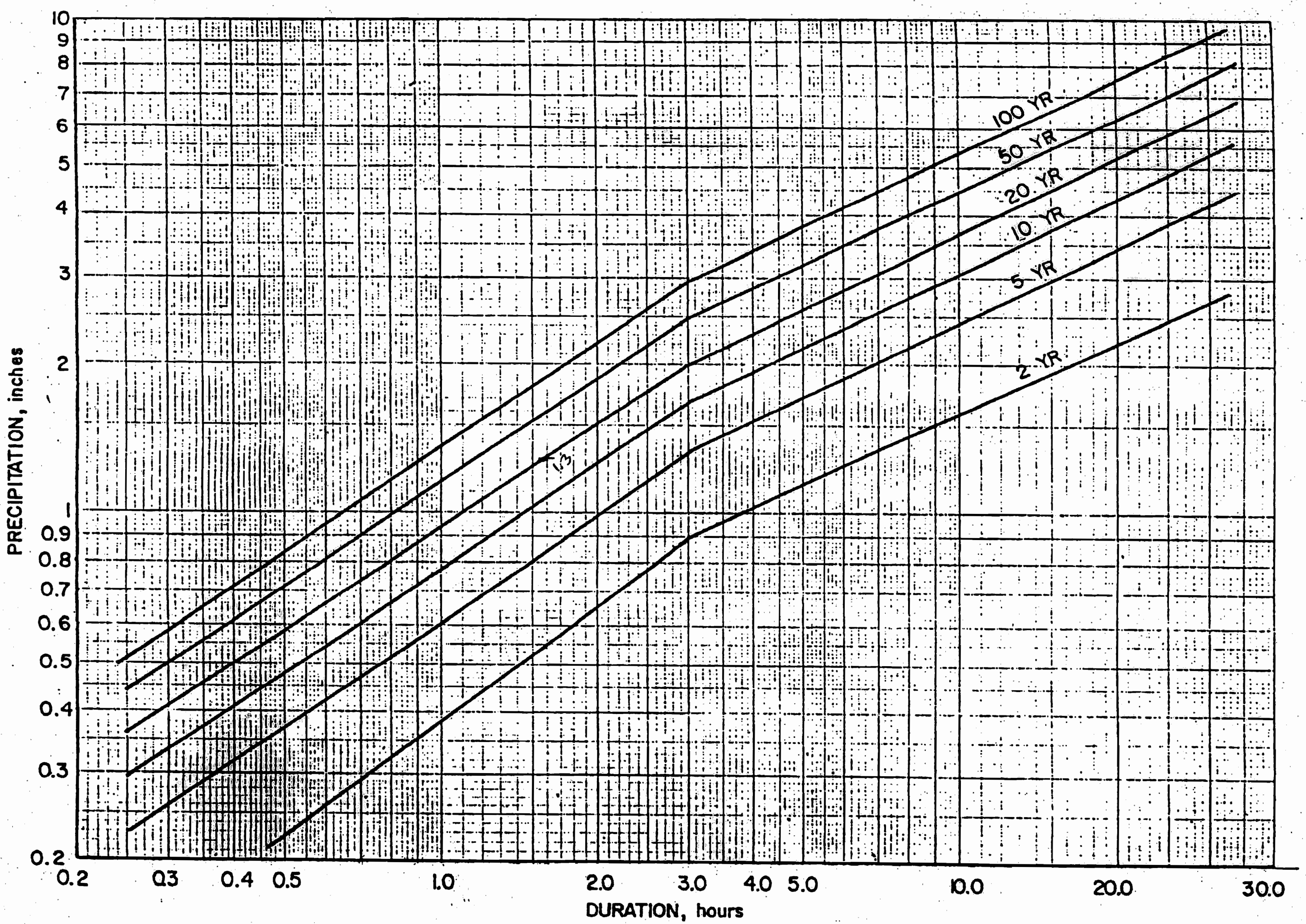


Figure 1-4 Winter Precipitation Design Curve

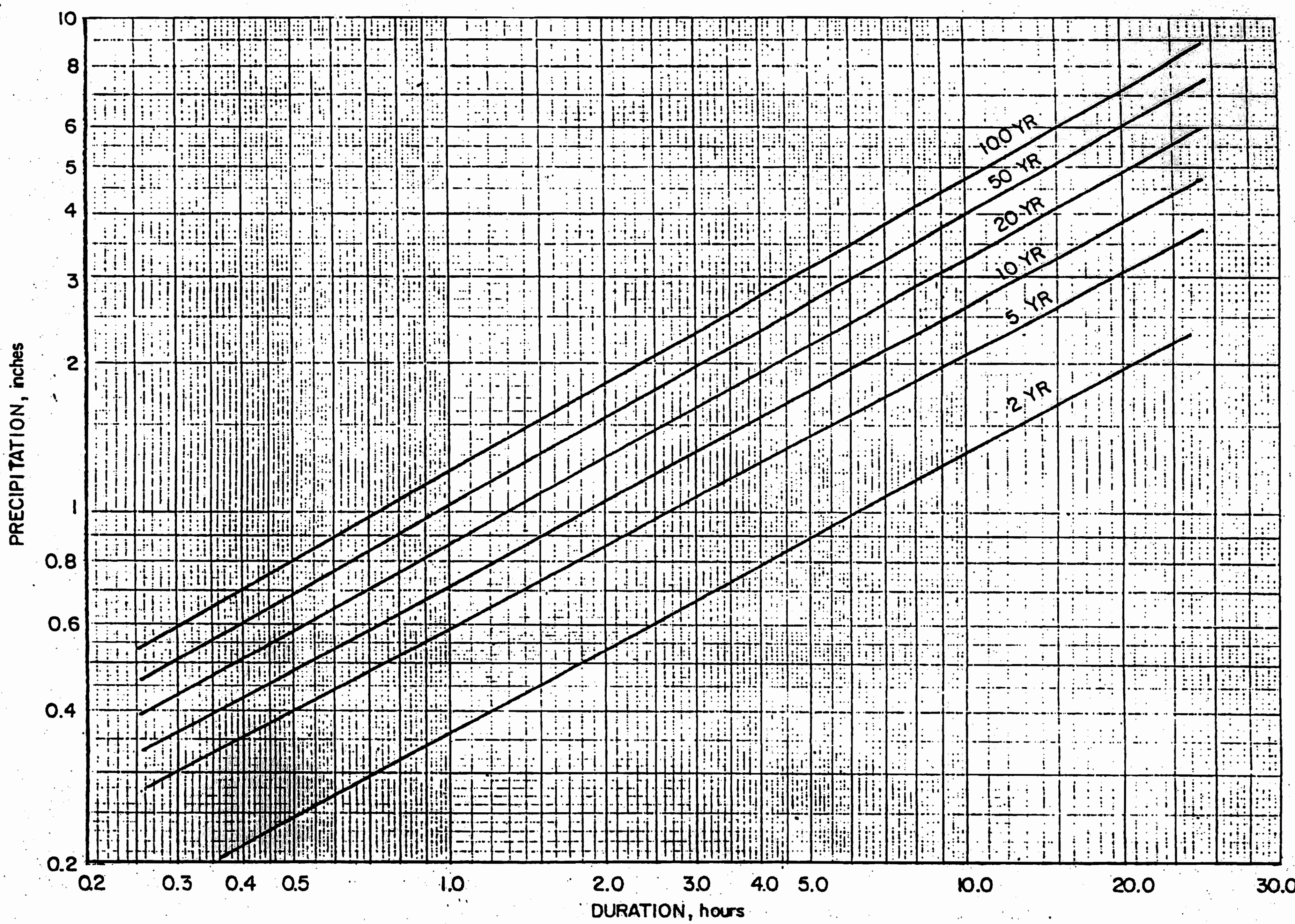


Figure I-5 Summer Precipitation Design Curve

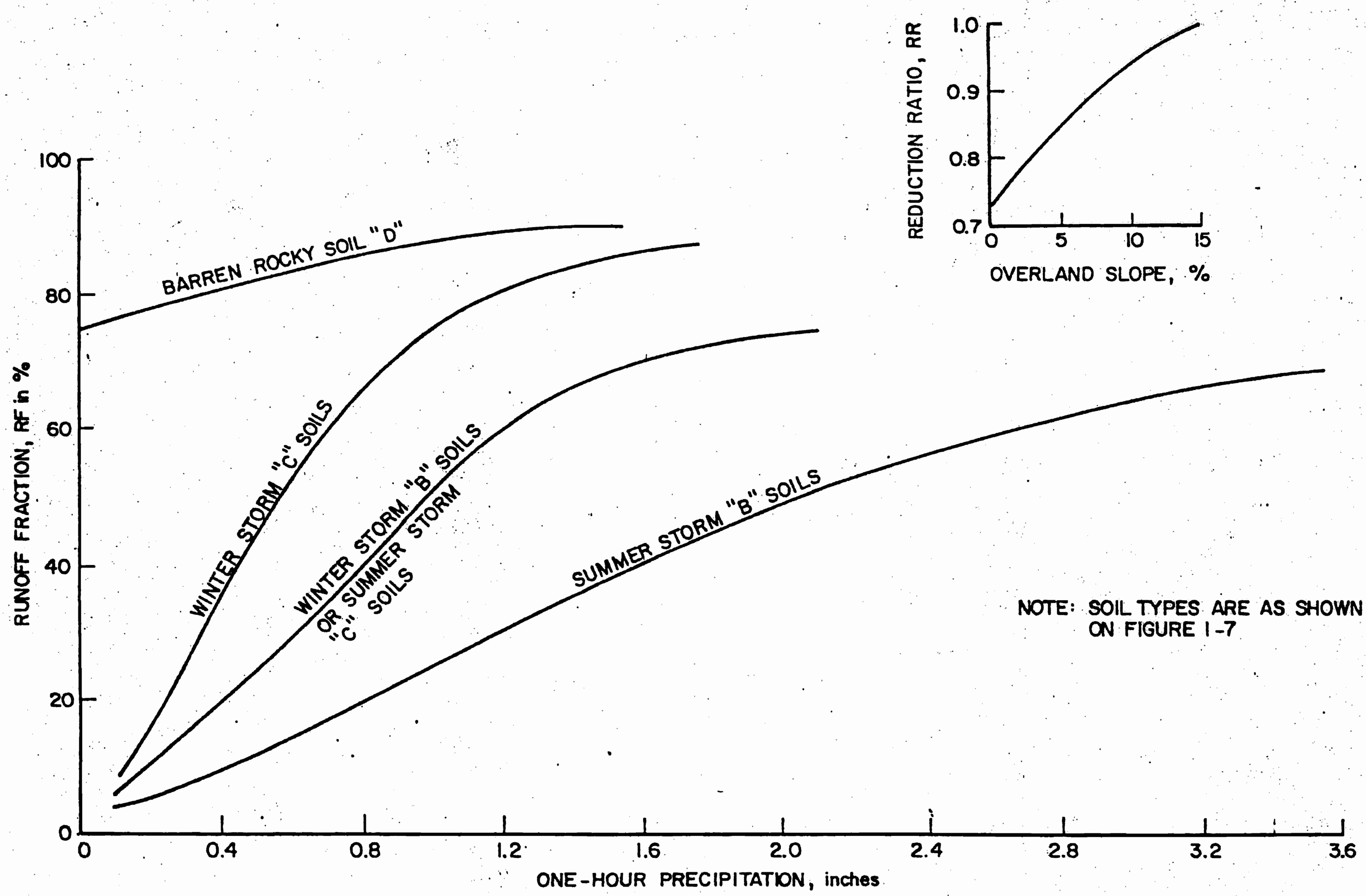


Figure I-6 Natural Area Runoff Factor, RF, and Reduction Ratio, RR

RATIONAL METHOD

TIME OF CONCENTRATION

TABLE 3

WATERSHED TIME OF CONCENTRATION FORM

Watershed	Season	Area, acres	Exceedence interval, years	Overland Flow: Unpaved Area: L_o, feet	Unpaved Area: S_o, ft/ft	Unpaved Area: t_{co}[A], hours	Paved Area: L_o, feet	Paved Area: S_o, ft/ft	Paved Area: t_{co}[A], hours	Total t_{co}, hours	Channel Flow: Channel: L_c, feet	Channel: S_c, ft/ft	Channel: t_{cc}[B], hours	Pipe: L_c, feet	Pipe: S_c, ft/ft	Pipe: t_{cc}, hours	Total t_{cc}, hours	Total t_c, hours
EXISTING 1	Winter	0.461	10, 100	225	0.040	0.98				0.98							0.00	0.98
	Summer	0.461	10, 100	225	0.040	0.37				0.37							0.00	0.37
EXISTING 2	Winter	1.389	10, 100	485	0.061	1.05				1.05	65	0.077	0.01				0.01	1.06
	Summer	1.389	10, 100	485	0.061	0.42				0.42	65	0.077	0.01				0.01	0.43
PROPOSED 1	Winter	0.377	10, 100	210	0.029	1.00				1.00							0.00	1.00
	Summer	0.377	10, 100	210	0.029	0.41				0.41							0.00	0.41
PROPOSED 2	Winter	0.727	10, 100	280	0.070	0.95				0.95	31	0.01	0.01	105	0.06	0.01	0.02	0.97
	Summer	0.727	10, 100	280	0.070	0.34				0.34	31	0.01	0.01	105	0.06	0.01	0.02	0.36

FOOTNOTES:

A Figure 1-2 (Design Manual, Mammoth Lakes Storm Drainage and Erosion Control, July 1984)

B Figure 1-3 (Design Manual, Mammoth Lakes Storm Drainage and Erosion Control, July 1984)

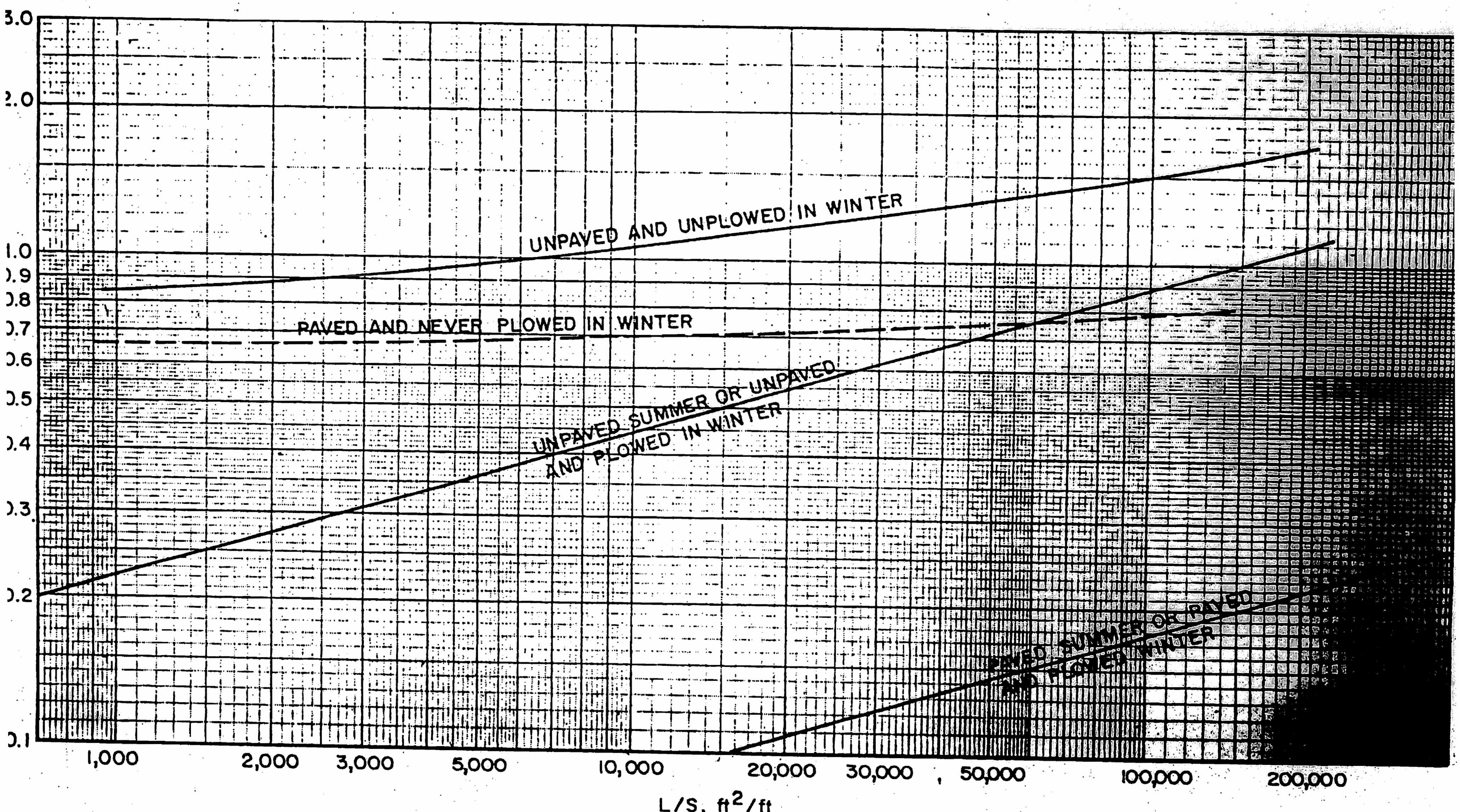


Figure 1-2 Overland Flow tc Component, tco

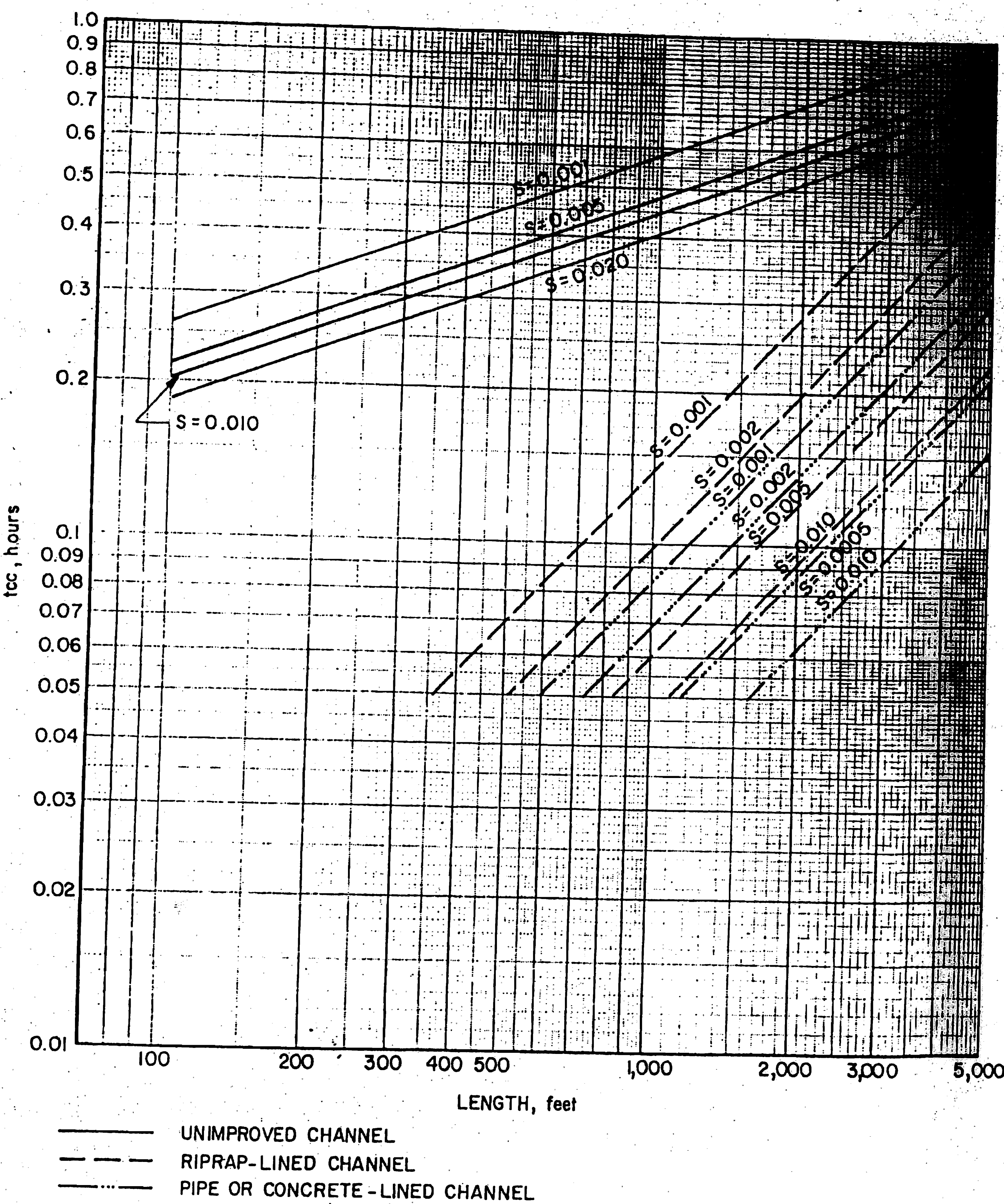


Figure I-3 Channel Flow tc Component, tcc

CALCULATIONS
AND
DETAILS

Infiltration Sizing Calculations

Volume Calculation:

Area =	30602 sf
Surface Type =	mixed
Percent Impervious =	59 %
Rainfall Intensity =	0.083 ft/hr

Runoff Volume = (area) x (Intensity in 1 hour) x (Percent Impervious)
= **1499 cf**

Infiltration Size:

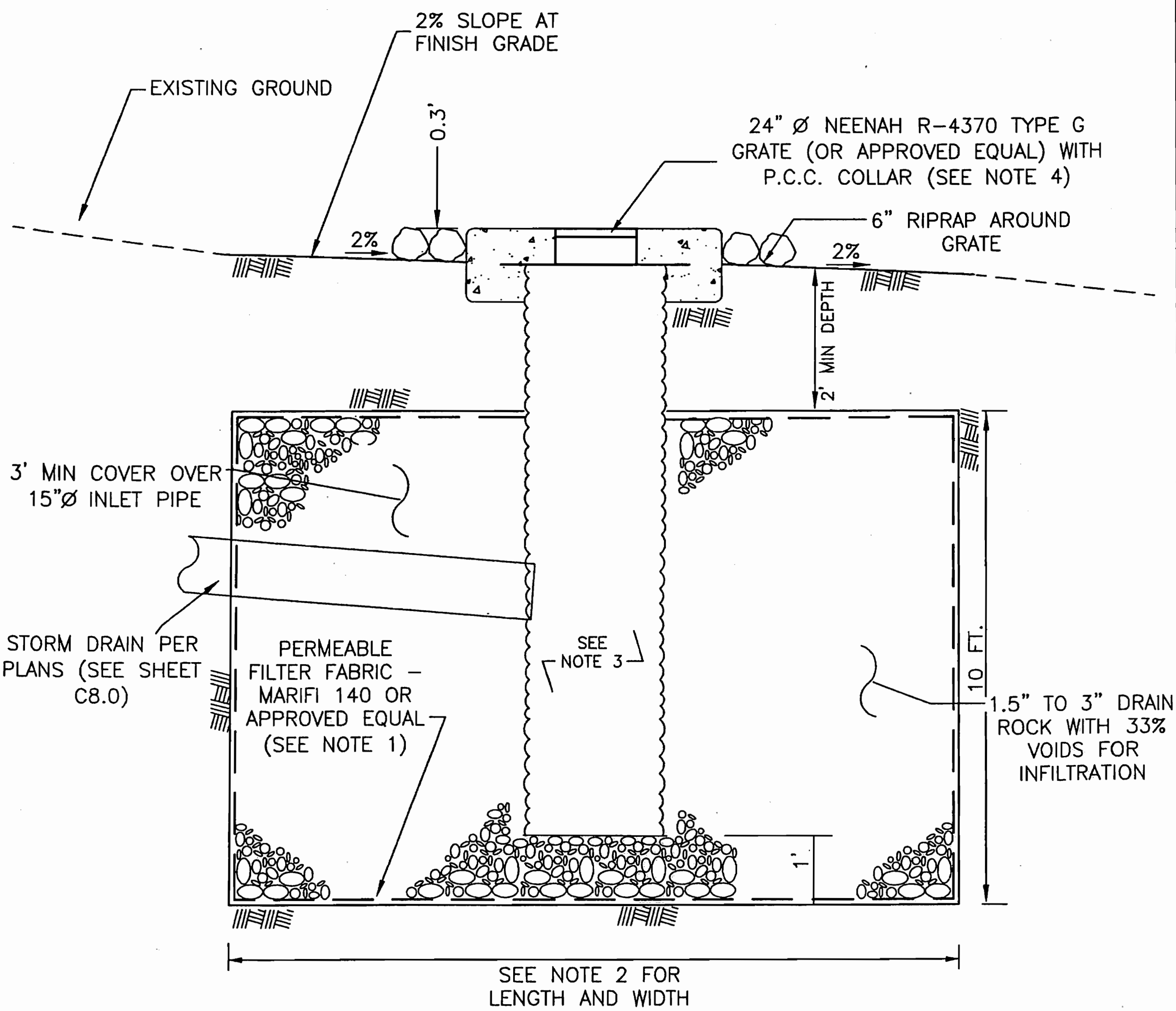
Type =	**Trench**
Length (L) =	**20 ft**
Width (W) =	**20 ft**
Depth (D) =	**10 ft**

Percolation Rate =	5 in/hr	(moderate)
Percent of Voids =	33.33 %	

Equation: Capacity = perc[(L x W) + 2(L x D)/3] + (W x D x L)/3
= **1555.6 cf**

Footnotes:

1. The surface types of the area that is to be infiltated contains pavement, native, roof, and landscaped.
2. The 20 year 1 hour storm needs to be retained per Lahontan Regional Water Quality Control Board. The design intensity per Lahontan RWQB is 1.0 in/hr (0.083 ft/hr)
3. Reference for the capacity equation is Lahontan Regional Water Quality Control Board, Lake Tahoe Infiltration Trench Design Requirements, 1999.



NOTES:

1. DRY WELL IS TO BE A MINIMUM OF 8' FROM ANY PROPERTY LINE
2. LENGTH = 20 FT.
   WIDTH = 20 FT.
3. 36" Ø PERFORATED VERTICAL CMP. DO NOT WRAP FILTER FABRIC AROUND PIPE.
4. GRATE IS TO BE BOLTED TO THE FRAME.
5. PERFORATIONS ON PIPE ARE 3/8" x 6" @ 12" O.C. INSTALL ON EVERY OTHER RIB.

cfa

FIGURE 4

DRY WELL/PERCOLATION PIT

THE CABINS AT CROOKED PINES

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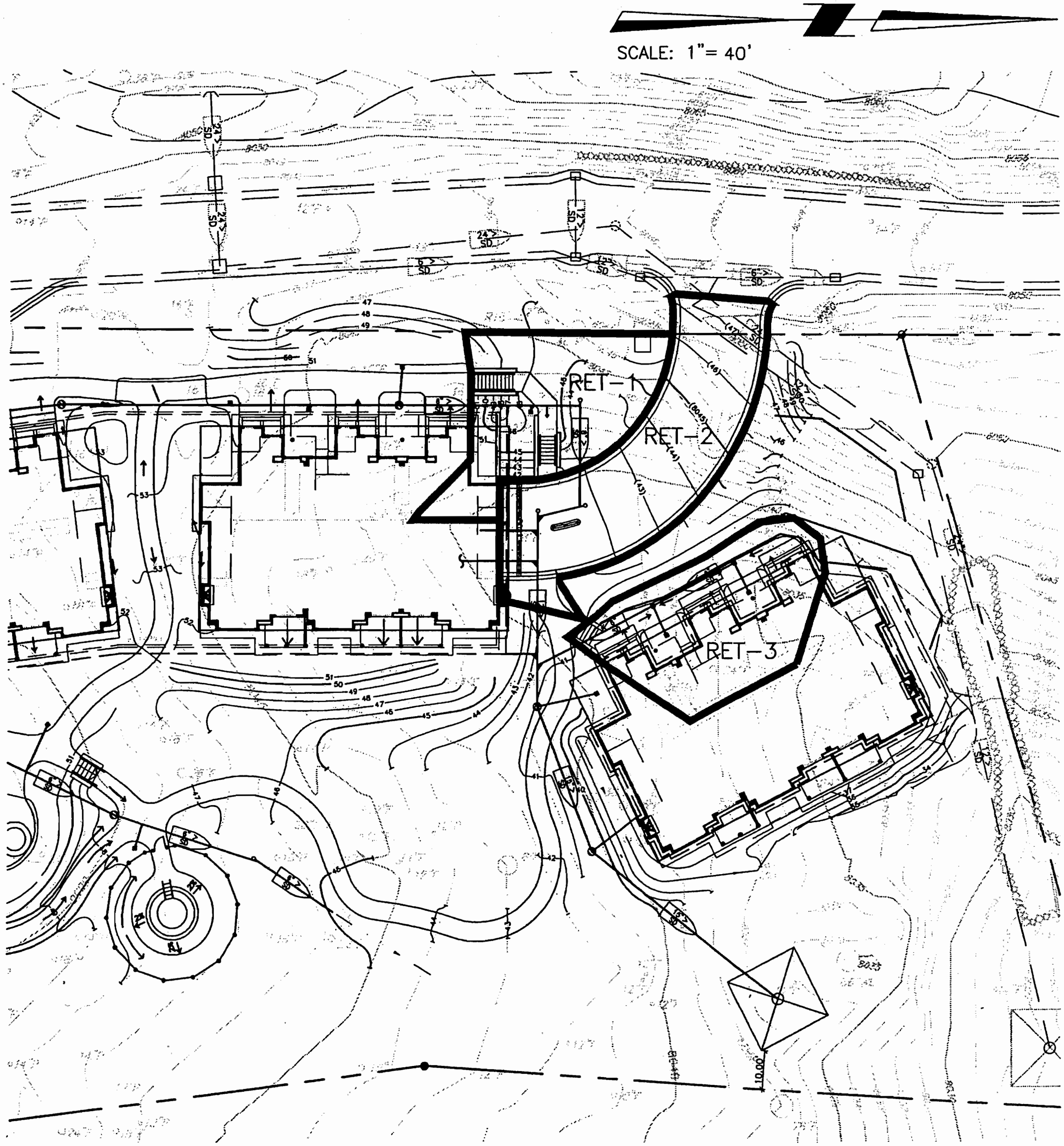
TABLE 4

ADDITIONAL HYDROLOGY CALCULATIONS

Sub-area	AREA (ACRES)	C	INTENSITY, I (IN/HR)	Peak Flow (cfs)
RET-1	0.0443	0.6	4.5	0.12
RET-2	0.0611	0.9	4.5	0.25
RET-3	0.0482	0.9	4.5	0.20
TOTAL RET.	0.703	0.59	4.5	1.87

Notes:

1. The abreviation of RET. stands for retained. Figure 3 shows the total area that is to be retained in the dry well.
2. A conservative intensity rate of 4.5 in/hr was used in the calculation.
3. The total flow to the trench drain is the sum of RET-1 and RET-2 (0.13+0.27=0.40 cfs).



SUB-AREA	AREA (ACRES)
RET-1	0.0443
RET-2	0.0611
RET-3	0.0482

cfa

FIGURE 5

ADDITIONAL HYDROLOGY

THE CABINS AT CROOKED PINES

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No. 5505
Engineer's Computation Pad

Catch Basin Capacity:

- Orifice Eq. $= CA(2gH)^{0.5}$

C = Coef = 0.6
A = opening sq ft
g = 32.2 ft/s²
H = head, ft

- Weir Eq $= CLH^{1.5}$

C = Coef. = 3.0
L = length, ft
H = head, ft

1. Capacity of Trench drain 12" × 24'
   * Josam 76010 - 56.5 SQ. IN. open area per 15" of length
     - 15" length, 7/16" opening
     - 15 openings
     - 15 × 7/16 = 6.56" open per 15" of length

Head = 0.25' (From grading plan)

Weir
$H = 0.25'$
$C = 3.0$
$L = [6.56"/15"] \times [24'/15"] = 125.95" = 10.50$ ft per side

$2(10.50) + 2(.5) = 22.0'$

$Q = (3)(22)(0.25)^{1.5} = 8.25$ cfs

Orifice:
$H = 0.25'$
$A = [56.5/15"] \times [24'/15"] = 1{,}084.80$ sq in. $= 7.53$ ft²
$g = 32.2$
$C = 0.6$

$Q = (0.6)(7.53)[2(32.2)(.25)]^{0.5} = 18.13$ cfs

∴ Use the weir Eq. $Q_{cap} = 8.25$ cfs

Assume 50% Clogging → $Q_{cap} = 4.12$ cfs

2. Capacity of Landscape drop inlet
   - NDS grate #21 (8"ø) = 9.0 sq. in.
   - NDS grate #30S (8"ø) = 11.5 sq. in.
   * Both grates are used in this project. The smaller inlet area will be used in the calculation.
     - Total area of 8" dia. (πr^2) = 50.24 sq. in
     - 9/50.24 = 18%
     - Assume 18% of the circumference of the grate is available for the weir eq.
   - perimeter $= 0.18(2\pi r) = 4.52$ in.

Next Sheet

→ Capacity of Landscape drop inlet Continued

Weir Eq : $CLH^{1.5}$

$C = 3.0$
$L = 4.52/12 = 0.377$ ft
$H = 0.2$ ft (Assumed)

$= 3(0.377)(0.2)^{1.5}$

$= 0.101$ cfs

Assume 50% Clogging → $\underline{\underline{Q_{cap} = 0.05 \text{ cfs}}}$

→ Analysis of Driveway Sump

- Trench Drain calculated capacity = 4.12 cfs
- Total On-site flow to trench drain from Table 4 is 0.40 cfs
- Off-site flow: The driveway for The Cabins is proposed at a low point on the road. The driveway was designed with a 4" berm up, prior to dropping down into the site. This 4" berm was designed to maintain the existing drainage pattern of the road and to prevent storm flows from entering the site. There are 2 existing catch basins near the driveway entrance. From the Drainage Study of Crooked Pines prepared by Triad/Holmes Ass. dated August, 2001, these catch basins receive flow from area 3A. The following are calculations for 3A

  Area = 34,287 SF (from report) = 0.787 Acres
  C = 0.70 (from report)
  I = 4.5 in/hr (conservative intensity)

  Q = 2.48 cfs
- If the catch basins clog and the storm flow ponds above the 4" berm, The Cabins site could receive 2.48 cfs of storm flow.
- This off-site flow combined with the on-site flow is (0.40 + 2.48) = 2.88 cfs.
- The trench drain has the calculated capacity to accept this entire flow.
- The storm drain (calculations on following sheets) has the calculated capacity to accept the total on-site flow of 1.87 cfs plus this additional 2.48 cfs.

* Based on the calculations provided, the storm drain design in this area should be adequate to handle the storm flows.

Analysis of Building 4 Sump

- Calculated capacity of the 8" landscape DI = 0.05 cfs

- 4 drop inlets in the area
  4(0.05) = 0.20 cfs

- There is also a 4" perforated PVC storm drain pipe @ 0.5% minimum slope to drain the area. The area drains to the rockery wall and the pipe is at the base of the wall. See grading section D on sheet C5.0 of the improvement plans.

- The calculated storm flow to this area is 0.20 cfs (See Table 4)

* Based on the calculations provided, the storm drain design in this area should be adequate to handle the storm flows.

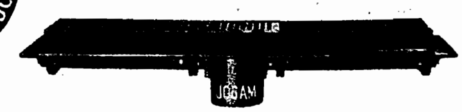
SUPER-FLO® 6" WIDE, RECTANGULAR — SERIES 76000

76000

APPLICATION: For use in heavy traffic areas where a continuous trench drain is required such as in parking garages, vehicle repair facilities, manufacturing plants and ramps. The internal dome strainer intercepts debris, that could block the drain line. An outlet section can be used individually as an area drain.

SPECIFICATION: JOSAM 76000 Series coated cast iron rectangular sectional Trench Drain with heavy-duty body sections and integral anchor flange, heavy-duty loose-set SUPER-FLO® Grates with perimeter drainage slots, 5/16" x 3-1/2" grate openings, secondary loose-set dome strainer and bottom outlet inside caulk connection.

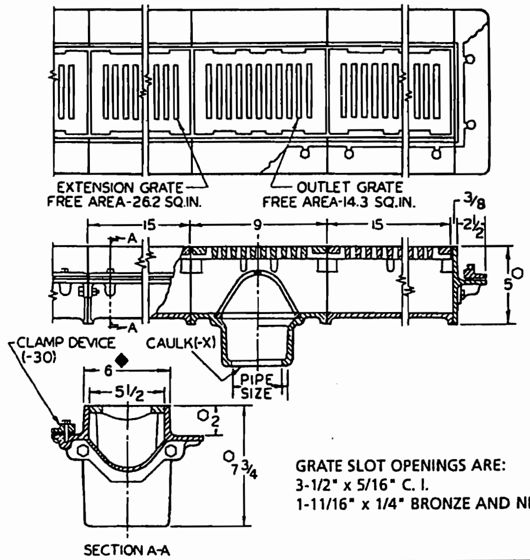
PREFERRED PRODUCT



○ ADD 1/4" FOR NIKALOY OR BRONZE TOP.

♦ ADD 1/4" TO WIDTH AND OVERALL LENGTH FOR NIKALOY OR BRONZE TOP.

IT IS RECOMMENDED THAT NO MORE THAN 8 EXTENSION SECTIONS BE USED WITH ONE OUTLET SECTION.



GRATE SLOT OPENINGS ARE:
3-1/2" x 5/16" C. I.
1-11/16" x 1/4" BRONZE AND NIKALOY

FOR OUTLET TYPE, SPECIFY -X.

OPTIONS

- -1 Satin Finish Nikaloy Top
- -2 Satin Finish Bronze Top
- -7 Ductile Iron Grate
- -20 Secured Grate, Vandal-Proof Screws
- -30 Flashing Clamp Device
- -40 Galvanized Cast Iron Parts

TYPE NO.	PIPE SIZE	LENGTH OUTLET SECTION	LENGTH EXTENSION SECTION	LBS. OUTLET SECTION	LBS. EXTENSION SECTION
76002	2	9	15	32	32
76003	3	9	15	32	32
76004	4	9	15	32	32

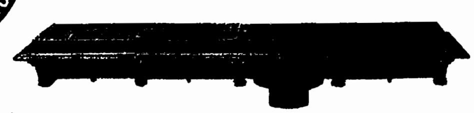
12" WIDE, RECTANGULAR — SERIES 76010

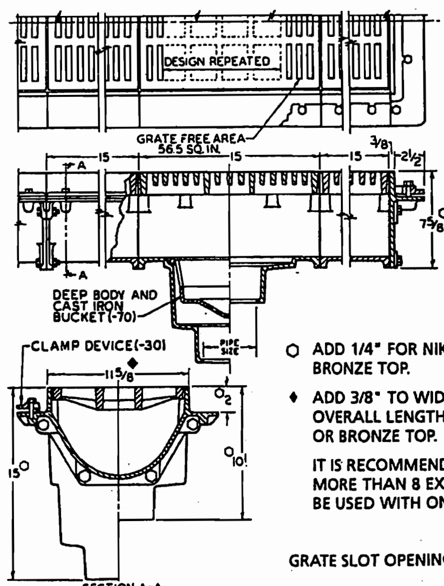
76010

APPLICATION: For use in heavy traffic areas where a wide, continuous trench drain that can serve as a temporary reservoir for large quantities of water is required, such as in parking garages, vehicle repair facilities, manufacturing plants and ramps. An outlet section can be used individually as an area drain.

SPECIFICATION: JOSAM 76010 Series coated cast iron rectangular sectional Trench Drain with heavy-duty body sections and integral anchor flange, heavy-duty loose-set grates, 7/16" x 2-3/4" grate openings and bottom outlet.

PREFERRED PRODUCT





○ ADD 1/4" FOR NIKALOY OR BRONZE TOP.

♦ ADD 3/8" TO WIDTH AND OVERALL LENGTH FOR NIKALOY OR BRONZE TOP.

IT IS RECOMMENDED THAT NO MORE THAN 8 EXTENSION SECTIONS BE USED WITH ONE OUTLET SECTION.

GRATE SLOT OPENING 2-3/4" X 7/16"

FOR OUTLET TYPE, SPECIFY –X.

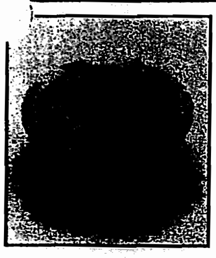
OPTIONS

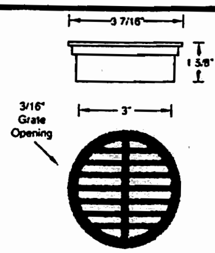
- -1 Satin Finish Nikaloy Top
- -2 Satin Finish Bronze Top
- -7 Ductile Iron Grate
- -11 Convex Grate
- -20 Secured Grate, Vandal-Proof Screws
- -30 Flashing Clamp Device
- -40 Galvanized Cast Iron Parts
- -70 Sediment Bucket
- -70-40 Bucket, Galvanized

TYPE NO.	PIPE SIZE	LENGTH OUTLET SECTION	LENGTH EXTENSION SECTION	LBS. OUTLET SECTION	LBS. EXTENSION SECTION
76013	3	15	15	94	69
76014	4	15	15	94	69
76015	5	15	15	94	69
76016	6	15	15	94	69

ROUND GRATES

3″ Round Grate



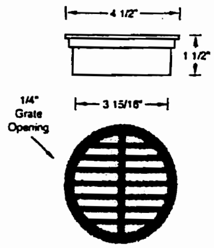


How to Specify:
NDS #14, #15, #16, or #16S, 3″ Round Structural Foam Polyethylene Grate with UV Inhibitor. Open surface area 2.6 sq. in.

Description	Part No.	Pkg. Qty.	Color
3″ Round Grate	14	40	Black
	15	40	Grey
	16	40	Green
	16S	40	Sand

Fits 3″ Sewer and Drain Pipe and Fittings, 3″ Corrugated Pipe.

4″ Round Grate

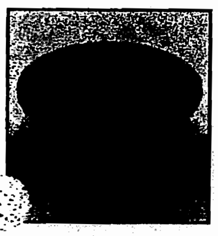


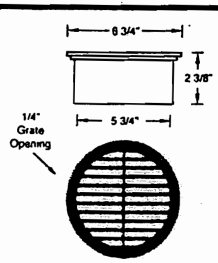
How to Specify:
NDS #11, #12, #13, or #13S, 4″ Round Structural Foam Polyethylene Grate with UV Inhibitor. Open surface area 3.85 sq. in.

Description	Part No.	Pkg. Qty.	Color
4″ Round Grate	11	25	Black
	12	25	Grey
	13	25	Green
	13S	25	Sand

Fits 4″ Sewer and Drain Pipe and Fittings, 4″ Corrugated Pipe.

6″ Round Grate



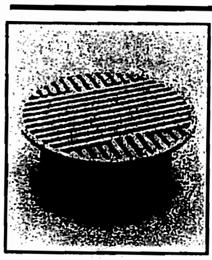


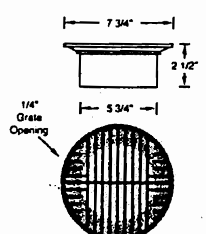
How to Specify:
NDS #40, #50, #60, or #60S, 6″ Round Structural Foam Polyethylene Grate with UV Inhibitor. Open surface area 9.1 sq. in.

Description	Part No.	Pkg. Qty.	Color
6″ Round Grate	40	10	Black
	50	10	Green
	60	10	Grey
	60S	10	Sand

Fits SPEE-D Basin, 6″ Sewer and Drain Pipe and Fittings and 6″ Corrugated Pipe.

8″ Round Grate



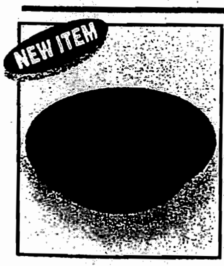


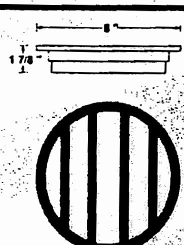
How to Specify:
NDS #10, #20, #30, or #30S, 8″ Round Structural Foam Polyethylene Grate with UV Inhibitor. Open surface area 11.5 sq. in.

Description	Part No.	Pkg. Qty.	Color
8″ Round Grate	10	10	Black
	20	10	Green
	30	10	Grey
	30S	10	Sand

Fits SPEE-D Basin, 6″ Sewer and Drain Pipe and Fittings and 6″ Corrugated Pipe.

8″ Round Cast Iron Grate



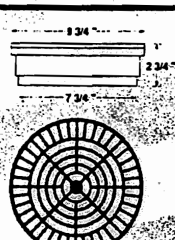


How to Specify:
NDS #21, 8″ Round Heavy Duty Cast Iron Grate with Black Powder Coating. Open surface area 9.0 sq. in..

Description	Part No.	Pkg. Qty.	Color
8″ Round Grate	21	2	Satin Black

Fits SPEE-D Basin, 6″ Sewer and Drain Pipe and Fittings and 6″ Corrugated Pipe.

10″ Round Plastic Grate



How to Specify:
NDS #1040, #1050, #1060, or #1060S, 10″ Round Structural Foam Polyethylene Grate with UV Inhibitor. Open surface area 17.46 sq. in.

Description	Part No.	Pkg. Qty.	Color
10″ Round Grate	1040	10	Black
	1050	10	Green
	1060	10	Grey
	1060S	10	Sand

Fits 8″ Sewer and Drain Pipe and Fittings, 8″ Corrugated Pipe

12" PVC @ 1.5%
Worksheet for Circular Channel

Project Description	
Project File	x:\projects\02099.00_docs\hydrology\pipes.fm2
Worksheet	Pipe Capacities
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.012	
Channel Slope	0.015000	ft/ft
Diameter	12.00	in

Results			
Depth	1.00	ft	
Discharge	4.73	cfs	
Flow Area	0.79	ft²	
Wetted Perimeter	3.14	ft	
Top Width	0.00	ft	
Critical Depth	0.90	ft	
Percent Full	100.00		
Critical Slope	0.013189	ft/ft	
Velocity	6.02	ft/s	
Velocity Head	0.56	ft	
Specific Energy	FULL	ft	
Froude Number	FULL		
Maximum Discharge	5.08	cfs	
Full Flow Capacity	4.73	cfs	⇐
Full Flow Slope	0.015000	ft/ft	

15" PVC @ 0.5%
Worksheet for Circular Channel

Project Description	
Project File	x:\projects\02099.00_docs\hydrology\pipes.fm2
Worksheet	Pipe Capacities
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.012	
Channel Slope	0.005000	ft/ft
Diameter	15.00	in

Results		
Depth	1.25	ft
Discharge	4.95	cfs
Flow Area	1.23	ft²
Wetted Perimeter	3.93	ft
Top Width	0.00	ft
Critical Depth	0.90	ft
Percent Full	100.00	
Critical Slope	0.006598	ft/ft
Velocity	4.03	ft/s
Velocity Head	0.25	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	5.32	cfs
Full Flow Capacity	4.95	cfs
Full Flow Slope	0.005000	ft/ft

APPENDIX H

NOISE DATA

OFF-SITE TRAFFIC NOISE LEVELS

Project Name: Sierra Star Master Plan EIR

Background Information

Model Description:	FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Analysis Scenario(s):	Existing and Future Traffic Noise Levels
Source of Traffic Volumes:	LSA, April 2006
Community Noise Descriptor:	L_{dn}: X CNEL: ____

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Traffic Noise Levels

Analysis Condition / Roadway Name / Roadway Segment	Land Use	Lanes	Median Width	Peak Hour Volume	ADT Volume	Design Speed (mph)	Dist. from Center to Receptor[1]	Alpha Factor	Barrier Attn. dB(A)	Vehicle Mix[2] Medium Trucks	Heavy Trucks	Peak Hou dB(A) L_{eq}	24-Hour dB(A) Ldn
Existing (Winter 2004) Conditions													
Minaret Road													
North of Main Street	Residential	2	0	0	11,910	35	75	0.5	0	0.5%	1.0%	0.0	62.4
Meridian to Old Mammoth	Residential	2	0	0	4,450	35	75	0.5	0	0.5%	1.0%	0.0	58.1
Lake Mary Road													
West of Minaret Road	Residential	4	0	0	12,880	35	75	0.5	0	2.5%	2.5%	0.0	64.5
Meridian Boulevard													
West of Minaret Road	Residential	4	0	0	8,400	40	75	0.5	0	0.5%	1.0%	0.0	62.5
Minaret to Old Mammoth	Residential	4	0	0	7,770	40	75	0.5	0	0.5%	1.0%	0.0	62.1
Sierra Park to Main	Residential	4	0	0	1,990	45	75	0.5	0	1.0%	2.0%	0.0	58.2
Old Mammoth Road													
West of Minaret Road	Residential	2	0	0	4,950	40	75	0.5	0	0.5%	2.0%	0.0	60.7
Minaret to Meridian	Residential	2	0	0	4,340	30	75	0.5	0	0.5%	2.0%	0.0	58.2
Meridian to Main	Residential	2	0	0	11,780	30	75	0.5	0	0.5%	2.0%	0.0	62.5
Cumulative (Existing Plus Approved projects) Conditions													
Minaret Road													
North of Main Street	Residential	2	0	0	17,950	35	75	0.5	0	0.5%	1.0%	0.0	64.2
Meridian to Old Mammoth	Residential	2	0	0	6,490	35	75	0.5	0	0.5%	1.0%	0.0	59.8
Lake Mary Road													
West of Minaret Road	Residential	4	0	0	16,930	35	75	0.5	0	2.5%	2.5%	0.0	65.7
Meridian Boulevard													
West of Sierra Star Parkway	Residential	4	0	0	10,740	40	75	0.5	0	0.5%	1.0%	0.0	63.5
Minaret to Old Mammoth	Residential	4	0	0	10,020	40	75	0.5	0	0.5%	1.0%	0.0	63.2
Sierra Park to Main	Residential	4	0	0	2,450	45	75	0.5	0	1.0%	2.0%	0.0	59.1
Old Mammoth Road													
West of Minaret Road	Residential	2	0	0	7,560	40	75	0.5	0	0.5%	2.0%	0.0	62.5
Minaret to Meridian	Residential	2	0	0	5,910	30	75	0.5	0	0.5%	2.0%	0.0	59.5
Meridian to Main	Residential	2	0	0	14,020	30	75	0.5	0	0.5%	2.0%	0.0	63.3
Cumulative Plus Project Conditions													
Minaret Road													
North of Main Street	Residential	2	0	0	18,660	35	75	0.5	0	0.5%	1.0%	0.0	64.4
Meridian to Mammoth	Residential	2	0	0	6,660	35	75	0.5	0	0.5%	1.0%	0.0	59.9
Lake Mary Road													
West of Minaret Road	Residential	4	0	0	19,310	35	75	0.5	0	2.5%	2.5%	0.0	66.2
Meridian Boulevard													
West of Sierra Star Parkway	Residential	4	0	0	12,320	40	75	0.5	0	0.5%	1.0%	0.0	64.1
Minaret to Old Mammoth	Residential	4	0	0	10,970	40	75	0.5	0	0.5%	1.0%	0.0	63.6
Sierra Park to Main	Residential	4	0	0	2,930	45	75	0.5	0	1.0%	2.0%	0.0	59.9
Old Mammoth Road													
West of Minaret Road	Residential	2	0	0	7,560	40	75	0.5	0	0.5%	2.0%	0.0	62.5
Minart to Meridian	Residential	2	0	0	6,010	30	75	0.5	0	0.5%	2.0%	0.0	59.6
Meridian to Main	Residential	2	0	0	14,080	30	75	0.5	0	0.5%	2.0%	0.0	63.3

[1] Distance is from the centerline of the roadway segment to the receptor location.

[2] Percentage of medium and heavy trucks as part of the vehicle mix is taken from the Revised Noise Element of the Town of Mammoth Lakes General Plan, 1997.

ON-SITE TRAFFIC NOISE LEVELS AND NOISE CONTOURS

Project Number: X
Project Name: Sierra Star Master Plan EIR

Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Source of Traffic Volumes: LSA, April 2006
Community Noise Descriptor: L_{dn}: X CNEL: ______

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Analysis Condition / Roadway Name / Roadway Segment	Lanes	Median Width	ADT Volume	Design Speed (mph)	Alpha Factor	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	Distance from Centerline of Roadway: Ldn at 100 Feet	Distance to Contour: 70 Ldn	65 Ldn	60 Ldn
Existing (Winter 2004) Conditions											
Minaret Road											
Main to Meridian	2	0	8,000	40	0.5	0.5%	1.0%	58.0	16	34	74
Main Street											
Minaret to Mountain	4	0	16,020	35	0.5	2.5%	2.5%	62.4	31	68	145
Meridian Boulevard											
West of Minaret Road	4	0	8,400	40	0.5	0.5%	1.0%	58.3	-	36	77
Minaret to Old Mammoth	4	0	7,770	40	0.5	0.5%	1.0%	58.0	-	34	73
Cumulative (Existing Plus Approved Projects) Conditions											
Minaret Road											
Main to Sierra Star	2	0	12,400	40	0.5	0.5%	1.0%	59.9	21	46	99
Sierra Star to Meridian	2	0	12,390	40	0.5	0.5%	1.0%	59.9	21	46	99
Main Street											
Minaret to Mountain	4	0	21,520	35	0.5	2.5%	2.5%	63.7	38	82	177
Meridian Boulevard											
West of Sierra Star	4	0	10,740	40	0.5	0.5%	1.0%	59.4	-	42	91
Sierra Star to Minaret	4	0	11,120	40	0.5	0.5%	1.0%	59.5	-	43	93
Minaret to Old Mammoth	4	0	10,020	40	0.5	0.5%	1.0%	59.1	-	40	87
Sierra Star Parkway											
Meridian to Minaret	2	0	220	25	0.5	1.8%	0.7%	39.0	-	-	-
Minaret to Main	2	0	110	25	0.5	1.8%	0.7%	36.0	-	-	-
Secondary Sierra Star Access											
Minaret to Main	2	0	330	25	0.5	1.8%	0.7%	40.8	-	-	-
Cumulative Plus Project Conditions											
Minaret Road											
Main to Sierra Star	2	0	15,900	40	0.5	0.5%	1.0%	61.0	25	54	116
Sierra Star to Meridian	2	0	14,960	40	0.5	0.5%	1.0%	60.7	24	52	112
Main Street											
Minaret to Mountain	4	0	21,600	35	0.5	2.5%	2.5%	63.7	38	82	178
Meridian Boulevard											
West of Sierra Star	4	0	12,320	40	0.5	0.5%	1.0%	60.0	-	46	100
Sierra Star to Minaret	4	0	13,360	40	0.5	0.5%	1.0%	60.3	-	49	105
Minaret to Old Mammoth	4	0	10,970	40	0.5	0.5%	1.0%	59.5	-	43	92
Sierra Star Parkway											
Meridian to Minaret	2	0	2,340	25	0.5	1.8%	0.7%	49.3	-	-	19
Minaret to Main	2	0	1,630	25	0.5	1.8%	0.7%	47.7	-	-	15
Secondary Sierra Star Access											
Minaret to Main	2	0	720	25	0.5	1.8%	0.7%	44.2	-	-	-

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway lanes.

APPENDIX I

LETTERS FROM PUBLIC SERVICES AND UTILITY AGENCIES

CHRISTOPHER A. JOSEPH & ASSOCIATES
Environmental Planning and Research

March 2, 2006

Chief Donnelly
Town of Mammoth Lakes Police Department
P.O. Box 2799
Mammoth Lakes, CA. 93546
mdonnelly@mammothlakespd.org

RE: Town of Mammoth Lakes Sierra Star Master Plan Subsequent Environmental Impact Report (EIR) – Request for Information

Dear Chief Donnelly:

Christopher A. Joseph & Associates (CAJA) is working with the Town of Mammoth Lakes (TOML) Community Development Department to prepare an EIR for the proposed Sierra Star Master Plan project (Project). The project site is located entirely within the Town of Mammoth Lakes (Refer to Figure 1). The Sierra Star Master Plan would address future development of an approximately 41-acre site surrounding the existing 18-hole, 114-acre Sierra Star Golf Course. The site is generally located in the center of town to the north of Meridian Boulevard and is bisected by Minaret Road. The site is currently designated as the "Lodestar Master Plan" area that was designated by the Town in 1991. Under the Lodestar Master Plan, the site was developed with the golf course (located west of Minaret Road and North of Meridian Boulevard), a 54-lot single family residential subdivision (Starwood) located southeast of the Intersection of Meridian Boulevard and Minaret Road, a 32-unit townhome condominium project (The Timbers), a 58-unit condominium project (Solstice) that is currently under construction, a 46-unit condominium development (Mammoth Green), and a 24-unit condominium project with 11 single-family residential lots (Crooked Pines). A 35-unit Workforce Housing development (The Chutes) is located on the Main Street frontage road in the site's northerly sector and a 28-unit townhome condominium project (Woodwinds) and 40-unit Workforce Housing condominium project were recently approved within the Master Plan area.

The Proposed Project would involve a revision to the 1991 Lodestar Master Plan that would result in replacement of the Lodestar plan with a new master plan that would change the name, land area, and land uses set forth in the 1991 plan. The Lodestar plan set development standards for an approximately 220-acre site situated around the Sierra Star Golf Course. The Lodestar Master Plan envisioned the development of a major commercial, residential, and recreational hub within the Town.

As of August 2005, a total of 451 residential units have been developed or approved under the Lodestar Master Plan. No commercial space has been developed. The Proposed Project would refocus remaining development within the plan area toward the creation of transient occupancy units, establishment of a more efficient transportation and circulation system, and the development of additional affordable housing units. Figure 2, Development Areas / Land Use, distinguishes between the existing Lodestar development and the proposed Sierra Star development described below.

Under the Proposed Project, a total maximum of 1,208 new dwelling units would be developed. Limited commercial development (up to a maximum of 29,000 square feet of retail space and up to a maximum of 30,000 square-foot conference center) would also be allowed in specific sectors of the plan area with discretionary approval by the Town. A 200-foot maximum height would be instituted in one sector of the site for purposes of potentially attracting a hotel complex. This would exceed the Town's current height limit.

Upon final approval of the Proposed Project, the proposed Sierra Star Master Plan would effectively replace the Lodestar Master Plan for the remaining portion of the overall area yet to be developed. Analyses included in the EIR for the Proposed Project would utilize all applicable information contained in the 1991 EIR prepared for the Lodestar Master Plan and its relevant appendices, updated to meet current CEQA statutes and guidelines and to evaluate the characteristics of the proposed Sierra Star Master Plan.

To determine whether a project would have the potential to have a significant environmental effect related to **police protection services**, the CEQA Guidelines asks the following:

- Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for police services?

The purpose of the EIR is to assess the Project's potential impacts to various environmental issue areas and public service and utility agencies, including the TOML Police Department (MLPD). The EIR will also provide recommendations that may be necessary to reduce such potential impacts to "less-than-significant" levels. Any assistance that you can provide with the following questions would be greatly appreciated:

1. Is the existing staff level information below accurate? If not, please indicate what the current status is.

   The MLPD is currently composed of 20 sworn employees and 6 non-sworn employees; consisting of one chief, one lieutenant, four sergeants, 10 patrol officers, one detective, one narcotics investigator, one K-9 officer, one SRO/DARE officer, one community service officer, two records personnel, one executive assistant, one animal control officer and one wildlife management specialist.

   Current staffing levels for MLPD is 21 sworn and 6 non-sworn employees; consisting of one chief, one lieutenant, four patrol sergeants, one detective sergeant, ten patrol officers, one detective, one narcotics investigator, one K-9 officer, one DARE/SRO officer, one community service officer, two records clerks, one executive assistant, one animal control officer and one part-time wildlife management specialist.

   1a. Are the existing staff levels at the station adequate to meet current demands for protection services in the Project area?

Current staff levels are adequate to meet current demands for protection in the project area. As this and other developments come on line additional police staffing will be required in order to maintain current levels of service, such as, response times and officer safety.

2. Is the statement below describing the patrol division and crime statistics still accurate? If not, please indicate what the most current information is?

   MLPD is the only agency within Mono County that provides 24-hour patrol coverage. Staffed by three sergeants and 12 patrol officers working three shifts, MLPD officers responded to 4,478 dispatched calls, completed 2,276 reports and made 512 arrests in 2004.

   MLPD remains the only agency within Mono County that provides 24 hour patrol coverage. The present staffing for patrol is; four patrol sergeants and twelve patrol officers.

   In 2005 the police department responded to 3,824 dispatched calls for service, wrote 2,064 reports, and made 531 total arrests.

3. What is the existing equipment inventory at the TOML police station?

   Current vehicle inventory is as follows:

   8 marked Patrol vehicles (6 Ford Expeditions and two Ford Explorers); 2 unmarked Detective vehicles (one Jeep Cherokee and one Ford Aerostar); one marked Community Service Officer vehicle (Ford Pick Up with Shell); one marked Animal Control Truck (Ford P/U w/Shell); one unmarked transportation vehicle (Dodge P/U w/shell); and two unmarked Administrative vehicles (Ford Explorers).

   Other primary equipment maintained by the Department includes:

   20 Portable Radios, 15 Streamlight Flashlights and 8 Tasers. There are 10 computer work-stations located within the police facility, as well as, a Livescan booking system. Numerous other items are part of the police facilities overall inventory, however these are the major items for this report.

   3a. Are the equipment levels adequate to meet the Project area's current demand for police services?

   While these items are sufficient to meet the current service levels, additional development will demand an increase in total inventory. Much of the current equipment is older and in need of replacement and requests will be made to increase these equipment levels as development continues.

4. Does the MLPD have a preferred officer-to-population ratio?

   The police department does have a targeted ratio of one officer to every 1,000 residents. This ratio is not based on simple permanent population numbers, rather it takes into account the average daily population (ADP)(visitors plus permanent residents on any given day) which is currently estimated at 17,000 and is also impacted by the maximum population at one time (PAOT), currently at about 35,000. The police department works to maintain an effective balance between these population totals.

   4a. What is the current ratio?

   See above, as this number fluctuates drastically depending on the seasons and holiday periods.

5. Does the MLPD have a preferred response time goal?

This department and its officers have prided themselves in reduced response times. We currently have a goal of less than five minute response times to calls for service, however we are finding this goal more difficult to achieve as additional development comes on line impacting the overall demand for services.

Presently our emergency call response times are near this established goal, with non-emergency response times falling into the 7-8 minute category. Many calls are held for several hours as a lack of available manpower does not allow for immediate response.

6. Below is a list of Special Units described on the MLPD website. Is this list still accurate? If not, please provide current information.

   - Patrol Division
   - K-9 Unit
   - Detective Division
   - Sexual Assault Response Team (SART)
   - Wildlife Management
   - Property & Evidence
   - Mono County Narcotic Enforcement Team (MONET)
   - Bicycle Patrol
   - Mounted Enforcement Unit

   Other units are: SRO & High Tech Crimes

7. Included in this letter is the Project site plan and proposed Roadways map (see Figure 2 and Figure 3). Does the proposed design conform to the MLPD's requirements for emergency access?

   Yes.

8. What effect, if any, would the Project have on the MLPD?

   All projects of this magnitude have an impact on the police department and our ability to provide effective police services. The construction of 1,200 dwelling units as proposed would impact the department in a number of ways. Recent history has proven that the construction of such projects has brought a large number of contractors and their laborers to this community. Many of these workers have become problems for local law enforcement as they socialize in the local bars and restaurants after hours. Additionally, many of these short- term residents have proven to be involved in drug use and other criminal activities requiring police intervention.

   Once the development is completed, the numbers of visitors and permanent residents created by such development will also have an impact on the Mammoth Lakes Police Department. During peak population periods, such a development could seemingly bring an additional 2,000-4,000 persons to the community, creating additional service demands for the police department.

9. Would the MLPD need to construct new police facilities or expand existing facilities in order to accommodate the Project's demand for police services?

   The current police facility is grossly inadequate for the departments overall needs and plans are ongoing to build a more adequate facility in the next 2-3 years. With the additional service level demands created by such a development, additional personnel would be necessary to meet those demands. Our current facility *is at capacity and could not meet these demands. Such development would require that the new facility be completed or at least in the latter phases of construction to meet these needs.*

10. In addition to addressing Project-specific impacts to police services, the EIR will also address cumulative impacts to police services. We are in the process of compiling a list of reasonably-foreseeable development in the TOML. Table 1 includes a list of some of the other major, reasonably-foreseeable approved development in the proximity to the Project's location. However, additional projects may be added to the list as our research continues. Can the MLPD accommodate the demand for police services associated with the development of these projects in conjunction with the Project?

    The present police department staffing levels, combined with a lack of an adequate police facility would indicate that these needs could not be met. In addition to additional staffing, the development would require a local jail facility be in place, as well as, a dispatch facility. Plans for a dispatch center and a less than 24-hour holding facility are included in the preliminary plans for the new police facility. However, development of this magnitude would likely require that a 72-hour holding facility be in place in the southern part of Mono County for persons taken into custody. This would alleviate manpower problems created by having to transport arrestees to Bridgeport.

    10a. How does your agency address the growing demand for police services?

    Presently, most newly created MLPD positions have been funded through the Town's General Fund, which is created primarily through the Town's TOT tax base. Some police department positions have been funded by both State and Federal Grants that are proactively pursued by the police department as they come available. Through the COPS Grant Program we have been able to fund 3 additional police officers and have funded one officer through the COPS In Schools Program. This funding traditionally has paid a portion of the officers salary for the first three years of their employment with additional funding having to be paid through the General Fund. Once the three year time frame has expired, the officers entire salary is paid through the General Fund. We have basically hired one officer per year for the last five years to keep pace with the demands created from new development.

    Our patrol staff works a 4-10 work schedule to provide maximum manpower coverage for those peak periods where law enforcement services are typically required. Currently, the primary overlap period for patrol personnel is from 9:00 PM through 2:00 AM every night.

    10b. Do you have any projections for future demand based on projected growth in the region?

    Our projected staffing levels over the next seven to ten years are as follows: one chief, two commanders, one administrative sergeant, four patrol sergeants, one detective sergeant, fifteen patrol personnel, four detectives, one SRO/DARE Officer, one K-9 officer, one Executive Assistant, two CSO's, one property room officer, two animal control officers, one Records/Dispatch Supervisor, six dispatchers and two records clerks.

10c. What would be needed to meet the cumulative demand for police services?

Plans in place to collect tax dollars (primarily TOT) and Developer Impact Fees that are designated specifically for law enforcement services. These funds will be necessary to not only build a new police facility, but also will enable the police department to recruit new employees to the organization.

11. Please provide recommendations that could reduce the demand for police services created by the Project.

Some initial thoughts that come to mind surrounding the reduction in police services are as follows:

- *As I am not certain what the plans are for the 29,000 square feet of commercial/retail space, I'd make a suggestion that any restaurant/bars primarily target an older crowd. Bars that cater to a crowd 30 years of age and younger typically have problems that create a greater demand for police services.*
- *Trained security personnel working in the bars and restaurants that cater to late night crowds have a positive impact on the overall success of those operations.*
- *Depending on the overall size of the development, consideration of private security patrolling the complex could be a consideration. They can reduce some criminal behavior and often work in conjunction with law enforcement to solve crimes and crime problems in a community.*

Thank you for your assistance with the questions outlined above. Any response that you can provide will help us ensure that our analysis of project-specific impacts on **police services** is accurate and complete. In order to attain a timely completion of our analysis, please provide your response (via mail, e-mail, or fax) no later than March 15, 2006. Should you have any questions, feel free to call me at (707) 283-4040 ext. 100. You may also reach me by email at terri@cajaeir.com and by fax at (707) 283-4041.

Sincerely,
Christopher A. Joseph & Associates

Terri McCracken
Assistant Environmental Planner

Enclosed:

Figure 1 Vicinity Map
Figure 2 Development Areas / Land Use
Figure 3 Proposed Roadways
Table 1 Related Projects List

March 2, 2006

Thom Heller
Fire Marshall
Mammoth Lakes Fire Protection District
PO Box 5
Mammoth Lakes, CA 93546

RE: Town of Mammoth Lakes Sierra Star Master Plan Subsequent Environmental Impact Report (EIR) – Request for Information

Dear Marshall Heller:

Christopher A. Joseph & Associates (CAJA) is working with the Town of Mammoth Lakes (TOML) Planning and Development Department to prepare an EIR for the proposed Sierra Star Master Plan project (Project). The project site is located entirely within the Town of Mammoth Lakes (Refer to Figure 1). The Sierra Star Master Plan would address future development of an approximately 41-acre site surrounding the existing 18-hole, 114-acre Sierra Star Golf Course. The site is generally located in the center of town to the north of Meridian Boulevard and is bisected by Minaret Road. The site is currently designated as the "Lodestar Master Plan" area that was designated by the Town in 1991. Under the Lodestar Master Plan, the site was developed with the golf course (located west of Minaret Road and North of Meridian Boulevard), a 54-lot single family residential subdivision (Starwood) located southeast of the Intersection of Meridian Boulevard and Minaret Road, a 32-unit townhome condominium project (The Timbers), a 58-unit condominium project (Solstice) that is currently under construction, a 46-unit condominium development (Mammoth Green), and a 24-unit condominium project with 11 single-family residential lots (Crooked Pines). A 35-unit Workforce Housing development (The Chutes) is located on the Main Street frontage road in the site's northerly sector and a 28-unit townhome condominium project (Woodwinds) and 40-unit Workforce Housing condominium project were recently approved within the Master Plan area.

The Proposed Project would involve a revision to the 1991 Lodestar Master Plan that would result in replacement of the Lodestar plan with a new master plan that would change the name, land area, and land uses set forth in the 1991 plan. The Lodestar plan set development standards for an approximately 220-acre site situated around the Sierra Star Golf Course. The Lodestar Master Plan envisioned the development of a major commercial, residential, and recreational hub within the Town.

As of August 2005, a total of 451 residential units have been developed or approved under the Lodestar Master Plan. No commercial space has been developed. The Proposed Project would refocus remaining development within the plan area toward the creation of transient occupancy units, establishment of a more efficient transportation and circulation system, and the development of additional affordable housing units. Figure 2, Development Areas / Land Use, distinguishes between the existing Lodestar development and the proposed Sierra Star development described below.

Under the Proposed Project, a total maximum of 1,208 new dwelling units would be developed. Limited commercial development (up to a maximum of 29,000 square feet of retail space and up to a maximum of 30,000 square-foot conference center) would also be allowed in specific sectors of the plan area with discretionary approval by the Town. A 200-foot maximum height would be instituted in one sector of the site for purposes of potentially attracting a hotel complex. This would exceed the Town's current height limit.

Upon final approval of the Proposed Project, the proposed Sierra Star Master Plan would effectively replace the Lodestar Master Plan for the remaining portion of the overall area yet to be developed. Analyses included in the EIR for the Proposed Project would utilize all applicable information contained in the 1991 EIR prepared for the Lodestar Master Plan and its relevant appendices, updated to meet current CEQA statutes and guidelines and to evaluate the characteristics of the proposed Sierra Star Master Plan.

To determine whether a project would have the potential to have a significant environmental effect related to **fire protection services**, the CEQA Guidelines asks the following:

- Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for fire protection?

The purpose of the EIR is to assess the Project's potential impacts to various environmental issue areas and public service and utility agencies, including the Mammoth Lakes Fire Protection District (MLFPD). The EIR will also provide recommendations that may be necessary to reduce such potential impacts to "less-than-significant" levels.

The following information was taken from the General Plan current revision that was available through the Town of Mammoth Lakes Website. Please verify that the following information is still accurate. Any assistance that you can provide with the following questions would be greatly appreciated:

1. There are two fire stations, the primary one located at 3150 Main Street, and the second at 1574 Old. Mammoth Road. Which station provides fire protection services to the Project site? Both stations would be responding to the project site and the distance would be about the same….less than one mile depending of the exact location of the incident.

2. The combined stations staff 55 volunteer (paid per call) personnel and four full time employees, including the chief. Two Mono County Paramedics are based at Station Number One. What are the types and numbers of staff at each station? Approximately half of the department members are assigned to each station. The District's offices are located at Fire Station 1, which is the station located on Main Street.

3. The MLFPD has the following vehicles: four engines, one aerial truck, one rescue unit, two utility vehicles, four staff trucks, and one water tender. What are the types and numbers of equipment (e.g., fire trucks, engines, etc.) distributed at each of these stations? The breakdown by station is as follows: Station 1 has

two engines, the ladder truck, the rescue vehicle, and the water tender. Station 2 has two engines. The utility vehicles vary depending on needs and the staff vehicles are assigned to staff personnel.

4. Fire Station Number One is in the process of being replaced by an updated and expanded facility. The new building will be approximately 17,600 square feet with administrative offices in addition to housing for full time staff. The expansion is expected to be completed by the summer of 2006. Is this still accurate? The expected completion date is January, 2007.

5. Are the existing staff levels at the stations discussed in answer to question 1 adequate to meet current demands for fire protection services in the Project area? The answer depends on the type of construction proposed, height of structures, and the density of occupants. Based upon the current plans and zoning, the Fire District believes that we are adequately staffed and equipped for the development.

   5a. If not, what is needed to accommodate current demands? N/A

6. Does MLFPD have an emergency evacuation plan or emergency response plan that the Project is a part of? The Fire District is a participant in the Town's Emergency Operations Plan and the area of the project is covered by the plan.

   6a. If so, how will the Project affect those plans? The plan will be revised with the development of this project to include any needed updates or changes. It would be anticipated that only minor changes would be needed to update the plan based upon the current plans and zoning.

7. Does the MLFPD have a preferred response time to calls for emergency service? MLFPD looks to have the first responding unit on scene within six minutes.

   7a. What is the MLFPD's record in meeting this preferred response time? Within the private land boundary of town, MLFPD generally meets this time frame. Adverse weather conditions are the primary reason for not successfully having the first in unit arriving within the first six minutes. Response outside the private land boundary, such as to the Lakes Basin or Mammoth Mountain Main Lodge/Inn take longer due to additional driving time.

8. Does the MLFPD have a preferred ratio of fire fighters per population? No

   8a. What is the current ratio? The answer varies, when considering our year-round population, MLFPD has 55 firefighters for 7500 citizens or a ratio of 1:136. At current maximum occupancy, MLFPD has 55 firefighters for 41,000 population or a ratio of 1:745.

9. Is the MLFPD responsible for assessing hydrants and fire flow capability in for the Project? Yes

   9a. If so, what are the hydrant placement and fire flow requirements for the site? Hydrants will need to be situated every 250 feet surrounding and within the project area. Fire flow requirements are going to vary depending on construction type and design. For high-rise construction, MLFPD requires a pressure of 100 psi at the roof.

10. What other agencies provide mutual aid to the Project site and surrounding areas? Mono County will provide the paramedic service for the project. MLFPD serves as the backup medical service. MLFPD has agreements with adjoining fire departments in Long Valley and June Lake for mutual aid fire protection.

11. Please describe the relationship between CDF and the Mammoth Lakes Fire Protection District. The two agencies attend unified command planning meetings and retain the ability to respond under mutual aid requests, but as there are no CDF response lands in close proximity, the incident related interaction is limited.

12. Would implementation of the Project require the MLFPD to construct new facilities or expand existing facilities to accommodate the increased demand for fire protection services created by the Project? Depending on construction type, design, and density, there is a possibility that a portion of an additional station may be necessary, along with additional equipment and additional staffing either paid or volunteer (paid per call).

13. In addition to addressing project-specific impacts to fire protection service, the EIR will also address cumulative impacts to fire protection service. We are in the process of compiling a list of reasonably-foreseeable development in the TOML. Table 1 includes a list of some of the major, approved development in proximity to the Project's location. However, additional projects may be added to list as our research continues. Can the MLFPD accommodate the demand for fire protection services associated with these projects in conjunction with the Project? Yes

    13a. How does your agency address the growing demand for fire protection services? MLFPD is in the process of remodeling and enlarging Fire Station 1 in response to the additional community development. The District is anticipating the hiring of more fulltime positions to increase our capability to respond to additional calls and the associated administrative work that will come along with increased development. MLFPD is also involved in the development of a strategic plan that will aid the department in planning for the future.

    13b. Do you have any projections for future demand based on projected growth in the region? MLFPD recognizes that the call volume and incident complexity will continue to increase as the population and unit numbers increase.

    13c. What would be needed to meet the cumulative demand for fire protection services? The outcome of the Strategic Plan will aid in determining the answer to this question.

14. Please provide recommendations that could reduce the demand for fire protection services created by the Project. Ample roads, adequate building spacing, use of fire resistive building materials, adequate vegetative clearance around structures, and compliance with all applicable codes.

Thank you for your assistance with the questions outlined above. Any response that you can provide will help us ensure that our analysis of project-specific **fire protection services** is accurate and complete. In order to attain a timely completion of our analysis, please provide your response (via mail, email or fax) no later than March 15, 2006. Should you have any questions, feel free to call me at (707) 283-4040 ext. 100. You may also reach me by email at terri@cajaeir.com and by fax at (707) 283-4041.

Sincerely,
Christopher A. Joseph & Associates

Terri McCracken
Assistant Environmental Planner

Enclosed:

Figure 1 Regional and Vicinity Map
Figure 2 Development Areas / Land Use
Figure 3 Proposed Roadways
Table 1 Related Projects List

Terri McCracken

From: Gayle Rosander [gayle_rosander@dot.ca.gov]
Sent: Monday, March 13, 2006 11:22 AM
To: terri@cajaeir.com
Cc: Craig Olson; Patricia Sanders
Subject: Sierra Star Master Plan EIR - Questions/Answers

Good morning,

Following are some answers to your questions.

Regards,
Gayle Rosander
IGR/CEQA Coordinator
Caltrans D-9
760-872-0785

1. Is the existing information below describing the relationship between the TOML Public Works Maintenance Division and CalTrans regarding snow removal accurate? If not, please indicate what the current status is.

"Snow removal is provided by CalTrans for State Highway 203 (Minaret Road and Main Street) from the junction of U.S. Highway 395 to the Mammoth Mountain Inn. The Town of Mammoth Lakes Public Works Department Maintenance Division provides snow removal service for all other publicly maintained roads. Roads and paved surface on private property are the responsibility of the landowner."

Not to the Mammoth Mountain Inn but to the Caltrans Minaret Maintenance Station at postmile 2.4.

At that point, in the winter the highway reverts back to the Inyo National Forest.

2. Please describe the sizes and capacities of existing snow storage land area utilized by CalTrans for snow removal from roads in TOML.

In general, Caltrans is usually able to blow snow and store it with in our existing R/W.
Our R/W in the area just north of the project is 200 -ft wide, with actual highway pavement varying from approximately 64-ft to 76-ft.
Some snow is blown/stored on the uphill side (north) but more area is blown/stored on the downhill side (south).

3. Are there any existing snow removal/snow storage problems/deficiencies in the Project area?

Keeping up with removal during large storms, dealing with the traffic flow and illegal parking.

3a. If snow removal/snow storage problems/deficiencies exist, how would they affect the Project?

Could be access issues from SR 203 in the area of pm 5.1 to the frontage road.

3b. What measures could the project incorporate to minimize the affect these snow removal/snow storage problems/deficiencies on the project and surrounding uses?

Ensure there are provisions for more than adequate snow storage.

4. Are there any stormwater quality regulations governing snow storage in the TOML?

Contact the Town of Mammoth Lakes, the Lead Agency in this matter.

5. Please provide any recommendations that might reduce any potential snow removal/snow storage impacts associated with the Project.

Have provisions for more than adequate snow removal and storage, ensuring sight distance is not inhibited for any mode of transportation.

Ensure snow removal/storage does not adversely impact pedestrians.

Mammoth Community Water District
P.O. Box 597
Mammoth Lakes, CA 93546
(760) 934-2596; fax (760) 934-2143

June 1, 2006

Terri McCracken
Assistant Environmental Planner
Christopher A. Joseph & Associates
179 H Street
Petaluma, CA 94952

Re: Response to Town of Mammoth Lakes Sierra Star Master Plan Subsequent EIR Request for Information

Dear Ms. McCracken:

This District received your letters regarding request for information for water and wastewater needs for the Sierra Star Master Plan EIR dated March 2, 2006 and May 1, 2006. We hope the information included in this response helps address the questions described in your letters. The numbering of the following responses corresponds to the questions posed to the District in your letters. Answers from March 2, 2006 letter (water demand):

1. Please see the attached map, Figure 2, which includes existing and planned future pipelines with diameters and pipe type.
2. The existing water system infrastructure will not be able to deliver proposed demand due to piping constraints.
    a. The District has worked with design engineers of the existing Lodestar development and future Sierra Star development to ensure the future design will meet the proposed water demands. The consulting design engineer (Triad Holmes Associates) has prepared design plans for the new pipelines that are shown on Figure 2. These new required lines include approximately:
        - 6,300 feet of 10-inch ductile iron pipe
        - 900 feet of 8-inch ductile iron pipe
        - 900 feet of 6–inch ductile iron pipe

System pressures range from 50 to 150 pounds per square inch (psi). Fire pumps may be required per the Mammoth Lakes Fire Protection District to meet fire flow requirements.

b. Please see the explanation under response #9. The above engineering work should relieve the piping constraints that have been identified.

3. The District will be able to accommodate the proposed project's demand for water service with the additional infrastructure noted in item 2b and Figure 2.
4. The proposed project will receive treated surface water from the Lake Mary Water Treatment Plant and treated groundwater from Groundwater Treatment Plant No. 2, located at the corner of Meridian Boulevard and Majestic Pines Drive. These two treatment plants have sufficient treatment capacity to serve the project's demand for water. Under rare conditions, it is possible for the proposed project to receive treated groundwater from Groundwater Treatment Plant No. 1, located off Old Mammoth Road near Snowcreek Athletic Club.
5. System pressures range from 50 to 150 psi. Fire pumps may be required per the Mammoth Lakes Fire Protection District to meet fire flow requirements for taller structures. Meeting the Fire Code for pressure of 20 psi at the point of service can be maintained for fire flows of 1,500 (residential), 2,000 (high density residential), and 2,500 (commercial) gallons per minute for 2 hours.
6. The District has developed an expected water demand at build out of 4898 acre-feet per year utilizing the unit counts projected in the Town of Mammoth Lakes General Plan Update DEIR (October 2005). These figures were also used in the preparation of the District's 2005 Urban Water Management Plan (UWMP). The Sierra Star Master Plan is proposing similar unit counts to those projects in the Lodestar Master Plan, which was included in the General Plan DEIR and the 2005 UWMP. The District estimates that, given the existing water supply, there will be a deficiency in supply at build out in the third year of a drought. However, the District is currently working on the following projects that either reduce demand or provide additional supplies: water pipeline replacement to reduce system loss, recycled water project to make additional potable water available for domestic uses, and an aggressive water conservation program. The following table provides additional detail.

Future Water Supply Projects

Project Name	Demand Reduction (acre-feet)	Supply Increase (acre-feet)	Projected Completion Date
Recycled Water Project	500 ac-ft	n/a	2007-2009
Water Conservation	10% with voluntary measures (about 200 ac-ft)	n/a	Ongoing
Water Pipeline Replacement (reduce water losses)	10-15% loss rate goal (about 300 ac-ft)	n/a	Ongoing, full implementation anticipated by 2011
New groundwater development	n/a	1000 ac-ft (or amount needed to meet demands)	As needed

The District has also prepared the attached table which details water consumptive factors for a variety of development unit types or customer billing classes. These consumptive factors have been used to evaluate water demands from this project and other new development projects.

7. This question is addressed in #4.
8. The District uses Senate Bill 610 direction in determining the need for preparing water assessments for development projects. Since the Lodestar Master Plan was included in the water assessment that was developed for the Town of Mammoth Lakes General Plan Update EIR (October 2005) and the Sierra Star Master Plan proposes less total units than the Lodestar Master Plan, this project does not require a separate water assessment.
9. Indoor water use could be minimized by utilizing high efficiency fixtures for toilets, urinals, faucets, and shower heads. Other technologies to consider are hot water demand devices for water heating, Energy Star dishwashers, clothes washers, and refrigerators, and limiting the number of showerhead to one high efficiency fixture per shower stall. Outdoor water use could be minimized by using drought tolerant plants in the landscaping design, drip irrigation systems where watering is needed, and by utilizing "smart" evapotranspiration irrigation controllers.

Answers from May 1, 2006 letter (wastewater demand)

1. Please see the attached map (Figure 1) for the sizes and types of existing sewer lines that would serve the project site.
2. District engineering staff has utilized a sewer flow model to determine anticipated flow in the existing sewer collection system with the demands projected from the Sierra Star Master Plan.

Three areas of deficiency have been determined: sewer collection lines on Manzanita Road from Dorrance Drive and along Center Street, the final sewer trunk lines coming into the District's wastewater treatment plant located at the corner of Meridian Boulevard and Highway 203, and a short section of sewer line on Meridian Boulevard near the intersection with Old Mammoth Road.

a. The connection fees for the project will be help pay for the necessary upgrades to the sewer collection pipelines described above. Although the District plans to upgrade these pipelines in the future, the District cannot guarantee that timelines for the upgrades will coincide with development associated with the Sierra Star Master Plan.
b. If fewer units were proposed as part of the Sierra Star Master Plan, this would lessen the impacts on the sewer collection system.

3. The Mammoth Community Water District cannot accommodate the proposed projected demand for sewer collection service with the existing infrastructure in the project area.
4. The District is planning to upsize the sewer pipelines on Center Street within the next two years, which should alleviate the capacity issues in this area. When development occurs on the Shady Rest tract, the District will require a new sewer line though this project which should alleviate deficiencies on Manzanita Road. The trunk lines at the wastewater treatment plant are planned for an increase in capacity. The planned installation of a new trunk line on Meridian Boulevard to the wastewater treatment plant will also help to alleviate deficiencies near the plant. Finally, the infrastructure upgrades needed on Meridian Boulevard near Old Mammoth Road have been previously identified and the District is currently working on reducing demands to this portion of the collection system by modifying the filter backwash system at groundwater treatment plant #2, located at the corner of Meridian Boulevard and Majestic Pines Drive. This work is scheduled for the summer of 2007, but additional upgrades may still be required to the pipelines on Meridian Boulevard.
5. The District can accommodate the project's demand for wastewater treatment service with the existing capacity of the wastewater treatment plant. The plant is designed to meet demands from the town at buildout of the community. The current capacity of the wastewater treatment plant is 4.9 million gallons per day (mgd) with 1.5 mgd currently being treated on an average day.
6. The District anticipates being able to meet the wastewater treatment demand from the future development proposed in the Town of Mammoth Lakes. As development of these various

projects take place, the District will need to evaluate potential impacts to the sewer collection system in the vicinity of each project.

   a. The District's wastewater treatment was recently upgraded to handle the capacity anticipated from the Town of Mammoth Lakes at buildout.
   b. The District's engineering staff has developed a sewer flow model which incorporates anticipated growth in the Town of Mammoth Lakes based on the unit projections in the Town of Mammoth Lakes General Plan Update Draft EIR (October 2005).
   c. The District has identified various locations in the sewer collection system that is near capacity and will need upgrades as various development projects come on line.

7. Please see the attached table for sewer generation factors.
8. Please see the response for 2 (b) above.

I hope this information is helpful and provides sufficient data for the preparation of the Sierra Star Master Plan Draft EIR. Please feel free to contact the District if you have any additional questions or would like any follow-up information regarding the information in this letter. As I will be out of the office from June 5 to July 11, you may contact General Manager Gary Sisson at gsisson@mcwd.dst.ca.us or by phone at extension 238. Engineering related questions may also be directed to District Engineer John Pedersen at jpedersen@mcwd.dst.ca.us or by phone at extension 240.

Sincerely,

Ericka Hegeman
Environmental Specialist

APPENDIX J

TRAFFIC DATA

TRAFFIC IMPACT ANALYSIS

SIERRA STAR MASTER PLAN

TOWN OF MAMMOTH LAKES, CALIFORNIA

This Traffic Impact Analysis has been prepared
under the supervision of Leslie E. Card, PE

Signed Leslie E. Card

REGISTERED PROFESSIONAL ENGINEER
LESLIE ERIC CARD
No. 34410
Exp. 9/30/07
CIVIL
STATE OF CALIFORNIA

LSA

REGISTERED PROFESSIONAL ENGINEER
LESLIE ERIC CARD
No. 322
Exp. 3/31/07
TRAFFIC
STATE OF CALIFORNIA

May 2006
Revised August 2006

TRAFFIC IMPACT ANALYSIS

SIERRA STAR MASTER PLAN

TOWN OF MAMMOTH LAKES, CALIFORNIA

Submitted to:

Sierra Star Four-Five Development Company, LLC
6900 South McCarran Blvd.
Reno, Nevada 89509

Prepared by:

LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, California 92614-4731
(949) 553-0666

LSA Project No. INT030

LSA

May 2006
Revised August 2006

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TRAFFIC IMPACT ANALYSIS

INTRODUCTION

The purpose of this traffic impact analysis (TIA) is to assess potential circulation impacts associated with the development of the Sierra Star Master Plan on the existing circulation system of the Town of Mammoth Lakes (Town).

This report will address the short-range (near-term) impacts of the Sierra Star Master Plan. The existing (2004) typical winter Saturday condition will be considered the baseline condition in this TIA. This analysis provides an assessment of the Sierra Star Master Plan traffic impacts and the determination of traffic mitigation as required for California Environmental Quality Act (CEQA) compliance.

PROJECT DESCRIPTION

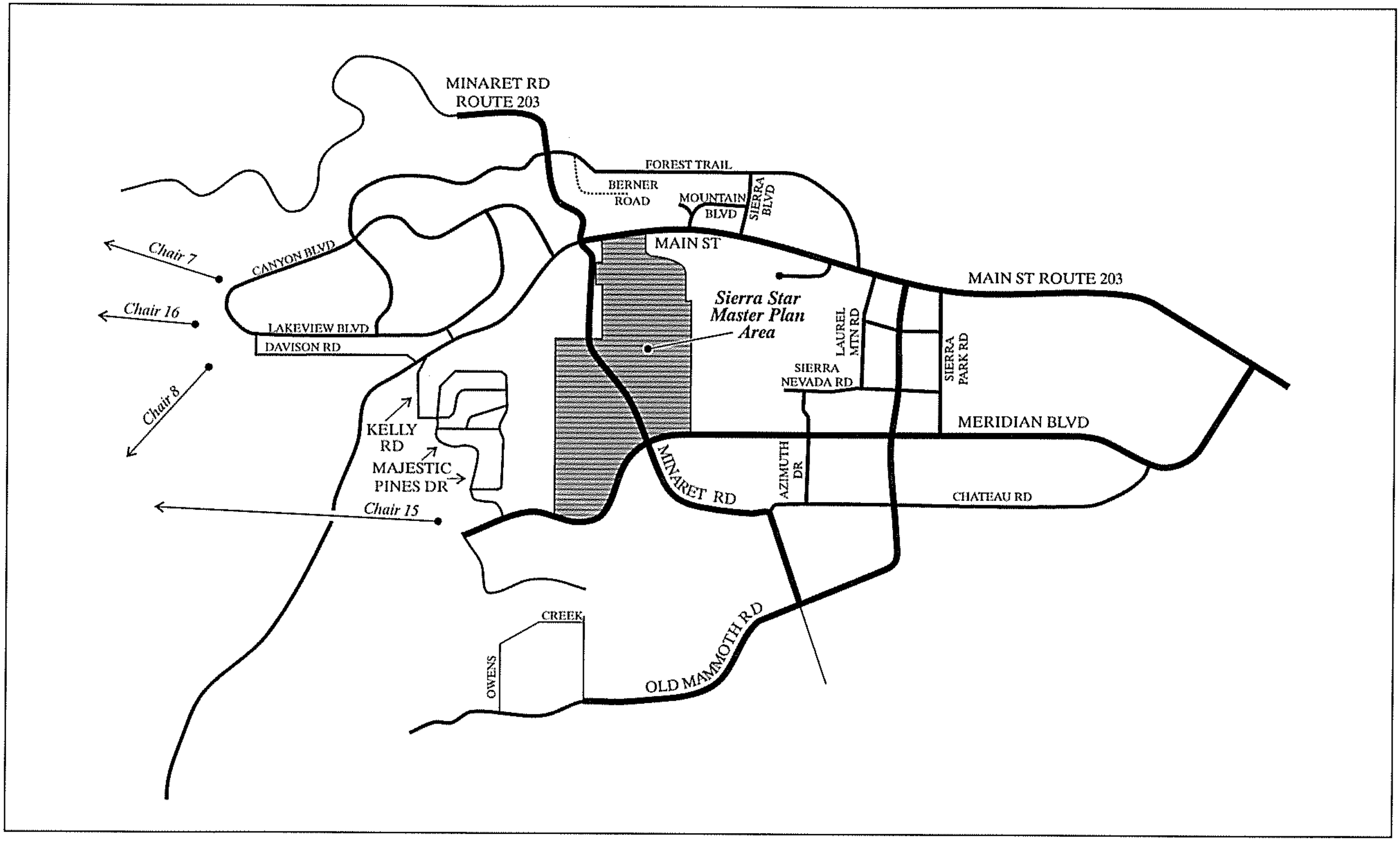
The Sierra Star Master Plan is located north of Meridian Boulevard on the west and east sides of Minaret Road and was previously referred to as "Lodestar at Mammoth." The project consists of approximately 970 traffic generating units. The location of the Sierra Star Master Plan is shown in Figure 1.

METHODOLOGY

The analysis of traffic impacts examines the following conditions:

1. Existing conditions
2. Cumulative baseline (existing plus approved projects) conditions
3. Cumulative plus project conditions

Typical winter Saturday peak hour baseline conditions were used to analyze traffic impacts for the existing and cumulative (existing plus approved project) conditions. The "design" day used in this study is a typical winter Saturday. This level of traffic occurs 15 to 20 times a year. In the context of standard engineering practice, even the typical winter Saturday represents a conservative approach to traffic planning and mitigation. Typical winter Saturday peak hour traffic counts previously conducted by the Town and other approved traffic studies were utilized. For intersections where existing traffic counts were not available, LSA used traffic counts from the General Plan Update Traffic Analysis (November 2004) prepared by LSC Transportation Consultants, Inc. Through traffic volumes at the project driveways were extrapolated from the existing adjacent intersections.



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NOT TO SCALE

FIGURE 1

Sierra Star Master Plan

Project Site Location

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The study area intersections are as follows:

1. Minaret Road/Meridian Boulevard
2. Minaret Road/Main Street/Lake Mary Road
3. Old Mammoth Road/Meridian Boulevard
4. Minaret Road/Old Mammoth Road
5. Sierra Park Road/Meridian Boulevard
6. Old Mammoth Road/Main Street
7. Mountain Boulevard/Main Street
8. Sierra Star Parkway/Meridian Boulevard
9. Minaret Road/Sierra Star Parkway-Grove Street
10. Minaret Road/Grove Street

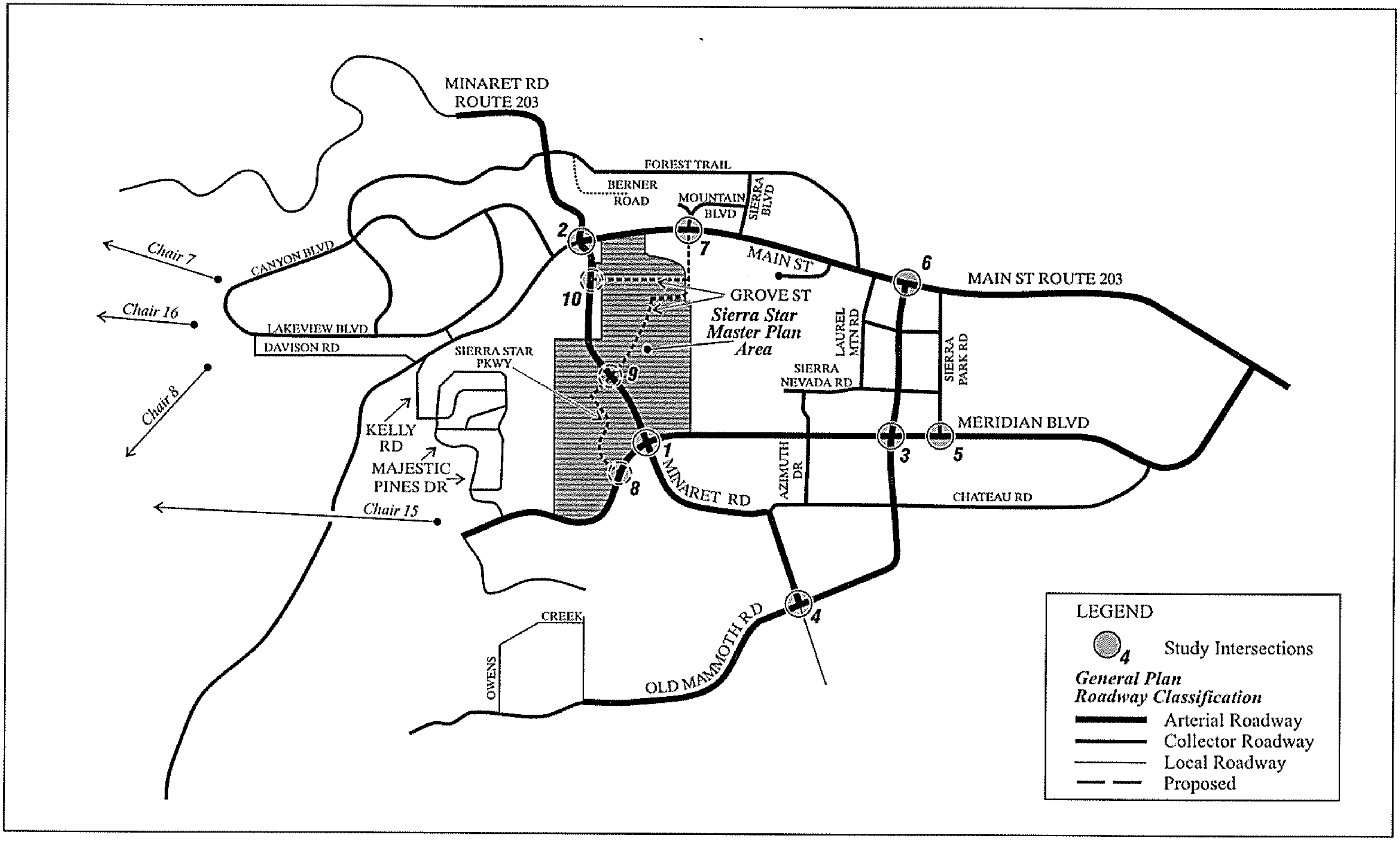
Figure 2 shows the location of the 10 study area intersections, as well as the Town's General Plan Roadway Classifications for the surrounding circulation system.

A cumulative scenario has been included in this analysis to account for traffic from reasonably foreseeable development projects that would be added to the existing circulation system. A list of reasonably foreseeable projects was mutually agreed upon with the Town staff. Reasonably foreseeable projects of 10 units or less are not included due to their nominal impact. Thirty (30) development projects have been identified by the Town as anticipated to be developed within the near future.

Peak winter Saturday daily and p.m. peak hour trips were generated for the proposed Sierra Star Master Plan using standard trip rates from the Town and the Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 7th Edition. Trip distribution percentages were determined based upon review of approved traffic studies for the Intrawest Master Plan and North Village Specific Plan.

LEVEL OF SERVICE STANDARDS

The Town's level of service (LOS, which is defined using letter grades A–F) standard for intersections is LOS D, which corresponds to a volume-to-capacity (v/c) ratio of 0.90 for signalized intersections. An intersection is considered satisfactory when it operates in the range of LOS A to D. An unsignalized intersection would be considered deficient if an individual minor street movement operates at LOS E or F <u>and</u> total minor approach delay exceeds four vehicle hours for a single-lane approach and five vehicle hours for a multilane approach, consistent with the adopted Circulation Element and General Plan Update Traffic Analysis (LSC Consultants, 2004).



LSA

FIGURE 2

Sierra Star Master Plan

Study Area Intersections
and Circulation System

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Methodology

Roadway operations and the relationship between capacity and traffic volumes are generally expressed in terms of LOS. These levels recognize that while an absolute limit exists regarding the amount of traffic traveling through a given intersection (the absolute capacity), the conditions that motorists experience rapidly deteriorate as traffic approaches absolute capacity. Under such conditions, congestion is experienced. There is general instability in the traffic flow, which means that relatively small incidents (e.g., momentary engine stalls) can cause considerable fluctuations in speeds and delays. This near-capacity situation is labeled LOS E. Beyond LOS E, capacity has been exceeded, and arriving traffic will exceed the ability of the intersection to accommodate it. An upstream queue will then form and continue to expand in length until the demand volume again declines.

A complete description of the meaning of LOS can be found in the Transportation Research Board Special Report 209, *Highway Capacity Manual.* The Manual establishes LOS A–F. Brief descriptions of the six LOS, as abstracted from the Manual, are shown in Table A. The LOS criteria for unsignalized and signalized intersections are shown in Table B.

Table A: Intersection LOS Descriptions

LOS	Description
A	No approach phase is fully utilized by traffic, and no vehicle waits longer than one red indication. Typically, the approach appears quite open, turns are made easily, and nearly all drivers find freedom of operation.
B	This service level represents stable operation, where an occasional approach phase is fully utilized and a substantial number are approaching full use. Many drivers begin to feel restricted within platoons of vehicles.
C	This level still represents stable operating conditions. Occasionally, drivers may have to wait through more than one red signal indication, and backups may develop behind turning vehicles. Most drivers feel somewhat restricted but not objectionably so.
D	This level encompasses a zone of increasing restriction approaching instability at the intersection. Delays to approaching vehicles may be substantial during short peaks within the peak period; however, enough cycles with lower demand occur to permit periodic clearance of developing queues, thus preventing excessive backups.
E	Capacity occurs at the upper end of this service level. It represents the most vehicles that any particular intersection approach can accommodate. Full utilization of every signal cycle is seldom attained no matter how great the demand.
F	This level describes forced-flow operations at low speeds, where volumes exceed capacity. These conditions usually result from queues of vehicles backing up from a restriction downstream. Speeds are reduced substantially, and stoppages may occur for short or long periods of time due to the congestion. In the extreme case, both speed and volume can drop to zero.

Table B: Level of Service Parameters

Level of Service	Signalized Intersections Delay (seconds)	Unsignalized Intersections Delay (seconds)[1]
A	≤ 10.0	≤ 10.0
B	> 10.0 and ≤ 20.0	> 10.0–15.0
C	> 20.0 and ≤ 35.0	> 15.0–25.0
D	> 35.0 and ≤ 55.0	> 25.0–35.0
E	> 55.0 and ≤ 80.0	> 35.0 seconds/vehicle and > 4.0 hour cumulative delay for single lane or > 5.0 hour cumulative delay for two lane approach
F	> 80.0	

For all study area intersections, the *2000 Highway Capacity Manual* (HCM 2000) analysis methodologies were used to determine intersection LOS. All LOS were calculated using the Traffix Version 7.7 software, which uses the HCM 2000 methodologies.

Signalized Intersections and Unsignalized Intersections

LOS for signalized and unsignalized intersections are determined using the methodology set forth in the 2000 HCM, where the calculation of LOS is dependent on the occurrence of gaps in the through traffic flow of the major street. Using data collected describing the intersection configuration and traffic volumes at the study area intersections, the delay (in seconds per vehicle) of each minor street or major street conflicting movement is estimated. These delays are used to calculate the intersection's average delay per vehicle, which is used to determine the intersection LOS. It should be noted that at two-way, stop-controlled intersections, the intersection delay refers only to the delay experienced by vehicles on the stop-controlled minor street. As a result, at locations where a higher volume of through traffic is experienced on the major street, fewer gaps will be experienced in the through traffic flow of the major street. As a result, the addition of only one or two vehicles to the stop-controlled minor street could result in the rapid deterioration of LOS at that intersection, although most vehicles at the intersection do not experience any delay.

It should be noted that the LOS threshold at unsignalized intersections can be easily exceeded when only a few vehicles experience a delay greater than 35 seconds. Furthermore, application of this threshold would substantially increase the frequency of identified failure of intersections, along with the need for intersection improvements. For these reasons, the Town has identified unsignalized intersection LOS standards that allow greater delay on low-volume approaches. These thresholds of significance identify a deficiency if the approach delay exceeds four vehicle-hours for a single-lane approach and five vehicle-hours for a multilane approach. This threshold has the advantage of being relatively easy to calculate as well as to explain to the public. For example, it could be summarized as

1 If the intersection exceeds the LOS D criteria, the hourly total criteria (four vehicle-hours) standard applies.

follows: "A deficiency is only found for a side street with two approach lanes when the cumulative total delay exceeds five hours." Therefore, as delay exceeds the 35-second threshold, the four vehicle-hour and five vehicle-hour standard applies.

EXISTING (WINTER 2004) CONDITIONS

Figure 3 presents the existing number of lanes and intersection control for the study area intersections. Figure 4 shows the existing typical winter Saturday peak hour traffic volumes at each study area intersection. Existing levels of service at study area intersections are shown in Table C. The LOS worksheets for the existing conditions are presented in Appendix A.

Table C: Existing (2004) Typical Winter Saturday Intersection Levels of Service

Intersection	Delay (sec)	LOS
1. Minaret Rd./Meridian Blvd.	19.9	B
2. Minaret Rd./Lake Mary Rd.-Main St.	20.0	C
3. Old Mammoth Rd./Meridian Blvd.	19.3	B
4. Minaret Rd./Old Mammoth Rd.*	18.9	C
5. Sierra Park Rd./Meridian Blvd.*	7.7	A
6. Old Mammoth Rd./Main St.	18.5	B
7. Mountain Blvd./Main St.*	>35.0 but < 4.0 hour cumulative delay on minor street approach	D

Notes: * = unsignalized intersection

As shown in Table C, all study area intersections currently operate at satisfactory levels of service in the existing condition.

CUMULATIVE (EXISTING PLUS APPROVED PROJECTS) CONDITIONS

To forecast background traffic conditions, traffic volumes from approved projects in the vicinity of the Sierra Star Master Plan were added to existing traffic volumes. A list of approved projects was provided by the Town of Mammoth Lakes. The following projects in the vicinity of the Sierra Star Master Plan are included:

1. Snowcreek 6, The Lodges: 120 high-density dwelling units
2. Mono County Library: 12,000 square feet
3. Mammoth Hospital: 40,000 square feet
4. Kern River Development (Swiss Chalet): 71 high-density dwelling units
5. Mammoth Gateway: 11 high-density dwelling units
6. 8050 A/B Coast Pacific: 23 high-density dwelling units

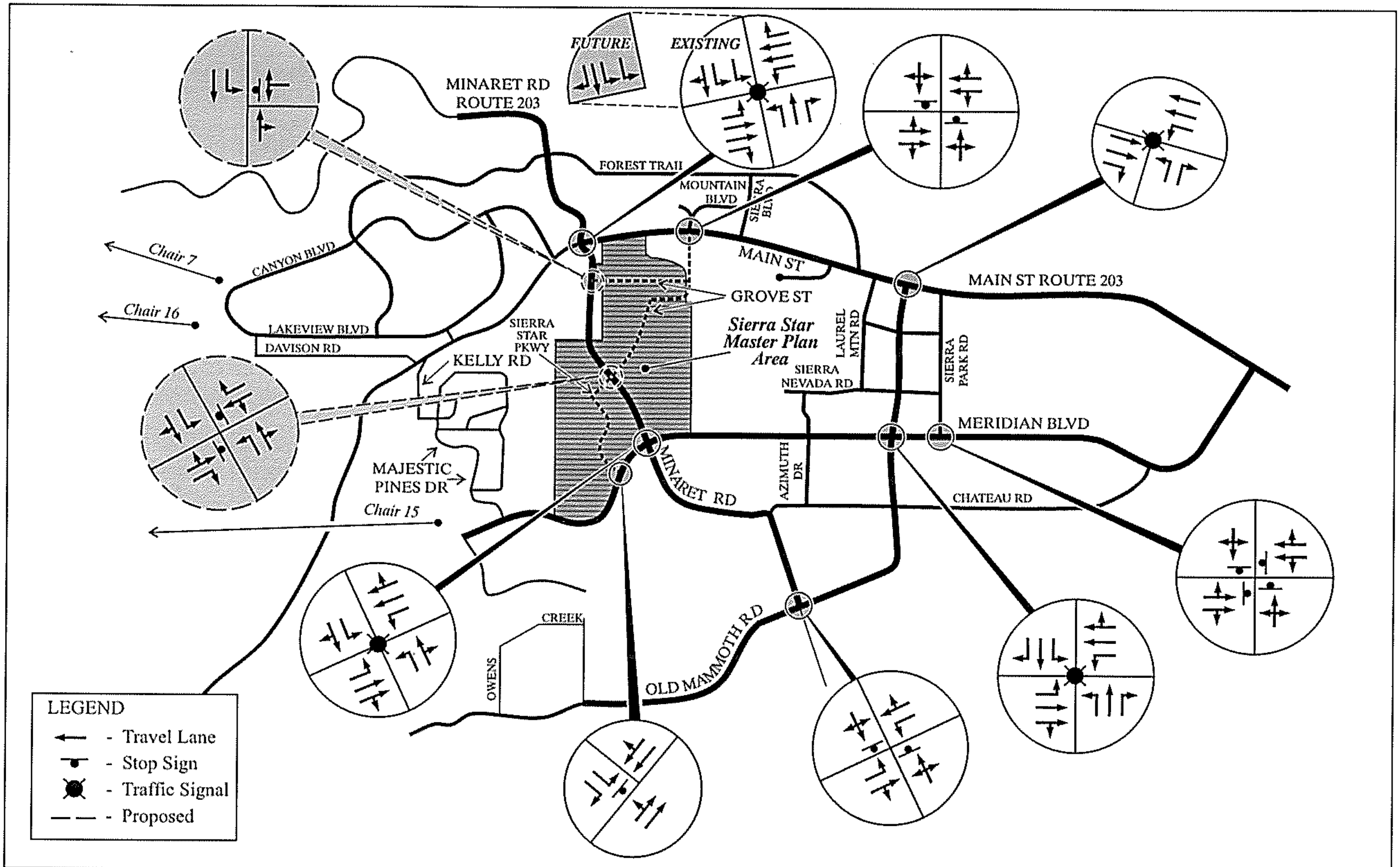

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FIGURE 3

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Sierra Star Master Plan
Study Area Intersection Geometrics
and Control Devices

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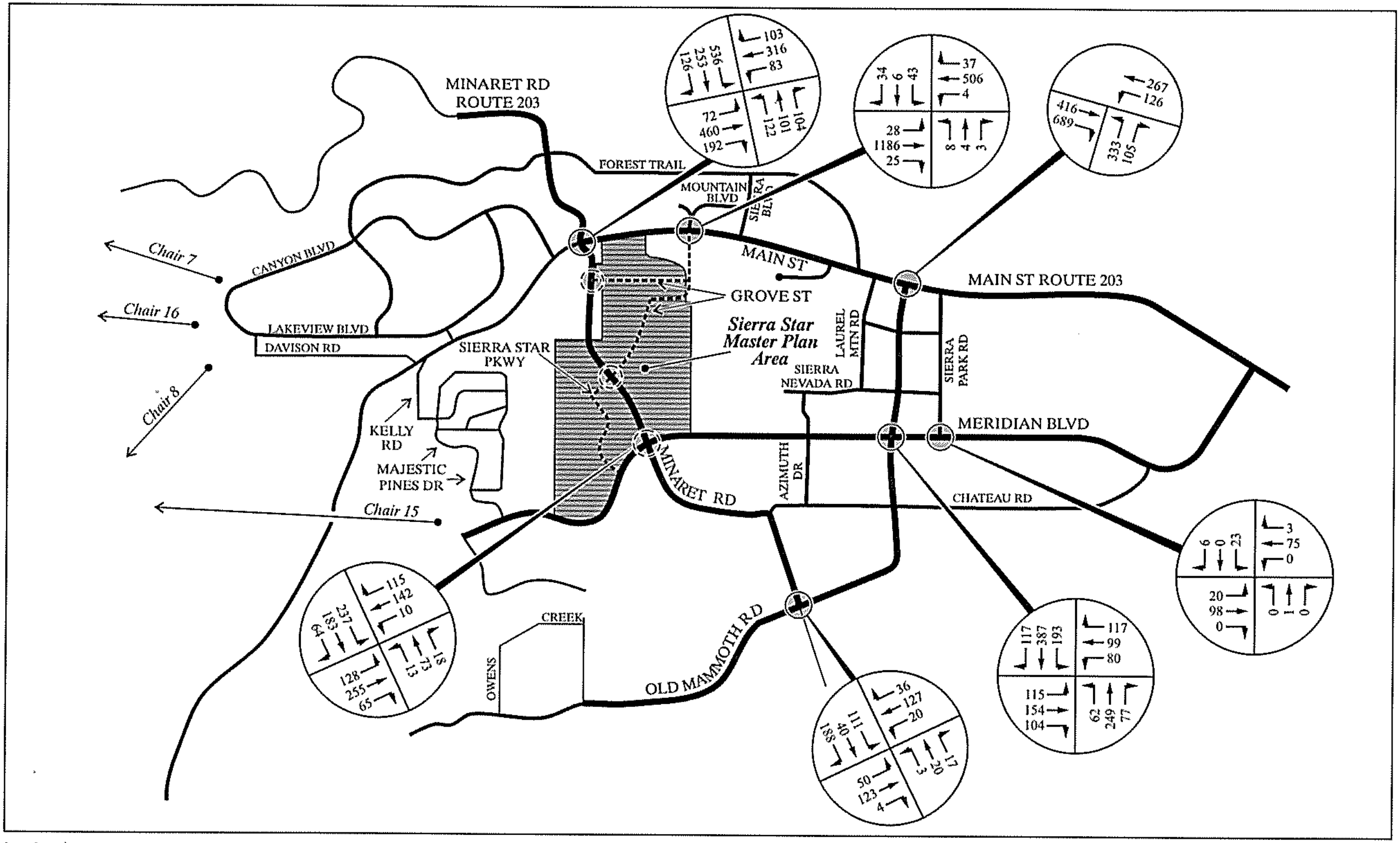

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FIGURE 4

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Sierra Star Master Plan

Existing Condition Typical Winter Saturday
Peak Hour Traffic Volumes

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7. Tosca/Big Air Mountain: 11 high-density dwelling units
8. Stonegate Mammoth: 14 medium-density dwelling units
9. Westin (The Monache): 230-room resort hotel with 4,000 square feet of restaurant use
10. Grey Eagle: 12 high-density dwelling units
11. Intrawest Solstice: 58 high-density dwelling units
12. Tallus: 19 high-density dwelling units
13. Mammoth Lakes Fire Protection District: 17,600 square feet
14. Aspen Village Phase I and II: 71 high-density dwelling units
15. Meridian Court: 24 high-density dwelling units
16. Lodestar Mammoth Crossing: 45 condominium/hotel units
17. Callahan Affordable Housing: 40 high-density dwelling units
18. Sierra Star 4/5 (Woodwinds): 28 high-density dwelling units
19. Mammoth 8050-C: 21 high-density dwelling units
20. Storied Places: 22 high-density dwelling units
21. Hard Rock Hotel: 149 high-density dwelling units
22. Mammoth Hillside Phase I and II: 234 resort hotel units and 37 employee units
23. Eagle Lodge: 62 condominium/hotel dwelling units, 21 private residence units, 5,000-square-foot ice skating rink, 4,000-square-foot convenience market, 8,000-square-foot day spa, 4,000-square-foot restaurant, a food court, ski school/day care, and skier commercial services
24. Snowcreek Hilltop (Snowcreek VII): 118 high-density dwelling units
25. Sam Walker & Brent Allen: 19,126 square feet of industrial use
26. Ward Jones: 54 high-density dwelling units
27. Mammoth Lakes 3789, LLC: 23 medium-density units
28. Clearwater Mammoth: 371 high-density dwelling units and 28,205 square feet of commercial
29. Mammoth Lakes Foundation: 70 student housing units
30. The Jefferies: 14 high-density dwelling units

Table D shows the trip generation of each reasonably foreseeable project. Where available, trip generation estimates were obtained from traffic studies prepared for these projects. Where traffic studies were not available, trips were generated for that project using trip rates from the Mammoth Lakes Transportation Model (MTM) and the ITE *Trip Generation Manual,* 7th Edition. The location of these projects, along with the traffic volumes contributed to study area intersections by these projects, is illustrated in Figure 5.

Traffic generated by the reasonably foreseeable projects was added to existing traffic to arrive at the cumulative baseline condition. The cumulative baseline traffic volumes at each intersection are

Table D- Cumulative Projects Trip Generation

		Winter Saturday Peak Hour		
Land Use	**ADT**	**In**	**Out**	**Total**
1. Snowcreek VI, The Lodges[1]	1,200	54	46	100
2. Mono County Library[1]	559	43	38	81
3. Mammoth Hospital[2]	671	9	28	37
4. Swiss Chalet[3]	—	—	—	—
5. Mammoth Gateway[1]	110	5	4	9
6. 8050 A/B, Coast Pacific	230	10	9	19
7. Tosco/Big Air Mountain[1]	110	5	4	9
8. Stonegate Mammoth[1]	140	6	5	12
9. The Monache[1]	2,473	141	100	241
10. Grey Eagle[1]	120	5	5	10
11. Intrawest[1]	580	26	22	48
12. Tallus[1]	190	9	7	16
13. Mammoth Lakes Fire Protection District[4]	—	—	—	—
14. Aspen Village Phase I and II[1]	710	32	27	59
15. Meridian Court[1]	240	11	9	20
16. Lodestar Mammoth Crossing[1]	450	20	17	37
17. Callahan Affordable Housing[1]	400	18	15	33
18. Sierra Star 4/5[1]	280	13	11	23
19. Mammoth 8050 C[1]	210	9	8	17
20. Storied Places[1]	220	10	8	18
21. Hard Rock Hotel[1]	1,490	67	57	124
22. Mammoth Hillside[5]	2,205	106	84	265
23. Eagle Lodge-Juniper Ridge[1]	1,285	132	114	143
24. Snowcreek Hilltop[6]	1,062	46	40	86
25. Sam Walker & Brent Allen[4]	—	—	—	—
26. Ward Jones[1]	540	24	21	45
27. Mammoth Lakes 3789[1]	230	10	9	19
28. Clearwater Mammoth[7]	2,894	76	96	159
29. Mammoth Lakes Foundation[8]	40	6	2	8
30. The Jefferies[1]	140	6	5	12
Total Approved Projects	**18,779**	**899**	**792**	**1,650**

Notes:

[1] Daily trip generation based on MTM. The p.m. peak-hour rates were developed based on the proportional relationship of the daily and p.m. peak-hour rates for the respective land uses as shown in the ITE Trip Generation, 7th Edition.

[2] Mammoth Hospital Expansion Traffic Impact Analysis, LSA Associates, Inc., April 2003.

[3] This project is forecast to generate fewer vehicle trips than the existing land use, resulting in no new trip generation.

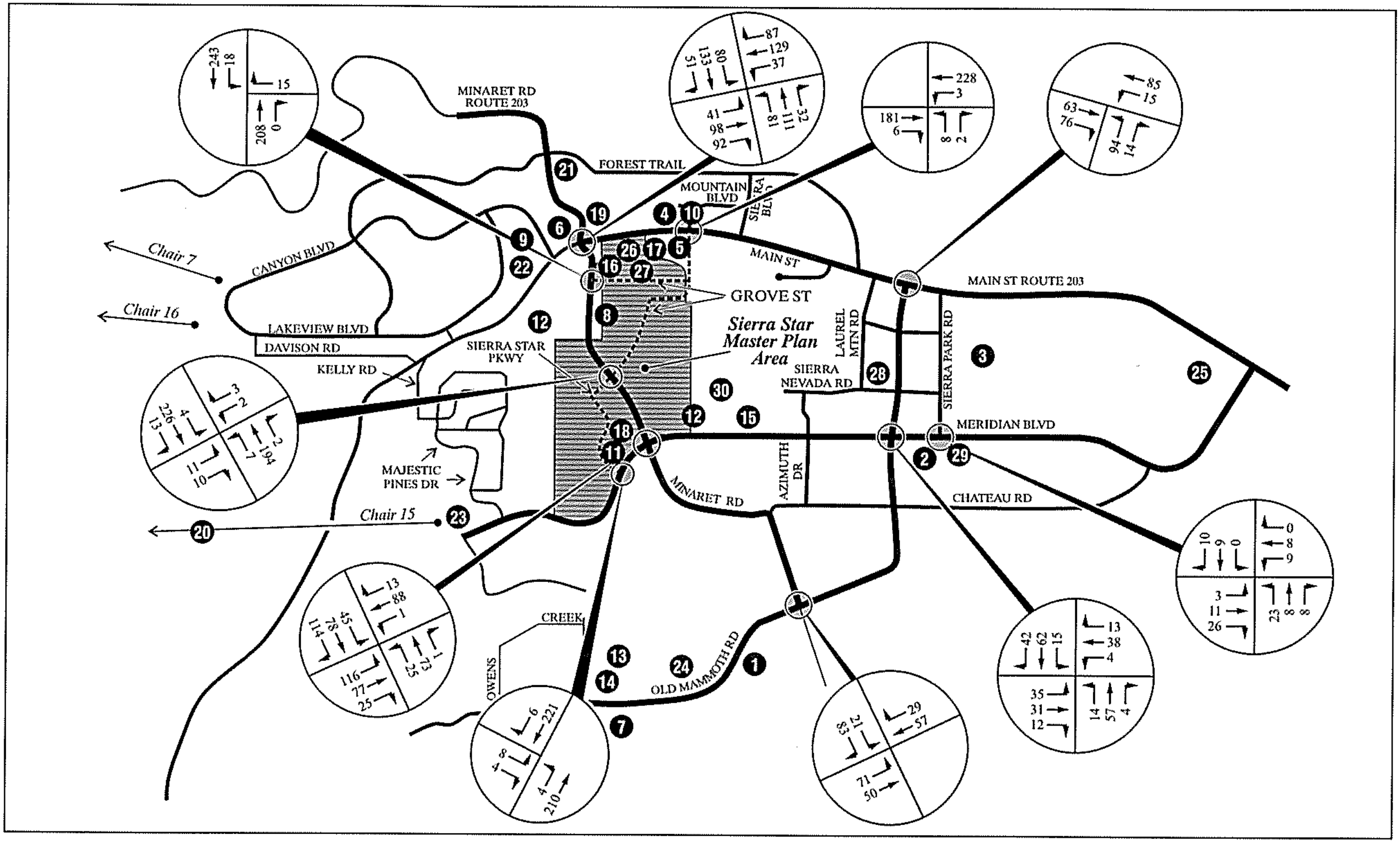
[4] This land use will generate a nominal number of trips during the Saturday peak hour.

[5] Mammoth Hillside Traffic Impact Analysis, LSA Associates, Inc., December 2005.

[6] Snowcreek 7 Traffic Impact Analysis, LSA Associates, Inc., December 2005.

[7] Mammoth Clearwater Traffic Impact Analysis, LSA Associates, Inc., April 2006.

[8] Traffic Impact Analysis and Parking Study, LSA Associates, Inc., February 2002. One-half of the 1,000-student college is expected to be built out in the cumulative condition. Saturday trips are expected to be 10 percent of the weekday peak hour.



LSA

NOT TO SCALE

Approved Projects Key

1. Snowcreek 6, The Lodges
2. Mono County Library
3. Mammoth Hospital
4. Swiss Chalet (Kern River Development)
5. Mammoth Gateway
6. 8050 A/B, Coast Pacific
7. Tosca/Big Air Mountain
8. Stonegate Mammoth
9. Monache (Westin)
10. Grey Eagle
11. Intrawest
12. Tallus
13. Mammoth Lakes Fire Protection District
14. Aspen Village Phase 1 and 2
15. Meridian Court
16. Lodestar Mammoth Crossing
17. Callahan Affordable Housing
18. Sierra Star 4/5
19. Mammoth 8050-C
20. Storied Places
21. Hard Rock Hotel
22. Mammoth Hillside
23. Eagle Lodge - Juniper Ridge
24. Snowcreek Hilltop
25. Sam Walker and Brent Allen
26. Ward Jones
27. Mammoth Lakes 3789
28. Clearwater Mammoth
29. Mammoth Lakes Foundation
30. The Jefferies

FIGURE 5

Sierra Star Master Plan

Approved Projects Location and Typical Winter Saturday Peak Hour Traffic Volumes

I:\INT030\G\AppvdProj&Vols.cdr (6/14/06) illustrated in Figure 6. A level of service analysis at study area intersections was prepared for the cumulative baseline condition. The level of service calculations include the implementation of mitigation measures associated with the Village at Mammoth project (i.e., a southbound through and right turn lane at Minaret Rd./Lake Mary Rd.-Main Street) The levels of service are shown in Table E. The LOS worksheets for the cumulative baseline conditions are presented in Appendix B.

Table E: Cumulative Typical Winter Saturday Intersection Levels of Service

Intersection	Delay (sec)	LOS
1. Minaret Rd./Meridian Blvd.	34.5	C
2. Minaret Rd./Lake Mary Rd.–Main St.	27.0	C
3. Old Mammoth Rd./Meridian Blvd.	22.0	C
4. Minaret Rd./Old Mammoth Rd.*	**>35.0 and > 4.0 hour cumulative delay on minor street approach**	**F**
5. Sierra Park Rd./Meridian Blvd.*	8.0	A
6. Old Mammoth Rd./Main St.	24.7	D
7. Mountain Blvd./Main St.*	>35.0 but < 4.0 hour cumulative delay on minor street approach	D

Notes: * = unsignalized intersection
Shaded and Bold = unsatisfactory LOS and exceeds four vehicle-hour criteria

As shown in Table E, all the study area intersections are forecast to operate at satisfactory LOS (LOS D or better) in the cumulative condition with the exception of the unsignalized intersection of Minaret Road/Old Mammoth Road. This intersection is forecast to operate at LOS F due to the delay conditions experienced on the minor street (Minaret Road). Based on an analysis, the intersection of Minaret Road/Old Mammoth Road exceeds the four vehicle-hour criteria.

PROJECT TRIP GENERATION

Project vehicle trips were generated as described in the Sierra Star Master Plan. Figure 7 shows the Sierra Star Master Plan site and the development areas on site. Several of the project areas have been developed under the previous 1991 Lodestar Master Plan or sold. The Sierra Star Master Plan is now considered to encompass Development Areas 1d, 2a–2d, 4a, 5a–5d, and 7. Winter Saturday daily and peak-hour trips were generated for the proposed Sierra Star Master Plan project using trip rates from the MTM and the ITE *Trip Generation Manual*, 7th Edition. The MTM was developed with the specific goal of providing analyses of the interrelated issues of land use, transportation demand, and air quality. Trip rates from the MTM were used to develop daily trip forecasts. Peak-hour traffic volumes were derived from peak-to-daily ratios and in/out splits for similar land uses from the ITE *Trip Generation Manual*, 7th Edition.

The project trip rates and trip generation are shown in Table F. According to the Sierra Star Master Plan, Development Area 4 will contain affordable housing units, primarily for employees. A future transit line will serve this Development area, which has the potential to reduce trips generated in this

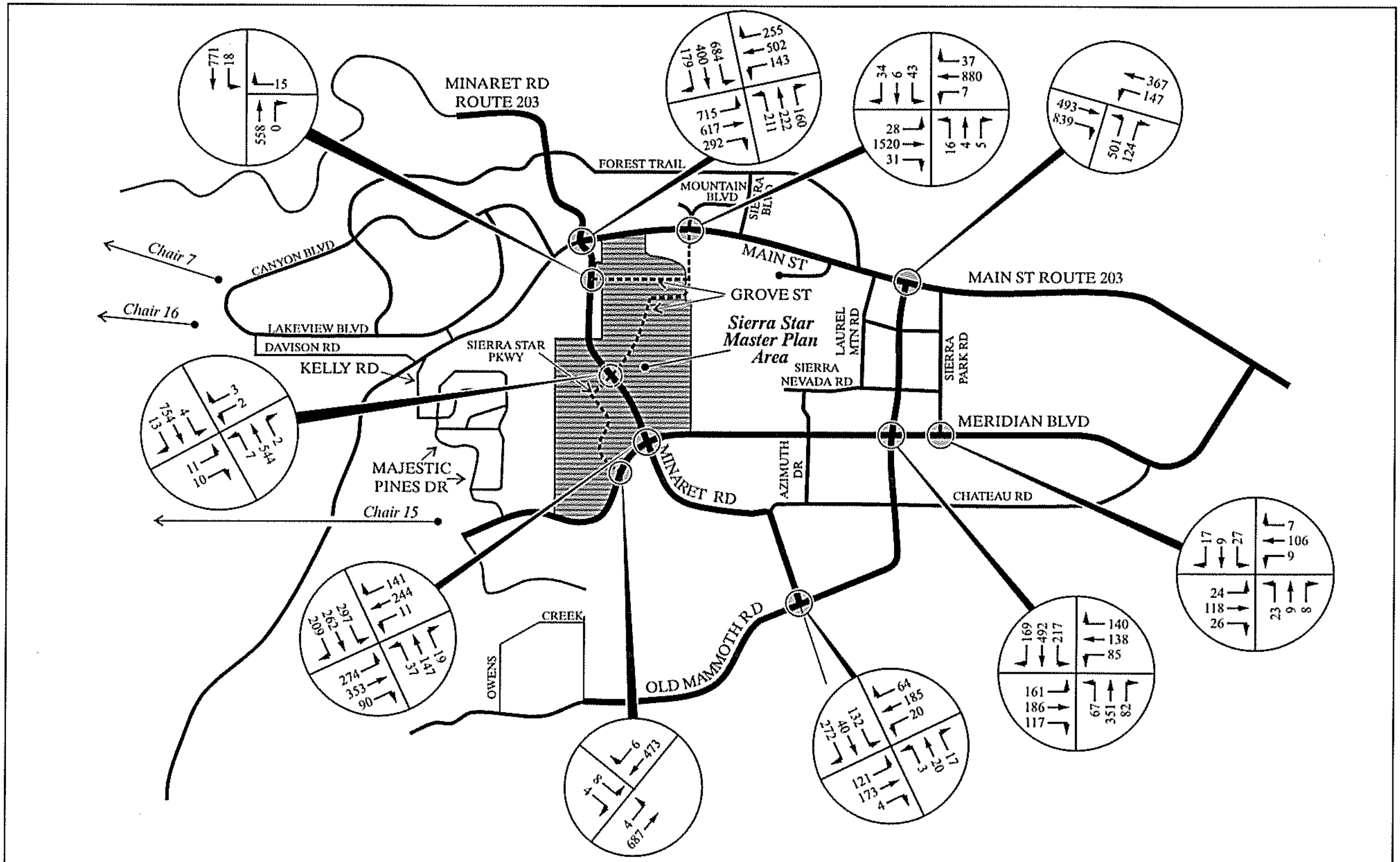


FIGURE 6

Sierra Star Master Plan

Cumulative Baseline Typical Winter Saturday
Peak Hour Traffic Volumes

I:\INT030\G\Cumulative Baseline Vols.cdr (8/14/06)

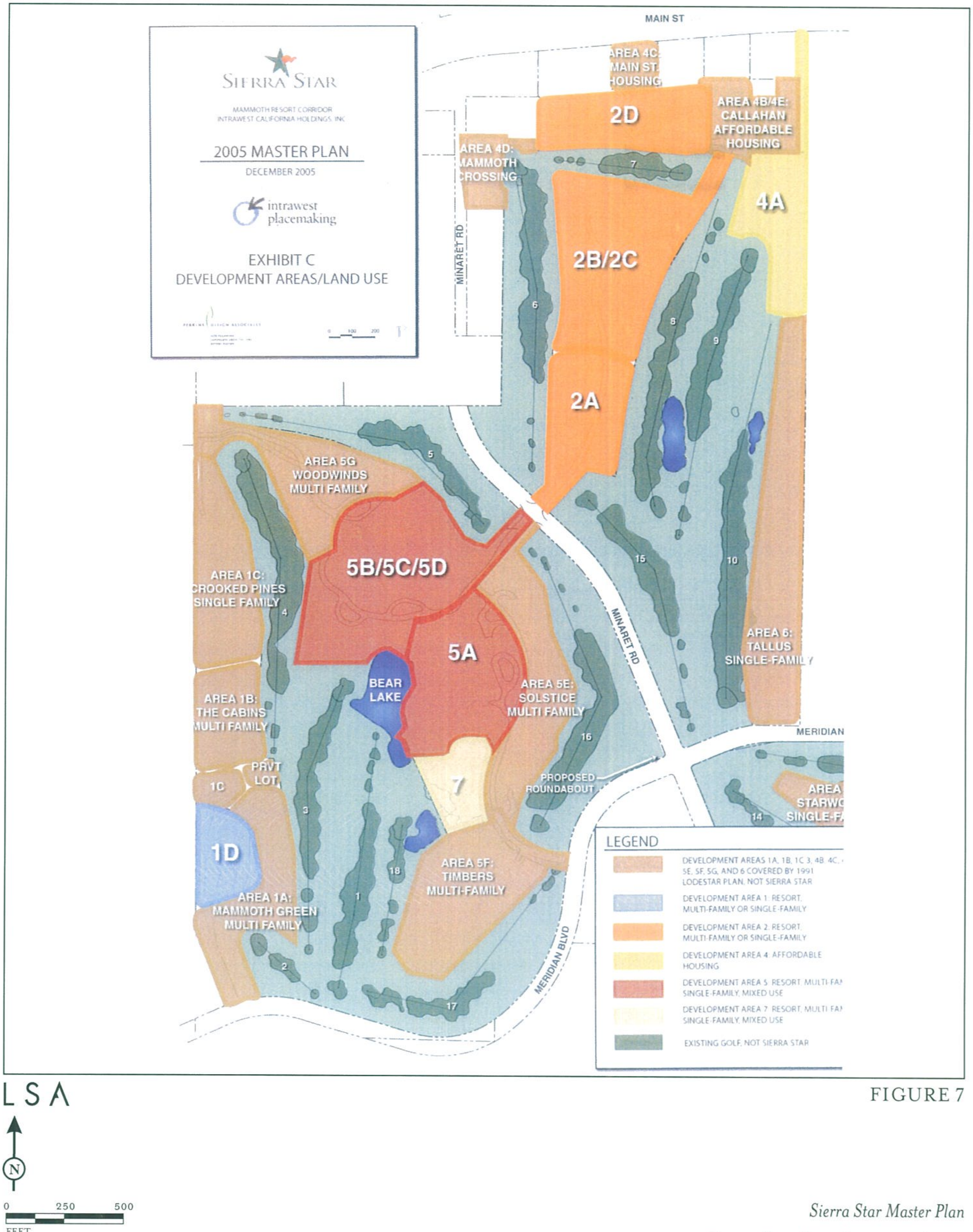


FIGURE 7

SOURCE: INTRAWEST

Sierra Star Master Plan

Sierra Star Development Areas

I:\INT030\G\Dev Areas.cdr (4/21/06)

Table F: Sierra Star Master Plan Trip Generation

			Weekend Peak Hour			
Land Use	**Size**	**Units**	**ADT[2]**	**In[3]**	**Out[3]**	**Total**
Trip Rate						
Residential Medium Density (MF) - Seasonal		DU	10.000	0.448	0.382	0.729
Lodging (Hotel[1]) - Visitor		DU	8.190	0.403	0.317	0.720
Trip Generation						
Area 1						
1A - Mammoth Green[4]	46	DU	-	-	-	-
1B - Cabins[4]	24	DU	-	-	-	-
1C - Crooked Pines[4]	11	DU	-	-	-	-
1D - MMSA Property	24	DU	240	11	9	17
Total Area 1			**240**	**11**	**9**	**17**
Area 2						
2A	22	DU	220	10	8	16
2B/C	182	DU	1,820	82	70	133
2D	56	DU	560	25	21	41
Total Area 2			**2,600**	**116**	**99**	**190**
Area 3						
Starwood[4]	54	DU	-	-	-	-
Area 4						
4A - Affordable	80	DU	800	36	31	58
Mode Shift to Transit			-160	-7	-6	-12
4B - Callahan[4]	24	DU	-	-	-	-
4C - MSAH[4]	35	DU	-	-	-	-
4D - Mammoth Crossings Lodestar[4]	44	DU	-	-	-	-
4E - Callahan/TOML[4]	16	DU	-	-	-	-
Total Area 4			**640**	**29**	**25**	**46**
Area 5						
5A - Condo-Hotel	144	DU	1,179	58	46	104
5B/C/D - Condo-Hotel	273	DU	2,236	110	86	197
5E - Solstice (Fairway 16)[4]	58	DU	-	-	-	-
5F - The Timbers[4]	32	DU	-	-	-	-
5G - Woodwinds (Fairway 4/5)[4]	28	DU	-	-	-	-
Total Area 5			**3,415**	**168**	**132**	**300**
Area 6						
Tallus[4]	19	DU	-	-	-	-
Area 7						
Golf Mixed-Use	40	DU	400	18	15	29
Commercial/Conference Center[4]	20	TSF	-	-	-	-
Total Area 7			**400**	**18**	**15**	**29**
Area 8						
Golf Course[4]	112	AC	-	-	-	-
Total Project Trip Generation			**7,295**	**342**	**280**	**583**

Notes:

DU = dwelling unit; TSF =thousand square feet; AC = acre

[1] Hotel includes conference and retail uses. This is consistent with the hotel description (ITE Code 310) provided in the Institute of Transportation Engineers, *Trip Generation*, 7th Edition.

[2] ADT rates referenced from Table 1 of the Town of Mammoth Lakes Travel Demand Mondel Update by LSC Consultants, Inc. (2004)

[3] Peak-to-daily ratios and in/out splits derived from trip rates contained in the Institute of Transportation Engineers, *Trip Generation*, 7th Edition.

[4] Trip generation is included in either the existing counts or cumulative baseline. Therefore, no new project trips are generated for these land uses.

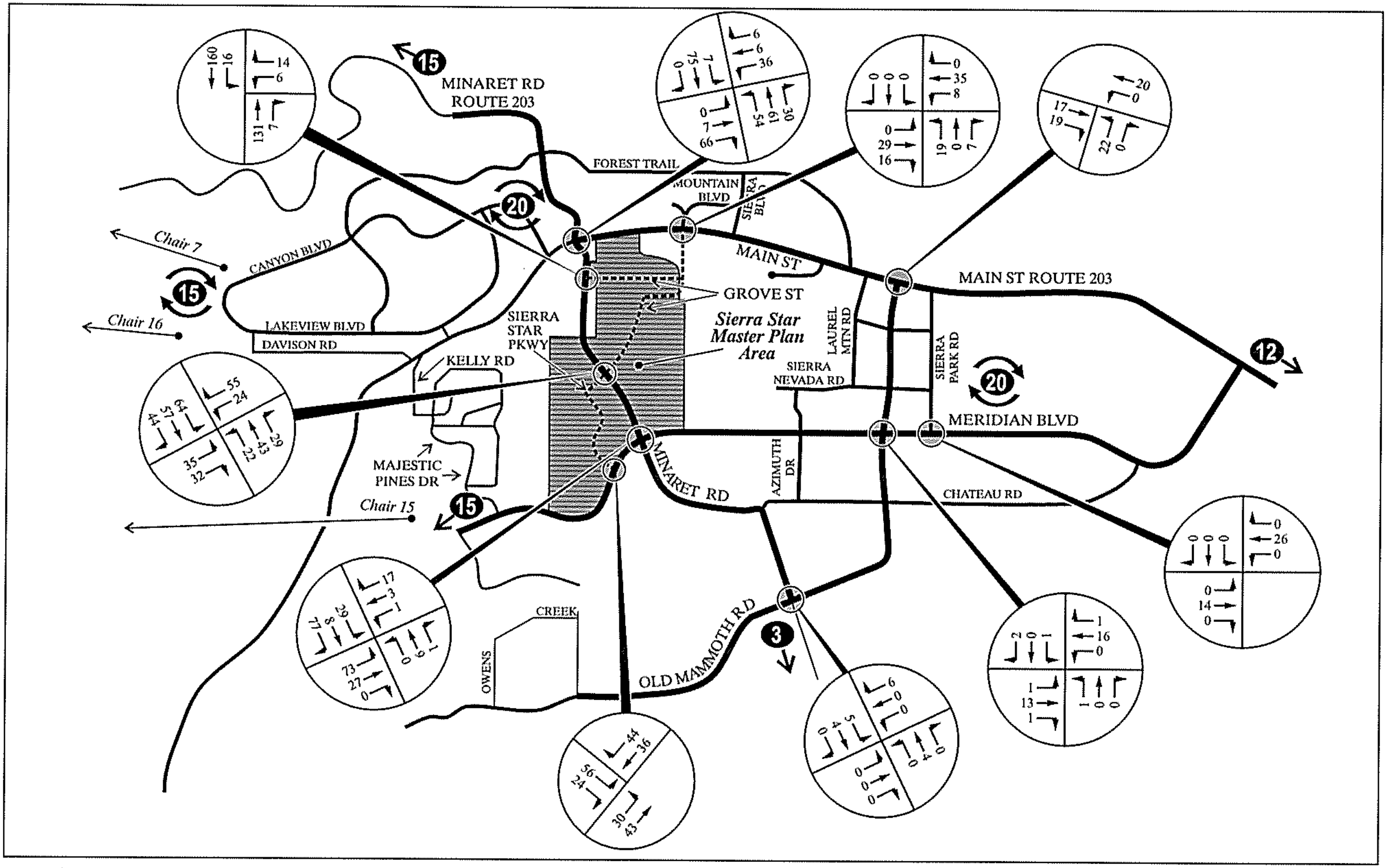
area. According to the MTM, the proportion of vehicle trips that are diverted to transit is 14 percent. Because 14 percent transit diversion is considered average, to account for the transit line service in Development Area 4, the trip generation of the employee housing in Area 4 was reduced by 20 percent. It is anticipated that Development Area 4 will have greater than average transit diversion based on its transit-oriented development characteristics (affordable housing) and its proximity to a transit route.

As part of the proposed project, a gondola may be constructed that would transport patrons from Area 5 to the Little Eagle ski area. It is reasonable to expect that this amenity would result in a reduction in vehicle trips to and from the Little Eagle ski area. The gondola was analyzed as part of the April 13, 1995, Mammoth Transportation Model Final Report, prepared by RKJK and Associates, Inc. According to this report, the gondola was forecast to carry approximately 3,450 daily and 600 peak hour passengers. To understand the effect this would have on vehicle trips, the report was consulted to determine average vehicle occupancies for recreation trips. According to the MTM, each vehicular recreation trip carries approximately 2.1 passengers. Application of this factor to the projected gondola person-trips results in a reduction of 1,643 daily and 286 peak hour vehicle trips.

Gondola patrons are expected to originate primarily from Project Area 5. Patrons from Project Areas 2 or 4 are not as likely to use the gondola because of the distance that it would be necessary to walk to access the gondola. Therefore, the reduction in vehicle trips attributed to the gondola is applied only to Project Area 5. Vehicles destined to Little Eagle ski area from Project Area 5 would use Sierra Star Parkway to access and turn right on Meridian Boulevard, then travel west on Meridian Boulevard to Little Eagle ski area. This route would not include any study area intersections. Therefore, the results of the level of service analysis would be the same for the project with and without the gondola. However, it should be recognized that with the construction of the gondola, the vehicle trips generated by the project would be reduced by 30 percent during the peak hour on a typical winter Saturday. This has been shown in previous reports (RKJK, April 1995). All trips on the gondola come from Meridian Boulevard. There were no intersections analyzed on Meridian Boulevard west of Minaret Road; therefore, no change in impacts or mitigation requirements result from the gondola.

CUMULATIVE PLUS PROJECT CONDITIONS

The project trips were distributed to the surrounding circulation system based on the location of activity centers in the Town, and the location of the proposed project in relation to the Town's recreational and commercial areas. The trip distribution and project trips at study area intersections are illustrated in Figure 8. Cumulative plus project traffic volumes are shown in Figure 9. Levels of service at study area intersections were analyzed and are shown in Table G. The cumulative plus project LOS worksheets are presented in Appendix C.



LSA

FIGURE 8

LEGEND:

20 - Percent Trip Distribution

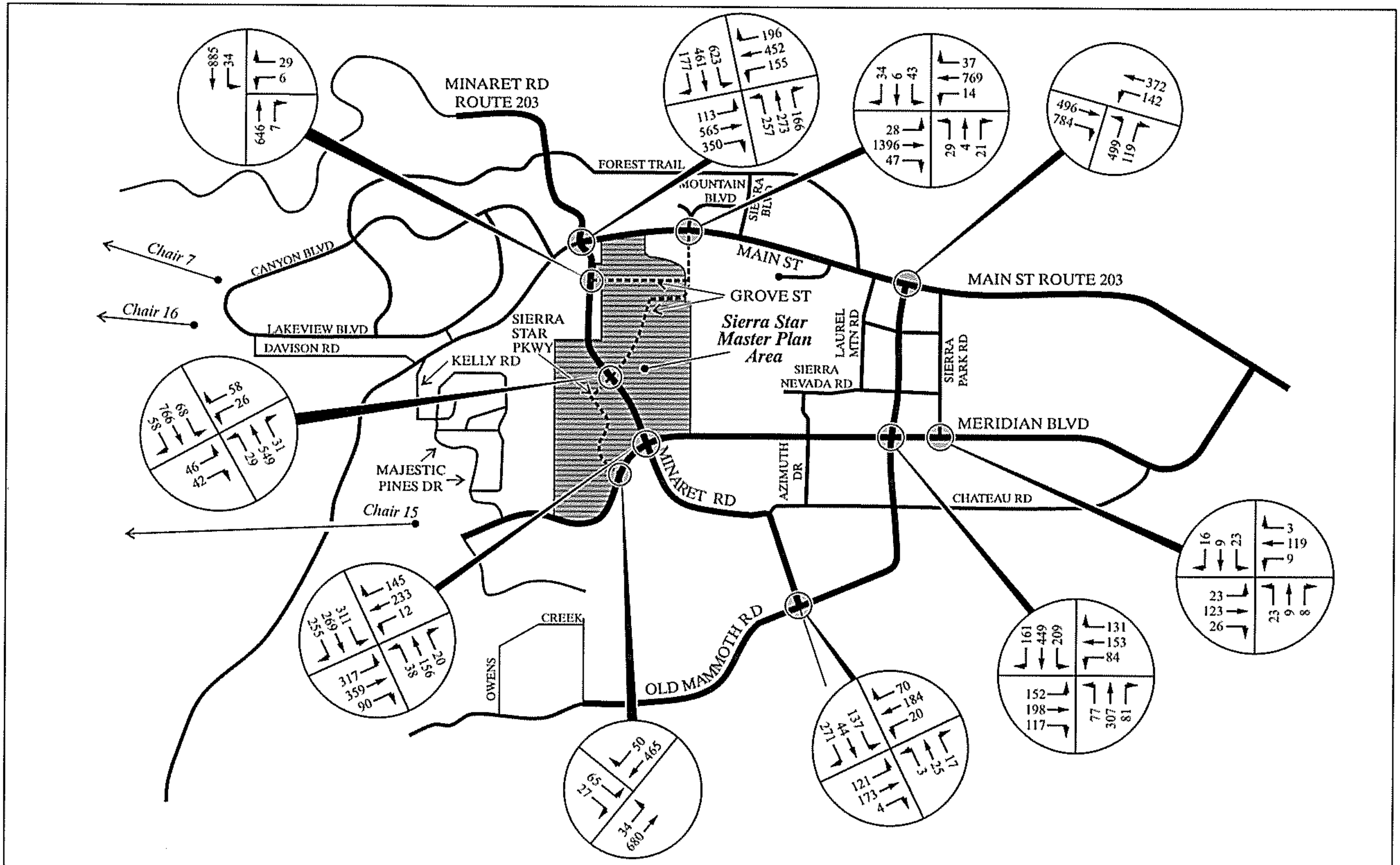
15 - In This Area

NOT TO SCALE

Sierra Star Master Plan

Project Trip Distribution and Assignment

I:\INT030\G\Trip Dist.cdr (4/21/06)



LSA

FIGURE 9

NOT TO SCALE

Sierra Star Master Plan

Cumulative Plus Project Typical Winter Saturday
Peak Hour Traffic Volumes

I:\INT030\G\Cumulative + Proj Vols.cdr (4/21/06)

Table G: Cumulative Plus Project Typical Winter Saturday Intersection Levels of Service

			With Mitigation	
Intersection	**Delay (sec)**	**LOS**	**Delay (sec)**	**LOS**
1. Minaret Rd./Meridian Blvd.	48.0	D		
2. Minaret Rd./Lake Mary Rd.-Main St.	38.4	D		
3. Old Mammoth Rd./Meridian Blvd.	23.5	C		
4. Minaret Rd./Old Mammoth Rd.	**>35.0 and > 4.0 hour cumulative delay on minor street approach**	**F**	22.9	C
5. Sierra Park Rd./Meridian Blvd.	8.1	A		
6. Old Mammoth Rd./Main St.	27.0	C		
7. Mountain Blvd./Main St.	>35.0 but < 4.0 hour cumulative delay on minor street approach	D		

Notes: * = unsignalized intersection
Shaded and Bold = unsatisfactory LOS and exceeds four vehicle-hour criteria

As shown in Tables E and G, the unsignalized intersection of Minaret Road/Old Mammoth Road is forecast to operate at LOS F. The intersection of Minaret Road/Old Mammoth Road is forecast to exceed the four-hour criterion in both the cumulative baseline and cumulative plus project conditions and is considered to be significantly impacted by the project.

At Minaret Road/Old Mammoth, the southbound approach volume causes the intersection to operate at LOS F and exceeds the four vehicle-hour criteria assuming a single-lane approach. However, actual field conditions indicate that left- and right-turning vehicles can separate into two lanes, with storage length for two vehicles as they approach the intersection. Based on this evaluation of the existing southbound geometrics, a two-lane southbound approach (i.e., one southbound left-turn lane and one southbound through right-turn lane) is an appropriate technical assumption. Given this configuration in the southbound approach, the LOS at this intersection improves to an acceptable LOS (LOS C 22.9 seconds of delay). Therefore, it is recommended that the southbound approach be restriped to formalize this operation as a mitigation measure.

INTERNAL CIRCULATION/PROJECT ACCESS

Internal circulation and project access is illustrated in Figure 10. As shown in the figure, the project's major internal roadway (Sierra Star Parkway and Grove Street) will provide access to Meridian Boulevard and Minaret Road. The intersections of Sierra Star Parkway/Meridian Boulevard, Minaret Road/Sierra Star Parkway-Grove Street, and Minaret Road/Grove Street (intersection nos. 8, 9, and 10, respectively in the previously referenced Figure 2) have been analyzed as part of the cumulative plus project level of service analysis.

Traffic generated by the land uses in Area 2a-d, Area 5a-d, and Area 7 all have access to Sierra Star Parkway. This traffic will enter the site via the intersections of Sierra Star Parkway/Meridian Boulevard, Minaret Road/Sierra Star Parkway-Grove Street, and Minaret Road/Grove Street. An HCM analysis was prepared for these three unsignalized access intersections and the levels of service are shown in Table H.

LSA

FIGURE 10

0 250 500
FEET

SOURCE: INTRAWEST

Sierra Star Master Plan

Internal Circulation and Project Access

I:\INT030\G\Internal Circ.cdr (8/14/06)

Table H: Cumulative plus Project Typical Winter Saturday Intersection Levels of Service at Unsignalized Access Locations

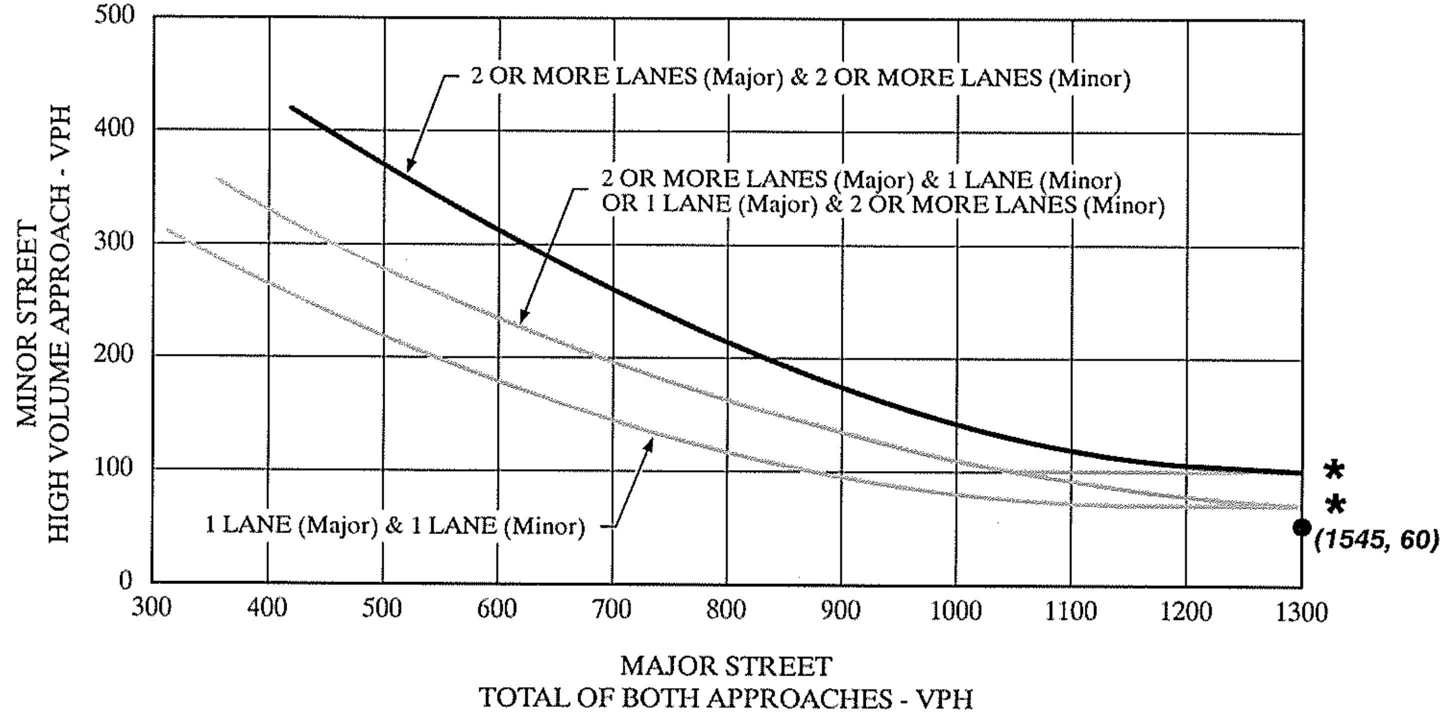
Intersection	Delay (sec)	LOS
8. Sierra Star Parkway/Meridian Blvd.	16.5	C
9. Minaret Rd./Sierra Star Parkway-Grove St.	> 35.0 but < 4.0 hour cumulative delay on minor street approach	D
10. Minaret Road/Grove Street	18.2	C

As shown in Table H, all the study area unsignalized access intersections are forecast to operate at satisfactory LOS (LOS D or better) in the cumulative plus project condition.
The cumulative plus project LOS at these three intersections are presented in Appendix D.

At Minaret Road/Sierra Star Parkway-Grove Street, the eastbound and westbound left turns out of the project onto Minaret Road are the primary reason that the intersection is forecast to operate at over 35 seconds of delay. Because the northbound and southbound directions are uncontrolled, no delay would be experienced by the vehicles traveling on Minaret Road, and there is minimal delay for vehicles turning right into or out of Sierra Star Parkway-Grove Street. The delay on the minor street approach would not exceed the criteria of four vehicle-hours and therefore would not be considered significantly impacted by the project. To further evaluate the operation of this intersection, a traffic signal warrant analysis was prepared. This analysis considered left turns, not right turns, as the critical movement. As shown in Figure 11, the intersection does not satisfy the peak hour warrant for a traffic signal and clearly would not satisfy other warrant criteria.

Traffic generated by the land uses in Area 4 will not have access to Sierra Star Parkway or Grove Street. Instead, this traffic will enter the site via an internal roadway that provides access to Main Street and Dorrance Street. Traffic exiting from Area 4 to the north will use the roadway to exit onto Main Street. Traffic exiting to the south will be able to exit onto Dorrance Street and then use either Joaquin Road or Manzanita Road to travel to Meridian Boulevard.

To understand the current traffic load along Joaquin Road and Manzanita Road, trips were generated based on the existing land uses along the roadway. There are approximately 33 dwelling units along Joaquin Road south of Dorrance Street, and approximately 30 dwelling units along Manzanita Road south of Dorrance Street. Table I shows the existing traffic generation along Joaquin Road and Manzanita Road.



WARRANT NOT SATISFIED

* 100 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 75 VPH applies as the lower threshold volume for a minor street approaching with one lane.

LSA

FIGURE 11

Sierra Star Master Plan

Peak Hour Traffic Signal Warrant
at Minaret Road/Sierra Star Parkway

SOURCE: CALTRANS TRAFFIC MANUAL, FIGURE 9-9.

I:\INT030\G\Warrant-Minaret&SierraStar.cdr (4/24/06)

Table I: Existing Traffic Generation on Joaquin Road and Manzanita Road

Land Use	Size	Units	ADT
Joaquin Road South of Dorrance Street			
Residential Low Density (SF), Year-Round	33	DU	396
Manzanita Road South of Dorrance Street			
Residential Low Density (SF), Year-Round	30	DU	360

Note: Trip rates taken from the Town of Mammoth Lakes, Mammoth Transportation Model, Table 5-1, RKJK & Associates, Inc.

According to Table F, Sierra Star Development Area 4 will generate 800 daily vehicle trips. Based on the project trip distribution illustrated in Figure 8, it is estimated that 20 percent of trips from Area 4 (160 daily trips) would arrive and depart to and from the south. It is assumed that 75 percent of this traffic would utilize Joaquin Road and 25 percent would utilize Manzanita Road. As a result, 120 daily project trips would utilize Joaquin Road and 40 daily project trips would utilize Manzanita Road.

According to the MTM Final Report,[1] both Joaquin Road and Manzanita Road are classified as local roadways with a capacity of approximately 4,000 ADT. Table J shows the forecasted existing plus project traffic volumes and volume to capacity (v/c) ratios for each roadway. As shown in Table J, the addition of traffic from Sierra Star would not cause traffic volumes along Joaquin Street or Manzanita Street to exceed the capacity of these roadways.

Table J: Existing Plus Project Traffic on Joaquin Road and Manzanita Road

Roadway Segment	Capacity	ADT	V/C Ratio	LOS
Joaquin Road south of Dorrance Street	4,000	516	0.13	A
Manzanita Road south of Dorrance Street	4,000	400	0.10	A

MITIGATION MEASURE

In order to mitigate the project's impacts to the study area street system, the project shall:

1. Make the recommended circulation improvements at Minaret Road/Old Mammoth Road (i.e., restripe the southbound approach to provide for separate left- and right-turn lanes). Mitigation measure should be implemented with the first increment of the Sierra Star Master Plan.

[1] *Mammoth Transportation Model Final Report*, Robert Kahn, John Kain & Associates, April 13, 1995.

APPENDIX A

EXISTING LEVEL OF SERVICE WORKSHEETS

```
--------------------------------------------------------------------------------
                           Sierra Star Master Plan
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
             2000 HCM Operations Method (Base Volume Alternative)
********************************************************************************
Intersection #1 Minaret Rd/ Meridian Blvd
********************************************************************************
Cycle (sec):          50               Critical Vol./Cap. (X):         0.576
Loss Time (sec):      16 (Y+R =  4 sec) Average Delay (sec/veh):        19.9
Optimal Cycle:        47               Level Of Service:                   B
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Split Phase      Split Phase      Split Phase      Split Phase
Rights:          Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        1  0  0  1  0    1  0  0  1  0    1  0  1  1  0    1  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      13   73    18   237  183    64   128  255    65    10  142   115
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:   13   73    18   237  183    64   128  255    65    10  142   115
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:     0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:    14   81    20   263  203    71   142  283    72    11  158   128
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   14   81    20   263  203    71   142  283    72    11  158   128
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.:    14   81    20   263  203    71   142  283    72    11  158   128
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.95 0.97  0.97  0.95 0.96  0.96  0.95 0.92  0.92  0.95 0.89  0.89
Lanes:       1.00 0.80  0.20  1.00 0.74  0.26  1.00 1.59  0.41  1.00 1.11  0.89
Final Sat.:  1805 1478   365  1805 1353   473  1805 2790   711  1805 1861  1507
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.05  0.05  0.15 0.15  0.15  0.08 0.10  0.10  0.01 0.08  0.08
Crit Moves:             ****              ****              ****       ****
Green/Cycle: 0.10 0.10  0.10  0.26 0.26  0.26  0.18 0.18  0.18  0.15 0.15  0.15
Volume/Cap:  0.08 0.58  0.58  0.56 0.58  0.58  0.45 0.58  0.58  0.04 0.58  0.58
Delay/Veh:   20.8 26.3  26.3  17.5 17.8  17.8  19.4 20.2  20.2  18.4 21.5  21.5
User DelAdj: 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:  20.8 26.3  26.3  17.5 17.8  17.8  19.4 20.2  20.2  18.4 21.5  21.5
HCM2kAvg:       0    3     3     5    5     5     3    4     4     0    3     3
********************************************************************************
```

```
-------------------------------------------------------------------------------
                           Sierra Star Master Plan
-------------------------------------------------------------------------------
                       Level Of Service Computation Report
                2000 HCM Operations Method (Base Volume Alternative)
*******************************************************************************
Intersection #2 Minaret Rd/Main St-Lake Mary Rd
*******************************************************************************
Cycle (sec):           50              Critical Vol./Cap. (X):         0.682
Loss Time (sec):       12 (Y+R =  4 sec) Average Delay (sec/veh):       20.0
Optimal Cycle:         47              Level Of Service:                  C
*******************************************************************************
Street Name:                  Minaret Rd                 Main St-Lake Mary Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Split Phase      Split Phase      Split Phase      Split Phase
Rights:          Include          Include          Include            Ovl
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Lanes:         1  0  1  0  1   2  0  0  1  0   1  0  2  0  1   1  0  2  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     122  101   104   536  253   126    72  460   192    83  316   103
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:  122  101   104   536  253   126    72  460   192    83  316   103
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:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:   128  106   109   564  266   133    76  484   202    87  333   108
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  128  106   109   564  266   133    76  484   202    87  333   108
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.:   128  106   109   564  266   133    76  484   202    87  333   108
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.95 1.00  0.85  0.92 0.95  0.95  0.95 0.95  0.85  0.95 0.95  0.85
Lanes:       1.00 1.00  1.00  2.00 0.67  0.33  1.00 2.00  1.00  1.00 2.00  1.00
Final Sat.:  1805 1900  1615  3502 1205   600  1805 3610  1615  1805 3610  1615
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.07 0.06  0.07  0.16 0.22  0.22  0.04 0.13  0.13  0.05 0.09  0.07
Crit Moves:  ****                  ****             ****             ****
Green/Cycle: 0.10 0.10  0.10  0.32 0.32  0.32  0.20 0.20  0.20  0.14 0.14  0.46
Volume/Cap:  0.68 0.54  0.65  0.50 0.68  0.68  0.21 0.68  0.64  0.36 0.68  0.15
Delay/Veh:   31.4 24.1  30.2  14.0 18.0  18.0  17.1 21.4  22.7  20.6 24.5   7.9
User DelAdj: 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:  31.4 24.1  30.2  14.0 18.0  18.0  17.1 21.4  22.7  20.6 24.5   7.9
HCM2kAvg:       4    2     3     4    7     7     1    5     4     2    4     1
*******************************************************************************
```

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--------------------------------------------------------------------------------
                           Sierra Star Master Plan
--------------------------------------------------------------------------------

                      Level Of Service Computation Report
                2000 HCM Operations Method (Base Volume Alternative)
********************************************************************************
Intersection #3 Old Mammoth Rd/Meridian Blvd
********************************************************************************
Cycle (sec):          50                Critical Vol./Cap. (X):        0.595
Loss Time (sec):      16 (Y+R =  4 sec) Average Delay (sec/veh):        19.3
Optimal Cycle:        48                Level Of Service:                  B
********************************************************************************
Street Name:             Old Mammoth Rd                    Meridian Blvd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected       Split Phase      Split Phase
Rights:          Include          Include          Include          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Lanes:         1  0  1  0  1    1  0  1  0  1    1  0  1  1  0    1  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      62  249    77   193  387   117   115  154   104    80   99   117
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:   62  249    77   193  387   117   115  154   104    80   99   117
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:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:    65  262    81   203  407   123   121  162   109    84  104   123
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   65  262    81   203  407   123   121  162   109    84  104   123
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.:    65  262    81   203  407   123   121  162   109    84  104   123
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.95 1.00  0.85  0.95 1.00  0.85  0.95 0.89  0.89  0.95 0.87  0.87
Lanes:       1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.19  0.81  1.00 1.00  1.00
Final Sat.:  1805 1900  1615  1805 1900  1615  1805 2026  1368  1805 1659  1659
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.04 0.14  0.05  0.11 0.21  0.08  0.07 0.08  0.08  0.05 0.06  0.07
Crit Moves:       ****        ****                   ****                   ****
Green/Cycle: 0.06 0.23  0.23  0.19 0.36  0.36  0.13 0.13  0.13  0.12 0.12  0.12
Volume/Cap:  0.60 0.60  0.22  0.60 0.60  0.21  0.50 0.60  0.60  0.37 0.50  0.60
Delay/Veh:   31.5 19.3  15.8  21.4 14.5  11.3  21.7 22.5  22.5  21.1 21.3  23.2
User DelAdj: 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:  31.5 19.3  15.8  21.4 14.5  11.3  21.7 22.5  22.5  21.1 21.3  23.2
HCM2kAvg:       2    5     1     4    6     1     3    3     3     2    2     3
********************************************************************************
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-------------------------------------------------------------------------------
                         Sierra Star Master Plan
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                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #4 Minaret Rd/ Old Mammoth Rd
*******************************************************************************
Average Delay (sec/veh):     10.1   Worst Case Level Of Service:      C[ 18.9]
*******************************************************************************
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  1  0  0  1    0  0  1! 0  0    1  0  0  1  0    1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       3   20    17   111   40   188    50  123     4    20  127    36
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:    3   20    17   111   40   188    50  123     4    20  127    36
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:     0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:     3   22    19   123   44   209    56  137     4    22  141    40
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     3   22    19   123   44   209    56  137     4    22  141    40
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  582  476   139   476  458   161   181 xxxx xxxxx   141 xxxx xxxxx
Potent Cap.:  427  491   915   502  502   889  1406 xxxx xxxxx  1454 xxxx xxxxx
Move Cap.:    291  464   915   455  475   889  1406 xxxx xxxxx  1454 xxxx xxxxx
Volume/Cap:  0.01 0.05  0.02  0.27 0.09  0.23  0.04 xxxx  xxxx  0.02 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx   0.1 xxxxx xxxx xxxxx   0.1 xxxx xxxxx   0.0 xxxx xxxxx
Stopped Del:xxxxx xxxx   9.0 xxxxx xxxx xxxxx   7.7 xxxx xxxxx   7.5 xxxx xxxxx
LOS by Move:    *    *     A     *    *     *     A    *     *     A    *     *
Movement:    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:  431 xxxx xxxxx  xxxx  628 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.2 xxxx xxxxx xxxxx  4.0 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel: 13.9 xxxx xxxxx xxxxx 18.9 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     B    *     *     *    C     *     *    *     *     *    *     *
ApproachDel:      11.8              18.9             xxxxxx            xxxxxx
ApproachLOS:        B                 C                 *                 *
```

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-------------------------------------------------------------------------------
                          Sierra Star Master Plan
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
                2000 HCM 4-Way Stop Method (Base Volume Alternative)
*******************************************************************************
Intersection #5 Sierra Park Road/Meridian Blvd
*******************************************************************************
Cycle (sec):          100              Critical Vol./Cap. (X):         0.088
Loss Time (sec):        0 (Y+R =  4 sec) Average Delay (sec/veh):        7.7
Optimal Cycle:          0              Level Of Service:                  A
*******************************************************************************
Street Name:              Sierra Park Road                   Meridian Blvd
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  0  1  0  0    0  0  1! 0  0    0  1  0  1  0    0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0     1     0    23     0     6    20    98     0     0    75     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     1     0    23     0     6    20    98     0     0    75     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:     0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:     0     1     0    26     0     7    22   109     0     0    83     3
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:    0     1     0    26     0     7    22   109     0     0    83     3
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.:     0     1     0    26     0     7    22   109     0     0    83     3
------------|---------------||---------------||---------------||---------------|
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:       0.00  1.00  0.00  0.79  0.00  0.21  0.34  1.66  0.00  0.00  1.92  0.08
Final Sat.:     0   778     0   619     0   162   252  1263     0     0  1477    59
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx  0.00  xxxx  0.04  xxxx  0.04  0.09  0.09  xxxx  xxxx  0.06  0.06
Crit Moves:        ****        ****              ****                    ****
Delay/Veh:    0.0   7.4   0.0   7.6   0.0   7.6   8.0   7.8   0.0   0.0   7.6   7.6
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:   0.0   7.4   0.0   7.6   0.0   7.6   8.0   7.8   0.0   0.0   7.6   7.6
LOS by Move:    *     A     *     A     *     A     A     A     *     *     A     A
ApproachDel:        7.4               7.6               7.9               7.6
Delay Adj:         1.00              1.00              1.00              1.00
ApprAdjDel:         7.4               7.6               7.9               7.6
LOS by Appr:          A                 A                 A                 A
*******************************************************************************
```

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--------------------------------------------------------------------------------
                            Sierra Star Master Plan
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM Operations Method (Base Volume Alternative)
********************************************************************************
Intersection #6 Old Mammoth Rd/ Main St
********************************************************************************
Cycle (sec):          80                Critical Vol./Cap. (X):        0.774
Loss Time (sec):      12 (Y+R =  4 sec) Average Delay (sec/veh):        18.5
Optimal Cycle:        67                Level Of Service:                  B
********************************************************************************
Street Name:           Old Mammoth Rd                        Main St
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected       Prot+Permit      Prot+Permit
Rights:           Include          Include          Include          Include
Min. Green:     0     0     0    0     0     0    0     0     0    0     0     0
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  2  0  1   1  0  2  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     333    0   105     0    0     0     0  416   689   126  267     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:  333    0   105     0    0     0     0  416   689   126  267     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:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:   351    0   111     0    0     0     0  438   725   133  281     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  351    0   111     0    0     0     0  438   725   133  281     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.:   351    0   111     0    0     0     0  438   725   133  281     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.95 1.00  0.85  1.00 1.00  1.00  1.00 0.95  0.98  0.95 0.95  1.00
Lanes:       1.00 0.00  1.00  0.00 0.00  0.00  0.00 2.00  1.00  1.00 2.00  0.00
Final Sat.:  1805    0  1615     0    0     0     0 3610  1857  1805 3610     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.19 0.00  0.07  0.00 0.00  0.00  0.00 0.12  0.39  0.07 0.08  0.00
Crit Moves:  ****                                         ****  ****
Green/Cycle: 0.25 0.00  0.25  0.00 0.00  0.00  0.00 0.50  0.50  0.65 0.60  0.00
Volume/Cap:  0.77 0.00  0.27  0.00 0.00  0.00  0.00 0.24  0.77  0.21 0.13  0.00
Delay/Veh:   36.0  0.0  24.5   0.0  0.0   0.0   0.0 11.3  20.2   5.7  7.0   0.0
User DelAdj: 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:  36.0  0.0  24.5   0.0  0.0   0.0   0.0 11.3  20.2   5.7  7.0   0.0
HCM2kAvg:      10    0     2     0    0     0     0    3    16     2    2     0
********************************************************************************
```

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-------------------------------------------------------------------------------
                         Sierra Star Master Plan
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #7 Mountain Blvd/Main Street
*******************************************************************************
Average Delay (sec/veh):      2.3   Worst Case Level Of Service:       F[ 53.5]
*******************************************************************************
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  1! 0  0   0  0  1! 0  0   0  1  0  1  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      8    4     3    43    6    34    28 1186    25     4  506    37
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:   8    4     3    43    6    34    28 1186    25     4  506    37
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:    8    4     3    43    6    34    28 1186    25     4  506    37
Reduct Vol:    0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:    8    4     3    43    6    34    28 1186    25     4  506    37
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  7.5  6.5   6.9   7.5  6.5   6.9   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1519 1806   606  1184 1800   272   543 xxxx xxxxx  1211 xxxx xxxxx
Potent Cap.:   83   80   445   147   81   732  1036 xxxx xxxxx   583 xxxx xxxxx
Move Cap.:     73   77   445   137   78   732  1036 xxxx xxxxx   583 xxxx xxxxx
Volume/Cap:  0.11 0.05  0.01  0.31 0.08  0.05  0.03 xxxx  xxxx  0.01 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.1 xxxx xxxxx   0.0 xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.6 xxxx xxxxx  11.2 xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     B    *     *
Movement:    LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx   89 xxxxx  xxxx  189 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  0.6 xxxxx xxxxx  2.0 xxxxx   0.1 xxxx xxxxx   0.0 xxxx xxxxx
Shrd StpDel:xxxxx 53.5 xxxxx xxxxx 38.1 xxxxx   8.6 xxxx xxxxx  11.2 xxxx xxxxx
Shared LOS:     *    F     *     *    E     *     A    *     *     B    *     *
ApproachDel:      53.5             38.1             xxxxxx            xxxxxx
ApproachLOS:        F                E                 *                 *
```

APPENDIX B

CUMULATIVE BASELINE LEVEL OF SERVICE WORKSHEETS

Mammoth Clearwater
Cumulative (Existing Plus Approved Projects) Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Minaret Rd/ Meridian Blvd

Cycle (sec):	70	Critical Vol./Cap.(X):	0.827
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	34.5
Optimal Cycle:	OPTIMIZED	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Split Phase			Split Phase			Split Phase			Split Phase	
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0 1	0	1 0	0 1	0	1 0	1 1	0	1 0	1 1	0
Volume Module:												
Base Vol:	13	73	18	237	183	64	128	255	65	10	142	115
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:	13	73	18	237	183	64	128	255	65	10	142	115
Added Vol:	25	73	1	45	78	114	116	77	25	1	88	13
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	38	146	19	282	261	178	244	332	90	11	230	128
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:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	42	162	21	313	290	198	271	369	100	12	256	142
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	42	162	21	313	290	198	271	369	100	12	256	142
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.:	42	162	21	313	290	198	271	369	100	12	256	142
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.98	0.98	0.95	0.94	0.94	0.95	0.92	0.92	0.95	0.90	0.90
Lanes:	1.00	0.88	0.12	1.00	0.59	0.41	1.00	1.57	0.43	1.00	1.28	0.72
Final Sat.:	1805	1653	215	1805	1061	723	1805	2749	745	1805	2194	1221
Capacity Analysis Module:												
Vol/Sat:	0.02	0.10	0.10	0.17	0.27	0.27	0.15	0.13	0.13	0.01	0.12	0.12
Crit Moves:		****			****		****					****
Green/Cycle:	0.12	0.12	0.12	0.33	0.33	0.33	0.18	0.18	0.18	0.14	0.14	0.14
Volume/Cap:	0.20	0.83	0.83	0.53	0.83	0.83	0.83	0.74	0.74	0.05	0.83	0.83
Delay/Veh:	28.3	52.1	52.1	19.9	31.0	31.0	43.4	31.7	31.7	26.1	40.6	40.6
User DelAdj:	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:	28.3	52.1	52.1	19.9	31.0	31.0	43.4	31.7	31.7	26.1	40.6	40.6
LOS by Move:	C	D	D	B	C	C	D	C	C	C	D	D
HCM2kAvgQ:	1	6	6	6	12	12	8	7	7	0	7	7

Note: Queue reported is the number of cars per lane.

```
-------------------------------------------------------------------------------
                              Mammoth Clearwater
            Cumulative (Existing Plus Approved Projects) Conditions
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
*******************************************************************************
Intersection #2 Minaret Rd/Main St-Lake Mary Rd
*******************************************************************************
Cycle (sec):          55              Critical Vol./Cap.(X):         0.828
Loss Time (sec):      12 (Y+R=4.0 sec) Average Delay (sec/veh):       27.0
Optimal Cycle: OPTIMIZED              Level Of Service:                  C
*******************************************************************************
Street Name:                Minaret Rd                    Main St-Lake Mary Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Split Phase      Split Phase      Split Phase      Split Phase
Rights:           Include          Include          Include             Ovl
Min. Green:    0     0     0    0     0     0    0     0     0    0     0     0
Lanes:        1  0  1  0  1    2  0  1  0  1    1  0  2  0  1    1  0  2  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     122   101   104   536   253   126    72   460   192    83   316   103
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:  122   101   104   536   253   126    72   460   192    83   316   103
Added Vol:     81   111    32    80   133    51    41    98    92    37   129    87
PasserByVol:    0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:  203   212   136   616   386   177   113   558   284   120   445   190
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:     0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95
PHF Volume:   214   223   143   648   406   186   119   587   299   126   468   200
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:  214   223   143   648   406   186   119   587   299   126   468   200
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.:   214   223   143   648   406   186   119   587   299   126   468   200
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900
Adjustment:  0.95  1.00  0.85  0.92  1.00  0.85  0.95  0.95  0.85  0.95  0.95  0.85
Lanes:       1.00  1.00  1.00  2.00  1.00  1.00  1.00  2.00  1.00  1.00  2.00  1.00
Final Sat.:  1805  1900  1615  3502  1900  1615  1805  3610  1615  1805  3610  1615
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.12  0.12  0.09  0.19  0.21  0.12  0.07  0.16  0.19  0.07  0.13  0.12
Crit Moves:  ****                    ****                    ****        ****
Green/Cycle: 0.14  0.14  0.14  0.26  0.26  0.26  0.22  0.22  0.22  0.16  0.16  0.42
Volume/Cap:  0.83  0.82  0.62  0.72  0.83  0.45  0.29  0.73  0.83  0.45  0.83  0.30
Delay/Veh:   42.3  40.7  27.2  21.3  30.4  17.9  18.2  23.1  34.9  22.1  32.3  11.0
User DelAdj: 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:  42.3  40.7  27.2  21.3  30.4  17.9  18.2  23.1  34.9  22.1  32.3  11.0
LOS by Move:    D     D     C     C     C     B     B     C     C     C     C     B
HCM2kAvgQ:      6     6     3     7     9     3     2     7     8     3     7     2
*******************************************************************************
Note: Queue reported is the number of cars per lane.
```

```
-------------------------------------------------------------------------------
                          Mammoth Clearwater
          Cumulative (Existing Plus Approved Projects) Conditions
-------------------------------------------------------------------------------

                   Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
*******************************************************************************
Intersection #3 Old Mammoth Rd/Meridian Blvd
*******************************************************************************
Cycle (sec):          50              Critical Vol./Cap.(X):         0.688
Loss Time (sec):      16 (Y+R=4.0 sec) Average Delay (sec/veh):       22.0
Optimal Cycle: OPTIMIZED              Level Of Service:                 C
*******************************************************************************
Street Name:          Old Mammoth Rd                   Meridian Blvd
Approach:     North Bound      South Bound      East Bound       West Bound
Movement:   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Protected        Protected       Split Phase      Split Phase
Rights:         Include          Include          Include          Include
Min. Green:   0    0     0    0    0     0    0    0     0    0    0     0
Lanes:      1  0  1  0  1   1  0  1  0  1   1  0  1  1  0   1  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     62  249    77   193  387   117   115  154   104    80   99   117
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:  62  249    77   193  387   117   115  154   104    80   99   117
Added Vol:    14   57     4    15   62    42    35   31    12     4   38    13
PasserByVol:   0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  76  306    81   208  449   159   150  185   116    84  137   130
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:    0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:   80  322    85   219  473   167   158  195   122    88  144   137
Reduct Vol:    0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  80  322    85   219  473   167   158  195   122    88  144   137
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.:   80  322    85   219  473   167   158  195   122    88  144   137
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:   1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment: 0.95 1.00  0.85  0.95 1.00  0.85  0.95 0.89  0.89  0.95 0.88  0.88
Lanes:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.23  0.77  1.00 1.03  0.97
Final Sat.: 1805 1900  1615  1805 1900  1615  1805 2090  1311  1805 1717  1629
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    0.04 0.17  0.05  0.12 0.25  0.10  0.09 0.09  0.09  0.05 0.08  0.08
Crit Moves:      ****        ****                  ****                    ****
Green/Cycle: 0.06 0.25  0.25  0.18 0.36  0.36  0.14 0.14  0.14  0.12 0.12  0.12
Volume/Cap: 0.69 0.69  0.21  0.69 0.69  0.29  0.65 0.69  0.69  0.40 0.69  0.69
Delay/Veh:  39.6 21.4  15.3  25.5 16.8  11.7  26.4 25.0  25.0  21.5 25.9  25.9
User DelAdj: 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: 39.6 21.4  15.3  25.5 16.8  11.7  26.4 25.0  25.0  21.5 25.9  25.9
LOS by Move:  D    C     B     C    B     B     C    C     C     C    C     C
HCM2kAvgQ:     3    6     1     5    8     2     4    4     4     2    4     4
*******************************************************************************
Note: Queue reported is the number of cars per lane.
```

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--------------------------------------------------------------------------------
                              Mammoth Clearwater
           Cumulative (Existing Plus Approved Projects) Conditions
--------------------------------------------------------------------------------

                        Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #4 Minaret Rd/ Old Mammoth Rd
********************************************************************************
Average Delay (sec/veh):      40.2       Worst Case Level Of Service: F[ 91.3]
********************************************************************************
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  1  0  0  1   0  0  1! 0  0   1  0  0  1  0   1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        3   20    17   111   40   188    50  123     4    20  127    36
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:     3   20    17   111   40   188    50  123     4    20  127    36
Added Vol:       0    0     0    21    0    83    71   50     0     0   57    29
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     3   20    17   132   40   271   121  173     4    20  184    65
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:      0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:      3   22    19   147   44   301   134  192     4    22  204    72
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      3   22    19   147   44   301   134  192     4    22  204    72
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  921  784   194   769  751   241   277 xxxx xxxxx   197 xxxx xxxxx
Potent Cap.:  253  327   852   321  342   803  1298 xxxx xxxxx  1388 xxxx xxxxx
Move Cap.:    128  289   852   269  302   803  1298 xxxx xxxxx  1388 xxxx xxxxx
Volume/Cap:  0.03 0.08  0.02  0.55 0.15  0.37  0.10 xxxx  xxxx  0.02 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx   0.1  xxxx xxxx xxxxx   0.3 xxxx xxxxx   0.0 xxxx xxxxx
Control Del:xxxxx xxxx   9.3 xxxxx xxxx xxxxx   8.1 xxxx xxxxx   7.6 xxxx xxxxx
LOS by Move:    *    *     A     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.:  248 xxxx xxxxx  xxxx  461 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.3 xxxx xxxxx xxxxx 15.7 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel: 21.2 xxxx xxxxx xxxxx 91.3 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     C    *     *     *    F     *     *    *     *     *    *     *
ApproachDel:       16.1             91.3            xxxxxx           xxxxxx
ApproachLOS:         C                F                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
```

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-------------------------------------------------------------------------------
                             Mammoth Clearwater
         Cumulative (Existing Plus Approved Projects) Conditions
-------------------------------------------------------------------------------

                     Level Of Service Computation Report
         2000 HCM 4-Way Stop Method (Future Volume Alternative)
*******************************************************************************
Intersection #5 Sierra Park Road/Meridian Blvd
*******************************************************************************
Cycle (sec):          100              Critical Vol./Cap.(X):          0.123
Loss Time (sec):        0 (Y+R=4.0 sec) Average Delay (sec/veh):         8.0
Optimal Cycle:          0              Level Of Service:                  A
*******************************************************************************
Street Name:          Sierra Park Road                 Meridian Blvd
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  0  1! 0  0   0  0  1! 0  0   0  1  0  1  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0     1     0   23     0     6   20    98     0    0    75     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     1     0   23     0     6   20    98     0    0    75     3
Added Vol:    23     8     8    0     9    10    3    11    26    9    18     0
PasserByVol:   0     0     0    0     0     0    0     0     0    0     0     0
Initial Fut:  23     9     8   23     9    16   23   109    26    9    93     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:     0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:   26    10     9   26    10    18   26   121    29   10   103     3
Reduct Vol:    0     0     0    0     0     0    0     0     0    0     0     0
Reduced Vol:  26    10     9   26    10    18   26   121    29   10   103     3
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    10     9   26    10    18   26   121    29   10   103     3
------------|---------------||---------------||---------------||---------------|
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:       0.58 0.22  0.20  0.48 0.19  0.33  0.29 1.38  0.33  0.17 1.77  0.06
Final Sat.:   425  166   148   363  142   252   207 1021   253   122 1280    42
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.06 0.06  0.06  0.07 0.07  0.07  0.12 0.12  0.11  0.08 0.08  0.08
Crit Moves:  ****            ****             ****             ****
Delay/Veh:    7.9  7.9   7.9   7.8  7.8   7.8   8.3  8.1   7.9   8.1  8.0   7.9
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:   7.9  7.9   7.9   7.8  7.8   7.8   8.3  8.1   7.9   8.1  8.0   7.9
LOS by Move:   A    A     A     A    A     A     A    A     A     A    A     A
ApproachDel:       7.9              7.8              8.1              8.0
Delay Adj:        1.00             1.00             1.00             1.00
ApprAdjDel:        7.9              7.8              8.1              8.0
LOS by Appr:        A                A                A                A
AllWayAvgQ:   0.1  0.1   0.1   0.1  0.1   0.1   0.1  0.1   0.1   0.1  0.1   0.1
*******************************************************************************
Note: Queue reported is the number of cars per lane.
```

Mammoth Clearwater

Cumulative (Existing Plus Approved Projects) Conditions

Level Of Service Computation Report

2000 HCM Operations Method (Future Volume Alternative)

Intersection #6 Old Mammoth Rd/ Main St

Cycle (sec): 80 Critical Vol./Cap.(X): 0.900

Loss Time (sec): 12 (Y+R=4.0 sec) Average Delay (sec/veh): 24.7

Optimal Cycle: OPTIMIZED Level Of Service: C

Street Name:	Old Mammoth Rd						Main St					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Prot+Permit			Prot+Permit		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0	0 1	0 0	0	0 0	0 0	2	0 1	1 0	2	0 0
Volume Module:												
Base Vol:	333	0	105	0	0	0	0	416	689	126	267	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:	333	0	105	0	0	0	0	416	689	126	267	0
Added Vol:	94	0	14	0	0	0	0	63	76	15	85	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	427	0	119	0	0	0	0	479	765	141	352	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:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	449	0	125	0	0	0	0	504	805	148	371	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	449	0	125	0	0	0	0	504	805	148	371	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.:	449	0	125	0	0	0	0	504	805	148	371	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	1.00	0.85	1.00	1.00	1.00	1.00	0.95	0.98	0.95	0.95	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	2.00	1.00	1.00	2.00	0.00
Final Sat.:	1805	0	1615	0	0	0	0	3610	1857	1805	3610	0
Capacity Analysis Module:												
Vol/Sat:	0.25	0.00	0.08	0.00	0.00	0.00	0.00	0.14	0.43	0.08	0.10	0.00
Crit Moves:	****								****	****		
Green/Cycle:	0.28	0.00	0.28	0.00	0.00	0.00	0.00	0.48	0.48	0.62	0.57	0.00
Volume/Cap:	0.90	0.00	0.28	0.00	0.00	0.00	0.00	0.29	0.90	0.27	0.18	0.00
Delay/Veh:	46.9	0.0	23.0	0.0	0.0	0.0	0.0	12.6	30.9	6.8	8.2	0.0
User DelAdj:	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:	46.9	0.0	23.0	0.0	0.0	0.0	0.0	12.6	30.9	6.8	8.2	0.0
LOS by Move:	D	A	C	A	A	A	A	B	C	A	A	A
HCM2kAvgQ:	15	0	3	0	0	0	0	4	22	2	2	0

Note: Queue reported is the number of cars per lane.

```
------------------------------------------------------------------------------
                        Mammoth Clearwater
         Cumulative (Existing Plus Approved Projects) Conditions
------------------------------------------------------------------------------

                Level Of Service Computation Report
         2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #7 Mountain Blvd/Main Street
******************************************************************************
Average Delay (sec/veh):      5.5      Worst Case Level Of Service: F[138.2]
******************************************************************************
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  1! 0  0    0  0  1! 0  0    0  1  0  1  0    0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       8    4     3    43    6    34    28 1186    25     4  506    37
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:    8    4     3    43    6    34    28 1186    25     4  506    37
Added Vol:      8    0     2     0    0     0     0  181     6     3  228     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   16    4     5    43    6    34    28 1367    31     7  734    37
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:    16    4     5    43    6    34    28 1367    31     7  734    37
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:    16    4     5    43    6    34    28 1367    31     7  734    37
Critical Gap Module:
Critical Gp:  7.5  6.5   6.9   7.5  6.5   6.9   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1823 2224   699  1508 2221   386   771 xxxx xxxxx  1398 xxxx xxxxx
Potent Cap.:   49   44   387    85   44   619   853 xxxx xxxxx   495 xxxx xxxxx
Move Cap.:     40   42   387    75   42   619   853 xxxx xxxxx   495 xxxx xxxxx
Volume/Cap:  0.40 0.10  0.01  0.58 0.14  0.05  0.03 xxxx  xxxx  0.01 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx   0.0 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   9.4 xxxx xxxxx  12.4 xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     B    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx   49 xxxxx  xxxx  107 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  1.9 xxxxx xxxxx  4.3 xxxxx   0.1 xxxx xxxxx   0.0 xxxx xxxxx
Shrd ConDel:xxxxx  138 xxxxx xxxxx  107 xxxxx   9.4 xxxx xxxxx  12.4 xxxx xxxxx
Shared LOS:     *    F     *     *    F     *     A    *     *     B    *     *
ApproachDel:       138.2            107.3           xxxxxx           xxxxxx
ApproachLOS:          F                F               *                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
```

APPENDIX C

CUMULATIVE PLUS PROJECT LEVEL OF SERVICE WORKSHEETS

Sierra Star Master Plan
Cumulative Plus Project Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Minaret Rd/ Meridian Blvd

Cycle (sec):	95	Critical Vol./Cap.(X):	0.907
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	48.0
Optimal Cycle:	OPTIMIZED	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0 1	0	1 0	0 1	0	1 0	1 1	0	1 0	1 1	0
Volume Module:												
Base Vol:	13	73	18	237	183	64	128	255	65	10	142	115
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:	13	73	18	237	183	64	128	255	65	10	142	115
Added Vol:	25	83	2	74	86	191	189	104	25	2	91	30
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	38	156	20	311	269	255	317	359	90	12	233	145
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:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	42	173	22	346	299	283	352	399	100	13	259	161
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	42	173	22	346	299	283	352	399	100	13	259	161
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.:	42	173	22	346	299	283	352	399	100	13	259	161
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.98	0.98	0.95	0.93	0.93	0.95	0.92	0.92	0.95	0.89	0.89
Lanes:	1.00	0.89	0.11	1.00	0.51	0.49	1.00	1.60	0.40	1.00	1.23	0.77
Final Sat.:	1805	1655	212	1805	904	857	1805	2800	702	1805	2096	1304
Capacity Analysis Module:												
Vol/Sat:	0.02	0.10	0.10	0.19	0.33	0.33	0.20	0.14	0.14	0.01	0.12	0.12
Crit Moves:			****		****		****				****	
Green/Cycle:	0.12	0.12	0.12	0.36	0.36	0.36	0.22	0.22	0.22	0.14	0.14	0.14
Volume/Cap:	0.20	0.91	0.91	0.53	0.91	0.91	0.91	0.66	0.66	0.05	0.91	0.91
Delay/Veh:	38.5	78.3	78.3	24.5	45.2	45.2	60.6	36.3	36.3	35.8	61.7	61.7
User DelAdj:	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:	38.5	78.3	78.3	24.5	45.2	45.2	60.6	36.3	36.3	35.8	61.7	61.7
LOS by Move:	D	E	E	C	D	D	E	D	D	D	E	E
HCM2kAvgQ:	1	9	9	8	20	20	14	8	8	0	10	10

Note: Queue reported is the number of cars per lane.

Sierra Star Master Plan
Cumulative Plus Project Conditions

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #2 Minaret Rd/Main St-Lake Mary Rd

Cycle (sec):	70	Critical Vol./Cap.(X):	0.925
Loss Time (sec):	12 (Y+R=4.0 sec)	Average Delay (sec/veh):	38.4
Optimal Cycle:	OPTIMIZED	Level Of Service:	D

Street Name:	Minaret Rd						Main St-Lake Mary Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Split Phase			Split Phase		
Rights:	Include			Include			Include			Ovl		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 1 0 1			2 0 1 0 1			1 0 2 0 1			1 0 2 0 1		
Volume Module:												
Base Vol:	122	101	104	536	253	126	72	460	192	83	316	103
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:	122	101	104	536	253	126	72	460	192	83	316	103
Added Vol:	135	172	62	87	208	51	41	105	158	72	136	93
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	257	273	166	623	461	177	113	565	350	155	452	196
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:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	271	287	175	656	485	186	119	595	368	163	476	206
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	271	287	175	656	485	186	119	595	368	163	476	206
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.:	271	287	175	656	485	186	119	595	368	163	476	206
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	1.00	0.85	0.92	1.00	0.85	0.95	0.95	0.85	0.95	0.95	0.85
Lanes:	1.00	1.00	1.00	2.00	1.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1805	1900	1615	3502	1900	1615	1805	3610	1615	1805	3610	1615
Capacity Analysis Module:												
Vol/Sat:	0.15	0.15	0.11	0.19	0.26	0.12	0.07	0.16	0.23	0.09	0.13	0.13
Crit Moves:		****			****				****		****	
Green/Cycle:	0.16	0.16	0.16	0.28	0.28	0.28	0.25	0.25	0.25	0.14	0.14	0.42
Volume/Cap:	0.92	0.93	0.66	0.68	0.93	0.42	0.27	0.67	0.93	0.63	0.93	0.31
Delay/Veh:	60.4	61.1	33.6	24.5	47.1	21.4	21.6	25.8	52.9	33.4	52.4	13.8
User DelAdj:	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:	60.4	61.1	33.6	24.5	47.1	21.4	21.6	25.8	52.9	33.4	52.4	13.8
LOS by Move:	E	E	C	C	D	C	C	C	D	C	D	B
HCM2kAvgQ:	10	10	5	8	15	4	2	7	12	5	9	3

Note: Queue reported is the number of cars per lane.

```
--------------------------------------------------------------------------------
                         Sierra Star Master Plan
                    Cumulative Plus Project Conditions
--------------------------------------------------------------------------------

                    Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #3 Old Mammoth Rd/Meridian Blvd
********************************************************************************
Cycle (sec):           60                Critical Vol./Cap.(X):          0.652
Loss Time (sec):       16 (Y+R=4.0 sec)  Average Delay (sec/veh):         23.5
Optimal Cycle: OPTIMIZED                 Level Of Service:                  C
********************************************************************************
Street Name:           Old Mammoth Rd                  Meridian Blvd
Approach:       North Bound      South Bound       East Bound        West Bound
Movement:      L  -  T  -  R   L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Split Phase       Split Phase
Rights:           Include          Include          Include           Include
Min. Green:     0     0     0    0     0     0    0     0     0    0     0     0
Lanes:         1  0  1  0  1   1  0  1  0  1    1  0  1  1  0    1  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       62   249    77   193   387   117   115   154   104    80    99   117
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:    62   249    77   193   387   117   115   154   104    80    99   117
Added Vol:      15    58     4    16    62    44    37    44    13     4    54    14
PasserByVol:     0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:    77   307    81   209   449   161   152   198   117    84   153   131
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:      0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95  0.95
PHF Volume:     81   323    85   220   473   169   160   208   123    88   161   138
Reduct Vol:      0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:    81   323    85   220   473   169   160   208   123    88   161   138
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.:     81   323    85   220   473   169   160   208   123    88   161   138
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:     1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900
Adjustment:   0.95  1.00  0.85  0.95  1.00  0.85  0.95  0.90  0.90  0.95  0.88  0.88
Lanes:        1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.26  0.74  1.00  1.08  0.92
Final Sat.:   1805  1900  1615  1805  1900  1615  1805  2142  1266  1805  1811  1550
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:      0.04  0.17  0.05  0.12  0.25  0.10  0.09  0.10  0.10  0.05  0.09  0.09
Crit Moves:         ****        ****                          ****        ****
Green/Cycle:  0.07  0.26  0.26  0.19  0.38  0.38  0.15  0.15  0.15  0.14  0.14  0.14
Volume/Cap:   0.66  0.65  0.20  0.65  0.66  0.28  0.59  0.65  0.65  0.36  0.65  0.65
Delay/Veh:    39.3  22.8  17.5  27.1  17.6  13.2  27.4  27.1  27.1  24.4  27.9  27.9
User DelAdj:  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:   39.3  22.8  17.5  27.1  17.6  13.2  27.4  27.1  27.1  24.4  27.9  27.9
LOS by Move:     D     C     B     C     B     B     C     C     C     C     C     C
HCM2kAvgQ:       3     7     1     5     8     2     4     4     4     2     4     4
********************************************************************************
Note: Queue reported is the number of cars per lane.
```

```
-------------------------------------------------------------------------------
                          Sierra Star Master Plan
                      Cumulative Plus Project Conditions
-------------------------------------------------------------------------------

                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #4 Minaret Rd/ Old Mammoth Rd
*******************************************************************************
Average Delay (sec/veh):     47.9      Worst Case Level Of Service: F[109.1]
*******************************************************************************
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  1  0  0  1   0  0  1! 0  0   1  0  0  1  0   1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       3   20    17   111   40   188    50  123     4    20  127    36
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:    3   20    17   111   40   188    50  123     4    20  127    36
Added Vol:      0    5     0    26    4    83    71   50     0     0   57    34
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    3   25    17   137   44   271   121  173     4    20  184    70
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:     0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:     3   28    19   152   49   301   134  192     4    22  204    78
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     3   28    19   152   49   301   134  192     4    22  204    78
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  926  790   194   774  753   243   282 xxxx xxxxx   197 xxxx xxxxx
Potent Cap.:  251  325   852   318  341   800  1292 xxxx xxxxx  1388 xxxx xxxxx
Move Cap.:    125  286   852   262  301   800  1292 xxxx xxxxx  1388 xxxx xxxxx
Volume/Cap:  0.03 0.10  0.02  0.58 0.16  0.38  0.10 xxxx  xxxx  0.02 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx   0.1  xxxx xxxx xxxxx   0.3 xxxx xxxxx   0.0 xxxx xxxxx
Control Del:xxxxx xxxx   9.3 xxxxx xxxx xxxxx   8.1 xxxx xxxxx   7.6 xxxx xxxxx
LOS by Move:    *    *     A     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.:  252 xxxx xxxxx  xxxx  448 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.4 xxxx xxxxx xxxxx 17.5 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel: 21.3 xxxx xxxxx xxxxx  109 xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     C    *     *     *    F     *     *    *     *     *    *     *
ApproachDel:       16.8            109.1            xxxxxx            xxxxxx
ApproachLOS:         C               F                 *                 *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
```

```
--------------------------------------------------------------------------------
                           Sierra Star Master Plan
                    Cumulative Plus Project Conditions   Mitigation
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #4 Minaret Rd/ Old Mammoth Rd
********************************************************************************
Average Delay (sec/veh):      11.5      Worst Case Level Of Service: C[ 22.9]
********************************************************************************
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  1  0  0  1   1  0  0  1  0   1  0  0  1  0    1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        3   20    17   111   40   188    50  123     4    20  127    36
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:     3   20    17   111   40   188    50  123     4    20  127    36
Added Vol:       0    5     0    28    4    83    71   50     0     0   57    34
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     3   25    17   139   44   271   121  173     4    20  184    70
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:      0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90
PHF Volume:      3   28    19   154   49   301   134  192     4    22  204    78
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      3   28    19   154   49   301   134  192     4    22  204    78
Critical Gap Module:
Critical Gp:  7.1  6.5   6.2   7.1  6.5   6.2   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3   3.5  4.0   3.3   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  926  790   194   774  753   243   282 xxxx xxxxx   197 xxxx xxxxx
Potent Cap.:  251  325   852   318  341   800  1292 xxxx xxxxx  1388 xxxx xxxxx
Move Cap.:    125  286   852   262  301   800  1292 xxxx xxxxx  1388 xxxx xxxxx
Volume/Cap:  0.03 0.10  0.02  0.59 0.16  0.38  0.10 xxxx  xxxx  0.02 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx   0.1   3.4 xxxx xxxxx   0.3 xxxx xxxxx   0.0 xxxx xxxxx
Control Del:xxxxx xxxx   9.3  36.7 xxxx xxxxx   8.1 xxxx xxxxx   7.6 xxxx xxxxx
LOS by Move:    *    *     A     E    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT    LT - LTR - RT
Shared Cap.:  252 xxxx xxxxx  xxxx xxxx   650  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.4 xxxx xxxxx xxxxx xxxx   3.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel: 21.3 xxxx xxxxx xxxxx xxxx  16.8 xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     C    *     *     *    *     C     *    *     *     *    *     *
ApproachDel:       16.8             22.9            xxxxxx            xxxxxx
ApproachLOS:         C                C                *                 *
********************************************************************************
Note: Queue reported is the number of cars per lane.
```

```
--------------------------------------------------------------------------------
                          Sierra Star Master Plan
                     Cumulative Plus Project Conditions
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #5 Sierra Park Road/Meridian Blvd
********************************************************************************
Cycle (sec):          100              Critical Vol./Cap.(X):          0.135
Loss Time (sec):        0 (Y+R=4.0 sec) Average Delay (sec/veh):          8.1
Optimal Cycle:          0              Level Of Service:                  A
********************************************************************************
Street Name:          Sierra Park Road                   Meridian Blvd
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  0  1! 0  0    0  0  1! 0  0    0  1  0  1  0    0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0     1     0   23     0     6   20    98     0    0    75     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     1     0   23     0     6   20    98     0    0    75     3
Added Vol:     23     8     8    0     9    10    3    25    26    9    44     0
PasserByVol:    0     0     0    0     0     0    0     0     0    0     0     0
Initial Fut:   23     9     8   23     9    16   23   123    26    9   119     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:     0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90 0.90  0.90  0.90
PHF Volume:    26    10     9   26    10    18   26   137    29   10   132     3
Reduct Vol:     0     0     0    0     0     0    0     0     0    0     0     0
Reduced Vol:   26    10     9   26    10    18   26   137    29   10   132     3
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    10     9   26    10    18   26   137    29   10   132     3
------------|---------------||---------------||---------------||---------------|
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:       0.58  0.22  0.20 0.48  0.19  0.33 0.27  1.43  0.30 0.14  1.82  0.04
Final Sat.:   414   162   144  353   138   246  190  1052   230   98  1309    33
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.06  0.06  0.06 0.07  0.07  0.07 0.13  0.13  0.13 0.10  0.10  0.10
Crit Moves:  ****                   ****       ****             ****
Delay/Veh:    8.0   8.0   8.0  7.9   7.9   7.9  8.4   8.2   8.0  8.2   8.1   8.1
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:   8.0   8.0   8.0  7.9   7.9   7.9  8.4   8.2   8.0  8.2   8.1   8.1
LOS by Move:    A     A     A    A     A     A    A     A     A    A     A     A
ApproachDel:        8.0               7.9               8.2               8.1
Delay Adj:         1.00              1.00              1.00              1.00
ApprAdjDel:         8.0               7.9               8.2               8.1
LOS by Appr:          A                 A                 A                 A
AllWayAvgQ:   0.1   0.1   0.1  0.1   0.1   0.1  0.1   0.1   0.1  0.1   0.1   0.1
********************************************************************************
Note: Queue reported is the number of cars per lane.
```

```
------------------------------------------------------------------------------
                       Sierra Star Master Plan
                 Cumulative Plus Project Conditions
------------------------------------------------------------------------------
                  Level Of Service Computation Report
        2000 HCM Operations Method (Future Volume Alternative)
******************************************************************************
Intersection #6 Old Mammoth Rd/ Main St
******************************************************************************
Cycle (sec):          85              Critical Vol./Cap.(X):         0.919
Loss Time (sec):      12 (Y+R=4.0 sec) Average Delay (sec/veh):       27.0
Optimal Cycle: OPTIMIZED              Level Of Service:                 C
******************************************************************************
Street Name:          Old Mammoth Rd                      Main St
Approach:     North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Protected        Protected       Prot+Permit      Prot+Permit
Rights:          Include          Include          Include          Include
Min. Green:    0    0    0    0    0    0    0    0    0    0    0    0
Lanes:       1  0  0  0  1   0  0  0  0  0   0  0  2  0  1   1  0  2  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     333    0   105     0    0     0     0  416   689   126  267     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:  333    0   105     0    0     0     0  416   689   126  267     0
Added Vol:    116    0    14     0    0     0     0   80    95    16  105     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  449    0   119     0    0     0     0  496   784   142  372     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:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:   473    0   125     0    0     0     0  522   825   149  392     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  473    0   125     0    0     0     0  522   825   149  392     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.:   473    0   125     0    0     0     0  522   825   149  392     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.95 1.00  0.85  1.00 1.00  1.00  1.00 0.95  0.98  0.95 0.95  1.00
Lanes:       1.00 0.00  1.00  0.00 0.00  0.00  0.00 2.00  1.00  1.00 2.00  0.00
Final Sat.:  1805    0  1615     0    0     0     0 3610  1857  1805 3610     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.26 0.00  0.08  0.00 0.00  0.00  0.00 0.14  0.44  0.08 0.11  0.00
Crit Moves:  ****                                         ****  ****
Green/Cycle: 0.29 0.00  0.29  0.00 0.00  0.00  0.00 0.48  0.48  0.62 0.57  0.00
Volume/Cap:  0.92 0.00  0.27  0.00 0.00  0.00  0.00 0.30  0.92  0.28 0.19  0.00
Delay/Veh:   51.1  0.0  23.9   0.0  0.0   0.0   0.0 13.3  34.6   7.4  8.7   0.0
User DelAdj: 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:  51.1  0.0  23.9   0.0  0.0   0.0   0.0 13.3  34.6   7.4  8.7   0.0
LOS by Move:    D    A     C     A    A     A     A    B     C     A    A     A
HCM2kAvgQ:     16    0     3     0    0     0     0    4    25     2    3     0
******************************************************************************
Note: Queue reported is the number of cars per lane.
```

```
-------------------------------------------------------------------------------
                         Sierra Star Master Plan
                    Cumulative Plus Project Conditions
-------------------------------------------------------------------------------
                    Level Of Service Computation Report
         2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #7 Mountain Blvd/Main Street
********************************************************************************
Average Delay (sec/veh):     10.3      Worst Case Level Of Service: F[269.8]
********************************************************************************
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  1! 0  0   0  0  1! 0  0   0  1  0  1  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       8    4     3   43    6    34   28 1186    25     4  506    37
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:    8    4     3   43    6    34   28 1186    25     4  506    37
Added Vol:     21    0     9    0    0     0    0  210    22    10  263     0
PasserByVol:    0    0     0    0    0     0    0    0     0     0    0     0
Initial Fut:   29    4    12   43    6    34   28 1396    47    14  769    37
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:    29    4    12   43    6    34   28 1396    47    14  769    37
Reduct Vol:     0    0     0    0    0     0    0    0     0     0    0     0
Final Vol.:    29    4    12   43    6    34   28 1396    47    14  769    37
Critical Gap Module:
Critical Gp:  7.5  6.5   6.9  7.5  6.5   6.9  4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3  3.5  4.0   3.3  2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1891 2310   722 1572 2314   403  806 xxxx xxxxx  1443 xxxx xxxxx
Potent Cap.:   44   39   374   76   38   603  828 xxxx xxxxx   476 xxxx xxxxx
Move Cap.:     34   36   374   64   36   603  828 xxxx xxxxx   476 xxxx xxxxx
Volume/Cap:  0.85 0.11  0.03 0.67 0.17  0.06 0.03 xxxx  xxxx  0.03 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx xxxx xxxx xxxxx  0.1 xxxx xxxxx   0.1 xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx  9.5 xxxx xxxxx  12.8 xxxx xxxxx
LOS by Move:    *    *     *    *    *     *    A    *     *     B    *     *
Movement:    LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx   45 xxxxx xxxx   93 xxxxx xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx  4.1 xxxxx xxxxx  5.0 xxxxx  0.1 xxxx xxxxx   0.1 xxxx xxxxx
Shrd ConDel:xxxxx  270 xxxxx xxxxx  148 xxxxx  9.5 xxxx xxxxx  12.8 xxxx xxxxx
Shared LOS:     *    F     *    *    F     *    A    *     *     B    *     *
ApproachDel:      269.8           147.7           xxxxxx           xxxxxx
ApproachLOS:        F               F               *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
```

APPENDIX D

CUMULATIVE PLUS PROJECT LEVEL OF SERVICE WORKSHEETS AT ACCESS LOCATIONS

```
--------------------------------------------------------------------------------
                        Sierra Star Master Plan
                    Cumulative Plus Project Conditions
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #8 Sierra Star Parkway/Meridian Blvd
********************************************************************************
Average Delay (sec/veh):      1.4      Worst Case Level Of Service: C[ 16.5]
********************************************************************************
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     0    0     0     0  427     0     0  208     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:    0    0     0     0    0     0     0  427     0     0  208     0
Added Vol:      0    0     0    65    0    27    34  253     0     0  257    50
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0    65    0    27    34  680     0     0  465    50
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    65    0    27    34  680     0     0  465    50
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0    0     0    65    0    27    34  680     0     0  465    50
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  1213 xxxx   465   515 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   203 xxxx   602  1061 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   198 xxxx   602  1061 xxxx xxxxx  xxxx xxxx xxxxx
Total Cap:      0    0 xxxxx   329    0 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.20 xxxx  0.04  0.03 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.7 xxxx   0.1   0.1 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx  18.6 xxxx  11.3   8.5 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 ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx             16.5             xxxxxx           xxxxxx
ApproachLOS:        *                 C                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
```

```
------------------------------------------------------------------------------
                       Sierra Star Master Plan
                  Cumulative Plus Project Conditions
------------------------------------------------------------------------------

                  Level Of Service Computation Report
         2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #9 Minaret Rd/Sierra Star Parkway
******************************************************************************
Average Delay (sec/veh):       5.7       Worst Case Level Of Service: F[ 67.8]
******************************************************************************
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:        1  0  0  1  0   1  0  0  1  0   0  1  0  0  1   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  307     0     0  482     0     0    0     0     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:    0  307     0     0  482     0     0    0     0     0    0     0
Added Vol:     29  242    31    68  284    58    46    0    42    26    0    58
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   29  549    31    68  766    58    46    0    42    26    0    58
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:    29  549    31    68  766    58    46    0    42    26    0    58
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:    29  549    31    68  766    58    46    0    42    26    0    58
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx   4.1 xxxx xxxxx   7.1 xxxx   6.2   7.1 xxxx   6.2
FollowUpTim:  2.2 xxxx xxxxx   2.2 xxxx xxxxx   3.5 xxxx   3.3   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  824 xxxx xxxxx   580 xxxx xxxxx  1583 xxxx   795  1575 xxxx   564
Potent Cap.:  815 xxxx xxxxx  1004 xxxx xxxxx    89 xxxx   391    90 xxxx   529
Move Cap.:    815 xxxx xxxxx  1004 xxxx xxxxx    73 xxxx   391    74 xxxx   529
Volume/Cap:  0.04 xxxx  xxxx  0.07 xxxx  xxxx  0.63 xxxx  0.11  0.35 xxxx  0.11
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx   0.2 xxxx xxxxx  xxxx xxxx   0.4  xxxx xxxx   0.4
Control Del:  9.6 xxxx xxxxx   8.8 xxxx xxxxx xxxxx xxxx  15.3 xxxxx xxxx  12.6
LOS by Move:    A    *     *     A    *     *     *    *     C     *    *     B
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx    73 xxxx xxxxx    74 xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   2.8 xxxx xxxxx   1.3 xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx 115.6 xxxx xxxxx  77.8 xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     F    *     *     F    *     *
ApproachDel:     xxxxxx           xxxxxx             67.8             32.8
ApproachLOS:        *                *                 F                D
******************************************************************************
Note: Queue reported is the number of cars per lane.
```

```
------------------------------------------------------------------------------
                       Sierra Star Master Plan
                 Cumulative Plus Project Conditions
------------------------------------------------------------------------------

                  Level Of Service Computation Report
        2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #10 Minaret Road/Sierra Star Exit
******************************************************************************
Average Delay (sec/veh):      0.6      Worst Case Level Of Service: C[ 18.2]
******************************************************************************
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  307    0     0  482    0     0    0    0     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:    0  307    0     0  482    0     0    0    0     0    0    0
Added Vol:      0  339    7    34  403    0     0    0    0     6    0   29
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:    0  646    7    34  885    0     0    0    0     6    0   29
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  646    7    34  885    0     0    0    0     6    0   29
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:     0  646    7    34  885    0     0    0    0     6    0   29
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   653 xxxx xxxxx  xxxx xxxx xxxxx  1603 xxxx   650
Potent Cap.: xxxx xxxx xxxxx   943 xxxx xxxxx  xxxx xxxx xxxxx   118 xxxx   473
Move Cap.:   xxxx xxxx xxxxx   943 xxxx xxxxx  xxxx xxxx xxxxx   114 xxxx   473
Volume/Cap:  xxxx xxxx  xxxx  0.04 xxxx  xxxx  xxxx xxxx  xxxx  0.05 xxxx  0.06
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx   9.0 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  307 xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.4 xxxxx
Shrd ConDel:xxxxx xxxx xxxxx   9.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 18.2 xxxxx
Shared LOS:     *    *    *     A    *    *     *    *    *     *    C    *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx            18.2
ApproachLOS:         *                *                *                C
******************************************************************************
Note: Queue reported is the number of cars per lane.
```

APPENDIX K

WATER SUPPLY ASSESSMENT

SB 610 Water Supply Assessment

For The

Sierra Star Master Plan Draft EIR

FINAL

Prepared by the Mammoth Community Water District

December 12, 2006

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Executive Summary

This water supply assessment covers the anticipated water demand associated with the 2006 Sierra Star Master Plan Draft EIR. It covers the requirements of Senate Bill 610 that are described in Water Code section 10910 – 10915. This document was prepared referencing the District's 2005 Urban Water Management Plan and the water supply assessment that was prepared for the Town of Mammoth Lakes General Plan Update dated October 2005.

The District's projections herein rely on the following supplies to meet water demands in the future: existing groundwater supplies, existing surface water supplies, future groundwater well development, and recycled water. The District also anticipates utilizing techniques to reduce demands by implementing water conservation in drought periods in addition to ongoing water conservation education and rebate programs and continuing to pursue water loss reduction by replacing water main pipelines.

This water assessment has found that existing groundwater and surface water resources are insufficient to meet future anticipated water demands in multiple dry year conditions and in single dry year conditions. The development of additional groundwater supplies and the use of recycled water would create sufficient supplies to meet demands, including those from the SSMP. The remaining small shortfalls seen after the implementation of these projects could be met through irrigation restrictions in drought years. There are uncertainties regarding the implementation of the future water supplies discussed in this assessment. As with the development of any water supply, the District will need to evaluate and respond to any environmental concerns associated with the projects, obtain any applicable governmental approvals, and address other considerations that may surround these projects. In addition, other currently undefined water supply projects may be used to replace and/or supplement those described in this assessment.

In conclusion, this water supply assessment shows that with the inclusion of several additional water supply projects, the District will have sufficient supplies through the next 20 years to meet the demands of the Sierra Star Master Plan in addition to other projected development in Mammoth Lakes.

Introduction

Senate Bill 610 (SB 610) requires that water supply assessments be furnished to local governments for inclusion in any environmental documentation for certain projects subject to the California Environmental Quality Act. The purpose of such an assessment is to determine if the water supplier will have sufficient supplies available during normal, dry, and multiple dry water years during a 20-year projection to meet the projected water demand of the proposed project, in addition to existing and other planned future uses.

The Town of Mammoth Lakes has commissioned an Environmental Impact Report on the Sierra Star Master Plan (SSMP), which covers development on approximately 40 acres of the 107-acre site surrounding the existing Sierra Star Golf Course. The Sierra Star Master Plan proposes to change the name, land area, and land uses set forth in the original 1991 Lodestar Master Plan. The Town of Mammoth Lakes formally requested a SB 610 water supply assessment for this project in a letter dated October 13, 2006.

The SSMP proposes to construct 1,220 dwelling units[1], of which 399 units already have been built or approved for construction and 821 units are set for approval through the SSMP Environmental Impact Report. The original Lodestar Master Plan included a total of 1,263 units and these unit counts were included in the Town of Mammoth Lakes 2005 General Plan Update, which was used in the preparation of the District's 2005 Urban Water Management Plan (UWMP). For this reason, the unit counts and demand projections used in the 2005 UWMP were used to prepare this water supply assessment.

In addition, the Sierra Star Master Plan may be considered a project under SB 610 because it appears to fit the definition of a "project" under Water Code section 10912 (a) (7). This section states that a "project" means a development that would result in the water demand equivalent to or greater than the amount of water required by a 500 dwelling unit project. Thus, using the District's historical meter record, 500 dwelling units, where a dwelling unit is considered equivalent to an EDU or single family home, would result in about 140 acre-feet of demand annually. Since the demand from the projected development associated with the Sierra Star Master Plan results in more than 140 acre-feet (see table below), it can be considered a project under the Water Code section described above. This project also could be considered a "specific plan" that only requires the water supply analysis as described in Government Code section 65352.5 and Government Code section 65453 (a). However, since the Town has requested a SB 610 analysis, the District has prepared this document.

[1] The Town of Mammoth Lakes municipal code defines a dwelling unit as being equivalent to a two-bedroom condominium unit or two hotel rooms.

Table 1: Sierra Star Master Plan estimated water demands

RESIDENTIAL	Unit Type	Unit Count	Gallons / Day	Annual Gallons	Annual AF
Area 1D	Single Family Homes	24	6,000	2,190,000	7
Area 2	Condominiums	260	44,200	16,133,000	50
Area 4A	Multifamily/Apartment	80	10,800	3,942,000	12
Area 5A	Hotel	356	28,480	10,395,200	32
Area 5B/C/D	Condo/Hotel	239	23,900	8,723,500	27
Area 7	Single Family Homes	40	10,000	3,650,000	11
	Total*	**821**			
COMMERCIAL	**Unit Type**	**Unit Count**	**Gallons / Day**	**Annual Gallons**	**Annual AF**
	General Commercial (sq ft)	29,000	4,350	1,587,750	5
	General Commercial (sq ft)	20,000	3,000	1,095,000	3
	Conference Center (sq ft)	30,000	3,750	1,368,750	4
	Total	**79,000**	**134,480**	**49,085,200**	**151**
*Note: The 365 hotel units in Area 5A equates to 178 dwelling units					

The District updated its Urban Water Management Plan in December of 2005 to include proposed development associated with the Town of Mammoth Lakes 2005 General Plan Update. While the current updates to the Town General Plan are an ongoing process, it represents the best, most current information regarding potential future development in the community. For this reason, the District included the unit counts in the Draft General Plan Update EIR dated October 2005 in the preparation of its 2005 UWMP. In addition, since the development for the land area in the Sierra Star Master Plan was already included in the Town General Plan and thus in the 2005 UWMP and the development projected to occur under the 2006 Sierra Star Master Plan (1,220 dwelling units) is less than the development projected under the 1991 Lodestar Master Plan (1,263 dwelling units), it can be assumed that the development figures used to prepare the 2005 UWMP essentially included the SSMP.

The District prepared a SB 610 water supply assessment for the Town of Mammoth Lakes General Plan update in the fall of 2004 with amendments in September and November 2005. This document, as well as the 2005 UWMP, was used as a reference for the preparation of this water supply assessment. The District's Board of Directors approved this completed water supply assessment prepared pursuant to Water Code Section 10910 at a special meeting held on December 7, 2006.

Documenting Water Supply

Water Code section 10910 (d) and (e) states that a water supply assessment must identify and quantify existing and planned sources of water available to the water supplier in 5-year increments for a 20-year projection. The following information regarding existing and planned sources of water is taken from the District's 2005 Urban Water Management Plan.

Table 2: Existing water supplies

Annual amounts of water for each entitlement and right under normal year conditions

Supply	Acre-Feet per Year	Entitlement	Right	Ever Used
Local surface	2760	X		Yes
Groundwater	4000		X	Yes

Note: While the District currently has surface water rights that total a maximum of 2,760 acre-feet annually, the bypass flow requirements that the District operates under have not been permanently established and the final bypass requirements that are eventually established could potentially result in less surface water being available to the District. In addition, the volume of groundwater noted in this table is the maximum amount of groundwater that the District has projected to pump in any given year and does not necessarily represent the safe yield of the aquifer.

Surface Water

The District currently has the right, through two licenses and one permit, to divert a total of 2,760 acre-feet of water annually from Lake Mary, located in the Mammoth Lakes Basin. The authorized amount of water that the District can divert under its surface water rights are set at a maximum instantaneous diversion of 5.039 cubic feet per second (cfs) and a maximum annual diversion of 2,760 acre-feet (AF). As part of this total, the District is allowed to store 606 acre-feet from April 1 to June 30 and an additional 54 acre-feet from September 1 to September 30 of each year.

The District's water rights are restricted by several management constraints that influence the amount of surface water that can be diverted. These include the bypass flow requirements in Mammoth Creek and lake level management of Lake Mary. The primary influence upon the amount of water that the District may store or divert are the bypass flow requirements in Mammoth Creek that are included as part of the District's water rights. The District measures Mammoth Creek flows at its Old Mammoth Road gage located near Mammoth Creek Park. The District is only allowed to directly divert natural flows entering Lake Mary and divert natural flows to storage when the flows, as measured at the Old Mammoth Road gage, exceed the bypass flow requirements. When the flows at the District's Old Mammoth Road gage are equal to or less than the bypass flow requirements, no water may be directly diverted or diverted to storage, and the District must bypass all incoming flows to Lake Mary.

While the District must currently operate under the bypass flow requirements, there is potential for these requirements to become modified in the future due to their temporary nature. The District is currently preparing an EIR that evaluates the environmental effects of the proposed bypass flow requirements for Mammoth Creek. The outcome of this EIR and the resulting decision by the State Water Resources Control Board could modify the existing temporary bypass flows to a different regime that could result in less surface water being available to the District.

Surface water supply volumes used in the preparation of this water supply assessment assume that the existing bypass flow requirements will remain as they are currently established. Potential reductions in surface water supplies in the future are a possibility, but the amount of these reductions is currently unknown.

Table 3: Past, Current, Projected Water Supplies

Water Supply Sources	1995	2000	2005 (Actual)	2005 (Projected Maximum)	2010	2015	2020	2025
Lake Mary	1725	1971	1660	2760	2760	2760	2760	2760
Well #1	47	19	188	500	500	500	500	500
GWTP #1	890	672	1430	2000	2000	2000	2000	2000
GWTP #2	230	574	493	1500	1500	1500	1500	1500
Future Wells						1000	1000	1000
Recycled Water					360	360	360	360
Total	**2892**	**3236**	**3771**	**6760**	**7120**	**8120**	**8120**	**8120**

Units of Measure: acre-feet per year
Note: Projected water supplies (2005 to 2025) represent maximum supplies that may be available in normal water years. Actual water supplies in 1995, 2000, and 2005 represent supplies that were made available to the community based upon demands. Groundwater pumpage reflects the metered amount of water pumped from individual wells, which tends to vary slightly from the flow measured through the treatment plants.

Future Water Sources

The District has identified groundwater as being a significant source of future water supplies for the community. These supplies would be extracted from either the Mammoth Basin watershed or the Dry Creek Basin watershed to the north of the Mammoth Basin. Additional groundwater production wells in the Mammoth Basin would require environmental review and hydrogeology analysis to ensure that additional volumes of water can be safely extracted from the basin. Well development in the Dry Creek Basin would also require environmental review and hydrogeology analysis prior to utilizing this water source. The District has budgeted $14,755,000 through 2025 for the development of these sources.

The District also has identified recycled water as an additional water supply source for the community, which would primarily serve large turf irrigators, such as golf courses and parks. The 2006 Recycled Water Distribution Project EIR addresses Sierra Star Golf Course, Snowcreek Golf Course, and Shady Rest Park (operated by the Town of Mammoth Lakes) as customers for this project. The District will be considering the certification of a final EIR at its January 16, 2007, meeting and has budgeted over $10,000,000 through 2010 for the development of this project.

More detailed information regarding future water supplies are included on page 19 of this assessment.

Groundwater

Water sources that will serve the project include groundwater; therefore, according to Water Code section 10910 (f) detailed groundwater information must be included in the water supply assessment. The following information is taken from the District's 2005 Urban Water Management Plan.

The District completed a Groundwater Management Plan (GWMP) in 2005 that describes a monitoring and operation plan for the long-term use of local groundwater and surface water resources. The intent of the GWMP is to ensure that groundwater resources are managed in a manner that ensures sufficient, high quality groundwater resources while minimizing potential environmental impacts. The GWMP was adopted by the District Board of Directors in July 2005.

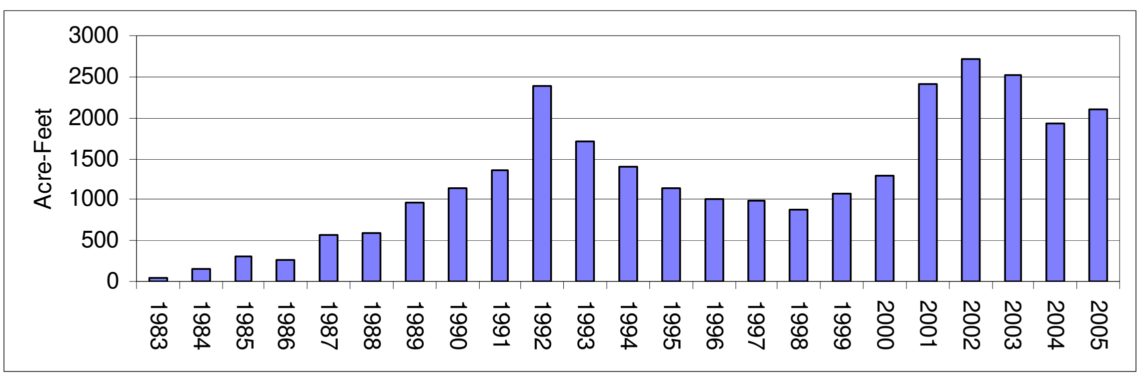
The District pumps groundwater from the Mammoth Basin watershed, which is located within the Long Valley Groundwater Basin identified by the Department of Water Resources as part of the South Lahontan Hydrologic Region. The Mammoth Basin is located on the eastern side of the Sierra Nevada Mountain Range. Surface elevations range from a high of about 12,000 feet at Mammoth Crest to 7,000 feet at the downstream easterly extremity. Mammoth Basin is the watershed of Mammoth Creek and is bounded on the south by the drainage divide of Convict Creek; on the west by the Mammoth Crest; on the north by the drainage divide of Dry Creek; and on the east extending along the watershed of Hot Creek. The area of the Mammoth Basin is about 71 square miles and extends approximately 13 miles west to east and 9 miles north to south.

Elevated areas on the north and west that are comprised largely of extrusive igneous rocks generally form the Mammoth Basin; a central trough filled with alluvial and glacial debris; and an abrupt southern flank of igneous intrusive and metamorphic rocks. The central trough area opens and drains to the east to the Owens River and Lake Crowley.

The Mammoth Basin has not been adjudicated or identified by DWR as being over drafted. In order to prevent the basin from being over drafted, the District maintains an extensive groundwater and surface water monitoring system. Groundwater levels are monitored in 8 production wells and in 15 shallow and deep monitor wells. Water level sensors are located on all production wells and are connected to the District's supervisory control and data acquisition (SCADA) system to allow for continuous monitoring. Surface water levels and flow rates are monitored at twelve locations throughout the basin watershed. The District prepares an annual groundwater monitoring report that provides an evaluation of groundwater level, surface flow, and water quality monitoring data accumulated throughout the year.

During the past 5-year period (2001 to 2005) the District pumped a total of 11,671 acre-feet of groundwater, averaging 2,334 acre-feet per year. The maximum volume pumped occurred in 2002 and amounted to 2,717 acre-feet. Groundwater was pumped from the District's eight (8) production wells located within the boundaries of the District's service area serving the Town of Mammoth Lakes. Production volumes of groundwater in any one year are dependent on the type of precipitation year experienced, the consequent availability of surface water, and the amount of demand from the community. The following graph shows annual groundwater volumes provided to District customers.

Figure 1: Annual volume of drinking water produced from District production wells 1983-2005



The following table shows detailed volumes of water pumped from each well over the past five years.

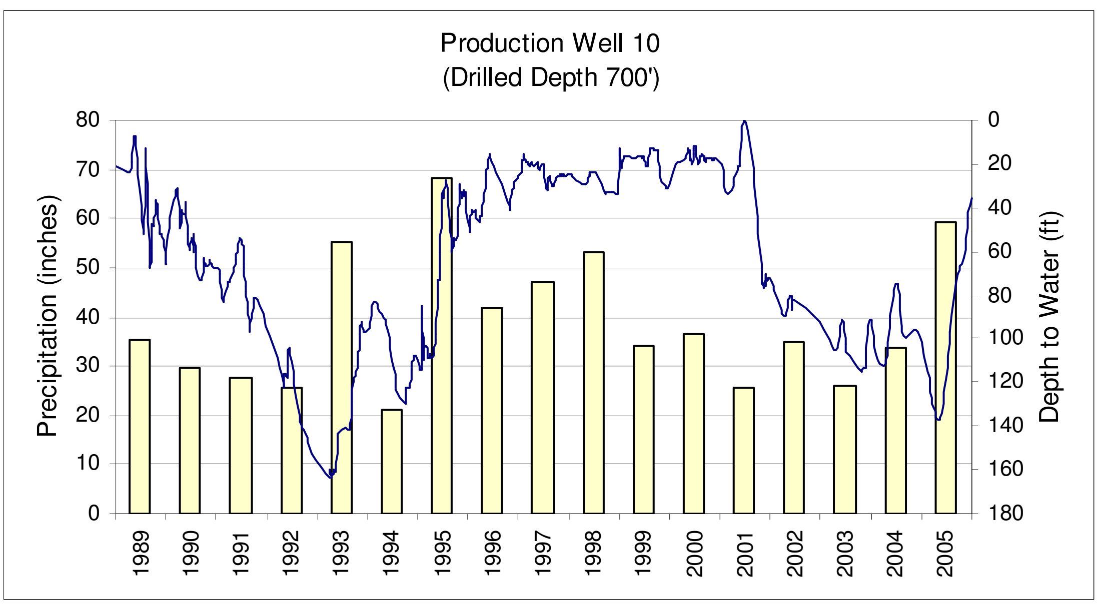
Table 4: Historical volumes (acre-feet) of groundwater pumped from individual production wells

Well No.	2001	2002	2003	2004	2005
1	74	132	184	71	188
6	110	184	454	347	554
10	546	1086	602	500	577
15	571	592	807	381	244
16	230	141	107	239	55
17	427	310	172	138	100
18	123	77	114	58	226
20	246	196	80	187	167
Total	2326	2719	2520	1921	2111

Note: Groundwater pumpage reflects the metered amount of water pumped from individual wells, which tends to vary slightly from the flow measured through the treatment plants.

During dry-year periods, groundwater levels within the Mammoth Basin tend to decrease due to increased pumping and less recharge. During normal and above-normal precipitation years, groundwater levels increase and tend to recover after two years of normal precipitation. The following graph depicts historical groundwater levels in one of the District's production wells and shows the variability of groundwater levels based on pumping and type of recharge year.

Figure 2: Variability of groundwater levels in a District production well



Future groundwater production rates have been projected based on community growth projections and on type of climatic conditions. The following tables describe projected volumes of groundwater that will be pumped under normal and multiple dry-year water year conditions.

Table 5: Groundwater pumping projections (acre-feet) to meet demands in a normal water year

Well No.	2010	2015	2020	2025
1	146	200	74	38
6	200	300	400	500
10	300	300	400	500
15	300	300	400	500
16	0	0	0	0
17	200	300	400	500
18	0	0	0	0
20	200	210	200	100
Future Well(s)	0	0	0	0
Total	1346	1610	1874	2138
<u>Note:</u> *Groundwater projections based on utilizing 2760 ac-ft of surface water in normal year to meet projected demand*				

Table 6: Groundwater pumping projections (acre-feet) to meet demands in multiple dry year conditions

Well No.	2010	2015	2020	2025
1	161	256	325	356
6	311	415	475	506
10	500	726	960	991
15	336	440	500	531
16	135	139	199	230
17	231	335	395	426
18	28	41	92	123
20	150	154	214	245
Future Well(s)	**0**	**0**	**0**	**406**
Total	1852	2506	3160	3814
<u>Note:</u> *Groundwater projections based on utilizing 1084 ac-ft of surface water in multiple dry years to meet projected demand. The volume of 1084 ac-ft is derived from the actual available surface water that could have been available in 1992, the last year of a six-year drought and assumes existing bypass flow requirements. If the District's bypass flow requirements were revert to those set forth in the District's water right permit, there would be substantial reductions in the availability of surface water available to the District in multiple dry years, which would increase the need for additional groundwater supplies.*				

As indicated by groundwater pumping projections for the future, the volume of groundwater currently available from existing wells is insufficient to meet the total demand under multiple dry-year conditions as the community nears build-out in the year 2025. However, the District currently supplements its groundwater supplies with surface water and may be supplementing existing well supplies with additional production wells in the future. A study conducted for the Mammoth Community Water District ("Investigation of Groundwater Production Impacts on Surface Water Discharge and Spring Flow", Wildermuth Environmental, Inc. November 2003) indicates that a total volume of 3800 acre-feet annually could be pumped from the Mammoth Basin during a three-year dry period.

Documenting Projected Demand

The projected water demand associated with the Sierra Star Master Plan was accounted for in the District's most recently adopted Urban Water Management Plan (UWMP) dated December 2005. Thus, according to Water Code section 10910 (c) (2), the analysis of water demand for the proposed project may be incorporated from the UWMP. The following table describes past, current, and future water demands from the District's Urban Water Management Plan.

Table 7: Past, current, and projected water use (acre-feet)

Water Use Sector	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**
Single Family Residential	515	549	586	623	659	696
Condominium	961	948	960	973	985	997
Multi-Family Residential	144	140	211	282	353	424
Commercial/Industrial/ Public	217	257	374	469	565	660
Motel / Hotel	112	111	304	496	689	881
Public Sector	170	296	Included in commercial	Included in commercial	Included in commercial	Included in commercial
Golf Course**	297	263	400	400	400	400
Other*	53	107	80	80	80	80
Unaccounted	486	752	760	760	760	760
Total	**2955**	**3423**	**3674**	**4082**	**4490**	**4898**

Note: Existing hotel/motel water-use sector includes only those units that are separately metered and does not include units that share water meters with commercial. Commercial includes mixed uses such as restaurants, condo/hotel, retail, etc. Public sector is included in the commercial water-use sector for future projections for consistency with data from the Town of Mammoth Lakes General Plan EIR (2005).
*Other = treatment plant process water, fire fighting, line cleaning, etc.
** Golf course water use based on existing demand from Sierra Star and Snowcreek Golf Courses. This value may be reduced by recycled water use in the future.
Groundwater data in this table is based upon metered flows from the District's groundwater treatment plants, which varies slightly from amounts measured from individual wells.

Documenting Dry-Year Supply

The Mammoth Community Water District's existing sources of water supply consist of surface water and groundwater, both derived from the Mammoth Basin watershed. The area is susceptible to drought and both of these sources of supply are impacted to various degrees. Surface water supplies are immediately impacted following a drought season whereas groundwater supplies tend to be affected by an extended drought period of several years.

Over the past thirty years, below average precipitation conditions have been experienced 50% of the years. In 30% of the years, seasons with less than 70% of average precipitation have been experienced.

Table 8 provides water supply volumes for average, single dry, and multiple dry water years based on current supplies.

Table 8: Existing water supply reliability

			Multiple Dry Years			
Supply	**Normal Water Year**	**Single Dry Water Year**	**Year 1**	**Year 2**	**Year 3**	**Year 4**
Projected Surface	2760	0	1780	1500	1100	1084
Projected Wells	4000	3410	3410	3408	3408	3408
Projected Total	**6760**	**3410**	**5190**	**4908**	**4508**	**4492**

Units of Measure: acre-feet per year
Note: *While the District currently has surface water rights that total a maximum of 2,760 acre-feet annually, the bypass flow requirements that the District operates under have not been permanently established and the final bypass requirements that are eventually established could potentially result in less surface water being available to the District.*

The following table describes how each water year type was derived.

Table 9: Basis of water year data

Water Year Type	Year(s) Data is Based Upon	Base Year(s)	Historical Sequence
Normal Water Year	Normal water year based upon 10% deviation from April 1 average snowpack of 43 inches, or 38.7 to 47.3 inches on April 1. Normal water years have historically occurred about every nine years, or seven times in the last 62 years. Surface water supplies are based upon the maximum quantity of surface water available through the District's surface water rights.	1997 1996 1984 1971 1954 1949 1946	Every nine years
Single Dry Water Year	Single dry years are generally considered the lowest annual runoff for a watershed since the water-year beginning in 1903. For the Mammoth watershed, the year with the lowest April 1 snowpack is 12.3 inches of snow water equivalent on April 1, 1977. Groundwater data is based upon driest year that production wells were in use (1992 for wells #1, 6, 10, and 15 and 2001 for wells #16, 17, 18, and 20).	1977 1992 2001	
Multiple Dry Water Years	Multiple dry years are generally considered the lowest average runoff for a consecutive multiple year period (three years or more) for a watershed since 1903. The driest multiple year period in the Mammoth watershed was the six-year period from 1987 to 1992, which averaged 28.7 inches of snow water content at Mammoth Pass.	1987 through 1992	

<u>Is the Projected Water Supply Sufficient or Insufficient for the Proposed Project?</u>

In comparing projected future water demand estimates with current supply data, it is projected that water supply deficiencies would occur after the first year of a multiple year drought and in single dry year conditions. The following table compares current supply and future demands in normal, single dry and multiple dry years. This table shows that shortfalls in supply would occur if the District were to continue to utilize existing water supplies to meet demands at build out of the community, including the Sierra Star Master Plan.

Table 10: Comparison of current supply and demand for normal, single dry, and multiple dry years

Current Supply			Multiple Dry Water Years			
	Average/ Normal Water Year	**Single Dry Water Year**	**Year 1**	**Year 2**	**Year 3**	**Year 4**
Supply Total	6760	3410	5190	4908	4508	4492
Demand Total (without SSMP)	4747	4747	4747	4747	4747	4747
Difference (without SSMP)	**2013**	**-1337**	**443**	**161**	**-239**	**-255**
Demand Total (including SSMP)	4898	4898	4898	4898	4898	4898
Difference (including SSMP)	**1862**	**-1488**	**292**	**10**	**-390**	**-406**
Units of Measure: Acre-feet per year						

As can be seen by the above supply versus demand comparison table, the current available water supply is considered insufficient to meet demands from build-out of the community during dry water years. Deficiencies of over 1000 acre-feet would occur in a single dry year, which is considered the lowest historical runoff for the watershed. However, this shortfall in supply would likely be reduced through landscape watering restrictions, which have historically reduced demands by 25% during summer irrigation periods. These landscape restrictions are part of the District's water shortage contingency plans, which are included in the District's 2005 UWMP. The extent of the insufficiency in multiple dry years depends on the duration of dry year periods, but would generally occur after the first year of a multiple year drought. It should also be noted that demands from the Sierra Star Master Plan (SSMP) increase the amount of deficiency of existing supplies in single dry and multiple dry year conditions, but not to a significant extent.

Table 11 describes future supply projections with demand totals anticipated at build out of the community according to the 2005 Town of Mammoth Lakes General Plan. These demand projections include the SSMP. Supply projections are based upon planned future well development and the use of recycled water in the community.

Table 11: Comparison of 20-year projection of supply and demand for normal, single dry, and multiple dry years

(Includes Recycled Water Use and Future Wells)

2025 Supply			**Multiple Dry Water Years**			
	Normal Water Year	**Single Dry Water Year**	**Year 1**	**Year 2**	**Year 3**	**Year 4**
Supply Totals	8120	4770	6550	6268	5868	5852
Demand Totals (without SSMP)	4747	4747	4747	4747	4747	4747
Difference (without SSMP)	**3373**	**23**	**1803**	**1521**	**1121**	**1105**
Demand Totals (including SSMP)	4898	4898	4898	4898	4898	4898
Difference (including SSMP)	**3222**	**-128**	**1652**	**1370**	**970**	**954**

Units of Measure: Acre-feet per year
Note: The supply totals on this table assume 1000 acre-feet of future groundwater well water and about 400 acre-feet of recycled water would be utilized in normal water years

The analysis of future demand included in the District's Urban Water Management Plan shows that sufficient supplies should be available in the future during normal and multiple dry year scenarios assuming recycled water use, future well development, and existing bypass flow requirements for Mammoth Creek. There are uncertainties regarding the implementation of each of these water supplies. As with the development of any water supply, the District will need to evaluate and respond to any environmental concerns associated with the projects, obtain any applicable governmental approvals, and address other considerations that may surround these projects. In addition, other currently undefined water supply projects may be used to replace and/or supplement those described in this assessment. The District is also currently working on a loss reduction program and the demand savings, estimated at a loss rate of 10 to 15%, from this program are not included in this table. It should again be noted that shortfalls seen in this table in single dry years would be met through landscape watering restrictions, which have historically reduced demands by 25% during summer irrigation periods.

Plan for Acquiring Additional Future Water Supplies

Under Water Code 10911 it is required, that if, as a result of its assessment, the public water system concludes that its water supplies are, or will be, insufficient, the public water system shall provide to the city or county its plans for acquiring additional water supplies. Since existing supplies are insufficient and future water supplies still result in a shortfall in single dry years, the District has developed the following plans regarding implementation of water conservation measures, use of recycled water, and development of new supplies.

Implementation of Water Conservation Measures

Estimated Total Costs and Proposed Method of Financing

Reductions in water use would affect District revenues during the months of June through September. It is estimated that the decrease in revenue during this period would amount to approximately $300,000 to $600,000 depending upon the level of restrictions implemented. The District maintains an operating reserve in its budget to compensate for conditions, such as lost revenue due to emergencies.

Federal, State, and Local Permits, Approvals or Entitlements

Water conservation measures are included in the District's Water Code. Therefore, the implementation of measures, such as landscape irrigation restrictions, would occur by action of the Board of Directors.

Source of Supply

In 1992, the District implemented water restrictions that included limiting landscape irrigation to 3 days per week. This restriction resulted in an average reduction in water demand of 25% for the irrigation period of June through September. At build-out of the community under the 2005 General Plan, the projected savings from implementation of water conservation measures amounts to about 500 acre-feet annually.

Estimated Timeframes for Implementation

Projections of available water supply are prepared each year after final snowpack measurements are made on April 1. At that time, if projections indicate possible water supply insufficiencies, the District's Board of Directors may declare the existence or threatened existence of a drought and may then implement any level of restrictions as deemed necessary.

Utilization of Recycled Water

Estimated Total Costs and Proposed Method of Financing

The total estimated cost of a recycled water project for the purpose of golf course irrigation amounts to approximately $11,000,000. This project would provide the capability to produce 1.55 million gallons per day of recycled water. The Mammoth Mountain Ski Area (Sierra Star Golf Course) has already paid a connection fee of $1,040,000 for their portion of recycled water once it is made available. The remaining costs of the project would be paid through additional connection fees and through the District's water capital expansion program budget. The District has also calculated a preliminary rate for recycled water, which would cover the operating and maintenance costs, as well as for facility and equipment depreciation. This rate amounts to $1.55 per 1,000 gallons.

Federal, State, and Local Permits, Approvals or Entitlements

Permits that would be required to provide recycled water for irrigation include a waste discharge permit from the Regional Water Quality Control Board and a design and use permit from the State Department of Health Services.

Source of Supply

The source of supply would come from the District's wastewater treatment facility. Although the facility can produce recycled water, there are some upgrades necessary to meet current State Department of Health standards which upgrades would be capable of producing up to 1.55 million gallons per day of recycled water. Parallel recycled water pipelines would be installed from the wastewater treatment plant to the Sierra Star Golf Course and the Snowcreek Golf Course. A third pipeline would be installed from the wastewater treatment plant to Shady Rest Park.

The District currently supplies untreated groundwater for irrigation of the Snowcreek and Sierra Star Golf Courses and supplies potable water to Shady Rest Park. The volume of groundwater supplied to the Sierra Star Golf Course over the past seven years (2000 to 2006) has averaged 238 acre-feet per year. The volume of groundwater supplied to the Snowcreek Golf Course over the past seven years has averaged 85 acre-feet per year. Water supplied to Shady Rest Park over the past four years averaged about 30 acre-feet per year. The maximum water supplied to these locations in dry water years has totaled about 440 acre-feet

The Recycled Water Project plans for providing recycled water to both golf courses and Shady Rest Park. Recycled water use at Shady Rest Park and Sierra Star Golf Course would result in a direct offset of potable water. Recycled water provided to the Snowcreek Golf Course would be provided to a portion of the existing nine holes and possibly the entire additional nine holes planned for development. Recycled water provided to the additional nine holes planned at the Snowcreek Golf Course would not offset any current demands for potable water. Overall, it is anticipated that the amount of potable water that could be made available through the implementation of this project is about 400 acre-feet annually. However, depending upon customer demands, the recycled water project could potentially supply about 550 acre-feet annually to large turf irrigators in the community during the summer irrigation season.

Estimated Timeframes for Implementation

It is currently estimated that the total project would take three construction seasons to fully complete. Therefore, recycled water is projected to be available for use by the summer of 2010.

Water System Loss Reduction

Estimated Total Costs and Proposed Method of Financing

This project is budgeted for approximately $2,300,000 per year over the next 8 years. The District funds water line replacement projects through its capital replacement program, which is derived from primarily property tax revenues.

Federal, State, and Local Permits, Approvals or Entitlements

Local permits are required for the excavation of pipelines in the public roadways.

Source of Supply

The District has been implementing an aggressive main water pipeline replacement program to replace old leaking water pipes since 2001. Over the past several years, an average of 10,000 feet of pipeline per year have been replaced. As a result of this replacement work, the District expects to achieve a reduction in water loss within the system of approximately 300 acre-feet annually.

Estimated Timeframes for Implementation

It is estimated that replacement of existing old pipelines in the entire system will occur over the next 8-year period. As stated above, approximately 10,000 feet of pipeline per year will be replaced.

Development of New Supplies

Estimated Total Costs and Proposed Method of Financing

Development of new groundwater supplies in the Dry Creek watershed and/or the Mammoth Basin are projected to cost approximately $14,755,000. Both of these projects are budgeted in the District capital expansion fund, which is funded primarily by new water connection charges and some funding from property tax revenues.

Federal, State, and Local Permits, Approvals or Entitlements

These projects would require permits and approvals from the State Department of Health Services and the U.S. Forest Service where potential well sites are located on federal land. This project also would require both State of California and federal environmental review.

Source of Supply

Overall, depending upon supplies needed, about 1,000 acre-feet of additional groundwater supplies may be developed in the future from either the Mammoth Basin watershed or the Dry Creek watershed. Volumes of groundwater projected to be available from the Dry Creek watershed are estimated at 1,500 acre-feet per year during normal years and 1,245 acre-feet per year during multiple dry year periods.

The District is evaluating whether or not there is additional water available to be pumped from the Mammoth Basin without causing environmental impacts. Continued monitoring of the Mammoth Basin over the next two years should provide sufficient data to evaluate the potential of additional groundwater that could be safely pumped from the basin.

Estimated Timeframes for Implementation

Evaluation of the potential for increased withdrawal from the Mammoth Basin should be completed within two years. Potential groundwater extraction from the Dry Creek watershed is currently budgeted to begin within the five-year period commencing in 2014.

Summary of Additional Water Supplies

Table 12: Summary of future water supply projects

Project Name	Demand Reduction (acre-feet)	Supply Increase (acre-feet)	Projected Completion Date
Recycled Water Project		400 acre-feet	2010 (depends upon customer commitments)
Water Conservation	About 500 acre-feet at build out with irrigation restriction enforced		N/A
Water Pipeline Replacement (reduce water losses)	10-15% loss rate goal (about 300 ac-ft at build out)		Ongoing, full implementation anticipated by 2011
New groundwater development		1000 ac-ft (or amount needed to meet demands)	As needed

Conclusion

This water supply assessment shows that with the inclusion of several additional water supply projects, the District will have sufficient supplies through the next 20 years to meet the demands of the Sierra Star Master Plan in addition to other projected development in Mammoth Lakes. However, as noted in this assessment, there are uncertainties regarding the implementation of these additional supplies. It is essential that additional water supplies are developed and demand reductions are utilized to their full potential to ensure that future demands can be met, especially in dry year conditions.