Mission Ridge
EIS final &
Master Plan

Reviewed
9-1-16

Board of Chelan County Com.
Courthouse
Wenatchee, WA. 98801

Lloyd Berry, Director
Chelan Co. Pub . Works
Courthouse
Wenatchee, WA.98801

Joe Collins, Sheriff
Courthouse
Wenatchee, WA. 98801

Robert A. Hughes Dir.
Wenatchee Planning Dept.
P. O. Box
Wenatchee, WA. 98801

Chelan Douglas Health Dist.
316 Washington St.
Wenatchee, WA. 98801
Att: Ann Jensen

Chelan County PUD
P. O. Box 1231
Wenatchee, WA. 98801
Attn: Jerry Copp

SEPA Register
Department of Ecology
PV 11
Olympia, WA. 98504

Department of Ecology
3601 West Washington
Yakima, WA. 98901
Attn: John Hodgson

Dept. Natural Resources
Public Lands Building
Olympia, WA. 98504

State Historic Preservation Off.
111 W. 21st Ave.KL-11
Olympia, WA. 98504

Dept. of Community
Development
GH -51
Olympia, WA. 98504

U.S. Forest Service
Don Smith, Supervisor
Wenatchee Nat. Forest
Box 811, Wenatchee, WA. 98801

County Conservation Dist.
Room 307, 301 Yakima St.
Wenatchee, WA. 98801

Wenatchee Public Library
Douglas St.
Wenatchee, Wa. 98826

Bee Hive Grange
c/o Dianne Cook
3686 Squilchuck Rd.
Wenatchee, WA. 98801

Tom Justus
D.S.H.S.
924 W. Sinto
Spokane, WA. 99201

Mark Grandstaff
Department of Game
600 Capitol Way
Olympia, WA. 98504

Dean Stone
Wen Sportsmen Assn.
1723 Lexington Dr.5
Wenatchee, WA. 98801

Community Resource Center
1300 Fifth St.
Wenatchee Valley College
Wenatchee, WA. 98801

U. S. Forest Service
Lake Wenatchee District
Star Route, Box 109
Leavenworth, WA. 98826

Department of Game
2802 Fruitvale Blvd.
Yakima, WA. 98902
Attn: Gene Tillett

Department of Transp.
P.O. Box 98
Wenatchee, WA. 98801

Wenatchee School Dist. #24
235 Sunset St.
Wenatchee, WA. 98801

Tom Pickeral, Dr.
Kittitas Co. Plan.
Courthouse .
Ellensburg,WA. 98926

Kittitas Co. Commissioners
Courthouse 12 Road
Ellensburg, WA. 98926

Susan Conklin, AAUW
P. O. Box 88
Malaga, WA. 98828

Norm Gutzwiler
398 Edgemont Dr
Wenatchee, WA. 98801

Nine Members of
Chelan Co. Planning
Commission

Department of Nat. Res.
713 E. Bowers Rd.
Ellensburg, WA. 98926

Department of Ecology
Environmental Review
Section PV-11
Olympia, WA. 98504

Chelan County PUD
P.O. Box 1231
Wenatchee, WA 98801
Attn: Brian Roger

Soil Conservation Dist.
Jan Carlson
301 Yakima
Wenatchee, WA 98801

Trust Dept.
First Interstate Bank
999 - Third Avenue
Seattle, WA 98104

Verg Murren
Fire Dist. #1
P.O. Box 2106
Wenatchee, WA 98801

Office of the Governor
Legislative Building
Mail Stop AS-13
Olympia, WA 98504

Leavenworth Ranger Static
600 Sherbourne
Leavenworth, WA 98826
Attn: Steve Martin

Ecological Commission
Dept. of Ecology
Mail Stop PV-11
Olympia, WA 98504

Sno-engineering Inc.

THE MOUNTAIN RESORT PLANNERS

April 30, 1986

Mr. Edward C. Loidhamer, Director
Chelan County Planning Department
411 Washington Street
Wenatchee, Washington 98801

Dear Ed:

Enclosed is the final draft of the FEIS for the Mission Ridge/Constellation Ridge Resort project. The document reflects all the changes and responses to comments that have been made since the DEIS was issued in late August, 1984.

The major substantive changes (sewer, water and transportation) were undertaken during the winter of 1985 and were incorporated into the FEIS at that time. Jerry and I then worked together making less substantive changes to various portions of the text, after which I sent over a revised FEIS showing project boundary changes, etc. These clarifications, in addition to changes made as a result of our meeting in Seattle last August, have been noted with a highlight pen.

The Flora and Fauna sections have been rewritten as a result of the Wildlife Assessment. Gene Tillett has reviewed and approved these sections for inclusion into the FEIS. The responses to the comment letters in Section 8 have been keyed to the appropriate page in the FEIS.

I have also enclosed two additions to the Transportation Appendix H which Steve Gorcester prepared following our August meeting.

If you have any questions, please do not hesitate to contact me. Your assistance throughout the FEIS preparation has been most appreciated.

Sincerely,

SNO-ENGINEERING, INC.

Ted Beeler
Principal Planner

TB/rb

Enclosure

cc: Ben Bevis
Gordon West

10900 N.E. 8th St., Suite 900, Bellevue, Washington 98004 ° (206) 451-8659

P.O. Box 287, Lyme, NH 03768 (603) 795-4811

P.O. Box 11536, Aspen, CO 81612 (303) 925-6615

1326 Fifth Avenue, Seattle, WA 98101 (206) 623-3777

Kathy Shrider
Diamond & Sylvester
2600 Columbia Center
701 Fifth Ave.
SEA 98104-7088

FOR THE ATTENTION OF

Mission Ridge File

Date 5/5/86

Please Handle	Please Route
Please Note & Return	Please Advise
For Your Information	Please Approve
Per Your Request	For Your File

- Mailed Tillett Wildlife sections of FEIS + Bark recomm. re: Mitigation
- Delivered Trans. section of FEIS for review & comment.

CHELAN COUNTY PLANNING DEPARTMENT
Courthouse Annex, Wenatchee, Washington

TECHNICAL APPENDIX H

APPENDIX

Trip Generation

The estimation of trip generation is a key element in transportation impact analysis. Trip generation estimates require assumptions to be made concerning mode of travel, vehicle occupancy and other elements. The assumptions included in this analysis are mainly based on data collected and reported for ski resorts in the Western United States. These ski areas and resorts or the traffic studies for them include:

- Mission Ridge, Washington
- Snowmass Transportation Study, Colorado
- Aspen Mountain, Colorado
- Winter Sports Site Base Study, Pacific Northwest Region
- Ketchum/Sun Valley, Idaho
- Steamboat Springs, Colorado
- Early Winters, Washington

In general, these resorts are larger than the proposal and are therefore studied more frequently resulting in a transportation data base mainly for larger ski resorts. When necessary, reasonable adjustments were made in the data to account for differences in size, services and area transportation systems. These adjustments resulted in traffic projections which were higher than would be the case if the values for modal split, vehicle occupancy and other factors from larger resorts had not been adjusted. The adjustments were made to represent a "worst case" condition. Trip generation calculations for 1990 are shown below to illustrate the estimation procedure.

Trip Generation Calculations

Tables A-1 thru A-5 proceed progressively thru the calculation of trip generation.

Day Skiers: 1990 = 75,000

Person trip generation is based on the estimated visitor population provided by the ski area consultant. Day skier person trips shown in Table A-1 are converted to vehicle trips in Table A-2 by applying a proportion coming by automobile (96% of day skiers) and dividing by average car occupancy of 2.5 persons per vehicle.

Table A-1. Person Trip Generation

	% of Visitors	Visitors	Number of Days	Average Day	Person Trip Ends
Weekdays	30%	22,500	92	245	500
Saturdays	35%	26,250	21	1250	2500
Sundays	35%	26,250	21	1250	2500
	100%	75,000	134		

Source: IDA Inc.

Table A-2. Vehicle Trip Conversion

	Person Trip Ends	Auto Mode Share	AVO	Vehicle Trip Ends	Peak Trip Ends
Weekdays	500	.96	2.5	192	60
Saturdays	2500	.96	2.5	960	300
Sundays	2500	.96	2.5	960	300

Source: Mission Ridge Ski Area

Destination Skiers: 1990 = 100,000

Destination skier trips were also converted from person trips based on visitor population estimates as shown in Table A-3. Surveys at Snomass Village, a destination ski resort in Colorado, indicated the probable distribution of arrivals by day of week for recreational trips. Visitor attendance was then converted to peak day arrivals based on Mission Ridge ski area records showing daily distribution of skier activity. Peak day departures were derived from arrivals by applying the projected number of days that destination skiers would stay at the site. This ranged from two to five days and averaged about 3 days. Total person trip ends are the result of peak day arrivals plus peak day departures.

Table A-3. Day of Week Distribution and Person Trip Ends

	Arrivals as % of Week1	Seasonal Attendance	Peak Day Arrivals	Peak Day Departures	Total PTE2
Mon	4%	4000	310	1380	1690
Tue	2%	2000	155	520	675
Wed	5%	5000	385	1040	1425
Thu	8%	8000	615	1270	1885
Fri	22%	22000	1770	410	2180
Sat	30%	30000	2380	460	2840
Sun	9%	9000	430	960	1340

1 Source: Snowmass Transportation Study

2 Average Peak Weekday Arrivals=1420; Peak Saturday=2840

Table A-4 shows transportation mode share which distributes person trips by mode of travel. Travel modes were derived from the same Snomass survey information as day of week distribution.

Table A-4. Transportation Mode Share-Destination Skiers

		Person Trip Ends		Vehicle Trip Ends[2]	
Mode	Percent1	Weekday	Saturday	Weekday	Saturday
Auto	70%	1000	1740	380	656
Bus	15%	210	370	7	12
Air to3					
Auto	10%	140	250	55	93
Bus	5%	70	120	3	4
Total	100%	1420	2480	445	765

1 Source: Adjusted for local area from Snomass studies.

2 Converted based on average car occupancy = 2.65 from surveys at destination resorts and average bus occupancy = 30 passengers.

3 Represents air trips transferred to vehicle trips.

Table A-5 sums the day skier and destination skier generation estimates to provide a summary of estimated project traffic.

Table A-5. 1990 Trip Generation Summary 60% on mtn

Remove 40% on Table A-3 Mode Split 30 20 40 Low 60

		Weekday	Saturday	
Day Skiers	ADT	200	960	
	Peak	60	300	
Destination Skiers	ADT	445	765	
	Peak	90	150	
Total	ADT	645 ~~800~~ 500 700	1725	1810
	Peak	150 ~~300~~ 100 160	450	470

The resulting trip generation was then added to the existing volumes on the highway and shown as a ratio of volume to capacity on the three major segments of the route.

PHASE I TRAFFIC GENERATION

Based on Bend Study, giving most occupancy to Clifftop Resort. 60% of destination skiers staying on-site. 40% staying elsewhere in the Wenatchee area.

Table A-1 Day Skiers (1990) 75,000 person trip generation

	% of Visitors	Visitors	# of Days	Avg. Day	Person Trip Ends
Weekdays	30%	22,500	92	245	500
Saturday	35%	26,250	21	1250	2500
Sunday	35%	26,250	21	1250	2500

Table A-2. Vehicle Trip Conversion

	Person Trip Ends	Auto Mode Share	ACO	Vehicle Trip Ends	Peak Trip Ends
Weekdays	500	.96	2.5	192	60
Saturdays	2500	.96	2.5	960	300
Sundays	2500	.96	2.5	960	300

Table A - 2a. Destination Skiers Staying Off-Site (40,000/season) Avg. 3 day stay. Arrival spread estimated from Snow Mass Study.

	Arrivals as % of Week	Seasonal Attendance	Peak Day Arrival	Total PTE
Monday	4%	1,600	123	1938
Tuesday	2%	800	62	462
Wednesday	5%	2,000	154	339
Thursday	8%	3,200	246	462
Friday	22%	8,800	677	1077
Saturday	50%	20,000	1538	2461
Sunday	9%	2,600	277	2492

Table A-2b. Daily Visitor Trips
(40,000 dest. (off-site) Skiers plus Day Skiers

	Day Skiers	Off-site Destination	Total Vehicle Vehicle Trip Ends
Weekdays	192	325	517
Saturday	960	930	1890
Sunday	960	940	1900

Table A-3. Destination Skiers, Assuming 60% stay at Mission Ridge for entire 2-5 day visit

	Arrivals as % of Week	Seasonal Attendance	Peak Day Arrivals	Peak Day Departures	Total PTE
Mon	4%	2,400	185	830	1015
Tues	2%	1,200	95	315	410
Wed	5%	3,000	230	600	830
Thurs	8%	4,800	370	760	1130
Fri	22%	13,200	1020	245	1265
Sat	50%	30,000	1430	280	1710
Sun	9%	5,400	260	560	820

Table A-4. Transportation Mode Share - Destination Skiers

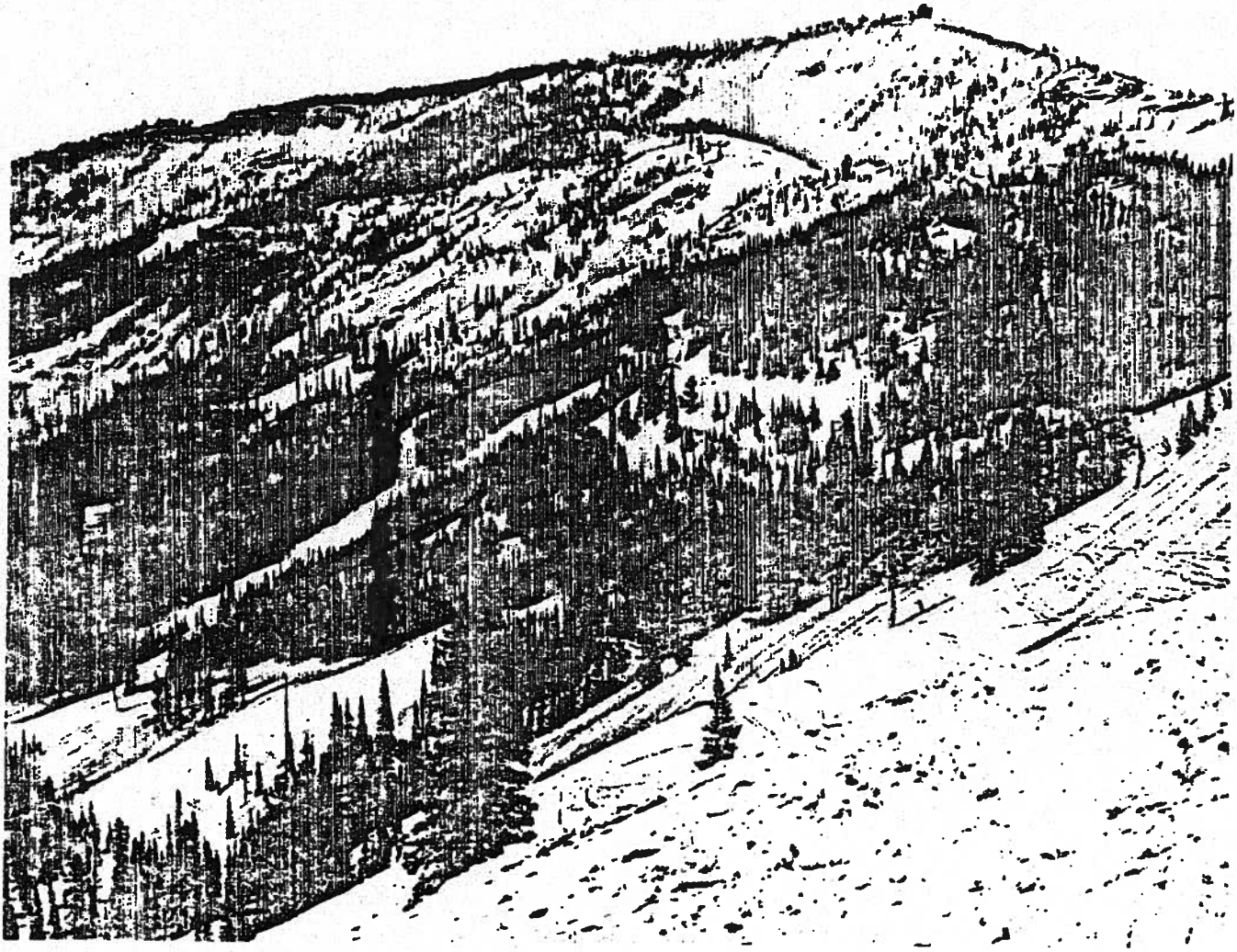
		Skiers Person Trip Ends		Vehicle Trip Ends	
Mode	Percent	Weekday	Saturday	Weekday	Saturday
Auto	70%	650	1200	245	453
Bus	15%	140	257	5	9
Air to 3					
Auto	10%	93	170	35	64
Bus	5%	47	83	2	3
	100%	930	1710	290	530

Table A-5. 1990 Trip Generation Summary

		Weekday	Saturday
Day Skiers	ADT	200	960
	Peak		
Destination	ADT	290	530
	Peak		
Destination Off-Site	ADT	731 (avg. weekday)	1890
	Peak		
Total	ADT		
	Peak	1221	3380

5/1/84

Final
Environmental Impact Statement



Mission Ridge/Constellation Ridge Resort

Chelan County
Planning Department

FINAL ENVIRONMENTAL IMPACT STATEMENT

MISSION RIDGE/CONSTELLATION RIDGE

SKI/SUMMER RESORT

MASTER PLAN

Prepared in compliance with the State Environmental Policy Act (SEPA), Revised Code of Washington 43.21.C, the SEPA Guidelines, Chapter 197-10 WAC, and the National Environmental Policy Act (NEPA).

Chelan County Planning Department

1986

INTRODUCTION

Action Sponsors:	Bevis Buildings, Inc., Wenatchee Mountain, Inc.
Proposed Action:	- Expansion of the existing Mission Ridge ski facilities to accommodate up to 3,000 more skiers at one time, and - The development of a year-round resort with housing units (hotel, condominiums) for 2,000 persons. The proposed action will also require constructing a sewage treatment facility and an access road from the Mission Ridge Ski Area to the new Mission Ridge base area and resort.
Project Location:	Township 21N, Range 20E Section 19 - Housing, Ski Facilities Sections 23, 24, 25, 26, 30, 31 and 36 - Ski Facilities Section 17 - Sewage Treatment
Lead Agencies:	Chelan County, Washington State Department of Natural Resources, Washington State Department of Game, U. S. Forest Service
Responsible Official and Contact Person:	Edward C. Loidhamer, Director Chelan County Planning Department 411 Washington Street Wenatchee, WA 98801 (509) 663-2101

Principal Contributors:

Principal Author:	Sno-engineering, Inc. 10900 N.E. 8th St., Suite 900 Bellevue, WA 98004 (206) 451-8659
Design of planned development and on-site drainage:	The NBBJ Group 111 South Jackson Street Seattle, WA 98104 (206) 223-5555
Design of sewage treatment facilities	Davis/Scheible Engineering 1302 Hamilton Avenue Yakima, WA 98902 (509) 575-1062
Transportation analysis:	TDA 316 2nd Avenue South Seattle, WA 98104 (206) 682-4750

Required Permits and Approvals:

Preliminary and Final Plat Approval:	Board of Chelan County Commissioners
Washington State Department of Natural Resources:	Commercial Lease, Forest Practice Permit for Non-Federal Lands and compliance to Forest Practices Act.
Planned Development Rezone:	Board of Chelan County Commissioners
Annexation of Property into Fire District:	Chelan County Boundary Review Board, Fire District No. 1, Creation of Water and Sewer Districts.
On-Site Sewage Disposal Systems Approval:	Chelan-Douglas Health District
Public Water Supply Approval:	Chelan-Douglas Health District, Chelan County PUD No. 1, Fire District No. 1
On-Site Drainage System Approval:	Chelan County Department of Public Works
Washington State Department of Ecology:	Water Right Permit, Waste Water Disposal Permit, State Waste Discharge Permit
Line Extension Agreement:	Chelan County PUD No. 1
Site Access and Roadway Requirements:	Chelan County Department of Public Works and the U. S. Forest Service
Term and Special Use Permits:	Wenatchee National Forest, U.S. Forest Service
Washington State Department of Social and Health Services:	Public Water Supply Permits
Property Leases	Washington State Department of Game and Washington State Department of Natural Resources
Location of EIS Background Data:	- The NBBJ Group, Seattle - MBA/Sno-engineering, Inc., Seattle - Davis/Scheible Engineering, Yakima - Chelan County Planning Department - Mission Ridge Ski Area
Date of Issue of Draft EIS:	August 1, 1984
Closing Date for Public Comments:	September 4, 1984
Date of Issue for Final EIS:	
Cost of Purchase Copy of Final EIS:	$10.00

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TECHNICAL APPENDICES

These appendices are technical reports which are available for public review at the Chelan County Planning Department.

Technical Appendix A	Site Inventory Maps and Suitability Criteria
Technical Appendix B	Summary of Projected Water Demand for Constellation Ridge Resort
Technical Appendix C	Constellation Ridge Resort Wastewater Treatment and Disposal: Description of Proposed Facilities
and C-1	Development of preliminary estimates of wastewater loadings,
C-2	Evaluation of the existing wastewater treatment and disposal facilities serving the Day Lodge at Mission Ridge,
C-3	Soil investigation summary; details of test hole excavations in areas originally considered for sub-surface disposal and in the areas proposed for lagoons.
Technical Appendix D	Techniques for Revegetation of Alpine Soils
Technical Appendix E	Washington State Department of Game: Policies and Management Plans and the Final Report: Mission Ridge/ Constellation Ridge Resort Wildlife Assessment Prepared by Beak Consultants, Inc., February 1986
Technical Appendix F	Washington Natural Heritage Program - Statements on Special Animal and Plant Species.
Technical Appendix G	Background Data on Wildlife and Habitats in the Vicinity of the Project Site
Technical Appendix H	Analysis of Transportation Route Opportunities for Potential Future Mission Ridge Ski Area Development and Trip Generation Estimates as a Key Element of Transportation Impact Analysis

LIST OF FIGURES

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DISTRIBUTION LIST

CHELAN COUNTY AGENCIES

4 ~~Board of Chelan County Commissioners~~
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1 ~~Chelan-Douglas Health District~~
3 Public Utility District No. 1 of Chelan County
1 ~~Chelan County Sheriff's Department~~
1 ~~Chelan County Fire District No. 1~~
2 ~~Chelan County Conservation District~~
9 Chelan County Planning Commission
4 Chelan County Planning Department
26

Kathy Shrieder
Diamond & Sylvester
2600 Columbia Ctr
701 - 5th Ave
Seattle 98104

CITY OF WENATCHEE AGENCIES

1 ~~City of Wenatchee Office of Zoning Administration~~
1 ~~Wenatchee School District No. 246~~
2 ~~Wenatchee Public Library~~
4

WASHINGTON STATE AGENCIES

3 ~~Washington State Department of Ecology~~ Ecological Commission
~~SEPA Register~~
~~Environmental Review Section, Olympia~~
~~Central Regional Office, Yakima~~
3 ~~Washington State Department of Game, Olympia and Yakima~~
3 Washington State Department of Natural Resources
~~Public Lands Section, Olympia~~
~~Area Headquarters, Ellensburg~~
1 ~~Washington State Office of Archaeology and Historic Preservation~~
1 ~~Washington State Department of Transportation, Wenatchee~~
1 ~~Washington State Department of Community Development~~
1 ~~Office of the Governor~~
13

FEDERAL AGENCIES

2 U. S. Department of Agriculture
~~Forest Service, Leavenworth~~
1 ~~Soil Conservation Service, Wenatchee~~
3

OTHER INTERESTED PARTIES

1 ~~Community Resource Center~~
1 ~~Susan Conklin, AAUW (American Association of University Women)~~
2 ~~Squilchuck Grange~~
1 ~~Trust Department, First Interstate Bank~~
1 ~~Kittitas County Planning Department~~
3 ~~Kittitas County Board of Commissioners~~
10

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SUMMARY

A. THE PROPOSED ACTION

The proposed action is for the approval of a mixed use, planned development comprising commercial, residential and recreational uses on private land situated in Chelan County and the concurrent approvals by the U. S. Forest Service: Wenatchee National Forest, Washington State Department of Natural Resources and Washington State Department of Game for using public lands for the future expansion of Mission Ridge Ski Area.

Specifically, the proposed action entails four major components:

1) Expansion of the existing Mission Ridge ski facilities by 3,000 skiers at one time to accommodate future demand in the form of constructing new lifts and ski trails on 1,255 acres of public and private property.

2) Development of complementary support services on private land at the base area to meet year-round recreational needs. Facilities will encompass parking, 700 lodging units of various sizes, day lodge, restaurants and other commercial/recreational services designed to accommodate 2,500 overnight guests.

3) Construction of a 4,000' access road which will traverse U. S. Forest Service property (Section 24), joining the existing Mission Ridge parking lot with the new Mission Ridge base area, ski facilities and the Constellation Ridge Resort on Section 19.

4) Development of a lagoon and sprayfield sewage treatment facility on a 62 acre site in the SW¼ of Section 17 (private land).

These components of the proposed action are depicted in Figure 1. The project site is located 13 miles south and west of the City of Wenatchee, Chelan County, Washington.

The proposed plan provides for the operation of year-round recreation facilities and visitor accommodations. The combined development of ski facilities and resort accommodations and services will result in increased midweek utilization of the ski facilities and greater use of the area on a year-round basis.

The project site is comprised of 4,920 acres of public and private lands, as shown in Table 1 on Page 2. At the present time, Mission Ridge utilizes 2,800 acres of public lands for purposes of operating the ski resort. An additional 1,220 acres of public property will be required for expanding the Mission Ridge ski facilities. The 900 acres of private property used for the resort site is

located in Section 19, the NE¼ of Section 30, and the SW¼ of Section 17, Township 21N, Range 20E.

Wenatchee Mountain, Inc. is the proponent responsible for developing and operating the ski facilities. Wenatchee Mountain, Inc. has operated the Mission Ridge Ski Resort for 18 years, under a Special Use Permit from the U. S. Forest Service and cooperative lease agreements with the Washington State Game Department and Department of Natural Resources.

Bevis Buildings, Inc. is the proponent leasing 900 acres of private property, a portion of which will be utilized as the resort center, providing visitor services, hotels, condominiums, homes, and parking facilities.

B. IMPACTS AND MITIGATING MEASURES

EARTH

Impacts

- Various degrees of topographic alteration will occur as a result of constructing resort facilities. A total of 240 acres will be modified. Facility construction such as lifts and trails will require minimal disturbance, parking lots, site roadways, resort buildings and sewage treatment system will necessitate moderate topographic changes. The construction of the site access road will result in the greatest topographic impact by removing approximately 59,000 cubic yards of earth and rock material.

- Erosion potential of site soils will increase temporarily as portions of the site are cleared and graded for facility development.

- Summer thunderstorms will increase soil erosion in areas disturbed by construction. Soil erosion will also occur prior to successful revegetation of cleared and disturbed areas.

- There is a potential for increased erosion of natural drainage channels immediately downstream of culverts under roadways.

Mitigating Measures

- Special construction practices will be employed in building the access road in order to reduce the potential for surficial mass soil movement in areas of soil instability and high moisture content.

- In areas with extreme side slopes, construction of the access road will require the full bench technique, or the hauling of earth material cut from the mountainside, as opposed to the traditional cut and fill practice.

- Since the project will be built in phases, soil disturbances will be isolated to small areas, providing easier control.

- Disturbed areas will be reseeded as soon as site grading is completed.

- To ensure that topographic alterations from the construction of lodging units do not cause an adverse visual effect, such alterations will be subject to review and approval by the Architectural Review Committee.

- Provisions in the covenants, conditions, and restrictions related to building heights and landscape treatment will help preserve the topographic character of the site.

- The CC&R's will limit clearing and grading to periods of normally dry weather and require seeding of cleared areas within a specified time.

- Riprap or locally found basaltic rubble will be placed in the natural drainage channels downstream of culverts under roadways to prevent channel erosion.

- Top soils will be hauled to the site in order to promote and accelerate grass growth in developed areas.

- Sprinkling will be utilized during the dry summer months to enhance vegetative growth.

AIR

Impacts

- Temporary adverse air quality impacts could occur during construction from vehicle exhaust emissions and airborne dust during clearing and grading.

- Short-term use of construction vehicles, long-term presence of automobiles on the site and added vehicular traffic along the Squilchuck Road will increase localized levels of carbon monoxide.

- Use of wood burning fireplaces in approximately 430 single-family hotel and condominium lodging units will increase total suspended particulates in the area.

- Temporary odors will occur during project development from construction equipment, asphalt paving, and burning, if permitted; and odors associated with vehicle use, home and resort heating and grounds maintenance will accompany development of the site.

- The sewage treatment lagoon system is a source of periodic odor.

Mitigating Measures

- Sprinkling of cleared areas during dry weather would reduce the potential for airborne dust during construction.

- Vehicular exhaust emissions should be reduced as federal vehicle emission standards are enforced and older vehicles replaced.

- Proper maintenance and operation practices and use of a mechanical aeration device for the sewage treatment system will reduce the potential for odor impacts.

WATER

Impacts

- Existing surface runoff characteristics of the site will be altered due to the coverage of 70 acres with impervious surfaces such as the access road, site roadways, parking lots and building rooftops. This will result in an incremental increase in the total volume of runoff downstream of the site.

- The high density resort area, occupying 140 acres will increase direct run-off by 20 percent when compared to the natural condition of the site.

- Runoff from the Constellation Ridge Resort site will contain small quantities of a number of contaminants that could enter the natural drainage system, including petroleum residues and sediments, as well as traces of heavy metals, nitrogen, and phosphorus, from pesticides and fertilizers.

- Disruption of fragile alpine soils for construction purposes will create short-term turbidity in surface water.

- Surface water contamination will occur if effluent leaves the sprayfield site as a result of hydraulic overloading.

Mitigating Measures

- Grading and earth moving activity will be restricted to the summer months when precipitation is low, thereby reducing runoff and erosion.

- An on-site drainage system will be designed to insure that an increase in peak surface water runoff does not occur.

- On-site natural water retention and sedimentation ponds with a 10 million gallon capacity will be utilized to control the rate of runoff and surface water turbidity.

- Basaltic rubble and talus slopes on the site will be utilized as natural drains and filters by absorbing a certain portion of surface water runoff.

- Various practices will be utilized to reduce potential stream sediment loads, including the use of buffer strips between surface water and ski trails, straw mulching, netting, maintenance of understory vegetation, use

of appropriate fertilizers and seeding on an annual basis until vegetation is established.

- The majority of natural drainage channels within the site are preserved by the designation of permanent open space and undeveloped areas which comprise 98 percent of the project site.

- A drainage system will be designed and constructed to remove the majority of heavier and lighter-than-water contaminants from surface water runoff.

- The potential for transitory degradation of water quality in the natural drainage channels from the lagoon and sprayfield sewage disposal system will be mitigated through review of the design, operation and maintenance of the facility by the Washington Department of Ecology and the Chelan-Douglas County Health District.

FLORA AND FAUNA

Impacts

- Loss of approximately 50 acres of alpine conifers for the development of ski lifts and trails and loss of about 70 acres of vegetation to be replaced with parking areas, roads and building sites. An additional 18 acres of trees will be removed for the sewage treatment facility and 44 acres will be thinned for the sprayfield site.

- The development of new ski trails and the resort complex will affect wildlife numbers and distribution through a combination of vegetational change and increased human activity.

- In concentrated areas of human activity, the summer and winter resort users will contribute to the reduction of species not tolerant to man and an increase in species tolerant to man.

- The future development of nearby private lands in the Stemilt and Naneum Basins will have cumulative impacts on big game species, primarily through restricting game movement and continued encroachment on habitat.

- The development of the Constellation Ridge Resort is likely to alter the current elk migration pattern of the Mission Ridge sub-herd.

Mitigating Measures

- Preservation of 98 percent of the project site in its natural state, reforestation and habitat retention/enhancement efforts untaken by the proponents will encourage continued use of the area by faunal species.

- Natural vegetation will be retained on approximately 90 percent of 810 acres of the Constellation Ridge private property.

- Native vegetative cover will be replaced with new grass species where soils have been disrupted from construction.

- Red clover and other grasses planted on cleared ski trails and the sewage treatment sprayfield site will supplement the summertime diet of elk and other big game inhabiting the area.

- Major human activity and use of the site will occur between November and April, when elk are ranging at lower elevations.

- A complete trail network in Section 19 will encourage guests to remain close to the resort complex, thereby decreasing the possibility of contact with elk grazing in other areas of the project site.

- To preserve game habitat and migratory freedom, restrictions will be placed on the use of all property controlled by Mission Ridge Ski Area and the Constellation Ridge Resort, including:

  - Access will be restricted to any former logging roads that are retained and used for the resort site.

  - Domestic pets on the site will be prohibited to run loose between May 1 and October 31.

  - Horseback riding will be regulated outside the resort area if the Game Department identifies a problem, especially during periods of calving and migration.

Impacts

- Increases in noise levels will occur during construction and subsequent use of the resort.

- Noise levels within the project site and along the Squilchuck access road will increase slightly as a result of the change in daily traffic counts.

Mitigating Measures

- All motorized off-road vehicles will be prohibited from the site, with the exception of those required for management of the ski resort.

- The use of properly maintained equipment with accepted noise attenuating apparatus could help reduce noise levels associated with on-site construction activities and the long-term operation of the resort.

LIGHT AND GLARE

Impacts

- Interior and exterior lighting from the hotel site and other select building placements will be visible from various places within the Wenatchee Valley and other areas of Central Washington.

- Additional night illumination for skiing purposes could increase the amount of light seen from distant viewpoints.

- At certain times of day, glare will be visible from the sun reflecting off building windows.

Mitigating Measures

- The resort buildings (hotel, condominium, commercial facilities and day lodge) will be situated on the site to take advantage of views and sun orientation.

- Use of outside lighting for roadways and pathways will be subtle.

LAND USE

Impacts

- Approximately 1,220 acres of public land will be utilized for the expansion of ski facilities at Mission Ridge. This land, controlled by the U. S. Forest Service, Washington State Game Department and Washington Department of Natural Resources will not be converted exclusively to skiing.

- The proposed project will also result in the conversion of 191 acres of vacant private property for development of the Constellation Ridge Resort. The remaining 709 acres of the private property controlled by the Constellation Ridge developer will remain as permanent open space.

- The Constellation Resort Project will contribute to the increased utilization of public property for the pursuit of various year-round recreational activities, including alpine and nordic skiing, snow-shoeing, hiking, hunting, fishing, horseback riding and any other non-motorized non-polluting forms of outdoor enjoyment.

- Additional pressure to develop large lot recreational tracts in the Naneum and Stemilt Basins.

- The proposed project will act as a catalyst for continued residential and commercial development along the Squilchuck Road.

Mitigating Measures

- The prohibition of off-road vehicles from within the resort site will not place added pressure on adjacent public and private lands.

NATURAL RESOURCES

Impacts

- The proposed project will result in expanding the use of resources which are deemed suitable for skiing at Mission Ridge.

Mitigating Measures

- None noted.

POPULATION, EMPLOYMENT AND HOUSING

Impacts

- The 700 dwelling units at project buildout will be utilized by temporary resort users causing the population to vary dramatically from season to season and respective high and low demand periods.

- The proposed project will result in a total of approximately 360 new jobs, 120 permanent full time equivalents at the resort and 240 in the local community. The gradual increase in new employment opportunities will be filled primarily by local residents.

- New employment opportunities will attract workers from outside the Wenatchee area. At project completion, this employment gain will equal approximately 100 jobs and an increase in population of 225 people, placing a greater demand for housing in the Greater Wenatchee area.

Mitigating Measures

- None noted.

TRANSPORTATION/CIRCULATION

Impacts

- Since the proposed access road crosses over U. S. Forest Service property in order to provide additional public parking and ski facilities at Mission Ridge and serve the Constellation Ridge Resort, it is expected that the portion of the road crossing public property (3,900') will be constructed with public funds. The estimated cost for building the preferred alternative, or lower access route, is estimated to cost $530,000. The proponent's proposal to construct the access road with public funds does not indicate a commitment by the Chelan County Commissioners and is not consistent with present policies.

- The resort will increase the Average Daily Traffic (ADT) and peak hour traffic volumes along the Squilchuck access road.

- ADT and peak hour volumes will be greatest on weekends and holidays which account for approximately 35 days per year.

- Traffic volumes along the Squilchuck Road will increase during the summer months as the resort expands its year-round operation.

- Approximately 8 acres of additional parking will be developed for the skiing public and 8 acres will be committed to site roadways.

- The increase in ADT and peak hour traffic volumes along the Squilchuck access road will increase the potential hazard to pedestrians walking along the roadway.

Mitigating Measures

- Shuttle service will be provided for on-site visitors. Increased provision of shuttle service from the ski area to several major lodgings in Wenatchee and airport shuttle service will reduce the use of private automobiles for daily skier trips.

- Peak hour use of the road will decrease as a result of staggered arrivals and departures by resort users and day skiers remaining on the site for apres skiing amenities.

- Pedestrian safety on the site will be enhanced by the construction of numerous pathways and trails which connect lodging and parking areas to resort activity centers, thereby separating pedestrians and vehicle traffic.

- Continue use of a staggered ski lift ticket expiration and starting time to reduce the percentage of vehicle trips made between 3:30 to 4:30 PM.

- The provision for additional parking will enhance pedestrian safety during peak demand periods when skiers are currently forced to park along the access road.

PUBLIC SERVICES

Impacts

- The project site will have to be annexed to Chelan County Fire District No. 1.

- The resort project will necessitate the construction of a fire station and the acquisition of fire fighting equipment.

- The project will cause approximately 10 to 20 fire calls per year.

- The chelan County Sheriff's Department has indicated that the proposed project will not have a material impact on their staffing requirements or their ability to respond to calls since resorts typically generate fewer police calls than permanent residential communities.

- Approximately 18 elementary, 3 junior high and 7 senior high students could be added to Wenatchee School District No. 246.

- The proposed resort will increase the use of ski facilities at Mission Ridge from the existing level of 100,000 annual skier visits to 287,000 visits at project buildout.

- The extension of the access road through the Mission Ridge parking lot and into Section 19 will amount to 1.3 miles of new roadway which will be maintained by the Chelan County Department of Public Works.

- The sewage treatment system will require monitoring by the Washington State Department of Ecology. Domestic water supply will be monitored by the Washington State Department of Social & Health Services and the Chelan-Douglas Health District.

Mitigating Measures

- Property tax revenues will mitigate costs associated with increased demands for County services (see TAX REVENUES VS. SERVICE COSTS.)

- Police services will be augmented by the presence of a 24 hour security service on the resort site.

UTILITIES

Impacts

- The sewer system will be built through the creation of a Water District which is empowered to sell revenue bonds to cover the cost of construction, and establish user rates for the cost of operation, maintenance and repayment of the bonds.

- Existing PUD No. 1 electrical distribution lines will have to be upgraded and extended to serve the Constellation Ridge Resort. Total annual electrical energy use from the resort will be about 4 megawatts. As part of the overall load growth, this project will increase demand. Chelan County PUD officials have stated that all new loads on the District's system that include significant wintertime usage will contribute to upward pressure on rates, whether or not the load is a new home or a new ski resort.

- Water for the project will be supplied by Chelan County PUD. Connection to the public system will require upgrading and extending the water line to the site. At project buildout, the anticipated peak day water demand is 157 gallons per minute. The cost for extending the PUD line to the site and installing all pump line systems and reservoirs will be borne by the project sponsor in accordance with the PUD's line extension policy.

- The demand for solid waste collection services will increase.

Mitigating Measures

- The design of resort buildings and complexes will encourage energy efficiency through widespread use of insulation and other energy-saving devices, including passive solar orientation.

- Various water restricting devices such as low volume flush toilets and water flow restrictors will be utilized to reduce overall water consumption on the site.

- Ground water quality will be monitored in the vicinity of the wastewater facilities site.

- The design of the on-site resort drainage system mitigates potential impacts on the capacity of the natural drainage systems downstream of the site.

AESTHETICS

Impacts

- The construction of additional ski lifts and trails will alter the natural character of the site. These modifications will be visible from various perspectives. The most prominent aesthetic alterations will occur from the construction of the access road and the hotel complex, condominium buildings and single-family residences. The resort accommodations will be visible from various viewpoints north of the project site.

Mitigating Measures

- A set of covenants, conditions and Restrictions (CC&R's) have been drafted by the project proponent to ensure the protection of values, desirability and attractiveness of the proposed resort project.

- Provisions in the CC&R's related to topographic alterations, building scale and design, exterior finishes, landscaping, and lighting will help ensure that the development is compatible with the natural character of the site.

- Formation of an Architectural Review Committee, as provided for in the CC&R's, will provide an enforcement mechanism for aesthetic standards.

- An existing natural depression on the site will be developed as a 1.5 acre water amenity to enhance site aesthetics.

ARCHEOLOGICAL/HISTORICAL RESOURCES

Impacts

- Unknown archeological resources in the project site could be unearthed during construction.

Mitigating Measures

- If unknown archeological resources are inadvertently unearthed, construction will cease in that area until the resources can be evaluated by the Washington State Office of Archeology and Historic Preservation.

TAX REVENUES VS. SERVICE COSTS

- The use of a year-round resort will generate a demand for public services that is non-existent at this time.

- At project buildout, the Chelan County tax base will increase by $31.5 million which is the total value of improved real estate at the resort.

- Tax revenues throughout the project development period will be adequate to cover costs of additional fire and police protection and school services.

- As a result of the resort, approximately $48.1 million of community income will be generated in the local economy at project completion.

- In the event the Chelan County Commissioners elect to fund the construction of the access road, it would cost the County approximately $530,000 to build the preferred alternative. One funding alternative, a County bond issue, would cost taxpayers $.063 per $1,000 of assessed valuation, or $4.41 annually for 10 years for a home assessed at $70,000.

Mitigating Measures

- The high real estate values of resort property, coupled with occasional and seasonal use by owners, provides a high tax base for Chelan County and less of a demand for public services as when compared to typical single and multi-family residential developments. These factors will all contribute to a surplus in the taxing districts for Chelan County.

C. ALTERNATIVES

NO-ACTION ALTERNATIVE

- Impacts listed in Section B would not occur.

- Mission Ridge Ski Area would continue to operate under its existing permits and leases. Skier visits would gradually level off at approximately 123,000 annually.

- The long-range economic effect of a no-growth alternative would tend to create serious economic problems for the operation of Mission Ridge, as its competitive position in the industry would be eroded.

- The image of the ski area would suffer due to crowding, and the absence of new improvements.

- Chelan County tax revenues from the operation would remain at the same level, below the actual annual costs for maintaining the Squilchuck Road.

MODEST EXPANSION WITHIN EXISTING PERMIT AREA

- Only those impacts associated with development of ski lifts and trails would occur under this alternative.

- Mission Ridge would continue with its existing pattern of development and operation, expanding facilities as attendance increases and warrants.

- The ski area's competitive position could decline as the permit area becomes more intensively developed and used.

- Expansion of ski facilities would continue to rely on Wenatchee for providing all overnight lodging and user services. The amount of available beds in the future will have a direct influence on the number of vacation skiers attracted to the area.

- The shortage of suitable land for parking, beginner and low intermediate skiing terrain would seriously limit future expansion.

- Buses would be required to transport skiers from satellite parking areas, either in Wenatchee or along the Squilchuck Roadway, altering the present vehicular user patterns typically found at a day ski area.

EXPANSION OF THE PERMIT AREA COMBINED WITH THE ADJACENT 900 ACRES OF PRIVATE PROPERTY ALLOWING TWO DAY-USE BASE AREAS TO DEVELOP

- This alternative would substantially reduce many of the impacts associated with developing overnight lodging in Section 19. However, the construction of the access road, parking areas, new base area, ski lifts and trails, and utility infrastructure would create the same impacts as covered in Section B.

- This alternative is not economically viable due to the limited market, the amount of available overnight lodging in Wenatchee and the high cost of constructing non-revenue producing improvements (access road, parking and utilities).

DEVELOPMENT OF THE CONSTELLATION RIDGE RESORT AT A REDUCED DENSITY

- Development of a lower density resort complex with 300 units would proportionately reduce many of the impacts in Section B.

- While the water and sewer systems would be reduced in size and capacity, this alternative would still require the construction of the access road, site roadways, parking and ski lifts to the same specifications as the present proposal. This would, undoubtedly, affect the developer's return on investment since the cost of these improvements is extremely high.

- While this alternative would visibly reduce certain impacts such as site run-off, disturbance of natural vegetation, traffic on the Squilchuck Road, associated construction noise, light and glare and the demand for electricity, it would have a negative impact in terms of strengthening the local and State economy through various taxes and the development of new business.

- The requirements for developing appropriate utility infrastructure (water, sewer, power, etc.) for such an isolated site are considerable. For this reason, a lower density development cannot attain the economy of scale needed to create a viable project.

D. UNAVOIDABLE ADVERSE IMPACTS

EARTH

- Topographic changes compatible with the natural character of the site.

- Disruption and overcovering of soils.

- Increased erosion potential following initial clearing and grading operations until revegetation occurs, with a potential for eroded sediments to enter surface water runoff.

AIR

- Temporary increases in airborne dust and vehicle emissions during construction.

- Localized increases in carbon monoxide levels along the Squilchuck access road.

- Temporary odors from construction activities such as asphalt paving, and increased odors associated with vehicle emissions, home heating, and property maintenance.

- Potential for odor from sewage treatment lagoon facilities located in Section 17.

WATER

- Alteration of the absorption characteristics of the site.

- Contamination of runoff water with trace amounts of petroleum residues, heavy metals, phosphorus, nitrogen and other pollutants associated with vehicle traffic and property maintenance.

FLORA AND FAUNA

- Permanent conflicts between wildlife and humans during summer resort use.

- Removal of natural vegetation on site, with a corresponding reduction in the wildlife habitat.

- Potential incidents of predation on wildlife by uncontrolled domestic pets.

- Removal of snags and stumps, permanent reduction in habitat for non-game species.

- Displacement of various species by the removal of habitat.

NOISE

- Temporary significant increases in noise levels during construction.

- An incremental increase in noise levels on the Squilchuck access road.

- Low level noise associated with the operation of a year-round resort and winter use of the ski area.

LIGHT AND GLARE

- Increased nighttime light visible from various areas in the Wenatchee Valley due to interior and exterior lighting.

- Increased reflective surfaces, causing glare at certain times on sunny days.

LAND USE

- Conversion of approximately 900 acres of vacant open land to resort use and the partial conversion of 1,255 acres for expanded ski terrain.

- Increased demand for use of commercially zoned property along the Squilchuck roadway.

- Increased use of public lands.

- Contribution to the loss of vacant open land in the area for the resort complex.

- Increased demand for large lot development on other private lands.

NATURAL RESOURCES

- Commitment of the private property to resort use, precluding other uses to which the land resource could have been committed.

- Commitment of power, water, and forest resources.

TRANSPORTATION/CIRCULATION

- Increased demand by permanent residents for school bus transportation to elementary, junior and senior high schools.
- An increase in Average Daily Traffic and peak hour volumes on the Squilchuck access road, especially during the midweek and holidays.
- Potential increased hazard to walking school children on Squilchuck Road.

PUBLIC SERVICES

- Increased demand for County maintenance for the extension of the Mission Ridge access road, an additional 1.3 miles.
- Possible addition of school students in Wenatchee School District No. 246 by permanent residents of the resort complex.
- Increased use of and demand for public recreational facilities in the area.

UTILITIES

- Increased demand for electrical energy for resort operations and heating/ lighting.
- Increased requirements for telephone services.
- Increased demand for water use and distribution.
- Increased demand for solid waste collection services.

AESTHETICS

- Alteration of the natural character of the site due to conversion to a developed stage.

1. DESCRIPTION OF THE PROPOSAL

INTRODUCTION

The proposed action entails two primary components:

1) Expansion of the existing Mission Ridge ski facilities by 3,000 skiers at one time to accommodate future demand in the form of constructing new lifts and ski trails on public and private property, and
2) Development of complementary support services on private land at the base area to meet year-round recreational needs. Facilities will encompass parking, overnight accommodations, day lodge, restaurants and other commercial/recreational services designed for approximately 2,500 overnight guests.

The proposed action also includes the construction of a 4,000' access road and sewage treatment facility. The access road will traverse U. S. Forest Service property (Section 24), joining the existing Mission Ridge parking lot with the new Mission Ridge base area and the Constellation Ridge Resort on Section 19 (private land). In addition, a 62 acre site on private land (Section 17) will be utilized for the resort sewage treatment facility.

All components of the proposed action are depicted in Figure 1. The proposed plan provides for the operation of year-round recreation facilities and visitor accommodations. The combined development of ski facilities and resort accommodations and services will result in increased midweek utilization of the ski facilities and greater use of the area on a year-round basis.

The project site is comprised of 4,920 acres of public and private lands, as shown in Table 1. At the present time, Mission Ridge utilizes 2,800 acres of public lands under various permit and lease agreements for purposes of operating the ski resort. An additional 1,220 acres of public property will be required for expanding the Mission Ridge ski facilities, requiring Mission Ridge to obtain the appropriate permits and leases from the U. S. Forest Service, Wenatchee

National Forest, the Washington State Department of Natural Resources and the Washington State Department of Game.

Table 1

Land Allocations - Project Site

	Existing Mission Ridge Ski Area Use	Proposed Resort Use
U. S. Forest Service	1,520 acres	1,840 acres
Wash. State Game Dept.	1,200 "	1,840 "
Dept. of Natural Resources	80 "	340 "
Private Property		900 "
	2,800 acres	4,920 acres

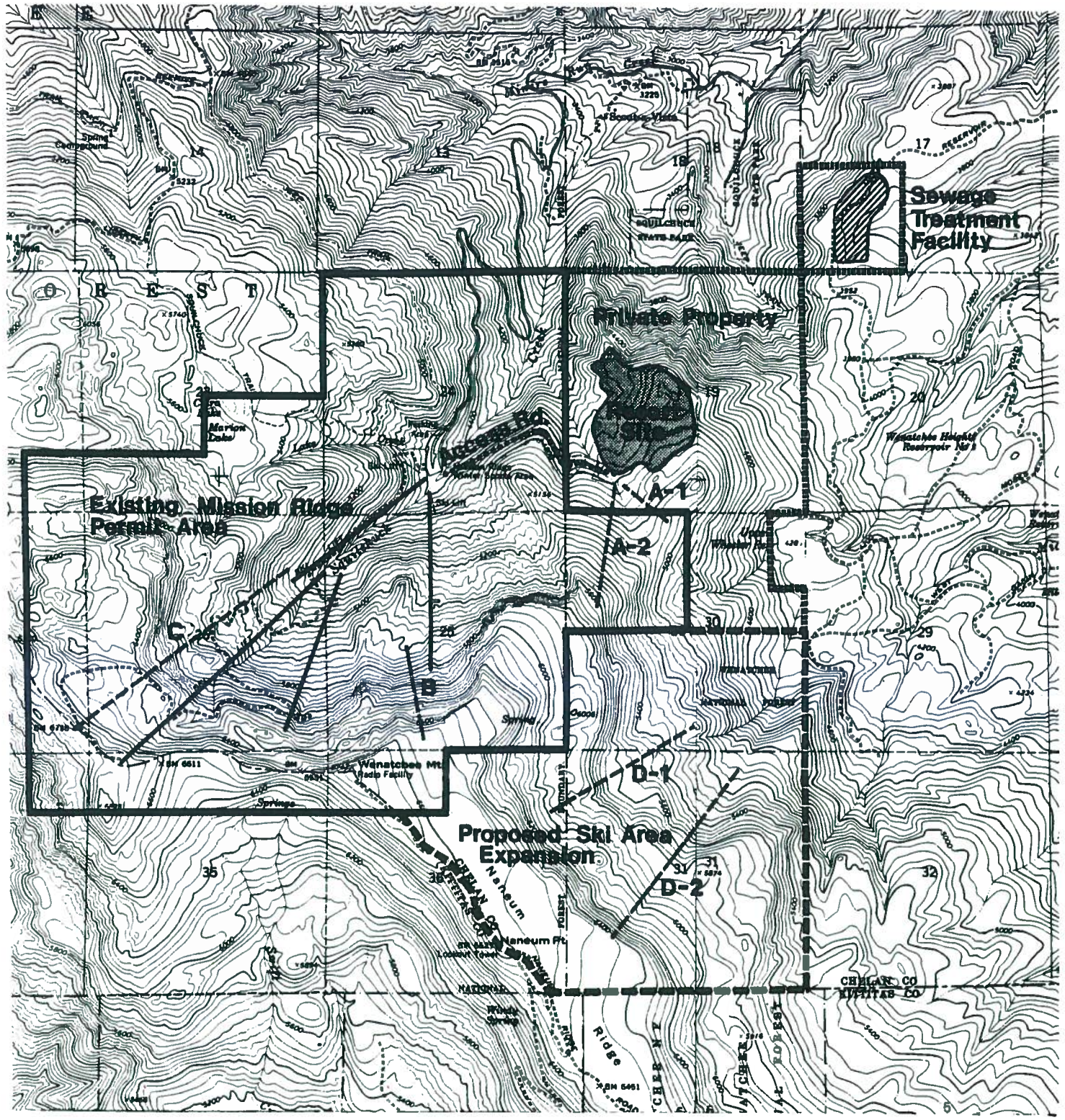
The 900 acres of private property used for the resort site comprises Section 19, the NE¼ of Section 30, and the SW¼ of Section 17, Township 21N, Range 20E.

Wenatchee Mountain, Inc. is the proponent responsible for developing and operating the ski facilities. Wenatchee Mountain, Inc. has operated the Mission Ridge Ski Resort for 20 years, under a Special Use Permit from the U. S. Forest Service and cooperative lease agreements with the Washington State Game Department and Department of Natural Resources.

Bevis Buildings, Inc. is the proponent leasing 900 acres of private property, a portion of which will be utilized as the resort center, providing visitor services, hotels, condominiums, homes, and parking facilities.

LOCATION

The Mission Ridge Ski Resort and adjoining private property (Section 19 and the NE¼ of Section 30) is located 13 miles south and west of the City of Wenatchee, Chelan County, Washington. The regional location of the site and the property boundaries are identified in Figures 1 and 2.



Site Development Plan

Figure 1.
MISSION RIDGE/CONSTELLATION RIDGE RESORT

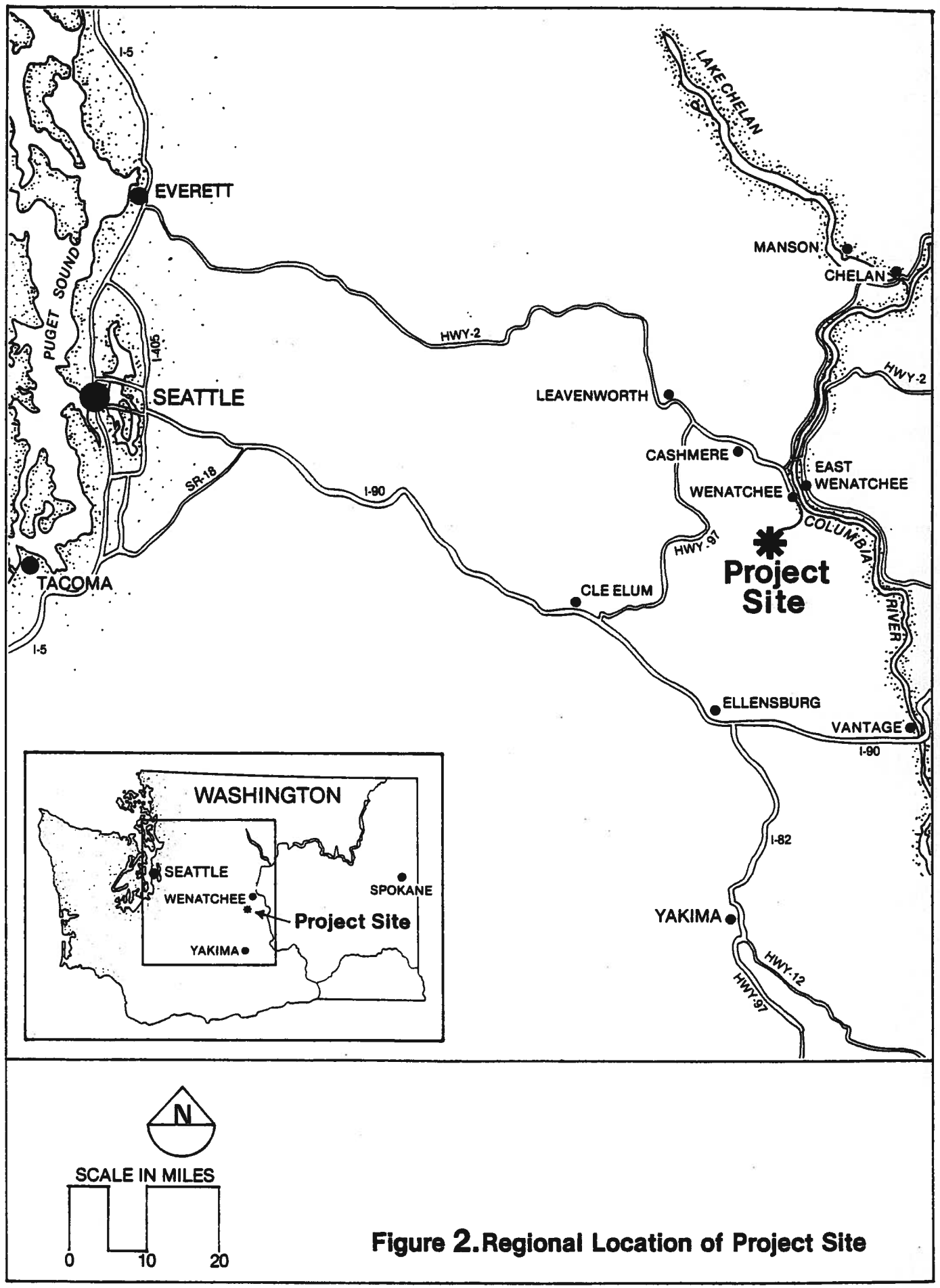


Figure 2. Regional Location of Project Site

BACKGROUND

Mission Ridge opened in 1966 under a 30-year Term Special Use Permit, issued by the U. S. Forest Service, and 20-year cooperative lease agreements with the Washington State Game Department and Department of Natural Resources. Lifts 1 and 2 were utilized during the first years of operation and Lifts 3 and 4 were added as skier demand increased. Mission Ridge has enjoyed steady growth since its opening, interrupted only by weather factors. Skier visits exceeded 100,000 for the 1983-84 ski season.

At the present time Mission Ridge is primarily a local ski area, its attendance limited to the day skiers residing within approximately two to two and one-half hours driving distance. However, Mission Ridge also caters to a portion of regional skiers who rely on overnight accommodations in the Wenatchee community and ski at the area for two to five days at one time. There are presently about 778 motel rooms to accommodate both skiers and non-skiers in the Wenatchee area.

Mission Ridge management recognized at an early stage the potential for providing overnight facilities at the ski area. The combination of factors such as favorable Eastern Washington weather, excellent ski terrain, good vehicular access, geographic proximity to the Pacific Northwest market area, and the lack of a destination ski resort in Washington State all help to create the potential for a viable resort project. Accordingly, ski area management studied numerous alternatives for developing overnight facilities on the mountain, including possible land trades with the U. S. Forest Service. After researching the available options, it was concluded that the private property contiguous to the Mission Ridge: U. S. Forest Service Permit Area was most suitable for the development of overnight accommodations. Subsequent analysis of the proposed action has been addressed in two documents entitled, "An Economic Feasibility Study: Mission Ridge Ski Resort and Sawyer Properties (1979)" and the "Mission Ridge/Sawyer Ski Resort Master Plan (1981)".

The proposed Mission Ridge/Constellation Ridge Resort is an entirely separate

project which must be reviewed independently of other previous attempts to develop real estate in the vicinity of Mission Ridge Ski Area.

DEVELOPMENT SCHEDULE

The actual construction, start-up date is based upon the proponent's schedule to proceed with the project at the earliest possible time, after all public approvals and conditions have been met. Construction will logically commence in late Spring once the snow has melted. At the present time, site preparation and construction is scheduled to start in May, 1987. Initially, the access road and other on-site roadways will be constructed. All utilities, including water, sewer, power and communications will be constructed simultaneously.

It is presently anticipated that the project will be developed in a sequence of two major phases. The actual rate of construction may be dependent upon such factors as financing, market demand, weather constraints, etc. Phase 1A of the project will include fundamental facilities, such as skier parking, skier day lodge, two ski lifts, a variety of overnight accommodations, restaurants, recreation amenities, utilities and roadways. The development schedule of the resort program is as follows:

	Phase 1A	Phase 1B	Phase 1C	Phase 1 Total	Phase 2 Total	Phases 1 + 2 Total
Hotel/Time Share Units	100	50	50	200	Mix of hotel,	
Condominium Units	30	30	24	84	time share, condo	
Single Family Lots	4	6	6	16	& single family	
			Total Units	300	400	700

Completion of Phase 1C will produce a resort complex with approximately 300 lodging units or 1,000 overnight accommodations (pillows). Development of the facility beyond Phase 1 will entail adding another 1,500 overnight accommodations (pillows), or approximately 400 additional units. Proceeding to Phase 2 will also necessitate the construction of additional parking, roadways and utility infrastructure. The expansion of ski facilities will be dependent upon visible demand, such as the length of lift lines and the utilization of ski trails. At this time the schedule for completing Phase 2 is difficult to quantify, since it will be dependent on future public demand and the prevailing financial climate.

AGENCIES OF JURISDICTION

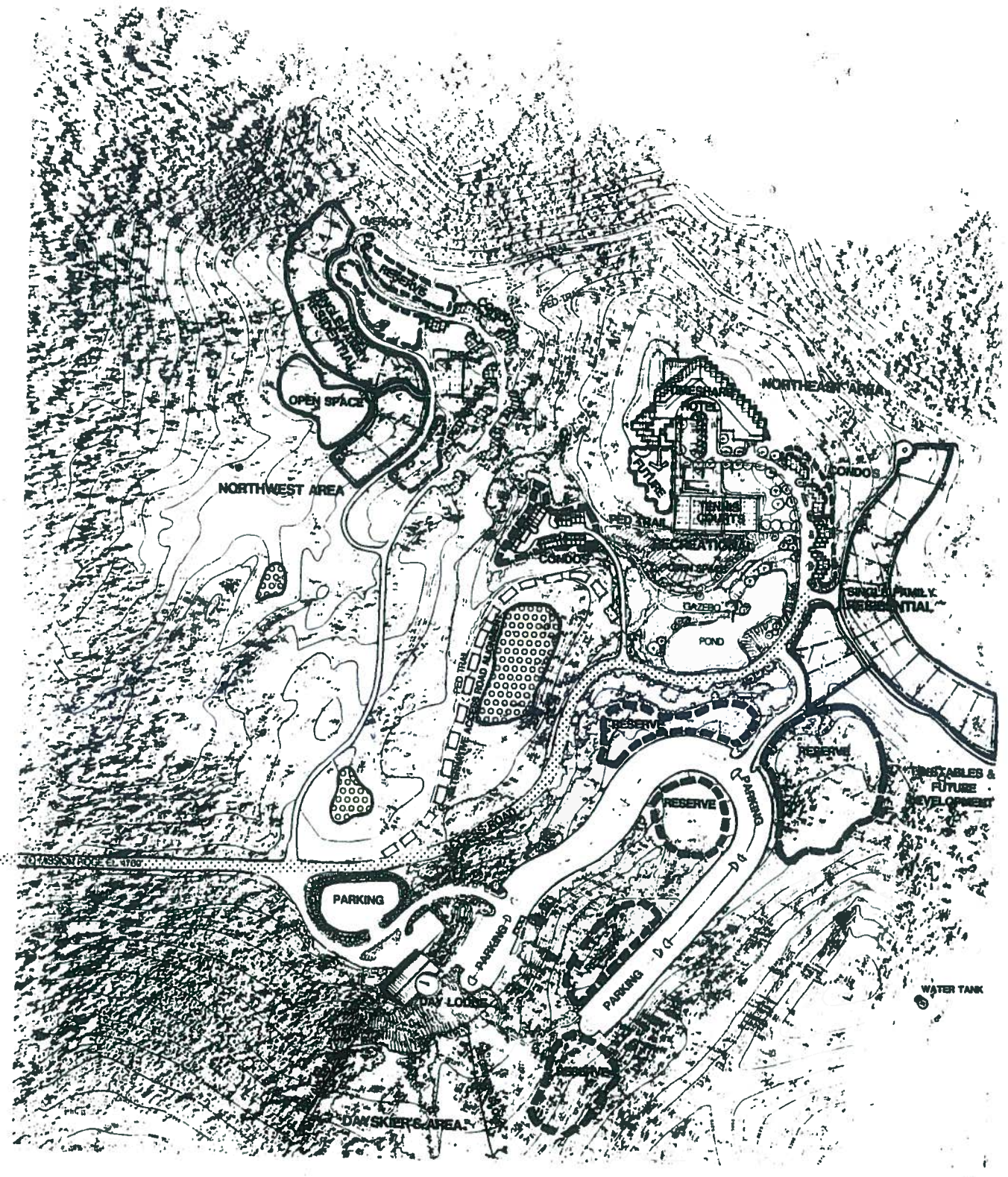
The proposed action affects both public and private lands which are primarily governed by the U. S. Forest Service-Wenatchee National Forest, Washington State Department of Game, Washington State Department of Natural Resources, and Chelan County, respectively. These agencies of jurisdiction have jointly determined that Chelan County should act as the lead agency for the preparation of the Draft and Final EIS. The Wenatchee National Forest, Washington State Department of Game and Washington State Department of Natural Resources are co-lead agencies and have assisted in this evaluation. Since the proposed resort is located on private land, Chelan County will administer the approval process for the resort. Specific conditions related to the development of the project will be required by Chelan County, including bonding for various site improvements. The EIS is intended to fulfill the requirements of both the State Environmental Policy Act (SEPA) and National Environmental Policy Act (NEPA).

PROJECT OVERVIEW

The proposed action involves the future expansion of Mission Ridge Ski Area and the development of Constellation Ridge, a year-round resort located on private property adjacent to the ski area site. Figure 1 identifies the existing ski lifts and the expanded skiing facilities as they relate to the Constellation Ridge Resort. Access will be provided by a road traversing from the existing Mission Ridge parking lot to the Constellation Ridge Resort site. Figure 3 shows the proposed master plan concept for Constellation Ridge Resort.

Mission Ridge will expand ski facilities to accommodate an additional 3,000 skiers at one time, for a total area capacity of approximately 5,600. The Constellation Ridge Resort will provide accommodations and visitor services for a total of 2,500 persons. This equates to about 700 lodging units. Recreational facilities offered at the resort will include alpine and nordic skiing, swimming, tennis, stables for horseback riding and a trail system.

The specific development program for Phase 1 of the proposal consists of:



Extension of Mission Ridge Access Road Dedicated to Chelan County

Storm Water Retention Ponds

Figure 3.

CONSTELLATION RIDGE RESORT MASTER PLAN

- A 200-room timeshare hotel resort with restaurant and lounge, meeting rooms, retail sales and services, swimming pool, tennis and racquetball courts, sauna/jacuzzi, horseback riding trails and stables, and pond with 240 accessory parking spaces for hotel and commercial uses.

- 84 condominiums, townhouse type units, with accessory parking.

- 16 one-third acre single-family lots.

- Two chairlifts, one surface lift (Lifts A-1, A-2 & B in Figure 1) and new ski runs to serve an additional 900 skiers at one time. When combined with an existing daily capacity of 2,600 skiers at one time, Mission Ridge will be able to accommodate 3,500 skiers a day.

- Day lodge with snack bar, lockers, restrooms and equipment rentals and space for first aid room, ski patrols and ski schools.

- Seven acres of accessory parking for day skiers with approximately 800 spaces and about one acre of parking for 30 buses.

Mission Ridge Ski Area will continue to expand skiing opportunities beyond the Lifts A-1, A-2 and B, which make up the Phase 1 development. Additional lifts and accompanying ski terrain will be developed as demand warrants. The future lift development concept is illustrated in Figure 1. Ski Lift C is located within the existing permit area. Lift D-1 occupies property which must be leased from the Washington State Department of Game, the Washington State Department of Natural Resources, and the U. S. Forest Service, Wenatchee National forest. Lift D-2 is located entirely on public land controlled by the Washington State Department of Game. Section 36, land administered by the Washington State Department of Natural Resources, will be utilized for both alpine and nordic skiing. The terrain within the Stemilt drainage will be utilized for alpine skiing (Lift D-1) while the Naneum Ridge area will be used for expanding the nordic trail network at Mission Ridge.

The proposed development of Constellation Ridge Resort consists of three main areas, including:

1) Phase 1 -- The Northeast Area: Approximately 20 acres in size and containing the Constellation Village. This includes the 200-room timeshare hotel complex, 84 condominium units and 16 1/3-acre single family lots.

Northeast Area Calculation

Type of Development	# of Units	Density	Area
Timeshare Hotel	200	50 du/ac*	4.0 acres
Condominium Units	84	15 du/ac*	5.6 acres
1/3-acre Single Family Lots	16	3 du/ac	5.3 acres
Subtotal	300		14.9 acres
Open Space and Roads			3.1 acres
Total Land Area Being Developed			18.0 acres

2) Phase 1 -- Day Skier's Area

Type of Development	Area
Day lodge and support facilities	1 acre
Day skiers parking	7 acres
Bus parking	1 acre
Total Area	9 acres

3) Future Phases -- Developed with a program density similar to Phase 1.

Northwest Area	18 acres
Reserve Property	12 acres
Total Area	30 acres

*In order to achieve these densities, the Timeshare Hotel has been designed as a 5-story structure while the condominium units have been designed as 3 and 4 story buildings, depending upon site topography.

It has been determined that approximately 191 acres of the 900 acre site are suitable for developing the Constellation Ridge Resort. The developed portion of the site is identified in Figures 1 and 3 and is located in the SW¼ of Section 19. A thorough examination of this area was conducted to identify opportunities and constraints for development. The resultant site inventory maps and suitability criteria have been included in Technical Appendix A. Based upon this analysis

of site characteristics, land use determinations were developed for the resort site, as shown in the following summary.

Table 2

Land Use Summary at Project Completion For Private Property Comprising The Constellation Ridge Resort Site

	Acreage	Percent
Residential (condominium, lots)	30	3.3%
Commercial/Hotel	6	0.6
Ski Slopes	35	3.9
Developed, Open Space, Trails and Recreation Area	26	2.9
Parking	12	1.3
Roadways	8	0.9
Reserve	12	1.3
Sewage Treatment	62	6.9
Natural Open Space	709	78.9
	900 acres	100.0%

These figures show that 191 acres, or 21.0% of the private property will be developed for skiing and resort uses while the remaining 709 acres will be dedicated as permanent open space. Additionally, overall site density will be less than one unit per acre.

MAJOR ENGINEERING AND PHYSICAL ASPECTS OF THE PROPOSAL

Site Access

A fundamental requirement of the proposed action is the provision of access to the private property comprising Section 19. Access to this area is necessary to provide Mission Ridge with much needed additional parking terrain, a new base area, and associated resort facilities, such as overnight accommodations, restaurants and other commercial/recreational facilities. Various alternatives have been addressed in numerous analyses, including vehicular, aerial tram and people mover systems.

The vehicular route alternatives evaluated two separate points of access, including roads emanating from the existing Mission Ridge parking lot (west of

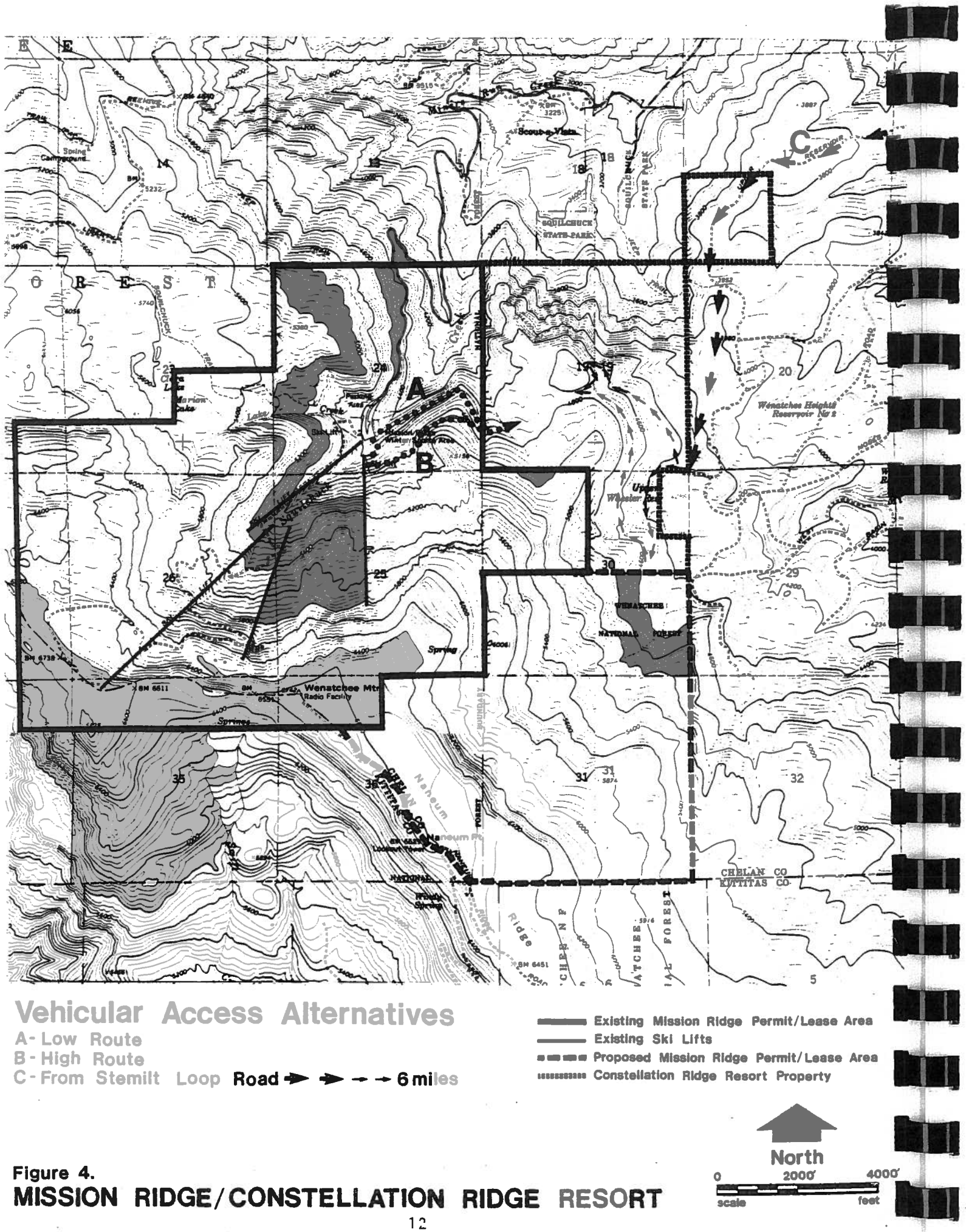


Figure 4.
MISSION RIDGE/CONSTELLATION RIDGE RESORT

Section 19) and alignments originating from the Stemilt or east side of Section 19. Refer to Figure 4. The access alternatives from the Stemilt Basin were considered not feasible for the following reasons:

- Did not provide the necessary link between the existing Mission Ridge Ski Area and Section 19.
- High cost of routes due to the need to construct many miles of new roadway.
- Create entirely new impact zone for vehicular traffic approaching and leaving the resort complex.
- High cost of maintenance.

Aerial tram and people mover alternatives were also considered. These options were dismissed due to constraints such as:

- Extreme high cost.
- Problem with staging areas, including locating parking areas and the movement of people and goods to the site.
- Lack of ski opportunities associated with such a mode of access.
- High cost of operation/maintenance.

These various access alternatives were thoroughly analyzed in the Mission Ridge Ski Resort Master Plan (1981). As a result of these analyses, it has been concluded that the vehicular access alternatives from the existing Mission Ridge parking area should receive further environmental evaluation. Two possible road alignments through U.S. Forest Service property (Section 24) have been considered, both leaving the existing Mission Ridge parking area and traversing to the east over a steep side slope into Section 19. The differences of the route alignments are shown in Figure 4. The Impact Analysis Matrix for these preferred alternatives is depicted in Figure 5. Based upon the evaluation criteria, it has been determined that the low route will provide the most practical, safest and direct link to the Section 19 base area. Construction of the access road will require a Special Use Permit from the U. S. Forest Service-Wenatchee National Forest. The permit will be issued once the detailed engineering drawings and specifications have been reviewed and approved by the Forest Service. Since the proposed access road crosses over U. S. Forest Service property in order

to provide additional public parking and ski facilities at Mission Ridge and serve the Constellation Ridge Resort, it is expected that the portion of the road crossing public property (3,900') will be constructed with public funds. The estimated cost for constructing the access road is $530,000 for the lower alternative and $460,000 for the upper alternate route. The impact of this proposal is discussed in the Section: REVENUES VS. SERVICE COSTS.

The lower, or proponent's preferred route, does not present any problems related to skier and motorist safety. Conversely, the upper road alignment creates potential safety problems since the route bisects some beginner ski terrain. Additionally, the steep switchback will traverse under Lift No. 4 where vehicles could lose control and skid onto ski slopes, or possibly into a lift tower. This roadway is also in a shaded area, which will tend to remain icy. Snow removal will be more difficult in this area due to the proximity of the ski slopes. The upper route will also require considerable modification to ski area facilities such as night lighting, underground wiring, relocation of snowmaking sprinkler heads, and redesign of a portion of the No. 4 chairlift. The higher route will also preclude the future use of the existing beginner area. Additional information concerning access alternatives may be found in Technical Appendix H.

FIGURE 5

IMPACT ANALYSIS MATRIX
FOR THE ACCESS ROAD TO CONSTELLATION RIDGE RESORT

EVALUATION CRITERIA	PREFERRED ACCESS ALTERNATIVES LOW ROUTE	HIGH ROUTE
- Lineal feet of road constructed	5	6
- Future County maintenance requirements	7	8
- Overall construction cost	10	8
- Provide for public safety	6	6
- Roadway gradients	5	6
- Landscape disturbance	10	6
- Conflict with existing ski area use	2	8*

*Will vary depending upon alignment.

Degree of Impact: 1 - Lowest
10 - Highest

Water Supply And Distribution System

Two alternatives for water supply were examined by the project proponent and analyzed in the Draft EIS, including development of new spring and surface water sources near the resort and extension of the Chelan County PUD water line to the site from Squilchuck State Park. Based upon comments received from the public and other development considerations, the proponent will obtain water from the Chelan County PUD. Through the analysis of environmental impacts, it has been determined that obtaining water from the PUD will reduce project impacts.

A detailed explanation of projected water demand for the project and impacts associated with the PUD water line extension is covered in the section, UTILITIES - Water. A Technical Summary of water demand and facility improvement for Phase 1 and subsequent phases of the resort is included in Technical Appendix B.

Sewage Disposal

The sewage disposal system proposed for the Constellation Ridge Resort is a lagoon/spray irrigation system. Sewage will be conveyed by buried pipeline to three lagoons for treatment and storage during the winter months. The stored effluent will then be disposed of in the summer months by spray irrigation. The lagoons will provide the equivalent of full secondary treatment and will produce an effluent suitable for controlled irrigation use.

A complete discussion of this system is covered in the section, UTILITIES - Sewer. Technical Appendix C describes all aspects of the proposed treatment facility in full detail.

COVENANTS, CONDITIONS, AND RESTRICTIONS (CC&R's)

Prior to receiving final approval, the developer, in coordination with the Chelan County Planning Department and other interested public agencies (State Game Department, etc.), will formulate a set of CC&R's for the purpose of enhancing and protecting the values, desirability, and attractiveness of the proposed resort project. These CC&R's will be recorded with the final planned development plat, and will be binding on all owners and users of the resort. The CC&R's have been prepared and address, in general terms, such aspects as architectural control for buildings, materials and owner modifications to property, resort rules and regulations, and maintenance of resort common areas, to name a few. The CC&R's have been revised and are available for review at the Chelan County Planning Department.

RELATIONSHIP TO EXISTING LAND USE PLANS AND ZONING

The proposed action is consistent with the Chelan County Comprehensive Planning Outline (adopted in 1958) which identifies the site as a "Major Recreational Area". The Chelan Comprehensive Zoning Resolution (Resolution 153-E of December 7, 1964 as amended) also applies to the development of the site. The purpose of the document is to: (1) promote the public health, safety, morals, and general welfare, (2) assist in implementing the Comprehensive Plan for all or portions of the unincorporated territory in Chelan County, and (3) comply with the provisions of RCW 36.70 as amended. To accomplish this purpose, the Zoning Resolution classifies all unincorporated areas into one of 18 zoning districts, and specifies uses permitted outright, conditional uses permitted, and various performance standards for the district.

The project site and surrounding vicinity are in a General Use (GU) zoning district. The general use district classification is intended to be applied in areas for which the highest use in the public interest has not been determined.

Outright permitted uses include single-family and duplex dwellings and certain agricultural uses. All other uses are subject to conditional use approval. The proposed action will comply with Chapter 11.38 of the Zoning Resolution which permits the application of a Planned Development District (PD) on the site.

Any subdivision of land into five or more lots is classified as a major subdivision under the Chelan County Subdivision Resolution (Resolution 77-103 of August 15, 1977, as amended by Resolution 81-75, August 10, 1981). The Resolution specifies the procedures that must be followed by the developer in applying for preliminary and final plat approval, and by the various County agencies in evaluating the application. In addition, the Resolution sets forth design and construction standards for roads, driveways, drainage and utilities, as well as fire protection standards. All single-family lots developed on the site will be governed by the Subdivision Resolution.

The project site is located in the Chelan Unit of the Wenatchee National Forest which is managed within guidelines of the Chelan Unit Final Environmental Impact Statement of 1976. The project site also borders on the Kittitas Unit of the Wenatchee National Forest. A Final Environmental Impact Statement -- Land Management Plan for this area was adopted in 1979. The Wenatchee National Forest is currently in the process of developing a new management plan as mandated by the Forest and Rangeland Renewable Resources Planning Act of 1974 as amended by the National Forest Management Act of 1976. These planning acts direct the Forest Service to develop long-range management plans for all individual National Forests by October, 1985. The present use and future expansion of the Mission Ridge Ski Area meets the management objectives for this developed recreation site in the Wenatchee National Forest.

Policies adopted by the Washington State Game Commission in January 1986 are also pertinent to the resort project, since the proposed ski area expansion utilizes land controlled by the Washington State Department of Game. Several policy statements used by the Department of Game in planning and managing wildlife resources are applicable to the proposed action and include:

1) The first management priority will be to establish and perpetuate the highest quality wildlife habitat, with the second priority being to provide recreation opportunity in the form of hunting, fishing and wildlife enjoyment.

2) Development and implementation of a long-range comprehensive management plan and shorter-range operational plans is imperative.

3) Cooperation and assistance with federal and other state agencies will be sought and provided in the development of wildlife-related management plans.

4) Only programs, activities, and facilities which directly and primarily benefit wildlife and wildlife-related recreation will be permitted on Department-controlled lands.

   - Land use decisions will be based on long-term benefits to habitat and wildlife, even though they may preclude an economic return to the Department.

5) Close coordination with state and federal land management agencies is encouraged to assure that management practices on public lands are in the best interests of wildlife and wildlife-related recreation.

6) Close cooperation and coordination with local governments and private landowners is encouraged to ensure that wildlife values are considered for protection or enhancement in the development of land use plans and ordinances.

The entire policy document is on file at the Chelan County Planning Department as Technical Appendix E.

The property owned and managed by the Washington State Department of Game (WDOG) in the vicinity of Mission Ridge was all purchased in the 1950's through Federal funds authorized by the Pittman-Robertson Act. The Act authorized such land purchases for the purpose of enhancing wildlife habitat and does not permit conflicting uses. The Department of the Interior-U.S. Fish and Wildlife Service monitors the use of the these lands and whether they meet the specific mandate of the Act. If they do not comply with the intent of the Act then they must be traded or purchased with other funds.

Mission Ridge Ski Area has leased 1,200 acres of Washington State Department of Game land purchased with the Pittman-Robertson (PR) funds for over 20 years. For the future expansion of ski terrain, Mission Ridge desires to lease an additional 640 acres (Section 31) of WDOG land which was originally purchased with Pittman-Robertson funds. Mission Ridge and the WDOG recently renewed the existing 1,200-acre lease for another 20 years. The new lease also recognizes Section 31 as a future development site for alpine skiing provided Mission Ridge complies with all terms and conditions of the Special Use Permit which governs the lease arrangement.

The Mission Ridge/Constellation Resort Wildlife Assessment (Appendix E) was completed in February 1986. The study addresses specific project related wildlife impacts and the appropriate mitigation to be implemented. The WDOG and U.S. Fish and Wildlife Service considers the impact analysis and proposed mitigation to be adequate for including Section 31 into the project.

2. EXISTING CONDITIONS, IMPACTS AND MITIGATING MEASURES

PREFACE: The discussion of Existing Conditions, Impacts and Mitigating Measures covers the entire project site as delineated in Figure 1. To avoid confusion to the reader, the project site is composed of the lands presently utilized to operate Mission Ridge Ski Area, undeveloped terrain proposed for future ski area expansion (lifts and trails) and undeveloped property to be utilized as the Constellation Ridge Resort site (lodging and commercial facilities). These project site components are identified in Figure 1. The following description of Existing Conditions, Impacts and Mitigating Measures for each element of the environment provides the reader with pertinent information as it relates to each area of the project site.

EARTH

Existing Conditions

Topography. The project site has an overall elevation difference of approximately 3,200 feet, from 6,835 feet at the KPQ FM radio installation to 3,600 feet on the north property line of Section 19. The existing Mission Ridge base area is situated at the 4,600 foot level, which has been determined as the critical snow level for the resort. The ski area has a vertical rise of about 2,000 feet and the topography is well suited for skiing. Slopes are highly variable, ranging between ten percent to over eighty percent. The topography most suitable for ski area expansion is identified in Figure 1 and comprises portions of Sections 30, 36 and all of Section 31, Township 21N, Range 20E, located within the Stemilt drainage basin.

The most dramatic natural hazard is the cliff area which traverses the eastern portion of Section 25. Avalanche zones of minor significance exist below ridge tops and open slopes. Control of avalanches is the responsibility of Mission Ridge. Skilled persons are employed by the ski area to undertake the monitoring and technical control of avalanches. The terrain generally slopes to the north and east, which is an ideal exposure for skiing.

Portions of the project site have already undergone various topographic alterations as a result of developing mountain and base area facilities for the ski area. Topographic modifications were required to construct ski runs and trails, ski lifts, parking lots and the day lodge. In addition, a portion of Section 19 has been selectively logged in recent years, requiring the construction of numerous roads and skid trails.

A large escarpment makes up the north half of Section 19. The topography most suitable for developing the Constellation Ridge Resort lies in the SW¼ of Section 19 and comprises approximately 140 acres. The area is a portion of the 900 acres of private property which includes Section 19, the NE¼ of Section 30 and the SW¼ of Section 17. The topographic features of this area are unique, in that they provide vistas from various ridgelines, knolls, and hillsides. The topographic and slope analyses of the Constellation Ridge Resort site (SW¼ of Section 19) are shown in Technical Appendix A.

Geology. Between 20 and 30 million years ago, in Miocene Time, the landscape that we see today in the Wenatchee Mountains was non-existent. This was an era of great outpourings of the basaltic lavas which are so extensive in central and eastern Washington. Following these outpourings, the landscape was essentially a level plateau that was built of layer upon layer of basalt with lava inundated soil surfaces, lake beds and other topographic and depositional features sandwiched in between. In the Wenatchee Mountains area these inter-basalt features consisted of clay lake beds of appreciable thickness and ancient basalt inundated topography in the sandstone and silt stone of what is known as the Swauk formation. During the past ten million years the Cascade Range as we know it today was uplifted, and it was also during this time that the Wenatchee Mountains were formed by an uptilting of the marginal portion of the basaltic plateau.

The Wenatchee Mountains are unique in that they are characterized by many large basalt rock escarpments which head numerous large landslide areas where the edge

of the upwarped plateau has failed during the erosion process. Possibly one of the largest landslides in Western North America forms the Stemilt Creek basin which extends all of the way from the drainage divide to the Columbia River. The landslide topography is attributable to erosion in the vertically jointed basalt flows which overlie inter-basalt and pre-basalt surfaces which consist of weak clayey materials. The extent of these slides is related both to the depth and to the area of the clay formations.

There is evidence of very recent and continuing slow land readjustment in most of the landslide topography, and in the Stemilt slide near the Three Lakes Golf Course, certain roadways exhibit distress attributable to mass readjustment. Spring and well water flows in the Stemilt area increase or diminish for no apparent reason. At the heads of many of these land slumps is evidence of tearing and there are many instances of large boulders of basalt which appear to be "floating" away from their parent rock. Re-surveys often exhibit unaccountable discrepancies both vertically and horizontally from original surveys. Although the slow movement is more or less continuous the geologic hazard which could result in disaster is small barring a severe earthquake.

Mission Ridge Ski Area is within the confines of a basin in the Squilchuck drainage which is continuous landslide topography from the escarpment ridge, elevation 6,600', to the parking area, elevation 4,500'. This landslide topography, unlike normal erosion topography, exhibits slope variation and contour configuration that is continuously varying and unique. It is this uncommon topography, together with an elevation and an exposure which assures a long snow season. It might be noted that the similar, though less rugged, type topography is a factor in the popularity of the Three Lakes Golf Course near Malaga.

The landslide topography within the ski area, with several exceptions, is relatively stable and should cause no trouble providing excavations for roadways and related developments are kept small. Depending upon where the towers for the lift facilities are founded, a certain amount of differential movement can be

anticipated. However, barring a severe earthquake, such differential movements can be compensated for at the cable clamping devices on each tower.

Soils. The soil characteristics in the vicinity of Mission Ridge Ski Area differ from bare rock to loam exceeding six feet in depth. Mission Ridge operators are familiar with the soils, wet areas and possible slide and erosion problems from a practical, working point of view. Since the opening of the ski area in 1966 the management has groomed new slopes and trails and revegetated exposed areas in order to control erosion. The development of ski trails and ski area access roads is regulated by the U. S. Forest Service and Washington State Forest Practices to reduce surface water runoff and resultant erosion. These practices include employing least disturbance logging methods, the use of revegetation efforts in disturbed areas, properly sized culverts at stream/creek crossings and other erosion control standards for mountain terrain.

The soils found in the vicinity of Mission Ridge Ski Area are generally quite shallow and of recent development. Their fertility immediately below the surface few inches is generally exceedingly low, particularly in nitrogen, a major nutrient for vegetative growth. The high altitude, coupled with low mean temperatures and abundant snow, provides for a very short growing season[1]. These factors contribute greatly to the difficulty of revegetating disturbed soils on ski slopes and trails. However, Mission Ridge has experimented with various mixtures of seed, broadcasting techniques and fertilizers. Their efforts have produced successful results, covering the slopes with a variety of grasses.

The entire project site is within the area identified as the Nard-Stemilt Association in the Soil Survey of Chelan Area, published by the Soil Conservation Service and the Washington Agricultural Experiment Station. This association is found on ridgetops, foothills, and sides of terraces and on mountainous

[1]Wash. Farmer-Stockman 97 (2), P.34, Jan. 1972, U.S.F.S. Dept. of Agriculture

uplands. It consists mainly of well-drained soils that are cobbly or bouldery or that have rock outcrops in places. The soils formed in glacial till, weathered granodiorite, basalt, gneiss, schist, or sandstone bedrock. Their surface layer contains a mixture of loess and some volcanic ash.

The Stemilt soils dominate the project area as they are found on mountainous uplands, mostly south and west of Wenatchee to the Kittitas County line. They have a surface layer of grayish-brown silt loam, a subsoil of brown very cobbly silty clay loam, and a substratum of pale-brown very cobbly silty clay loam.

Other soil types found within the project site include the Loneridge, Naxing, Blewett, Saydab, Rubbleland and Rock Outcrop groups. Other than some of the Rock Outcrops which are located in the area, these soil types do not present any limitations on the development of ski lifts and trails.

A thorough analysis of soil types and composition has been undertaken for Section 19 in order to identify any limitations which may be connected with the development of the site. Soil types include those found on the following page.

Soil Types Found in Section 19

Code No.	Name		Acres
1301*	Naxing Series		12
1155*	Loneridge Series		491
1770*	Rubble and Talus Slope (Basaltic)		51
130*	Blewett		36
1760	Rock Outcrop (Sandstone)		25
1881	Stemilt Stony Loam	30-65%	20
1880	Stemilt Stony Loam	3-30%	5
			640

The soil types identified with an asterisk are those found primarily in the SW¼ of Section 19, the area proposed for the resort site. In reference to Figure 6, pertinent soil characteristics are:

1301 Naxing Series: Very Stony Loam -- Does not present any significant problems related to construction.
- 0-14" Stony Loam
- 14-28" Extremely Cobbly (3-10" in diameter)
- 28-60" Extremely Gravelly Loam

1155 Loneridge Series (Elevation 2400-5400')-- Does not present any significant problems related to construction.
- 0-4 " Very Stony Loam
- 4-11" Very Gravelly Loam
- 11-19" Very Cobbly Loam
- 19-48" Very Cobbly Clay
- 48-60" Extremely Gravelly Clay

1770 Rubble Land and Talus Slope -- Development limitations
Basaltic at least 60"

130 Blewett Series
- 3-10" Very Gravelly Sandy Loam -- Must employ appropriate construction methodology.

Sandstone at 10"

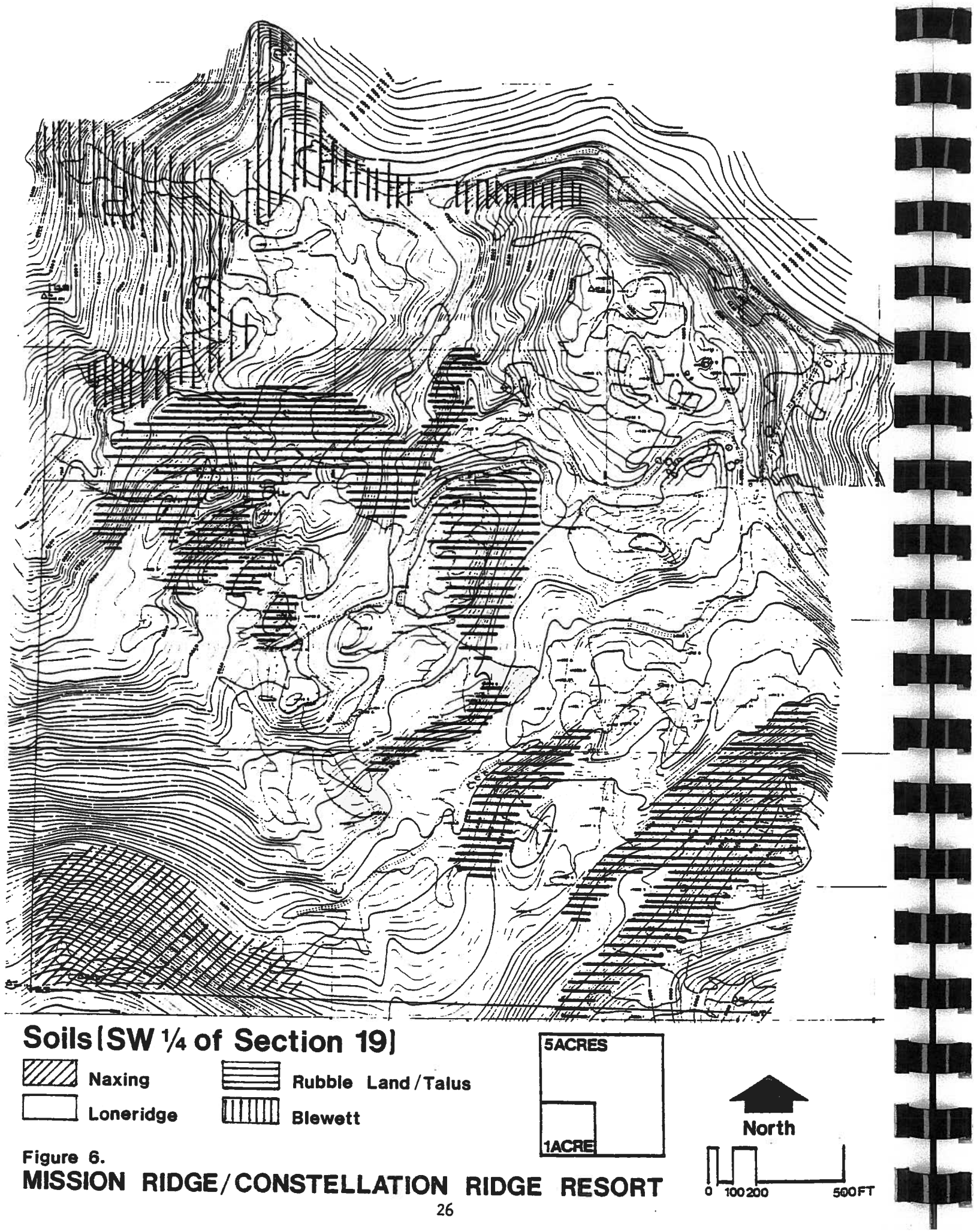


Figure 6.
MISSION RIDGE/CONSTELLATION RIDGE RESORT

More specific soils information was obtained by an on-site excavation in October of 1983. The findings are summarized in Technical Appendix C-3.

Soils in the vicinity of the proposed sewage treatment lagoon and sprayfield system (SW¼ of Section 17) are of the Stemilt Series. This soil type is characterized by slow permeability, slow to medium runoff rates and slight to moderate erosion potential. Providing the lagoon and sprayfield system is constructed on the gentle plateau, these soils should not present any problems for development of the sewage treatment facility. Two soil test holes were excavated in the location of the proposed sewage treatment facility. The information is included in Technical Appendix C-3.

Impacts

Further development of the ski facilities will necessitate additional topographic changes similar to what has occurred in the past. Specifically, the construction of ski runs and trails, ski lifts, parking lots and a new day lodge will require various levels of site grading. In addition, the development of the resort infrastructure, buildings and roadways/driveways will impact the existing topography in the form of ditch and roadway construction and site grading for building pads. The following table summarizes the degree of topographic impact as a result of constructing resort facilities.

Table 3 shows the expansion of ski facilities will result in topographic alterations to approximately 106 acres. Modifications for ski-related facilities will be similar to the existing Mission Ridge ski trails and lift lines. Topographic disturbances will provide enhanced skiing opportunities for various skier classification levels. Development of the Constellation Ridge Resort facilities will impact approximately 134 acres of site topography, as shown in Table 3.

Table 3

Topographic Alterations -- By Use

Facility Type	Degree of Topographic Impact	Design Criteria	Total Acreage	
Ski Lifts & Trails	Very Low	Follow natural undulations	106 acres	106 acres
Parking Lots	Low	Locate on natural benches	12 "	
Roads -- Access	High	Minimize visible side cut	4 "	
Site Roadways	Moderate	Follow natural benches & contours	8 "	134 acres
Buildings	Moderate	Locate on gentle to moderate slopes	48 "	
Sewage Treatment	Moderate	Locate on flat or gentle slopes	62 "	
		Total	240 acres	

The construction of the access road to the Constellation Ridge Resort site will produce a significant topographical change. Beginning at the existing Mission Ridge parking lot, the roadway alignment will make a 3,900 foot traverse along a ridge with very steep side slopes, ranging from between 20 to over 100 percent. Road construction will entail the removal of approximately 59,000 cubic yards of earth and rock material. Excess material available as a result of the full bench construction technique on the proposed access road will be utilized in Sections 17, 19 and 24. Project engineers have indicated that the earth and rock material will be used for construction of site roadways and parking areas where fill is required and for building the impoundments for the sewage treatment lagoons. Some of the fill will be utilized for extending the access road through the existing Mission Ridge lower parking lot at the crossing of Squilchuck Creek.

The public land which must be crossed is managed by the Wenatchee National Forest, U. S. Forest Service. Once detailed engineering drawings are approved by

Wenatchee National Forest, a Special Use Permit will be issued for the construction of the roadway. The proposed 30 foot roadway will create a visual impact as a result of the cut required to traverse the steep terrain. The visual impact created will be similar to that of the present Mission Ridge road immediately across the canyon. The roadway sidecut will be most visible as drivers proceed up the last few miles of the existing access road. The proposed access road crosses zones with stability problems as a result of high soil moisture content during periods of snowmelt runoff. One perennial stream channel and several ephemeral flow channels cross the proposed route.

The construction of the Phase 1 sewage treatment lagoon system will necessitate topographic modification to approximately 7 acres in Section 17, as identified in Figure 12. The flat plateau area of Section 17 will be recontoured to create three wastewater storage lagoons of varying size and occupy a total of 7 acres. Lagoon embankments will be constructed from excess material from the construction activities in Section 19 or from a borrow pit, immediately southeast of the lagoon site. Approximately 39,000 cubic yards of borrow material will be required to construct the lagoons. The borrow pit will consist of an area of several acres from which trees, brush, and larger vegetation will be removed. The top layer of soil will then be removed to a depth of approximately 6 inches and stockpiled. The subsoil will be removed to a depth of approximately 3 feet and utilized in the construction of lagoon embankments.

Construction of the 18 acre sprayfield site will require minor topographic disturbances in the form of berms across low areas to prevent runoff. As the Constellation Resort project expands and wastewater loadings increase, the sewage treatment lagoons and sprayfield will be enlarged to approximately 62 acres at project buildout. The topographic modifications for future wastewater storage cell and sprayfield construction will be similar to the Phase 1 requirements.

The topographic and soil disturbances as a result of developing ski and resort facilities total about 240 acres, as shown in Table 3. This represents about 5% of the 4,920 acres involved in the project.

Soils. Soils within the project site will be disrupted due to clearing and grading for the construction of ski trails, roadways, parking lots, utility infrastructure and resort buildings. The probability for mass soil failures exist if properly designed construction techniques are not employed in areas with stability problems as a result of high soil moisture content. At project build-out, approximately 70 acres of site soils will be covered with impermeable surfaces, including roadways, parking lots and roof-tops.

The potential for soil erosion will increase once construction is underway. Erosion during and immediately following construction will occur if heavy rainfall occurs before the erosion control grass cover is established. Soil erosion will result in increased sedimentation to water courses and drainage channels. Soil disturbance from past road building, run clearing and land contouring has resulted in some slight amounts of surface erosion, as will similar activities in the future.

Mitigating Measures

Topography and Soils. Several mitigating measures will be employed in constructing the Constellation Ridge access road. In areas of soil instability and high moisture contact, special construction practices will be required in the form of adequate drainage and the use of "filter cloth" to prevent possible surficial mass soil movement. Full bench construction will be utilized along the access road in areas with extreme side slopes. This construction technique deviates from the traditional "cut and fill" practice as all the earth and rock material is cut and hauled from the mountainside. This method of construction will mitigate the visual impact of the roadway as it crosses steeper terrain. Excess material from the full bench construction can be deposited on the Constellation Ridge Resort property or the ski area for use in developing the recreation complex. The traditional "cut and fill" technique will be employed where the access road crosses more moderate sloping terrain.

To mitigate topographic and soil impacts caused by the borrow pit development, the borrow area will be contoured to generally conform to the surrounding topography. Stockpiled topsoil will then be replaced over the borrow area and reseeded with

grass. After these improvements, the area will appear more as a grassy swale than a "pit". Recontouring and reseeding of the borrow pit area will be undertaken after the Phase 1 sewage treatment facility has been constructed.

Two aspects of the development schedule which will help to reduce soil erosion are the short summer construction period and the accompanying shortage of precipitation. In addition, the project will be developed in phases, thereby isolating soil disturbance to certain areas which can be easily controlled.

The combination of high altitude, low mean temperatures and abundant snow, provides for a very short growing season.[1] These factors contribute greatly to the difficulty of revegetating disturbed soils as a result of construction. Mission Ridge has experimented with various mixtures of seed, broadcasting techniques and fertilizers. Their efforts have produced very successful results, covering exposed areas with a variety of grasses. These techniques will be employed in revegetating the cut for the access road, utility corridors, ski trails, roadway drainage ditches, detention/sedimentation ponds, etc. In areas where the access road is constructed through bedrock and rock outcroppings revegetation will not be required. The construction of water and sewer pipelines in steep erosion prone areas will require immediate planting with erosion control grass in order to minimize potential erosion. Hydromulching and the use of jute mats in any heavily eroded areas will be used when major rehabilitation is required. In addition, sprinkling will be utilized during the dry summer months and topsoil will be hauled in to promote grass growth in the developed resort area. Specific planting and fertilization techniques are discussed in a related article found in Technical Appendix D.

[1]Wash. Farmer-Stockman 97(2), p.34, Jan. 1972, USFS, Dept. of Agriculture.

AIR

Existing Conditions

Climate. The climate in the vicinity of Mission Ridge is generally cool and dry, due to its geographic location east of the Cascade Crest and base elevation of 4,600 feet. Precipitation is greatly influenced by the Cascade Mountains. Moist air from the Pacific Ocean climbs over the Cascade Range, cooling as it rises. The cold air is not able to retain as much moisture as when it is near the ocean, so the majority of moisture is dropped on the west side of the mountains and the Cascade Crest. This creates a condition where lands on the east side of the Cascades receive less precipitation as the distance from the Cascade Crest increases. Average precipitation at the Crest is over 80 inches, while Mission Ridge receives around 17 inches annually at the base area, elevation 4,600 feet. The majority of precipitation at Mission Ridge is in the form of snow, which falls from late November through April, accumulating approximately 145 inches annually.[1] Occasionally, a temperature inversion traps fog in the Wenatchee Valley and can persist for days, while at Mission Ridge it can be completely clear and considerably warmer.

Snow Data. Since Mission Ridge is located east of the Cascade Crest, it enjoys weather conditions which are generally more favorable to skiing than that found in the coastal regions of the Pacific Northwest. Temperatures are typically lower, and the quality of the snow is generally superior, since it has less water content than snow found in the Pacific Coastal areas. Snow depths at Mission Ridge typically reach four feet or more, but are not so excessive as to cause snow removal problems and extreme avalanche hazards.

Mission Ridge management has observed and studied snow deposition patterns in the potential expansion areas during the past 20 years. Snow depth is affected by a myriad of elements, including elevation, tree cover, slope exposure and wind effects, to name a few.

[1]Mission Ridge: Ski Area Records

Ridges or ridgelines, due to the exposure, are sometimes bare or without much snow cover. In cases where this is apparently a problem, modern snow farming practices or snow making can be employed to ensure adequate snow cover. The ski area management has identified the best areas for expansion, based upon the observations that adequate snowfall exists.

The slope exposure is primarily north and east, which is ideal. This provides maximum snow accumulation and retention, good snow quality and protection from the prevailing south and west winds. Wind exposure presents a problem at times, with the greatest exposure on the Wenatchee Mountain ridge. Tree cover in the area provides some protection against wind, and supplies visual reference during periods of flat lighting and whiteouts.

The critical snow level is between 4,600' - 5,000', and is an ideal location for the base area. There is a minimum snow depth to contend with on roads, parking lots, buildings, utilities, etc., and costs of snow handling and removal are minimal. It is the elevation, hopefully, where there is adequate snow for beginner areas, lower terminals and ski trails.

The possibility of inadequate snow on occasion, especially at lower elevations, is a problem which confronts Mission Ridge and many other North American ski areas. The winter of 1976-77 was unique, in that there was less snowfall and less snow accumulation in most parts of the Western United States and Canada than has ever been recorded since weather records have been maintained. Mission Ridge, along with some other areas seriously affected by the lack of snow, did not open during the 1976-77 season. Snow making facilities have been installed since the drought year to help insure that the ski area has adequate snow cover for a longer season. During an average year, Mission Ridge operates 125-150 days.

Temperature. Recorded low temperatures during the winter months have reached an extreme of -22° F. Pacific Chinooks occasionally produce warmer winter temperatures of up to 40° F. Summer highs and lows are 80° F. and 40° F, respectively.

The mean annual temperature is approximately 39° F, as compared to Wenatchee's mean annual temperature of 50.6°F.

Air Quality. Due to the relative isolation of the project site from potential air pollution sources, it is evident that the air quality in the vicinity of Mission Ridge is high. There is currently no monitoring for air quality parameters in the vicinity of the project site. However, monitoring of suspended particulates at various locations has been undertaken in the Wenatchee area since 1970. State particulate standards for locations east of the Cascade Crest depend on background concentrations, and therefore may be somewhat higher than the general standards applied in other areas of the state (60 micrograms per cubic meter, annual geometric mean; 150 micrograms per cubic meter, maximum 24-hour concentration not to be exceeded more than once per year). Background concentrations are not known for the area. Since 1980, the general state standard for the annual geometric mean was exceeded only once, by 6 micrograms per cubic meter in 1983, based upon a 9 month sample. The general standard for the maximum 24-hour concentration was greatly exceeded during 1980 in May and August, as a result of the eruption of Mt. St. Helens. The levels reached were 414 and 239 micrograms per cubic meter, respectively. The state standard was most recently exceeded in October, 1983, reaching 166 micrograms per cubic meter.

The amount of suspended particulated generally decreases with elevation. However, proximity to slash burning in the mountains greatly affects particulate levels. Such air quality deterioration caused by logging activity in the surrounding environs is only a temporary phenomenon.

There is no data available on carbon monoxide levels in the Wenatchee area or in the vicinity of the project site. The Washington Department of Ecology (DOE) does not view carbon monoxide in the Wenatchee area as a problem, although it could be a temporary problem during periods of air stagnation, usually caused by temperature inversions.

Odor. There is currently no odor associated with the project site other than that produced by the natural environment.

Impacts

Air Quality. Construction will occur during the summer dry period. Suspended dust particulates caused by site grading will be the most significant form of air pollution. Coupled with the construction vehicles traveling along the gravel roads in the area, this will be the major source of pollution. In addition, the short-term use of construction vehicles, the long-term presence of automobiles on the site, and the increased use of the Squilchuck access road to Mission Ridge will affect carbon monoxide levels.

The long-term use of woodburning fireplaces will increase total suspended particulates in the area. It is estimated that 430 hotel and condominium lodging units will have fireplaces. Winter temperature inversions often trap fog in the Wenatchee Valley for days at a time. The resort site is situated above the inversion layer. For this reason, woodburning fireplaces will not create a particular air pollution problem.

Odor. Exhaust emissions from construction vehicles, asphalt paving, and burning, if permitted, will create odors during construction. Increased odors associated with vehicular emissions, home heating, and grounds maintenance will accompany the development of the site. Another source of potential odor is from the sewage treatment lagoons located on Section 17, as created by short-term conditions or malfunctions associated with operating the system. Wastewater lagoons have acquired a reputation for odor problems, one which is not always undeserved. Lack of adequate aeration equipment and improper maintenance are the most common causes of objectionable odors. If lagoons are suffering from odor problems, the situation will be worsened by distributing the lagoon contents over a sprayfield where the area exposed to the atmosphere is greatly increased.

Precise estimates of the size of the area within which odors from the storage lagoons would be detectable cannot be made, although the potential for discerning

odors increases with proximity to the source. The lagoons and sprayfield are located approximately one mile northwest from the project site. Squilchuck State Park, located within one-half mile to the west, is the closest developed area to the sewage treatment site. A number of variables control odor production and travel, including wind strength and direction, humidity, temperature, and lagoon loading history. However, many lagoons have been in operation in North Central Washington for a number of years, and conclusions regarding the proposed system can be drawn upon the experiences of these facilities.

Mitigating Measures

Air Quality. Sprinkling of cleared areas during dry weather would reduce the potential for airborne dust during construction. Slash burning will be scheduled at times for optimum air dispersal. Vehicular exhaust emissions accompanying the use of the resort development should be reduced as federal vehicle emissions standards are enforced and older vehicles are replaced. A shuttle service will be provided within the resort to reduce traffic congestion and the use of automobiles, thereby reducing vehicular emissions. At the present time, Mission Ridge and local motel operators are providing shuttle service from Wenatchee to the ski area. A 40 passenger bus began operation this season for one round trip per day. As demand increases, additional runs will be provided.

Odor. The proposed lagoons and sprayfield will include design features to eliminate odors. Proper operation and maintenance by a licensed operator will be required to ensure that the system performs as designed.

Aeration has been proposed for the first cell of the sewage lagoon system to ensure that odors are not produced when spring thaws occur. Since the peak loads will occur during cold weather and since ice cover will severely limit natural oxygen transfer, mechanical aeration equipment consisting of compressed air and perforated tubing will be utilized to provide oxygen underneath the ice. The resulting mixing will increase the treatment efficiency of the first cell.

Cell 1 will be sized to remove essentially all the incoming organic material

in the wastewater before discharging to Cells 2 and 3. The aeration tubing will be concentrated at the inlet end of Cell 1 to ensure mixing and to maximize biological reaction rates. The outlet end of Cell 1 will not be heavily aerated, and will act as a sedimentation zone to allow biological solids to settle. As a result, the loadings to Cells 2 and 3 will be very light, and aeration equipment will not be required. However, some slight odors may be generated immediately following the melting of the ice cover on Cells 2 and 3 each Spring, since the lagoons will become anaerobic under the ice even when lightly loaded. Since significant quantities of anaerobic byproducts will not be present, the odors will not be significant and should not be noticeable beyond the immediate vicinity of the lagoon cells.

The remote location of the proposed facility will minimize the impact of odors that could occur. When the development expands in the future, aeration equipment could be added to Cells 2 and 3 to increase their treatment capacity and further reduce the potential for odors. A complete description of the sewage treatment system may be found in Technical Appendix C.

Proper maintenance of the lagoons will require periodic removal of accumulations of floating debris or plants such as cattails in order to reduce the potential of stagnant areas developing which could produce odors.

The high quality of effluent that will be produced after treatment and storage will minimize the organic loadings placed on the sprayfield, and odors are not anticipated. Care will be required during operation to avoid short-term hydraulic overloading by excessive sprinkling in one area and/or during prolonged periods of heavy rainfall in order to reduce the potential of creating localized objectionable odors.

The spray irrigation system will not be used until the storage lagoons have had time to return to an aerobic condition. A floating drawoff assembly will be used to deliver water from the surface of the lagoon to the irrigation pump, to ensure maximum oxygen content.

WATER

Existing Conditions

Surface Water. The project site is located at the headwaters of three major drainage areas, namely the Squilchuck, Stemilt and Swift Creek Basins, as depicted in Figure 7. The existing ski area is completely within the boundaries of the Squilchuck drainage basin. Numerous intermittent streams flow into Squilchuck Creek, which has a sustained annual flow with a relatively low peak flow. This is attributable to the landslide interrupted drainages of Squilchuck Creek which hold water that ultimately issue as numerous perennial springs. Vegetation and forest cover within the landslide areas of Squilchuck creek are definitely not a factor in the stream flow.[1]

Section 19, the Constellation Ridge Resort site, displays little evidence of natural springs or other water resources with the exception of one intermittent stream in the southwest quarter which flows into Squilchuck Creek. Surface runoff from the southeast quarter of Section 19 drains into the Stemilt Basin. Section 30, which is also part of the resort site, drains into the Stemilt Basin via the Wheeler Reservoir, which is used for irrigation purposes.

At the present time, site runoff into the Squilchuck and Stemilt Basins is naturally regulated since the majority of precipitation is stockpiled in the form of snow. The winter snowpack functions as a water retention basin, gradually releasing water during spring and early summer melting. With the exception of heavy rains, coupled with rapid snowmelt, the surface water runoff is quite modest. Stream flows reach their highest level during the spring runoff. Summer thundershowers also create high short term surface runoff. Since the storage of water is of great importance to agricultural productivity in the Wenatchee

[1]Letter from Hugo A. Pilz, December 3, 1965

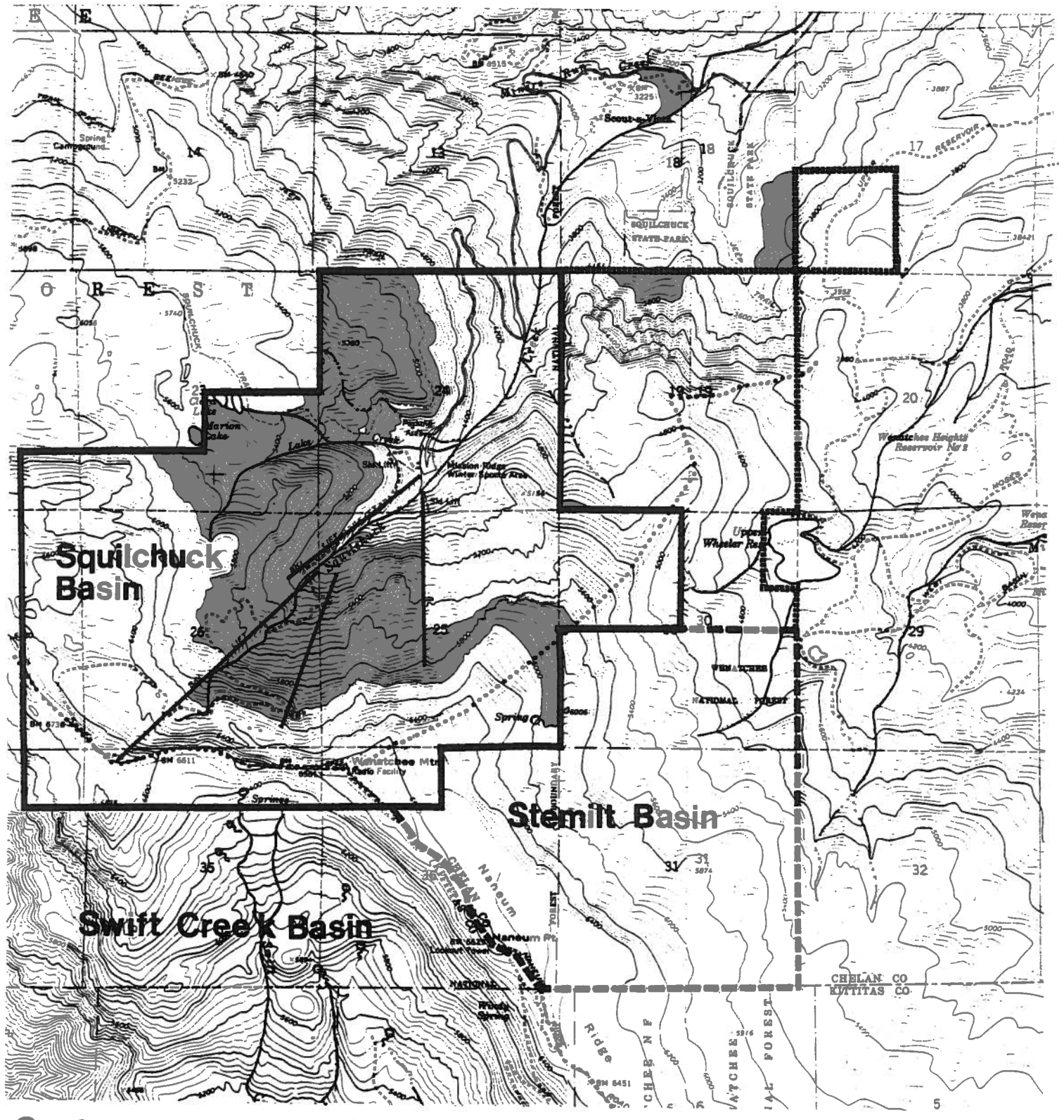


Figure 7.
MISSION RIDGE/CONSTELLATION RIDGE RESORT

region, much of the natural runoff has been contained in reservoirs which serve the various water and irrigation cooperatives or districts.

Based upon evaluation criteria from the U. S. Soil Conservation Service report, entitled, Urban Hydrology For Small Watersheds, Technical Report No. 55, it can be estimated that the existing project site has a runoff curve number in the range of 70 to 77, depending upon the mix of soil permeability, forest cover and grasses. For comparative purposes, a paved roadway has a runoff curve of 98. The higher the curve number, the greater the runoff.

The naturally-occurring depressions in the vicinity of the proposed resort buildings presently capture a significant portion of runoff from the hilltop area of Section 19. These natural depressions have an estimated capacity of over 8 million gallons of water. Many of these depressions are surrounded at least partially by talus, which is very permeable and acts as a natural drain.

Numerous springs are found within the boundaries of the project site, as shown in Figure 7. The existing Mission Ridge Ski Area obtains its water supply from a spring and surface runoff. A storage facility holds 8,500 gallons which presently meets all year-round water needs for the ski area.

Public Water Supply. PUD No. 1 of Chelan County provides water service as far as Squilchuck State Park, which is approximately one mile from the Constellation Ridge Resort site in Section 19, as indicated in Figure 10.

Irrigation Water Supply. Wenatchee Mountain, Inc., operators of Mission Ridge Ski Area, currently utilize two certificates of water rights from the Squilchuck Drainage. The first certificate permits water extraction for purposes of snowmaking from October 1 to April 1 in the amount of .45 cfs (cubic feet per second) up to 11 acre/feet per year. The second water right runs from April 1 to October 1, and is utilized for purposes of irrigation. This certificate allows the extraction of .10 cfs, up to 36 acre/feet per year. Irrigation impoundments developed by local water users for agricultural purposes have been vandalized in the past. Easy access by auto and off-road vehicles is the major cause of littering, trespassing and vandalism to improvements.

Impacts

Surface Water. The following discussion of surface runoff characteristics and storm water drainage facilities addresses only a small portion of the overall project site. Specifically, it focuses on the Constellation Ridge Resort, located in the SW¼ of Section 19, and the access road corridor, which originates at the existing Mission Ridge parking area. This area comprises approximately 140 acres, of which 70 acres will be covered by impervious surfaces such as the access road, site roadways, parking lots and building rooftops. These impervious surfaces will significantly increase surface water runoff from the developed portion of the site.

Utilizing the runoff equation from Urban Hydrology For Small Watersheds, Technical Report No. 55, U. S. Soil and Conservation Service, it has been estimated that the fully developed 140 acre Constellation Ridge Resort site will increase direct runoff by 20 percent, when compared to the natural condition of the site. Applying a 25-year storm event, equal to 3 inches of rainfall over a 24-hour period, the developed resort site will produce approximately 4.8 million gallons of runoff.

Runoff from the Constellation Ridge Resort site will contain small quantities of a number of contaminants that could potentially enter the natural drainage system. These include heavier and lighter-than-water contaminants, such as traces of heavy metals, phosphorus, and nitrogen from pesticides and fertilizers. Inputs are expected to be very small, and those contaminants not removed by the on-site drainage system (see Mitigating Measures) will dilute considerably. Surface water contamination will occur if effluent leaves the sprayfield site as a result of hydraulic overloading.

The use of an ornamental pond on the site will create problems associated with vectors and stagnation. Mosquitos will be the most obvious problem. Plant nutrients reaching the water will eventually cause some algae growth.

In alpine environments, disruption of fragile soils for construction purposes is potentially a major contributor to surface water turbidity. There will be some increase in turbidity of surface streams, primarily as an unavoidable result of construction of the access roadway. Increased sediment production will most likely occur in areas where soils are unstable and poorly drained. The potential

for this to occur is most evident where the new access road alignment intersects with known problem areas, creating a short-term construction impact. Since the roadway will be constructed with full bench (cut-only) methods in steep areas, disruption of the surface will be minimized and no large fill areas will be created. Clearing and grading of ski runs will also promote short-term erosion and resultant surface water turbidity in areas which intersect or lie adjacent to drainage swales or intermittent streams.

After the roadway drainage system is completely installed and operational, it will be dedicated to Chelan County, which will then be responsible for maintenance of the system.

Groundwater. The greatest potential for contamination of groundwater exists at the first lagoon cell, where untreated wastewater enters the system. Additionally a portion of the treated effluent applied to the sprayfield will eventually reach groundwater. The quality of effluent ultimately reaching groundwater will approach that of natural groundwater, except that concentrations of nitrate and other inorganic solids will be above background levels.

Public Water Supply. The public water supply and system proposed for the Constellation Ridge Resort is discussed in the Utilities: Water section of the FEIS.

Irrigation Water Supply. Vandalism to irrigation impoundments in the area will continue to occur with or without the development of the Constellation Ridge Resort. In the event that trespassing, littering and vandalism become a serious problem for the water district, it may be necessary for the district to construct fences where appropriate.

Mitigating Measures

Construction activities involving earthwork will take place during summer months when precipitation and runoff will be at a minimum. Runoff and erosion will also be minimized due to the lack of impervious surfaces and the retention of the natural ground cover over the majority of the site. Revegetation of disturbed

areas will mitigate surface water impacts. In fact, the U. S. Soil Conservation Service Technical Report No. 55, Urban Hydrology For Small Watersheds, indicates that providing grass cover on ski trails will enhance the water absorption capabilities in the vicinity of Mission Ridge, thereby reducing storm water runoff in reseeded areas. These considerations, and the use of immediate revegetation of disturbed surfaces with erosion control grass will be the primary safeguards against excessive erosion and turbidity.

The on-site drainage system will be designed to ensure that an increase in peak surface water runoff does not occur. Surface water runoff from parking areas, roadways and rooftops will be directed to the natural retention ponds via open ditches, culverts and control catch basins and released at a rate no greater than the peak flow rate under existing conditions.

The storage volume and size of the control outlets in the drainage system will be designed to accommodate runoff from a 25-year storm event. Several large natural depressions exist on the site with a capacity in excess of 10 million gallons. The numbers and volumes of stormwater retention and ornamental ponds at the site will not be precisely determined until the project reaches the design stage, but preliminary estimates indicate that the total impounded volume will be less than 10 million gallons (31 acre-feet).

The proposed development will direct surface water via pipes and open ditches to the natural depressions and use them for storm water and runoff retention. This storage of water will not increase the probability of mass soil failure since the natural depressions are situated in a stable area consisting of basalt. The impoundment system will utilize both ornamental and storm water retention ponds.

The ornamental ponds will remain full at all times, and will be lined with a membrane liner or the clay which occurs at the site. Percolation will be very limited. Once the pond is full, the water flowing into the pond will displace an equal amount over the outlet structure. Evaporation from shallow ponds is estimated to total approximately 25 inches per year, and will be approximately

equal to the evapotranspiration uptake of existing vegetation in the area. As a result, the volume of water reaching the Squilchuck drainage will not change measurably once the ponds have been filled. The clay sealed ornamental pond may also be utilized for fire flow purposes if necessary. Actual mitigation taken to relieve or alleviate vectors and stagnation problems associated with the use of the ornamental ponds in the site will depend upon the degree of insect presence and algae growth. Preventive measures may include aeration of the pond and/or the use of sprays. If applied properly by licensed contractors, the impact should be controlled as a result of spraying.

The stormwater ponds will be operated so that the water surface varies, and will be located in existing low areas of basaltic talus which is relatively permeable. Outlet structures will be constructed for the stormwater ponds to allow them to be drained. Since the purpose of the stormwater ponds is to attenuate peak runoff flow rates, they will be normally kept empty. As a result, evaporation will be minimized, and the amount of water reaching the Squilchuck drainage will not be significantly changed from present conditions.

Sediment in runoff resulting from earthwork on the relatively flat areas surrounding the resort development will be much less likely to cause problems, since the gentle slopes will limit water velocities. Also, the proposed stormwater retention ponds can be constructed early in the project to act as settling basins for the removal of sediment from the resort area work.

All roads constructed on the site will be designed with open ditches which will direct storm water runoff to drainage catch basins at regular intervals. Where the proposed roads cross natural drainage channels on site, culverts will be installed to allow uninterrupted flow. Riprap will be placed on either side of the drainage channel downstream from culverts to prevent erosion. Culverts for local drainage channels will be sized according to peak flows in those areas.

Roadway cross drains will be installed every 800 to 1,000 feet, or where natural swales occur. The system of open ditches and drainage culverts will direct runoff

to control catch basins and site retention ponds. These measures will restrict the flow of storm water runoff, releasing it at a rate equal to the rate prior to development. The drainage system will also help remove lighter-than-water contaminants (oil) and heavier-than-water contaminants (sediments) before the runoff is released to the natural drainage system. Sediment will settle to the bottom of the impoundments, and will not be discharged. Floatable materials, including oils from the parking areas, will be captured by baffles around the outlet structure. These oil and sediments present in runoff from roads and driveways will be removed before they can enter the natural drainage channels. The baffles would extend below the level of the sluice gates. Similar systems are in use as the outlet structures of many municipal lagoons in North Central Washington, such as those operated by the City of Quincy. Baffles are also used by the City of Wenatchee's sewage treatment plant clarifiers as the final barrier to floating material. The on-site drainage system will be constructed and maintained by the project proponent. No mitigation is proposed to prevent the anticipated small quantities of water-soluble materials in surface water runoff from entering the natural drainage system.

To reduce potential stream sediment loads, buffer strips will be placed between surface water drainages and ski runs. In addition, straw mulching, netting, maintenance of understory vegetation, use of fertilizer and seeding will be employed where necessary. Reduction of ground water accumulation through drainage techniques in slumpy areas will reduce long-term mass erosion potential. These techniques include eliminating unnecessary clearcutting of those particular sites, diversion of surface and ground water from above slope to more stable areas and use of perforated pipe to drain wet areas.

The use of berms around the low areas of the sprayfield will provide insurance against runoff. Maintenance of a permanent grass cover crop will slow the travel of effluent across the sprayfield site in the event of inadvertent overloading to minimize ponding. Additionally, the potential for transitory degradation of water quality in the natural drainage channels from the lagoon and sewage disposal system will meet the standards of the State Department of Ecology and the Chelan-Douglas Health District.

Groundwater. The remoteness of the sprayfield site in relation to points of human use of groundwater further ensures against problems. In addition, the application rate proposed for the sprayfield is less than the total evapotranspiration that will normally occur during the growing season, so most of the effluent will ultimately be disposed of to the atmosphere. The low permeability of the soils and of the lagoon embankments will minimize the amounts of effluent that percolate into the soil to eventually become part of the groundwater, as the clay linings and the natural sealing action of domestic sewage will slow percolation rates to insignificant levels. Passage of effluent through a cover crop and fine-grained aerobic soil mantle will further remove pollutants. Groundwater monitoring in the area surrounding the sewage disposal site will be undertaken by the system operators, in conjunction with the regulations and procedures of the State Department of Ecology. (Refer to pgs. 122-124 of the FEIS for a more detailed explanation of the monitoring process.)

Public Water Supply. To reduce overall water consumption, the developer will utilize various water restricting devices such as low volume flush toilets and water restrictors where possible.

Irrigation Water Supply. Prohibiting all auto and off-road vehicle access from the resort complex into the Stemilt Basin should prevent further vandalism from occurring to irrigation impoundments as a result of the project.

FLORA

Existing Conditions

Technical Appendix E, the Mission Ridge/Constellation Ridge Resort: Wildlife Assessment (Beak Consultants 1986), is on file at the Chelan County Planning Department, and provides a thorough description of the vegetative or habitat types found within the project site. Major physical and vegetative characteristics for the habitat types are described as part of the Wildlife Assessment.

The project site is located within the Abies lasiocarpa (sub-alpine fir) zone, a sub-alpine forest zone found on the eastern slopes of the Cascades. The sub-alpine community of the Mission Ridge area is predominantly covered in forest, with the exception of groomed ski trails, talus slopes, rock outcroppings, and natural meadows. The higher elevations have sub-alpine fir and limber pine. The lower slopes consist of dense mixed forest stands of Douglas fir, ponderosa pine, lodgepole pine, hemlock, sub-alpine fir and western larch. Many species of wildflowers abound and a large variety of grasses exist, many of which have been introduced through the revegetation of ski trails. South and southwest facing slopes at the summit of Wenatchee Mountain, and along Naneum Ridge support an extensive grass/forb-shrub plant community dominated my mountain sage and fescue.

Selective logging in the past has been compatible with irrigation, recreation, grazing and timber management. There are presently no plans for logging Section 30. Lands in private ownership have also witnessed logging activity. Section 19 was selectively cut in 1978. The logging operation entailed the construction of numerous roads throughout the section and the harvesting of larger tree specimens, leaving many smaller trees for maturation.

The Washington Natural Heritage Program (letter dated December 16, 1983, Technical Appendix F) has indicated that they do not have data on special plant species or high quality native plant communities near the project site. Two on-site surveys conducted during May and June 1985 did not note the presence of any rare or unusual plant species within the project area.

Impacts

The major long-term impact to vegetation will be a permanent loss of approximately 105 acres due to the construction and operation of resort facilities and sewage treatment lagoons. The 140 acre Constellation Ridge Resort site will necessitate the removal of plant species for parking areas, roads, and building sites, totaling about 70 acres. Another 18 acres of trees and vegetative cover will be removed for construction of the sewage treatment

pipes and lagoons. The sub-alpine conifers will be the primary vegetative cover to be impacted by the project.

Short-term loss of vegetation, amounting to about 75 acres, will result from construction activities such as the digging of borrow pits (in conjunction with construction of the sewage treatment lagoons), ski trail development, and installation of utility lines that do not follow roadway alignments. Approximately 50 acres of sub-alpine tree cover will be removed during the construction of ski trails. In addition, rock blasting, brush clearing, slash disposal, stream channelization, earth or rock grading and drainage installations will occur in conjunction with ski trail development. These projects are undertaken mainly to improve early-season skiing, especially on lower beginner and intermediate runs. Once reseeded, these slopes will support a thick stand of grass which will ensure catching the early snows.

Trees will be thinned for the 44-acre sprayfield site. In total, the clearing of ski runs and trails and thinning of the sewage sprayfield will result in the conversion of approximately 74 acres of forested land to more open habitats. The remainder of the 900-acre site will be left in its natural state. Year-round use of the site will increase the potential for fire and the destruction of wildlife habitat.

Mitigating Measures

Natural vegetation will be retained on approximately 90 percent, or 810 acres, of the Constellation Ridge private property. Much of the mountain terrain is naturally open in the form of talus slopes, which require less clearing for the construction of ski trails. Reseeding with grasses will occur where trees are cleared for ski trails, utility lines, etc. or thinned for the sewage treatment sprayfield site. The sprayfield site is expected to develop a lush ground cover-shrub understory.

In the event a fire starts in the area, it is jointly suppressed through a reciprocal fire fighting agreement between the Chelan County Fire District,

the U.S. Forest Service and the Washington State Department of Natural Resources. All clearing projects will be done in accordance with state-of-the-art silviculture practices. The disruption of soils and native vegetative cover will be mitigated by introducing new grass species which are adapted to higher elevations. This new growth may need to be aided by proper site drainage, application of topsoil, fertilizing, mulching and sprinkling during the dry summer months. (See Technical Appendix D.)

FAUNA

Existing Conditions

The area is presently a habitat and seasonal migratory passage for elk, deer, small animals, birds and various species of stocked fish. Habitat for elk and deer include mixed conifer stands with available browse and water where escape and thermal cover are present. Brushy areas provide habitat for doves, pheasants, grouse, chukars and other game birds while old growth conifers and snags provide habitat for other bird species, such as raptors and pileated woodpeckers. Small mammals nest in the ground, the talus slopes and fallen trees. Technical Appendix E, the Mission Ridge/Constellation Ridge Resort Wildlife Assessment, lists and discusses the various species likely to be found in the vicinity of the site and their preferred habitat. This Appendix is available for review at the Chelan County Planning Department.

The Washington Natural Heritage Program does not list any special animals inhabiting any of the lands comprising the project site. As a part of the Mission Ridge Wildlife Assessment a list of "special animal species", for which there is concern over the continued viability of population was provided by WDOG. Of the species listed, local WDOG biologists identified the spotted owl (Strix occidentalis), marten (Martes americana), pileated woodpecker (Dryocopus pileatus), blotched tiger salamander (Ambystoma tigrinum), and all raptor species as being of special concern in the Mission Ridge area. A brief review of the literature concerning natural history, habitat requirements, range, and seasonal occurrence was conducted for each species of concern.

Informal surveys for these special species were conducted by a field crew in conjunction with deer and elk habitat analysis during the on-site surveys.

Marten tracks were observed on the study area during winter, and are likely to be resident, although uncommon, throughout the local area in older timber and near talus slopes. Some evidence of pileated woodpecker activity (excavations in trees) was noted on the study area at lower elevations. None of this activity was recent, however, and due to the limiting amount of large diameter old growth timber, pileated woodpeckers are probably uncommon on the study area.

One golden eagle (Aquila chrysaetos) and two red-tailed hawks (Buteo jamaicensis) were the only raptors observed during the May and June field trips. Surveys of cliffs revealed no birds or nests. Cavity-nesting owls were not found during snag surveys. No tree nests were found in forest stands. Possible explanations for low raptor populations are: relative lack of food in comparison to nearby agricultural areas; high elevation; or disturbance from human activity in the existing ski area during the late winter and early spring pre-nesting season. Raptor species known to occur in the vicinity of Mission Ridge include the golden eagle, red-tailed hawk, Cooper's hawk (Accipiter cooperii), prairie falcon (Falco mexicanus), American kestrel (Falco sparverius), great horned owl (Bubo virginiaus) and the small cavity nesting owls: the northern saw-whet (Aegolius acadius), northern pygmy (Glaucidium gnoma) and flammulated owl (Otus flammeolus). Spotted owls are known to occur on portions of the Wenatchee National Forest adjacent to the study area.

The northern spotted owl is an uncommon-to-rare species found in coniferous forests of northern California, and the Pacific Northwest. Preferred nest sites are in old growth trees that have lost either crown or large limbs, leaving large cavities. Two spotted owl management areas (SOMAs) have been proposed for the Wenatchee National Forest just west of the study area (R. Roberts, pers. comm., 16 July 1985). Spotted owls have been observed in the Mission Creek drainage. Although spotted owls did not respond to calling

efforts during the spring field trips,they may use the area near Marion and Clara Lakes, or pockets of larger timber in the Stemilt Basin.

Potential Habitat for tiger salamanders exists in the Mission Ridge study site, along streams and in west meadows, however, salamanders were not located during May and June field trips.

The most important big game animals in the vicinity of the project site are mule deer (Odocoileus hemionus) and elk (Cervus elaphus). The Colockum elk herd is a large, apparently increasing herd which occupies a range east of the Cascade crest. Recent estimates indicate a population of about 6,800 elk in the herd (WDOG, 1965-1983). Individuals from the Colockum herd are known to use portions of the project site during the spring and summer as a migration corridor and summer range.

Mule deer are year-round residents in lower elevation portions of the study area, except during mid-winter, when deep snow forces them to the canyons and foothills below the ski area. Deer use the high elevation sub-alpine habitats during the summer months. Population estimates for mule deer were derived from Washington State hunter report cards (G. Tillett, pers. comm. 31 July 1985). Population density for the Mission Ridge area is approximately 8.3 deer per square mile (G. Blomstrom, letter August 12, 1985).

The Colockum herd grew from transplants of Rocky Mountain elk that were introduced in Washington State during the early 1900's. Transplants at first appeared to be only moderately successful. However, since those initial transplants were made, significant elk populations have become established in areas where elk were formerly uncommon or totally absent.

The Colockum herd occupies an area east of the Cascade crest, generally bound by highways U.S. 2 and I-90 to the north and south, respectively, and the Columbia River to the east. In recent years, the elk population has begun to expand beyond these boundaries, and efforts have been initiated to restrict the population to the area outlined above.

Based on the statistics provided in the Big Game Status Reports (WDOG 1965-1983), the Colockum elk herd is still expanding. The segment of the herd that uses the southern portion of the range (containing 85 percent of the elk in the herd) has grown steadily since the 1960's. The harvest has declined over this period, while the estimated population levels have continued to increase. John Musser (WDOG Area Biologist, pers. comm. January 1985) felt that the increase in elk numbers is real, and attributes the decline in harvest to more restrictive hunting regulations (i.e., fewer antlerless permits, shorter season, the 5 area elk-tag system).

Population dynamics of the northern portion of the herd are difficult to interpret. Elk numbers were high in the mid-1970's, then declined 50 percent in the period from 1975-1979. The actual cause of this decline is not known. There has been a partial recover of elk in the past few years. The same pattern is reflected in the elk harvests for this area. Elk harvest patterns show a pattern of boom-bust, with the troughs about ten years apart.

The primary winter range (the Colockum Game Refuge) of the Colockum herd is to the east of the Colockum Pass road in Kittitas County. Elevations range from 700 to 5,000 feet. Winter distribution of elk depends to a great deal on the severity of the winter, with snow driving elk to lower elevations. Small numbers of elk are found wintering in other drainages in the area. Elk are occasionally found wintering in the Stemilt and Squilchuck drainages (i.e., local winter range). The Mission Creek sub-herd consists of approximately 1,000 animals and occupies a summer range to the north and west of the Colockum Game Refuge. Of this sub-herd, an estimated 200-300 animals use the Stemilt and Squilchuck basins and Naneum Ridge during the summer. Animals from the Colockum and Naneum Basins also use Naneum Ridge (G. Tillett, pers. comm. 31 July and 28 August 1985). WDOG biologists estimate that five to ten percent of the Mission Ridge Sub-herd (i.e., 50 to 100 elk) migrate through the Squilchuck and Stemilt Basins during spring (G. Tillett, pers. comm. 31 July and 28 August 1985). Exact numbers of animals using the area and exact routes are not known.

Based on observation and information gathered from local residents and hunters, WDOG biologists have identified a migration corridor approximately one mile wide that traverses Sections 19 and 24 of the project site. Animals using this route winter along the Columbia River (Colockum Game Refuge), moving north and west through the ski area and development site in late spring, and south and east in early autumn, on their way to and from summer range on Naneum and Mission Ridge.

Deer, and to a lesser degree, elk populations are limited by the quality and extent of available winter range. Developments on other land have severely reduced the amount of big game winter range. Severe winters with accompanying restricted food supply has a greater effect upon big game populations than does hunting. There has been no active supplemental feeding program for elk in the Colockum herd area. However, there have been plantings of wheat and other agricultural crops on WDOG lands, in an attempt to increase the carrying capacity of the winter range. The Washington State Department of Game maintains Habitat Management Areas (HMA's) that help to provide stability to the supply of critical winter range lands.[1]

The critical components of deer and elk habitat are forage, water and cover. The amount, type and interspersion of these components determine overall quality of the habitat. Optimum habitat for deer and elk has been defined as the amount and arrangement of forage and cover components that result in maximum use, without habitat degradation of the greatest possible area by deer and elk (Thomas et al. 1979).

Individual elk (four elk were seen in late May, no elk were seen in June) and/or sign (fresh tracks or droppings) were observed in the Stemilt and Squilchuck Basins and on Naneum Ridge during the two field visits in late May and June, 1985. Elk sign was more common during the June field visit. The sign during late May consisted of track groups where individual tracks were

[1] Final Environmental Statement, Land Allocation Proposal: Chelan Planning Unit, U.S. Forest Service, 1976, P. 50 and 51.

distinguishable. The sign in June included the track groups as well as game trails where mineral soil was exposed by animal use. There was no sign of calf tracks during either field visit.

A number of small alpine lakes, creeks and reservoirs are within the vicinity of the project site. Beehive Reservoir, Black Lake, Clear Lake and Lily Lake are all stocked annually with Eastern Brook and Rainbow trout. These fisheries are all on a short season schedule, permitting fishing from Mid-April to July 4th. Due to the short fishing season, these lakes all provide for a good carry-over population for the next season. The short fishing season is the result of negotiations with various property owners to prevent more intensive use of these areas when fire danger reaches a peak in the mid to latter summer.

The intensity of fishing typically reaches its height on opening day when 400-500 people have been observed at Lily Lake. Native Cutthroat are found in many of the creeks within the Naneum and Stemilt Basins. Upper Wheeler Reservoir is posted as private property, although certain people fish in it. The reservoir has a population of Eastern Brook trout that is self-sustaining. Two unproductive lakes lie within the project site; Lake Marion and Lake Clara. A small spring-fed swampy area to the east of Clara Lake sustains a fish population which also extends down the drainage outlet and into Lake Creek which joins the Squilchuck. (Conversation with Larry Brown, Washington State Department of Game, June 28, 1984.)

The most significant changes to wildlife habitat and ultimately to wildlife themselves occurred at the time the ski area was originally dedicated to recreation management. Cutting of runs changed both short and long-term plant successional patterns which, in turn, influenced the species using the area. Big game such as elk and deer began to graze in cleared areas which were once covered by forest. The Mission Ridge ski area has not produced any negative impact upon game in the winter since elk and deer seek lower elevations at that time. Summer use of the area by game has been enhanced by Wenatchee Mountain, Inc. in many ways. Wenatchee Mountain employees control and

restrict vehicular and horse traffic. Off road vehicles are not permitted except on official business. Horses are kept away from the seeded slopes, preventing erosion. There are no ski lift summer trips for the public, and none are planned. The current practice of excluding the public from these areas during non-snow periods greatly reduces the likelihood of adverse impacts on deer and elk.

Timber harvest for ski trail development has opened up areas which are predominantly forest. Ski lift and run corridors provide foraging openings of relatively high value, depending on age of the opening and success of seeding attempts. Older runs and lift corridors often have well established grass/sage communities, which provide significant forage for elk and deer.

The most disruptive activity which presently affects the distribution pattern of the elk herd is from off-road vehicle use. This summertime activity is prevalent in the Stemilt Basin, lying just to the east of the project site boundary. Four-wheel drive vehicles and mostly trail bikes use both public and private lands for their recreational pursuits.

Impacts

Based upon comments received on the Draft EIS concerning impacts on wildlife, the project proponents retained Beak Consultants, Inc. to undertake a Wildlife Assessment under the direction and review of the Washington Department of Game (WDOG). The general approach for the Wenatchee Mountain Wildlife Study focused on the assessment of: deer and elk habitat, possible impacts of the proposed development and mitigative measures. The mechanics of assessing existing habitats and impact followed the Habitat Evaluation Procedures (HEP) established by by the U.S. Fish and Wildlife Service (USFWS 1980). The scope also included reconnaissance level surveys for Washington State Special Animal Species (WDOG 1983). The scope of work was discussed with and accepted by WDOG. Field studies were conducted in January, May, and June 1985. Data gathered during these surveys, from discussions with local biologists and from a review of the literature are the basis for impact assessment.

The scope of work accepted by WDOG did not address secondary impacts of the proposed project. However, it was agreed by WDOG and the proponent that secondary impact might very well cause a serious impact on big game. For example, access for the Naneum Basin could have a serious negative impact on wildlife. If development of private lands by other parties is proposed in the Naneum Basin, every effort should be taken to study the full extent of any potential impacts on wildlife.

The Mission Ridge/Constellation Ridge Resort: Wildlife Assessment (Technical Appendix E), is available for review at the Chelan County Planning Department.

This section addresses expected impacts to big game and Washington State special animal species as a result of the proposed development. The major direct impacts on all wildlife would be loss of habitat, increased year-round disturbance, and a potential decline in the quality or availability of regional migration routes for deer and elk.

Since Mission Ridge is primarily a ski resort, the major human activity on the project site will occur during the months of November through April, a time when elk are ranging at lower elevations. Summer activity will fall off dramatically when compared to winter use of the Constellation Resort overnight facilities. Since the resort is located within the summer range of the Colockum herd, the management of human distribution is an important component in maintaining the elk habitat. Numerous studies have indicated that the impact zone from concentrated human activity is between one-quarter to one-half mile. The distance will vary depending upon the topography of the area, thereby increasing or decreasing the buffer required between the heavy use area and the undisturbed elk habitat.

Altering the existing natural environment to develop more ski runs and a resort complex will affect wildlife numbers and distribution through a combination of vegetation change and increased human activity. Winter operation will not affect the larger game population since these animals migrate to lower elevations with the outset of winter. While adjacent properties are owned by public agencies, including the U.S. Forest Service,

Washington State Department of Game and the Washington State Department of Natural Resources, the future development of nearby private lands in the Stemilt and Naneum Basins will have cumulative impacts on the big game species, primarily through restricting game movement and continued encroachment on habitat.

The development of the Mission Ridge/Constellation Ridge Resort is likely to alter the current elk migration pattern of the Mission Creek sub-herd. Most elk would likely find their way to the summer range in the study area, either by the traditional route, skirting the development (probably at night); or by an alternate route. Neither of these options are free of potential impact. Construction activity and associated disturbance, ~~if ongoing during the migration period~~, could prove particularly disruptive and might result in elk choosing an alternate route. Most alternate routes available would involve longer, and therefore more energy-intensive migrations, increasing stress on the herd. If an alternate route requires crossing a major road (i.e., vehicles traveling at 30+ mph) the risk of mortality will be increased.

It is most likely that migration will continue by the traditional route or some alternative and the 50 to 100 elk currently using the migration corridor are not likely to be lost if adequate mitigation is provided. Habitat improvement (i.e., increases in forage openings in the forest, and maintaining buffer zones and measures to reduce mortality along roads) should be the focus of mitigation.

The installation of additional permanent facilities such as chairlifts, buildings, parking lots and roads will reduce native habitat and provide artificial situations for nesting, perching, etc., thereby reducing numbers of native species and increasing numbers of non-native species.

Loss of habitat in the logged mixed conifer type will be the most important impact of the proposed development on non-game and special species. Numbers of snags and downed logs, important habitat components for cavity nesting birds, flying squirrels and raptors (perches) will be decreased on 183 acres as a result of resort construction and clearing of ski runs.

The presence of people and their activities in the operation and management of the facilities in both winter and summer will contribute to the reduction of species not tolerant to man and increase the number of species tolerant to man. As an example, increased year-round recreational use of the area surrounding the resort may result in disturbance to marten, or to nesting birds. Construction of ski lifts or runs through wet meadows or springs would destroy habitat critical to the tiger salamander.

No matter how well intentioned animal control regulations may be, domestic pets will be introduced into the natural environment by irresponsible owners. Approximately 44 units within the resort complex will be occupied by permanent residents, of which a certain portion will own domestic pets. The resort management will make every effort to enforce the leash laws as stated in the CC&R's for the resort. It is expected that few of the resort guests will bring domestic pets during their vacation.

The year-round operation of the Constellation Ridge Resort will increase the demand for local fisheries. Since the greatest concentration of summer use at the resort will occur in July and August, the impact to fisheries in the area will be minimal if the current short season from mid-April to July 4th remains intact. The regulation of fishing and future stocking policies enforced by the Washington State Department of Game will be responsive to public demand for utilization of the fishery resources.

Based upon market research, it is anticipated that approximately 20 percent of the total resort capacity will be utilized during the prime summer season occurring in July and August. This level of activity on the 129-acre Constellation Ridge Resort site will not create an impact to elk grazing on distant ski slopes. The number of resort guests hiking or horseback riding in the rugged terrain outside of the resort complex will be minimal, especially since numerous recreational facilities will be included as resort components. Horseback riding will be regulated as discussed under Mitigating Measures. Part of the recreational system will include an extensive trail network interconnecting the developed areas of Section 19.

Mitigating Measures

Based upon the potential impacts to wildlife as a result of the project, a number of mitigating measures have been developed by the project proponents in conjunction with the Washington Department of Game. The mitigating measures are designed to preserve and enhance game and non-game species wildlife habitat in addition to promoting continued migratory freedom for elk.

A thorough description of project mitigating measures and their effect on the wildlife habitat is included as part of Technical Appendix E which is available for review at the Chelan County Planning Department. The following list provides a summary of the information contained in the Mission Ridge/ Constellation Ridge Resort: Wildlife Assessment (Technical Appendix E).

- Encourage nesting denning habitat for the pileated woodpecker, marten, and spotted owl by creating/preserving snags.

- Attract non-game species to the site through planting and maintaining deciduous trees, which will also help to act as a buffer for migrating elk.

- Through leaving slash piles on the site, small mammal populations will be maintained, providing a food supply for raptors.

- Lift corridors and ski trails will be designed to avoid the removal of stands of older timber which will enhance the habitat for the pileated woodpecker, marten and spotted owl.

- A dog ordinance and posted restrictions requiring leashing from May 1 to October 31 will be in effect commencing with occupancy.

- Seed the sewage treatment sprayfield with a grass and forb mix which is palatable to deer and elk.

- Provide access to high quality forage at the sewage sprayfield site for deer and elk via passable fencing.

- Design and place all lift corridors, ski trails, and maintenance roads to avoid wet meadow spring areas.

- In order to decrease disturbance levels to big game and minimize damage to the fragile sub-alpine area along the Naneum Ridge, horseback riding will be regulated outside the resort area if the Game Department identifies a problem, especially during the spring (calving and migration) and fall (migration).

- To minimize disturbances to wildlife, use signs to restrict access to any former logging roads that are retained and used for the resort site.

- Reforestation of the resort site (to improve buffer between human activity and migration corridor) within five years from project construction.

- Retain maximum cover adjacent to the resort site.

- Limit the number of access corridors for construction purposes in order to minimize wildlife disturbance during peak migration periods which occur in late May to mid-June and early October.

- In order to provide hunting perches for raptors and cover adjacent to forage areas, maintain snags and cull trees on edge of ski trails unless they pose a safety hazard.

- Pile and/or burn slash on the southern portion of the resort site within two years from project construction, thereby providing big game travel lanes.

- As ski trails are developed, clear log debris and plant browseway corridors consisting of grasses and shrubs.

- Design lift and ski trails to minimize sight lines for deer and elk moving through the area.

NOISE

Existing Conditions

At the present time there is no permanent source of noise within the project area. The Mission Ridge Ski Area provides skiing for the public from November to April and is open for both day and night skiing during this period. Noise is produced at the ski area by operating certain equipment at various intervals including ski lifts, snow grooming vehicles and snow making equipment. In addition, the public generates low level vocal emissions while skiing and a certain level of vehicular noise while traveling to the site. During the non-operating season the area is entirely free of noise, with the exception of a small work force involved in periodic maintenance.

Snowmaking is the greatest contributor to high level noise on the site. The use of the equipment depends on various factors including the need to produce man-made snow and ambient air temperature. When conditions are favorable and the ski area needs to make snow the equipment may be operative continuously until a proper snow cover is achieved. In operation, the snowmaking nozzle guns produce noise levels of approximately 94 decibels at 100 feet and 105 decibels at 20 feet.

Impacts

Increases in noise levels will occur during construction and subsequent use of the resort. Noise levels at 50 feet from equipment such as trucks, pavers, backhoes, and concrete mixers can be as high as 85 dBA (U.S. Environmental Protection Agency, December 1971). Construction impacts will be confined to the summer months. Each 10 dBA increase in noise levels represents a doubling in

loudness to a human observer, so noise levels in the immediate vicinity of construction activity could be approximately 14 times as loud as existing summer noise levels. Construction activities will occur during daytime hours, when they are exempt from state noise standards. (WAC 173-60-050)

The primary potential noise impact when the resort is complete will be increased traffic levels on roads in the site vicinity. Noise sources within the resort will include those produced by operating the ski facilities (snow cats, ski lifts, snow making equipment) and those generated by users of the site (vehicular traffic, skiers, summer outdoor recreation users, domestic animals, etc.)

Mitigating Measures

All motorized off-road vehicles will be prohibited from the site, with the exception of those required for management of the resort. Lands prohibited for public motorized off-road use will include the entire Mission Ridge Permit/Lease Area, Section 19, the NE¼ of Section 30 and the SW¼ of Section 17. The use of properly maintained equipment with accepted noise attenuating apparatus will keep noise levels associated with on-site construction within State and Federal standards.

Noise impacts associated with the operation and use of the Constellation Ridge Resort will be confined to the developed portion of the site, since elevation differences, exposure, ridge lines and other natural features isolate the resort from the Stemilt Basin, Naneum Ridge and surrounding environs.

LIGHT AND GLARE

Existing Conditions

The only light and glare currently associated with the site is the interior and exterior lighting on the day lodge and lights utilized to illuminate ski trails for night skiing. The night lighting is visible from most places in the Wenatchee Valley. There is also a flashing beacon on the top of Wenatchee Mountain at the apex of the radio tower installation.

Impacts

Interior and exterior lighting from the hotel site and other select building sites will be visible from various places within the Wenatchee Valley and other areas of Central Washington. Additional night illumination for skiing purposes could also increase the amount of light seen from distant viewpoints.

Mitigating Measures

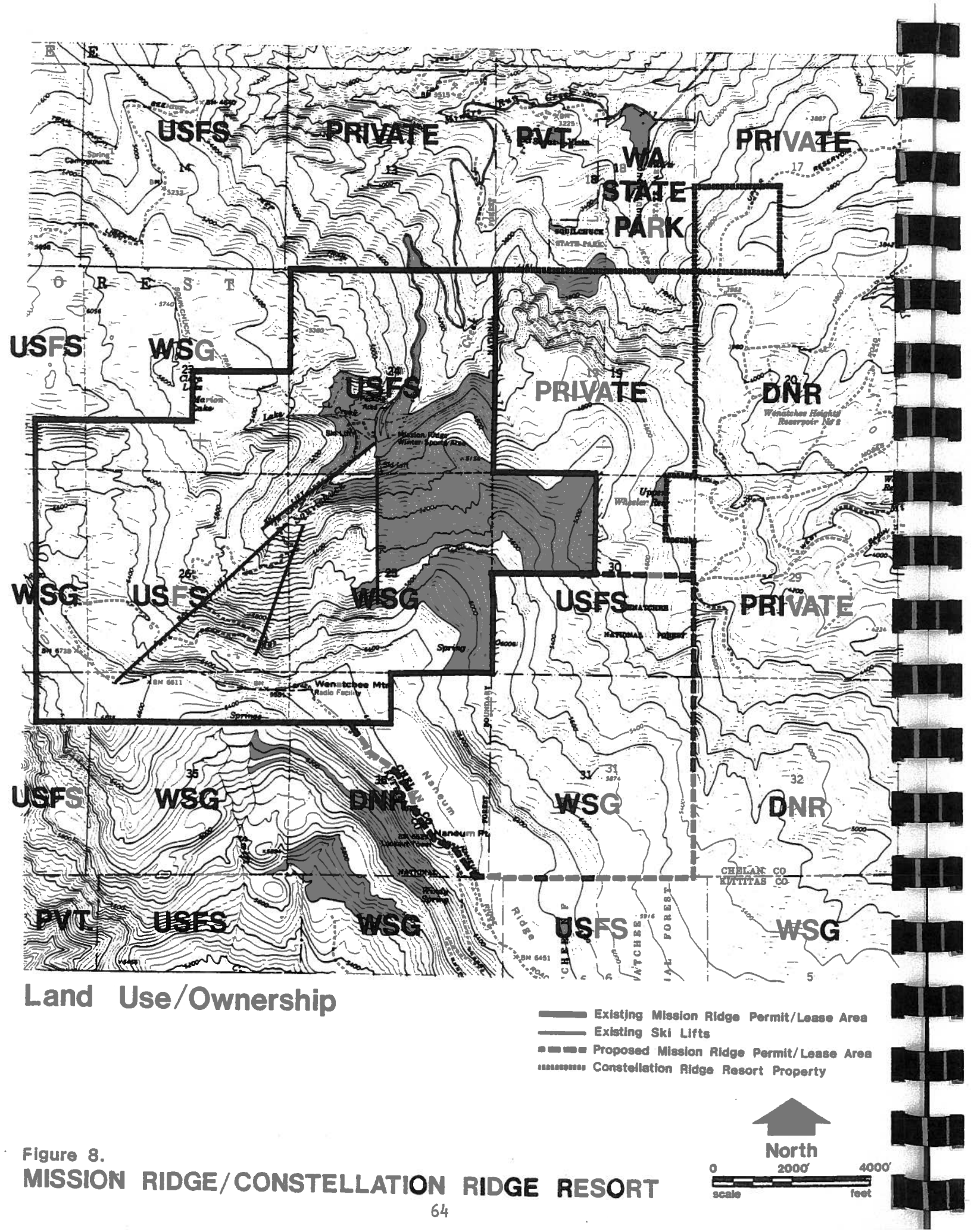
Glare from the sun reflecting on buildings will not be oriented towards the Wenatchee Valley, but will be directed towards the ski facilities to the south and west of the resort site. The use of outside lighting will be subtle as fixtures will be shielded and signs illuminated by indirect lighting methods.

LAND USE

Existing Conditions

To a large extent, land use within the 4,920 acre project site is governed by private and public ownerships and regulations by appropriate agencies of jurisdiction. Figure 8 shows that the project site is composed of properties controlled by the Constellation Ridge developer, Washington State Department of Natural Resources, Washington State Department of Game and the U. S. Forest Service, Wenatchee National Forest. These properties combined total 4,920 acres. The Mission Ridge Ski Area currently utilizes 2,800 acres under a permit/lease arrangement with the U. S. Forest Service, State Game Department and the State Department of Natural Resources. With the exception of the land developed for ski facilities, the remaining portion of the project site is vacant forest property.

Lands surrounding the project site are also divided between various public agencies and private owners. In the past, all public agencies have worked



Land Use/Ownership

Figure 8.
MISSION RIDGE/CONSTELLATION RIDGE RESORT

together in formulating cooperative policies and guidelines for the use of tneir properties. Accordingly, the project site has been designated in numerous public documents as a recreation area for alpine skiing.

Chelan County is the public agency which regulates the use of the Constellation Ridge private property, comprised of Section 19, the NE¼ of Section 30 and the SW¼ of Section 17. The Chelan County Comprehensive Planning Outline (adopted in 1958) identifies the site as a "Major Recreational Area". The Constellation Ridge Resort site is zoned general use district (GU). The General Use District classification is intended to be applied in areas for which the highest use in the public interest has not been determined. Outright permitted uses include single-family and duplex dwellings and certain agricultural uses.' All other uses are subject to conditional use approval.

Residential densities in the General Use District are defined by a minimum lot size of 12,500 square feet without public sewer service and 10,000 square feet with public sewer service. Standards are specified for the typical residential subdivision, including 70 to 80 feet minimum lot width, 35% maximum lot coverage, maximum building height of 35 feet and minimum yards - 25 feet front, 5 feet sides and 10 feet rear.

The Chelan County Comprehensive Zoning Resolution No. 11.38 provides for a Planned Development District. The intent for creating such a district is:

> 11.38.010 Purpose: The planned development district is intended to facilitate new development, which might otherwise be inhibited by the rigid application of the Chelan County zoning resolution, through judicious use of discretionary power by the Chelan County planning commission and the board of Chelan County commissioners.
>
> More specifically, it is the purpose of this resolution to:
>
> (1) Encourage flexibility in design and development that will result in a more efficient and desirable use of land;

'Chelan County Comprehensive Zoning Resolution, December 7, 1964, as amended.

(2) Permit adaptability in design and placement of buildings, use of required open spaces, circulation facilities, off-street parking areas, and otherwise to better utilize the potential of sites characterized by special features such as geography, topography, size or shape;

(3) Promote the use of innovative development techniques that might not ordinarily be permitted in other zoning districts;

(4) Produce a balanced development that continues to carry out the objectives of the spirit and intent of the comprehensive plan, the Chelan County zoning resolution, the Chelan County subdivision resolution, and/or other Chelan County land use regulations. (Res. 80-86 (part), 7/8/80).

The uses of the public and private property in the vicinity of the project site are extremely diverse. All U. S. Forest Service, Washington State Department of Natural Resources and Washington State Game Department lands are accessible to the public on a year around basis for purposes of outdoor recreation, including hunting. As in the case with the existing Mission Ridge use of Game Department lands, the public will be allowed access, as long as it is not motorized. Both public and private properties are presently utilized for wood harvesting, game management and numerous recreational pursuits, including off-road vehicle use, snowmobility, alpine skiing, (Squilchuck State Park), cross country skiing, hunting, fishing, hiking, horseback riding, and sightseeing. Within the 2,800 acre existing ski permit area, Mission Ridge has maintained a restriction on all public off-road vehicle use for the past 20 years, under authority by the U. S. Forest Service in managing public lands. In addition, Sections 30, 31 and 36, which comprise a major portion of the expanded resort site, are not frequently utilized by off-road vehicles due to the isolation of the properties (lack of road access) and the steep and rugged terrain. Section 19, the site for the Constellation Resort complex, receives somewhat higher use from off-road vehicles since it is accessible by the Stemilt Road network. At the present time, the highest concentration of off-road vehicle use occurs in the Stemilt Basin, on public and private lands with developed trail and road networks.

The closest residential development to the project site is located approximately three miles down the access road. This plat is in the early stages of development

and has a total of 92 lots planned. Other residential development is scattered along the access road to Mission Ridge. There are also a number of fruit orchards in the Squilchuck Basin.

Impacts

The proposed project will require the expansion of the existing Mission Ridge permit and lease area to accommodate the increased demand for skiing. The proposal allocates approximately 1,220 additional acres of public land for this purpose. This land is controlled by the U. S. Forest Service, Washington State Game Department, and the Washington State Department of Natural Resources. These lands will not be converted exclusively to skiing. The current uses for these lands will continue. As shown in Figure 1, the proposed Mission Ridge expansion area will be developed with additional ski trails and lifts, including D-1 and D-2. Chairlifts D-1 and D-2 will be developed on the eastern side of Naneum Ridge in the Stemilt Basin, providing access to about 70 acres of new ski trails.

The 900 acres comprising the Constellation Ridge Resort will be closed to any off-road vehicle use by the public. In addition, direct access from the resort property to peripheral lands will not be available to ORV users. Snowmobile, motorcycle and other off-road vehicle use will continue on public and private property surrounding the proposed resort. A certain portion of the Constellation Ridge Resort guests will also increase the potential for off-road vehicle use within the existing trail network on adjacent public and private properties.

The proposed project will also result in the conversion of approximately 129 acres of vacant private property for the Constellation Ridge Resort, located in the SW¼ of Section 19. An additional 62 acres will be used for the sewage treatment lagoon and sprayfield site, located in the SW¼ of Section 17. The portion of Section 17 to be utilized for the sewage treatment facility will not inhibit trail riding since the Upper Reservoir Road will be relocated. The private ownership totals 900 acres which will be controlled by the developer. Based upon the analysis of site characteristics, the following land use summary has been formulated for the 900 acres controlled by the developer.

Proposed Land Use At Project Completion For Private Property Comprising The Constellation Ridge Resort Site[1]

Land Use	Acreage	
Residential (Condominium, Lots)	30	191 acres
Commercial/Hotel	6	
Ski Slopes	35	
Recreational/Open Space/Trails	26	
Parking	12	
Roadways	8	
Reserve	12	
Utilities[2]	62	
Natural Open Space	709	
Total	900	

[1]The proposed land use plan is the outcome of analyzing site characteristics as shown in Technical Appendix A.

[2]Utilities: The construction of the sewage treatment lagoon and sprayfield system will necessitate the conversion of approximately 62 acres of land in Section 17, which is located one mile northeast of the resort development site.

These figures show that 191 acres, or 21 percent of the private property will be developed for skiing and resort uses while the remaining 709 acres will be dedicated as permanent open space. The land use plan or site development master plan for the Constellation Ridge Resort is depicted in Figure 3. At project buildout, the 700 lodging units will be dispersed throughout the 129 acre resort complex, for a density of 5.4 dwelling units per acre. When including the entire 900 acres of private property, overall site density will be less than one dwelling unit per acre.

The proposal for the Constellation Ridge Resort and expansion of Mission Ridge ski facilities is consistent with the Chelan County Comprehensive Planning Outline and the Chelan County Planned development provisions. The long-range expansion of the Mission Ridge Winter Sports Site is also consistent with the land utilization objectives of the Wenatchee National Forest.

The proposed action will intensify the use of public lands utilized in the operation of the Mission Ridge Ski Area. The Constellation Ridge Resort will increase the utilization of the land and ski area facilities by providing lodging and commercial facilities on the mountain. The resort accommodations and amenities will attract a new and larger market which will significantly alter the pattern of use at Mission Ridge. For this reason, it is anticipated that the midweek utilization of Mission Ridge will increase when skiers spend three to five days at the area. The Constellation Ridge Resort will also contribute to increased use of public property in the vicinity of the site for the pursuit of other year-round recreational activities, including: cross country skiing, snowshoeing, hiking, hunting, fishing, horseback riding and many other non-motorized, non-polluting forms of ourdoor enjoyment.

As Figure 8 depicts, the project site is surrounded by numerous public and private properties. The future development of private parcels surrounding the project site in the Stemilt and Naneum Basins will sponsor increased demand for recreational use of nearby public properties. It is expected that these private properties will be developed primarily as large lot recreational subdivisions. Since these properties are located in undeveloped areas, the actual timing of the projects will rely on the extension of necessary access roads and public utilities and continued consumer demand. It is anticipated that the greatest demand for overnight lodging will occur where services are available, at the resort site or in the City of Wenatchee.

The development is expected to sponsor new growth along the Squilchuck access road where land is more suitable and accessible to roads and utilities. This trend is already evident as other private landowners have developed subdivisions for single-family residences. This conversion of vacant or agricultural land is likely to continue, as the general population of the Wenatchee area grows. The resort's presence is likely to accelerate this conversion to residential use. New commercial development is likely to occur along the Squilchuck Road at the intersection of the Wenatchee Heights Road, as the area was recently rezoned for such a use.

Mitigating Measures

The strict regulation of all forms of all-road vehicles is currently practiced by Mission Ridge Ski Area within the existing 2,800 acre permit area. Under the U. S. Forest Service Permit Agreement, Mission Ridge has the authority to restrict this use in order to prevent damage to ski trails. The ski area has maintained this restriction for the past 20 years, and will continue to do so on all public and private lands utilized in their operation.

NATURAL RESOURCES

Existing Conditions

The Mission Ridge Ski Area was selected as a prime natural resource for skiing during the early 1960's. As stated in the section entitled Climate in this EIS, it was chosen due to its favorable weather conditions, topography well suited for skiing, vertical rise, access and many other important factors. Ski resort sites with these salient features are in short supply in the Pacific Northwest. More recently, the project site has been recognized as a valuable resource for cross country skiing for reasons similar to developing the alpine skiing.

The project site contains renewable forest resources, of which a portion has been removed for ski trail development. Sensitive resource management of contiguous property is of prime importance to all public agencies administering land in the area.

Impacts

Development of the Constellation Ridge Resort will require expansion of resources which are deemed suitable for skiing at Mission Ridge. Approximately 1,220 acres of additional forest lands will be committed to this use and other recreational pursuits, thereby removing these properties from further timber production.

Mitigating Measures

None noted.

POPULATION, EMPLOYMENT AND HOUSING

Existing Conditions

Population. The proposed project lies within the boundaries of the U. S. Census Enumeration District 82 (Malaga Division) and is in close proximity to the Greater Wenatchee Urban Area. The majority of the Malaga Division is uninhabited. The results of the 1980 U.S. Census indicate that a total of 1,781 people resided in the district. Of the 1,781 residents, 163 (9.2 percent) were under five years of age, 398 (22.3 percent) were 5 to 18 years of age, 1,081 (60.7 percent) were 19 to 64 years of age, and 139 (7.8 percent) were 65 or older. The median age was 29.4.

The populations of Chelan County, Greater East Wenatchee and Wenatchee in 1980 were 45,061, 16,355 and 17,257 respectively (U. S. Bureau of the Census, 1980). Overall population growth in Chelan County from 1970 to 1980 amounted to 9.6 percent. The area lagged behind State growth, which was 21.2 percent for the same period. The 1983 populations of Chelan County and Wenatchee were 46,500 and 17,150 respectively (State of Washington Office of Financial Management 1983). Population in the county increased an average of one percent per year between 1980 and 1983, according to these figures, and actually decreased slightly in Wenatchee. No 1983 data were available for greater East Wenatchee. Wenatchee Planning Department (1983) estimates indicate a growth rate since 1980 in Wenatchee which is similar to Chelan County, about one percent per year. In general, population growth in the area since 1980 appears comparable or slightly slower than that which occurred in the 1970's. The population of Wenatchee has been recently projected as 17,708 in 1985 and 17,954 in 1990 (Wenatchee Planning Department 1983). Populations in Wenatchee would have to grow during the 1980's at twice the rate of the 1970's to achieve this projection. In general, past population projections have been higher than actual population growth.

Population data for Chelan County indicate a steady trend toward an older population, as the percentage of individuals over 65 increased from 8.3 percent in

1950 to 15.1 percent in 1980, and is projected at 18 percent for 1990. The county's population is composed of slightly more than half females, a stable situation based on review of historical data. The ethnic structure of the populations of Wenatchee, East Wenatchee and Chelan County is essentially identical, all three populations being predominantly white, with the Indian population being the largest ethnic minority.

Housing. Housing unit supplies in Chelan County, Wenatchee, and the Wenatchee urban area in the 1970's increased an average of 2, 1.7, and 1.6 percent per year, respectively (BEAK 1984a). Approximately 40 percent of the county-wide increase during the 1970's occurred in the Wenatchee urban area. A survey of Chelan County housing units in 1978 determined that 86 percent were single-family units (Chelan County Regional Planning Council 1978). A Wenatchee Planning Department (1983) survey indicated that almost all of the multi-family units in the county are in Wenatchee, as would be expected. Housing vacancy rates in Chelan County and the Wenatchee area have varied considerably in recent years. Vacancy rates were very low in the late 1970's, principally in response to decreasing household size. A housing shortage existed during those years, especially in regard to lower income groups. The nationwide recession at the end of the 1970's produced migration from Chelan County to larger urban centers, resulting in a rapid rise in vacancy rates for Chelan County and Wenatchee. Since 1980, vacancy rates have returned to levels similar to the late 1970's. Current rates are believed to be approximately one percent, and are projected to increase to approximately 3 percent by 1990, a level which is more desirable from the standpoint of market flexibility. In response to the nationwide recession, residential building activity in Wenatchee decreased substantially during the late 1970's and began to make a recovery in 1983.

The most recent analyses of housing needs in Chelan County and the Wenatchee area identified the following general housing problems:

- Extremely low vacancy rates limit housing choices, particularly for the low income groups;
- Majority of units are approaching age when major maintenance will be needed to prevent serious decline in condition--many units in need of rehabilitation 20 years ago have continued to decline to substandard conditions;
- Many older units are poorly insulated;
- Rapidly rising housing costs, especially as they impact low income groups, first-time buyers, and senior citizens with fixed incomes; and
- Lack of a coordinated effort on the part of local officials and lower income groups to address the problems of housing needs for such groups.

Mission Ridge Ski Area records, as compiled by user surveys, indicate that about 25 to 30 percent of all skier visits are generated by out-of-town guests. These skiers primarily stay in local motels in the Wenatchee Valley, occupying 9,000 units during the ski season. There are presently 778[1] motel units to accommodate both skiers and non-skiers in Wenatchee.

Employment. Mission Ridge Ski Area currently employs 12 year-round personnel and about 160 part-time employees during the height of the ski season. Based upon total hours worked, Mission Ridge employs 37 full-time equivalents. Approximately 6 to 8 students from the Wenatchee Valley College Ski Area Management Program are employed at Mission Ridge during the winter months.

Impacts

Population, Employment and Housing. The proposed project will impact the population of the Malaga division and the Wenatchee area both directly and indirectly. Direct or primary population impacts would occur as a result of workers and their families moving to the Wenatchee area to fill some of the jobs on the project. Indirect or secondary impacts would occur as a result of workers and their families moving to Wenatchee to fill some of the jobs which would be created in the local community by the proposed project.

[1]Source: Wenatchee Chamber of Commerce

At full development, the proposed resort will increase the number of dwelling units in ED 82 by approximately 700 residences. The dwelling units will have an average of about 3.6 pillows for a total occupancy of 2,500 skiers. Only a small portion of these units will be occupied by permanent residents who either work at the resort or in the Wenatchee area. Market studies indicate that about 6.3 percent, or 44 units, will be permanently occupied. This will result in a population increase of about 120[1] residents within the Malaga Division (ED 82). This population growth will occur gradually as the resort expands.

The dwelling units on the site will be utilized by temporary resort users. The population will vary dramatically from season to season and respective low and high demand periods. The 700 dwelling units will have a total capacity of about 2,500 pillows. Based upon use patterns in other resorts it is expected that the units may never attain a level of full occupancy, even during peak use periods. During the low season, average use of the facilities will be less than 50 percent of capacity.

As the Mission Ridge Ski Area and Constellation Ridge Resort expand, there will be a gradual increase in the number of employment opportunities. At project buildout approximately 180 new positions will be created, resulting in the equivalent of 120 full time jobs. These positions will be filled primarily by local residents, which will benefit from both seasonal and year-round employment opportunities. Jobs created at the resort could also prompt younger residents to remain in the Wenatchee area, rather than leaving to find work elsewhere. A trend such as this will gradually increase the population over time. Students enrolled in the Ski Area Management Program at Wenatchee Valley College will also continue to work at Mission Ridge.

It is anticipated that approximately 10 percent of the jobs at the resort will be filled by persons from outside the Greater Wenatchee area. Such an inmigration will further increase the population by approximately 45 residents and create added demand for housing units.

[1]Permanent population projection based upon 2.7 persons per household.

As the proposed resort reaches the project buildout level, it can be expected that the population and job base in the Wenatchee area will have expanded indirectly as a result of the resort operation. New jobs and resultant population growth will be stimulated in the local community as the demand for goods and services increases, as a result of the permanent positions at the resort. New businesses may be created with accompanying new jobs. For purposes of this impact assessment, it has been assumed that two jobs will be created in the local community for each permanent job created by the resort operation. Assuming a workforce of 120 permanent positions at the resort, an additional 240 jobs would be created in the Wenatchee area. Assuming that one-third of the available jobs are filled by people outside of the Wenatchee area, a gradual population influx of 180 people would result, assuming one additional household per immigrating worker and an average household size of 2.25 persons. The principle factor in population growth as a result of the resort project will be the ability of the local labor force to fill available direct and indirect employment positions as demand warrants.

Mitigating Measures

None noted.

TRANSPORTATION/CIRCULATION

Existing Conditions

Access. The project site is located 13 miles south and west of the City of Wenatchee. The access road starts at the south end of Wenatchee and follows the Squilchuck Creek drainage up to the existing ski area. The last 4-mile segment of the access road, extending from Squilchuck State Park to the Mission Ridge parking lot, was built in 1966. The unpaved roadway was built with public funds provided by Chelan County ($400,000 bond issue) an the U. S. Forest Service ($150,000) for a total cost of $550,000. Chelan County paved the roadway four years later. The County maintains the road to the park-

ing lot edge. The road gains approximately 3,900 feet of elevation in 13 miles, for an average grade of 5.6 percent. The roadway follows the natural curves of Squilchuck Creek up to the first switchback at the 3,400 foot elevation. Above this point, the average road gradient increases to 8.3 percent and reaches a maximum of 12 percent as it traverses steep side slopes and continues to switchback. Chelan County has created chain-up areas and generally improved the roadway since it was constructed in the 1960's.

Vehicular Traffic. The access road network connects to the City of Wenatchee approximately 11 miles to the northeast. The road was divided into three analysis segments for evaluative purposes.

- Segment 1. This includes the four mile upper road from Mission Ridge to Squilchuck State Park. The road is paved to about 26 feet with no cleared shoulders. Small turnout areas are provided periodically. The upper road has five switchback turns and a continuous grade of 6 to 12 percent, averaging about 8 percent. No guard rails are provided to facilitate snow removal by plow. In addition, no paint line striping or lighting is present; though some reflectors have been placed. The road has a calculated capacity of about 260 vehicles per hour. A 25 mile per hour speed limit is posted.

- Segemnt 2. This includes Squilchuck Road from the State Park to Wenatchee Heights road. The segment has two 12 foot lanes and three to four feet of part paved/part gravel shoulder. The grade in this two and one half mile segment is 6 to 8 percent. The road has paint line stripes down the center and both sides, pavement quality is good and some guard railing is provided. The calculated capacity is 440 vehicles per hour and the posted speed limit is 45 MPH.

- Segment 3. The lower Squilchuck Road from Crawford Road in Wenatchee to Wenatchee Heights Road is about four and one-half miles long with 5 percent grade. Capacity increases to an estimated 735 vehicles per hour as a result of the reduced grade.

Table 4 shows estimated existing traffic volumes in both the winter and summer. As shown, demand varies substantially depending on season and day of week. Summer volumes are lowest because little traffic is generated by Mission Ridge. The Squilchuck State Park is utilized as an overflow and reservation facility reducing daily traffic on the upper segments to a minimum. Winter volumes are highest on weekend days when Mission Ridge is operating.

Table 4

Existing Traffic Volumes

	Mission Street/Squilchuck Road		
	Crawford to Wenatchee Heights	Wenatchee Heights to State Park	State Park to Mission Ridge
Winter			
Average Weekday	2,010	540	200
Peak Hour	260	100	60
Peak Weekend Day	3,100	1,640	1,300
Peak Hour	600	440	400
Summer			
Average Weekday	1,865	400	30
Peak Hour	200	45	5

Source: TDA, Inc.

Traffic count data on Squilchuck Road is limited. However, the Chelan County Department of Public Works conducted daily and peak hour counts above Squilchuck State Park on January 25 and January 26, 1985. These data showed a Saturday traffic volume of 1,175 ADT and 345 vehicles in the afternoon peak hour. On this particular Saturday, an Explorer Scout event was in progress at Scout-a-Vista, a Boy Scout camp accessing the upper road about 800-1,000 feet above Squilchuck State Park. This event was attended by about 75 scouts. According to the Wenatchee Scout Master, the highest traffic generation from Scout-a-Vista occurs mainly on weekend days in January when most camp events occur. On most other winter days, Scout-a-Vista volumes would be lower than on a Saturday in January. Summer events also occur at Scout-a-Vista, but project volumes are considerably reduced during this season. The traffic counts compare favorably to estimated existing traffic volumes on a peak weekend day of 1,300 ADT and 400 in the peak hour. The higher volumes used in the analysis are more conservative than actual counts, and therefore, are considered to be representative of typical peak conditions.

Existing peak volumes exceed the calculated capacity of the upper road on peak weekend days. This indicates that peak operations of the upper roadway are slow and long delays are experienced by motorists. This peaking condition occurs on

Saturday and Sunday during the ski season. The upper road serves mainly the ski area and the proposed project. Conditions above capacity represent an increase in the delay of traffic and therefore, greater inconvenience to the user. This delay can be a transportation system problem when thru traffic is affected, especially for commercial traffic. However, in this case mainly leisure/recreational traffic are affected by conditions on the upper road. Both Scout-a-Vista and Forest Ridge are below the point on the upper road where capacity is most constrained and would experience less delay than skier traffic.

Periods which exceed the design capacity of a roadway during peak hours are common to many highways and arterial streets in urban and resort areas. In this case, with the absence of through traffic and limited commercial traffic during the winter months, it is not necessary to make major modifications to the roadway. Segments of the existing access road above Squilchuck State Park have undesirable horizontal and vertical alignment.

Generally, 42 days per ski season are weekend days and about 35 of these days have sufficient attendance to create above capacity conditions. Existing operating condition is represented in Table 5 by the relationship of volume to capacity. The volume to capacity ratio reflects the proportion of hourly capacity which is accommodating traffic. At v/c levels greater than 1.0, the roadway is carrying traffic during 100 percent of the peak hour.

Table 5

Existing Peak Hour Volume Capacity Ratios

		Crawford to Wenatchee Heights	Wenatchee Heights to State Park	State Park to Mission Ridge
Winter:	Weekday Peak Hour	260	100	60
	V/C	.35	.23	.23
	Weekend Peak Hour	600	440	400
	V/C	.82	1.0	1.54
Summer:	Weekday Peak Hour	200	45	30
	V/C	.27	.10	.12

Source: TDA, Inc.

Parking. Parking is provided at Mission Ridge in two gravel lots totaling six acres. The parking areas are separated by grade into two levels. The upper area is slightly smaller than the lower lot. This parking can accommodate about 870 standard sized automobiles. Of course, when buses are present fewer cars can be parked in the lots. During some weekend peak periods demand exceeds the available parking space and skiers must park on the access road.

Transportation Systems. The Wenatchee area is served by a full complement of transportation services. Major highways crossing the Cascade Range provide convenient and safe access. These highways include Interstate 90 (Snoqualmie Pass), State Route 97 (Blewett Pass) and State Route 2 (Stevens Pass). Rail freight service along the Columbia and Wenatchee Rivers is provided by Burlington Northern Railway Company. During December, 1983, the ski area, in conjunction with a ski promoter and Amtrak, operated a ski train from Seattle for one weekend. This was the first passenger service to Wenatchee in many years.

The area is also served by all major national truck lines and a number of local carriers. Air transportation is available at Pangborn Field in East Wenatchee, with scheduled commercial flights daily through Horizon Air. The airport is also used for charter flights and private aviation. Passenger enplanements on the commercial carriers are projected to increase at an average annual rate of 14 percent. Table 6 indicates the number of scheduled departures, departures per week and the average number of enplanements per departure. As demand increases, the commercial carriers will gradually shift to larger aircraft, rather than increase the number of scheduled operations.

Table 6

Forecast Air Commuter Activity - Pangborn Field

Year	Scheduled Departures	Departures/ Week	Enplanements/ Departures	Number of Enplanements
1979 (actual)	2,860	55	4.8	13,714
1985	2,960	57	7.9	23,300
1990	3,110	60	10.5	32,900
2000	3,280	63	15.9	52,000

A new long-term parking area will be constructed during the summer of 1986, alleviating much of the vehicular congestion in the vicinity of the air terminal. The planned improvement for 1987 will entail the extension of the primary taxiway to provide more rapid entrances and exits.

A new navigational aid instrument system has been installed, which will allow more frequent use of the airport during periods of poor visibility, which usually occur between late November through early February.

Improvements for 1990 include the reconstruction of the second runway, the construction of a connecting taxiway to the airplane parking area and the expansion of the commuter air terminal and its auto parking area.

The year 2000 may see the construction of hangars for future increases of based aircraft. Ultimately, the primary runway will be lengthened to 6,550 feet to meet the expected future demand for corporate jet type traffic.

Fancher Field, a private operation, also serves the Wenatchee area. Bus transportation is provided by Greyhound Lines, West and Empire Lines. There is no mass transit service in the area, and no plans to provide such service in the near future.

Traffic Hazards. At certain times, congestion creates access problems for residents along the Squilchuck Road. Chelan County has posted "reduce speed" signs in more populated areas where automobiles travel too quickly as a result of steep downhill grades. The Squilchuck access road is not scheduled for upgrading of any kind in the County's 6-year (1985-1991) road improvement plan. With peak skier traffic occurring during the weekends and holidays, the conflict with school bus service and morning and evening work related trips is ~~eliminated~~ minimized.

Impacts

Transportation Summary. Development of the proposed Constellation Ridge Resort will increase the winter and, to a lesser extent, the summer traffic activity on Squilchuck Road. Three segments of the road to Mission Ridge were analyzed in the transportation study; the Squilchuck below Wenatchee Heights, above Wenatchee Heights and the Upper Road from Squilchuck State Park to Mission Ridge.

Currently, Saturdays and Sundays during the ski season bring heavy hourly volumes, especially in the late afternoon when daytime skiers leave and evening/night skiers arrive. The peak hour volumes are high compared to daily traffic because of the concentrated arrivals and departures of skiers. During this peak period, traffic below Wenatchee Heights can be heavy, but usually flows without extreme delay. Above Wenatchee Heights, traffic slows considerably as grades and turns reduce the road capacity.

The proposed project will change traffic patterns on Squilchuck Road. Skiers planning stays of several days will be attracted to the new facilities while local and regional one-day skiers will continue to use the area. Destination skiers tend to arrive and leave at a greater variety of times, lowering the intensity of peak traffic periods. Daily and peak hour traffic will grow as a result of increased activity at the Mountain, but a smaller percentage of daily traffic will be on the road during peak hours. The result will be additional traffic throughout the day and evening but only slight increases during peak periods. This reduction in peak intensity is caused by the lower peak percentage of daily traffic generated by destination skiers (those staying several days), the added services available at the ski area, and changes in the ticketing system to reduce the overlap of skier arrivals and departures.

Drivers on Squilchuck Road will notice added traffic during the day and a small increase in congestion during the peak afternoon period for phase one. Phase two traffic will impose additional peak congestion which may extend over a period of two hours in the afternoon on Saturdays and Sundays.

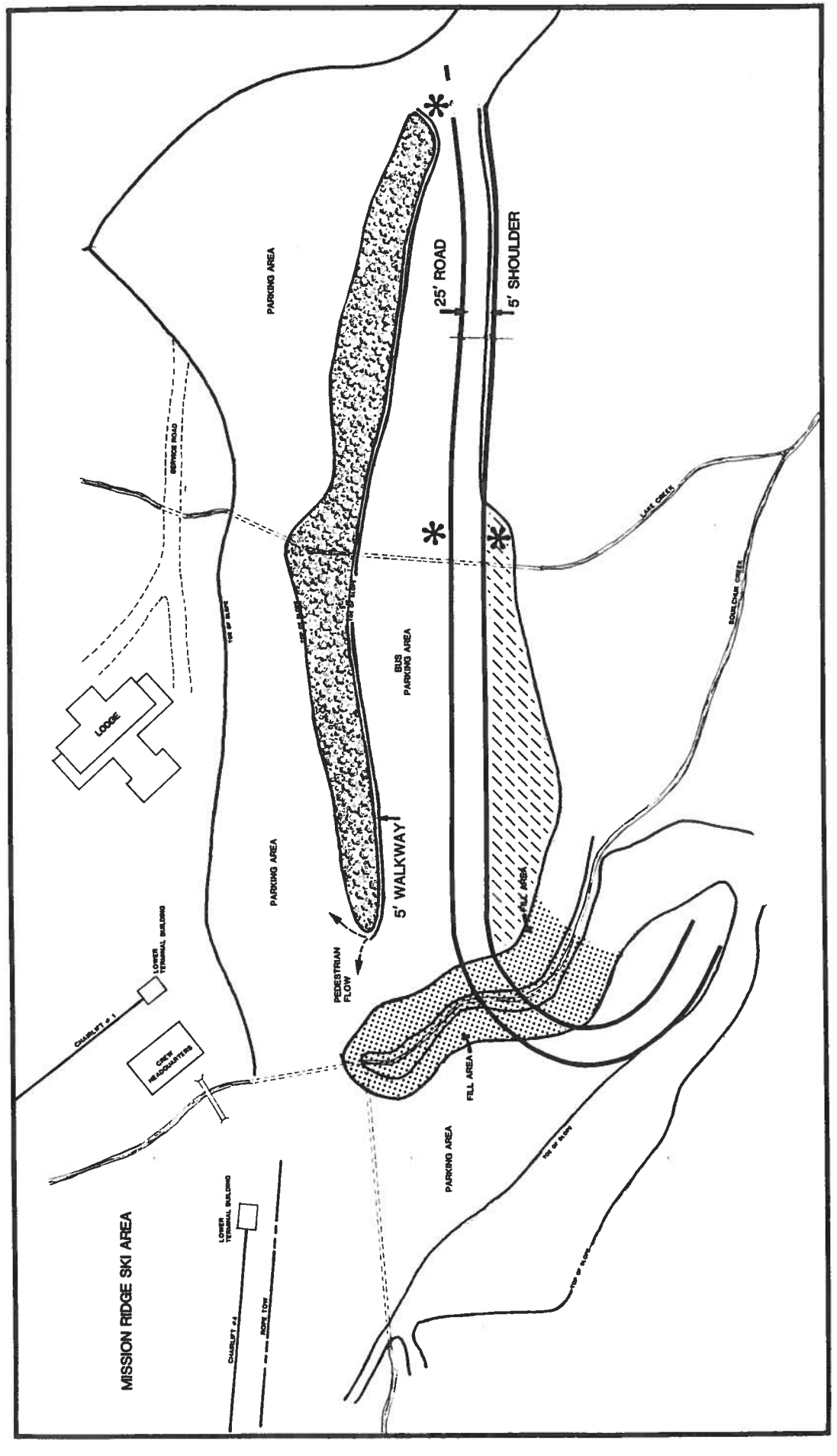
Access. The existing public Mission Ridge access road will have to be extended to the site for a distance of 3,900 feet. This distance includes 1,200 feet of roadway through the existing Mission Ridge lower parking lot and 2,700 feet of road across Section 24 (U.S. Forest Service ownership) to the property boundary of Section 19. The proposed roadway extension will provide access to additional skier parking and ski facilities as well as the Constellation Ridge Resort. The developers propose that the access road will be constructed with some combination of public funds. Figure 9 illustrates the approximate alignment of the road within the lower Mission Ridge parking area. To facilitate this extension and improve the configuration of the parking area, Squilchuck Creek would be further culverted and filled for approximately an additional 150 feet.

Two access alternatives have been considered. Refer to the discussion under Major Engineering and Physical Aspects of the Proposal. The lower access route, which is preferred by the applicants, is estimated to cost $530,000, while the higher elevation road is estimated at $460,000. The proponent's proposal to construct the access road with public funds does not indicate a commitment by the Chelan County Commissioners and is not consistent with present policies.

Lifts D-1 and D-2 will require road access for purposes of construction and periodic maintenance. An existing road will be utilized to gain access to the bottom drive terminals for both lifts. The road presently comes within a quarter mile of the proposed lifts. The road will also be used as a pick-up trail for skiers traversing back into the Section 19 base area at the Constellation Ridge Resort. Additional roads constructed to service Lifts D-1 and D-2 will follow the natural benches along the talus slopes, causing little ground disturbance.

There is no proposal to construct an access road from Ellensburg to a base area in the Naneum Basin, since the proposal to develop alpine skiing into the Naneum Basin has been removed from the project.

Vehicular Traffic Generated. Trip generation estimates of the ski area and



CONSTELLATION RIDGE RESORT

PROPOSED ACCESS ROAD LAYOUT (in parking area)

Figure 9.

* Caution signs placed along roadway indicating reduced speed due to foot traffic and congestion.

//// Employee and Overnight Motorhome Parking

proposed project were determined through the patterns of existing area use based on Mission Ridge records. In addition, data collected and reported for ski resorts in Washington and Colorado were used where applicable. Technical Appendix H contains a step by step account of the factors and conversions used to determine trip generation estimates.

Table 7, below, shows existing and projected seasonal attendance based on area records and demand projections. Traffic analysis assumed these population levels. In addition, data collected and reported for ski resorts in Washington and Colorado were used where applicable. Destination skiers will occupy lodging both in Wenatchee and at the site. Trip generation calculations assume that 60 percent of destination skiers will stay at Constellation Ridge Resort, while 40 percent will occupy existing lodging in town.

Table 7
Seasonal Attendance

	Day Skiers	Destination Skiers	Total
Existing	70,000	30,000	100,000
Phase 1	75,000	100,000	175,000
Phase 2	87,000	200,000	287,000

Source: Sno-engineering, Inc.

The current ski season runs about 134 days from December to April depending on snow conditions. Weekdays account for about 70 percent of the operating period while weekends are 30 percent. Peak utilization generally occurs during the Christmas holidays and on weekends in January and February. Area records show that about five maximum peak days occur during these months. Skier visits are relatively low on weekdays when 25 percent of the seasonal usage occurs. The remaining use is on weekends and holidays.

Trip generation of the existing ski area and projections of the area plus the proposal are provided in Table 8. A reduction in the proportion of average daily traffic occurring in the peak hour is expected. Currently, 30 percent of daily traffic may be on the access road during a one hour peak between 3:30 and 4:30 PM. The projected peak hour reduces to about 24 to 26 percent of daily traffic. This lower peak hour intensity is due to the effect of different travel patterns of destination skiers compared to day skiers.

Table 8
Existing and Projected Trip Generation

	Daily	Peak Hour
Existing		
Average Weekday	200	60
Peak Weekend Day	1,300	400
Phase 1		
Average Weekday	690	160
Peak Weekend Day	1,810	470
Phase 2		
Average Weekday	1,180	260
Peak Weekend Day	2,660	640

Source: TDA, Inc.

Three major factors, and many minor ones work to reduce the current sharp intensity of peak hour egress from the ski area. First, area operators have implemented ticketing revisions designed to eliminate the condition of coinciding lift ticket expirations and validations around the hour of 4:00 PM. This will produce a reduction in the intensity of peak hour vehicle traffic as a percentage of ADT. Second, the arrival patterns of destination skiers differ considerably from current day users. Destination visitors arrive and depart on two different days of the week and the peaks of these trips are more widely distributed than the typical Saturday peak of day skiers. Also, the time of arrival or departure is tied to varying travel times to their origins causing a greater distribution of hourly traffic. Lastly, the planned services at the resort will broaden the activity choice of all visitors, reducing the tendency to rush immediately down the mountain when the lift ticket expires.

These factors result in a reduction in the percent of peak hour traffic from 30 percent down to 24 percent of average daily traffic. This estimated change in travel behavior is consistent with data from destination ski resort areas.

Trip generation estimates are based on a predominately automobile oriented travel mode. Destination skiers planning overnight stays will arrive by auto and bus.

Some will also arrive by scheduled and charter air carriers but will convert to automobiles and buses for the trip between the airport or motel and the mountain.

Surveys at Snowmass, Colorado found destination skiers use autos, taxis and buses as well as other minor modes to reach their destination. Adjusting for fewer available modes in Wenatchee and a greater use of private autos, indicates that about 80 percent of these trips will be made by auto and 20 percent by bus. In this case, bus transfers would be expected to be provided in a ski travel package. The assumed distribution of travel modes is shown in Table 9. Day skier percentages were determined based on the numbers of autos and buses parking at Mission Ridge. Destination skier mode choice was based in part on information generated for another Washington State ski resort (Early Winters Draft Environmental Impact Statement).

Table 9

Projected Mode of Travel

	Day Skiers	Destination Skiers
Auto	96%	70%
Bus	4%	15%
Air to: Auto	-	10%
Bus	-	5%

Source: Mission Ridge records and TDA

Estimates of person trip generation were made using the visitor population assumptions identified previously. Vehicle occupancy rates were applied to convert person trips to vehicle trips using the access road. Table 10 shows the assumed vehicle occupancy factors.

Table 10

Vehicle Occupancy

	Persons Per Vehicle
Visitor Auto	2.5 to 2.65
Employee Auto	1.7
Bus	30

Source: TDA and Mission Ridge records

Phase One. Average daily and peak hour traffic volumes are shown for each analysis segment in Table 11, assuming development of Phase One by 1986. In addition, existing traffic volumes on the Squilchuck Road were increased by 2 percent per year to account for unknown growth. This growth is assumed as a result of continuing small residential subdivisions along the lower roadway. Phase One traffic volumes increase over the existing case but the changes in travel patterns has reduced the percentage of trips in the peak period.

Table 11

Phase One Traffic Volumes (1986)

	Mission St./Squilchuck Road		
	Crawford to Wenatchee Heights	Wenatchee Heights to State Park	State Park to Mission Ridge
Winter			
Average Weekday	2,350	980	690
Peak Hour	460	205	160
Peak Weekend Day	3,585	2,205	1,810
Peak Hour	660	520	470
Summer			
Average Weekday	2,300	500	130
Peak Hour	250	60	30

Source: TDA, Inc.

Volume to capacity ratios were calculated for peak hour volumes and are reported in Table 12. As shown, during all period except peak weekend days, each segment operates within capacity. On weekend days, segment 1 (Mission Ridge access road above State Park) is projected to operate at V/C = 1.81. This represents an over-capacity condition but is not significantly different from existing peak operations. During these times, flow along the upper road will be slow and peaking conditions will extend beyond the one hour analysis period to accommodate the entire demand. The four mile trip to Squilchuck Road could be expected to require a slightly longer travel time. For example, at speed limit the trip requires 15 to 20 minutes of travel time. During current peak times the trip requires about 20 minutes and with projected traffic about 25 to 30 minutes. This increase in

travel time is not considered a critical impact because the upper road (Squilchuck State Park to Mission Ridge parking lot) serves primarily project traffic and does not affect through traffic or regional circulation. However, the additional delay will be viewed as an inconvenience by those affected. The Squilchuck Road above Wenatchee Heights also experiences above capacity operations (V/C = 1.18) on weekend days. A small increase in travel times compared to existing peaks will be noted in this area. This segment serves traffic beyond that generated by the project but limited to only about 50 peak hour trips from residences, and at some times, the State Park and Scout-a-Vista. Peak volumes below Wenatchee Heights are within the capacity of the existing roadway.

Table 12

Phase One Volume Capacity Ratios

		Mission St. / Squilchuck Road		
		Crawford to Wenatchee Heights	Wenatchee Heights to State Park	State Park to Mission Ridge
Winter:	Weekday Peak Hour	460	205	160
	V/C	.62	.47	.62
	Weekend Peak Hour	660	520	470
	V/C	.89	1.18	1.81
Summer:	Weekday Peak Hour	250	60	30
	V/C	.34	.14	.12

Source: TDA, Inc.

Phase Two. Buildout of the Phase Two project is not scheduled at this time but was assumed to occur by 1990 for the analysis. Table 12 shows projected traffic volumes while Table 13 converts peak volumes to operating ratios.

Operating conditions with Phase Two continue to impose high traffic peaks on the Upper Road segments on weekends. As shown in Table 13, volume to capacity ratios increase as a function of the higher volumes. There will be a corresponding increase in travel time as a result of this additional traffic.

Table 13

Phase Two Traffic Volumes

		Mission St. / Squilchuck Road		
		Crawford to Wenatchee Heights	Wenatchee Heights to State Park	State Park to Mission Ridge
Winter:	Average Weekday	3,285	1,600	1,180
	Peak Hour	505	315	260
	Peak Weekend Day	4,775	3,085	2,660
	Peak Hour	870	685	640
Summer:	Average Weekday	2,850	625	250
	Peak Hour	350	80	60

Source: TDA, Inc.

The lower Squilchuck roadway slightly exceeds capacity during these peaks. These at- and above- capacity conditions are mainly restricted to weekend peaks which do not coincide with peak travel demand for work and school trips.

Travel 14

Phase Two Volume Capacity Ratio

		Mission St. / Squilchuck Road		
		Crawford to Wenatchee Heights	Wenatchee Heights to State Park	State Park to Mission Ridge
Winter:	Weekday Peak Hour	505	315	260
	V/C	.68	.72	1.00
	Weekend Peak Hour	870	685	640
	V/C	1.18	1.56	2.46
Summer:	Weekday Peak Hour	350	80	60
	V/C	.48	.18	.23

Table 15 summarizes the operating ratios for each segment and analysis period to aid in identifying changing conditions over each phase.

Table 15

Volume/Capacity Ratio Summary

		Crawford to Wenatchee Heights	Wenatchee Heights to State Park	State Park to Mission Ridge
Existing:	Winter Weekday	.35	.23	.23
	Weekend	.82	1.00	1.54
	Summer Weekday	.27	.10	.12
Phase One:	Winter Weekday	.62	.47	.62
	Weekend	.89	1.18	1.81
	Summer Weekday	.34	.14	.12
Phase Two:	Winter Weekday	.68	.72	1.00
	Weekend	1.18	1.56	2.46
	Summer Weekday	.48	.18	.23

Source: TDA, Inc.

Construction of the resort complex will occur during the summer months when orchards in the area are handling and transporting fruit. Orchards closest to the project site are located along the Squilchuck Road, approximately 2.5 miles from the construction site. The elevation differential between the project site and the orchard areas is about 1,700 feet. The heavy earth moving equipment used for construction will remain on the site until work is completed. While the access road from the existing Mission Ridge parking lot is being completed, all construction equipment will be delivered to the site via the Stemilt Loop Road and connecting access roads through the Stemilt Basin. Traffic impacts related to construction will be the occasional hauling of heavy equipment, including asphalt and concrete deliveries up the Squilchuck or Stemilt Loop Roads. An increase in vehicular traffic will occur as a result of employees travelling to the construction site. These short term construction activities will not conflict with the orchard growers' use of the road.

The presence of permanent residential dwellings intermingled with cherry orchards in the vicinity of Wenatchee Heights, Squilchuck and Stemilt Hill districts is a problem to residents and cherry growers alike. The proposed Constellation Ridge Resort is located in an area separated from the activities of the cherry growers. The resort site is approximately 2.5 miles from the nearest orchard

and 1,700 feet higher in elevation. An increase in summertime vehicular traffic during the construction of the resort and increased use of the Squilchuck Road by summer resort guests may conflict at times with the cherry growers' use of the road.

Parking. Development of the proposed project includes increasing parking for skier use. Approximately 7 acres will be made available for auto parking accommodating about 800 vehicles. An additional acre of bus parking will also be provided to hold 30 buses. Extension of the road through the Mission Ridge lower parking area will eliminate an estimated 100 spaces from the current supply, but added culverting of Squilchuck Creek will create a net increase in available space for parking in the lower lot. Refer to Figure 9. The new parking lot capacity will accommodate from 1,550 to 1,650 vehicles. This parking will serve 5,000 skiers at one time (including 30 buses).

Transportation Systems. New roadways on the resort site will consume approximately 8 acres. As shown in Figure 3, the Constellation Ridge Resort Master Plan, the main roadway on the site extends from the Section 19 boundary to the resort lodging and commercial complex for a total distance of 4,000 feet. Secondary roads provide access to parking and future residential areas. These secondary roadways serving the outlying residential areas of the site will be designed to handle the total vehicle trips generated, as a function of the number of dwelling units constructed. All roads constructed on the project site will be designed to allow for snow removal and reduce the potential for icing problems. Drainage ditches will channel spring snow-melt and summer thundershower rainfall to appropriate holding ponds scattered throughout the site.

It is anticipated that the demand for air transportation into the Wenatchee area will gradually increase as a result of the proposed activities. The growth will occur in private aviation and from commercial carriers. The long-range development plan for Pangborn Field addresses the future increase in air traffic.

Pedestrian Circulation. Pedestrian trails will link residential areas with the main resort complex in addition to the base area and other points within the project site, as shown in Figure 3 of the Constellation Ridge Resort Master Plan. The trail network will complement many of the unique natural features of the site while discouraging pedestrians from using the roadways for walking. The trails will also function as part of the cross country ski network when there is an adequate accumulation of snowfall on the site. Directional and informational signs will act as a guide to the recreational user. A pedestrian path will be provided along the upper side of the lower lot in front of the parking slots designated for bus use, as depicted in Figure 9. A shuttle bus will transport pedestrians between the resort site and the Mission Ridge base areas.

Traffic Hazards. The increase in traffic levels along the Squilchuck Road will increase the potential hazard to pedestrians walking along the roadway. In particular, this affects school age children as they walk to or wait at designated bus stops. Furthermore, the bus loads and unloads in the traffic lane which may present hazards during icy conditions. Specific accident numbers cannot be projected because some of the factors affecting accidents are not measurable or predictable.

The safety of pedestrians in the lower parking area is not expected to be significantly impacted since the majority of vehicle parking will be located on the lodge side of the access road. A small number of vehicles for employee's and overnight motorhome guests will be parked on the far side of the access road, requiring pedestrians to cross the roadway mostly during non-peak hour times. Refer to figure 9. The potential for pedestrian exposure to accident risks will increase with higher traffic volumes. However, access road volumes and pedestrian levels should be sufficiently low to allow adjacent operations without unacceptable risk.

Additional Use of Mass Transit. The comments on the Draft EIS included the suggestion that more emphasis be placed on mass transportation to reduce vehicle trips. As shown in the previous section, this has been included in the trip generation calculation reflecting an expectation that more organized group trips to the site will be made after development of the resort. In addition, some person trips would be expected by commercial or charter air flights and a portion of these visitors were assumed to be transferred to the mountain by bus.

At the present time, Mission Ridge and local motel operators are providing shuttle

service from Wenatchee to the ski area. A 40-passenger bus will be available this season for one round trip per day. As demand increases, additional runs will be provided. A shuttle bus will provide transportation for resort and ski area users between the resort site and the Mission Ridge base areas.

Mitigating Measures

Mitigating measures have been developed to reduce the transportation impacts resulting from increase vehicular use of the Squilchuck access road and traffic generated within the resort site. These measures will help to reduce the percentage of vehicle trips in peak periods, improve the operating condition of the Squilchuck and Mission Ridge access road(s) and enhance pedestrian safety. Conditions of project approval will determine the party responsible for completion of certain mitigating measures.

Access. The developer proposes that the County improves the horizontal and vertical alignment of the access road where deemed appropriate. Provision of slow vehicle turnouts is not considered necessary due to the short distance of the road. The existing high design of Squilchuck Road would not allow for reasonable low cost improvements. Major improvements are not warranted considering the limited periods of peak traffic volumes. When road maintenance is underway on the road from the State Park to the existing Mission Ridge parking lot, the developers propose that an effort should be made to improve shoulder widths and stabilize side slopes. The developer also proposes that the County should provide paint line striping on the Mission Ridge access road to enhance operational safety when the road is clear from snow.

Vehicular Traffic Generated. Currently, the lift ticket system is arranged with day and afternoon expirations and night starting times coinciding at 4:00 PM. These periods have been staggered to reduce the percentage of vehicle trips made during the hour of 3:30 to 4:30 PM. Mission Ridge will continue to employ this procedure of staggering arrival and departure times through ticket sales.

Parking. The provision of additional parking will eliminate periods of excessive demand when skiers must park on the access road.

Transportation Systems. Left turn lands and acceleration lanes on two lane highways help to facilitate smooth entering and exiting movements. It is proposed by the developers that the County undertake traffic circulation improvements when conditions warrant attention. The following locations have been considered for auxiliary lanes:

- Wenatchee Heights Road serves a residential community east of Squilchuck Road. The location has existing auxiliary lanes for left turns and southbound accelerating traffic. These lanes are sufficient considering projected traffic volumes. However, as Wenatchee Heights traffic grows in the future, the lengthening of these lanes may be necessary.

- Forest Ridge accesses the Upper Road near the intersection with Squilchuck Road. The property is planned to have about 90 to 95 single family homes build as demand requires. The access road would not require auxiliary lanes for the small amount of hourly traffic generated by 95 units. Such lanes could be constructed in connection with additional lanes at the Squilchuck intersection, if desired.

- Scout-a-Vista is a Boy Scout Camp accessed from the Upper Road. This camp is used by Scout Troops at various times of the year. When in use, Scouts generally arrive by bus and generate very few vehicle trips. The very low turning volumes from this facility do not justify widening and construction of a left turn lane.

Pedestrian Circulation. The provision of pedestrian pathways between parking areas and buildings where possible will separate pedestrian and vehicle activity and encourage walking between areas. A pedestrian path will be provided along the upper side of the lower lot in front of the parking slots designated for bus use. This measure should reduce the tendency for pedestrians to walk in the road because no other clear path is available. Refer to Figure 9. A pedestrian trail network throughout the Constellation Resort complex will discourage guests from using roadways for walking. A shuttle service will be provided to transport pedestrians between the resort site and the Mission Ridge base areas.

Additional Use of Mass Transit. The provision of shuttle service from the ski area to several major lodgings in Wenatchee will reduce the demand on private automobiles for daily skier trips and the provision of airport transfers in ski package sales will allow greater control over vehicle occupancy and use of buses to reduce the number of automobile trips on the highway to Mission Ridge.

PUBLIC SERVICES

Existing Conditions

Fire. Fire protection in the vicinity of the project site is provided by Chelan

County Fire District No. 1. The district service area currently covers Squilchuck State Park, which is approximately 3.5 miles from the existing Mission Ridge day lodge. The fire district will respond to a call from the ski area, but will bill expenses since Mission Ridge is outside of the service area.

The closest fire station to the project site is at the intersection of Wenatchee Heights and Squilchuck Roads, approximately 4.5 miles from Mission Ridge Ski Area. The station is equipped with a 1,500 gallon per minute pumper and a one ton 4 x 4 vehicle, which is utilized primarily for fighting grass and brush fires. The station is staffed by volunteers.

Fire District No. 1 currently serves about 12,000 people, and responds to about 270 calls per year, with close to 10 - 15 percent of the response in the Squilchuck area. Approximately 10% of the calls in the Squilchuck drainage are a result of grass or brush fires. (Chelan County Fire District No. 1, telephone conversation with Vergil Murren, Chief, January 18, 1984). The District has an agreement with the City of Wenatchee fire department under which each automatically sends an engine to a fire in the other's service area. In addition, the District has mutual aid agreements with the seven other fire districts in Chelan County. To evaluate the level of fire protection in a given area for insurance purposes, the Washington Survey and Rating Bureau assigns a fire rating of 1 to 10, with 1 indicating maximum protection. The rating is based on available fire-fighting equipment, manpower, and water supply. The entire service area of Fire District No. 1 has been assigned a fire rating of 5. No medical aid service is provided by the district.

Since the project site receives minimal precipitation during the summer months, it is susceptible to fires started by lightning storms. Limited access to the site lessens the threat of fire caused by careless people.

Police. The project site is within the Sunnyslope detachment of the Chelan County Sheriff's Department. The department is composed of five detachments which provide police protection in all areas of Chelan County, with the exception of the Cities of Wenatchee and Chelan. The Sheriff's Department currently

has a force of 31 officers. The Chelan County Sheriff's Department is primarily overtaxed during the summer and fall when recreationists (hunters, campers, etc.) and migrant workers increase the permanent population of the County by two or three times. Presently, the Sheriff's Department dispatches officers to Mission Ridge for incidents such as ski thefts and traffic related problems on the access road.

In addition to police protection, the Sheriff's Department is responsible for search and rescue operations in the County's mountainous areas.

Schools. The project site is located within the service of Wenatchee School District No. 246. Students living at the resort would attend Mission View Elementary, Pioneer Middle School and Wenatchee High School. The addresses, grade levels provided, and current enrollment at these schools are as follows:

Mission View Elementary School
60 Terminal Avenue
Grades K-5
Enrollment: 281

Pioneer Middle School
1620 Russel
Grades 6-8
Enrollment: 496

Wenatchee High School
1101 Millerdale
Grades 9-12
Enrollment: 1,298

The Mission View Elementary School is presently at capacity, and the district has added a portable clasroom to reduce overcrowding. Mission View and Columbia Elementary Schools are the two fastest growing schools in the district. Students are currently being bused from Mission View to nearby Lincoln Elementary due to overcrowding. Wenatchee High School is also at capacity. There is presently available classroom space at Pioneer Middle School. In May 1986, the public will vote on a $8.9 million bond issue for capital improvements designed to relieve the current overcrowding conditions. The estimated cost for educating one pupil in the Wenatchee School District for the 1984-85 school year was $3,738.

The school bus network presently goes as far as Squilchuck State Park. The school bus serving the Squilchuck Road picks up about 58 children who live in the area.

The Wenatchee School District PTA operates a ski school at Mission Ridge for 8 weeks during the ski season. About 4-5 school buses are used for this program.

Parks and Recreation. One of Washington State's major winter recreation areas lies within the boundaries of the project site. Mission Ridge Ski Area has been serving northwest skiers for the past 18 years. The ski area presently attracts numerous weekend skiers from around the region, in addition to generating skier visits from the local market. Skier visits presently amount to about 100,000 annually. The ski area has a vertical rise of 2,138 feet, which is served by 4 double chairlifts and various rope tows. The ski lifts have an estimated daily capacity of 2,993, while the slopes and trails can accommodate over 4,000 skiers per day. The parking lot and 15,000 square foot day lodge are designed to handle an estimated 2,600 skiers per day.

The facilities at Mission Ridge become overcrowded during certain peak use periods when the number of skiers exceed design capacity. This is a common problem at all ski areas since the major demand for the facilities falls on weekends and holidays. While Mission Ridge has considerable additional natural resources to meet the growing demand for skiing, suitable land for parking is unavailable at the existing site.

Recently, the Mission Ridge Ski Area and portions of the project site have been recognized as a valuable resource for cross country skiing. Mission Ridge now grooms trails especially tailored for cross country users.

Squilchuck State Park is the closest public park to the project site. The park is operated during the winter by Wenatchee Valley College, through a student program oriented towards training for ski resort management and/or ski instructing. The Squilchuck Ski Bowl operates 2 rope tows, a 5 kilometer cross country ski trail, a lighted tubing hill, day lodge, and coffee shop. Winter recreational visits for the last few years have averaged 600 annually. The park is

also open during the summer months for group camping and picnicking on a reservation basis.

Numerous parks, recreation and camping areas are found within close proximity to Wenatchee and the project site. The recreational activities pursued on public lands surrounding the project site include off-road vehicle use, snowmobiling, alpine skiing, ski touring, hunting, fishing, hiking, horseback riding and sightseeing. The Wenatchee area also has various public and private facilities for camping, golf, tennis, swimming and boating. Playing fields at Wenatchee Public Schools are available to the general public for baseball, soccer and other sports activities.

The major recreational event in the Wenatchee area is the Washington State Apple Blossom Festival, which takes place annually in late April and early May. In 1985 there were more than thirty social and recreational events associated with the Apple Blossom Festival. A number of scenic attractions are also available in the project area, including Ohme Gardens, a nine-acre alpine garden; Rocky Reach dam; the early American village of Cashmere; and the Bavarian village of Leavenworth.

Maintenance. There are currently no facilities on the project site requiring maintenance by Chelan County. However, the Washington State Department of Social and Health Services, and the Chelan-Douglas Health District monitor the domestic water supply at Mission Ridge on a regular basis. Mission Ridge also has a certified operator for their wastewater treatment system, submitting data to the Washington State Department of Ecology. The Chelan County Department of Public Works maintains the access road up to the Mission Ridge parking lot. The portion of roadway extending from Squilchuck State Park to the ski area requires year-round maintenance in the form of sanding and snow removal in winter and road/shoulder repairs during the summer. The current snow removal and annual maintenance costs are extremely high for this roadway, creating a situation where the County now subsidizes the operation since expenses exceed revenues.

Impacts

Fire. The development of a year-round resort with a hotel, condominium units,

other residences and commercial facilities, will require organized fire protection since the potential for fire will increase as the site is utilized on a year-round basis. The project site will be annexed to Chelan County Fire District No. 1. Fire District No. 1 has estimated the project will cause an additional 10 to 20 calls per year, the most frequent involving auto fires, transmission problems, etc., associated with travel on the access road. Fire District No. 1 will respond to building, auto and small brush fires in its district. In the event a brush or forest fire threatens public property, fire fighting crews from the Wenatchee National Forest, the Washington State Department of Natural Resources and Fire District No. 1 will be immediately dispatched to the area. These agencies have a reciprocal fire fighting agreement whereby they jointly suppress fires which could endanger lives and native habitat. In isolated areas, air drops would be utilized to suppress fires.

The installation of fire hydrants and an adequate water supply for the fire flow will be required. The actual fire flow requirements will be predicated upon building size, height, design and type of materials used in construction. Based upon initial building design criteria, Fire District No. 1 has estimated the fire flow needs to be in the vicinity of 4,000 to 5,000 GPM'. The Fire District also stated that a 10 inch water main from the water reservoir would be sufficient for the above fire flow estimate. (Fire District No. 1, telephone conversation with Vergil Murren, Chief, March 19, 1984).

Police. The Sheriff's Department envisions that the proposed resort development will generate fewer police calls than a conventional single or multi-family residential development, since a resort complex is a more controlled environment, and private security will be present on the site. As stated previously, the 700 lodging units will accommodate about 2,500 people at full capacity. The resort will operate at an average of approximately 50 percent of capacity annually. Furthermore, it has been estimated that 120 permanent residents will live at the resort. The Sheriff's Department will patrol the resort periodically and monitor

'Source: Insurance Services Office - Guide For Determination Of Required Fire Flow

traffic related problems on the Squilchuck Road. As the resort develops, the principal determinant for adding to the law inforcement workload will be the incidence of theft and traffic problems. Based upon the Sheriff's Department demands at the Inn at Wapato Point, another resort in Chelan County, the Department does not foresee a dramatic impact on their budget demands, staffing requirements or ability to respond to calls. (Telephone conversation with Mike Methena, Chief Criminal Deputy, October 19, 1984).

Schools. It is projected that 120 permanent residents will live at Constellation Ridge Resort. School age children living on the site will attend Mission View Elementary, Pioneer Middle and Wenatchee High School. Wenatchee School District No. 246 is currently planning the expansion of the elementary and high schools to accommodate present overcrowded conditions, as well as the future growth of student enrollment. Mr. Virgil Shiflett, Transportation Supervisor for the Wenatchee School District No. 246, has stated that school bus service would not be provided beyond the current Squilchuck State Park bus stop. Residents of the resort would be responsible for transporting their children to and from the school bus drop-off at the State Park.

Direct and indirect effects of the project will cause a gradual increase in employment opportunities within the Greater Wenatchee area and a proportionate population increase. The majority of jobs will be locally filled, causing an inmigration of approximately 100 families or 225 people. On the basis of typical age statification data for populations in Chelan County in 1980 (State of Washington Financial Management updated), a group of 225 residents would include about 50 school age children.

Parks and Recreation. The proposed resort project will dramatically increase the use of ski facilities at Mission Ridge. The ski area presently receives about 100,000 skier visits per winter. At the end of Phase 1, the addition of new ski lifts plus 1,000 pillows in the resort will increase skier visits to around 185,000 annually. At project buildout skier visits are projected to be 287,000.

The resort accommodations and amenities will attract a new and larger market which

will significantly alter the pattern of use at Mission Ridge. For this reason, it is anticipated that the midweek utilization of Mission Ridge will increase dramatically when skiers spend three to five days at the area. It is also expected that many cross country skiers will be attracted to the Constellation Ridge Resort and the accompanying nordic trail facilities. The recreational use of public property in the vicinity of the project site will increase as a result of resort users pursuing cross country skiing, snowshoeing, hiking, hunting, fishing, horseback riding or any other non-motorized outdoor activities. The current policy of Mission Ridge is to prohibit all off-road vehicles within the boundaries of the ski area, except for ski area use. This closure will be extended to include the 900 acres comprising the Constellation Ridge Resort. Snowmobile, motorcycle and other off-road vehicle use will continue on other public and private property surrounding the proposed resort. Direct access from the resort properties to peripheral lands will not be available to ORV users.

Within the Wenatchee area, visitors of the resort will utilize various public and private facilities for recreational activities such as camping, golf, tennis, swimming and boating. The resort development will include private recreational amenities, including tennis courts, swimming pools, indoor saunas and jacuzzis, horseback riding and a ski touring/recreation center.

Maintenance. The proposed project will require additional road maintenance. The developers propose that the access road as extended through the Mission Ridge parking lot and into Section 19, amounting to 1.3 miles of new roadway, will be maintained by the Chelan County Department of Public Works. County maintenance responsibilities would include maintaining an adequate driving surface, any necessary work on road shoulders, vegetation control in the right-of-way, contour control and repair, cleaning of catch basins, snow and ice control, street cleaning, and maintenance of traffic control devices such as lines in the roadway or stop signs. The County's annual maintenance cost for the 1.3 mile section of roadway is difficult to quantify since there are so many variables which affect cost, including annual snowfall and other variable conditions.

Annual roadway maintenance and snow removal costs were calculated from the estimated 1980 Chelan County costs for the 4-mile segment of access road above Squilchuck State Park. Using the change in the Consumer Price Index from 1980 to 1986 the maintenance costs for the existing roadway would be approximately $11,620 in 1986. Anticipated maintenance costs have been estimated for the preferred access alternative (lower route) and the upper access route. Both roadways will require an estimated 20 percent more maintenance when compared to the existing access road since they are at a higher elevation, have different sub-surface conditions, and have a northerly exposure. Based upon these assumptions, the 1.3 mile preferred access route will have an annual maintenance cost of $18,000 while the upper route (1.6 miles) will cost $22,000 per year. The cost of maintenance for the upper route is expected to exceed that of the lower road because of longer length and a less stable sub-surface which affects pavement life.

The new maintenance costs will come out of the County Road District fund which is supported by property tax revenues generated by the project in the amount of $26,529 for Phase 1 and $64,281 at project completion. The remainder of the roads and parking areas within the project site will be maintained by the project proponents. The portion of the access road maintained by Chelan County will be dedicated to the County by the developer. Equipment owned and operated by the project proponents will be utilized to plow the new County access road as a supplement to the County's responsibility for winter plowing.

Snow removal on County roads will continue to be the responsibility of Chelan County. The Department of Public Works has stated that the County will allow the proponents to also plow the new County road. Equipment owned and operated by the project proponents will be utilized to plow the new County access road as a supplement to the County's responsibility for winter plowing.

All drainage facilities on the project site, other than culverts and drains along the dedicated County access road, will be maintained by the project proponents. This includes drainage ditches in parking areas, building drains, collector pipes, culverts and retention basins throughout the site.

Maintenance will also be required for the domestic water supply and the wastewater treatment system. The Washington State Department of Social and Health Services and the Chelan-Douglas Health District will monitor the domestic water supply for the project on a regular basis. The Washington State Department of Ecology will monitor the operation of the sewage treatment lagoon and sprayfield system.

Mitigating Measures

Fire: The properties comprising the resort complex will be annexed to Chelan County Fire District No. 1. Since Mission Ridge Ski Area is entirely without fire protection facilities at this time, development of the resort and annexation to Fire District No. 1 will provide much greater fire protection for the ski area. Fire protection facilities will be constructed in accordance with the requirements of Fire District No. 1. This will include the construction of a fire station and the acquisition of necessary fire fighting equipment. The new fire station will provide adequate volunteer manpower and equipment to serve the proposed resort. The new fire station and facilities will be financed through a Local Improvement District (LID), which will cover the entire resort operation. Fire District No. 1 will sell the LID bonds which will be repaid annually from property tax revenues. Fire District No. 1 has indicated that the construction of the fire station may be deferred for approximately three years in order that the real estate development will adequately support the LID financing. Until that time, the fire district will adequately serve the resort from existing facilities nearby. Tax revenues generated from the project will offset the cost of responding to the projected increase in fire calls.

Police, Schools and Maintenance. Tax revenues from the proposed resort will greatly offset the costs associated with providing services for police protection, schools and Chelan County maintenance requirements. This is primarily related to the fact that a resort community is not composed of permanent residents, and therefore, demands for public services will be substantially less while tax revenues will be more due to the high value of resort real estate. Officials from

the Chelan County Department of Public Works and the Chelan County Sheriff's Department have indicated that the tax base and resultant revenues from the resort will easily support the increase in demand for public services. At the current cost rate for educating one pupil ($3,738), the $215,531 of school tax revenues generated by the project will fund 58 new students from the Constellation Ridge Resort. Since few permanent residents and school age children will reside at the resort, the school district will receive an excess of revenue as a result of the development. Equipment owned and operated by the project proponents will be utilized to plow the new County access road as a supplement to the County's responsibility for winter plowing.

UTILITIES

Existing Conditions

Energy. The only form of energy that will be provided to the proposed resort is electrical energy. The supplier of electrical energy in Chelan County is the Power Department PUD No. 1. The PUD currently has about 26,000 electrical services in the County, about 20,000 of which are residences. Mission Ridge presently obtains power for operation of the ski resort from PUD No. 1. The cable supplying power to Mission Ridge is buried. All facilities, including chairlifts, are operated with electricity. (PUD No. 1 of Chelan County, telephone conversation with Tim Olson, Head Distribution Engineer, January 19, 1984).

Communications. Telephone service to Mission Ridge Ski Area is provided by General Telephone Company. The phone line is buried with the power cable and is presently at capacity.

Water. Mission Ridge Ski Area presently obtains water from a tributary of Squilchuck Creek. Water collects in an 8,000 gallon underground reservoir. The ski area has water rights for both winter and summer needs. Chelan County PUD has a water line that presently extends as far as Squilchuck State Park. Representatives of the PUD have stated that the system is operating at less than fifty percent of capacity and was designed and constructed to accommodate growth. Refer to Technical Appendix B.

Sewer. There is no public sewer utility in the project area. The ski area at Mission Ridge presently treats wastewater in a package-type extended aeration plant, and discharges the effluent to a drainfield. The plant is capable of treating the present wasteloads, and does not need extensive upgrading or renovation. A licensed technician operates the treatment facility. Refer to Technical Appendix C.

Storm Water. No storm water system is currently installed on the site.

Solid Waste. Solid waste is hauled from Mission Ridge under management with Dependable Disposal, a private contractor. The waste is taken to a 70-acre landfill site about 10 miles outside Wenatchee in Douglas County. The landfill has an estimated remaining life of over 30 years.

At the present time Mission Ridge Ski Area does not store a significant amount of fuel or dangerous waste on the property. The total amount of fuel stored is 20,000 gallons, which is below the minimum Washington State standard for requiring a spill prevention, control and counter-measure plan (SPCC).

Impacts

Energy. The proposed resort will be entirely served by electrical power furnished by Chelan County PUD No. 1. The PUD system has adequate power for all expected needs. However, certain portions of the Squilchuck line will require upgrading as the resort develops and power consumption increases. The system upgrade is based upon power demand estimates by the PUD for the latter stages of Phase 1 and project buildout. As part of the overall load growth, this project will increase demand. The following table correlates demand figures to system upgrading.

The power demand figures as stated in Table 16 are estimates of the projected

demand load for the expansion of ski facilities and the construction of the Constellation Ridge Resort. Detailed development programming for each project phase will provide the connected loads for all facilities. The information will be utilized by the PUD to determine what system upgrades will be required to satisfy the power needs of the resort development.

Table 16

Demand for Electrical Power and Phased System Upgrades Necessary for the Constellation Ridge Resort

Project Phase	Overnight Capacity of Resort	Estimated Power Demand in Mega-Watts	System Improvements Required by Phase
Beginning of Phase 1	300 people	Less than 1 MW	Upgrade existing buried cable from Squilchuck State Park to Mission Ridge and extend line to Section 19 resort site.
End of Phase 1	1,000 people	2 MW	Upgrade portions of overhead line from Squilchuck sub-station to State Park.
End of Phase 2	2,500 people	3.5-4 MW	Upgrade the entire overhead line from sub-station at mouth of Squilchuck Canyon to State Park.

Chelan County PUD has indicated that all future system improvements will be designed for project buildout or 2,500 overnight accommodations and the power requirements for the expanded ski area. This approach will reduce the long-term costs associated with system upgrades. Since the resort project will develop gradually, the PUD will be capable of projecting load growth annually. Chelan County PUD officials have stated that all new loads on the District's system that include significant wintertime usage will contribute to upward pressure on rates, whether or not the load is a new home or a new ski resort. This occurs as a result of the District's current power purchasing method, whereby more expensive power must be purchased during the winter months. The PUD is presently studying the impact of growth on the system and how to correctly allocate costs to all power supply users in an equitable manner. Under the current PUD policies for purchasing winter power, the project would cause increased pressure on rates as

any significant usage would. The cost for upgrading the system will be borne by the project sponsor in accordance with the PUD's line extension policy.

Two alternatives were considered for extending the power lines from Mission Ridge Ski Area in the Draft EIS. Both options involve upgrading the existing buried cable which starts approximately one mile below Mission Ridge. The alternatives for power extensions are shown in Figure 10. Route 1 utilizes the newly constructed access road to the Constellation Ridge Resort while Route 2 follows an existing logging road to the resort. PUD, water and electrical engineers have indicated that Route 2 is the preferred alternative since the water and power lines can be placed in a joint facilities trench. Power lines serving the resort will all be buried underground. Coordination with telephone and other service lines will be undertaken to minimize trenching and soil/earth disruption. (Telephone conversation with Tim Olson, Head Distribution Engineer, PUD No. 1, March 29, 1984). Power lines will be extended from Section 19 to Lifts D-1 and D-2, along an existing road which comes within one-quarter mile of the lower lift terminals. The extension of the road utilized to service the lifts will also accommodate the power cable.

Communications. Development of Constellation Ridge will require major improvements to the General Telephone system to serve additional customers. New phone lines will be buried in the same trench as the power lines to reduce soil disturbance. The cost of phone system improvements will be borne by General Telephone and the resort users, depending upon a formula of capital construction outlays and anticipated service revenues.

Water Demand and Wastewater Flows. Water demand and wastewater production are directly related, and the estimates used for both are based upon similar considerations. The piping systems will utilize modern materials and construction techniques and there will be little potable water leakage from water mains or infiltration of groundwater into sewers. As a result water and wastewater volumes will be essentially equal during the winter (peak season) months, and the following discussion will apply to both water and wastewater.

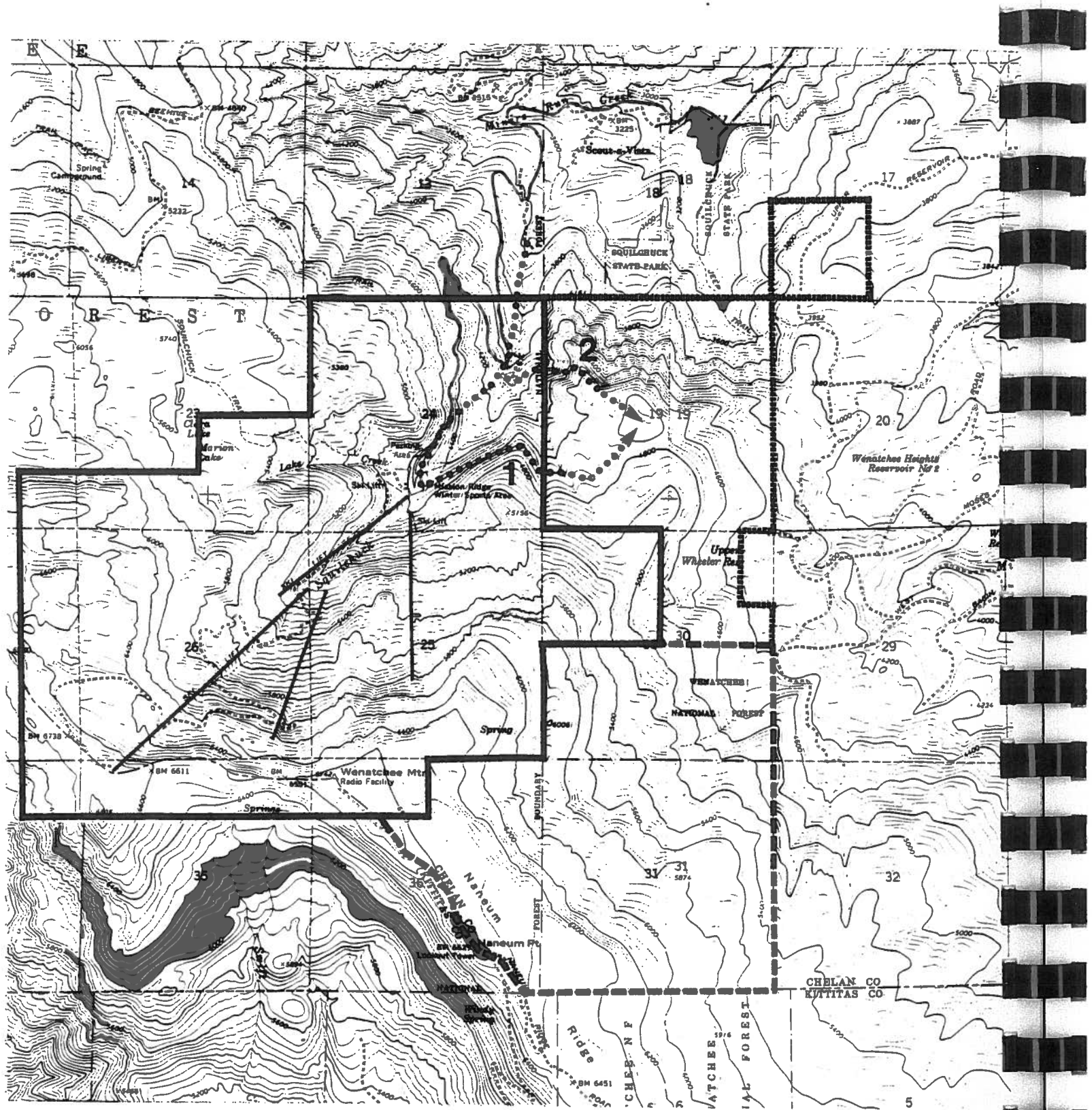


Figure 10.
MISSION RIDGE/CONSTELLATION RIDGE RESORT

The amount of water consumed and the resultant wastewater discharged in a resort community cannot be compared to water use and wastewater flows in an urban environment, such as the City of Wenatchee.

Municipal sewage flows on a per capita basis are normally much larger, since many sources of extraneous (non-sewage) flows exist in the much more extensive and older sewer systems of municipalities, such as commercial wastewater, groundwater infiltration, and stormwater inflow.

The majority of dwelling units at the Constellation Ridge Resort, with the exception of those occupied by the projected 120 permanent residents, will be occupied by temporary resort guests. Accordingly, the water demands and wastewater production will be different from the levels normally experienced in systems with large numbers of permanent residences, such as the City of Wenatchee. Water demands and wastewater production are lower at recreational developments for a variety of reasons, including the following:

- many occupants in units with kitchens will utilize restaurants rather than preparing all meals,
- meal preparation will tend to be less elaborate,
- due to the cyclical nature of a resort operation, occupancy levels in the available units will vary according to the day of week and time of year, resulting in low use for much of the year,
- the utilization of washing machines (where available in condominiums) would be less frequent.

Both DOE and DSHS recognize the fact that the water consumption and wastewater production characteristics of recreational developments differ from those of municipalities. Both agencies rely upon a case-by-case evaluation of specific facilities and anticipated used to determine the required design criteria.

The approach taken in the DEIS was to develop anticipated unit flow rates for each type of source (hotel, condominium, single-family residence, restaurant, etc.), and to extend these values at each stage of development for the projected numbers of sources. Mr. John Hodgson of the Department of Ecology and Mr. Tom

Justus of the Department of Social and Health Services indicated general agreement with this approach and the determination that municipal criteria are not appropriate.

Both water demands and wastewater production will be strongly influenced by the types of plumbing fixtures that are incorporated into the final design of the resort. The estimates used in the FEIS conservatively assumed that normal fixtures will be used. The use of water-conserving fixtures will be evaluated during the design phase, but are not necessary for feasibility of the project.

Water Facility. The Draft EIS evaluated two alternate sources for supplying water to the resort, including obtaining water from on-site sources through water rights application and from the Chelan County PUD-Squilchuck water line. Based upon comments received on the Draft EIS concerning water rights issues in the Squilchuck and Stemilt Basins and other project considerations, it has been determined that obtaining water from Chelan County PUD will reduce project impacts.

The water needs of the resort, including the total annual water requirements, have been estimated in Table 17. Annual water use equals wastewater production plus water used during the growing season for limited landscape irrigation. Based upon project wastewater estimates, and adding the water requirements for irrigation of 2 acres at the end of Phase 1 and 3 acres (total) at the end of Phase 2, the following water demands are expected.

Table 17
Anticipated Water Requirements

Phase of Development	Peak Day	Monthly Average 100% Occupancy	Annual Total
Phase 1			
Winter	63 GPM	25 GPM	10,200,000 Gal.
Summer	37 GPM	28 GPM	
Phase 2			
Winter	157 GPM	62 GPM	23,600,000 Gal.
Summer	93 GPM	56 GPM	

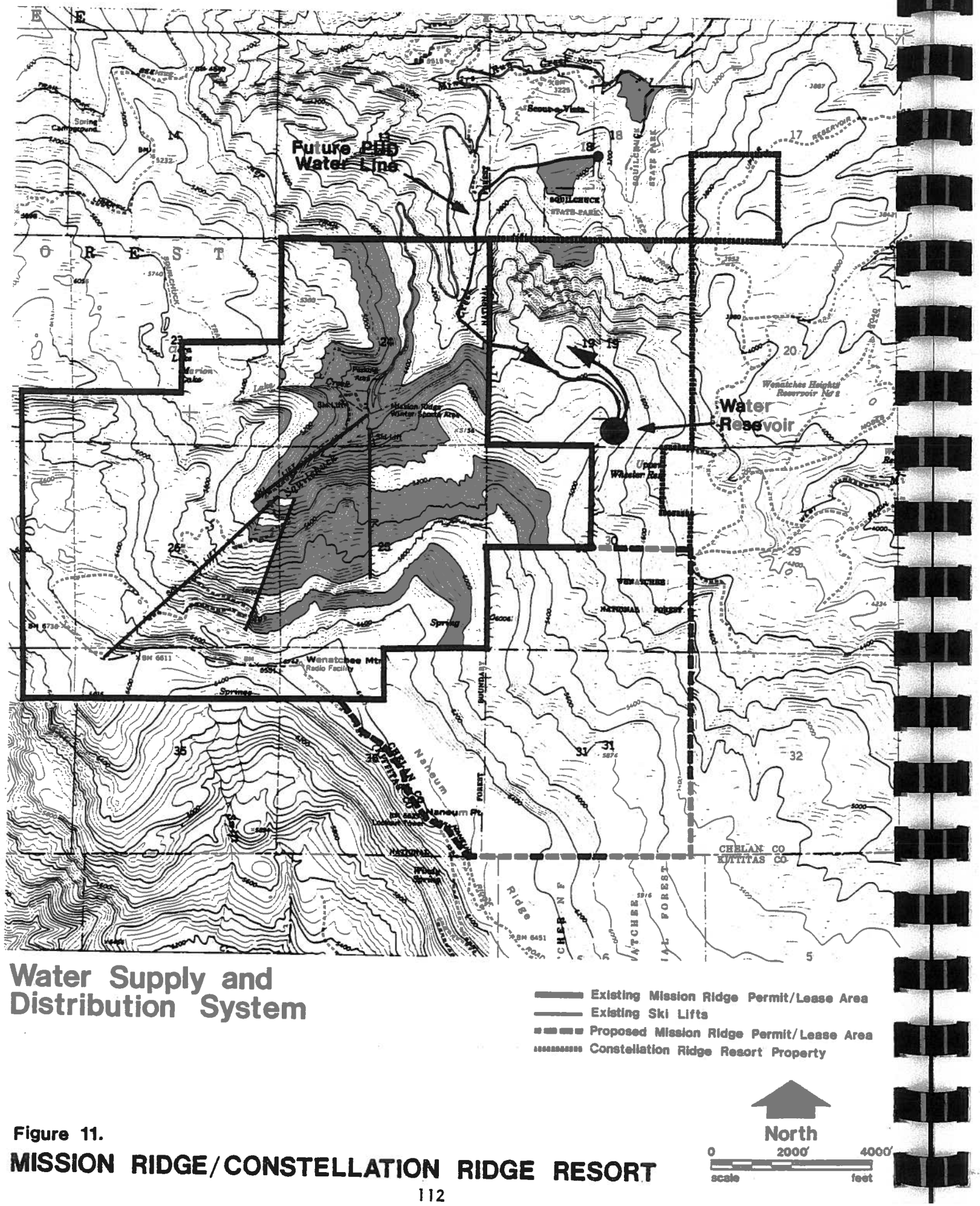
The total projected annual use is relatively small. The total annual consumption at the end of Phase 2 is equivalent to the irrigation water required for about 20 to 25 acres of pasture.

The PUD provides water service up the Squilchuck canyon as far as the State Park through a six-inch line which utilizes four pump stations to maintain adequate flow. Representatives of the PUD have stated that the system was designed and constructed with expansion in mind. The present capacity of the pumps and piping is 200 GPM, but with the addition of a pump to each of the booster stations, it would be possible to increase the line capacity to a maximum of 350 GPM.

The PUD currently provides water to a total of 220 residential customers, with a total demand of 122 GPM. Total average water usage by PUD customers is .56 GPM (Conversation with Brian Wengreen, January 23, 1985). Excess capacity above this level is available on a first-come basis, and was not reserved by the PUD for any particular class of user. Upgrading the system to a capacity of 350 GPM would result in a surplus of 228 GPM. Based upon the winter peak day water demand of 157 GPM for the resort at the end of Phase 2, approximately 71 GPM would remain for future expansion in the Squilchuck Basin. Utilizing an equal proportion of water consumption per existing Squilchuck PUD customer, the 71 GPM surplus will permit approximately 128 new hook-ups along the Squilchuck.

Connection to the PUD water supply will require extension of the main pipeline and the installation of line systems, pumps and storage reservoirs, as depicted in Figure 11. The necessary improvements to the Squilchuck water system are itemized in Technical Appendix B.

It is apparent that the potential maximum flow rate of 228 GPM available from the PUD system would be capable of meeting the average water needs of the resort through Phase 2. Short-term demands and fire flow requirements cannot be precisely quantified until the design of the buildings are more complete, but would certainly exceed the available peak flow rate of 228 GPM. As a result, a storage reservoir would be required to provide equalizing storage for instantaneous peak domestic demands and for fire-fighting purposes. The equalizing volume required



Water Supply and Distribution System

Figure 11.

MISSION RIDGE/CONSTELLATION RIDGE RESORT

for short-term peak flows would be determined after the building design has proceeded to the point that the types of fixtures and facilities are known.

The rate and duration of fire flow requirements would be determined after review of the final building designs by the developer, insurance underwriters, and Fire District. Fire flow requirements will determine the size and location of the distribution piping within the resort area, and will represent a significant portion of the storage reservoir volume. Water for fire fighting can be provided in two different ways:

1. by sizing the distribution piping within the resort to be capable of meeting peak fire flow rate requirements, and by increasing the volume of the storage reservoir to provide the required duration,
2. by construction of a separate piping system to utilize water from the ornamental pond to meet rate and duration requirements; a Factory Mutual approved, gasoline engine-driven pump installation would be required for this approach.

The decision between these two alternatives will be made as design details of the major resort structures are developed. Both of the alternatives can be designed to be acceptable to the Fire District and to the insurance companies that must approve this aspect of the project.

Water requirements for fire fighting will not influence average water demand considerations. The water required for fire protection must be stored on the site, since the PUD water source cannot provide all of the required instantaneous fire flow rates. However, the amount that must be stored is small in comparison to the long-term needs of the resort.

The PUD staff has reviewed the possible extension of water service to the resort and has proposed the route shown on Figure 11. The pipeline will be extended from the State Park in the draw located to the west of the resort, in order to take advantage of the relatively gradual slopes.

It will not be necessary to construct or maintain access roads for the water

pipeline; construction access will be along the route itself. Maintenance of the route will require that trees not be allowed to re-establish themselves, so that access would be possible in the event that repairs are required. A break in the pipe would result in a very rapid and severe erosion, and could trigger landslides if not shut off promptly. (See Mitigating Measures)

The cost for extending the PUD line to the site and installing all pumps, line systems, and reservoirs will be borne by the project sponsor in accordance with the PUD's line extension policy.

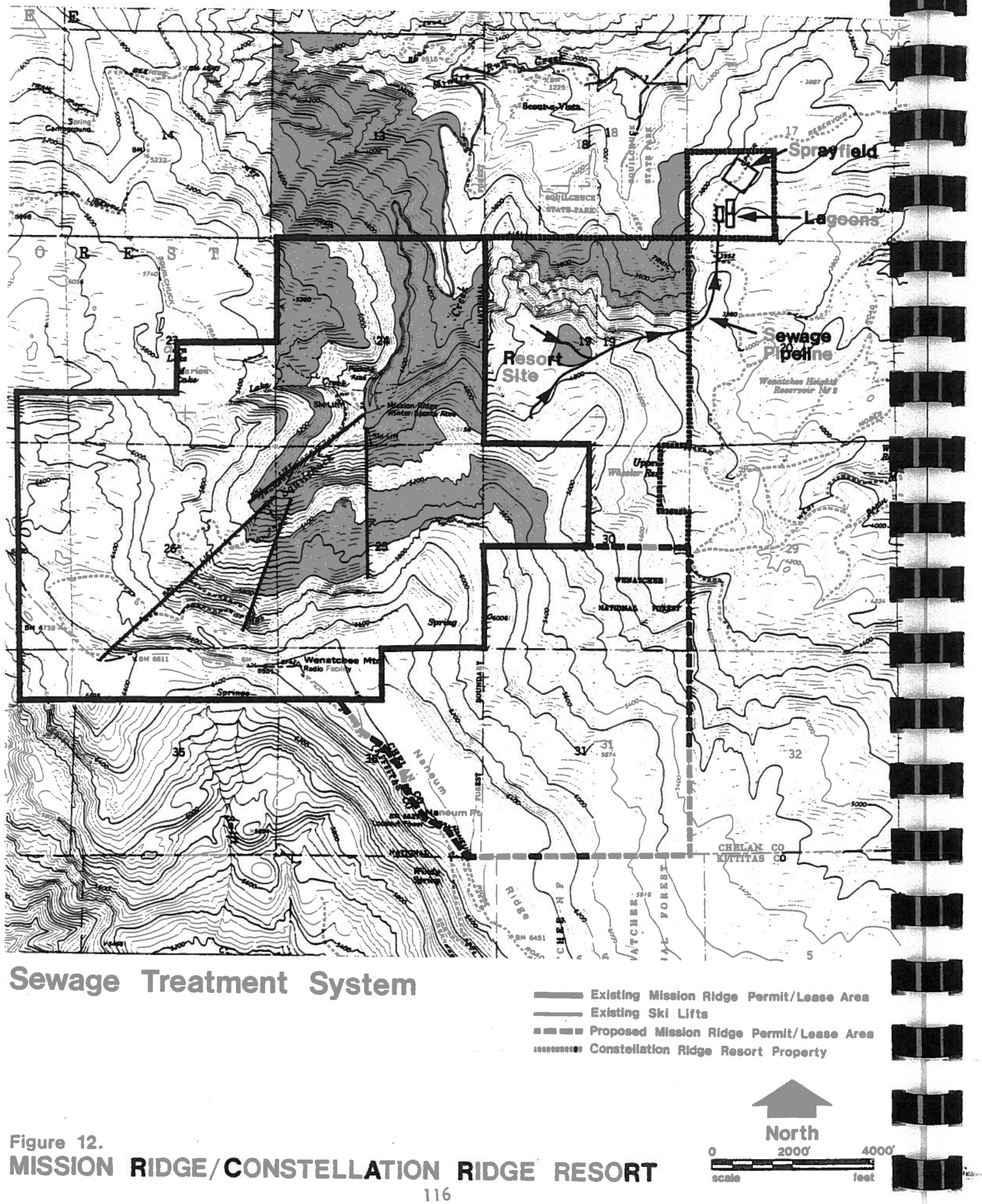
Sewer. Public sewer service is not available to the project site. Development of the Constellation Ridge Resort will require the installation of an approved sewage treatment system. Wastewater treatment and disposal facilities in the State of Washington must comply with a number of regulations concerning design, ownership, operation, and maintenance. Since the Constellation Ridge development will include condominium units, the wastewater facilities are considered to be public treatment facilities by the Department of Ecology and must comply with regulations for public systems. Public systems must be owned, operated, and maintained by a municipal corporation. The developer will create a water district, which, in the State of Washington, is empowered to operate sewage collection and disposal facilities within the district. The water district will sell revenue bonds to pay for the construction of sewage treatment facilities and establish user rates for the cost of operation, maintenance and repayment of the bonds. The entire Constellation Ridge Resort will be within the district boundaries. Some of the procedural steps required to form a water/sewer district include the development of a comprehensive plan by a qualified engineering firm and the review of proposed district boundaries and taxing capabilities by the Chelan County Boundary Review Board.

The Chelan County PUD is capable of providing overall operational guidance for the wastewater facilities. The PUD at present provides a State-certified operator for several other small treatment facilities in the County, and meets the Department of Ecology's requirements that such facilities be under the control of a certified operator. In the event that operation by the PUD is determined

to be infeasible or economically undesirable, Constellation Ridge could provide its own operating personnel and obtain State certification. The type of sewage treatment facility proposed for the Constellation Ridge Resort is a three-cell lagoon and sprayfield system. Figure 12 depicts the pipeline route from the resort site and the approximate location of the proposed lagoons and sprayfield. The lagoon treatment system is used throughout Eastern Washington for various municipalities, parks, and industrial facilities. They are the system of choice where land is available because of their simplicity and reliability. Technical Appendix C provides a detailed explanation of the design, construction and operational aspects of the system for the proposed action.

The site of the Constellation Ridge Resort complex was thoroughly analyzed for purposes of locating the sewage treatment facilities. Unsuitable topographic and soil characteristics on Section 19 precluded its use for the facility. This analysis may be found in Technical Appendix C, on file at the Chelan County Planning Department. Section 17 was chosen as the site for the sewage treatment system, due to the lower elevation (3,900') and the availability of suitable flat terrain. Sewage generated at the Constellation Ridge Resort will be conveyed by buried pipeline for a distance of approximately 6,000 feet to the lagoon and sprayfield site located in the SW¼ of Section 17. The route shown in Figure 12 includes areas with slopes of 30 to 40 percent and passes through densely forested areas. A portion of the pipeline across Section 20 will be on Washington State Department of Natural Resources land, which will necessitate an easement for construction, operation and maintenance. It is unlikely that sewage from the existing Mission Ridge operation will be piped to Section 17 in the future, unless the present base area facilities expand beyond the capability of the treatment system. The distance between the existing treatment plant and the Constellation Ridge development makes it impractical to combine treatment at a single facility. As the development grows and use of the Mission Ridge area increases, the treatment facility's performance and the cost-effectiveness of combining the treatment facilities can be re-evaluated.

Final Design Loadings And Regulatory Agency Review. The wastewater flows



Sewage Treatment System

Figure 12.
MISSION RIDGE/CONSTELLATION RIDGE RESORT

provided are not final design values. The loadings used for design will be determined when resort planning has proceeded further and when details of facilities, occupancy levels, and plumbing fixtures are available.

The final design loadings and storage volume computations will be summarized in engineering reports developed in accordance with the requirements of DOE and DSHS. Also, final plans and specifications must be submitted to DOE and DSHS for review and approval.

A review of the wastewater production patterns of similar destination ski resorts will be carried out prior to final design, and the results of this review will be submitted to DOE prior to the development of final design criteria.

If the final design flows are larger than preliminary estimates, suitable land is available at the proposed lagoon/sprayfield site for larger facilities. The relatively inexpensive nature of lagoon and sprayfield construction makes larger facilities feasible without jeopardizing the financial status of the project.

Wastewater Production. A comprehensive review of the water and wastewater estimates has been undertaken in response to comments received on the Draft EIS. The estimates are based upon the anticipated occupancy levels used in financial planning for Constellation Ridge Resort. Peak wastewater loadings will occur during the ski season, generally from late November to the end of March. Some activity will occur year-round and is reflected in the annual totals. Table 18, which follows, summarizes the results of this review and the current estimates for wastewater production.

Table 18

Anticipated Wastewater Production

Phase of Development	Peak Day	Monthly Average & 100% Occupancy	Annual Total	Storage Required
Phase 1	90,600 G/D	42,300 G/D	8,270,000 Gal.	5,000,000 Gal.
Phase 2	227,000 G/D	106,000 G/D	20,700,000 Gal.	14,500,000 Gal.

Phase 1 represents development of the lodging and support facilities of the resort to a level capable of accommodating 1,000 overnight guests; Phase 2 represents full development of the site to accommodate 2,500 guests. The resort will include restaurants, shops, a day lodge, and other facilities, all of which are included in the flow estimates given above.

For purposes of visualizing the scope of the entire proposed development it is useful to compare the flows with those typically produced by single-family residences. On the basis of 400 gallons per residence per day, the monthly average flows generated by the entire resort complex when fully occupied would correspond to the following numbers of residences:

Phase 1: 106 single-family residential equivalents,
Phase 2: 265 single-family residential equivalents.

The revised wastewater estimates given above are higher than those originally presented in the DEIS, and a correspondingly larger area would be required for lagoon and sprayfield construction. Based upon the very conservative sprayfield application rate of 24 inches per year that was used in the DEIS, a total area of 25 acres would be required for Phase 1, with 7 acres for lagoon and 18 acres for sprayfield. By the end of Phase 2, a total of approximately 62 acres would be needed. More than 355 acres of suitable private land is available at the proposed wastewater facilities site, and the system proposed remains the most economical and appropriate approach to wastewater disposal.

Three lagoon cells in series parallel will be utilized to treat the wastewater loads from the resort. The lagoons will be constructed of native soil material, compacted in place with a clay liner to limit seepage. The first cell will receive the heaviest loading and will be provided with aeration equipment capable of operation beneath ice to avoid odor problems. Most of the waste materials will be removed before the effluent reaches cells 2 and 3 for further treatment. The lagoons will provide the equivalent of full secondary treatment, and will produce an effluent suitable for controlled irrigation use.

The design of the sprayfield is based upon a total application rate of 24 inches per year, which is an estimate of the requirements during the growing season for a grass cover crop. The effluent applied to the sprayfield will actually be disposed of by a combination of percolation, evaporation, and plant uptake (evapotranspiration). The total of these factors during the period that the effluent will be applied is well above the design application rate.

Precise evapotranspiration data is not available for the proposed site, but information for the Bumping Lake and Rimrock Lake areas in Yakima County has been developed by the National Weather Service. These locations are somewhat lower than the proposed project site, and are further west, but represent the best available data. Precipitation data is available from Upper Wheeler Reservoir, located approximately 1 mile from the sprayfield site. Summarizing averages for the months of July, August, and September:

Month	Precipitation	Potential Evapotranspiration	Net Potential Evapotranspiration
July	0.7"	4.4"	3.7"
August	0.5	3.9	3.4
September	1.0	2.8	1.8
		Total	8.9"

Evaporation data is also limited. Annual evaporation in the range of 40 to 45 inches per year can be expected, based upon Class A Evaporation Pan data for the area. Most of the annual evaporation will take place during the summer months that will be used for application of effluent. The sprayfield will be located on a relatively flat ridgetop, and good air movement can be expected. The aspect of the slopes in the sprayfield area is generally Southeast and South. These factors will increase evaporation.

The maximum application rates designed for the sprinkler system will be limited to the surface infiltration rate of the soil/cover crop combination: approximately 0.20 inches per hour. Runoff will not be a part of normal operation, and routine observation of the sprayfield and frequent changes of sprinkler sets will

be carried out to avoid overloading. Application will not begin in the Spring until the sprayfield is dry enough to accept the effluent without ponding or runoff, and will be discontinued during extended periods of rainy weather.

Potential for Groundwater Contamination.

Percolation from Lagoons: The lagoons will be constructed with embankments of the compacted native clay material which is abundant at the project site, and will be tested for leakage with clean water before startup, in accordance with Department of Ecology requirements. Technical Appendix C, on file at the Chelan County Planning Office, includes a soil investigation summary which discloses the clay content of the soils to be used for sealing the treatment lagoons.

Clay-lined lagoons are leaktight if properly constructed. In addition to the sealing provided by the clay embankment material, the solids which are present in domestic wastewater and the solids which are formed by biological activity within the lagoons act to further seal the submerged portion of the embankments. Many such lagoons have been used in Eastern Washington for long periods of time without groundwater contamination.

The proposed location of the lagoons is well within the boundaries of the project's property so that if any leakage from the lagoons occurs, the distance to adjacent properties will provide an additional factor of safety against contamination of groundwater beyond the site.

Percolation of Effluent from Sprayfield: The effluent applied to the proposed sprayfield will have received full secondary treatment as defined by the U. S. Environmental Protection Agency (EPA). In addition, effluent from the lagoons will be disinfected with chlorine before spray irrigation. The fine-grained soils in the area of the proposed sprayfield and lagoons will slow the passage of effluent and will further remove materials remaining after treatment.

As a result, the constituents of the effluent that will reach groundwater will consist primarily of low levels of dissolved solids, and would not affect the suitability of the water for irrigation use.

Domestic wastewater contains nitrogen in a variety of forms, including ammonia, nitrates, and organic compounds. Much of the nitrogen will ultimately be converted to nitrate form during the course of lagoon treatment and passage through aerobic soils. Some of the nitrates dissolved in the effluent could potentially percolate into the groundwater, and would be a contaminant of concern for potable water supplies if present in high enough concentrations.

The limit for nitrate in potable water supplies is set at 10 milligrams per liter. The concentration of nitrate that can be expected in the groundwater immediately beneath the sprayfield can be estimated on the basis of information from similar installations treating domestic wastewater. Based on the following assumptions, a concentration of approximately 14 milligrams per liter would occur beneath the root zone for the facilities proposed for the end of Phase 1:

1. total nitrogen content of raw wastewater: 40 milligrams per liter,
2. total annual wastewater flow: 8,270,000 gallons,
3. quantity discharged to sprayfield (includes precipitation falling into lagoons): 11,600,000 gallons,
4. nitrogen removal through lagoons and chlorine contact tank: 40 percent,
5. nitrogen removal in the soil by bacterial dentrification: 20 percent,
6. crop uptake: none.

The foregoing assumption of no net crop uptake conservatively assumes that the grass cover crop will not be harvested. Since deer will be able to jump the fence around the sprayfield, it can be anticipated that a significant amount of nitrogen will actually be removed in the form of grass.

The 14 milligram per liter level was calculated on the assumption that all the nitrogen remaining after treatment will be converted to nitrate, when actually a significant fraction will remain as dissolved organic nitrogen. Also, much of the nitrogen applied to the sprayfield will be converted into organic matter (humus), and will remain in the soil.

When these factors are taken into account, and when the dilution that will occur as the result of naturally-occurring groundwater is considered, it is apparent that the limit of 10 milligrams per liter will not be approached in groundwater beyond the proponent's property. Since the system will be expanded proportionally for Phase 2, similar performance would be expected.

Potable Water Supplies in the Area. It is not known whether or not the proposed sprayfield serves as the primary recharge area for the springs located below the development.

The nearest source of potable water registered with the Department of Ecology in the vicinity of the proposed sprayfields is the spring that supplies Squilchuck State Park, as shown on Figure 12. This spring is located approximately 2,000 feet to the west of the edge of the proposed sprayfield, on the far side of the major canyon which parallels the west line of Section 17. It is unlikely that percolation from the sprayfield will affect water quality in the park's spring or any other existing withdrawal points for potable water.

Monitoring. The Department of Ecology will have authority over the design, operation, and maintenance of the wastewater facilities, and will require that a State Waste Discharge Permit be obtained in accordance with WAC 173-216. The permit will set forth detailed monitoring schedules for the treatment system (lagoons and chlorination equipment), for the disposal area (sprayfield), and for water in the surrounding area that could be affected by the sewage treatment system. The schedules will specify types of samples, sample locations, frequency of sampling, and tests required. Results will be reported to the Regional DOE Office in Yakima on a monthly basis. (See Mitigating Measures - Sewer, pgs. 123-124).

Storm Water. As discussed under Surface Water, the drainage system for the proposed resort is designed to release surface water runoff at a rate no greater than pre-development conditions.

Solid Waste. Dependable Disposal, another private contractor, or the resort operators will haul solid waste from the site. The estimated annual tonnage of

solid waste generated by the project at full development will be approximately three tons per day during peak use. The local landfill has an estimated remaining life of over 30 years.

Mitigating Measures

It is proposed by the developers that the Chelan County PUD will issue bonds to fund the construction of the sewer, water and electrical facilities required to serve the project. The Constellation Ridge Resort residents and Mission Ridge Ski Area will amortize these capital expenditures through utility service payments to the PUD over a period of fifteen years or longer.

Energy. The design of resort buildings and complexes will encourage energy efficiency through widespread use of insulation and other energy saving devices including passive solar orientation.

Water. In order to conserve water, the developer will utilize various water restricting devices such as low volume flush toilets and water restrictors where possible. Use of automatic valves at the top and bottom of the slope would minimize the potential of severe erosion in the event of a water line fracture.

A check valve at the entrance to the reservoir would prevent backflow from above. A gate valve for manual shutoff at the reservoir would also be provided, and would be kept accessible for operation during winter. The check valve would operate automatically; the purpose of the shutoff valve would be to provide a manual backup and drip-tight shutoff.

An automatic valve or automatic pump controls at the bottom of the slope would be used to shut off the supply if a loss in pressure is sensed. This would be adequate for major breaks in the system which would cause a significant drop in pressure, but would not be capable of detecting small leaks or breaks near the top of the hill.

The pipe would be of adequate pressure class for the static and dynamic heads, and pressure-tested after installation.

Sewer. Monitoring requirements are normally established by DOE during the plan and specification review process, since design details are needed before a

meaningful schedule can be developed. However, the general nature of the monitoring for groundwater quality can be described, and is summarized in the following sections.

Monitoring Near Treatment Facilities: DOE routinely requires that groundwater observation wells be established around the perimeter of all sprayfields, with emphasis on down-gradient areas that are most likely to be impacted. Since the proposed sprayfield location is on the top of a flattened ridge, most of the observation wells would be located along the lower edges of the lagoon area and the sprayfield, in both the Stemilt and Squilchuck drainages. These observation wells, concurrent with testing procedures required by the DOE, will ensure that groundwater quality is continually monitored.

Other Monitoring Locations: The only spring with a water rights claim in the vicinity of the wastewater facilities site is Squilchuck State Park. This spring could be periodically monitored to determine if there is a measurable impact before and after the facilities are placed in operation. Any surface streams in the immediate vicinity of the wastewater facilities site could also be monitored before and after construction to establish the presence or absence of runoff. Tests for both springs and surface streams necessary to determine impact would include conductivity, nitrate, and coliform bacteria.

Agency Responsible for Monitoring: The operating agency for the wastewater facilities (either the PUD or a water district formed for the resort) would be responsible for the collection of samples. The operator would require certification by DOE. Tests would be run by the operator, and/or sent to independent laboratories.

The containment berms will be designed to capture runoff which could occur during unexpected periods of hydraulic overloading, e.g., during intense rainfall events such as thunderstorms. The berms are intended to provide a factor of safety against accidental runoff which could otherwise reach surface streams.

Storm Water. As discussed previously, the design of the on-site drainage system mitigates potential impacts on the capacity of the natural drainage systems downstream of the site.

Solid Waste. Seasonal use at the resort, coupled with industry improvements in solid waste disposal, should help to minimize impacts on the landfill site. The resort operators will implement a Spill Prevention, Control and Countermeasure Plan (SPCC) prior to providing fuel or dangerous waste storage areas, as prescribed by Washington State law.

AESTHETICS

Existing Conditions

The project site is typical of the semi-arid mountainous terrain of the Eastern Cascade Range. Dominant colors are a medium sandy brown mottled with patches of sparse vegetation and patches of conifers. Rock outcroppings and cliffs are visible throughout the project site. However, the dominant land form consists of rolling terrain with a pleasing visual quality. Ski trails are evident where they have been cut through tree cover. Section 19, the site for Constellation Ridge Resort, has been selectively cleared in recent years, which is evidenced by cuts for logging roads and some remaining slash. The primary views are north toward Wenatchee and the Columbia River, and south looking up toward the ski slopes and the mountains.

Impacts

The project will alter the portion of the site that is not currently allocated for skiing. Additional ski runs and lift towers will be visible from various perspectives. The access road to the resort site, as it traverses Section 24, will also be visible from points along the upper Squilchuck Road. The visual impact of the roadway will vary depending upon the steepness of the terrain. The hotel complex, condominium buildings and single-family residences will be visible on the site. The hotel complex has been designed as a 5 story building and will sit on a knob at an elevation of approximately 4,900 feet. Besides lighting for night skiing, this will be the most visible aspect of the development.

The sewage treatment facility will be located on Section 17 at the 3,800 foot level in a forested area. Trees will be removed to construct the 18 acre lagoon

area and thinned for the 44 acre sprayfield site. The lagoons will look similar to other manmade impoundments in the Stemilt Basin. The lagoon site will not be viewed from distant vantages due to its specific location.

Construction of the water pipeline from the State Park will require the permanent removal of trees in a corridor wide enough to allow access of construction equipment. The treeless corridor will create a visual impact along the serpentine route up the draw and along side slopes.

Mitigating Measures

To ensure high quality aesthetic values on the site and provide a high quality ski experience, every effort will be undertaken to maintain the natural character of the site. The design and placement of ski lifts and trails, parking lots, roadways and buildings will be compatible with site topography. The site plan also utilizes a natural depression as a 1.5 acre water amenity to enhance the site. In addition, exterior finishes, landscaping and lighting will complement the built environment. Revegetation of areas disturbed as a result of access road, sewage treatment, ski trail and utility line construction will minimize visual impacts as well as the retention of site tree cover wherever possible. The retention of trees surrounding the lagoon site will minimize the visual impact of the impoundments from closer settings. The serpentine route proposed for the water pipeline will reduce the visual impacts of the treeless corridor.

ARCHEOLOGICAL/HISTORICAL RESOURCES

Existing Conditions

There are no known historic or archeological properties on the State or National Register of Historic Places, or the Washington State Inventory of Historic Places, that will be impacted by the project. No archeological survey of the site has been conducted.

Impacts

None noted at this time.

Mitigating Measures

An archeological/historical field check will be conducted prior to any ground disturbing activity. Monitoring will be undertaken during actual construction.

REVENUE VS. SERVICE COSTS

Existing Conditions

The private land which will be utilized for the Constellation Ridge Resort (900 acres) is currently valued by the Chelan County Assessor's Office as "classified timber". Such a classification places a low value on land since it is primarily utilized for growing and harvesting timber. Accordingly, the land presently has an assessed value of $17,665. The total annual tax levy in the project site vicinity is 11.27289 per $1,000 of assessed valuation. Therefore, the site now contributes about $200 in annual tax revenues. When the property changes to a new use, the assessor will apply a compensating tax which will be based on the current market value and the number of years which the land was listed as classified timber. (Chelan County Assessors Office, telephone conversation with Chuck Graves, April 4, 1986) . Tax revenues from the site are allocated to various taxing districts as follows:

	Rate per $1,000 of assessed value
State School Tax	4.11938
County Fund (including current expenses, mental health, and law library)	1.50536
County Road District	2.04066
School District No. 246	2.72290
Library District	.5000
Port District	.38459
	11.27289 total tax levy

At the present time there are no service costs associated with the private property. The Mission Ridge Ski Area provides revenue to Chelan County, the State of Washington and the U. S. Forest Service in the form of property taxes and land lease payments, totaling approximately $35,000 annually. The ski area also pays various business and sales taxes to state and local authorities. The ski area presently receives services in the form of road maintenance and police

assistance. Since Mission Ridge is located outside of Fire District No. 1, they are billed in the event a fire truck is dispatched to the site.

Impacts

Construction of 700 resort units of varying size and cost would add a substantial tax base to Chelan County. Using an average of $45,000 per unit, total value of improved real estate and land would be $31.5 million. Phase 1, the initial 300 units would have an approximate value of $13 million. Assuming this assessed valuation for Phase 1 and subsequent buildout, the resort project would generate conservatively $402,972 in property tax revenues. In addition, the ski operation and other commercial facilities would increase revenues in the form of various business taxes, sales taxes and land lease payments that would be distributed to local, state and federal agencies.

The additional property tax revenues would be distributed as follows:

	Phase 1	Buildout
State School Tax	$ 53,552	$129,760
County Fund	19,570	47,419
County Road District	26,529	64,281
School District No. 246	35,398	85,771
Fire District No. 1	19,758	47,876
Port District	5,000	12,115
Library District	6,500	15,750
	$166,307	$402,972

As stated previously, the Constellation Ridge Resort project will not be occupied by permanent residents, with a few exceptions. For this reason, demands for public services will be substantially less as when compared to typical single and multi-family residential developments. Few school age children residing on the site will create a large surplus for school District No. 246, and other taxation districts will experience a similar net benefit.

A direct tax increase to Chelan County residents, as a result of the project would occur if the Chelan County Commissioners elected to fund the construction of the access road. The cost for constructing the access road would be approximately $530,000 for the lower, or developer's preferred alternative, and $460,000 for the upper route alignment. The lower route is the preferred alternative of the project proponents since it provides the most direct and safest route to the new Mission Ridge base area, parking lots and the Constellation Ridge Resort. The lower route also is favored by the project proponents since the upper route will require the redesign of ski runs, night lighting, snowmaking equipment and Chairlift No. 4.

Based upon the $530,000 cost of constructing the preferred access route, the Chelan County Commissioners would review various funding alternatives. One such alternative would be to issue bonds for $530,000 to be repaid through a tax levy by all County taxpayers. At an interest rate of 10.5% and a repayment schedule of 10 years, it would cost the taxpayers $86,000 per year, or $.063 per $1,000 of assessed valuation. For a home assessed at $70,000 it would cost the taxpayer $4.41 annually for the 10 year levy.

A similar financial arrangement for constructing the upper access route would cost the taxpayers $75,000 per year or $.055 per $1,000 of assessed valuation. For a home assessed at $70,000 it would cost the taxpayer $3.85 annually for the 10 year levy. Construction of either access alternative to the site with County funds, as suggested by the project proponents, is not consistent with present County policies.

The Constellation Ridge Resort project will not impact local cherry growers through higher taxation as a result of secondary residential growth. It is currently the policy of Chelan County that agricultural lands are taxed according to their current use, and not as potential residential property.

Mitigating Measures

The high real estate values of resort property, coupled with occasional and

seasonal use by owners, provides a high tax base for Chelan County and less of a demand for public services, as when compared to typical single and multi-family residential developments. These factors will all contribute to a surplus in the taxing districts for Chelan County. Police services will be further reduced by the presence of a 24 hour private security service on the resort site.

SOCIO-ECONOMIC IMPACTS

Exisitng Conditions

Since its opening in the early 1960's, Mission Ridge Ski Area has had a significant economic impact on the Wenatchee area. Beyond the jobs and income provided at Mission Ridge, skiing also generates employment and income throughout the local economy.

The Wenatchee economy benefits directly from the sale of goods and services to both local and out-of-town skiers. Besides money spent at Mission Ridge, skiers purchase goods and services from motels, restaurants, ski shops, grocery stores, service stations and taverns. Other local businesses cater to skiers as a very small part of their operation, including movie theaters, specialty shops, etc.

At the present time approximately one-third of Mission Ridge skiers are from out-of-town, generating about 30,000 annual skier visits. This influx of winter skiers has substantially increased winter business to motels, restaurants and other businesses which provide goods and services to the skiers. In the local motel industry alone, approximately 50 percent of the winter business is attributed to skiers. (Conversation with Marsha Gamble, Manager, Chieftan Motel, June 15, 1984).

The current direct income impact of Mission Ridge visitors upon the Wenatchee economy is estimated to be $3 million. This income then recirculates throughout the local economy purchasing additional goods and services, paying wages, rents, etc. This creates additional income for the local economy and is represented as

an economic "multiplier". A rule of thumb is that for each dollar spent for skiing, an additional 2.7 dollars of comminity income is generated. This equates to a multiplier of 2.7[1]. Using the 2.7 multiplier, Mission Ridge Ski Area generates $8.1 million in the Wenatchee economy.

Impacts

The proposed expansion of ski facilities at Mission Ridge and the development of the Constellation Ridge Resort will have a beneficial economic impact on the Wenatchee area. At project buildout the ski area will generate 287,000 annual skier visits, or about three times the present annual skier count. Additionally, 70 percent, or 200,000, of the skier visits will be generated by out-of-town visitors.

This influx of visitors will bring about $17.8 million into the Wenatchee economy. As the money continues to circulate among Wenatchee businesses and households, it will generate another $30.3 million in community income. Therefore, a total of approximately $48.1 million of income will be generated in the local economy as a result of the resort operation. This is about six times the present level of community income.

The resort expansion will increase the demand for goods and services within the Wenatchee economy. Employment will also increase relative to growth in community income. The actual magnitude of the increases will depend upon the rate at which the facilities develop and the ability of the resort operators to attract new customers. The project will also contribute to stabilizing the tourism and recreation industry in Wenatchee as a four-season economic activity.

[1]A multiplier of 2.7 was utilized in the 1981 Socioeconomic Analysis entitled: Impact of the Proposed Expansion of Mt. Bachelor on the Bend Urban Area, published by the Central Oregon Intergovernmental Council.

Mitigating Measures

The expanded resort operation will have a positive impact on transient lodging and other commercial facilities in the Greater Wenatchee area. Rather than competing directly, the resort will complement existing facilities available in the area. This will occur as a result of the volume of annual skier visits increasing from a present level of 100,000 to approximately 287,000 at project buildout. The new demand for lodging and services will be accommodated by existing facilities in Wenatchee and at the resort complex. Furthermore, the construction of resort lodging at Mission Ridge will be undertaken as demand warrants, which is the present case with developing new commercial lodging units in Wenatchee. The City of Bend, Oregon, the support community for Mt. Bachelor, is an example of this particular growth pattern. As a result of the growth in skier visitation during the past ten years, there has been a dramatic increase in private resort accommodations in conjunction with motel and public lodging facilities in the Bend area. The two principal resorts, Sunriver and the Inn of the Seventh Mountain, account for almost 40% of the rooms and 50% of the beds in the area'. These resorts, as in the case of the Constellation Ridge proposal, are comprised of various types of accommodations, including hotel, time-share, condominium and single-family units. The actual number of resort units available for public use will depend upon owner preference. Some owners prefer to have exclusive use of their recreational units while others enter their units into a rental pool or open market.

The proposed Mission Ridge/Constellation Ridge Resort will have approximately 650 non-permanent dwelling units, while Wenatchee will have approximately 1,000 units (made up of 778 current motel/lodging units and about 200 which are presently being developed). This would create the same 40 percent ratio of resort rooms to non-resort rooms which occurs in Bend, Oregon. However, as stated previously, only one-half of the winter business or occupancy in Wenatchee motels is attributed to skiers. Business and other non-ski related travellers utilize the remaining one-half of the motel units. For this reason, it is anticipated that 60 percent of

'1981 Socioeconomic Analysis entitled: Impact of the Proposed Expansion of Mt. Bachelor on the Bend Urban Area, published by the Central Oregon Intergovernmental Council.

the resort users will occupy overnight accommodations at Constellation Ridge Resort while 40 percent of the future out-of-town skiers will stay at various Wenatchee motels. This simultaneous demand of resort and non-resort facilities is a result of skier preference for a particular type and price of accommodation. As compared to the current usage of Wenatchee motels by Mission Ridge guests, the projected increase in skier visitation will be split between the Constellation Ridge Resort and Wenatchee motels, as shown below.

Skier Visit/Occupancy Split For Mission Ridge Destination Skiers

	Total Number of Destination Skier Visits	Wenatchee Motels	Constellation Ridge Resort
Current (1984-85)	30,000	30,000	-
Phase 1	100,000	40,000	60,000
Phase 2	200,000	80,000	120,000

The resort expansion will also increase demand for commercial facilities in the Wenatchee area. Since the resort is not isolated from Wenatchee, it will rely on local businesses for support of all types, including food supplies and shopping needs, automobile services, a full range of restaurant choices, banking needs, etc. In fact, local businesses have indicated a strong desire in catering to on-site resort users by expanding their current operation. As in the example with Bend, Oregon, growth in skier visitation has increased the opportunity and development of local commercial facilities.

The proposed resort development will also help to balance the winter with the high summer income derived from tourists and recreationalists. Presently, the number of summer tourists and visitors greatly exceed the number of people who visit in the winter months, including skiers. This will also be true at project buildout when 200,000 out-of-town visitors will utilize the resort facilities during the winter. Current summer tourism figures for weekends only during June, July and August equal approximately 360,000'. When analyzing demand for public services such as police, fire/emergency services, maintenance, etc., it is evident that needs are greater during the summer months. The future increase in winter tourism will help to bridge the gap, thereby creating a certain economy of scale in providing public services.

'Based upon tourism estimates from Population Trends: Chelan & Douglas Counties, Chelan County Planning Department, January, 1984.

3. UNAVOIDABLE ADVERSE IMPACTS

EARTH

- Topographic changes compatible with the natural character of the site.
- Disruption and overcovering of soils.
- Increased erosion potential following initial clearing and grading operations until revegetation occurs, with a potential for eroded sediments to enter surface water runoff.

AIR

- Temporary increases in airborne dust and vehicle emissions during construction.
- Localized increases in carbon monoxide levels along the Squilchuck access road.
- Temporary odors from construction activities such as asphalt paving, and increased odors associated with vehicle emissions, home heating, and property maintenance.
- Potential for odor from sewage treatment lagoon facilities located in Section 17.

WATER

- Alteration of the absorption characteristics of the site.
- Contamination of runoff water with trace amounts of petroleum residues, heavy metals, phosphorus, nitrogen and othe pollutants associated with vehicle traffic and property maintenance.

FLORA AND FAUNA

- Permanent conflicts between wildlife and humans during summer resort use.
- Removal of natural vegetation on site, with a corresponding reduction or loss of the wildlife habitat and animal species.
- Potential incidents of predation on wildlife by uncontrolled domestic pets.
- Removal of snags and stumps causing a corresponding reduction or loss of wildlife habitat and non-game animal species.
- Secondary impacts to habitat and wildlife as a result of induced development in the Squilchuck, Stemilt and Naneum Basins.

NOISE

- Temporary significant increases in noise levels during construction.
- An incremental increase in noise levels on the Squilchuck access road.
- Low level noise associated with the operation of a year-round resort and winter use of the ski area.

LIGHT AND GLARE

- Increased nighttime light visible from various areas in the Wenatchee Valley due to interior and exterior lighting.
- Increased reflective surfaces, causing glare at certain times on sunny days.

LAND USE

- Conversion of approximately 900 acres of vacant open land to resort use and the partial conversion of 1,255 acres for expanded ski terrain.

- Increased demand for use of commercially zoned property along the Squilchuck Roadway.

- Increased use of public lands.

- Contribution to the loss of vacant open land in the area for the resort complex.

- Increased demand for large lot development on other private lands.

NATURAL RESOURCES

- Commitment of the private property to resort use, precluding other uses to which the land resource could have been committed.

- Commitment of power, water and forest resources.

TRANSPORTATION/CIRCULATION

- Increased demand by limited number of permanent residents for school bus transportation to elementary, junior and senior high schools.

- An increase in peak hour and average daily traffic on the Squilchuck access road.

- Potential increased hazard to walking school children on Squilchuck Road.

PUBLIC SERVICES

- Increased demand for County maintenance of the extension of the Mission Ridge access road.

- Possible addition of school students in Wenatchee School District No. 246 by permanent residents of the resort complex.

- Increased use of and demand for public recreational facilities in the area.

UTILITIES

- Increased demand for electrical energy for resort operations and heating/ lighting.

- Increased requirements for telephone services.

- Increased demand for water use and distribution.

- Increased demand for solid waste collection services.

AESTHETICS

- Alteration of the natural character of the site due to conversion to a developed stage.

4. SHORT-TERM USE VS. LONG-TERM PRODUCTIVITY

The proposed expansion of the Mission Ridge Ski Area and development of the Constellation Ridge Resort complex will provide a year-round recreational opportunity for thousands of residents of the Pacific Northwest. A major portion of the site has already been committed to alpine and cross-country skiing, a developed recreational activity. However, use of alpine terrain for recreational skiing is not an exclusive use since the majority of the land remains in a natural state.

The Constellation Ridge development on private property is a long-term commitment which will provide resort accommodations for approximately 2,500 people, occupying 700 lodging units. The resort development is consistent with the Chelan County Comprehensive Planning Outline, and the proposed density is in accordance with the Chelan County Comprehensive Zoning Resolution. The commitment of approximately 129 acres, which comprises the resort complex, will preclude other future uses of the land resource, and specifically the growth of merchantible timber. The property was selectively logged in 1978. No unique ecosystems will be affected by the proposed development.

There is no apparent advantage in reserving for some future time the implementation of the proposal, as opposed to possible approval of the proposal at this time. The recreational development project responds to a demonstrated need for a resort in Washington State and will sponsor new growth in the tourism and recreation industry. It is a common fact that this type of industry provides considerable economic development with negligible impact on the environment when compared to other large industries. This effect would have a positive economic benefit to Chelan County, as well as the State, by providing additional jobs and through the sale of goods and services.

Development of additional ski terrain on U. S. Forest Service land would be permitted under a term Special Use Permit with a probable tenure of

thirty years and subsequent renewals. The proposed ski area expansion is also consistent with the long-term management plans of the Chelan and Kittitas Planning Units of the Wenatchee National Forect. Other public lands required for the development of ski facilities will be leased from the respective administering agencies, the Washington Department of Natural Resources and the Washington State Game Department. Issuance of these leases permitting ski area expansion would result in a long-term benefit to recreation in Washington State.

5. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

As discussed previously, the project will convert approximately 191 acres of open vacant private property to be committed to a resort complex and sewage treatment facility, effectively precluding use of the land resource for other purposes. It is apparent that Mission Ridge Ski Area has been developed to its highest and best use -- winter recreation, and that this utilization of resources should continue.

The labor and materials necessary to construct and maintain the proposed resort will be irreversibly and irretrievably committed. Materials committed will include water, wood and metal products, sand and gravel, asphalt, and concrete. A certain amount of the natural vegetation on the site will be permanently removed, reducing available wildlife habitat. Fossil fuels and electrical energy would be consumed for transportation, lighting, and heating during construction, occupation, and operation of the resort. In addition, long-term commitment of public services would be required. Such commitments of resources are not unique to this particular site. They would be required wherever recreational properties are developed.

6. ALTERNATIVES

It is the objective of Wenatchee Mountain, Inc. and Bevis Buildings, Inc. as project proponents, to develop both public and private properties to their highest and best use. The natural resources of the site are unique and provide a quality skiing experience for thousands of people at the existing Mission Ridge Ski Area. Concurrently, the presence of private property adjacent to the ski facilities creates a situation which is extremely unique in Washington State as the majority of alpine terrain suitable for ski development and resort lodging is in the public domain. These public and private ownerships must be joined in concert to achieve the highest and best use of the available resources.

The discussion of alternatives in this section is limited to an evaluation of the no-action alternative and reasonable alternatives on the proposed site. Site development alternatives include expanding the Mission Ridge Ski Facilities at the present site, expanding the permit area to allow two day-use sites to develop, and development of the resort site at a reduced density.

NO ACTION ALTERNATIVE

A no-action alternative should see skier visits gradually leveling off at approximately 123,000 annually, depending upon weather, snow conditions, length of the winter season, etc. As the public demand increased, lift lines would grow longer, slopes would become more crowded and the quality of the winter experience would deteriorate on weekends and holidays. Controlling attendance would be the only method to counteract this phenomena.

Additional clearing and earth work on the slopes would be necessary to provide for increased attendance. Removal of more trees in the existing permit area would have to be curtailed at some point when the protective and aesthetic qualities of the forest are endangered.

The long range economic effect of a no-growth alternative would tend to create serious economic problems for Wenatchee Mountain, Inc. The employment at Mission Ridge would increase as attendance grew, but the seasonal and part time work pattern would not materially change. As the quality of the skiing was lowered, due to crowding and the absence of improvements, the image of the area would suffer. This could lead to a poor competitive situation in the industry and a lowering of annual skier visits, in spite of crowding on peak attendance days. Even with the continued growth of the lodging industry in Wenatchee, the opportunity to increase mid week attendance and attract vacation skiers would be diminished.

The conclusion that the no-growth alternative for Mission Ridge would create serious economic problems for the ski area was arrived at through a specific analysis of user data for Mission Ridge and other ski areas around the Pacific Northwest. A review of skier visit data from selected resorts for the past ten years indicates that the greatest demand and growth in the ski industry is found at destination resorts, as shown in the following table.

Table 19

10-Year Percentage Increase In Skier Visits For Selected Local and Destination Resorts

	Local Resorts	Destination Resorts	State/Prov. Average
British Columbia			+ 44.8
Whistler/Blackcomb		+121.1	
Kimberley		+ 71.4	
Red Mountain	- 5.3		
Silverstar	- 4.4		
Washington			- 14.2
49° North	+37.7		
Mt. Spokane	-30.8		
Crystal Mountain	-28.3		
Ski Snoqualmie	-30.9		
Stevens Pass	+26.9		
Mission Ridge	- 2.4		
White Pass	-42.0		
Oregon			+ 36.3
Mt. Bachelor		+ 97.7	
Timberline		+ 99.1	
Mt. Hood Meadows	+40.3		
Anthony Lakes	-31.8		
Mt. Ashland	+ 5.5		
Idaho			+ 23.6
Sun Valley		+ 71.6	
Schweitzer		+ 47.9	
Bogus Basin	+ 3.1		
Montana			+ 20.1
Big Mountain		+ 38.8	
Big Sky		+ 90.8	
Bridger Bowl	+30.7		
Red Lodge	+44.5		
Showdown	+ 4.3		

Source: Sno-engineering, Inc. (1974-75 to 1983-84).

Many factors have influenced steady growth, including snow droughts, demographic changes and economic recessions. Despite these factors, the majority of the destination resorts have witnessed considerable growth. Conversely, the local ski areas have shown nominal or negative growth since they are so easily

influenced by changing conditions.

As shown in the foregoing table, Washington State's skier growth rate for the ten-year period of -14.2% is well below that of British Columbia, Oregon, Idaho and Montana. This is due to the fact that Washington State lacks any destination resorts, which are present in all the other states. These destination resorts have contributed substantially to skier visit growth in British Columbia, Oregon, Idaho and Montana. Washington State loses approximately 750,000 skier visits annually since skiers must travel out-of-state to enjoy the facilities available at destination resorts.

As compared to other Washington State ski areas, Mission Ridge has faced a similar, although less pronounced, negative growth rate for the ten-year period, as indicated below. This is a result of Mission Ridge's ability to attract a certain number of skiers from within the region. However, comparing Mission Ridge's growth figures with that of competing destination resorts in the Northwest, it is evident that the majority of skiers are travelling to resorts with a greater variety of services and facilities, such as those proposed for the expanded Mission Ridge Resort.

Annual Attendance: Mission Ridge Ski Area

Year	Skier Visits
1974-75	98,472
1975-76	75,668
1976-77	Did not operate due to lack of snow
1977-78	97,980
1978-79	79,697
1979-80	93,541
1980-81	56,248
1981-82	96,080
1982-83	101,646
1983-84	96,079
1984-85	91,203

Source: Ski Area Records 5-86

Note: Mission Ridge skier visits have vascillated due to weather, economic factors and changes in skier attitudes and desires.

Based upon this information the no-growth alternative would have a negative impact on the growth of the Mission Ridge skier market, amplifying the trends evident during the past ten years. While other resorts in British Columbia, Idaho, Oregon and Montana continue to expand in response to added skier demand, Mission Ridge's competitive position in the industry would be further eroded.

MODEST EXPANSION WITHIN EXISTING PERMIT AREA

Mission Ridge could continue with its existing pattern of development and operation. This would involve adding facilities as the attendance increases and warrants it, which would include parking, utilities, shelter, lifts, slopes, food, first aid, ski school, merchandise and rentals, and related items pertaining to a day or regional operation.

This program would continue to rely on Wenatchee for overnight lodging and apres ski amenities. The amount of available beds in the future will have a direct influence on the number of vacation skiers attracted to the area. The alternate would encourage growth in attendance, and in facilities, as the ski sport expands in popularity. Growth in midweek attendance would develop slowly, and non-winter use programs would be absent.

Limitations on this form of development include the need for more convenient parking areas, an increase in beginner and low intermediate terrain, and creating more intensive use of the existing permit area. Some ski areas have developed a major market for night skiing, contributing greatly to customer satisfaction, and increased revenue.

Mission Ridge Ski Area has all the resources for a very sizeable increase in capacity, except for parking terrain. To solve the parking problem, busing would be required to transport skiers from parking spaces along the access route or possibly from parking areas located at a lower elevation. However, the costs and logistics of transporting large quantities of skiers by bus over mountain roads for any great distance are not

favorable. The large number of buses necessary to support such an operation in an effective manner would require a tremendous capital outlay. Financial considerations would dictate that the buses be operated at the maximum utilization level. An expanded day ski area would be unable to meet such expectations due to seasonal operation and low midweek attendance. Additional costs would include the acquisition of property for the parking facility, maintenance of the buses and hiring of new personnel to operate the vehicles. In summary, an expanded version of the existing Mission Ridge ski area operation, with a limited market, cannot support a transportation system to ferry skiers to and from the ski area. Such an operation is not financially feasible.

EXPANSION OF THE PERMIT AREA COMBINED WITH THE ADJACENT 900 ACRES OF PRIVATE PROPERTY, ALLOWING TWO DAY-USE BASE AREAS TO DEVELOP

The combination of the Mission Ridge Ski Area and the contiguous 900 acres of private property would make possible a moderate or large expansion of the ski area. An access road would be required from the existing base area of Mission Ridge to the southwest quarter of Section 19. Additional parking would be provided for in Section 19 along with a day lodge to serve new ski lifts and trails in the second base area.

Major constraints related to this alternative are the limited available market, the amount of available overnight lodging close-by and the high cost of constructing the access road, parking, utilities, lifts and buildings. As a regional ski resort, Mission Ridge's attendance is limited to the day skiers residing within approximately two to two and one-half hours' driving distance, plus the available overnight facilities in the Wenatchee community.

In summary, the development and operation of two base areas for day use only would not be feasible. Such a facility would have a capacity

greater than the local and regional market could support. In addition, the available overnight lodging in Wenatchee would not be capable of supporting the number of skiers required to make the alternative economically viable. The cost per skier day of capacity for the roads, parking and infrastructure would be prohibitive.

DEVELOPMENT OF THE CONSTELLATION RIDGE RESORT SITE AT A REDUCED DENSITY

The proposed Constellation Ridge Resort is situated on 900 acres of private property (Section 19 and the northeast quarter of Section 30). The resort complex utilizes a small portion of the 900 acres in the southwest quarter of Section 19, totaling approximately 129 acres. The present proposal will maintain an overall density of less than one dwelling unit per acre. At complete development the resort will accommodate about 2,500 people.

For purposes of evaluating a reduced density alternative, it is assumed that a resort with 300 units to lodge approximately 1,000 people would be developed on the project site. Such a project would also require the formation of a Planned Development District under the Chelan County Zoning Resolution. The reduced density alternative would develop lodging at fewer units per acre since more available land exists. Lodging units would be developed in the same locations as the present proposal to take advantage of unique topographic features and views.

While the water and sewer systems would be reduced in size and capacity, the development of this alternative would require the construction of the access road, site roadways, parking and ski lifts to the same specifications as the present proposal. This would, undoubtedly, affect the developer's return on investment since the cost of these improvements is extremely high.

While this alternative would visibly reduce certain impacts such as site run-off, disturbance of natural vegetation, traffic on the Squilchuck

Road, associated construction noise, light and glare and the demand for electricity, it would have a negative impact in terms of strengthening the local and State economy through various taxes and the development of new business.

The creation of a successful destination resort is a function of the availability of natural resources, the design and management of the facilities and the number of people utilizing the site. The reduced density alternative limits the ability of the ski area and resort complex to realize its highest and best use since fewer recreational enthusiasts will use the site. In addition, due to the limited opportunities for similar developments in Washington State, demand will exceed capacity within a short time.

The requirements for developing appropriate utility infrastructure (water, sewer, power, etc.) for such an isolated site are considerable. For this reason, a lower density development cannot attain the economy of scale needed to create a viable project.

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8. EIS COMMENTS AND RESPONSES

A total of 68 comment letters were received on the Mission Ridge/ Constellation Ridge Draft EIS. The public and agency consultation period extended from August 1, 1984 (the date of release of the Draft EIS) through September 4, 1984. One state agency, Department of Ecology, received an extended deadline (September 19, 1984) for comment purposes.

Of the 68 comment letters received by Chelan County Planning Department, 44 letters expressed only approval or disapproval of the project without making any other comments. Of these 44 letters received; 36 indicated they favored the project and 8 stated they were not in favor of the expansion.

A list of the 24 comment letters received, their assigned numbers and the pages on which they occur is provided in Table 19 of this section of the Final EIS. All responses to the comment letters have been incorporated into the text of the Final EIS. A page reference found in the left-hand margin of each comment letter received has been furnished as a key for locating the responses to comments found in each letter.

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LETTER 1

CITY OF WENATCHEE, WASHINGTON
"Apple Capital of the World"
DEPARTMENT OF PUBLIC WORKS

RECEIVED AUG 24 1984 PLANNING OFFICE

See Page

August 21, 1984

Edward C. Loidhamer, Director
Chelan County Planning Department
411 Washington Street
Wenatchee, Washington 98801

Subject: Comments on DEIS for Mission Ridge/Constellation Ridge Resort

Dear Ed:

Prior to offering my comments on specific areas of the DEIS which I feel could be improved upon, I feel it incumbent to make a few general statements regarding the document in general. I note with considerable interest that the responsible lead agency has added editorial comments in italics after many of the specific areas of discussion. For the lead agency to express concerns over areas of review as critical as the preliminary design of the transportation system, long-term road maintenance costs, the lack of a necessary biological survey of existing wildlife and their living patterns, preliminary design plans for the parking facility, the quantification of the impact on future load growth of electrical systems and the lack of preliminary feasibility determinations for the creation of special purpose districts (water, sewer and fire), my only reaction can be that the DEIS was circulated prematurely without the necessary research being done allowing a meaningful environmental evaluation. I would draw your attention to the language of WAC 197-10-420 (1) Preparation of EIS by persons outside the lead agency....."The responsible official prior to distributing the draft EIS shall be satisfied that it complies with these guidelines and the guidelines of the lead agency", and WAC 197-10-420 (2)....."The responsible official within the lead agency shall assure that the EIS is prepared in a responsible manner and with appropriate methodology. The responsible official shall direct the areas of research and examination to be undertaken as well as the organization of the resulting document" (emphasis added). I agree with the lead agency's editorial additions to the DEIS in that the information not made available, is critical to a meaningful evaluation of the subject matter. My concern is that the DEIS cannot serve the purposes for which the draft statement is intended when such essential background information is unavailable for review and consideration. It would appear that the DEIS was issued prematurely, thereby seriously encumbering the full environmental disclosure mandate required by the State Environmental Policy Act of 1971.

16 On page xix, a set of covenants, conditions and restrictions (cc and r's) are listed as a mitigating measure under the aesthetic impact of the proposal. The cc and r's are described as endstate performance standards that will supposedly insure that the development is compatible with the natural character of the site by regulating topographic alterations, building scale and design, exterior finishes, landscaping, lighting and

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LETTER 1, CONTINUED

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16 other aesthetic values. Yet according to the discussion on page 15, the covenant's conditions and restrictions have yet to be drafted. It would appear appropriate that inasmuch as a number of sensitive environmental concerns would be regulated by these documents, that they should be available for public consumption so that their effectiveness and workability could be ascertained.

141-145 In the evaluation of the no-action alternative found on page xx, the statement is made that the long range economic effect of the no-growth alternatives would create serious economic problems for the operation of Mission Ridge as its competitive position in the industry would be eroded. How was this conclusion arrived at? Are there user studies in existence from actual Mission Ridge operations that suggest a declining trend in the facility as it now operates?

132-133 Other than a few general comments scattered throughout the EIS regarding the economic advantages of this proposal on the Greater Wenatchee Area, I see no discussion regarding the effects this expanded operation might have on existing transient lodging and other existing community facilities that would be directly competing with the new facilities being planned in the Mission Ridge area.

On page 40, the statement is mad that control catch basins in the on-site drainage system are designed to remove both heavier and lighter than water

42-45 contaminants from surface water runoff. Has this design work actually been done and if so, what are the particulars of the systems that are anticipated for the use? Are oil traps and sedimentation structures actually built into the system, or is some other means going to be employed?

Under the section on short-term use versus long-term productivity on page 106, the DEIS states "no unique ecosystems will be effected by the proposed development", but on pate 43 under the description of existing conditions, the DEIS states "since an actual on-site survey of animal species has not been conducted, it is possible that unique species could be identified". It seems apparent and conceded by the DEIS itself, that a detailed biological survey is necessary before these impacts can be adequately assessed and addressed through adequate mitigating measures or project alterations.

49-58 Perhaps the most substantial and potentially disruptive change represented by this proposal is the major shift in use habits from current practice. The Mission Ridge facility is currently a non-residential wintertime sports staging area, which does not cause any major conflicts with other recreationalists at other times of the year. The proposal at hand would seek to extend the period of human activity not only on a residential basis 24 hours a day, but also on a year round basis since only through a relatively high level of use could such amenities as a hotel, restaurant, lounge, swimming pool, tennis courts, horseback riding stables etc. be financially feasible to construct and maintain. The argument put forth in pages 44 and 45, which describe the relatively low impact of the existing Mission Ridge ski area and the fact that the public is excluded from being in the area outside of the ski season, is

See Page

not a demonstration that the Constellation Ridge development will likewise have no adverse impact on wildlife and other recreational consumers of this wilderness area. The DEIS on page 56 indicates that the resort accomodations and amenities will attract a new and larger market;will significantly alter the pattern of use at Mission Ridge. It also alludes to growth inducement anticipated as a result of this proposal succeeding by indicating that the future development of private parcels surrounding the project site in the Stemilt and Nahuhum Basins will sponsor increased demand for recreational use of nearby public properties. I quite agree that this development as well as "future development on nearby private lands in the Stemilt and Nahuhum Basins will have cumulative impacts on big game species primarily through restricting game movement and continued encroachment on habitat" (page 46), which leaves me to wonder at comments such as those found on page 47 which indicates "this level of activity on the 148 acre Constellation Ridge resort site will not create an impact to elk grazing on nearby or distant ski slopes". I don't believe speculation and supposition serves as a viable substitute by an adequate survey and evaluation conducted by wildlife professionals.

49-58

On page 48 under mitigating measures, the proponent indicates that in the intention of preserving game habitat and migratory freedom, restrictions will be placed on the use all property controlled by the Mission Ridge ski area and Constellation Ridge resort, having the effect of prohibiting the use of four-wheelers, trail bikes and snow-mobiles in any off-road situation other than those used in the operation of the resort and the ski area and by prohibiting all domestic pets on the site to run loose. Then under unavoidable adverse impacts on page 103, the proponent lists the potential incidents of predation on wildlife by uncontrolled domestic pets. The City of Wenatchee's experience has been that irregardless of how well intentioned animal control regulations may be, domestic pets will be introduced into the natural environment. Strict regulation of recreation vehicles will simply force ATV owners to dispurse into adjacent public and private properties impacting a much greater area than that intended for formal development by the proponent.

58

67

The existing traffic conditions described on page 64 demonstrate that the calculated capacity of the upper road is exceeded on 83% of the ski season weekend days based on the current level of development at Mission Ridge. Reviewing the traffic projections based on both Phase I and 2 development on page 68 describes a scenario of a 71% increase in weekend trips which mystically results in a forecast of reduced intensity of peak hour traffic. I find it difficult to accept the presumption that a significant reduction in day skiers will occur as a result of residential accomodations being available at the resort and certainly the project proponent would attempt to entice as many destination skiers as possible in order to capitalize on peak season activities. Rather than to go through the numerical gymnastics of attempting to gloss over an already overloaded transportation system, the proponent may have been able to maintain a greater level of credibility

75-94

See Page

by simply exercising greater candor on this issue rather than to use questionable assumptions that do little more than confuse the reader and obscure the main issue.

75-94

On page 88 under the calculation of projected demand for water supply, Table 17, domestic water demand projections are made for both Phase I and Phase 2 development. I would offer the following calculations based on supply standards in use by the State Board of Health and actual consumption experience in this area:

PROJECTED DOMESTIC WATER DEMAND

TYPE	NO.UNITS Phase I	NO.UNITS Phase 2	NO. PERSONS Phase I	NO. PERSONS Phase 2	GPD/UNIT	TOTAL GPD Phase I	TOTAL GPD Phase 2
Apt./Condo.	120	400	428	1428	800[1]	96,000	320,000
Hotel	100	300			171[2]	17,135	51,405
Day Visitors			950	950	6[3]	5,700	5,700
Restaurant/Seat			220	550	50[3]	11,000	27,500
Tavern/Person			100	280	25[3]	2,500	7,000
Employees			50	100	10[3]	500	1,000
RV /Unit	20	40			100[3]	2,000	4,000
Dorm Staff			10	15	50[1]	500	750
Residences	15	30	37	75	800[1]	12,000	24,000
					Total Gallons Per Day	147,335	441,355
					Total Gallons Per Minute	102	306

[1] State Board of Health standard of 800 gallons per unit per day without irrigation load.

[2] Actual demand calculations on local transient accomodations per unit - City of Wenatchee.

[3] Applicants figures from technical studies (equivalent to wastewater flows)

107-114-123

The total demand for domestic water using realistic volumes show a flow requirement of 306 GPM as opposed to the applicant's projection of 141 GPM as a peak winter load at buildout. This would suggest that suitable water supplies might not be available for a project this ambitious.

Table 18 on page 93 estimates wastewater for both Phase I and Phase 2 development. The following calculations reflect local experience with actual flows in similar applications:

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PROJECTED WASTEWATER LOADINGS

SOURCE	NO.UNITS Phase I	NO.UNITS Phase 2	NO.PERSONS Phase I	NO.PERSONS Phase 2	FLOW/PERSON GPD	TOTAL GPD Phase I	TOTAL GPD Phase 2
Apt./Condo	120	400	428	1428	150[1]	64,200	214,200
Hotel	100	300			115[2]	11,500	34,500
Day Visitors			950	950	6[3]	5,700	5,700
Restaurant/Seat			220	550	50[3]	11,000	27,500
Tavern			100	280	25[3]	2,500	7,000
Employees			50	100	10[3]	500	1,000
RV/Vehicle	20	40			100[3]	2,000	4,000
Dorm Staff			10	15	50[4]	500	750
Residences	15	30	36	75	150[4]	5,625	11,250
					Total Gallons Per Day	103,525	305,900
					Total Gallons Per Minute	72	212
					Annual Total[5]	66,074,400 gallons	

[1] Actual per capita residential flow-City of Wenatchee. Family size of 3.57 persons per unit (applicant's estimate)

[2] Actual per unit transient residential accomodation flow - City of Wenatchee

[3] Applicant's estimate

[4] Actual per capita residential flow - City of Wenatchee. Family size of 2.5 persons per unit (assumed).

[5] Calculated at 180 days at capacity and 180 days at 20% capacity.

107-110 / 114-120

The applicant's projected peak day is 64% of the average daily flows projected above. The total annual flow projected by the proponent is less than 17% of the annual total above. These questions of adequate capacity and the fact that the spray field will not be operational during peak flow periods should be addressed in holding cell design. The DEIS did not contain sufficient information to determine if the processing cells were adequately sized.

132-133

I believe the discussion of economic impact on pages 100 and 101 are simplistic in light of the many issues involved in this proposal. It would be a very rare day indeed, when all impacts are positive, which I do not believe to be the circumstance in the case at hand. In addition to the competitive situation that would logically result from established area business offering the same sorts of goods and services that would be available at the Constellation Ridge development, there is also the matter of other displaced recreationalists, which may well result from the change in use anticipated in the Stemilt Basin. If, for example, elk hunting opportunities were to be significantly reduced as might reasonably be expected as a result in the use change being proposed, then a substantial source of tourist dollars would likewise be adversely effected. Although it may be admittedly difficult to quantify many of these concerns, the obligation still persists that a reasonable

discussion be pursued that would at least outline the reasonable possibilities that might result from the proposal's implementation.

In summary, I am left with the unshakeable conviction that the DEIS is woefully inadequate in discussing the environmental issues raised by the proposal. Rather than to serve the ends of full environmental disclosure, it tends to frustrate these goals to the extent that a meaningful evaluation of the environmental concerns raised by this proposal is impossible to conduct.

It appears obvious by the editorial comments added to the DEIS by the responsible lead agency that it was likewise of the opinion that critical information was not included in the document. I generally concur with all the misgivings addressed by the lead agency and extend my sympathies for what was obviously a very difficult DEIS to adequately assemble when working in tandem with what appears to be an uncooperative proponent.

Thank you for the opportunity to comment on this Draft Environmental Impact Statement.

Sincerely yours,
WENATCHEE PLANNING DEPARTMENT

Robert A. Hughes
Planning Director

RAH/di

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LETTER 2

CHELAN-DOUGLAS HEALTH DISTRICT

316 WASHINGTON STREET
WENATCHEE WASHINGTON 98801
AC 509 663 2105

August 21, 1984

See Page

Edward C. Loidhamer, Director
Chelan County Planning Department
411 Washington Street
Wenatchee, WA 98801

Dear Mr. Loidhamer:

Thank you for the opportunity to review the draft Environmental Impact Statement for the Mission Ridge/ Constellation Ridge project.

As a result of that review, we have the following questions and comments.

GENERAL COMMENTS:

The proponents propose that a water district will be formed to administer water distribution and sewage collection. The legal requirements for formation and administration of a water district are detailed in RCW 57.08; this section of the RCW mandates the adoption of a general comprehensive plan by the commissioners of the water district prior to ordering any improvements, or submitting to vote any proposal to incur indebtedness. The legal requirements for forming a water district, election of commissioners, & preparation and approval of a general comprehensive plan which must then be approved by the County commissioners, the County Engineer, and the Health Officer. In light of these requirements, a construction startup date of May, 1985, seems somewhat optimistic.

6+ 114

SEWAGE DISPOSAL

1. Proposed sewage flows used for conceptual design of the lagoons and sprayfield areas are 60 gal/person/day. This figure is consistent with that provided by EPA. However, local figures for motel potable water consumption indicate that this area shows a higher than average use/room. Please provide additional data, or further document the data that has been provided, justifying the usage figure in the document.

114-120

2. There is insufficient data in the statement regarding the use of the proposed on site sewage systems to allow us to evaluate whether such systems will be acceptable. Soils and slopes at the sites of the proposed on site systems must meet minimum state and

LETTER 2, CONTINUED

See Page

local requirements before permits can be issued.

120-124

3. Will bacteriological and biological monitoring of the sewage effluent be provided prior to irrigation? Who will provide this monitoring? Will records be submitted to Washington State Department of Ecology?

120-122

The DEIS indicates that effluent will be higher in nitrates and inorganic solids that the groundwater, and that some of this effluent may reach the groundwater. However, the impact of this effluent on the groundwater is not discussed in quantitative terms. What is the probable depth of groundwater in this area? Does it represent an aquifer that is presently, or will potentially be used, for human consumption. Will the addition of this effluent to the groundwater produce measurable degradation?

114-124

4. Sewer lagoons are a proven method of sewage disposal. Properly operated, they are effective and relatively odor free from short distances. The keys are adequate design and proper operation. The concept as outlined is acceptable, pending further satisfactory information as requested above; the plans and method of operation must be approved by the Washington State Department of Ecology.

SURFACE WATER PROTECTION:

120-124

1. Is there any possibility that the proposed sprayfield serves as a recharge area for springs located below the development?
Any drainage ditches, creeks, or ephemeral streams that may receive irrigated effluent should be identified, and protective measures established.

WATER SYSTEM:

107-114

The same question regarding applicability of national average water use figures to this developemnt would apply as in our questions regarding sewage disposal. Local figures regarding water consumption would suggest higher figures should be used in system planning. Please provide additional documentation regarding sizing of system and peak flow demands.

All plans for expansion or extension of existing water systems, or creation of new systems must be approved by the Washington State Department of Social and Health Services.

Water quality monitoring must be provided at a schedule determined by population during use.

See Page

LETTER 2, CONTINUED

SOLID WASTE:

The amound of solid waste generated by a resort of the size proposed will be large. The proponents should either contract with an independent solid waste hauler, or become licensed by the Chelan Douglas Health District to haul solid waste. In either case, the waste must be properly stored and removed to an approved landfill site at least weekly.

122,123 & 125

What will be the estimated annual tonnage at full development? What impact will this have on the regional landfill in Douglas County?

FOOD SERVICE:

So noted

It should be noted that plans for any restaurant/bar associated with the project must be approved by the Chelan Douglas Health District prior to any constructions, and anually permitted by this agency. Regular inspections will be required.

This completes our comments at this time.

Sincerely
DIVISION OF ENVIRONMENTAL HEALTH

Ann Jensen, R.S.
Director, Environmental Health

LETTER 3

JOHN SPELLMAN
Governor

DUANE BERENTSON
Secretary

STATE OF WASHINGTON
DEPARTMENT OF TRANSPORTATION
Office of District Administrator
1551 N. Wenatchee Ave., P.O. Box 98 • Wenatchee, Washington 98801 • (509) 663-9611

August 14, 1984

Planning Department
Chelan County
411 Washington Street
Wenatchee, WA 98801
ATTN: Jerry Litt

Re: Mission Ridge/Constellation Ridge
Draft Environmental Impact Statement

Dear Jerry:

So noted

Thank you for your August 1, 1984 letter requesting comments on the draft environmental impact statement for the above referenced proposal. We have reviewed the document and have determined that the proposed resort has no significant adverse impact on State Highway Facilities at this time. We have no objections to this development.

Thank you for the opportunity to comment.

Very truly yours,

ROLAND C. COOK
District Administrator

BY: GLENN B. MARTIN
Environmental Coordinator

RCC:gm
GBM

LETTER 4

See Page

Aug 21, 1984

Ed Loydhammer
Chelan County Planning Dept.
Wenatchee, Wa 98801

Dear Mr. Loydhammer:

I am writing to oppose the Expansion of Mission Ridge. And would like to go of record as so. My reasons? I was raised up Squilchuck, & then moved to town when I was about 15. I am now married with 2 children, & we just bought a place up Squilchuck because it's a good, No it's a great community to raise children.

Most of the folks up there have been there for generations, the Pearsons, Hedmons, Showalters, Kibys to name a few. Alot of new faces have appeared since we moved. But why do you think they picked that area to live in the first place?

5-6 My folks own 65 acres up Squilchuck - which they sold to the first Mission Ridge project

LETTER 4, CONTINUED

See Page

5-6 As you know, that operation went belly-up over years & so did the once producing orchards on that property. What if this one does the same thing?

75-94 Not to mention the traffic flow. And all the remodeling of roads (which I'm sure will have to be widened to accomodate the traffic) which will be cutting into our property.

35,61-53,69 I'm not against expanding & making money. But why not pick on an area that won't be effected like our little community. Why not Stevens Pass or Snoqualmie. The roads are there, you're not destroying a unique life style that so many of us up Squilchuck have come to enjoy.

It's hard to explain to a city person what its like living up there. The people are just a different breed. And I must comment that I think most kids raised up there turn out to be good-responsible, respectable citizens

LETTER 4, CONTINUED

You very rarely read about them in the papers under the police & sherriff blotter columns.

I could go on all day about this subject.

I know this project is seriously affecting just a handful of people - but for these people I urge you & all others to put yourselves in our shoes And try to understand how we feel.

Thank you

Cindy Gutzwiler
4366 Squilchuck Rd
Wenatchee, Wa 98801

LETTER 5

5622-2 Squilchuck Rd.
Wenatchee, Wash. 98801
August 21, 1984

See Page

Chelan County Planners
Chelan County Annex Bld.
Wenatchee, Wash. 98801

Dear Chelan County Planners:

We attend the expansion of Mission Ridge and Clifftops development hearing.

We have several unanswered questions.

75-94 1- Traffic on Squilchuck Road.
With 3 times more traffic and no improvement to the road; we suggest you talk to the Chelan County Deputys and the Washington State Patrol who were on radar the last two weekends of February 1984; for their opinion if this road can handle 3 times the traffic.

28 2- New Road to Clifftop
Where will the excess material go if they plan to cut the road and not cut and fill to minimize the scar? Is it the policy of the county to build a road for a private developments?

82+129 3- Sewer Lagoon
The sewer lagoon is to be placed on Section 17. Our property line (section 8) joins Section 17. Our domestic water to 2 houses orginates about 100 yards downhill from Section 17. There is other water for homes on down the hill.

35-37+115 If the the lagoon is clean and no smell why doesn't he put it near his development and use it to fill his ponds he planning to build?

4- Millerdale Water

15+111-114 Mr. Bevis said he has 5 inches of Millerdale Water. Bee Hive Irrigation District has had to cut 50% and has cut 90% in dry years. That is not enough to handle a hotel.

5- Wildlife on the rockslides

49-61 Mr. Bevis said nothing lives on the rock slides; right away you know he is from the city. He never heard of a Coney or commonly known as a Rock Rabbit. We consider it as IMPORTANT as the snail darter fish in the Tennessee Valley.

6-School Bus Service

100 Mr. Bevis says in time they will need school bus service. Are we going to make an exception here, when parents on Halvorson Rd. and Pitcher Canyon take their children to the bus stop?

7- Game Department Lands

66 I helped pay for the game department lands. I would expect to be able to go on them any time of the year.

Yours Truly
Lucene Hedman
Lucene Hedman
Lorraine Hedman
Lorraine Hedman

LETTER 6

See Page

Malaga Wash.
9-4-84

Planning Department
Chelan County
Dear Mr. Edward Loidhamer
We strongly object to any further development of the Mission ridge ski area. Due to the following reasons

46, 114-122 1. No one, Danger of pollution of the water shed as we use the water for domestic use as well as irrigation. And there

98-99 danger. The more people in an area the greater the danger The fire truck want do much good out on the hales where they can't drive it

99-100 No 3. It will add more work to an already over worked Sheriff

23, 30-31 +42-45 Dept. No 4. Roads & trails in the Nat. will cause erosion & flooding

LETTER 6, CONTINUED

See Page

for 5. They can't do that much building and not dammage the environment.

44-61 6. People in some areas will upset wild life, migration & their birthing process.

114-122 7. There is to much danger of pollution with sewage system

75-94 8. To much traffic for a narrow - winding road.

yours truly
Arthur Jackmans

Arthur Jackmans
4951 Joemiller Rd.
Malaga Wash. 98828

LETTER 7

8-24-84

See Page

Mr. Loidhamer,
I am opposed to the proposed Mission Ridge Recreational Development for the following reasons:

28-130 1. Increased taxes of county residents

75-94 2. Increased traffic on Squilchuck road.

15+ 110 3. Questionable water supply which may affect irrigation and domestic rights of Squillchuck and Wen. Heights residents.

46-61 4. Severe impact on Wildlife, particularly in Nanneam Basin.

5. Severe impact on wild life habitat.

6. Sewage treatment plant on that mountain.

55-58 7. No official and detailed study has been done by Game Dept. biologists to evaluate exact impact on wildlife & habitat.

See Page

LETTER 7, CONTINUED

8. Am not interested in a rich persons year around recreational resort in the communities back yard.

131-133 9. I believe a development of this magnitude will ultimately decrease Wenatchee business.

10. Do not prefer commercializing the Squillchuck valley.

49-58 11. Severe disruption of elk calving areas, summer range, and migration route.

18-19 12. Game Dept. land needed to be leased is <u>mandated</u> for wild life and wild life recreation <u>only</u>.

130-133 13. The Wenatchee communities life style being changed by such a massive project.

Robin Schutt
Wenatchee

See Page

LETTER 8

Dear Sir:

I am writing you to express my wishes that you do NOT allow the proposed expansion of the Mission Ridge ski area. We already have a very adequate ski resort area and there are several others state wide for the people who ski to choose from and not be the least bit deprived.

We who live in and around the Wenatchee area have just this one small timbered area for those of us who do not ski to enjoy - those who cannot go long distances or do not have the health to ski or back pack. We can drive through mushroom hunt, snowmobile, picknic etc. and still be close to home.

49-61 Just a couple of weeks ago we saw 20 Head of elk in the area of the proposed sewage treatment plant. Obviously that is their summer range and once it is destroyed where will they and the other wildlife go? We have already developed much of their winter range in the canyons along the rivers. What will happen to the wildlife if their summer range is taken away too?

46+, 114-124 What of the domestic springs situated below the sewage treatment plant? Surely seepage would occure. I wouldn't want to drink water from a well or spring below a sewage plant. No one could convince me it would be pure. Just the thought of it would make me sick.

35-37 The smell of such a large sewage pond would be so offensive as to make living down wind or near by very unpleasant.

Surely the people already here deserve some consideration over and above the elite Seattle skiers and the developers who just want to make a fast buck and move on.

75-94 How would thousands more skiers manage to get to the proposed resort on the existing road? Of course next would be a demand for a much wider road, which would mean taking private land - at public expense - my expense & yours, but especially people with farms and orchards that are already taxed to the hilt.

128-130 I understand the developers even want a ~~State~~ County Road constructed to the resort. Of course the county means us! I do not my taxes raised so someone can have a new place to Ski!

on back

164

LETTER 8, CONTINUED

The business that think a new resort could make them wealthy are fooling themselves. The 200 room hotel would certainly be full to save a trip to Wenatchee while existing motel rooms would be empty. The proposed restaurants would be used rather than the existing ones down town.

I hope that you will ~~deny~~ not approve this or any other ~~resort~~ such development in this area now or in the future.

Thank You
M.R. Olson
C.A. Olson
C.W. Olson
2585-15 Atwood Rd
Wenatchee, Wash.

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LETTER 9

30 August 1984

Edward C. Leidhamer, Director
Jerry Litt, Zoning Administrator
Chelan County Planning Department
411 Washington Street
Wenatchee, Wa 98801

Re: Proposed Mission Ridge/Constellation (Clifftop Resort)

See Page

Dear Sirs:

The following items are offered as background facts for later reference:

ITEM I: All waters and water useages in the Squilchuck drainage system are controlled by the State of Washington under the Revised Code of Washington. Each chapter of the RCW relates to a particular topic (i. e. 90.03.360 CONTROLING WORKS & MEASURING DEVISES; 90.03.400 CRIMES AGAINST WATER CODE--UNAUTHORIZED USE OF WATER; etc.)

ITEM II: Irrigation water rights in Chelan County are the 'life blood' of agriculture. The first water rights in the Squilchuck Drainage were granted to Philip Miller in 1870 and all are adjudicated to lands within the Squilchuck Drainage. This right claims all of the water ever expected to contribute to the regular flow of the Squilchuck Creek.

15+, 107-114 ITEM III: Subsequently other land owners filed on any possible 'flood waters' of the Squilchuck Creek and the state continued granting rights "subject to prior rights". This resulted in much dissension among water right claimants because of insufficient flow to satisfy their claimed rights. In years of normal or sub-normal precipitation, proportionate reductions of 50 percent or more are enforced. Reductions over 90% have been experienced in the past.

ITEM IV: In 1927, claimants of various priority rights to flood waters of Squilchuck Drainage formed a corporation which required assignment of all water rights within the drainage, except Miller Rights, in exchange for an agreed number of corporation shares--each share to receive a proportionate share of flood waters of Squilchuck Drainage. These shares are measured in miners inches, as are the shares of Miller Rights. This corporation, SQUILCHUCK WATER USERS ASSOCIATION, accepted shareholders until 12 January 1931, when all of the significant water rights except Miller Rights within the Squilchuck Drainage had been assigned to the association.

ITEM V: The most recent court action is found in Decree No 7647 -- State of Washington vs. Millerdale Irrigation District -- Dated 14 June 1928. This decree states: "When the water supply of Squilchuck Creek is insufficient to fill the whole of the Philip Miller right of 400 miner's inches under 4-inch pressure, each water user owning a part of such right shall bear his proportionate share of the quantity deficient, excepting

See Page

LETTER 9, CONTINUED

the right of Wm. F. Miller for 20 miner's inches under 4-inch pressure, the Lena Land Company for 5 miner's inches under 4-inch pressure, and James Bercroft for 2½ miner's inches under 6-inch pressure, which shall not be subject to such reduction." (Decree, page 10)

"That all natural springs and spring branches which flow in natural channels during any part of the entire year and which contribute to the flow of Squillchuck Creek are tributary to and form a part of the water supply of said creek." (Decree, page 28, #6)

"That any person taking water from Squillchuck Creek or its tributaries shall provide and maintain, at his own expense, a proper diversion works and measuring devise, as required by statute . ." (Dec., p.28,#7)

ITEM VI: BEEHIVE IRRIGATION DISTRICT was later formed and was granted first priority rights to the waters of Squilchuck Drainage during the months waters were not claimed by Miller Right.

The major concern of the irrigation districts within the Squilchuck Drainage is two-fold: Water Rights; and Water Quality.

15+, 107-114

The resort proponent states Phase I water needs can be met from sources within the site (EIS p.14, p. 89), specifying springs. They further state (EIS p.38) "The project proponent has existing water rights in Section 19 for approximately 68 GPM year round."

FACT: Section 19 is situated primarily within the Squilchuck Drainage, where all waters are claimed by prior right. Five shares of Miller Water Right are adjudicated to Section 19. These shares are useable during the irrigation season only, and are subject to proportionate reduction, or 'cut'. (Item V)

Springs within the Squilchuck Drainage contribute to the original Miller Water Right (Item V) and must be measured by a proper measuring device (Items I, V)

Beehive Irrigation District holds first priority to waters of the Squilchuck Drainage during the non-irigating season (Item VI).

DSHS requires a Minimum Available Source of 800 GPD per residence during winter and 1500 GPD during irrigation season. (Tec.App.B, p.1) Development Phase 1 includes : 150 Hotel/Time Share Units
60 Condominium Units
10 Single Family Lots

FACT: If the proponent is able to borrow an unused portion of Mission Ridge's five (5) shares of Miller Water Right, their combined shares would be insufficient; plus, these shares are for summer use only and are subject to 'cut'. (Items III, V)

PUD domestic water should be a requirement for any development within the Squilchuck Drainage.

40-45

Alteration of absorption characteristics of the site is expected to increase direct runoff by 20 percent (EIS p.xii) A drainage system is proposed to direct this runoff into natural retention ponds (EIS p.39), thus allowing the collected runoff water to percolate back into the ground.(p.39)

FACT: The irrigation districts feel this would cause only small impact on the over-all water conditions of the Squilchuck Drainage.

However, in the same paragraph (EIS p.39) it is stated, these depressions would require lining with an impermeable membrane to retain water year-round as ornamental or fire protection storage ponds.

See Page

40-45

FACT: Impounding of waters within the Squilchuck Drainage would have an adverse impact upon the water supply adjudicated to the lands of water right shareholders within the drainage. (Item III) No disturbance of ground or surface water flow should be permitted.

Proposed construction will create short-term turbidity in surface water (EIS p.xii, p.37) and will occur during the summer months (EIS p. 38).

FACT: Turbid water causes intense wear on irrigation systems, necessitating expensive repairs or replacements to pumps, sprinklers, valves, etc. Proponent should be required to prevent stream turbidity during irrigation season.

45-46+ 114-124

There is a potential for contamination of ground water at the first lagoon cell and also at the sprayfield (EIS p.39, Tec. App. C, p.23), and surface water contamination will occur if effluent leaves the sprayfield site (Tec. App. C, p.25).

FACT: Strict rules and rigid enforcement must be enacted to prevent polution or contamination of both ground and surface water.

Shareholders of water rights within the Squilchuck Drainage are not sufficiently assured there will be no damage to water rights and water quality; therefore we stand opposed to the development plan as currently written.

Sincerely,

Lars Simonsen, Pres.
John M. Nick
Marion E. Hill
Janet F. Wise, Sec.

SQUILCHUCK-MILLER WATER USERS
SQUILCHUCK WATER USERS ASSOCIATION
BEEHIVE IRRIGATION DISTRICT
3483 Squilchuck Road
Wenatchee, WA 98801

cc. Chelan County Board of Commissioners

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LETTER 10

JOHN SPELLMAN
Governor

JACOB THOMAS
Director

STATE OF WASHINGTON
OFFICE OF ARCHAEOLOGY AND HISTORIC PRESERVATION
111 West Twenty-First Avenue, KL-11 • Olympia, Washington 98504 • (206) 753-4011

August 29, 1984

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SEP 4 - 1984
PLANNING OFFICE

See Page

Mr. Edward C. Loidhamer, Director
Chelan County Planning Department
411 Washington Street
Wenatchee, WA 98801

Log Reference: 547-C-CH-10

Re: Mission Ridge/Constellation Ridge Resort

Dear Mr. Loidhamer:

127

A staff review has been completed of your draft environmental impact statement. A search of our records, including the National and State Registers of Historic Places and the Washington State Archaeological and Historic Sites Inventories, indicates no sites have been recorded in the immediate project vicinity; however, this may be due more to a lack of information than an actual lack of resources.

In the event that archaeological or cultural materials are discovered during project activities, work in the immediate vicinity should be discontinued and this office notified.

Thank you for this opportunity to comment.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist
(206) 753-4405

dw

167

LETTER 11

Wenatchee Sportsmen's Association

P.O. Box 762
WENATCHEE, WASHINGTON 98801

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SEP 4 - 1984
PLANNING OFFICE

August 24, 1984

Ed Loidhamer, Director
Chelan County Planning Department

See Page

As residents of the Chelan and Douglas Counties and members of the Wenatchee Sportsmen's Association, we would like you to know that we are strongly opposed to the proposed expansion of Mission Ridge and the Constellation Resort development.

44-61 98-104 128-133

We are convinced that the negative effects of the project far outweigh the benefits. We feel the Draft Environmental Impact Statement is insufficient in the way it addresses wildlife and the environment of the area. A complete study should be made to determine the wildlife that is using the area at this time and what detrimental effects this development would have on it. The area is used by many animals on a year round basis and also serves as deer and elk migration routes to some of the lower areas of the Stemilt Basin. A year round recreation facility in this area, with hikers, horseback riders, motorcycles, dogs, noise and additional traffic would have a severe impact on the area's wildlife and physical environment. For these reasons, we strongly encourage a complete study to address the wildlife issues. Our Association would even be willing to help with such a survey. As County taxpayers, we think it is unfair to ask us to pay for new roads, improvements to existing roads and other expenses. An additional burden would also be felt by the Sheriff's Office and Fire Departments of the County, who would have to provide additional services.

59-61 +82

We are also concerned about the potential road from the Ellensburg side of the mountain. This would have a tremendous impact on the Colockum elk herd, cutting in half the range now used by the elk. Wildlife mitigation is not fully addressed in the Draft EIS and we think this is a grave error.

125-126

A sewage treatment plant on the mountain would be an eyesore to the aesthetic beauty of the area.

46, 107-124

Having discussed this project with residents of the Squilchuck and Wenatchee Heights area, we feel as they do, that a development such as this could threaten the water supply for orchards and residential uses in the area. Several streams located in the area of proposed development empty into the lakes in the Stemilt Basin which serve many Heights residents.

Dedicated to the Education of Sportsmanship, and the Propagation and Conservation of Wildlife and Its Habitat

See Page

LETTER 11, CONTINUED

94-106, 114+, 128-130 — Underground utilities, a new fire station, road construction and additional maintenance costs, plus additional school bus routes would all impact Chelan County residents. It is obvious that hundreds of thousands of dollars in additional tax monies would be required. It is our impression that Mission Ridge is currently in a good financial situation and we feel that trying to make Mission Ridge a destination ski area would put it in competition with other ski areas which have far greater skiing resources. The early winter ski area which has just recently been approved in the Methow Valley would be competition from less than 100 miles away. We also question the areas designated for ski area expansion from the standpoint of adequate snow fall. Many of these areas are on the south slopes of the mountain and often times, during the mid-season of the ski year, bare ground is exposed on some of the ridges. This would not encourage people to drive several hundred miles to ski an area with insufficient snow covering. The increased need for motels in the Wenatchee area is being addressed currently through the addition of 255 new rooms as part of two new hotel/motels being constructed. What are these two new motel owners supposed to do when facilities like theirs are duplicated on the mountain? It is not likely that the Wenatchee area businesses will benefit when services are provided at Mission Ridge, especially if a road from Ellensburg is constructed. Coastal travelers will not need to pass through Wenatchee.

32-33

82, 132-133

We feel this proposed development will only duplicate services and facilities that are already in Wenatchee.

To review our thoughts, the individuals and members of the Wenatchee Sportsmen's Association representing 200 families, are opposed to this development because it will have an adverse impact on the mountain and our community's lifestyle. It will be an increased financial burden on Chelan County tax dollars for roads, police and fire protection and utility services. The potential for wildlife and habitat loss is not worth allowing this type of development which will financially benefit a few individuals.

Respectfully yours,

Robin Schutt

Robin Schutt, President
Wenatchee Sportsmen's Association

CL/di

LETTER 12

September 1, 1984

See Page

Chelan County Planning Commission
Chelan County Courthouse Annex
Washington & King Street
Wenatchee, Washington

Gentlemen:

We are writing regarding the impact of the proposed Mission Ridge expansion on traffic in the Squilchuck area.

We feel that the Squilchuck and Mission Ridge Roads are inadequate now for the skiing traffic and that a major expansion should not be planned unless it is tied to road improvements to handle heavier winter traffic. Thank you for your consideration.

75-94

Judy A. Gerry
James A. Gerry
2951 Mission Ridge Rd.
Wenatchee, WA 98801

LETTER 13

1 September 1984

Edward C. Loichamer, Director
Jerry Litt, Zoning Administrator
Chelan County Planning Department
411 Washington Street
Wenatchee, WA 98801

Re: Proposed Mission Ridge/Clifftop Resort

Dear Sirs:

See Page

We favor private enterprise in Chelan County, but feel the Mission Ridge/Clifftop development proponents have failed to adequately protect either the environment or the inhabitants of Chelan County in their Environmental Impact Statement as currently written.

15,46 110, 114-124 — WATER RIGHTS and WATER QUALITY must be protected and maintained as stated in the letter from the irrigation districts within the Squilchuck Drainage, dated 30 August 1984. There are also many domestic springs and wells in the Squilchuck area which will be ruined if ground waters become contaminated--some of them are located in a near proximity to Section 17.

18-19 and 49-61 — WILDLIFE HABITAT and MIGRATION PATTERN should be undisturbed in the fragile ecology of the Naneum Ridge-Swift Creek Area. Game Department policies state, "Only programs, activities and facilities which directly and primarily benefit wildlife related recreation will be permitted on department controlled lands." Sections 31 and 35 are Game Department land, therefore, no additional instalations or roadways should be built on those sections.

The area of proposed expansion is heavily use at various times of the year by both wildlife and wildlife oriented recreationists. Elk use the area of proposed development mostly in summer and autumn, and deer use it from spring through fall. Increased use of these lands by human and canine populations could destroy the wildlife herds; therefore, additional summer and fall use should be held to a minimum.

141-148 — Mission Ridge/Clifftop resort development plan as currently outlined is much too large for this area and should be scaled down considerably.

94-104 +128-130 — TAXPAYERS of Chelan County should not be expected to provide facilities (spacifically: access roads, school bus service and fire protection) beyond current practices. We feel the development proponent should build the access road; residents should shuttle or carpool children to established schoolbus routes, as other residents in remote areas of the school district; and because of the remoteness of the area from established fire districts, a separate fire district should be formed with mutual aid cooperation with other fire districts of the community.

RESIDENTS along the route from Wenatchee to the ski area will suffer great

LETTER 13, CONTINUED

impact from any development or expansion and should be informed specifically of the necessary changes to be made on the Squilchuck Road.

Thankyou.

Sincerely,

Marion E. Hill
Janet L. Hill
3483 Squilchuck Road
Wenatchee, WA 98801

LETTER 14

September 4, 1984

Ed Loidhamer, Director
Chelan County Planning Department
411 Washington
Wenatchee, Washington 98801

See Page

Dear Mr. Loidhamer:

We are opposed to the possible expansion of the Mission Ridge Ski Resort/Constellation Resort Development.

49-61 — We feel the development will have an adverse impact on the wildlife in the area and could do permanent damage to the environment. We don't feel the Draft document on the E.I.S. addresses the wildlife issue properly and we think a complete study of the wildlife and surrounding habitat should be done to assess the issues.

94-106, 114+ 128-136 — We are also opposed to County tax dollars being used to construct a road into a private development. Increased taxes and jobs will not offset County expenses such as road maintenance, police and fire protection, utility services and other costs.

49-61 — Losing deer and elk habitat is much more important than coastal skiers having a deluxe condominium fifty yards from their ski lifts. As sportsmen, we have never opposed the ski hill; primarily because it is only a winter use. A year round facility is a different story.

61-62 — The noise and commotion that goes with a development of this nature would ruin the solitude and beauty of the area's surrounding Mission Ridge, Stemilt Basin and Naneum Ridge.

49-61 — We have seen developments encroaching further and further onto important wintering areas for deer and elk populations and we think it is important not to develop more problems in already limited range areas.

LETTER 14, CONTINUED

See Page

75-94
107-124

In addition, we are concerned about inadequate water supplies needed for the development, sewage treatment on the mountain and the problems from additional traffic on the Squilchuck Road.

We don't think this proposal will benefit the community and we hope you consider our concerns.

Ralph W. Lucas — Chuck Largent

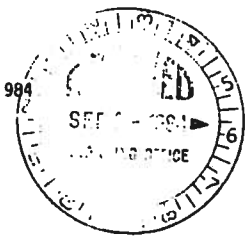
Robert L. Johnson —

Edward Bratton —

—

LETTER 15

2370 W. Malaga Road
Malaga, WA 98828



September 4, 1984

Chelan County Planning Commission
Wenatchee, WA 98801

See Page

Gentlemen:

I spoke against the Mission Ridge expansion at the Environmental Impact Statement Meeting. I am still against further development for the following reasons:

1. I don't believe that Central Washington needs two destination ski resorts.
2. Early Winters seems to have much better financial backing and organization.

49-61 — 3. The distruption of wild life habitat. I don't need to elaborate on this. Please check Washington State Game Department recommendations.

107-114 — 4. The shortage of available water which could affect the orchardists of the area; and if P.U.D. water is made available, who pays for the installation and maintenance?

75-94 — 5. With the additional traffic added to an already crowded and dangerous Squilchuck Road, I believe that this road will have to be expanded to accommodate the extra 2,500 anticipated skiers.

6 and 90-91 — 6. This construction would have to be done during the summer which would be disastrous to the Squilchuck and Hill cherry growers.

46, 49-61 114-124 — 7. The sewer system at the top of Mikes Canyon will have a detrimental effect on this hunting region; as well as, potentially dangerous to the Kirby's, if problems should arise.

40, 42+ 46 — 8. We, Daryl Kirby and I, have had to repair vandalism to the districts water system already. If you add Summer, Fall and Spring activities, this type of mischief is bound to increase.

LETTER 15, CONTINUED

See Page

Chelan County Planning Commission
Page 2
September 4, 1984

40, 42+ 46 — 9. The Upper Reservoir is boardered on three sides by the proposed expansion. I feel that there will be increased problems with trespassing, littering and vandalism. One of the few solutions to stopping this would be the fencing the entire reservoir off. Who would pay for this?

94-106, 114+ 128-130 — 10. Regarding the proposed road to the resort, I am adamantly against the entire concept. Why should we pay for the road and then the maintenance for it. I find it absurd that the taxpayers should pay for the corporations profit.

11. We the taxpayers will also be burdened with the expense of manning a fire station, school bus routes, maintenance of a sewer system, police protection and patrol, additional rate increases for P.U.D. power and real estate tax increases for local residents.

12. Total disruption of one of the last pristeen areas in North Central Washington.

For these reasons, I feel that the expansion of the Mission Ridge Development will be more of a liability than an asset to the taxpayers of Chelan County.

Yours truly,

Philip P. Gutzwiler

LETTER 16

JOHN SPELLMAN
Governor

DONALD W. MOOS
Director

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Mail Stop PV-11 • Olympia, Washington 98504 • (206) 459-6000

August 28, 1984

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PLANNING OFFICE

Mr. Edward Loidhamer
Chelan County Planning Department
411 Washington Street
Wenatchee, WA 98801

See Page

Dear Mr. Loidhamer:

Thank you for the opportunity to comment on the draft environmental impact statement for the expansion of the Mission Ridge ski facilities and development of a year-round resort. We reviewed the EIS and have the following comments.

114-124 The plans and specifications for the wastewater treatment plant must be submitted to the Department of Ecology for review and approval (RCW 90.48.110). In addition to the design criteria of the unit processes and projected system loadings, we will consider ownership and operation of the plant, system monitoring, and site access.

If you have any questions, please call Mr. Clar Pratt of the Central Regional Office at (509) 575-2800.

Sincerely,

Barbara J. Ritchie

Barbara J. Ritchie
Environmental Review Section

BJR:pk

cc: Corrine Guse, CRO

LETTER 17

North Central Washington
SPORTSMEN'S COUNCIL
COUNTIES
Chelan - Douglas - Ferry - Grant - Kittitas - Lincoln - Okanogan

September 2, 1984

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See Page

Mr. Ed Loidhammer
Chelan County Planning Dept.
Courthouse Annex
Wenatchee, Washington 98801

Dear Mr. Loidhammer,

The North Central Washington Sportsmen's Council has asked me to write you on behalf of our member clubs to express opposition to the proposed expansion of Mission Ridge Ski Area and the Constellation Resort development.

49-61 Our concern relates primarily to the apparent major impacts such a development would have on wildlife in the area. A development open to year-round use, and an all-seasons highway from the Kittitas County side of the ridge would have severe effects on the Colockum elk herd-- one of the most important herds in the state.

We believe the draft environmental impact statement is sadly lacking in its treatment of wildlife and necessary mitigation measures. We would support a complete study of wildlife impacts, and hope the Washington Department of Game would be involved in such a study.

Our member clubs do not believe the gain to be realized from such a development is sufficient to offset the loss in wildlife and habitat. I hope you will keep us posted on future developments with this proposal

Sincerely,

Paul Hart

Paul Hart
Secretary-Treasurer

LETTER 18

September 1, 1984

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Open letter to the Chelan County Planning Commission and Chelan County Commissioners.

See Page

Dear Sirs:

The purpose of this letter is in regard to the Mission Ridge Expansion.

We are against further expansion of the Mission Ridge Area because:

40-45+ 114-124 1. Polluting our present water supply, (the Squilchuck creek) by run off and sewer seepage.

15+110 2. They do not have enough water rights to supply their needs, especially in dry years. (5 shares of cutable water)

3. This canyon is too small and narrow for a development of that size.

75-94 4. Increased traffic on the present Squilchuck road. It is extremely dangerous now, and will not handle three times the traffic that they predict.

75-76, 98+ 101-104 5. The Chelan County has spent over $400,000 on building the present Mission Ridge road, not counting the heavy yearly winter maintenance building up the road shoulders and the heavy snow removal.

14,82+ 128-130 6. The developers want the taxpayers of Chelan County to pay another $53,000 to build the road to their development. We are definitely against this.

7. This is very unfair to expect this of the taxpayers.

35-37 8. The sewage plant will be located south and above the residents and for a of the Squilchuck canyon, and our prevailing winds are down from the sewage plant in the Squilchuck canyon.

94-106, 114+ 128-130 9. There will be a need of more police force, school buses, snow removal equipment, electrical power, water, etc. all at an additional cost to the taxpayer.

We live next to the road, and we have seen many near wrecks, speeders, overturned automobiles, school busses losing their brakes, etc. Increasing the use of the hill almost 3 times can cause a very dangerous situation with possible loss of lives.

We agree that some jobs will be created, but please do not be mis-lead by the developer's remarks as to how much the Wenatchee area will benefit. Their goal is for the county (the taxpayers) to pay $53,000 for their road. This they claim would be redeemable in property taxes. We doubt this very much.

LETTER 18, CONTINUED

If any part of their development plan is approved, we demand that the County Commissioners do not use any county funds (taxpayers money) to pay for a road for a private enterprise.

Sincerely,

Russell Erickson
Donna Erickson
Ray Erickson

Concerned Land Owners

Russell Erickson
Donna Erickson
Ray Erickson
5224 Squilchuck Rd.
Wenatchee, Washington 98801

LETTER 19

The fruit industry in Chelan County is the largest industry in the county. It would appear the county is forcing it's largest industry into extinction. The planning board & county commissioners must begin to study the long term effects their decision will have on the fruit industry. Outside interests such as Cliff Top Resort or an expanded Mission Ridge will put increasing pressure on our now suffering industry.

See Page

The following items are of major concern to area growers:

15+ 110 — 1. Wenatchee Heights water is in great demand and short supply. Cliff Top has filed on water within our drainage area. This area cannot give up any water.

40,42+ 46 — 2. Wenatchee Heights reservoirs within easy access to thousands of people. These are earthern dams and no vehicle or foot traffic can be allowed. Cliff Top should be responsible for their patrons.

75-94 — 3. The proposed development will cause an increase in traffic flow during all seasons. The existing county road will have to be widened to accommodate the traffic. This traffic flow will include large commercial trucks, farm trucks, warehouse trucks, an increase of 10% residential; (building to 25% more residents within 5 years) plus the 25% to 50% increase in ski traffic.

69, 110+ 128-130 — 4. Late cherries are grown only in the Wenatchee Heights, Squilchuck and Stemilt Hill districts of this state. High taxes, increased residential pressure and loss of water will force these areas out of the fruit business. These areas cannot be replaced because of their unique geographic locations.

90-91 — 5. Expanding residential areas into orchard areas has and will continue to cause problems. Home owners complain about aerial spray; cherries require numerous aerial applications; the early morning noise of ground spraying, harvesting and other practices. Growers sustain higher vandalism, more restriction on spray, herbicides and fertilizer. Growers need the protection of isolation not population.

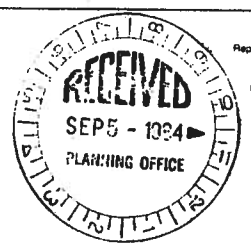
Mary Hutchinson
318 E Edgemont
Wenatchee, Wa.

LETTER 20

United States Department of Agriculture — Forest Service — Wenatchee National Forest — Leavenworth RD, 600 Sherbourne, Leavenworth, WA 98826

Reply to: 1950

Date: September 4, 1984



Mr. Ed Loidhamer, Director
Chelan County Planning Dept.
411 Washington Street
Wenatchee, WA 98801

See Page

Dear Ed:

This letter is the Wenatchee National Forest comment on the Draft EIS prepared for the Mission Ridge/Constellation Ridge Resort.

The Statement has been reviewed by several of the Forest Staff officers and specialists. I am including them essentially as they were given to me, without editing their notes. Some are comments and some are questions and concerns for the authors to consider for the final EIS.

Ed Susich - Acting Fire Staff

48-49 +98-99 — Page 43. The Forest Service/DNR have a reciprocal fire agreement that covers the area. Chelan County is not included in the agreement. The fire prevention and suppression impact will increase once we insert people on a year-around full-time basis.

Merle Wischnofske - District Wildlife Biologist

49-61 — Appendix. F-14 page not included?
F-15 and 16 are not the current information we are using for Forest planning purposes.

Carl Anderson - Interagency Liaison Officer

129 — Page xvi. The statement that "the portion of the road crossing public property will be constructed with public funds," needs to be clarified. Who will fund it?

82 — No mention is made of access for roads or power to lifts C-1, D-1, or D-2. Such access may impact National Forest land.

132-133 — Page 60. Discussion of housing doesn't appear to consider the new facilities under construction in Wenatchee.

FS-6200-11(8-80)

LETTER 20, CONTINUED

See Page

49-61 — Page 18. The impression is given that the project would primarily be a continuation of the present non-conflicting use of WSDG land. With planned summer use, there is distinct possibility for conflict with wildlife using the area.

so noted — Page 38. The statement that the completed roadway drainage system will be turned over to Chelan County for maintenance needs to be verified by agreement.

49-61 — Page 48. An acceptable wildlife survey such as the U.S. Fish and Wildlife Habitat Evaluation Process should be conducted so that an adequate evaluation of wildlife impacts and mitigating measures can be made.

100-101 — The impact of recreational use on public lands as a result of year-around use is not adequately treated. I.e., hiking and riding trails, snowmobile and M/C use in the surrounding area, etc.

Al Thompson - Forest Engineer

so noted — Page x. The Forest Service will give close review to the completed road plans to determine what special construction practices will be used on the access road.

so noted — Page xvi. Forest Service funds will not be used for construction of the road.

so noted — Page 13. Engineering drawings and specifications will also have to be approved by the County before we issue a permit.

28+30 — The plan review must include a disposition of material from the full bench construction areas.

Phil Glass - Recreation Staff Officer

68-69+ 100-101 — Pages xiv-xv. The development will probably result in increased pressure on the Forest Service to accommodate a variety of trails; i.e., jogging, horses, hikers, M/C, etc. Forest Service lands cannot accommodate all desires.

92-93 — Page xvi. Mass transit to reduce ADT should be addressed.

114 — Creation of a Water/Sewer District takes time and will require public input.

16 — Page xix. CC&R's will need some agency input also.

127 — Archaeological/Historical Resource. A prework survey should be conducted according to NEPA/SEPA, with SHPO consultation.

LETTER 20, CONTINUED

See Page

141-145 — Page xx. Several of the assumptions under the No-Action Alternative appear to be worst-case statements.

Gran Rhodus - Hydrologist

15+ 110-114 — Page 89. The map depicts a 100,000 gallon reservoir. This would satisfy some of the concerns for increased fire protection. A discussion early in the text would clarify the developer's intent and avoid confusion about water storage and supply. Water use in the out-years and droughty periods will probably necessitate expansion of the Squilchuck Basin system with PUD source.

117-120 — Page 40. What are the evaporation figures being used for lagoon and sprayfield? Text states June-September are the months for effective evaporation. The aspect, elevation, 3-4 month evaporation period, and a beginning soggy soil will tax the resources to free up effluent. Can evaporation handle the effluent in late stages of phase 1 and project build-out?

41+44 — Page 39. Regarding the proposed 1.5 acre pond, have the problems of vectors and stagnation been adequately considered?

Phil McColley - Soil Scientist

30-31 — Page x. There is a probability that mass soil failures will occur. What plans are envisioned if they occur?

115 — Page 1. Is there a possibility that sewage from the current Mission Ridge site will be piped to the proposed treatment facility in Section 17 in the future? This could result in pipeline failures due to the slumpy, failure-prone terrain it will cross.

30-31+ 43+45 — Page 38. The accumulation and concentration of surface water is inevitable and will increase the risk of mass failures. A more complete discussion of this would be helpful.

120 — Page 41. Evidently, the sewage lagoons will not be lined, so there will be some leaching and drainage. There is no mention of the clay content of the material in which the lagoon will be built.

Please call on us if we can help in further discussions regarding any of the above subject areas.

Sincerely,

Stephen L. Morton

STEPHEN L. MORTON
District Ranger

cc:S.O.

LETTER 21

So Noted

DAVID J. WHITMORE
JON H. PHELPS
THOMAS C. WARREN
J. KIRK BROMILEY
CHANCEY C. CROWELL
LEWIS W. GARD

(AC 509) 662-9544
(AC 509) 662-6559
115 SOUTH CHELAN STREET

WHITMORE, PHELPS, WARREN, BROMILEY & CROWELL, P. S.
ATTORNEYS AT LAW
POST OFFICE BOX 1885
WENATCHEE, WASHINGTON 98801

August 29, 1984

Edward C. Lloydhammer
Director
Chelan County Planning Dept.
411 Washington Street
Wenatchee, WA 98801

Re: Environmental Impact Statement
Mission Ridge/Constellation Ridge Resort

Dear Mr. Lloydhammer:

This letter is written to comment on the draft Environmental Impact Statement for Mission Ridge/Constellation Ridge Resort. I have reviewed the Environmental Impact Statement and attended the hearing recently held by the Chelan County Planning Department. I support the basic proposal that is set forth in the draft Environmental Impact Statement.

At the public hearing on the draft Environmental Impact Statement, concerns were expressed concerning:

1. The impact upon the air quality;
2. Impact upon surfact water runoff;
3. Impact upon wild life;
4. Impact upon public roads;
5. Impact upon utility costs.

I believe that the draft Environmental Impact Statement adequately addresses these issues and that the responses and concerns expressed were more emotionally based than factually based. The resulting economic benefit to Chelan and Douglas County more than outweigh the minimal adverse impact and inconvenience which may result from the development. There is a substantial need for additional skiing facilities in the State of Washington, especially those that can qualify as destination type facilities. Basically, there is no destination ski resort in the State of Washington. Although one may be contemplated in the Methow Valley, it will be years before that development will be undertaken and equate to a destination ski resort. Even when it is developed, it will be complimentary to the Mission Ridge/Constellation Ridge Resort as proposed.

LETTER 21, CONTINUED

A. Earth.
There is no doubt that there will be an impact upon the earth, both in the construction of the road, parking lot, buildings, sewage treatment system and ski facilities. Most of these impacts will be of short term duration and related to the construction phase. Under a planned unit development permit, it will be relatively easy to control these construction impacts. The mitigating measures related to road construction minimize the impact to be created by constructing of the access road. The proposals of reseeding the ski runs and site of the overnight facilities are adequate to minimize impact in those areas and create conditions which will be both pleasing to the eye and minimizing the impact on the flora and fauna.

B. Air.
Although there will be some impact upon the air quality during the construction phase, after construction is completed impact should be minimal. Natural air drainage from the proposed development is good at all times of the year and will diffuse and disburse the impacts of carbon monoxide and suspended particulates from wood burning fireplaces. Although there is a possible impact of air quality from the sewage treatment lagoon, modern techniques in dealing with aireation of sewage treatment systems in a practical sense reduces that potential impact to a minimal.

C. Water.
Although there are identified impacts upon the water runoff, the enhancement of water runoff more than outweigh the impact. Once the development in the base area is complete, the control of water runoff should be enhanced and there should be an increased supply of water over the summer months. The permanent impact upon the water are minimal, whereas the enhancement of water supply and water control is substantial.

D. Flora and Fauna.
Although the Environmental Impact Statement identifies potential impacts upon natural animals inhabiting the area, experience at Mission Ridge and other ski areas leads to the conclusion that the local animals will not be impacted but will be enhanced by the development, except in the immediate area of the lodging facilities. There is a possible impact on big game species, but other natural species in the area will not be impacted.

176

LETTER 21, CONTINUED

It is my personal opinion that the big game species in the area are suffering a greater impact from motorcycles, four-wheel drive vehicles and snowmobiles than any of the activities attendent to the proposed development. In the Winter time, when most of the skiers would be utilizing the area, there is a substantial snow cover, big game animals have moved to lower elevations where there is more forage, whereas smaller local animals have not been shown to have been affected by the existence of skiers in the area. Most of the big game animals, deer and elk, are more substantially affected by the noise pollution created by four-wheelers, trail bikes and snowmobiles which under the impact statement would be prohibited in the proposed development.

E. Noise.
Basic noise impact will be during the construction phase. Noise which is attendent to the development once completed is minimal.

F. Light and Glare.
The impact from possible interior and exterior lighting in the proposed development is minimal.

G. Land Use and Natural Resources.
I feel that the impact upon the land use and the natural resources would be minimal under the proposed development. The area is little used at the present time except for some hunting, hiking, motorized vehicles in areas other than the existing ski area development. The proposal would eliminate motorized vehicles in the area and introduce activities which are non-polluting and quiet.

H. Population, Employment and Housing.
The benefits to be gained in terms of increased employment opportunities and increased dollars spent in the community by users more than offset any potential adverse impacts.

I. Transportation.
Although there are those who complain that the proposed development would adversely affect the traffic volumes on the Squilchuck Road, I believe that the expressed fears are more emotional than factual. There would be some increase in traffic during the week by people who would be driving to the resort for overnight accomodations or driving to the resort for daily use. These

LETTER 21, CONTINUED

increases would not be substantial. There would be some increase in weekend traffic because the increased facilities would tend to naturally draw more people to those facilities. The road in the Squilchuck area is adequate to handle increased traffic. Beyond the junction to Wenatchee Heights the increased traffic volume would at best be 36 days per year and more likely relate only to the weekend days during the latter half of December through the middle of March, 26 to 28 days. When considered with the potential benefit for employment and increased local income, this impact is not substantial.

J. Public Services - Utilities.
There is no doubt that there will be an increased need for public services of a varied nature. I would expect that the increased tax revenues generated by the additional flow of users, together with revenues generated on real property taxes would more than offset any increased costs to the County in providing services and utilities.

I have been a skier for some 40 years. I have been a professional ski instructor for about 30 years. I am presently the Executive Vice President of the Professional Ski Instructors of America - Northwest Division. Throughout my some 30 years as a professional skier, I have continued to analyze ski resorts, recreational ski developments and the ski industry in general. The proposed development offers an optimum of recreational opportunity with a minimum of adverse impact upon the community. It is easily accessible from the City of Wenatchee. Yet it is remote enough so that it will not adversely impact any residential or developed areas. As a resort complex, it offers a desired mix between alpine skiing and cross country skiing providing a maximum recreation activity for the sport. With proper controls, the development can be completed without adversely impacting the environment.

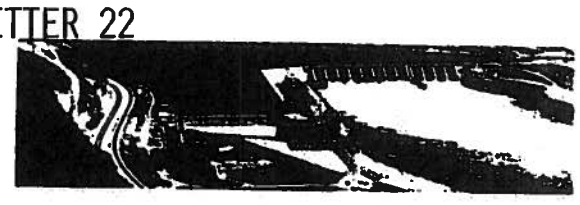
Respectfully,

David J. Whitmore

DJW:ls

177

LETTER 22



Public Utility District No. 1 of Chelan County

P. O. BOX 1231 • WENATCHEE, WASHINGTON 98801 0011 • (509) 663-8121

September 5, 1984

Mr. Edward Loidhamer, Director
Chelan County Planning Department
411 Washington St.
Wenatchee, WA 98801

See Page

Dear Ed:

The District's staff has completed its review of the "Mission Ridge/Constellation Ridge Resort Draft EIS", dated August, 1984. Our comments primarily concern the utility and energy topics.

107-114 Water. The project sponsor states that 133 gpm is available from on site sources (page 90). This quantity is supported by references to existing and inchoate water rights (page 88). There are no references to stream or spring flow measurements or other analyses that might verify the presence of a dependable supply of water in these quantities. This background information would help the District assess the potential quantities of water that may be required from the District during the course of the phased construction schedule.

110 On page 88, there is a table that identifies projected water demand. Is this for both domestic and irrigation needs?

111 On page 90, the DEIS states that "a total water supply of 293 gpm is available for future use of Constellation Ridge". It is correct that the District system could be expanded to 360 gpm; however, any statement that implies that District water will automatically be reserved for the future use of Constellation Ridge is an assumption. On

114 this same page, reference is made to a sharing of expansion costs between the District and the project sponsors. From what the District has seen to date, it appears that the District could not share in any of the costs.

LETTER 22, CONTINUED

114-115 Sewer. The second paragraph of page 91 states that "The Chelan County PUD has informally expressed a willingness to provide overall operational guidance for the wastewater facilities". This statement should be revised to reflect that the District is capable of providing this service rather than expressing informal agreement. No agreement to provide this service can be made without authorization of the District's Board of Commissioners.

106-107 Energy. During this past year, the District provided a detailed analysis of the electrical rate impacts of the local Cannon Mine, which was sponsored by Asamera. This detailed analysis was included in the Final EIS for that project. The Cannon Mine data indicated that such an increase in electrical energy load would result in increased purchases of higher cost Bonneville Power Administration energy, thus creating an effect upon electrical rates. The discussion in the Constellation Ridge EIS on pages xvii and 86 conflicts with the Cannon Mine data when it states that "the project will not necessitate an overall rate increase in the PUD's service area". In fact, all new loads on the District's system that include significant wintertime usage will contribute to upward pressure on rates, whether or not the load is a new home or a new ski resort.

So noted 106 The District does not expect a project sponsor to address the District's power supply issues. The impact of load growth on electrical rates is a District problem to be solved in the most appropriate manner by the District. To this end, the District is currently engaged in a study of the short and long-term effects of load growth.

So noted 107 The statement on page 86 concerning the distribution of costs for upgrading the Squilchuck line is incorrect. It should state: "The cost will be borne by the project sponsors in accordance with the District's line extension policy".

107 Also on page 86, two alternatives for a power line route are identified. In discussions with the District's water and electrical engineers, the preference in routes is highly dependent upon a decision on use of District domestic water at the initial stage of project development. If District water is to be used, Route 2, along the existing logging road, may be the preferred route, with a joint facilities trench. If no District water is to be used, Route 1 is the preferred route.

105-106 The District is unsure whether the estimated power demand on page 86 refers to connected load or projected demand load. We would also like to see the background information on the power demand figures, although this information need not be in the final EIS. There appears to be a substantial discrepancy between the stated numbers and the data that we have on file from existing ski resorts in other areas.

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LETTER 22, CONTINUED

Due to the need for general clarification of the energy section, the project sponsor might find it helpful to arrange to meet with the District during the course of final EIS preparation. We feel it should not be too difficult in that setting to accomplish the needed clarifications. Additionally, at a cold weather site such as a ski resort, there may be some cost-effective conservation measures that we can discuss that will offer additional opportunities to lessen energy consumption.

Thank you for the opportunity to comment.

Very truly yours,

SYSTEM PLANNING AND DESIGN

Roger L. Purdom
Environmental Coordinator

LETTER 23

STATE OF WASHINGTON
DEPARTMENT OF GAME
600 North Capitol Way, GI-11 • Olympia, Washington 98504 • (206) 753-5700

August 31, 1984

Edward C. Loidhamer, Director
Chelan County Planning Department
411 Washington Street
Wenatchee, Washington 98801

DRAFT ENVIRONMENTAL IMPACT STATEMENT:
Mission Ridge/Constellation Ridge Resort

Dear Mr. Loidhamer:

Your document was reviewed by Game Department staff as requested; comments follow.

Generally, we believe the DEIS contains too little detail to give an accurate picture of probable adverse effects. This is especially the case in the areas of land use conflict and wildlife impact.

Based upon comments received on the Draft EIS concerning impacts on wildlife, the project proponents retained Beak Consultants, Inc. to undertake a wildlife assessment under the direction and review of the Washington Department of Game (WDOG). The Mission Ridge/Constellation Ridge Resort: Wildlife Assessment (Technical Appendix E), is available for review at the Chelan County Planning Department.

Impacts to wildlife and potential land use conflicts, as stated in this letter from WDOG, have been mitigated to the satisfaction of the agency as a result of the Mission Ridge/Constellation Ridge Resort: Wildlife Assessment. The study addresses specific project related wildlife impacts and the appropriate mitigating measures to be implemented.

Land use issues of primary concern to this agency are those involving restrictions set by our funding source and conflicts with Game Commission policies. All department property requested by the proponent was purchased using federal funds under the Pittman-Robertson (P-R) Act (total contribution: 25% state, 75% federal). Terms of the grant would obligate the department to replace converted land and adjoining impacted parcels. Until such replacement took place, all further P-R money would be withheld. For fiscal year 1986, this contribution is estimated to be $1.97 million. Loss of these funds would seriously impact several ongoing management programs. Moreover, we have received a preliminary determination from the P-R administrator, U.S. Fish and Wildlife Service, that allowing the proposed expansion would constitute such a violation of our contract. In addition, we are not aware of any alternative summer range, within reach of the Colockum elk herd, that is not being used already. Effective replacement lands, offering at least as much habitat value for these elk, may be impossible to find. We see this as a significant land use conflict.

The DEIS seriously downplays this issue. No mention is made in the summary on page xv or page xxiii, nor is it discussed in the main body of the document on pages 54-56. The federal restriction and certain Game Commission policies, which also conflict with the proposed project, are referred to only on pages 17-18. Nowhere is there any discussion of project compatibility/incompatibility with these land use requirements.

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See Page

49-61 A second area where the document lacks sufficient information is in wildlife existing conditions, impacts and mitigating measures. We concur with italicized statements on page 48 which point out this shortcoming. A great deal more study would be needed to substantiate the relatively mild level of impact described by the proponent, as well as the efficiency of proposed mitigating measures. In contrast, we believe that adverse effects would be significant. Moreover, secondary impacts from induced development in the Naneum basin would be severe, and effective mitigation would likely be impossible. This aspect of the proposal is seriously understated.

Specific comments follow.

So noted — Page ii, Required Permits and Approvals. Work within any permanent or intermittent streamcourse (e.g., stream channelization mentioned on page 42) would require Hydraulic Project Approval from Washington Department of Game.

42-45 — Pages xii-xiii, Mitigating Measures. Use of vegetated swales for surface water runoff would help in removal of pollutants. Oil/water separators need to be regularly maintained to be effective.

179 — Page xv, Land Use. Conflict of proposed use with federal P-R requirements and Game Commission policies should be mentioned here.

179 — Page xxiii, Land Use. See previous comment.

49-51 — Page 43, Fauna, paragraph 1. Spotted owl typically nest in mid and lower elevations.

So noted — Page 43, Fauna, paragraph 2. Herd reduction occurred during hunting season. Most deer and elk populations in the State of Washington are limited by the availability of winter range. However, we believe that the extent of summer range is limiting for the Colockum elk herd.

So noted — Page 44, first line. Such department lands are called Habitat Management Areas (HMA's).

179 — Page 44, final paragraph. We strongly disagree with the inference of this discussion that future expansion would have little additional negative impact on wildlife and would definitely enhance elk use. Because of recent logging activity and forest fires in this vicinity, hiding and thermal cover may be the limiting factor for elk populations.

179 — In such case, additional forage on ski slopes would not provide enhancement. Studies would be necessary for documentation. Additionally, the discussion ignores secondary impacts from induced development.

So noted — Page 45, paragraph 4. Quality of elk diet falls off due to natural maturation of forage plants.

49-61 — Page 46, Impact, paragraph 2. We agree that project development and operation would reduce sensitive and native species, while increasing tolerant and non-native species. However, this assessment tends to understate the severity of impact. First, no baseline studies have been performed to determine what species are at risk. Secondly, it is likely that wildlife diversity would decrease. Finally, it is also likely that impacted species woud be those with already limited populations. Such a change in species distribution would be a significant adverse effect.

32-33 — Page 47, paragraph 3. Would area expansion mean increased snow making to get an earlier start to the ski season? If so, elk use and hunting recreation in the area could be impacted.

59-61 — Page 48, Mitigating Measures, paragraph 1. Again, these measures could provide some enhancement for elk, but it has not been established that these are limiting factors on the Colockum herd.

We agree with the italicized statement that the listed mitigating measures are inadequate for Game Department lands, especially given restrictions on management mandated by federal regulations and Game Commission policies.

179 — Pages 51-56, Land Use. Again, use restrictions and guidelines governing Game Department lands should be mentioned here.

135 — Page 103, Flora and Fauna. Secondary impacts from induced development in the Squilchuck, Stemilt, and Naneum basins should be listed here. Also, both statements mentioning loss of habitat should explain that wildlife would perish.

179 — Page 104, Land Use. Conflict of proposal with mandated use of Game lands should be mentioned.

82 — Page 107. No discussion of lost hunting opportunity appears in this document. We believe that this recreation impact would be inevitable from Naneum basin development.

In conclusion, we believe the DEIS contains insufficient detail in those areas which concern us the most. Our leasing decision will be made with reference to Game Commission policies and federal grant contract restrictions. Clear wildlife benefit must be shown to satisfy both. However, this DEIS does not make a sufficient showing of such benefit.

Thank you for giving us the opportunity to respond to your document.

Very truly yours,

THE DEPARTMENT OF GAME

Frank R. Lockard
Director

FRL:cv
cc: Agencies
[illegible]

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LETTER 24

JOHN SPELLMAN
Governor

DONALD W. MOOS
Director

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
[illegible] • Olympia, Washington 98504 • (206) 459-6000

September 11, 1984

RECEIVED SEP 14 1984 PLANNING OFFICE

Mr. Jerry Litt
Chelan County Planning Department
411 Washington Street
Wenatchee, WA 98801

See Page

Dear Mr. Litt:

Thank you for the opportunity to provide additional comments on the draft environmental impact statement for the Mission Ridge/Constellation Ridge Resort. The comments are in addition to those submitted in our letter of September 6, 1984, to Mr. Loidhamer.

114-124 — 1. The engineering report and construction plans and specifications for the proposed domestic wastewater treatment and disposal system(s) will have to provide greater detail than has been supplied in the EIS. Specific concerns not yet addressed are the possible impacts on the quality, quantity and existing beneficial uses of the area's ground and surface waters. A geological/hydrological evaluation of the wastewater treatment and disposal areas will be needed. Also needed is an outline of a ground and surface water monitoring program which will provide:

a. Sewerage system failure early warning;

b. Continuous evaluation of treatment efficiency; and

c. A mechanism to predict the short and long-term impacts on water quality and public health.

42-45 — 2. The use of surface runoff retention basins to allow collected runoff to percolate back into the ground (ground water) should be evaluated in more detail. Minimizing surface drainage is usually beneficial, but directing surface drainage to seepage ponds may cause greater long-term ground water problems depending on levels of surface drainage contaminants. It is unclear how runoff catch basins and site retention ponds will be designed to effect removal of oils and sediments. There is no mention in the EIS of how these contaminants will be removed from the system or the method of disposal.

110 — 3. The discussion of existing conditions, impacts, and mitigating measures makes no mention of the direct impacts on surface or ground water attributable to the proposed appropriation of water for domestic purposes at the resort. These impacts should be identified and weighed against the obvious alternative of extending the PUD service to the resort at the outset of resort development.

4. The discussion of existing water rights held by Wenatchee Mtn., Inc.

181

(page 88) is erroneous. Existing rights and the pending application for the Mission Ridge Ski Area and constellation resort are shown below:

Application or Certificate	Instantaneous Rate	Annual Total	Purpose	Period of Use
Cert. No. 1, Cert of Change 1030	0.10 cfs (49 gpm) -	36 ac-ft	Irrigation of 12 acres	April 1 to October 1
SA-25295C	0.45 cfs (200 gpm)	11 ac-ft	snowmaking	October 1 to April 1
GA-28345	68 gpm	N/A	community domestic	November 1 to April 1

As can be seen from the table, Wenatchee Mtn., Inc. currently has no water right for community domestic purposes at the existing day lodge. The proponent should contact the Central Regional Office to determine what modifications to existing rights are needed and whether additional applications are necessary.

122-123 — 5. The discussion of solid waste (page 85) does not identify the volume per year of solid waste generated at Mission Ridge. This should be identified in the final EIS. Also, the possible impact of increased solid waste on the landfill should be addressed. Compliance with local comprehensive solid waste management plans is required.

So noted 105 — 6. An assessment of the types and quantities of waste generated is needed and may indicate some dangerous wastes will be present (i.e., solvents and oils routinely used in equipment maintenance, or pesticide containers and residues). If dangerous waste is involved, compliance with dangerous waste laws and regulations will be required.

125 — 7. A spill prevention, control and countermeasure (SPCC) plan must be submitted to the Department of Ecology for approval if there is significant storage of fuel or dangerous waste on the property.

35 — 8. The EIS does not discuss the possible increase in wood combustion from fireplaces. Air pollution emissions from residential wood heating devices, including fireplaces, is a growing problem and must be addressed.

If you have any questions, please contact Mr. Clar Pratt of the Central Regional Office (509/575-2491) or Mr. Tom Harris of Air Programs Division (206/459-6248).

Sincerely,

Barbara J. Ritchie
Environmental Review Section

BJR:pk

cc: Tom Harris
Corrine Guse, CRO

LIST OF ELEMENTS OF THE ENVIRONMENT

(1) Every EIS shall have appended to it a list of the elements of the environment in subsection (2), (3) and (4) of this section. The lead agency shall place "N/A" ("not applicable") next to an item when the proposal, including its indirect impacts, will not significantly affect the area (or subarea) of the environment in question. Items marked "N/A" need not be mentioned in the body of the EIS. Subsections (2) and (3) of this section correspond in subject matter to the questions contained in the environmental checklist used for threshold determination, and the questions in the checklist may be used to interpret this outline listing. (Provided, this list of elements need not be appended to an EIS being prepared to satisfy both the National Environmental Policy Act and SEPA.)

(2) ELEMENTS OF THE PHYSICAL ENVIRONMENT.

(a) Earth.
- (i) Geology.
- (ii) Soils.
- (iii) Topography.
- (iv) Unique physical features.
- (v) Erosion.
- (vi) Accretion/avulsion. N/A

(b) Air.
- (i) Air quality.
- (ii) Odor.
- (iii) Climate.

(c) Water.
- (i) Surface water movement.
- (ii) Runoff/absorption.
- (iii) Floods.
- (iv) Surface water quantity. N/A
- (v) Surface water quality.
- (vi) Ground water movement.
- (vii) Ground water quantity.
- (viii) Ground water quality.
- (ix) Public water supplies.

(d) Flora.
- (i) Numbers or diversity of species.
- (ii) Unique species.
- (iii) Barriers and/or corridors.
- (iv) Agricultural crops. N/A

(e) Fauna.
- (i) Numbers or diversity of species.
- (ii) Unique species.
- (iii) Barriers and/or corridors.
- (iv) Fish or wildlife habitat.

(f) Noise.

(g) Light and glare.

(h) Land use.

(i) Natural resources.
- (i) Rate of use.
- (ii) Nonrenewable resources.

(j) Risk of explosion or hazardous emissions.

(3) ELEMENTS OF THE HUMAN ENVIRONMENT

(a) Population.

(b) Housing.

(c) Transportation/circulation.
- (i) Vehicular transportation generated.
- (ii) Parking facilities.
- (iii) Transportation systems.
- (iv) Movement/circulation of people or goods.
- (v) Waterborne, rail and air traffic.
- (vi) Traffic hazards.

(d) Public services.
- (i) Fire.
- (ii) Police.
- (iii) Schools.
- (iv) Parks or other recreational facilities.
- (v) Maintenance.
- (vi) Other governmental services.

(e) Energy.
- (i) Amount required.
- (ii) Source/availability.

(f) Utilities.
- (i) Energy.
- (ii) Communications.
- (iii) Water.
- (iv) Sewer.
- (v) Storm water.
- (vi) Solid waste.

(g) Human health (including mental health).

(h) Aesthetics.

(i) Recreation.

(j) Archeological/historical.

(4) The following additional element shall be covered in all EISs, either by being discussed or marked "N/A," but shall not be considered part of the environment for other purposes:

(a) Additional population characteristics.
- (i) Distribution by age, sex and ethnic characteristics of the residents in the geographical area affected by the environmental impacts of the proposal.

TECHNICAL APPENDIX A

Site Inventory Maps and Suitability Criteria

Site Characteristics

The total land area within the Constellation Ridge Resort area is 900 acres which includes 640 acres in Section 19, 130 acres in the Northeast Quarter of Section 30, and 130 acres in the Southwest Quarter of Section 17. A site analysis was conducted to determine the amount of land suitable for development. Development of Constellation Village, the residential development and the ski area has been concentrated with the Southwest Quarter of Section 19, an area of approximately 160 acres. The analysis took into consideration the following:

Topography	Slopes less than 30% were considered suitable for development
Soils	Talus, a loose rocky material were considered unsuitable for building on
Solar Orientation and Wind Exposure	The most desirable sites for development were those with southerly exposures, with the second most desirable being those protected against winter winds
Existing Forest Cover	An effort was made to reduce the amount of logging of additional areas for development and concentrated development in the area already logged
Distinctive Land Forms	An attempt has been made to enhance the natural land forms found on the site. Efforts have been made to avoid development on ridge lines and natural peaks which are a distinctive feature of the site. Natural depression and sink holes have been avoided due to the problem of snow and drainage
Views and Aspect	The primary views are north toward Wenatchee and the Columbia River, and south southwest looking up toward the ski slopes and the mountains. Attempts have been made to create additional views into the site such as the creation of a small lake and meadow

Given these suitability criteria for development the following site-specific program criteria were developed:

Parking Suitability

- 0 - 20% slopes
- Low visibility from Mission Ridge Road
- Open forest cover

Building Suitability

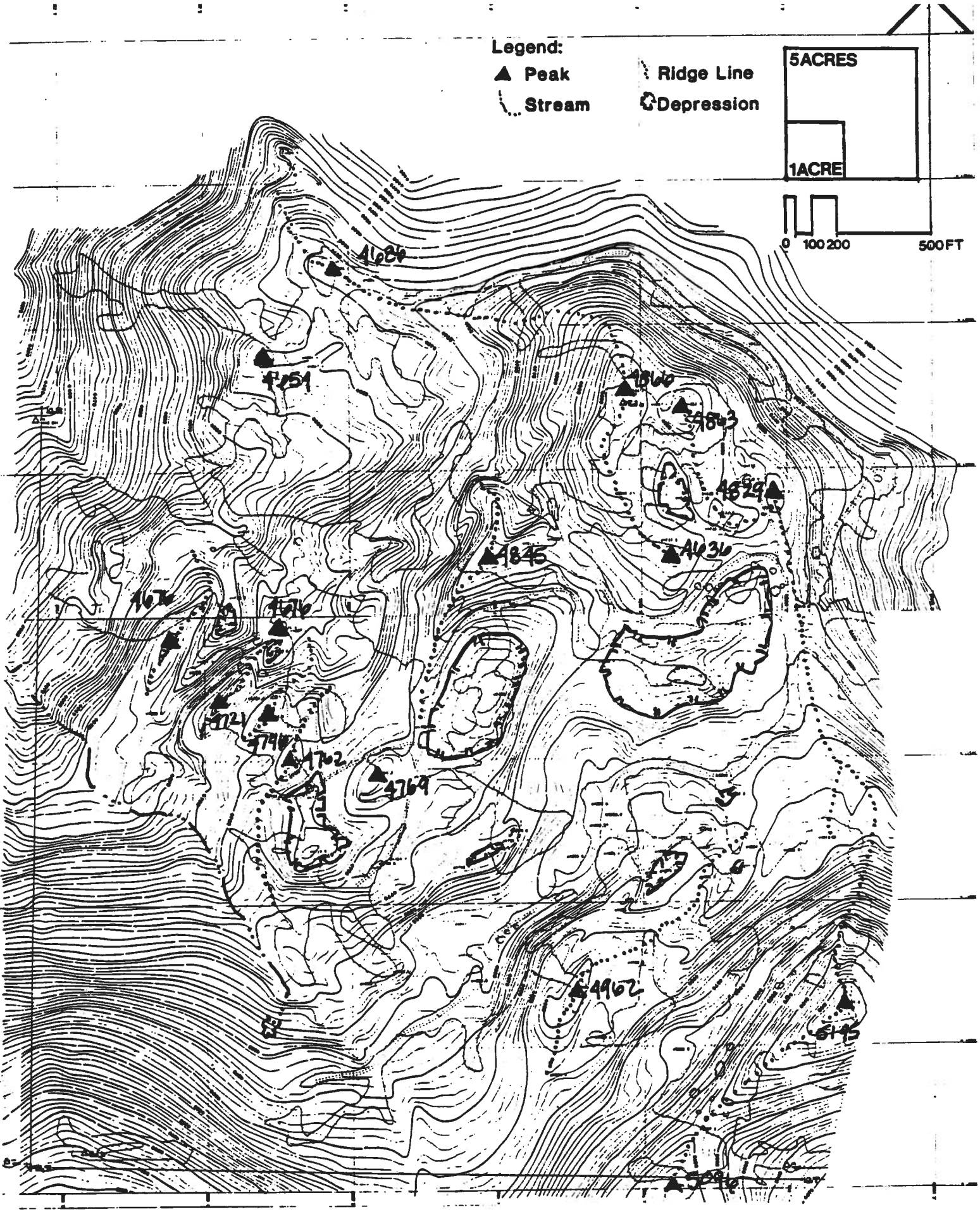
General Sites

- Less than 30% slope
- Not on talus
- Open forest cover
- Not on ski run

Prime Site

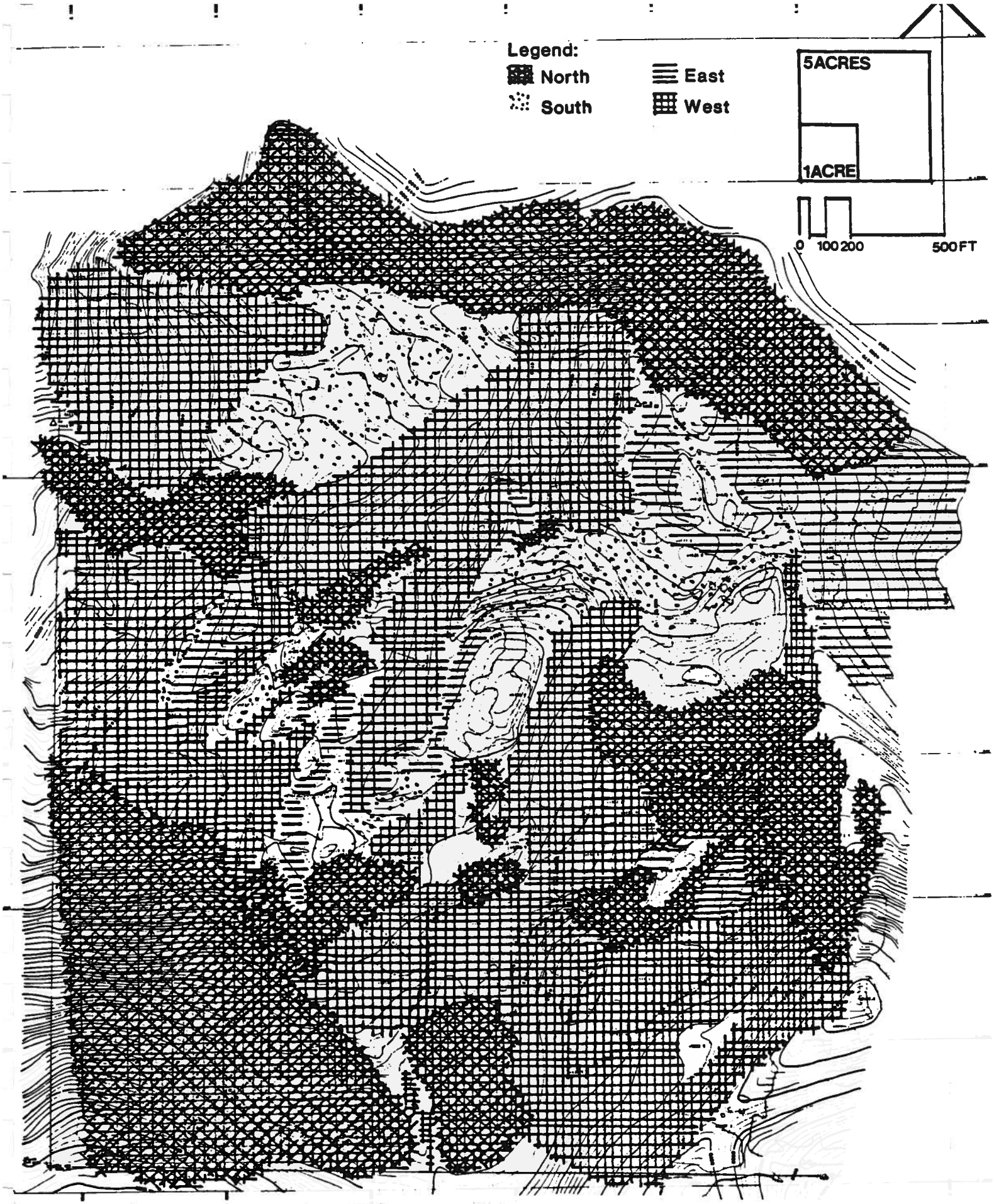
All of those listed above and:

- Good solar orientation - south, east and west
- In winter sun - 12/21 at 2:00 pm
- Less than 20% slope
- Not in sink holes



CONSTELLATION RIDGE RESORT
MASTER PLAN The NBBJ Group

LANDFORM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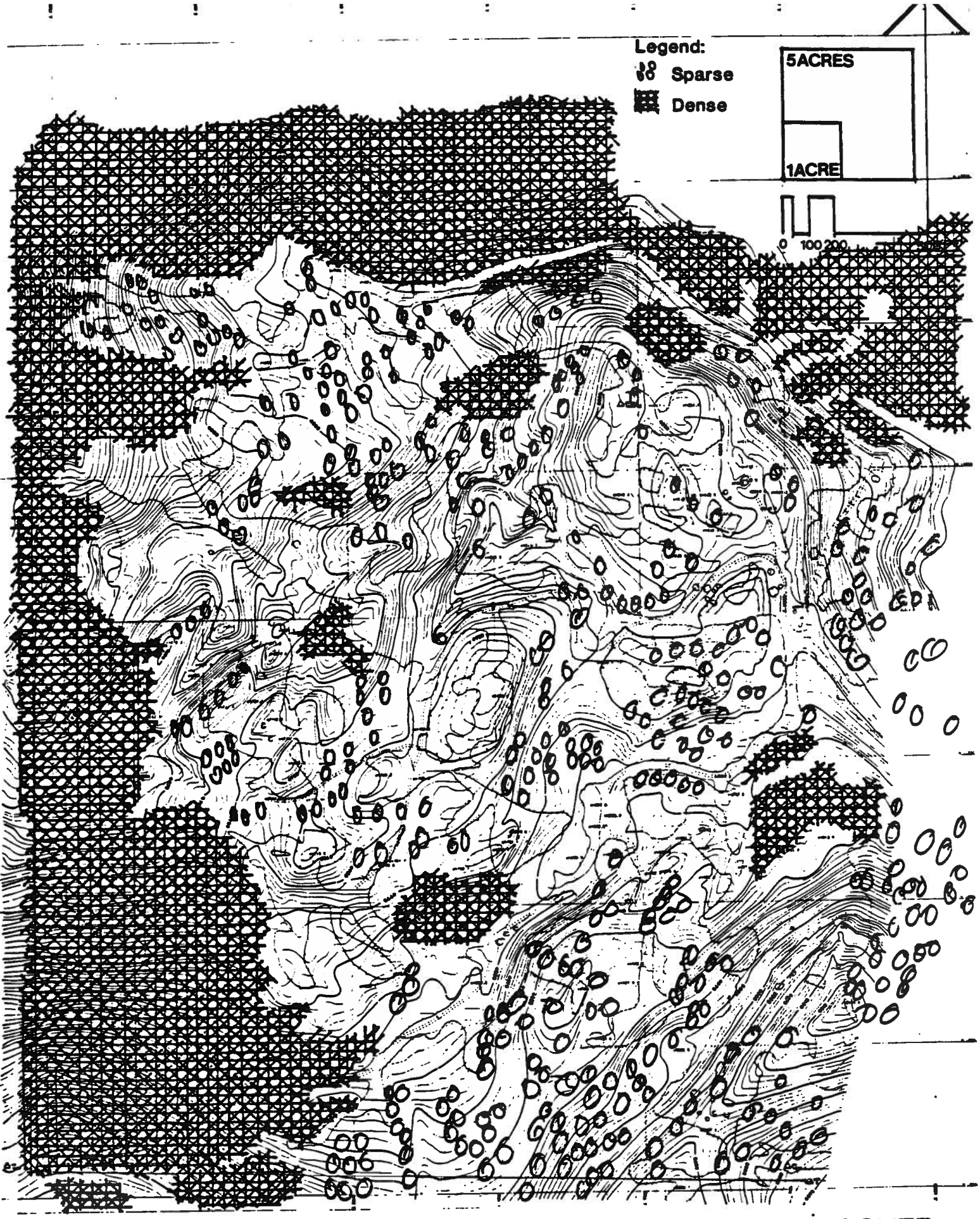
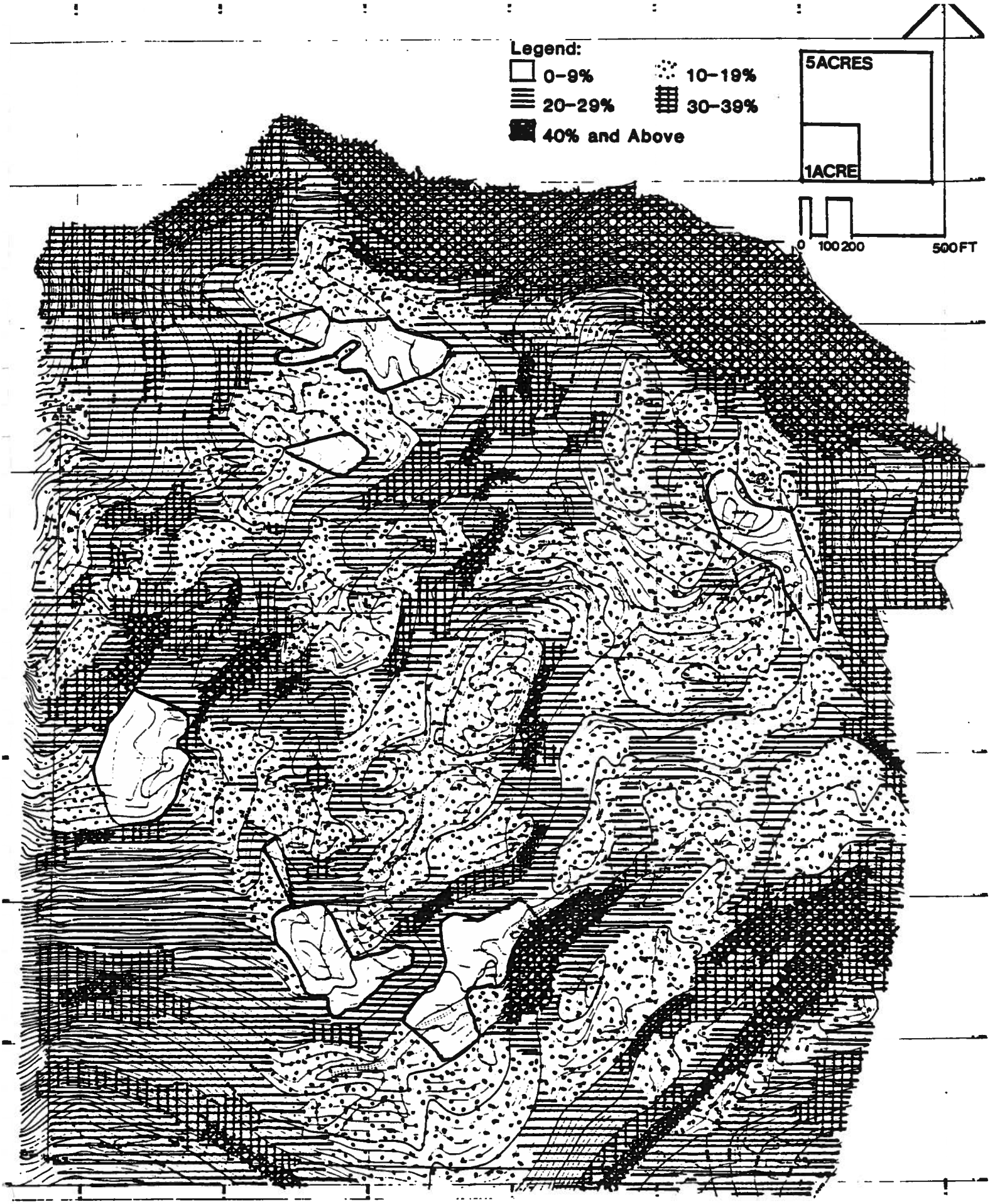


CONSTELLATION RIDGE RESORT
MASTER PLAN The NBBJ Group

FOREST COVER



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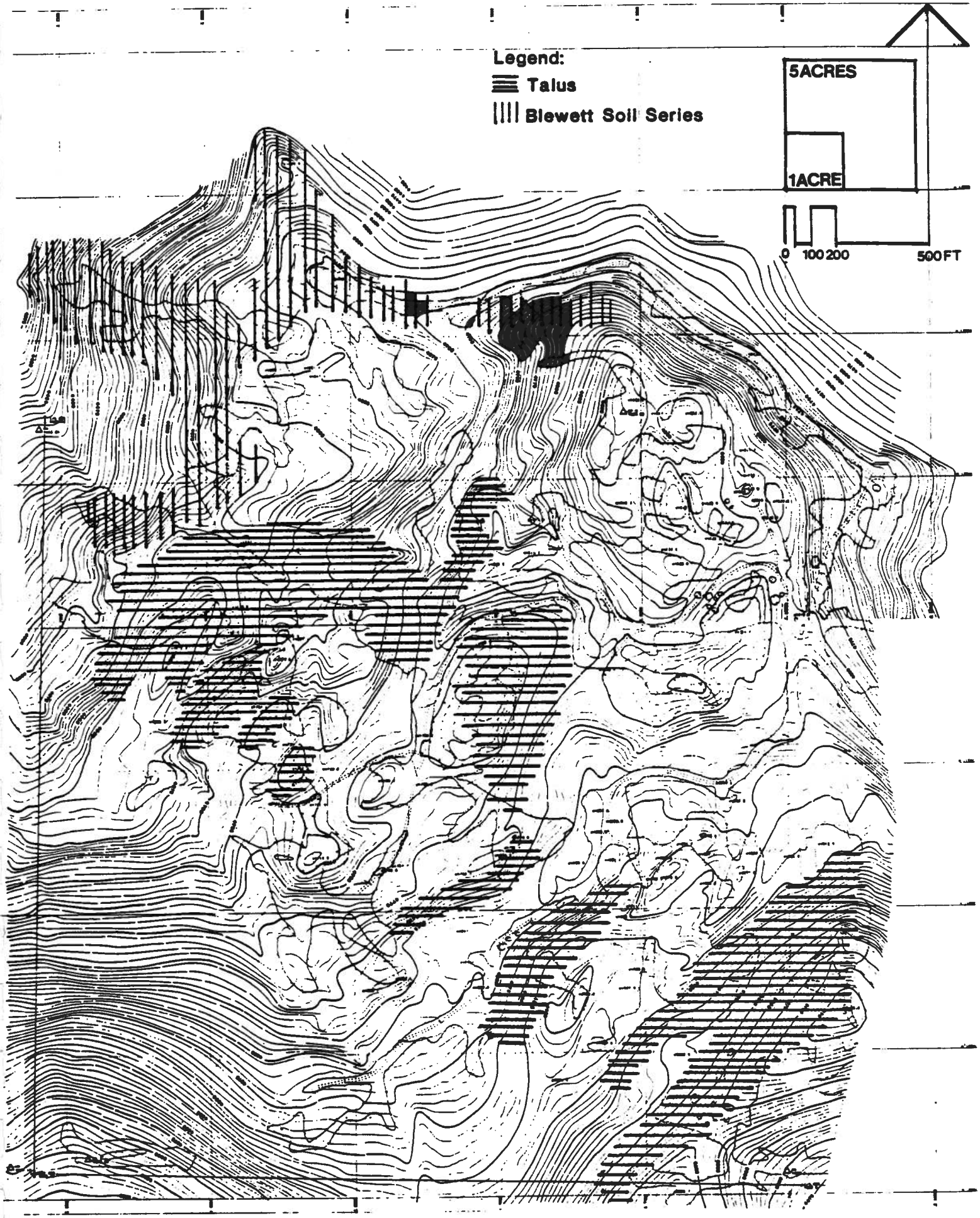
MASTER PLAN The NBBJ Group

SLOPE



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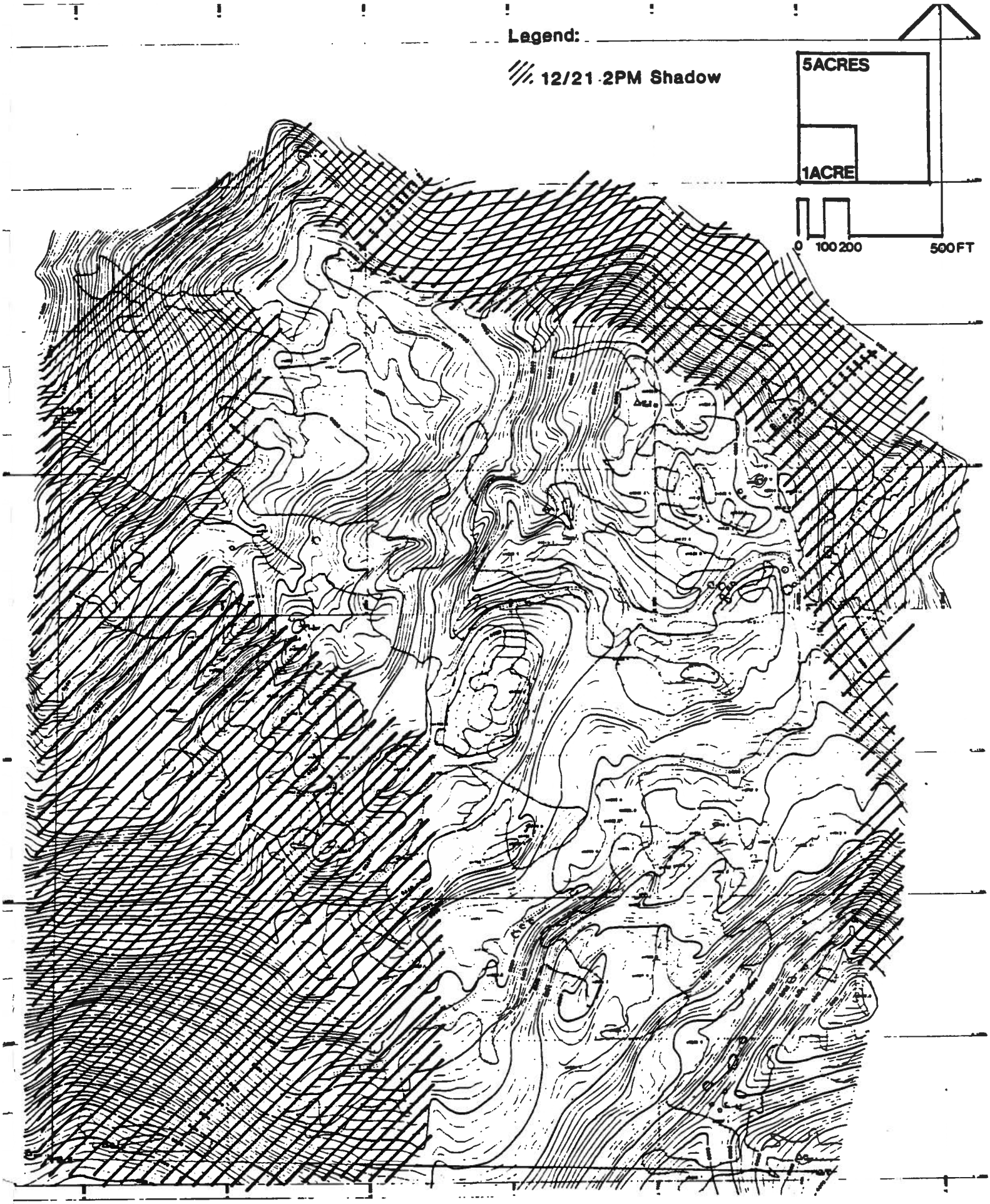
SOILS



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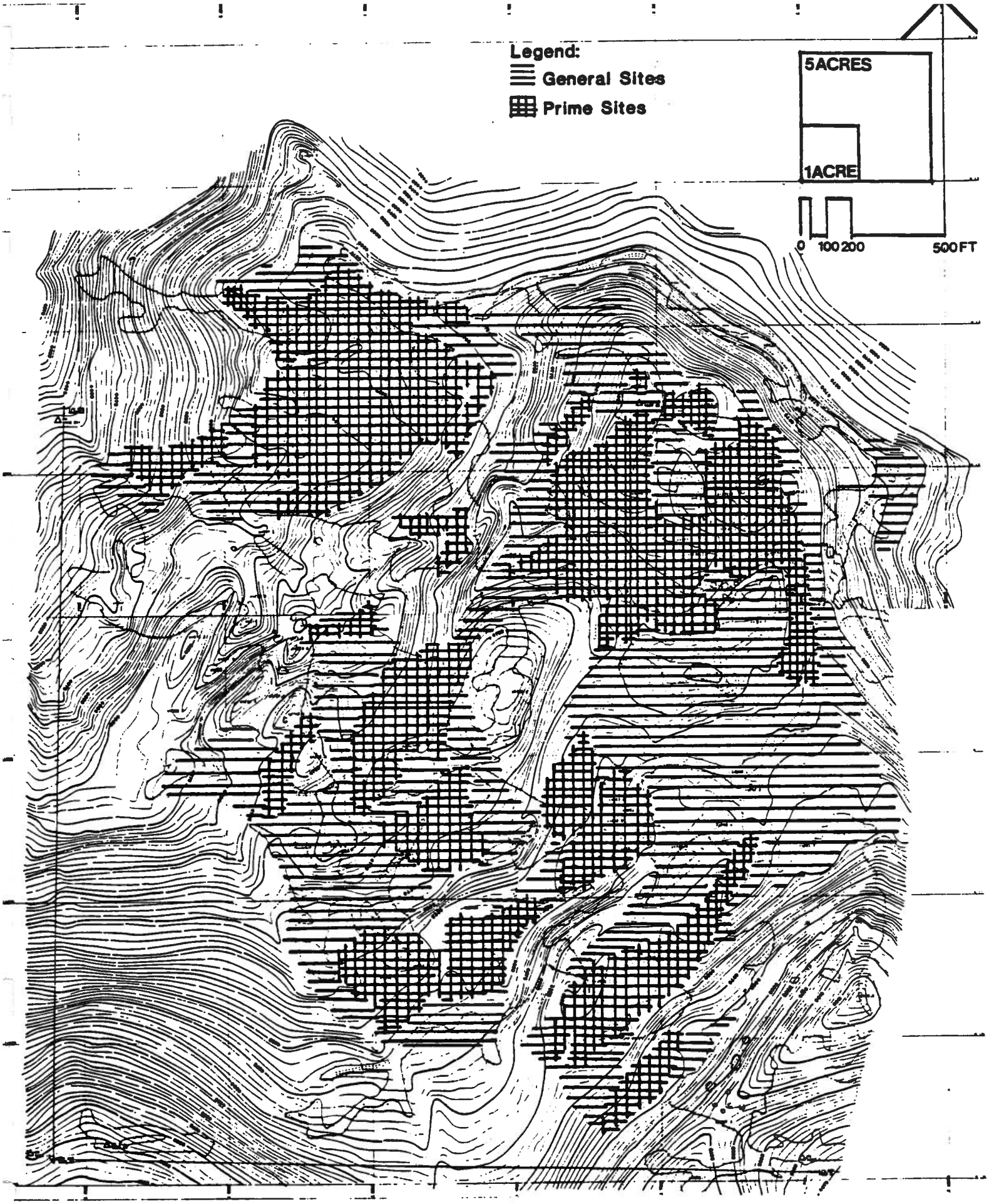
SOLAR



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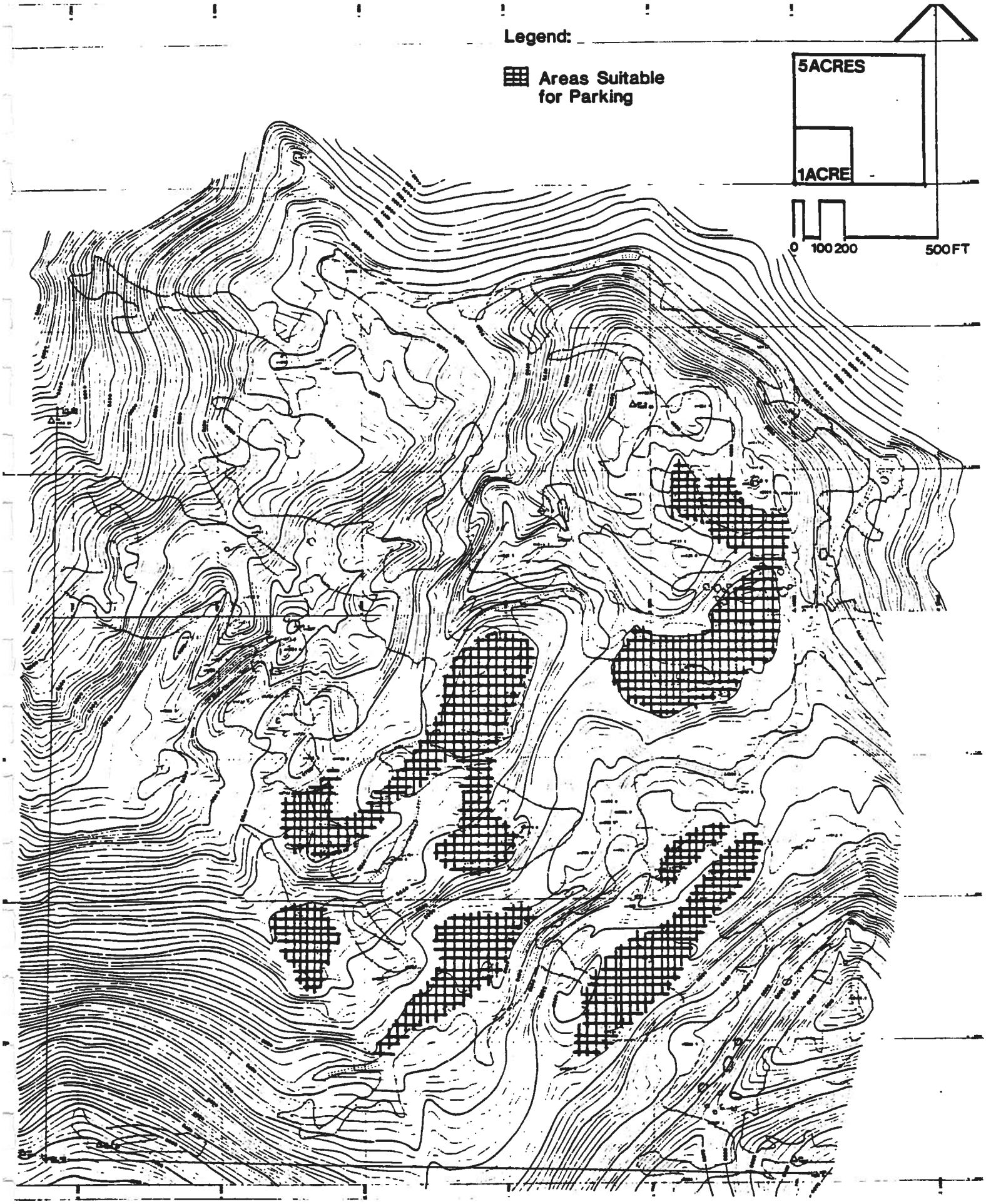
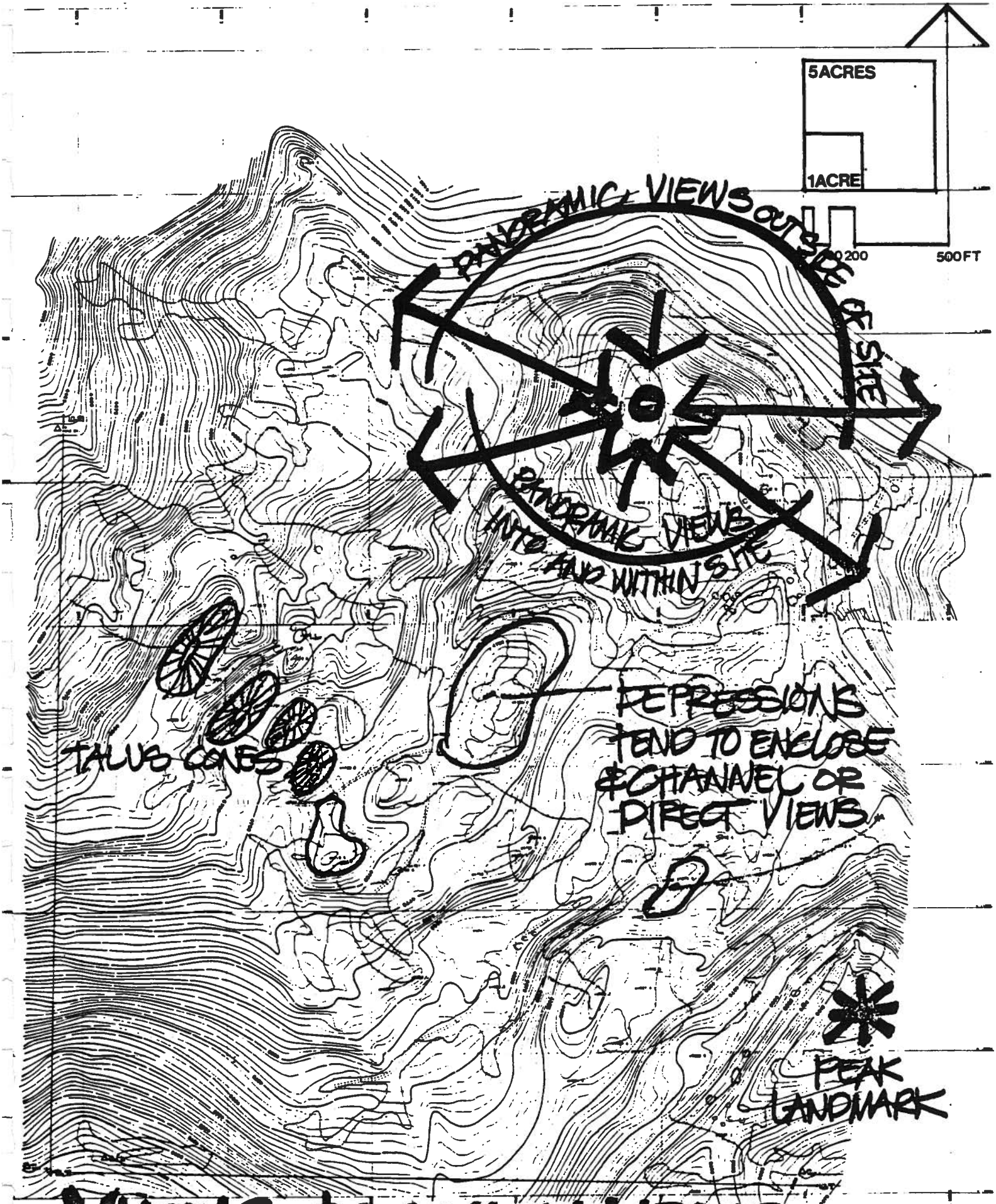
BUILDING SUITABILITY



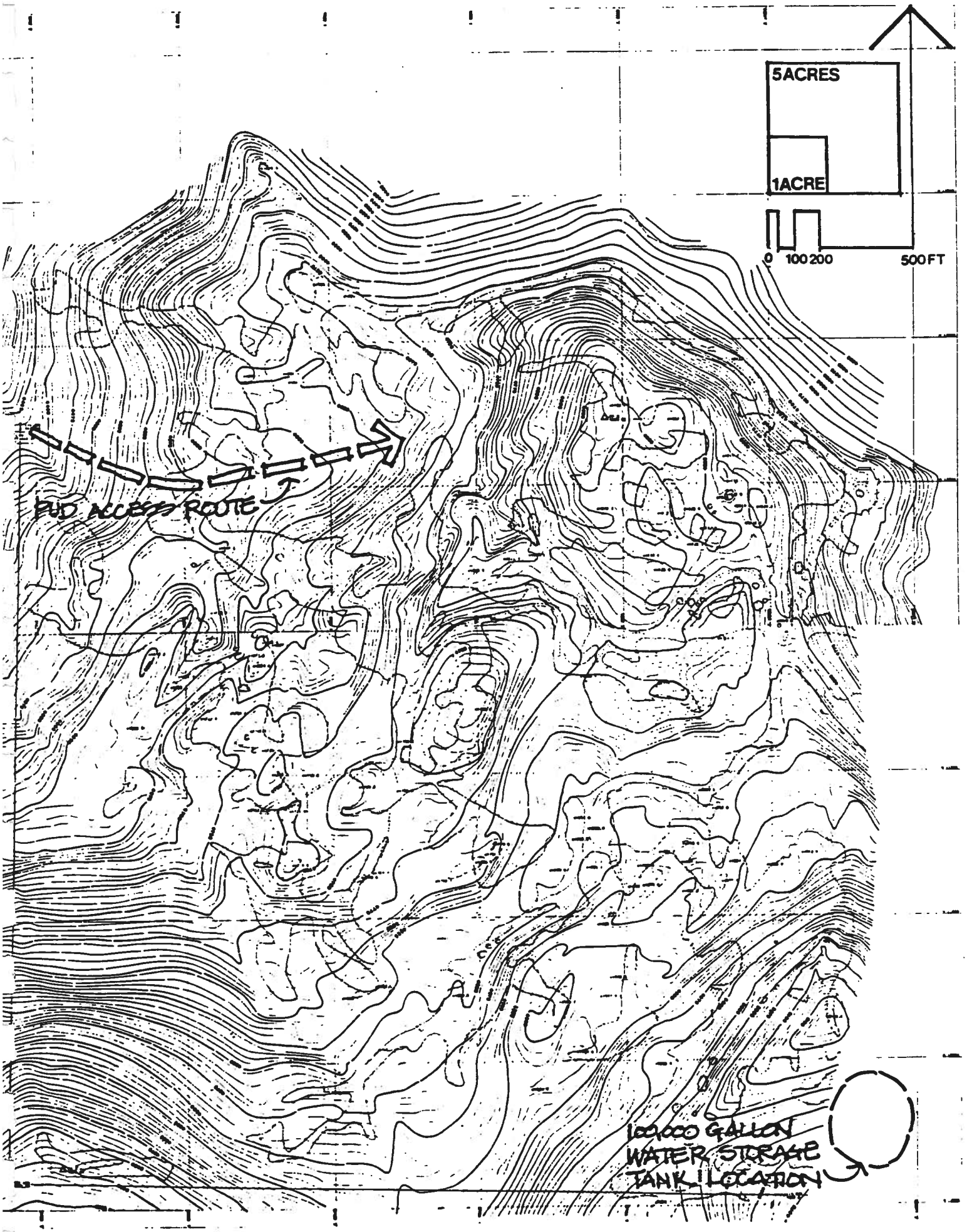
CONSTELLATION RIDGE RESORT
MASTER PLAN The NBBJ Group

PARKING SUITABILITY



VIEWS & LANDMARKS

CONSTELLATION RIDGE RESORT MASTER PLAN THE NBBJ GROUP



CONSTELLATION RIDGE RESORT

WATER

TECHNICAL APPENDIX B

Summary of Projected Water Demand for Constellation Ridge Resort

CONSTELLATION RIDGE RESORT

PRELIMINARY

MAXIMUM DAILY WATER DEMANDS

WINTER USE TYPE UNIT	NO. UNITS Phase 1	 Phase 2	NO. PERSONS Phase 1	 Phase 2	FLOW/DAY PER UNIT OR PERSON	TOTAL USE GALS/DAY Phase 1	 Phase 2
Apartment or Condo	120	400	600	2,500	60	36,000	150,000
Hotel Rooms	100	300	400		50	20,000	
Day Visitors (1)	-		950	950	6	5,700	5,700
Restaurant/Seat	220	550	-	-	50	11,000	27,500
Bar-Taverns/Seat	100	280	-	-	25	2,500	7,000
Commercial/Employee	-	-	50	100	10	500	1,000
RV Park/Vehicle	20	40	-	-	100	2,000	4,000
Dormitory/Staff	-	-	10	15	50	500	750
Residence Staff/Residence	5	10	-	-	250 (2)	1,250	2,500
Residence Private/Residence	10	20			250 (2)	2,500	5,000
SUB TOTAL						81,950	203,450
DSHS MINIMUM RESIDENTIAL SUPPLY						8,250	
TOTAL PEAK WINTER DEMAND						90,200	
						63 GPM	141 GPM

SUMMER USE					
Apartment or Condo	120	200	60	12,000	
Hotel Rooms	100	100	50	5,000	
Day Visitors	-	20	10	200	
Restaurant/Meal	-	300	10	3,000	
Bar-Taverns/Person	-	150	20	3,000	
Commercial	-	10	10	100	
RV Park/Vehicle	20	-	100	2,000	
Residental/Staff	5	-	250 (2)	1,250	
Residental/Private	10	-	250 (2)	2,500	
Irrigation/Residence	15	-	700 (2)	10,500	
Irrigation/Landscape	-	-	-	6,000	
SUB TOTAL				45,550	
DSHS MINIMUM RESIDENTIAL SUPPLY				8,250	
TOTAL PEAK SUMMER DEMAND				54,800	
				38 GPM	85 GPM (3)

(1) Includes Snack Bar - Source Mission Ridge 1982 Peak.

(2) DSHS requires a Minimum Available Source of 800 GPD per residence during winter and 1500 GPD per residence during irrigation season.

(3) Based upon user demand of 2.2 times Phase 1 Summer Program.

Reference: Metcalf & Eddy "Waste Water Engineering".

MISSION RIDGE DATA

Certificate of Water Right #54-25295C (Snowmaking) - Effective October 1 to April 1
.45 cfs, 11 Acre/Ft/Year.

5 shares of Millerdale Water - Effective during summer - 5 shares x 9 GPM Eas.
@ 4" = approximately 45 GPM.

Peak Sewer flow in 1982 Approx. 17,380 GPD
Average flow during week 3,000 to 5,000 GPD
Staff Use (Assumed) 500 GPD
Demand per skier (17,380-500 ÷ 2,900 = 5.8 Gallons/Skier
Excess water peak weekend 45 GPM - $\frac{17,380}{1440}$ = 33 GPM

REPORT ON IMPACT OF SUPPLYING DOMESTIC WATER TO CONSTELLATION RIDGE

Consultants for the Constellation Ridge development have requested that the District analyze its water system to determine the availability of domestic water for this project which is to be located in the Mission Ridge area. An estimated average flow of 62 gpm is reported to be required for the first stage. An additional average daily flow of 94 gpm is reported to be required for the second stage. Therefore, a total of 156 gpm, or 225,000 gpd, will be required. (It is assumed that no future expansion after the second stage will take place.)

In analyzing the impact of the proposed development on the District's system, it should be kept in mind that its peak loading will occur in the wintertime when the District is not experiencing peak loading. (The District's typical peak loading occurs in the summer months -- normally July and August.) Whereas, a peak demand of 800 gpd per connection is anticipated in the District's existing system during the summer months, a peak demand of 400 gpd per connection (in the existing system) is anticipated during the winter months.

Information on the development's peak summer flows has not been provided. However, for the purpose of this report, it is assumed that the loading will be reduced by 50% (based on light summer use and also a separate irrigation system). An evaluation of the proposed development on the District's system is presented below:

SUPPLY SYSTEM

Supply. The District obtains water that it supplies to the area of the project site from the City of Wenatchee's Regional Water System. The District is entitled by contract to take up to 4 MGD and has installed regional booster pumps that will supply this amount. Currently, District customers use an estimated 1821 gpm or 2.62 MGD. (See Table No. 6 from the District's Comprehensive Water System Plan, which is attached.) Therefore, there is an ample supply (960 gpm) of water remaining for future District customers.

Distribution System. As discussed above, the District's main (regional) booster pumps are capable of delivering an adequate quantity of water into the system. However, water has to be boosted or lifted from the lower pressure zone fed by the main booster pumps to the upper zones in the system. As shown on the attached map, water is delivered to the Circle Street-Dry Gulch area through two booster pump stations. The first is located on Western Avenue near Springwater. This pump station serves pressure zones 1A, 1B, 2, 3A, 3B, 3-7 Squilchuck, and 5-6

Wenatchee Heights. The demand for these areas as shown on Table No. 6 is 620 gpm. The Springwater pump station has a 60 HP pump capable of delivering approximately 675 gpm. (There is a second 60 HP pump at the station designed as a standby pump.)

The Skyline booster pump station delivers water on up to the Upper Skyline reservoir which provides water to the Squilchuck area. This station serves zones 1A, 1B, 3A, 3-7 Squilchuck, and 5-6 Wenatchee Heights, where approximately 315 gpm is required. This duplex pump station was recently modified to pump 450 gpm (per each pump, with one acting as standby).

The Squilchuck pump stations (four in all) deliver water from a reservoir located in Pitcher Canyon to the District's upper reservoir located above Squilchuck State Park. Each station is designed to pump 200 gpm. The demand on each pump station drops as you move uphill toward the proposed development.

In order to determine the impact of the proposed development, the following charts have been compiled showing summer and winter water demands. It should be pointed out that the District has been requested to determine the impact of providing water to a proposed mine on Circle Street. This mine will require 103 gpm which has to be delivered through the Springwater and Skyline pump stations.

As shown on chart nos. 1 and 2, there is no problem anticipated in providing water to the first stage of the Ridge development if the mine is not built. Figures for the second stage (without the mine) show that the Springwater pump station would be slightly overloaded by 23 gpm during summer months and that Squilchuck pump station #1 and #2 would be slightly overloaded (17 gpm and 12 gpm, respectively) in the winter. With the additional flows required for the proposed mine and the ski resort, the Springwater pump station would be overloaded by 80 gpm during Stage I and by 126 gpm during Stage II. The Skyline station would be at its maximum during Stage I and overloaded by 49 gpm during Stage II.

Another factor that should be considered is future normal growth of the system. A growth rate of approximately 2% has been projected for the system. The figures in the charts show existing demands. Each year these will increase. Also, if either the ski development or the mine (or both) are carried out, then reserve capacity for future growth will be used up. The actual percentage of reserve capacity being utilized in each case can be calculated from charts nos. 1 and 2. The capacity required for each service zone based on normal growth is given on Table No. 6 (from the District's Five-Year Plan).

It should also be pointed out that an existing line 2,400 feet long leading to the Springwater pump station is only an 8" diameter line and will require replacement (or a parallel line) if flows much greater than

the existing flow are required. It is felt that if the mine and the ski resort are built, then this line should be increased in size. No other lines would be affected with the exception of somewhat less water being available for fire flows.

NOTE: All the above narrative deals with direct impacts on the system. Secondary growth resulting from the project is not believed to be any problem, except that the direct impact of supplying water to the proposed developments will use a portion of the reserve capacity at each pump station that would have been used for future growth.

CHART NO. 1

WINTER DEMANDS, GPM

Facility	Capacity	Existing Demand	With Proposed Ski Resort Demand		With Ski Resort and New Mine	
			Stage I	Stage II	Stage I	Stage II
Springwater Pump	675	310	375	466	478	569
Skyline	450	158	223	314	326	417
Squilchuck No. 1	200	61	126	217*	N/A	N/A
Squilchuck No. 2	200	56	121	212	N/A	N/A
Squilchuck No. 3	200	16	81	172	N/A	N/A
Squilchuck No. 4	200	11	81	167	N/A	N/A

* Projected flow exceeds capacity

CHART NO. 2

SUMMER DEMANDS, GPM

Facility	Capacity	Existing Demand	With Proposed Ski Resort Demand Stage I	With Proposed Ski Resort Demand Stage II	With Ski Resort and New Mine Stage I	With Ski Resort and New Mine Stage II
Springwater Pump	675	620	652	698*	755	801
Skyline	450	315	347	393	450	499
Squilchuck No. 1	200	122	154	200	N/A	N/A
Squilchuck No. 2	200	112	144	190	N/A	N/A
Squilchuck No. 3	200	33	65	111	N/A	N/A
Squilchuck No. 4	200	22	54	100	N/A	N/A

* Projected flow exceeds capacity

TABLE NO. 6

PROJECTED WATER DEMANDS BY AREA

Pressure Zone	Required Peak Daily Flow, gpm				
	1980	1985	1990	1995	2000
1 (Wenatchee)	514	584	663	752	854
1 (Sunnyslope)	184	233	294	371	470
1A	80	93	108	125	145
1B	12	14	16	19	22
2S	80	93	108	125	145
3S	100	116	135	156	181
2	255	296	345	401	466
2A	14	16	19	22	25
2B	14	16	19	22	25
3A	118	138	160	187	218
3B	67	78	90	104	121
3 Sq-7 Sq	67	78	90	104	121
5 W-6 W	57	66	77	88	103
TOTAL	1,562	1,821	2,124	2,476	2,896

FIGURE NO. 1

SCHEMATIC DIAGRAM OF WATER SYSTEM
WENATCHEE AREA

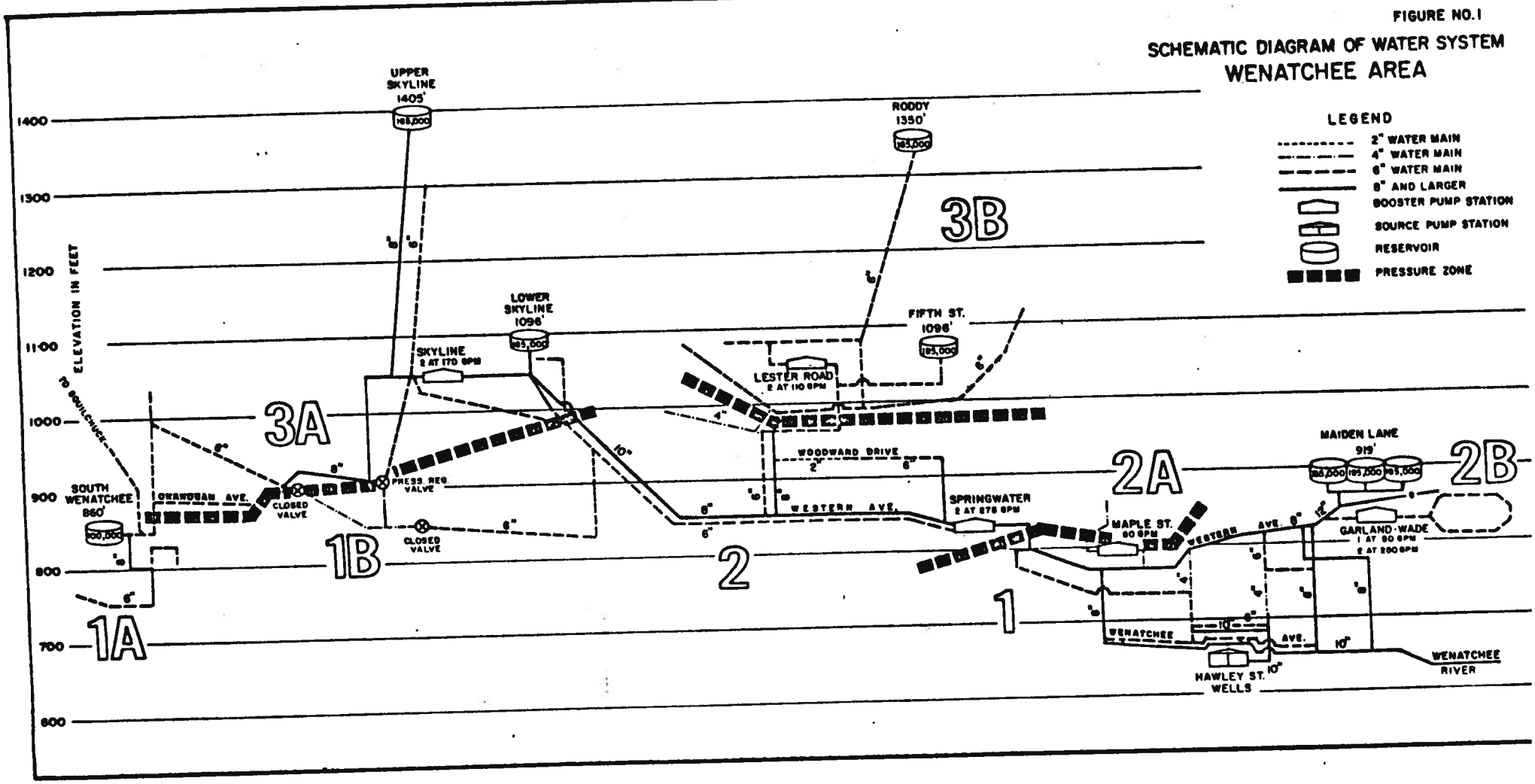
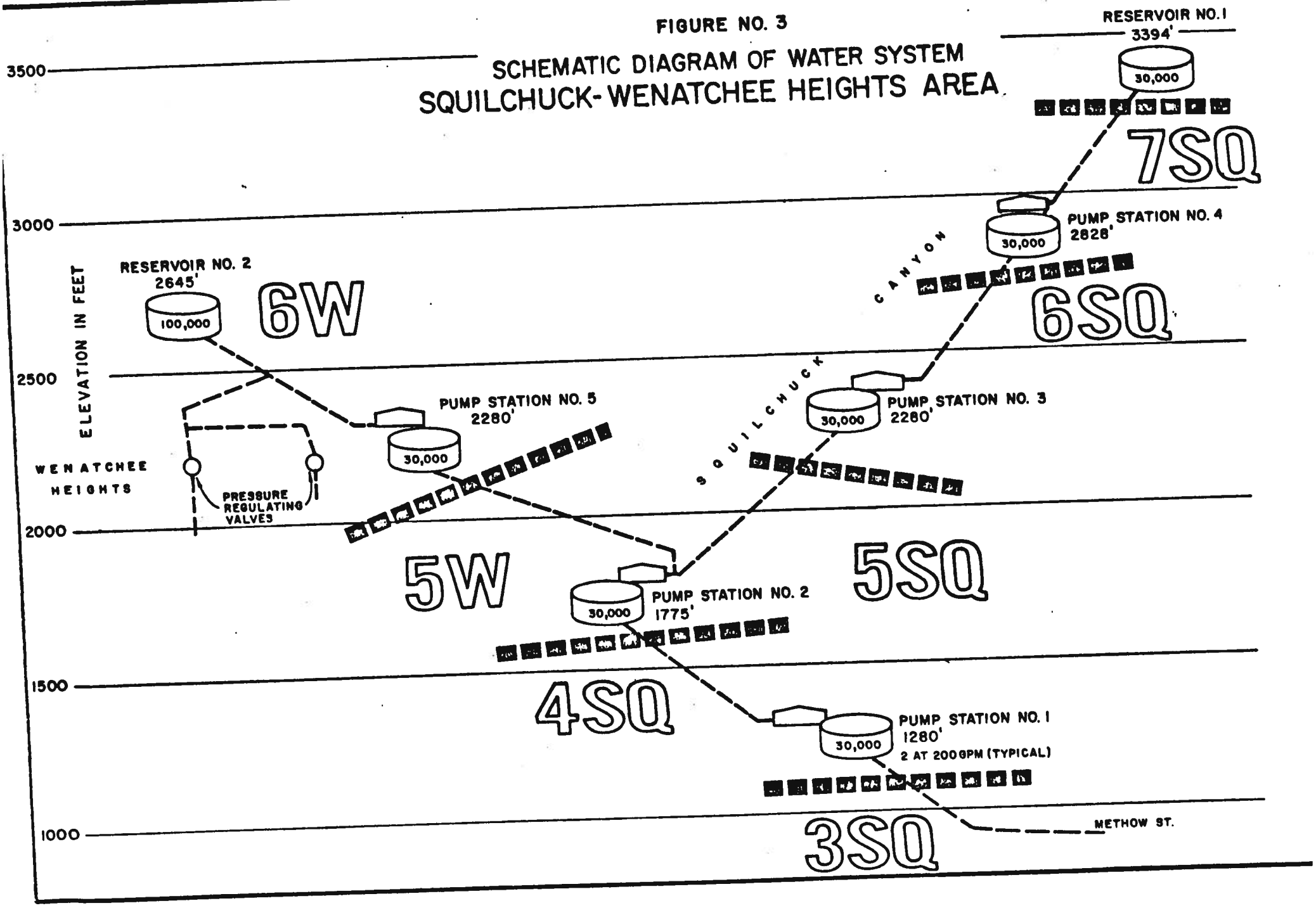


FIGURE NO. 3

SCHEMATIC DIAGRAM OF WATER SYSTEM SQUILCHUCK-WENATCHEE HEIGHTS AREA



TECHNICAL APPENDIX C

Constellation Ridge Resort Wastewater Treatment and Disposal: Description of Proposed Facilities

C-1 Development of Preliminary Estimates of Wastewater Loadings

C-2 Evaluation of the Existing Wastewater Treatment and Disposal Facilities Serving the Day Lodge at Mission Ridge

C-3 Soil Investigation Summary; Details of Test Hols Excavations in Areas Originally Considered for Sub-surface Disposal and in the Areas Proposed for Lagoons

CONSTELLATION RIDGE RESORT

WASTEWATER TREATMENT AND DISPOSAL

DESCRIPTION OF PROPOSED FACILITIES

SUMMARY OF ENVIRONMENTAL IMPACTS

Davis/Scheible Engineering
12/15/83

1. SUMMARY

1.1 PROPOSED WASTEWATER FACILITIES AND ANTICIPATED IMPACTS

1.1.1 PROPOSED FACILITIES

Sewage generated at the resort will be conveyed by buried pipeline to lagoons for treatment and storage during the winter months. The stored effluent will be disposed of by spray irrigation. Figure 1.1.1-A, which follows, shows the approximate location of the proposed lagoons and sprayfield.

The lagoons will be constructed of native soil material, compacted in place with a clay liner to limit seepage. Three cells in series-parallel will be used; the first cell receives the heaviest loading, and will be provided with aeration equipment capable of operation beneath ice to avoid odor problems.

The lagoons will provide the equivalent of full secondary treatment, and will produce an effluent suitable for controlled irrigation use. Table 1.1.1-1 summarizes the major features of the lagoons and sprayfield.

TABLE 1.1.1-1
LAGOON AND SPRAYFIELD FEATURES

WASTEWATER FLOW RATES:	
Peak Day	74,900 Gallons
Annual Total	4,400,000 Gallons
LAGOONS:	
Cell 1 Volume, constant	409,000 Gallons
Cell 2 Volume, maximum	2,560,000 Gallons
Cell 3 Volume, maximum	2,560,000 Gallons
Water Surface, maximum	2.2 Acres
Approximate Total Area	5 Acres
SPRAYFIELD:	
Total Area	10 Acres
Total Annual Loading	6,340,000 Gallons
Annual Application	24 Inches
Application Period	June through September

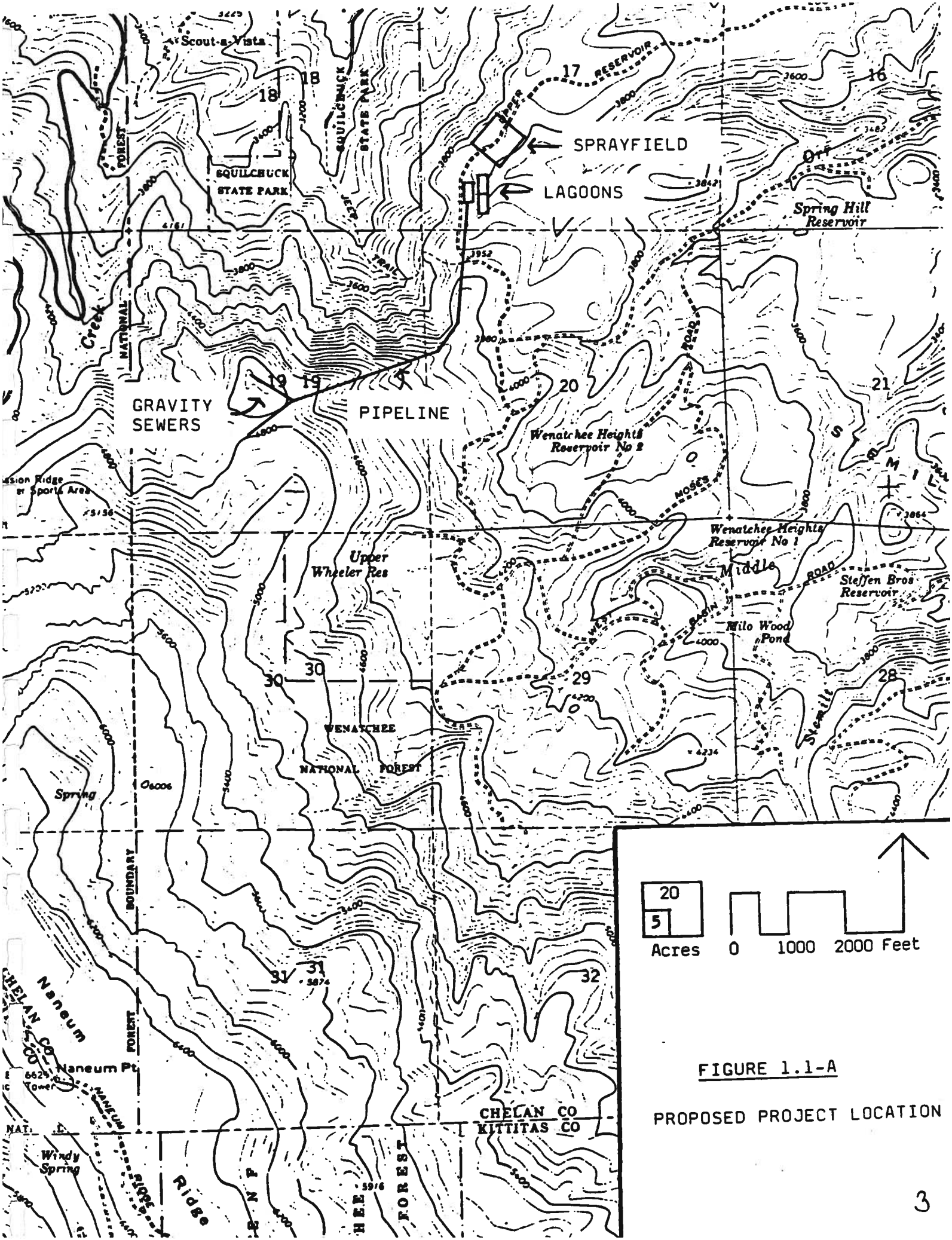


FIGURE 1.1-A

PROPOSED PROJECT LOCATION

1.1.2 ANTICIPATED IMPACTS

Wastewater facilities have the potential for significant impact upon the environment. Odors, contamination of surface streams or groundwater, and transmission of diseases are possible major problem areas. The lagoon and sprayfield system that has been proposed will create the least impact of the available treatment and disposal methods.

Lagoons were chosen as the method of treatment since they can handle the shock loadings that are typically produced by recreational facilities, and since they will provide the necessary winter storage volume. The long detention times will significantly reduce pathogenic organisms, as well as produce a high quality of effluent with a minimum of operator attention.

Disposal of the treated wastewater by irrigation was chosen for the following reasons:

A. the soils in the area contain large amounts of clay, and are not suitable for subsurface disposal systems,
B. there are no surface streams with adequate flows to allow discharge of treated effluent,
C. irrigation will allow the wastewater to be used in a productive manner, rather than simply disposing of it.

The lagoons will be fenced to restrict access by humans and animals. Trees will be planted to screen the lagoon area and to provide a windbreak to minimize wave formation and erosion of the embankments.

The lagoon effluent will be disinfected with chlorine to minimize the possibility of disease transmission by aerosol formation at the sprayfield or by inadvertent contact of humans or animals.

Unavoidable impacts include the following:

A. removal of trees along the pipeline routes and at the lagoon site,
B. thinning of trees at the sprayfield site,
C. use of electrical power for pumping and aeration,
D. compaction and disruption of the soil surface at the lagoon site,
E. creation of a major new visual feature,
F. noise, dust, and vehicular traffic during construction.

These impacts will be minimized by careful use of screening vegetation, by restrictions on construction activities, and by reseeding disturbed areas.

1.2 ADDITIONAL INFORMATION

The following sections of this document describe the existing situation, physical and regulatory constraints, alternatives considered, proposed new facilities, anticipated impacts, and mitigating actions.

In addition, appendices have been prepared to provide additional information concerning the proposed project. These appendices will be submitted to the Department of Ecology for review, and will be made available to the public upon request.

The following appendices have been prepared:

Wastewater Appendix A: development of preliminary estimates of wastewater loadings,

Wastewater Appendix B: evaluation of the existing wastewater treatment and disposal facilities serving the Day Lodge at Mission Ridge,

Wastewater Appendix C: soil investigation summary; details of test hole excavations in areas originally considered for subsurface disposal and in the areas proposed for lagoons.

These appendices are on file at the following locations for review during normal working hours. Copies will be mailed upon request.

Davis/Scheible Engineering
1302 Hamilton Avenue
Yakima, Washington 98903
(509) 575-1062

Mel Borgerson & Associates, Ltd.
347 Skinner Bldg.
1326 Fifth Avenue
Seattle, Washington 98101
(206) 623-3777

2. INTRODUCTION AND BACKGROUND

2.1 WASTEWATER FACILITIES - GENERAL CONSIDERATIONS

Wastewater treatment and disposal for winter recreation areas is particularly difficult. A successful system must deal with:

A. shock loadings,

B. extreme seasonal load variations,

C. low temperatures and resultant low reaction rates for biological systems,

D. heavy snowfall and attendent access problems,

E. isolated locations,

F. lack of personnel familiar with wastewater facilities,

G. high residual solids (sludge) disposal costs.

In addition, environmentally-sensitive surroundings must be considered. Suitable land is often not available and terrain is rugged. The treatment and disposal systems must be relatively inexpensive and capable of modular expansion to avoid loading projects with front-end capital requirements.

The combination of these factors limits the number of practical alternatives which should be considered. For treatment, biological systems are proven and cost-effective: septic tanks, lagoons, and "package" mechanical treatment (activated sludge) plants have been successfully used.

The alternatives for disposal of treated effluent are also limited. Re-use through landscape or forest irrigation is difficult during the cold weather of peak wasteload periods, and requires storage facilities with their associated cost, odor, and "attractive nuisance" potential. Disposal by seepage/evaporation ponds is possible, but requires large areas of land and carries the same winter storage liabilities. Subsurface disposal requires suitable slopes and soils, as well as a consideration of potential groundwater contamination.

2.2 REGULATORY REQUIREMENTS

Wastewater treatment and disposal facilities in the State of Washington must comply with a number of regulations concerning design, ownership, operation, and maintenance. Since the Constellation Ridge development will include condominium units, the wastewater facilities are considered to be public treatment facilities by the Department of Ecology and must comply with regulations for public systems.

Public systems must be owned, operated, and maintained by a municipal corporation. Two possibilities exist in the Mission Ridge area: formation of a water or sewer district, or development of agreements with Chelan County Public Utility District.

Since the PUD presently has State-certified operators on its staff and is responsible for the operation of several other treatment plants, it is capable of meeting the State's requirements.

2.3 WASTEWATER CHARACTERISTICS

The wastewater produced by the Constellation Ridge Resort will consist of domestic sewage generated at living, eating, and public restroom facilities. Since no facilities are presently constructed, estimates of loadings from similar facilities must be used for design. Table 2.3-1 summarizes the anticipated quantities.

TABLE 2.3-1
ESTIMATED WASTEWATER LOADINGS

FLOWS:	
Instantaneous Peak	240 GPM
Peak Day	74,900 Gallons
Annual Total	4,400,000 Gallons
ORGANIC LOADING:	
Peak Day	205 Lb BOD/Day
Annual Total	11,700 Lb BOD/Day

The peak loadings will occur during the ski season, generally from late November to the end of March. Some activity will occur year-round, and is reflected in the annual totals.

2.4 EXISTING TREATMENT FACILITIES

The ski area at Mission Ridge presently treats wastewater in a package-type extended aeration plant, and discharges the effluent to a drainfield. The plant is capable of treating the present wasteloads, and does not need extensive upgrading or renovation.

Since the major impact of the proposed Constellation Ridge development will be to increase the mid-week use of the Mission Ridge Ski Area, the peak volumes requiring treatment are not expected to increase dramatically. The present treatment

facilities can be expected to perform satisfactorily.

The distance between the existing treatment plant and the Constellation Ridge development makes it impractical to combine treatment at a single facility. As the development grows and use of the Mission Ridge area increases, the treatment facilities' performance and the cost-effectiveness of combining the treatment facilities can be re-evaluated.

3. ALTERNATIVES CONSIDERED

3.1 TREATMENT ALTERNATIVES

A number of treatment systems are capable of producing an acceptable quality of effluent. The ones most appropriate for winter recreation areas are lagoons, activated sludge, and septic tanks. The following section will provide a brief description of each system as it could be used for the Constellation Ridge wastewater.

3.1.1 LAGOONS

Sewage treatment lagoons consist of shallow impoundments, normally made up of two or more cells in series. Naturally-ocurring microorganisms develop in lagoons and utilize the organic material in sewage as food. The long detention times and quiescent conditions remove much of the waste material and microbial population by allowing it to settle to the bottom, where microorganism activity continues and conversion to carbon dioxide, methane, and inert residual sludge takes place.

Oxygen is transferred from the atmosphere into the lagoons, where it is used by aerobic bacteria. The amount of oxygen transfer that can take place is limited under the best of conditions, and restricts the amount of organic material that can be treated without odor problems.

Oxygen transfer drops dramatically when lagoons are covered with ice, and a long period of anaerobic conditions can be expected each winter. Treatment efficiency will decrease and the odorous byproducts of anaerobic decomposition will accumulate during cold weather. Periods of significant odor production occur each spring as the ice melts and the lagoon is again exposed to the atmosphere.

Lagoons which depend upon natural aeration are often referred to as oxidation ponds. If mechanical devices are used to increase oxygen transfer, the lagoons are referred to as aerated lagoons. Mechanical aeration with compressed air can operate beneath ice, and can essentially eliminate the potential for odors while improving treatment efficiency.

Aerated lagoons normally concentrate aeration equipment in the first cell, where most of the microbial activity and oxygen demand occurs. Downstream cells or portions of the first cell serve as sedimentation basins to allow material to settle out prior to discharge of effluent.

Lagoons have been successfully used at many locations in Washington, and can be expected to operate reliably with a minimum of attention. Sludge accumulation is very slow,

particularly when loadings are intermittent, and removal is normally required only after many years of operation. The large volumes and long detention times of lagoon systems makes them particularly resistant to shock loading problems.

3.1.2 ACTIVATED SLUDGE

The activated sludge process also utilizes microorganisms to remove waste material. The sewage is aerated in a tank along with a mass of naturally-occurring microorganisms, and then flows into a sedimentation basin (clarifier) to allow solids to settle out. The sludge which is formed in the clarifier is then pumped back to the aeration tank and the clarified effluent is discharged.

The activated sludge process requires a much smaller space than lagoons, since the microbial activity is concentrated in a small volume by recycling active biological solids. The smaller volume of this system also makes it more vulnerable to upsets from shock loadings or toxic materials. A fairly high degree of operator sophisticaton and attention is required.

Much of the waste material is ultimately converted to carbon dioxide, but inert matter eventually builds up and requires disposal as sludge. An additional aerated tank can be used to store the sludge removed from the system; disposal would be required at least once each year at full development levels.

3.1.3 SEPTIC TANKS

Septic tanks have been successfully used to treat sewage at many smaller winter recreation areas. Large septic tanks typically consist of cast-in-place concrete tanks with two compartments, sealed to prevent the entry of oxygen. Anaerobic bacteria convert the organic matter in sewage into methane, carbon dioxide, and a residual sludge.

The relatively slow reaction rates which occur in anaerobic systems result in a poor quality of effluent when compared to aerobic systems such as aerated lagoons or activated sludge. Also, the buildup of residual material is rapid, and septic tanks must be pumped every 2 or 3 years to maintain efficieny. The effluent is suitable for discharge to subsurface absorption systems, but not to surface waters unless further treatent is provided.

Since septic tanks must remain isolated from the atmosphere, construction costs are relatively high. Also, septic tanks are particularly vulnerable to upsets from toxic materials.

3.2 DISPOSAL ALTERNATIVES

Four basic alternative methods of disposal exist:

1. subsurface absorption,
2. discharge to surface waters,
3. land application,
4. evaporation.

The absence of large streams in the area makes discharge to surface water unacceptable. None of the streams meet minimum dilution criteria set by the Department of Ecology.

Evaporation from large impoundments can be used to dispose of wastewater, and is a method frequently used for small systems in the semi-arid areas of Eastern Washington. Accurate information concerning evaporation rates is not available for the Mission Ridge area, but data from the Bureau of Reclamation for nearby areas in the Cascades indicate that less than 20 inches of annual evaporation will occur. This is less than precipitation at the site, making this method of disposal ineffective.

Only subsurface absorption and land application would be practical for the Constellation Ridge development, and are described in the following section.

3.2.1 SUBSURFACE ABSORPTION

Subsurface absorption systems consist of perforated pipe buried in a gravel envelope. Effluent is distributed through the gravel and percolates into the soil. Significant removal of pollutants occurs as the effluent passes through the soil, and if sufficient soil depth is available the degree of treatment that is achieved can be very high.

Subsurface disposal has the advantages of low environmental impact, compatibility with other land uses (such as ski slopes), and minimum maintenance requirements. An increase in interest in this type of disposal in recent years has led to a great deal of research and improvement in performance. The longevity of subsurface disposal systems can be geatly enhance by incorporation of three features in design:

1. pressure distribution,
2. periodic dosing,
3. alternate rest and use periods for different portions of the disposal area.

Subsurface disposal systems can be designed to handle effluent from any of the treatment systems previously mentioned, if soil and groundwater conditions are suitable.

Care must be taken in the design of subsurface absorption systems on steep slopes to avoid surfacing of effluent and slope stability problems. The problem of stability is particularly acute for the Loneridge Series soils, which are very similar to soils in the Stemilt and Squilchuck valleys which have experienced landslides in irrigated areas. Steep slopes require deep soils and wide spacing of conventional tenches; gravel beds covering large areas cannot be used.

The high clay content and relative impermeability of soils at the site would require a very large absorption area (approximately 16 acres). Trees would not be compatible, and large areas would require clearing.

3.2.2 LAND APPLICATION

Treated effluent can be effectively disposed of by land application in the form of spray irrigation. The most appropriate use of the water during the initial phases of the development would be for a grass cover crop; ultimately it could be used for landsape or golf course irrigation.

The effluent produced by aerated lagoons or activated sludge facilities would be suitable for irrigation, after disinfection with chlorine. The sprayfield should be isolated from areas of heavy human use to avoid pssible exposure to airborne effluent. The sprayfield area would not require access control if located away from the development, and it would not be necessary to keep animals such as dèer out of the area. In fact, the grass cover crop would be utilized by grazing animals. This would allow a portion of the residual nitrogen compounds in the effluent to effectively be harvested and removed.

Low areas of the sprayfield area should be surrounded by embankments, to restrict runoff which could occur during periods of snowmelt or heavy rainfall.

3.3 SITE ALTERNATIVES

Available sites are limited by the topography of the area. The following two areas were considered (see Figure 3.3-A):

1. the relatively flat area of Section 19 immediately to the west of the main development,
2. the gently sloping plateau which extends from the east onto Sections 17 and 20.

3.3.1 SECTION 19

Much of Section 19 consists of steeply sloped areas, which are not suitable for subsurface application or sprayfields. The areas that would be suitable for wastewater treatment and disposal are also the best areas for the development itself. As a result, sites in Setion 19 are not acceptable for wastewater facilities.

3.3.2 SECTIONS 17 & 20

Section 17 is part of the Constellation Ridge development; Section 20 is U.S. Forest Service land. Large areas of both sections are relatively flat and have deep well-drained soils that could be used for lagoon construction or sprayfields.

The Forest Service land on Section 20 is closer to the main development area, so that pipeline costs would be lower than those for Section 17. However, the forest cover is much more uniform and dense on Section 20, and construction of facilities would require that large areas of trees be removed. Also, Forest Service policy requires that private developments utilize private land to the greatest extent possible before considering publicly-owned land. Since suitable sites are avaiable on Setion 17, the Forest Service land should not be considered further.

It will be necessary to construct a pipeline across Section 20, however, since the portions of Section 19 between the development and the proposed wastewater facility site on Section 17 are too steep to allow construction. Right-of-way must be obtained from the Forest Service for this purpose, and costruction must be done in accordance with Forest Service conditions.

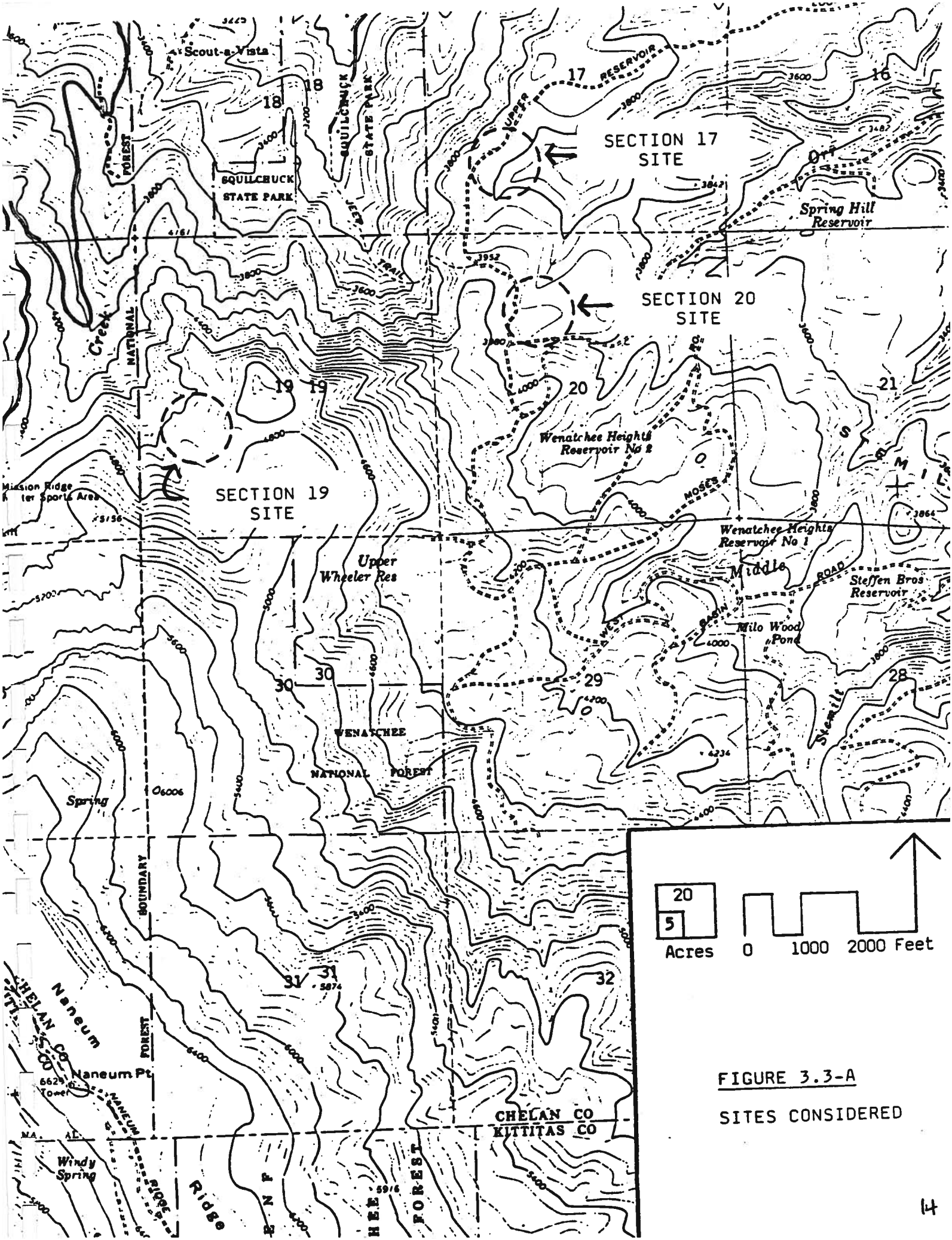


FIGURE 3.3-A

SITES CONSIDERED

3.4 COMPARISON OF ALTERNATIVES

The alternative methods of treatment, types of disposal, and sites discussed above have different advantages, disadvantages, and impacts upon the environment. Some are not suitable by virtue of physical limitations, such as proximity to the development or steep slopes; others could be made to work but would be unacceptable from environmental or economic standpoints.

The table which follows summarizes the major impacts of feasible combinations of treatment and disposal in a semi-quantitative manner. The ranking system allows a range of anticipated impacts or use levels to be displayed:

+	very low,
++	low,
+++	medium,
++++	high.

TABLE 3.4-1

COMPARISON OF ALTERNATIVES

POTENTIAL FOR IMPACT

ALTERNATIVE Treatment/Disposal	Odor Potential	Ground Water Contamination Potential	Public Health Hazard Potential	Sludge Disposal Requirements	Power Requirements	Land Requirements	Vegetation Change	Impact Upon Wildlife	Visual Impact	Construction Cost	O&M Cost	Potential For Process Upset
Oxidation Ponds/Subsurface	++	++	+	+	+	++++	++++	+	+++	+++	+	+
Oxidation Ponds/Sprayfield	++++	+	++	+	++	+++	+++	++	+++	++	++	+
Aerated Lagoons/Subsurface	+	++	+	+	++	++++	++++	+	+++	+++	+	+
Aerated Lagoons/Sprayfield	+	+	++	+	++	+++	+++	++	+++	++	++	+
Septic Tank/Subsurface	+	++	+	+++	+	++++	++++	+	++	++++	+	++
Septic Tank/Sprayfield	*	*	*	*	*	*	*	*	*	*	*	*
Activated Sludge/Subsurface	+	++	+	+++	+++	++++	++++	+	++	++++	+++	+++
Activated Sludge/Sprayfield	+	+	++	+++	+++	+++	+++	++	++	++++	+++	+++

\+ very low

++ low

+++ medium

++++ high

* not acceptable

4. PROPOSED PROJECT

4.1 SELECTION OF ALTERNATIVE

Two alternatives were given serious consideration and were explored in more detail to develop preliminary designs: aerated lagoon/sprayfield and septic tank/subsurface absorption.

The aerated lagoon/sprayfield system was selected, and is proposed for implementation. The higher costs, greater land requirements, and potential for unstable slopes of the septic tank/subsurface absorption alternative were the primary factors for rejection.

The aerated lagoon process will provide stable effluent quality and winter storage at moderate cost and acceptable impact. Disposal by spray irrigation will allow the effluent to be used to create a grass cover crop in the disposal area, initially to serve as wildlife feed and ultimately for landscape irrigation or golf course use. Details of the proposed project are included in the following section; approximate locations are shown on Figure 4.1-A.

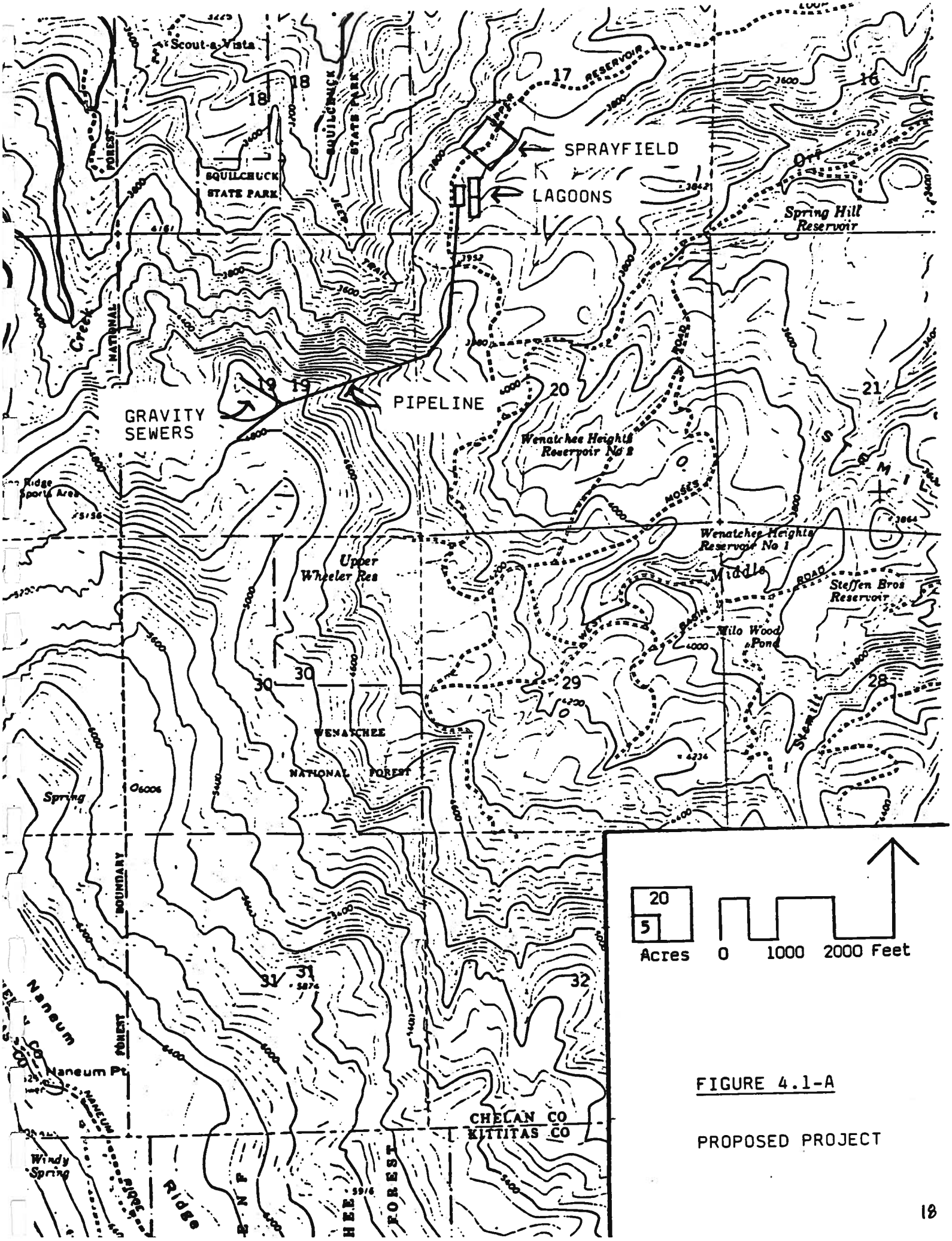


FIGURE 4.1-A

PROPOSED PROJECT

4.2 DESCRIPTION

4.2.1 PIPELINE TO LAGOONS

Sewage from the development in Section 19 will be conveyed by gravity sewer to the lagoon site in Section 17. The route shown on Figure 4.1-A includes areas with slopes of 30 to 40 percent, and passes through densely forested areas.

The steep slope will require energy dissipation devices at intervals during the 800-foot drop. Manholes with stilling wells will be utilized to dissipate energy in order to avoid excessive velocities and pipe erosion. Manholes will be constructed of fiberglass to avoid corrosion by the hydrogen sulfide that is commonly released from domestic sewage in areas of high turbulence.

Expansion joint couplings will be used at the entrances and exits of manholes and at intervals along the pipeline to accomodate motion due to settlement and minor downslope creep. The pipe will be PVC with slip-on type joints and a minimum cover of three feet of backfill.

It will be necessary to remove trees and brush along the pipeline route to a width of approximately 15 feet to accomodate a crawler-mounted backhoe during construction. The disturbed area will be reseeded with grass as soon as construction is complete, in order to avoid erosion. It will not be necessary to maintain the pipeline corridor free of trees and brush except at manholes. Natural reseeding can be allowed to occur.

4.2.2 COLLECTION SYSTEM

Details of the collection system within the heavily developed areas of Section 19 have not yet been finalized. In general, gravity drainage will be used wherever possible to avoid the necessity of pump stations.

A pump station on the west side of the hilltop will be required to convey sewage from the Day Lodge and scattered residential or comfort station facilities in the vicinity. The pump station will be provided with a backup pump and emergency storage tank to allow use during mechanical failures or power outages.

4.2.3 SMALL ON-SITE SYSTEMS

The precise location and scheduling of scattered residential development has not been determined, but it appears that a total of approximately 10 residences will ultimately be constructed along the ridge that extends northwest of the hilltop in Section 19.

These residences would produce only small quantities of wastewater, and could be cost-effectively and safely served by on-site septic tank/drainfield disposal systems where distances from the main westside sewage pump station are excessive. The use of individual on-site systems is proposed for those instances where connection to the pump station would be more expensive.

4.2.4 LAGOONS

The lagoons will be constructed of native material, with compacted rock/soil embankments and clay liners. The soil at the lagoon site consists of a rocky clay-loam averaging approximately 5 feet in depth, and can be utilized to form well-sealed lagoons. Additional material for embankment construction may be available from excavations for roadways, buildings, and parking areas in Section 19.

The depth of soil at the site will not allow cut and fill quantities to be balanced. If adequate quantities of excess fill are not available from other areas of the project, a borrow pit will be required in the vicinity of the lagoons.

Figure 4.2.4-A shows the general arrangement of the lagoons. Cell 1 would be aerated with perforated tubing and compressed air, and would be operated at a constant depth year-round. The volume of Cell 1 would be designed to remove most of the waste materials before overflow to storage in Cells 2 and 3.

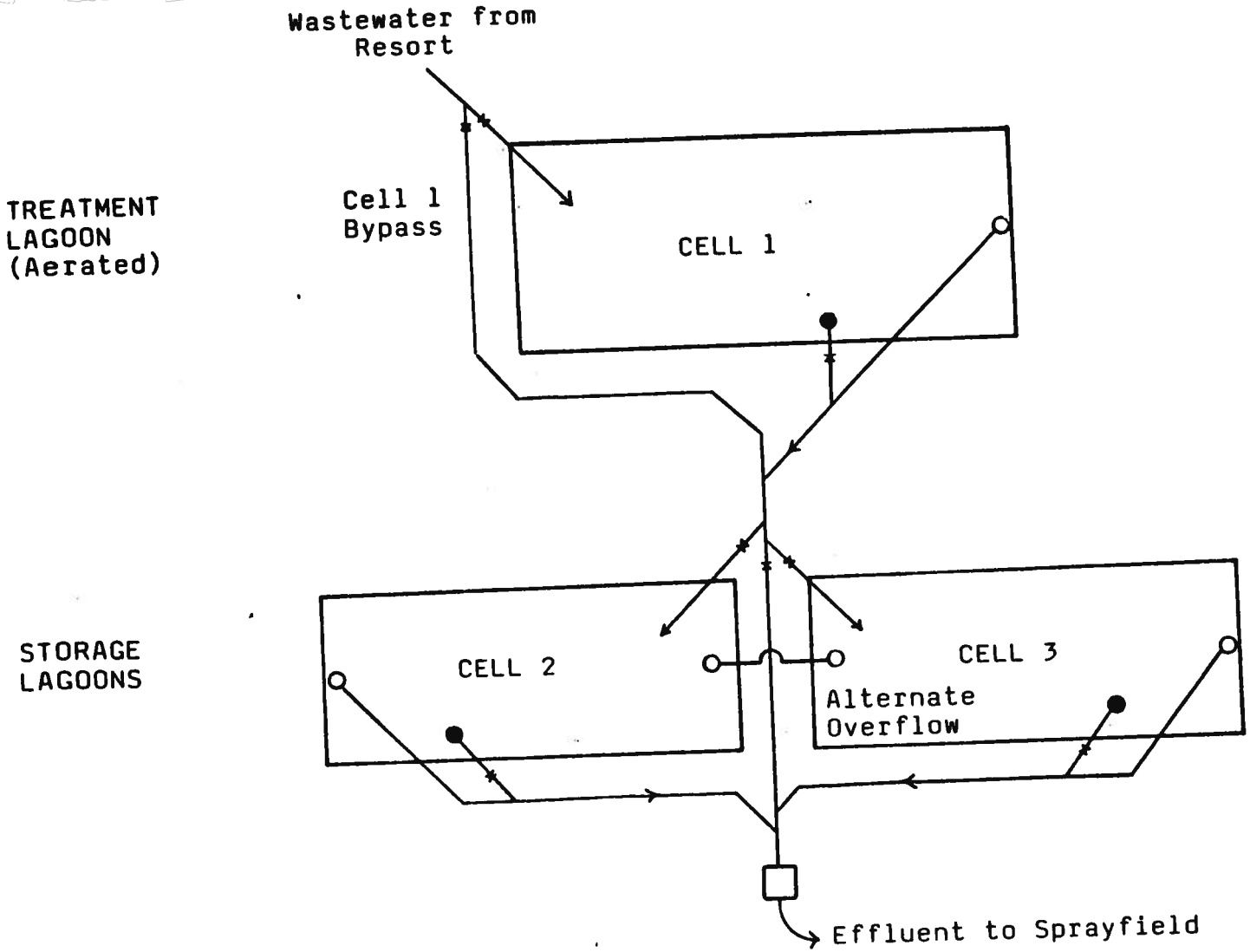
Cells 2 and 3 would vary in depth as the ski season progresses, from a minimum in early October to a maximum in late May. Since most of the oxygen demand of the waste would be exerted in Cell 1, aeration equipment would not be provided in the storage cells. Baffled areas near the outlets of Cells 2 and 3 would be used to provide a contact chamber for chlorination. The design of Cells 2 and 3 must include adequate allowance for the additional volume that will be contributed by precipitation.

The outside slopes of the lagoon embankments will be no steeper than 3:1, and will be seeded with grass for erosion control and to minimize visibility. The entire lagoon area will be fenced; warning signs will be posted around the fenced perimeter.

The following table summarizes preliminary design information for the lagoons.

TABLE 4.2.4-1
LAGOON DESIGN CRITERIA

Total Annual Flow	4,400,000 Gallons
Storage Volume: Oct.through May	3,190,000 Gallons
Annual Precipitation Into Lagoons	1,940,000 Gallons
Total Volume Required: Cells 2 and 3	5,130,000 Gallons
Depths:	
Cell 1, constant	4.0 Feet
Cells 2 and 3, maximum	12.0 Feet
Aeration Blower, Cell 1	10 Horsepower
Maximum Oxygen Transfer	460 Pounds/Day



CELL	BOTTOM DIMENSIONS	MAXIMUM DEPTH	MAXIMUM VOLUME*
1	300' X 70'	4'	409,000
2	250' X 70'	12'	1,750,000
3	250' X 70'	12'	1,750,000

*useful storage volume; additional volume provided for precipitation

LEGEND

- valve
- surface overflow
- bottom drawoff

arrows indicate normal flow routing

FIGURE 4.2.4-A

LAGOON SCHEMATIC

4.2.5 SPRAYFIELD

The sprayfield area would be located on the relatively flat and open area of Section 17 at an elevation of approximately 3,900 feet. Low temperatures and snow accumulation will make the sprayfield unusable for most of late Fall, Winter, and Spring. The field will be designed for application of effluent only during the months of June through September.

Since the wastewater volume generated during summer months will be much smaller than that produced during the ski season, it will be possible to operate the lagoons and sprayfield together on a flexible schedule to avoid the possibility of hydraulic overloading and runoff. A total annual application rate of 24 inches is recommended for the sprayfield design. This low loading rate will be adequate to maintain a grass cover crop, but will be low enough to allow irrigation to be discontinued when necessary; e.g., during periods of heavy rainfall.

The irrigation system would consist of a buried main with risers connecting to portable pipe. The above-ground pipes would be installed in the Spring and removed in the Fall. Laterals would be removed and connected manually.

The remote location of the sprayfield will minimize the potential for disease transmission. Employees working in the sprayfield should be aware of the safety precautions necessary to work with treated wastewater, and should be immunized against waterborne diseases.

Fencing of the sprayfield to exclude range cattle will be necessary to protect the sprinklers from damage. Fencing height should be set low enough to allow access for deer. Since a dirt roadway does allow some vehicular access to the general area of the sprayfield, warning signs should be posted. Some relocation of the road in the vicinity of the sprayfield will be required.

Berms will be constructed accross low areas of the sprayfield to prevent runoff. Since the sprayfield will occupy the top of a plateau, problems with drainage from adjacent areas wil not occur. Existing brush, stumps, dense stands of timber, and debris will be removed during construction, followed by discing and seeding. Widely-spaced trees that will not interfere with sprinkler distrbution will remain, and can be expected to benefit from the effluent.

4.3 ANTICIPATED IMPACTS AND MITIGATING MEASURES

Any wastewater treatment and disposal system has the potential for significant impact upon the environment. Odors, contamination of surface steams or groundwater, and transmission of diseases are possible major problem areas.

The following section expands information given in Table 3.4-1 for the proposed lagoon/sprayfield facilities, and describes how impacts will be mitigated where possible by design considerations and operational techniques.

4.3.1 OBJECTIONABLE ODORS

Wastewater lagoons have acquired a reputation for odor problems, one which is not always undeserved. Lack of adequate aeration equipment and improper maintenance are the most common causes of objectionable odors. If lagoons are suffering from odor problems, the situation will be worsened by distributing the lagoon contents over a sprayfield where the area exposed to the atmosphere is greatly increased.

The proposed lagoons and sprayfield will include design features to eliminate odors; proper operation and maintenance will be required to ensure that they perform as designed.

The major portion of the wasteload's oxygen demand will be exerted in the first lagoon cell. If aerobic conditions are not maintained, treatment efficiency will drop very significantly in the first cell and incompletely treated wastewater will be transferred into the storage cells. Since the peak loads will occur during cold weather and since ice cover will severely limit natural oxygen transfer, mechanical aeration equipment consisting of compressed air and perforated tubing will be utilized to provide oxygen underneath the ice.

Cell 1 will be sized to remove essentially all the incoming organic material in the wastewater before discharging to Cells 2 and 3. The aeration tubing will be concentrated at the inlet end of Cell 1 to ensure mixing and to maximize biological reaction rates. The outlet end of Cell 1 will not be heavily aerated, and will act as a sedimentaton zone to allow biological solids to settle.

As a result, the loadings to Cells 2 and 3 will be very light, and aeration equipment will not be required. However, some slight odors may be generated immediately following the melting of the ice cover on Cells 2 and 3 each Spring, since the lagoons will become anaerobic under the ice even when lightly loaded. Since significant quantities of anaerobic byproducts will not be present, the odors will not be significant and should not be noticeable beyond the immediate vicinity of the lagoon cells.

The remote location of the proposed facility will minimize the impact of odors that could occur. When the development expands in the future, aeration equipment could be added to Cells 2 and 3 to incrase their treatment capacity and further reduce the potential for odors.

Proper maintenance of the lagoons will require periodic removal of accumulations of floating debris or plants such as cattails. Stagnant areas and odors can be expected if these materials are not removed.

The high quality of effluent that will be produced after treatment and storage will minimize the organic loadings placed on the sprayfield, and odors are not anticpated. Care will be required during operation to avoid short-term hydraulic overloading by excessive sprinkling in one area and/or prolonged periods of heavy rainfall. The ponding that could otherwise result would create localized objectionable odors.

4.3.2 CONTAMINATION OF SURFACE AND GROUND WATERS

Surface water contamination will occur if effluent leaves the sprayfield site as a result of hydraulic overloading. The use of berms around the low areas of the sprayfield will provide insurance against runoff. Maintenance of a permanent grass cover crop will slow the travel of effluent across the sprayfield site in the event of inadvertent overloading to minimize ponding.

The greatest potential for contamination of groundwater exists at the first lagoon cell, where untreated wastewater enters the system. The clay linings that will be used for the lagoons and the natural sealing action of domestic sewage will slow percolation rates to insignificant levels.

A portion of the treated effluent applied to the sprayfield will eventually reach groundwater. The application rate proposed for the sprayfield is less than the total evapotranspiration that will normally occur during the growing season, so most of the effluent will ultimately be disposed of to the atmosphere.

Passage of effluent through a cover crop and fine-grained aerobic soil mantle will further remove pollutants. The quality of water ultimately reaching groundwater will approach that of natural groundwater, except that concentrations of nitrate and other inorganic solids will be above background levels. The remoteness of the sprayfield site in relation to points of human use of groundwater further ensures against problems.

4.3.3 PUBLIC HEALTH CONSIDERATIONS

Waterborne diseases can be spread by exposure to incompletely treated domestic sewage. After lagoon treatment, storage, and chlorination, the risk of disease transmission will be very significantly reduced. Restricting access to the lagoon and sprayfield site with fencing and warning signs will minimize the potential for inadvertent human contact.

4.3.4 CREATION OF RESIDUAL SOLIDS

Inert material remaining after biological oxidation will accumulate as sludge in the lagoons, and will ultimately require disposal. Many lagoons which treat domestic sewge hve operated for 20 years and longer without the need for sludge removal, and the amount of time that will pass before cleaning is needed cannot be predicted with confidence. The intermittent nature of the loadings from the resort development will tend to reduce sludge accumulation rates further, and removal should not be required for many years.

When solids acumulate to a level that interferes with treatment in Cell 1, they can be removed by bypassing flows to Cell 2 during the summer months and allowing the sludge to dry for removal with earthmoving equipment.

An alternate method would be to use a small dredge to pump sludge solids directly from the lagoon bottom, without the need for dewatering and prolonged drying which can cause odors. Dredging services are available from a number of specialty contractors in the State.

4.3.5 INSECTS

Both the lagoons and sprayfield can serve as habitat for aquatic insects; mosquitoes are the most likely to cause problems.

If the sprayfield is properly operated to avoid ponding, insect problems should not be created. The aeration equipment in Cell 1 will mix the contents to the point that larvae cannot survive, and mosquito problems normally do not occur in aerated lagoons.

Cells 2 and 3 offer the best environment for mosquitoes, and chemical control could be required if nuisance conditions are created. Since mosquitoes at high altitudes in northern latitudes do not normally act as vectors, their primary impact would be as a nuisance.

4.3.6 ELECTRICAL POWER

The proposed project will require electrical power for aeration during cold weather and for spray irrigation pumping. Estimated annual consumption at Phase I development levels is 26,000 kilowatt hours per year. Power will be delivered to the lagoon site from the hotel area by buried cable installed in the sewage pipeline trench.

4.3.7 CHANGES IN LAND USE AND VEGETATION

Construction of the lagoons and sprayfield will affect an area of approximately 15 acres. The area is presently used as cattle range and is covered with scattered conifers and sparse grass. Approximately 5 acres will be utilized for lagoons, with the remainder as sprayfield.

Tree removal in the sprayfield area will be limited as much as possible. Only trees which are grouped very closely or which would interfere with sprinkler irrigation will be removed.

Pipeline installation will require the removal of trees and brush from an area of approximately 2 acres. This area will be allowed to return to a natural state after construction is complete and a secure grass cover is established.

4.3.8 WILDLIFE

The impact upon wildlife in the area will be small. Habitat lost as a result of lagoon construction will be offset by the increased productivity of the sprayfield area. In addition, the storage lagoons can be expected to attract waterfowl.

4.3.9 VISUAL IMPACT

The appearance of the lagoons will be similar to other manmade impoundments located throughout the surrounding areas. Grass cover used to control erosion on the embankments will reduce visual impact, as will tree plantings. The air compressor will be located in a small building designed to avoid conspicuous appearance.

The sprayfield area will not appear significantly different from natural vegetation, except that grass will be deeper and thicker and will remain green during the dry season.

The fence and signs will be visible at close range, but are neessary to warn of potential health hazards and to exclude range cattle which would damage the sprinklers and compact the soil surface.

4.4 FUTURE EXPANSION

The proposed lagoon/sprayfield facilities can be expanded as required to accomodate increased wastewater flows from future expansions of the development. The flat plateau area of Section 17 includes a much larger area than needed for any conceiveable wastewater facilities.

February 27, 1984
CONSTELLATION RIDGE RESORT

EIS -- ADDITIONAL INFORMATION -- WASTEWATER FACILITIES

1. Ability of depressions to hold water.

Soils at the main development site vary widely over short distances. In general, when fine-grained soils are present, they are clays or clay-loams that have very low permeabilities and that can be utilized to form essentially leakproof impoundments.

The naturally-occurring depressions in the vicinity of the proposed buildings presently capture a significant portion of the runoff from the hilltop area of Section 19. Many of these depressions are surrounded at least partially by talus, which is very permeable and can be expected to act as a natural drain. These depressions would require lining with an impermeable membrane if they are to be expected to retain water year-round in such applications as ornamental or fire storage ponds. However, they would serve without lining as effective short-term retention ponds for runoff containment, and would allow the stored flows to gradually reach surface and ground waters.

If depressions do not completely empty the stored flows during each year, it would be possible to construct outlet structures to allow draining. The rate of drawdown could be set low enough to avoid erosion, and the draining could be done when stream flows are low, in order to minimize impact.

2. Stormwater runoff coefficients.

The design of stormwater control facilities must consider different situations for Winter and Summer. Much of the annual precipitation at the site occurs as snow, and accumulates on the ground throughout the winter. The use of typical runoff coefficients for snowfall would be misleading, since release of stored precipitation in the Spring occurs gradually over a period of several months. The rate of release due to thawing is much more sensitive to wind and temperature conditions than it is to surface infiltration characteristics.

Snow removal activities around buildings, walkway areas, and parking lots would create areas of piled and compacted snow, which would melt very slowly in the Spring, increasing precipitation retention times above natural levels.

The most intense liquid precipitation will occur as rainfall during Summer thunderstorms, and runoff coefficients are applicable. Direct precipitation on the lagoons will be added to the storage volume, and an allowance for this water will be made in design. Much of the wastewater facilities site is presently covered with sparse grass and trees, and the sprayfield will be seeded with grass. The cover at the sprayfield will be much heavier than the natural vegetation, and can be expected to be much more effective in slowing runoff.

Construction at the sprayfield area will include small earth embankments across low areas to retain peak runoff from thunderstorms on the site. The hilltop location of the proposed sprayfield eliminates problems with runoff from adjacent areas.

In summary, runoff from the wastewater facilities site will be smaller in volume and distributed over a longer period of time than natural precipitation. The storage lagoons will allow most of the water at the site to be disposed of when evapotranspiration rates are highest, and the cover crop at the sprayfield will provide a more effective deterrent to runoff than the present vegetation.

3. Wastewater loadings from comparable ski areas.

A review of wastewater loading literature was undertaken as part of the facilities planning process. A study of the waste characteristics of winter recreation areas was completed by the Federal Water Pollution Control Administration (the predecessor of the Environmental Protection Agency), and this study appears to be the most directly comparable information available. Wastewaters from Crystal Mountain, Bachelor Butte, and Timberline Lodge at Mount Hood were included.

The flows that occur at the studied locations are lower than those predicted by standard textbook information for lodging and restaurant facilities (see Item No. 5, below), and were not used for design.

4. Source of demand figures.

The demand figures were derived from textbook information for similar hotel facilities.

5. Background information.

A. Similar Installations:

Lagoons are used to treat and store the wastewater from a large number of municipalities, parks, and industrial facilities throughout Eastern Washington. They are the system of choice where land is available, because of their simplicity and reliability. Most of the treatment facilities in the Department of Ecology's Eastern Region are lagoons.

Many of these lagoons are nothing more than simple ponds, and are not aerated except by the natural transfer of oxygen from the atmosphere. Some nearby lagoons that treat domestic wastewater include Sun Lakes State Park and the towns of Mansfield and Quincy. An aerated lagoon with many features similar to the proposed system serves the town of Winthrop. The Resort at Crescent Bar will utilize aerated lagoons when the existing package plant is abandoned in 1985.

Aeration has been proposed for the first cell of the Constellation Ridge lagoons to ensure that odors are not produced when Spring thaws occur. As a side effect, the resulting mixing will increase the treatment efficiency of the first cell.

B. Development of Wastewater Loading Figures:

The estimated loadings were derived from textbook information for similar lodging and restaurant facilities, as summarized in Wastewater Appendix A. It can be assumed that the hotel and restaurant wastewater loadings will be very similar to the loadings from similar facilities at locations other than at ski areas.The Day Lodge estimates are based on data from the day lodge at White Pass.

It should be emphasized that the loading estimates will be re-evaluated when the design of the lodging and restaurant facilities has been completed and details of the waste-generating fixtures have been established.

C. Wastewater from Commercial Complexes:

The largest wastewater loads from commercial development will originate from food preparation, and these are included in the estimates. The shops that will eventually be constructed will not create significant loadings; only the sewage generated by daytime employees would be expected, and no specific allowances have been made in the loading estimates.

6. Operation by PUD.

The Chelan County PUD has informally expressed a willingness to provide overall operational guidance for the wastewater facilities. The PUD at present provides a State-certified operator for several other small treatment facilities in the

County, and meets the Department of Ecology's requirements that such facilities be under the control of a certified operator.

In the event that operation by the PUD is determined to be infeasible or economically undesireable, Constellation Ridge could provide its own operating personnel and obtain State certification. In this case it would be necessary to form a sewer or water district to meet Department of Ecology requirements for operation by a public entity.

7. Annual distribution of wastewater loadings.

The anticipated annual distribution of loadings is summarized in Wastewater Appendix A. Data was based upon the annual use records of condominium facilities at White Pass, Washington, slightly adjusted to take the expected higher levels of summer use at the Constellation Ridge development into account.

8. Pipeline route: maintenance.

The pipeline from the resort area to the sewage disposal site can be considered as an interceptor sewer; i.e., a sewer that does not directly serve buildings, but instead conveys wastewater to treatment facilities from a region of collection. Experience with many interceptor sewer pipelines throughout Washington indicates that little of no maintenance will be required.

Most of the maintenance that is normally required for sewers occurs in laterals that serve a number of sources, and is associated with plugging. Problems with plugging typically occur at service connections, in areas where roots have penetrated the joints of older (typically concrete) pipe, or in reaches with inadequate slopes where solids can accumulate.

The use of PVC pipe with its widely spaced and leakproof O-ring type joints has proven to be very effective in excluding roots. Also, PVC pipe is very smooth, and does not offer a rough interior surface for objects in the flow to catch on. The steep slopes will avoid problems with accumulation of heavy solids.

Manholes are required at intervals by the Department of Ecology's design standards, and will allow access for equipment to remove plugs if necessary. It will be necessary to maintain small service roads to each manhole to provide access for rodding equipment. These roadways will be used very infrequently, and surfacing other than grass for erosion control will not be needed. The primary maintenance activity required for the roadways will be occassional removal of

small trees.

Constructon of the manhole access roads will require removal of trees over a width of approximately 20 feet. These roads will be similar to the logging roads which are common throughout the site, and should not be visible except at very close range in the heavily forested area of the pipeline route. Planting of erosion control grass after construction will minimize the potential for increased runoff or erosion.

The 15-foot width suggested for the pipeline route should be adequate for the shallow construction that will be involved. Only minimum cover is necessary along the relatively steep route, and no deep cuts are anticipated. The 15-foot width refers to the approximate width of vegetation damage during construction; a greater width should be obtained for easements.

9. Pipeline route: selection.

The pipeline route shown on Figure __ was chosen on the basis of slope: it offers the most gentle grade between the lagoon site and the main development area. It is not feasible to locate the pipeline entirely upon the private property of the development, since the slopes in the Northeast corner of Section 19 are extremely steep and consist of exposed rock faces.

10. Odors.

It is not anticipated that odor generation along the pipeline will be detectable, even in the immediate vicinity of the manholes. The quantities of hydrogen sulfide that will be released will be very small; the use of fiberglass manholes is as much for ease of construction on the relatively steep terrain as it is for corrosion prevention.

Domestic sewage in the relatively cool climate of the Pacific Northwest normally does not form significant quantities of hydrogen sulfide in sewers that have adequate slopes. Problems are only encountered in very long sewers with flat slopes, such as those along the North Shore area of Lake Chelan.

11. Hydrogen sulfide hazards.

The quantities of hydrogen sulfide that will be produced will not be readily detectable, much less hazardous.

12. Pipeline route: features to deal with steep slope.

As mentioned in the draft EIS, the manholes will be designed to serve as energy dissipation devices as well as access points for cleaning. This will avoid excessive flow velocities. Also, the pipe will enter and exit the manholes with slip joints to allow settlement and slippage to be accommodated.

Once the project proceeds to the design phase and a precise route has been chosen, it will be possible to evaluate the need for additional pipeline features such as concrete anchors at points along the pipeline and/or additional slip joints between manholes.

Careful and thorough pipe bedding and backfill compaction will be required along the steeper sections of the route to minimize the potential for slippage and settlement.

13. Precipitation.

The average annual precipitation at the lagoon site is 25 inches per year. This value was derived from data from the nearby Upper Wheeler Reservoir station maintained by the Soil Conservation Service since 1976, and from data from the National Oceanographic and Atmospheric Administration Publication: Climate of Washington .

14. Quantities of effluent to be spray-irrigated.

The annual quantity of effluent to be spray-irrigated is estimated to be 6,640,000 gallons. This volume includes the annual precipitation that will fall into the treatment and storage lagoons.

15. Borrow Pit features.

The exact location and size of the borrow area cannot be determined until the entire project's final design is completed. It may be possible to utilize excess material from the construction activities in Section 17 in the construction of the lagoon embankments, reducing the need for borrow material. It does appear, however, that it will be necessary to obtain additional material in the vicinity of the lagoons, and its general features can be described.

The borrow pit will consist of an area of several acres from which trees, brush, and larger vegetation will be removed. The top layer of soil will then be removed to a depth of approximately 6 inches and stockpiled. The subsoil will be

removed to a depth of approximately 3 feet and utilized in the construction of lagoon embankments. The stockpiled topsoil will then be replaced over the borrow area and fertilized and seeded with grass. The borrow area will be contoured to generally conform to the surrounding topography, and after reseeding will appear more as a grassy swale than a "pit". The borrow area would be excavated in the wooded area to the immediate Southeast of the lagoon site.

Approximately 22,000 cubic yards of borrow material will be required to construct the lagoons. If this quantity of material is obtained at an average thickness of 3 feet, the total borrow area required will be 4.6 acres.

16. Source of clay for lining lagoons.

The subsoils at the lagoon site consist of a clay-loam that will be used in embankment construction. SCS information indicates that these subsoils have low permeablities, and it can be expected that leakproof lagoons can be constructed. The solids that are present in sewage and the biological solids that will be generated as a result of the treatment in Cell 1 of the lagoon system will tend to form a layer of relatively impermeable material on the lagoon bottoms, further ensuring against leakage.

17. Roadway relocation in vicinity of lagoons.

The dirt road in the vicinity of the lagoon and sprayfield site traverses a broad plateau, and ample space is available for relocation. It will not be necessary to relocate the road onto the areas of relatively steep slopes which exist on both sides of the plateau.

18. Impact of roadway relocation upon long-time users.

The road will be relocated, not closed, so the impact upon regular users should not be significant. The lagoon and sprayfield facilities will be visible from the road, but will not appear offensive. The appearance of the lagoons will be equivalent to the numerous artificial ponds in the immediate area, except that they will be fenced; the sprayfield will appear as a fenced pasture area.

19. Long-term effects of disposal system upon Squilchuck Basin.

There should be no long-term effects upon the Squilchuck Basin. The low permeability of the soils and of the lagoon embankments will minimize the amounts of effluent that

percolate into the soil to eventually become part of the groundwater. In addition, exposure of wastewater to aerobic soil systems will remove any residual contaminants long before the groundwater appears in the basin.

It will be necessary to properly operate and maintain the sprayfield to avoid excessive application rates in any part of the field and the attendent possibility for runoff from the site. A number of features of the sprayfield design which will minimize the possibility for runoff are discussed in the draft EIS.

20. Pipe easements.

The portion of the pipeline across Section 20 will be on DNR land, and it will be necessary to obtain an easement for construction, operation, and maintenance. The exact width and location of the easement can be determined when the project is in the design phase. The easement should be at least 20 feet in width, with a larger width for construction activities where necessary. The location of the pipeline on Section 20 will be near the existing dirt road, and few if any manhole access roadways will be required for this portion of the pipeline

21. Health concerns associated with sprayfield.

The treated and stored effluent will be disinfected with chlorine prior to irrigation, and will meet DOE and DSHS guidelines for the disposal and utilization of effluent by spray irrigation. The long storage periods which will take place in the lagoons will result in very sigificant decreases in potentially pathogenic organisms by natural dieoff; chlorination will be added as further insurance against health hazards. The lagoons and sprayfield will be enclosed with fencing to exclude the range cattle which frequent the area and to discourage human trespassing. The entire area will be posted with warning signs.

Low pressure sprinklers will be used to minimize aerosol formation, but some drift of the aerosols formed during spray irrigation will occur, and can be expected to reach the dirt roadway at times of high winds. The road receives only very light and infrequent use, minimizing the exposure of humans to such aerosols.

In summary, there will not be significant health hazards. Treated and disinfected effluent has been successfully and safely used at much more heavily populated locations throughout the Northwest, including such diverse applications as food crops and golf courses.

22. Wastewater loadings for ultimate development levels.

The increases in loadings that will occur as the resort expands will be similar in nature and volume to those anticipated for the first phase of development, since the additional recreational and living facilities will be similar. The estimated loadings given in the draft EIS are based on a total of 1,000 overnight visitors, plus day use loads and the restaurant facilities that will be constructed. If the total overnight occupancy levels reach 2,500 at ultimate development, the following wasteloads can be anticipated:

FLOWS:	
Instantaneous Peak	530 GPM
Peak Day	190,000 Gallons
Annual Total	11,000,000 Gallons
ORGANIC LOADING:	
Peak Day	510 Lb BOD
Annual Total	29,200 Lb BOD

The proposed lagoon/sprayfield system can be expanded by adding more aerated treatment and storage cells and by increasing the area under irrigation. If the proposed sprayfield is expanded in the future, there is more than adequate land available for expansion at the proposed site on the plateau with identical topography, soils, and vegetation. The proposed system will require less than 15 acres for the first phase of development, and less than 40 acres at ultimate levels of development. More than 355 acres of suitable private land is available at the proposed site.

WASTEWATER APPENDIX A

LOADING ESTIMATES

The following table summarizes estimated wastewater loadings, based on Phase I development levels. These estimates are preliminary, and must be reviewed at the time that design is initiated to include any changes in the number or size of units.

The unit loads are based on information from similar facilities, and represent average values. The unit loads used in the final design should be developed once details of the major waste-producing facilities are known. The types and numbers of fixtures used in the condominium units and hotel rooms will be especially influential in the determination of water usage and wastewater production.

WASTEWATER APPENDIX A

PRELIMINARY WASTEWATER LOADING ESTIMATES

ANNUAL DISTRIBUTION

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Percent of Annual Flow	12	11	14	12	3	2	6	13	6	3	6	12	100%

DESIGN LOADINGS

	FLOW	BOD
Instantaneous Peak*	240 GPM	- -
Peak Day	74,900 GPD	205 Lb/Day
Peak Week	47,500 GPD	128 Lb/Day
Peak Month	21,700 GPD	59 Lb/Day
Annual Total	4,400,000 Gal	11,700 Lb

*Based on estimated instantaneous peak: peak day ratio of 4.5:1

Source	Number	Unit Load	Total	Ref.	Unit Flow	Total	Ref
Hotel: 100 roms @ 2/room	400	0.125	50	1	50	20,000	2
Condos: 100 units @ 6/unit	600	0.170	102	1	53	31,800	2
Staff: daytime only	45	0.050	2	1	15	675	1
Restaurant, meals	1200	0.021	25	1	10	12,000	1
Bar, visits	800	0.006	5	1	3	2,400	1
Day Lodge	NA	21	21	3	8,000	8,000	3
	Totals		205	lb/day		74,875	gal/day

References:

1. EPA Process Design Manual: Wastewater Treatment Facilities for Sewered Small Communities.
2. EPA Process Design Manual: Onsite Wastewater Treatment and Disposal Systems.
3. Design data developed for Day Lodge at White Pass by Davis/Scheible Engineering.

WASTEWATER APPENDIX B

EVALUATION OF EXISTING TREATMENT AND DISPOSAL FACILITIES

1. EXISTING TREATMENT FACILITIES

The present ski area at Mission Ridge is served by a package-type sewage treatment plant which discharges chlorinated effluent into a drainfield located east of the lower parking area. The plant utilizes the activated sludge/extended aeration process, and was constructed in 1965. The following table summarizes primary design criteria.

TABLE 1.1

EXISTING PLANT DESIGN CRITERIA

Manufacturer/Model	Clow "Yeowave", Model B-150
Type	Extended aeration
Design flow	15,000 gallons/day
Aeration Basin volume	15,000 gallons
Design detention time	24 hours
Aeration: compressed air	Single blower @ 5HP
Aeration capacity	Approximately 240 lb O_2/day
Clarifier	Square: 9 Ft X 9 Ft 11 Ft. 6 In. sidewater depth 185 Gal/Sq Ft/Day overflow

Since the effluent is discharged to a subsurface disposal system, a discharge permit under the National Pollutant Discharge Elimination System (NPDES) is not required, and specific effluent limitaitons for BOD, suspended solids, and coliform bacteria have not been set. However, the effluent quality must be maintained at a high enough level to avoid organic overloading of the drainfield.

The plant has operated successfully and continues to produce an effluent low in BOD and suspended solids, suitable for subsurface discharge. Some washout of solids has been observed during peak loading periods, but this has been infrequent and quantities have been limited.

Loadings in recent years have exceeded design levels during peak use periods, as shown in the following tables.

TABLE 1.2

1982/83 PEAK SEASON LOADING*

Month	Average Flow	Peak Day Flow	Minimum Flow
December	8,496 GPD	14,940 GPD	5,560 GPD
January	9,130	17,930	5,500
February	10,390	17,260	4,120
March	7,915	12,500	4,330
April	7,618	13,210	660

*Flows measured by metering potable water service for ski area.

TABLE 1.3

1982/83: SHORT-TERM PEAKS

Date	Flow	Date	Flow	Date	Flow
12/26	10,150 GPD	12/31	13,260 GPD	2/19	10,055* GPD
12/27	13,110	1/1	17,930	2/20	10,055*
12/28	12,610	1/2	14,530	2/21	17,860
12/29	9,630	1/3	8,600	2/22	13,740
12/30	14,940	1/4	8,850		

*Averaged over 2 days; single day data not available

It is apparent from the foregoing information that peak loadings can be expected to approach 18,000 gallons per day. Since most of the volume occurs over a period of approximately 8 hours, the rate of flow reaching the treatment facilities will be much higher, approximately 60,000 gallons per day.

High flow rates will exert their greatest impact upon the clarifier, where an overflow rate of 740 gallons per square foot per day will be experienced when flows reach 60,000 gallons per day. This level would be considered high for this type of clarifier, and some solids washout could be expected.

The aeration capacity appears adequate, even for peak loadings. Based on an estimated influent strength of 200 milligrams/liter, peak demands can be expected to approach a rate of 90 to 100 pounds of oxygen per day, well within the present 240 pound per day capacity. Since only a single blower is provided, however, no backup capacity is available for mechanical failures.

2. EXISTING DISPOSAL FACILITIES

Chlorinated effluent is discharged into a drainfield for subsurface disposal. The drainfield is divided into two sections of approximately equal size, only one of which is operated at a time. The sections are alternated approximately once every six months. The following table summarizes drainfield design criteria and present loadings.

TABLE 2.1

DRAINFIELD DESIGN CRITERIA

Total length of trenches	970 feet
Total trench bottom area	3,880 square feet
Peak month loading	5.6 GPD/Sq Ft[(a)]
Annual loading	1.0 GPD/Sq Ft[(b)]

(a) Loading shown is based on smaller section (465 lineal feet) and 10,400 GPD average flow (February, 1983 flow level).

(b) Based on a total annual flow of 1,400,000 gallons and the total trench length.

The peak month loading shown in the foregoing table is well above the maximum level allowed in current Department of Social and Health Service guidelines for sub-surface absorption systems: 1.2 gallons per square foot per day. However, the DSHS guidelines are based on constant year-round loadings of septic tank effluent, not seasonal loadings of high quality treatment plant effluent. The higher quality effluent produced at Mission Ridge should not exceed the assimilative capacity of the soil during peak months, and the long off-season allows a rest period to ensure that assimilative capacity is retained.

The annual average loading of 1.0 gallon per day per square foot is more representative of what can be expected for long-term performance, and is below the DSHS maximum. This is consistent with operating experience for the drainfield, which has not had surfacing of effluent or back-up problems.

3. IMPACT OF INCREASED LOADINGS

The existing treatment and disposal system will be affected in two different ways as loadings increase. First, increases in short-term peak flows will exceed the clarifier's hydraulic capacity and cause more frequent and extensive washouts of solids. Second, increases in "base flow", i.e., mid-week wastewater loadings, will cause biological solids to accumulate in the aeration basin faster than they can be destroyed by endogenous respiration, creating a need for periodic sludge removal.

The present system is adequate for current loadings and can be expected to handle higher loadings without problems. However, effluent quality will deteriorate as wastewater flows increase, and will eventually cause problems in the highly-loaded drainfield. The point at which expansion and upgrading is required cannot be precisely determined, since the responses of drainfields to seasonally-applied loads have not been defined with predictive models.

Increased performance monitoring would allow effluent quality deterioration to be observed, so that corrective actions could be taken before problems occur. The following section includes recommendations for expanded monitoring and other improvements which will help to ensure against drainfield damage.

4. RECOMMENDED IMPROVEMENTS

The following improvements are recommended to allow effluent quality to be more closely monitored, to increase reliability, and to increase peak and base load capacity. Improvements to increase capacity would be implemented when monitoring indicates that significant effluent quality deterioration is taking place. A schedule for upgrading to increase capacity would be developed in concert with the Department of Ecology, the agency with jurisdiction over plant design and operation.

Improvements in Effluent Monitoring

A portable automatic sampler should be installed to collect composite samples (timed basis, not flow-proportional) prior to chlorination. The sampler would be operated to obtain effluent samples while the Day Lodge facilities are in use, i.e., primarily during and immediately following daytime hours.

Samples should be obtained for one day on every other weekend from mid-December through February, with two additional samples during the Christmas holidays and one additional sample during the Washington's Birthday holiday. The samples should be analyzed for BOD and Total Suspended Solids.

Improvements to Increase Reliability

A standby blower should be installed to ensure that the aeration basin can be kept mixed and aerobic when the primary blower fails. Since major blower repairs would take at least several hours and since failure could occur during peak loading periods, large quantities of sludge could potentially reach the drainfield if the blower fails.

Power failure would also stop aeration, but emergency power is not recommended since flows would rapidly cease during periods of power outage.

It is recommended that the two sections of the drainfield be alternated more frequently during peak season: twice monthly from December through April and monthly during the rest of the year. This schedule allows adequate rest periods for recovery during peak loading and allows the entire field's assimilative capacity to be more effectively used.

Future Improvements to Increase Capacity

Short-term peaks could be attenuated with the addition of an equalization basin ahead of the treatment plant. The equalization basin should be kept mixed and aerated to maintain aerobic conditions, and should be covered to avoid excessive heat loss.

A tank with approximately 12,000 gallons of variable volume would allow the peak day flow to be metered into the treatment plant at a constant rate of 18,000 gallons in 24 hours, rather than the 60,000 gallon per day rate presently experienced. A blower could be used for mixing and aeration, and could be piped into the treatment plant for use as emergency standby.

When build-up of organic material (sludge) within the aeration basin becomes a problem, two courses of action are avilable: Store and treatment the sludge at the plant or periodically pump sludge into a tank truck for disposal. Storage and treatment could most effectively be accomplished with an aerobic digester but would require significant construction and O&M costs.

Hauling by tank truck would require installation of a sludge pump, piping, and truck filling standpipe, but would be much less expensive to construct. Sludge could be hauled to an approved landfill site for diposal. This method also has the advantages of short construction time and simplicity of operation.

WASTEWATER APPENDIX C

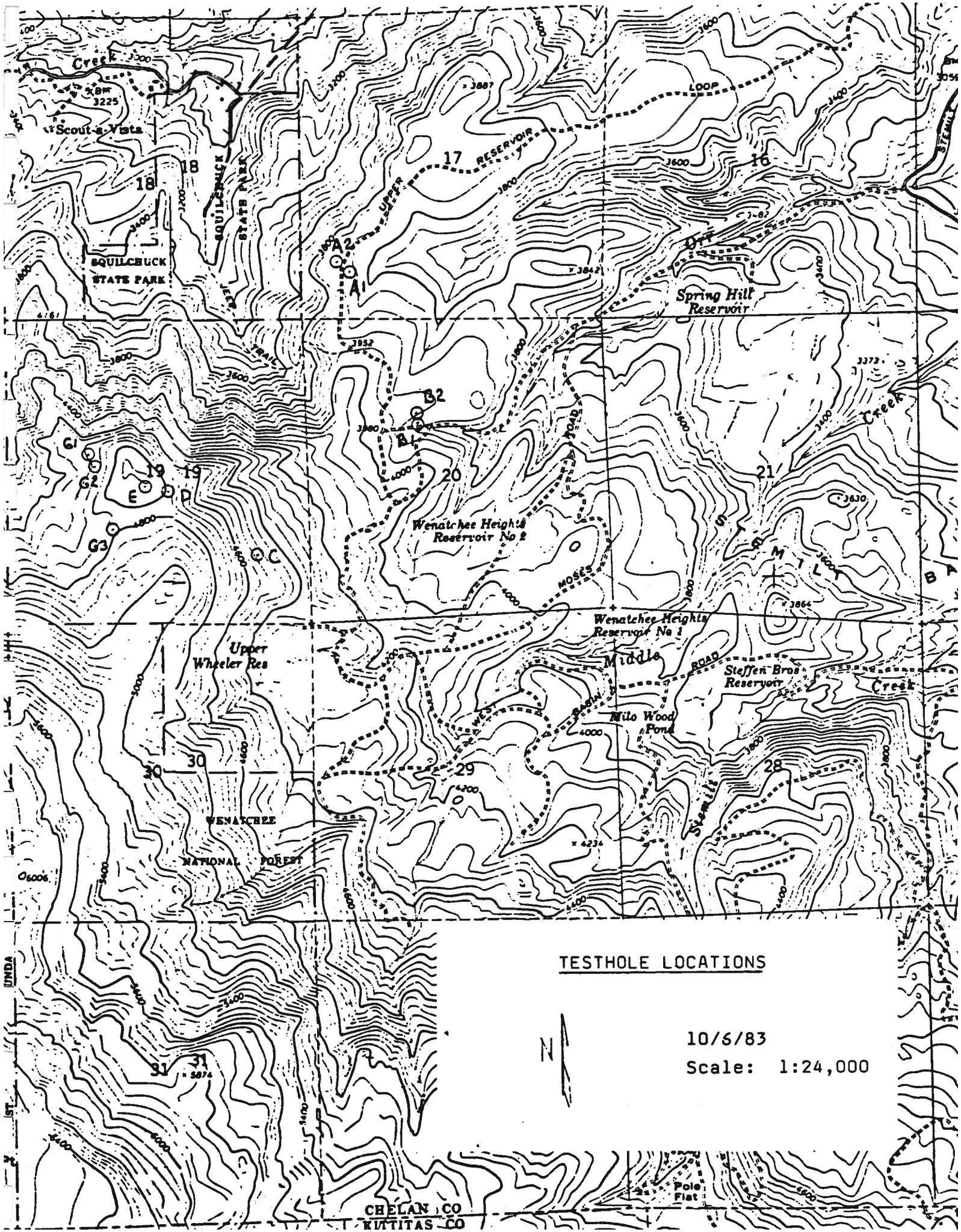
Constellation Ridge — October 6, 1983

SUMMARY - SOIL EXCAVATION DATA

The following soil logs represent information obtained by observation of testholes excavated with a tractor-mounted backhoe. Weather conditions during observations: clear and cool; no significant precipitation since 9/17/83. Testhole locations are given as coordinates on the site topography map prepared by Horton Dennis & Associates or as shown on the USGS 7½-minute quadrangle which is attached. No groundwater was observed in any of the testholes. "Rock" is defined as the level that backhoe excavation became difficult.

Designation	Elevation	Coordinates	Depth	Characteristics
A-1	3,850	N/A	0 - 18 in.	rocky brown silt loam
			18 - 36	brown clay loam
			36 - 63	rocky yellow-brown clay loam grading to rock
				Samples @ 8", 24", & 50"
A-2	3,860	N/A	0 - 15	very rocky brown silt loam
			15 - 40	very rocky yellow-brown clay loam grading to rock
				Sample @ 23"
B-1	3,890	N/A	0 - 18	brown silt loam
			18 - 64	rocky brown clay loam, essentially uniform down to rock
				Samples @ 36" & 60"
B-2	3,900	N/A	0 - 18	brown silt loam
			18 - 50	rocky brown clay loam, essentially uniform down to rock
				Sample @ 36"
C	4,500	N/A	0 - 24	brown sandy loam
			24 - 60	light brown sandy loam
			60 - 120	orange-brown sandy loam
				Stopped digging at 120:, no large rock observed

Designation	Elevation	Coordinates	Depth	Characteristics
D	4,720	N 12,600 E 10,195	0 - 24 in. 24 - 90	brown sandy loam rocky light brown sandy loam grading to rock Samples @ 36" & 60"
E	4,810	N 12,200 E 9,950	0 - 15 15 - 100	brown silt loam yellow-brown clay, shading to blue clay at depth Stopped digging at 100", no rock observed. Samples @ 36" & 100"
G-1	4,660	N 13,095 E 8,400	0 - 18 18 - 60 60 - 84	brown silt loam brown clay loam orange brown sandy loam Stopped digging @ 84", no large rock observed. Samples @ 36" & 72"
G-2	4,660	N 12,905 E 8,555	0 - 24 24 - 72	brown silt loam rocky yellow-brown clay loam Stopped digging @ 72", rocks increasing with depth Samples @ 36" and 60"
G-3	4,750	N 11,675 E 8,715	0 - 16 16 - 42	very rocky brown silt loam very rock orange-brown sandy loam, grading to rock


Creek
Scout-a-Vista
SQUILCHUCK STATE PARK
SQUILCHUCK STATE PARK TRAIL
UPPER RESERVOIR
LOOP
Spring Hill Reservoir
Wenatchee Heights Reservoir No 2
Wenatchee Heights Reservoir No 1
Upper Wheeler Res
Middle
Steffen Bros Reservoir
Milo Wood Pond
MOSES
ROAD
WENATCHEE NATIONAL FOREST
Pole Flat
CHELAN CO
KITTITAS CO
A1
A2
B1
B2
C
D
E
G1
G2
G3
TESTHOLE LOCATIONS
N
10/6/83
Scale: 1:24,000

TECHNICAL APPENDIX D

Reproduced from THE WASHINGTON FARMER-STOCKMAN 97(2), page 34, January 1972, *by the* Forest Service, U.S. Department of Agriculture, *for official use.*

Skiing—'And on Grass Base'

By GLEN O. KLOCK and WALTER A. HAMPTON

"SIXTY inches of packed snow with 4 inches of powder on top and dotted with flashing skis and colorful clothing, all over a dense grass base," might be the description of an ideal ski slope. In summer this same slope will blend with the green of the trees instead of showing bare, brown gullies.

Needless to say, more attention has been given to the snow surface for skiing than to the summer surface for erosion control. However, with numerous new slopes being developed and with our concern for improving our environment, a growing interest is developing in carpeting the summer slopes with a cover of green.

But revegetating these slopes is not easy. Areas used for ski development are characterized by several features which reduce the opportunities for quick natural revegetation once disturbed. Their high altitude with low mean temperatures and abundant snow provides a very short growing season. Desirable ski locations are on north and east slopes which accentuate the shortening of the growing season. Soils in these areas are normally quite shallow and of recent development. Their fertility immediately below the surface few inches is generally exceedingly low, particularly in nitrogen, a major nutrient for vegetative growth.

A recent ski development with many of these characteristics is Mission Ridge, located 12 miles southwest of Wenatchee. It lies in an easterly facing basin on the east slope of the Cascade Mountains. Approximately 45 acres of trails and roads have been cleared between 4,600- and 6,700-foot altitudes. The soils run from bare rock to loam exceeding 6 feet in depth. Some highly weathered pumice has been exposed in excavations. A considerable amount of grading has been necessary to provide ideal "runs." Over 50 per cent of the topsoil in the area has been disturbed and mixed with the subsoil.

Part of the development is on Forest Service land. The use permit required the operator to revegetate the exposed slopes. In the late fall of 1967, the area was seeded with a mixture of orchard grass, timothy, and hard fescue. The seed was broadcast on top of a blanket of snow. In the summer of 1968, the only evidence of the planting was on undisturbed topsoil and near ski lifts where chemicals had been used to condition the snow. The moisture and temperature conditions did not appear responsible for the absence of vegetation.

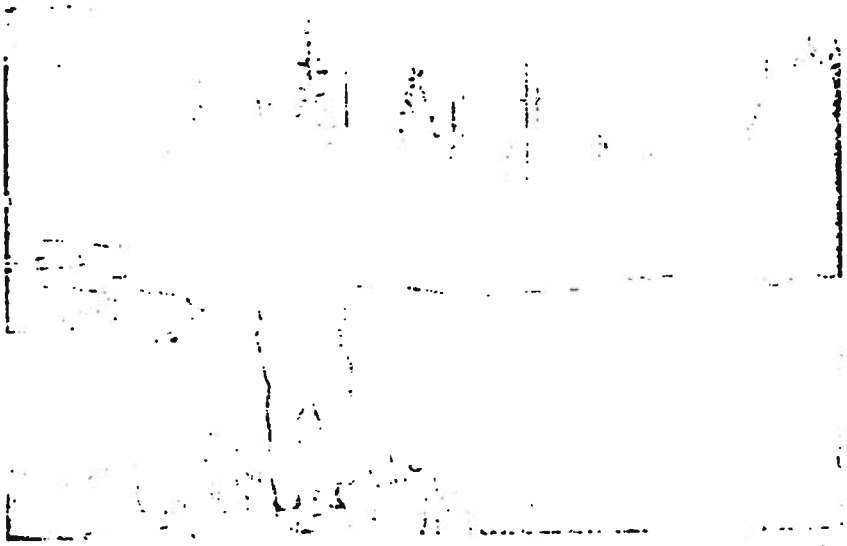
Soil samples were chemically analyzed for a possible cause for the limited success with the initial seeding. All plant nutrients were found to be low with the nitrogen measured at 0.02 per cent. A greenhouse study was initiated to confirm that the soil nutrient supply was one of the major limiting factors in revegetating the ski slopes. Crested wheatgrass seeds planted in unfertilized containers grew only until their endosperm energy was exhausted and then slowly died. Containers of fertilized soil grew an abundant quantity of healthy grass.

In late August a field trial was established in the middle of one of the major ski runs. Crested wheatgrass, common ryegrass,

Glen Klock is Research Soil Scientist, Pacific Northwest Forest and Range Experiment Station; Walter Hampton is Manager, Wenatchee Mountain, Inc., Ltd., Wenatchee.

TECHNICAL APPENDIX D

Techniques for Revegetation of Alpine Soils



The response of grass to nitrogen fertilization at planting time is shown on the right. The grass on the left received equal nitrogen fertilization in the spring after a fall planting.

and a mixture of orchard grass, timothy, and hard fescue was broadcast, planted in plots 15 by 40 feet. One half of each plot received a starter fertilizer at planting. Nitrogen in the form of urea was applied at the rate of 100 pounds per acre, phosphorus (P_2O_5), as single superphosphate at 100 pounds per acre, and potassium (K_2O) as muriate of potash at 100 pounds per acre. The surface soil was light harrowed to cover the seed and to minimize fertilizer loss due to volatilizing.

Seventeen days after planting, a high percentage of seedlings had emerged on the half of the plot receiving starter fertilizer, but the low percentage of seedlings on the unfertilized section of the plot was conspicuous. This difference after planting and subsequent winter survival was very evident when the snowpack melted off the plots in May 1969. At this time, all plantings were fertilized with 100 pounds of nitrogen per acre in the form of urea. The vegetative growth of the half of each plot receiving a starter fertilizer was spectacular. This excellent growth was in contrast to the low productivity on the plots not receiving a starter fertilizer.

One section of the test area was broadcast planted on top of snow in the late fall to duplicate previous planting attempts. Although a generous quantity of orchard grass, timothy, and hard fescue was planted, very few seedlings emerged the following spring. This test demonstrated that broadcast planting on snow is not a recommended practice in this area.

The results of these field tests demonstrate that the method of planting is perhaps as important as the choice of seed mixture. It is important to use a starter fertilizer with a fall planting and cover the seed and fertilizer with a thin layer of soil. This practice would also likely be successful on spring plantings, but the inaccessibility of these areas due to snowbanks and wet soil conditions make such plantings impractical. The quantity of fertilizer used in these tests is in excess of that required for vegetation establishment in many areas. The correct amount and kind of fertilizer to use for good vegetation establishment can be determined by soil testing.

Using the planting and fertilizing techniques practiced in this study, the operators of Mission Ridge have made successful plantings. The successful planting procedures developed here would be adaptable to revegetate ski slopes and other disturbed areas in many places along the upper slopes of the Cascade Mountains.

TECHNICAL APPENDIX E

Washington State Department of Game Policies and Management Plans

POLICIES

WASHINGTON GAME COMMISSION

January 7, 1980

STATE OF
WASHINGTON

Dixy Lee Ray
Governor

DEPARTMENT OF GAME
600 North Capitol Way, Olympia, Washington 98504 206/753-5710

Ralph W. Larson, Director

We, the members of the Washington State Game Commission, hereby adopt on January 7, 1980 the following statements of general policy to guide the Department of Game in planning for and management of the wildlife resources of the State of Washington.

FRANK L. CASSIDY, JR., Chairman

ARCHIE U. MILLS, Vice-Chairman

ELIZABETH W. MEADOWCROFT

TOM NELSON

MARTIN PEDERSEN

VERN E. ZIEGLER

FOREWORD

These Commission policies are to serve as a guide for the management and enhancement of all fish and animal species and their habitats. "Wildlife" includes all such fish and animals which are the responsibility of the Washington Game Commission.

Wildlife and wildlife habitat are renewable resources that if managed properly will provide enjoyment and benefit to man indefinitely. The wildlife resource also provides great economic benefits to Washington State. Modern wildlife management is the science of managing wildlife habitat and succeeding generations of wildlife in response to public need.

No matter where wildlife lives in Washington, ownership is held by the state. In general, however, wildlife must be managed without direct Department control over the land and water base on which the wildlife resource depends. Where important habitat areas exist on private or public lands not managed by the Game Department, protective measures must be provided by either the land owner/ manager or by Department acquisition.

Destruction or disturbance of habitat is the major cause of permanent decreases in wildlife populations. Proper management must include cooperative planning with other land users to avoid habitat loss. Where habitat loss has already occurred, steps should be taken to compensate for it through enhancement efforts.

The problem of balancing the public's need with the land's ability to produce wildlife is best summed up by the following statement: With wildlife, as with politics, everyone seems to be an expert on the subject. However, while use and enjoyment of wildlife are common to all, the expertise required to manage wildlife is not. The problem comes in balancing scientific professionalism with public involvement. The public should understand that wildlife management must be based on biological and ecological principles and that it should be conducted with the highest standards of professional expertise. Wildlife managers in turn should be responsive to changing public attitudes concerning wildlife and its use, and managers should be more cognizant of their custodial role. Essentially, it is a problem of communication, in both directions.

The Commission recognizes that informed, involved sportsmen's groups and wildlife organizations, as well as a concerned, educated public, are essential to a strong, purposeful Game Commission and Game Department.

1. The first management priority will be to establish and perpetuate the highest quality wildlife habitat, with the second priority being to provide recreation opportunity in the form of hunting, fishing and wildlife enjoyment.

2. Washington's wildlife resources belong to all residents of the state. Support will be given to legislation and programs designed to ensure the enjoyment of the State's wildlife resources for all. The rights and needs of residents will receive first consideration in jurisdictional matters.

3. Commercial exploitation of wildlife and wildlife trophy contests will be opposed unless specifically authorized by the Commission as not being harmful to the resource.

4. Decommercialization of steelhead trout will be pursued.

5. Funding sources will be sought which allow adequate program levels while protecting the integrity of license and permit revenues.

6. Legislation or programs which would result in losses of wildlife or wildlife habitat will be opposed.

7. Development and implementation of a long-range comprehensive management plan and shorter-range operational plans is imperative.

8. Illegal harvest of wildlife is inconsistent with wildlife management, and depletes an important resource of great value to the residents of Washington. A high level of enforcement will be implemented and severe penalties will be encouraged.

9. Within habitat capabilities, wildlife will be managed according to the following priorities:

   (1) natural reproduction rather than stocking
   (2) native species of wildlife
   (3) species which provide the most recreational opportunities for hunting, fishing, and wildlife viewing.

10. Fish stocking programs will be coordinated with other entities to avoid conflicts between competing species.

11. Only programs, activities, and facilities which directly and primarily benefit wildlife and wildlife-related recreation will be permitted on Department-controlled lands.

    - Land use decisions will be based on long-term benefits to habitat and wildlife, even though they may preclude an economic return to the Department.
    - The planned, judicious use of fire will be encouraged when and where it will enhance wildlife habitat.
    - Livestock grazing will be permitted under approved management systems when wildlife habitat would be benefited.

12. Habitat for unique, rare or endangered species will be identified, protected, and, when possible, improved for those species on Department-controlled lands.

13. Geological formations and historic sites on Department-controlled lands will be preserved for the education and enjoyment of the public.

14. Suitable unroaded and closed road areas will be established for the benefit of wildlife and dispersed recreation.

15. All lands will be managed to protect the water resource.

16. Acquisition of access to public lands or waters will be undertaken only where accessibility is hindered by legal constraints or private ownership, rather than physical conditions.

17. Acquisition of habitat and recreational access through purchase of conservation easements, public hunting and fishing easements, longterm leases, transfer of development rights, and other forms of less-than-fee title conveyance, along with outright purchase, will be sought.

18. Habitat suited and needed for wildlife winter use will be managed to provide optimum food supplies. Key winter habitat will be given high priority for acquisition.

19. Close coordination with state and federal land management agencies is encouraged to assure that management practices on public lands are in the best interests of wildlife and wildlife-related recreation.

    - The use of pesticides, herbicides, controlled burning, and other land management practices will be opposed when wildlife would be adversely affected.

    - Stocking and harvest of wildlife in federally-classified Wilderness areas will be based on jointly-developed management plans.

20. The Commission supports the establishment of instream water flows for wildlife.

21. Cooperation and assistance with federal and other state agencies will be sought and provided in the development of wildlife-related management plans.

22. Classification of federal lands to provide optimum habitat for wildlife while permitting reasonable consumptive and non-consumptive use of the wildlife will be supported.

23. Close cooperation and coordination with local governments and private landowners is encouraged to ensure that wildlife values are considered for protection or enhancement in the development of land use plans and ordinances.

24. Efforts by public or private entities to preserve or protect wildlife habitat which would otherwise be lost to development will be strongly supported.

25. Public input from organizations and individuals will be solicited and considered in the development of programs and regulations. Close working relationships will be established and maintained with organizations concerned about wildlife and habitat.

26. Development and expansion of programs to educate and inform the public about wildlife, hunter safety, and the rights of private landowners will be encouraged and emphasized.

WILDLIFE PROGRAM PLANS

WASHINGTON DEPARTMENT OF GAME

APRIL 1984

April 1984

Statewide Rocky Mountain Elk Program

Population Objectives

Maintain population level at the 1970-1979 mean of 23,800 elk as determined by the population trend index (PTI). The population objective may change as more accurate estimates of population size become available.

Harvest Objectives

Maintain harvest level at the 1970-1979 mean of 5,600 elk and hunter success rate of 7 percent. A significant increase in hunter pressure may result in lowering of the success rate.

Key Elements of Rocky Mountain Elk Plan

All items contained within the Rocky Mountain elk management plan are designed to assist in meeting the 1989 population and harvest objectives. There are, however, components of this plan which, if not completed within the necessary time frame, would preclude the achievement of the 1989 goals. These key elements are listed below.

B. Monitor Population Status.
   1. Implement improved system for measuring population parameters.
   3. Employ computer stimulation models to summarize, collate and identify inadequate data regarding the dynamics of our elk populations needs and estimating population size.

C. Inventory, Protect and Improve Habitat.
   2. Develop range improvement projects on elk habitats and acquire management rights on critical, non-Department owned lands.
   3. Enhance range on Department HMA's.
   4. Identify and seek mitigation/compensation for impacts on elk range from ski resorts, logging, mining, road construction, etc.
   6. Encourage U.S. Forest Service and DNR to pattern timber sales to protect habitat during the five-year action plan meeting.

D. Manager Harvest and Use.
   1. Define management goals by unit or area.
   3. Utilize population dynamics, harvest and other pertinent data in making hunting season recommendations.

E. Obtain Game Law Compliance.
   1. Ensure that 90 percent of the Rocky Mountain elk harvested are lawfully taken.
   4. Increase enforcement activities to reduce harassment from dogs and recreational users.

F. Supplement Wild Populations with Artificial Production
   1. Continue annual feeding program during winter.

I. Information and Education.
   2. Educate public on various aspects of elk management program.

MD = Must DO
H = High
M = Medium
L = Low

1. PRIORITY				2. ACTIVITY (WHAT)	3. WHO	4. WHERE	5. WHEN	6. 83-85	7. 85-87
A	B	C	D						
				A. COLLECT BASIC BIOLOGICAL DATA					
H		X		1. Review recent and existing literature concerning Rocky Mountain elk management and ecology. (Abstracts provided semi-annually.)	B/G Invest. PM	Olympia	Ongoing	Yes	Yes
H		X		2. Assess current research findings and apply to management efforts as required. (Incorporate in plan review cycle.)	B/G Invest. PM Regional Bios	Olympia Regions 1, 2, 3	Ongoing	Yes	Yes
H		X		3. Investigate the nutritional well-being of each major elk herd utilizing the DAPA process.	B/G Invest. PM Reg. W/L Bios	Olympia Regions 1, 3	Ongoing	Yes	
				B. MONITOR POPULATION STATUS					
MD	X			1. Review current data collection procedures; develop improved and standardized systems for measuring population parameters, trends, and/or estimating populations using the latest technology.	Big Game PM Big Game Invest. PM	Olympia	1984	Yes	Yes
MD		X		2. Conduct population surveys to provide needed management data.	Reg. Wildlife Bio. Reg. Wildlife Agent	Regions 1, 3	Ongoing	Yes	Yes
MD	X			3. Develop and employ computer simulation models to summarize and collate data and identify inadequate data regarding population size.	Big Game Invest. PM Research PM/Data Processing	Olympia	Start 1984	Yes	Yes
L		X		4. Estimate elk populations utilizing the population trend index (PTI).	B/G Invest. PM	Olympia	Ongoing	Yes	Yes
				C. INVENTORY, PROTECT AND IMPROVE HABITAT					
M	X			1. Map and quantify critical elk range; monitor change in range periodically, utilizing Landsat (20 percent annually).	Research PM B/G Invest. PM Reg. W/L Bios Cartographer	Olympia Regions 1, 3	Start 1984	Yes	Yes
H		X		2. Develop elk range improvement projects through cooperative agreements with land management agencies and private landowners. Acquire management rights on critical, non-Department-owned elk range. (Reported annually.)	Landowners Rel. PM Reg. W/L Bios Reg. Hab. Bios Lands PM Game Lands Agent	Olympia Regions 1, 3	Ongoing	Yes	Yes
H		X		3. Maintain or improve elk habitat on HMA's to maximum potential consistent with other species priorities. (Chief Joe, Asotin, Grouse Flats, Wooten, Oak Creek, L.T. Murray, Colockum, Cowiche).	Reg. W/L Bios HMA Mgrs.	Regions 1, 3	Ongoing	Yes	Yes

1. PRIORITY				2. ACTIVITY (WHAT)	3. WHO	4. WHERE	5. WHEN	6. 83-85	7. 85-87
A	B	C	D						
				C. INVENTORY, PROTECT AND IMPROVE HABITAT (Continued)					
H		X		4. Identify and seek mitigation/compensation for impacts on elk range, particularly winter range, from ski resorts, logging, mining, road construction, etc., through review of environmental documents and resource permits.	Env. Affairs Reg. Hab. Bios Reg. W/L Bios Mitigation Team	Olympia Regions 1, 3	Ongoing	Yes	Yes
L	X			5. Identify and promote legislation which encourages retention and enhancement of elk habitat by private landowner.	Big Game PM Landowner Rel. PM	Olympia	Ongoing	Yes	Yes
H		X		6. Encourage U.S. Forest Service and DNR to pattern timber sales to protect habitat during the five-year action plan meetings.	Reg. W/L Bios Reg. Hab. Bios Environmental Affairs Landowner Rel. PM	Regions 1, 3	Ongoing	Yes	Yes
				D. MANAGE HARVEST AND USE					
				GUIDELINE: Continue management efforts which favor elk in units where this species has been given priority.					
H	X			1. Define herd management goals by unit or area.	Reg. W/L Bios	Regions 1, 2, 3	Winter 84-85	Yes	
H	X			2. Investigate and improve harvest monitoring system.	B/G Invest. PM	Olympia	Start 1983	Yes	
MD	X			3. Utilize population dynamics, harvest, and other pertinent data in making hunting season recommendations in accordance with management goals.	Big Game PM B/G Invest. PM Reg. W/L Bios	Olympia Regions 1, 2, 3	Start 1984	Yes	Yes
H		X		4. Implement additional techniques for limiting number of hunters in congested areas (i.e. early-late seasons, restricting access through road management, limiting overall elk tag sales).	Big Game PM B/G Invest. PM Reg. W/L Bios	Olympia Regions 1, 3	Start 1984	Yes	Yes
H		X		5. Conduct field checks and collect the following data: a. Hunter's name, address and license number. b. Species of kill plus sex and age. c. Number of antler points per side. d. Location of kill by game management unit, local. e. Date of kill. f. Method of take (modern firearm, muzzleloader or archery).	Reg. W/L Bios Reg. W/L Agents	Regions 1, 2, 3	Ongoing	Yes	Yes
H		X		6. Collect incisors from all female and those branched antler male elk taken in branched antler restriction units and analyzed to determine age of animals. (80 percent compliance objective.)	Reg. W/L Bios B/G Invest. PM	Regions 1, 3 Olympia	Ongoing	Yes	Yes

1. PRIORITY				2. ACTIVITY (WHAT)	3. WHO	4. WHERE	5. WHEN	6. 83-85	7. 85-87
A	B	C	D						
				D. MANAGE HARVEST AND USE (Continued)					
H		X		7. Collect and analyze mandatory harvest report cards.	B/G Invest. PM	Olympia	Ongoing	Yes	Yes
L			X	8. Collect locker forms and analyze data.	B/G Invest. PM	Olympia	July 1984	Yes	No
MD		X		9. Incorporate resource allocation guidelines into season recommendations in conjunction with management goals.	Big Game PM Reg. W/L Bios	Olympia Regions 1, 2, 3	Spring 1984	Yes	Yes
MD		X		10. Assimilate season recommendations into unified package for presenation to Administration, public and Commission.	Big Game PM	Olympia	Spring	Yes	Yes
MD		X		11. Administer controlled permit drawings.	B/G Invest. PM	Olympia	August	Yes	Yes
H		X		12. Review and summarize reports and harvest data. Distribute to regions.	B/G Invest. PM	Olympia	Ongoing	Yes	Yes
MD	X			13. Computerize harvest information and analyze.	Research PM Data Processing	Olympia	1984	Yes	Yes
			E.	OBTAIN GAME LAW COMPLIANCE					
MD	X			1. Ensure that 90 percent of Rocky Mountain elk harvested are lawfully taken.	Reg. W/L Agents	Regions 1, 2, 3	Start 1984	Yes	Yes
H	X			2. Attain a minimum return rate of 60 percent on mandatory harvest report cards.	Reg. W/L Agents	Regions 1, 2, 3	Start 1984	Yes	Yes
MD	X			3. Ensure a 90 percent compliance rate with rules regulating hunting (i.e., basic license requirement, elk tag, etc.).	Reg. W/L Agents Commissioned Personnel	Regions 1, 2, 3	Ongoing	Yes	Yes
H	X			4. Define and implement enforcement activities to reduce harassment to elk from dogs and recreational users.	Reg. W/L Agents	Regions 1, 3	Start 1985		Yes
H	X			5. Design and implement a reward system to encourage participation in controlling unlawful harvest.	Enforcement Div.	Olympia	1985		Yes
H	X			6. Design and implement covert operations to control unlawful harvest and commercialization.	Enforcement Div.	Olympia	1985		Yes
H		X		7. Investigate 100 percent of incidents where commercialization of Rocky Mountain elk is suspected.	Reg. W/L Agents	Regions 1, 2, 3	Ongoing	Yes	Yes
H		X		8. Ensure that 50 percent of special permit holders comply with tooth return requirements.	Reg. W/L Agents	Regions 1, 2, 3	Ongoing	Yes	Yes
L		X		9. Implement enforcement activities to improve elk hunter image.	Reg. W/L Agents	Regions 1, 2, 3	1983	Yes	Yes

1. PRIORITY				2. ACTIVITY (WHAT)	3. WHO	4. WHERE	5. WHEN	6. 83-85	7. 85-87
A	B	C	D						
				F. SUPPLEMENT WILD POPULATIONS WITH ARTIFICIAL PRODUCTION					
H		X		1. Continue annual feeding program to help maintain elk populations.	Reg. W/L Agents	Regions 1, 3	Ongoing	Yes	Yes
				G. PROVIDE RECREATION ACCESS AND OPPORTUNITY					
L		X		1. Acquire better access when needed to address damage situations.	Reg. W/L Bios Lands PM Game Lands Agent	Regions 1, 3	Ongoing	Yes	Yes
MD		X		2. Provide recreation opportunity on HMA's.	Reg. W/L Bios HMA Mgrs.	Regions 1, 3	Ongoing	Yes	Yes
				H. ESTABLISH NEW POPULATIONS					
				POLICY: Prohibit introduction of elk into units selected for deer management.					
				I. PROVIDE INFORMATION AND EDUCATION					
M		X		1. Provide training to intra-agency personnel (Regional and Area Biologists, Wildlife Agents and Regional Habitat Biologists) on Rocky Mountain elk management program, techniques and data collection.	Big Game PM B/G Invest. PM W/L Mgmt. Admin. Asst.	Olympia	Pers. School When Appropriate	Yes	
H		X		2. Keep public informed on various aspects of elk management programs including seasons, special hunts and permits, management goals and objectives, data collection procedures and populations dynamics through news releases, media contacts, publications and public meetings.	I & E Program	Olympia	Ongoing	Yes	Yes
M		X		3. Develop public information programs to emphasize the importance of not disturbing elk when climatic conditions produce physical stress.	I & E Program	Olympia	1985		Yes
H		X		4. Provide public information on Cowichee elk herd.	I & E Program	Olympia	1984	Yes	Yes

MD = Most DO

1. PRIORITY				2. ACTIVITY (WHAT)	3. WHO	4. WHERE	5. WHEN	6. 83-85	7. 85-87
A	B	C	D						
				J. CONTROL PROBLEM WILDLIFE					
				GUIDELINES: a. The first choice for control of Rocky Mountain elk damage is recreational hunting. b. The Department will not enter into any new damage control fence construction agreements. c. The Department will furnish fence repair materials under existing repair agreements. d. The Department will not extend damage fence repair agreements. e. Landowners will be encouraged to construct their own fences as a long-term solution to elk damage.					
H		X		1. Pursue with the legislature repeal or modification of existing damage laws to eliminate or reduce damage payments and the need for fencing at Department expense.	Reg. Enforcement Enforcement Div. Administration	Regions 1, 2, 3 Olympia	Continuing Ongoing	Yes Yes	Yes
M		X		2. Use management techniques such as special permits, antlerless harvest and other harvest restrictions to prevent or reduce damage on private agricultural lands.	Administration Reg. W/L Bios	Olympia Regions 1, 2, 3	Ongoing	Yes	
L	X			3. Develop and implement a self-help approach to Rocky Mountain elk damage control.	Enforcement Div. Reg. Enforcement	Olympia Regions 1, 2, 3	1985		Yes
M		X		4. Respond to 100 percent of Rocky Mountain elk damage complaints within 24 hours.	Reg. Enforcement	Regions 1, 2, 3	Continuing	Yes	Yes
M	X			5. Resolve 70 percent of Rocky Mountain elk damage the satisfaction of the complainant.	Reg. Enforcement	Regions 1, 2, 3	Continuing	Yes	Yes
M		X		6. Maintain present Department-owned damage fences.	Constr. & Maint. Staff, Reg. Enforcement	Olympia Regions 1, 2, 3	Continuing	Yes	Yes
H	X			7. Condition Section 404 permits for new irrigation projects to remove Department liability for Rocky Mountain elk damage.	Habitat Management	Olympia	Continuing	Yes	Yes
M	X			8. Initiate investigation into new repellents, devices and methods to reduce or resolve Rocky Mountain elk damage problems.	W/L Control PM Reg. Enforcement	Olympia Regions 1, 2, 3	1984	Yes	Yes
M	X			9. Initiate research into methods of determining actual crop loss resulting from Rocky Mountain elk damage.	Research PM W/L Control PM Reg. Enforcement	Olympia Regions 1, 2, 3	1985		Yes

1. PRIORITY				2. ACTIVITY (WHAT)	3. WHO	4. WHERE	5. WHEN	6. 83-85	7. 85-87
A	B	C	D						
				K. CONTROL WILDLIFE DISEASE					
H		X		1. Collect and examine samples from hunter harvested, road killed and collected elk for general health and parasite levels when outbreaks of disease or parasites are suspected. Coordinate with disease/ parasite specialists.	Regional W/L Bios Reg. W/L Agents WSU	Regions 1, 2, 3	As Required		
				L. ADMINISTRATION/OTHER					
				Not applicable.					

Statewide Mule Deer Program

Population Objectives

Maintain mule deer populations at the 1970-1979 mean of 144,000 as determined by the population trend index (PTI). An increase in populations may be possible in some areas. The population objective, however, may be adjusted as new estimators are employed and more accurate estimates become available. With an improved data base, we will initiate management programs based upon specific areas or game management unit data as opposed to statewide averages.

Harvest Objectives

Maintain the 1970-1979 mean harvest of 17,000 mule deer and hunter success rate of 23 percent. A significant increase in hunter pressure may result in a lowering of the success rate.

Key Elements of Mule Deer Plan

All items contained within the mule deer management plan are designed to assist in meeting the 1989 population and harvest objectives. There are, however, components of this plan which, if not completed within the necessary time frame, would preclude the achievement of the 1989 goals. These key elements are listed below.

A. Collect Basic Biological Data
   3&4 Develop and implement research plan to study mule deer winter ecology in north-central Washington.

B. Monitor Population Status.
   1-6 All components of this section must be completed to assimilate updated population data.

C. Inventory, Protect and Improve Habitat.
   1. Identify and map critical range.
   4. Develop grazing programs which benefit mule deer.
   5. Identify and seek mitigation/compensation for impacts from ski resorts, logging, mining, road construction, etc.
   8. Acquire management rights (e.g., conservation easements, etc.) on critical range which is privately owned.
   9. Encourage managing agencies to pattern timber sales to protect habitat.

D. Manage Harvest and Use.
   1. Define and implement herd management goals by area or game management unit.
   8. Evaluate population dynamics and harvest; make hunting season recommendations based upon these data.

Mule Deer

E. Obtain Game Law Compliance.
   1. Ensure that 80 percent of the mule deer harvested are lawfully taken.
   4. Increase enforcement activities to reduce harassment to wintering mule deer from dogs and recreational users.

I. Provide Information and Education.
   2. Educate people on various aspects of mule deer management programs.

1. PRIORITY								
A	B	C	D (New / No / Stop)	2. ACTIVITY (WHAT)	3. WHO	4. WHERE	5. WHEN	6. 83-85	7. 85-87
				A. COLLECT BASIC BIOLOGICAL DATA					
H		X		1. Review recent and existing literature concerning mule deer management and ecology. Provide abstracts semi-annually.	B/G Invest. PM	Olympia	Ongoing	Yes	Yes
H		X		2. Assess current research findings and apply to management efforts as required and incorporate appropriate findings into planning process.	B/G Invest. PM Big Game PM	Olympia	Ongoing	Yes	Yes
MD	X			3. Develop research plan to investigate winter ecology of mule deer in north-central Washington. Study will evaluate mule deer habitat requirements during winter, specifically the use and importance of timbered north-facing slopes and how logging of these areas effects mule deer use.	B/G Invest. PM Research PM Reg. W/L Bio	Olympia North-central Washington	Winter 84-85	Yes	
MD	X			4. Implement research plan on winter mule deer ecology.	Big Game PM B/G Invest. PM Reg. W/L Bio	Olympia North-central Washington	Fall 1985		Yes
M		X		5. Develop research plan to document migration routes and seasonal habitat use by mule deer in the southern portion of Region 3.	B/G Invest. PM Research PM Reg. W/L Bio	Olympia Region 3	Sept. 1983	Yes	
H	X			6. Implement research plan in Region 3.	Reg. W/L Bio	Eastern Washington	Fall 1983 (?)	Yes	
M	X			7. Design and implement study plan to determine actual browse utilization of trees in apple orchards; devise system to determine if long-term damage does occur to apple trees and to measure extent of such damage.	Research PM B/G Invest. PM		1985		Yes
H	X			8. Develop study plan to investigate the extent of poaching loss and the impacts on harvest management.	Research PM B/G Invest. PM W/L Enforcement	Regions 1, 2, 3	1985		Yes
				B. MONITOR POPULATION STATUS					
MD	X			1. Implement mule deer marking program on winter range. Mark 10 percent of wintering population on selected areas.	B/G Invest. PM Research PM	Region 3 Region 2	Winter 1983-84 Winter 1984-85	Yes	Yes
MD	X			2. Review current data collection procedures;develop improved and standardized systems for measuring populations using the latest technology.	Big Game PM Big Game Invest.PM	Olympia	1984	Yes	Yes

Program Name MULE DEER

Program Plan

REGION 18

1. Priority A	B	C	D	2. ACTIVITY (WHAT)	3. WHO	4. WHERE	5. WHEN	6. 83-85	7. 85-87
MD	X			3. Conduct aerial census using helicopter or fixed-wing aircraft during midwinter and early spring; composition counts will be conducted at these times. Classify at least 20 percent of wintering population on selected areas.	Reg. W/L Bios Reg. W/L Agent	Region 3 Regions 1,2	Winter 1983-84 Start Winter 1985-86	Yes	Yes Yes
MD	X			4. Conduct late summer/early fall herd composition counts. Quantification to be determined before implementation in Fall 1985.	Reg. W/L Bios Reg. W/L Agent	Regions 1,2,3	Start Fall 1985		Yes

1. PRIORITY				2. ACTIVITY (WHAT)	3. WHO	4. WHERE	5. WHEN	6. 83-85	7. 85-87
A	B	C	D						
				B. MONITOR POPULATION STATUS (Continued)					
MD	X			5. Develop and employ computer simulation models to summarize, collate and identify inadequate data regarding the dynamics of the mule deer herds and estimating population size.	B/G Invest. PM Research PM	Olympia	Start 1984	Yes	Yes
L		X		6. Estimate mule deer populations utilizing the population trend index (PTI).	B/G Invest. PM	Olympia	Ongoing	Yes	Yes
				C. INVENTORY, PROTECT AND IMPROVE HABITAT					
H	X			1. Identify, map and quantify critical mule deer ranges (i.e., winter, spring, fawning, summer, and fall). Provide results in single document.	Research PM, Reg. W/L Bios, B/G Invest. PM, Cartographer	Regions 1, 2, 3 Olympia	Ongoing Complete 1986		Yes
M		X		2. Inventory critical ranges periodically to monitor changes utilizing Landsat or other techniques. (Survey every 5 years.)	Research PM B/G Invest. PM	Olympia	Start 1985		Yes
M	X			3. Develop programs and agreements with landowners and/or managing agencies to preserve, protect and enhance mule deer range.	Landowner Rel. PM Reg. Hab. Bios, Lands PM, Game Lands Agent	Olympia Regions 1, 2, 3, 5	Start 1985		Yes
H		X		4. Develop grazing programs which are beneficial to mule deer on public lands (DOU's or grazing plans).	Lands PM, Landowner Rel. PM, Reg. Hab. Mgrs.	Olympia Regions 1, 2, 3, 5	Ongoing	Yes	Yes
H		X		5. Identify and seek mitigation/compensation for impacts on mule deer range from ski resorts, logging, mining, road construction, etc., through review of environmental documents and resource permits.	Reg. W/L Bios Reg. Hab. Bios Env. Affairs Mitigation Team	Regions 1, 2, 3, 5	Ongoing	Yes	Yes
M		X		6. Maintain or improve deer habitat on HMA's to maximum potential consistent with other species priorities (Chief Joe, Asotin, Wooten, Sherman Cr., Methow, Sinlahekin, Chiliwist, Oak Creek, L.T. Murray, Colockum, Swakane, Entiat, Chelan Butte, Cowiche, Klickitat).	Reg. W/L Bios HMA Mgrs.	Regions 1, 2, 3, 5	Ongoing	Yes	Yes
L	X			7. Promote legislation which encourages retention and enhancement of mule deer habitat by private landowners.	Big Game PM Administration	Olympia	When Required	Yes	Yes
H	X			8. Acquire management rights on critical, non-Department owned mule deer range and enhance range to increase carrying capacity. Measure by amount of acreage maintained.	Big Game PM Administration Lands PM	Olympia	When Required	Yes	Yes
H		X		9. Encourage U.S. Forest Service and DNR to pattern timber sales to protect habitat at the five-year action plan meetings through review of plans.	Reg. Hab. Bios Reg. W/L Bios Landowner Rel. PM	Regions 1, 2, 3, 5 Olympia	Ongoing	Yes	Yes

1. PRIORITY				2. ACTIVITY (WHAT)	3. WHO	4. WHERE	5. WHEN	6. 83-85	7. 85-87
A	B	C	D						
				D. MANAGE HARVEST AND USE					
				GUIDELINE: Continue management efforts which favor mule deer in units where mule deer have been given priority.					
H	X			1. Define and implement herd management goals by area or game management unit. (Complete by 1989).	B/G Invest. PM Reg. W/L Bios	Olympia Regions 1, 2, 3, 5	Start 1985		Yes
H	X			2. Distribute hunters in proportion to deer densities and harvest needs to meet management goals through: a. Road closure programs. b. Special permits. c. Antler restrictions. d. Season structure.	B/G Invest. PM Reg. W/L Bios Landowner Rel. PM Reg. Hab. Bios	Olympia Regions 1, 2, 3, 5	Ongoing	Yes	Yes
M	X			3. Evaluate need for additional field checks of harvested mule deer and determine quota of field checks required of field personnel.	B/G Invest. PM Reg. W/L Bios	Olympia Regions 1, 2, 3, 5	Start 1984		Yes
H		X		4. Conduct field checks and collect the following data: a. Hunter's name, address and identifying number (i.e., hunting license, social security, or driver's license). b. Species, sex and age of deer taken. c. Number of antler points. d. Location of kill by game management unit, local area and county. e. Date of kill. f. Method of take (modern firearm, muzzleloader or archery).	Reg. W/L Bios Reg. W/L Agents	Regions 1, 2, 3, 5	Ongoing	Yes	Yes
H		X		5. Collect incisors from all female and those branched antlered mule deer taken in branched antlered restriction units and analyze to determine age (80 percent compliance objective.	B/G Invest. PM Reg. W/L Bios	Olympia Regions 1, 2, 3, 5	Ongoing	Yes	Yes
MD		X		6. Collect and analyze mandatory harvest report cards.	B/G Invest. PM	Olympia	Ongoing	Yes	Yes
H	X			7. Investigate and improve harvest monitoring systems; differentiate between species and subspecies, method of take and measure recreational time.	B/G Invest. PM	Olympia	1984	Yes	Yes
MD	X			8. Evaluate population dynamics, harvest and other pertinent data and make hunting season recommendations in accordance with management goals.	Big Game PM B/G Invest. PM Reg. W/L Bios	Olympia Regions 1, 2, 3, 5	Annually	Yes	Yes

1. PRIORITY								
A	B New	C Now	D Stop	2. ACTIVITY (WHAT)	3. WHO	4. WHERE	5. WHEN	6. 83-85	7. 85-87
				D. MANAGE HARVEST AND USE (Continued)					
MD	X			9. Incorporate resource allocation guidelines into season recommendations in conjunction with management goals.	Big Game PM B/G Invest. PM Reg. W/L Bios	Olympia Regions 1, 2, 3, 5	1984	Yes	Yes
MD		X		10. Assimilate season recommendations into unified package for presentation to Administration, public and Game Commission.	Big Game PM B/G Invest. PM	Olympia	Annually	Yes	Yes
MD		X		11. Administer controlled hunt permit drawings.	B/G Invest. PM	Olympia	August/September	Yes	Yes
H		X		12. Review and summarize reports and harvest data. Provide this information to regions.	B/G Invest. PM	Olympia	Ongoing	Yes	Yes
L			X	13. Collect locker forms and analyze data.	B/G Invest. PM	Olympia	July 1984	No	No
MD	X			14. Computerize harvest information and analyze.	Research PM Data Processing	Olympia	1984	Yes	Yes
				E. OBTAIN GAME LAW COMPLIANCE					
MD	X			1. Ensure that 80 percent of mule deer harvested are lawfully taken.	Reg. W/L Agents	Regions 1, 2, 3, 5	Start 1984	Yes	Yes
H	X			2. Attain a minimum return rate of 60 percent on mandatory harvest report cards.	Reg. W/L Agents	Regions 1, 2, 3, 5	Start 1984	Yes	Yes
MD	X			3. Ensure a 90 percent compliance rate with rules regulating hunting (i.e., basic license requirement, deer tag, etc.).	Reg. W/L Agents Commissioned Personnel	Regions 1, 2, 3, 5	Ongoing	Yes	Yes
H	X			4. Design and implement enforcement activities to reduce harassment to wintering mule deer from dogs and recreational users.	Reg. W/L Agents	Regions 1, 2, 3, 5	Start Winter 1984-85		Yes
H	X			5. Design and implement a reward system to encourage participation in controlling unlawful harvest.	Enforcement Div.	Olympia	1985		Yes
H	X			6. Design and implement covert operations to control unlawful harvest and commercialization.	Enforcement Div.	Olympia	1985		Yes
H		X		7. Investigate 100 percent of incidents where commercialization of mule deer is suspected.	Reg. W/L Agents	Regions 1, 2, 3, 5	Ongoing	Yes	Yes
H		X		8. Ensure that 50 percent of special permit holders comply with tooth return requirements.	Reg. W/L Agents	Regions 1, 2, 3, 5	Ongoing	Yes	Yes

1. PRIORITY				2. ACTIVITY (WHAT)	3. WHO	4. WHERE	5. WHEN	6. 83-85	7. 85-87
A	B	C	D						
				F. SUPPLEMENT WILD POPULATIONS WITH ARTIFICIAL PRODUCTION					
M		X		1. Provide artificial feed only during periods of stress when there are potential losses of great numbers of mule deer.	Reg. W/L Bios Reg. W/L Agents	Regions 1, 2, 3	Winter/Spring	Yes	Yes
				G. PROVIDE RECREATION ACCESS AND OPPORTUNITY					
L		X		1. Acquire better access when needed to address damage situations.	Reg. W/L Bio, Lands PM, Game Lands Agent	Eastern Washington	As Required	Yes	Yes
MD		X		2. Provide recreation opportunity on HMA's.	Reg. W/L Bio HMA Mgrs.	Regions 1, 2, 3, 5	Ongoing	Yes	Yes
				H. ESTABLISH NEW POPULATIONS					
				1. GUIDELINE: No introductions of mule deer onto new ranges are planned.					
				I. PROVIDE INFORMATION AND EDUCATION					
M	X			1. Provide training to intra-agency personnel (Regional and Area Biologists, Wildlife Agents and Regional Habitat Biologists) on mule deer management program, techniques and data collection procedures. (Incorporate in training programs.)	Big Game PM B/G Invest. PM W/L Mgmt. Admin. Asst. Information Team	Statewide	Scheduled Training Pers. School Reg. Meetings	Yes	Yes
H		X		2. Educate public on various aspects of mule deer management programs including seasons, special hunts and permits, goals and objectives, data collection procedures and population dynamics through news releases, media contacts, publications and public meetings.	Information Team	Statewide	Ongoing	Yes	Yes
M	X			3. Develop public information programs to emphasize the importance of not disturbing deer when climatic conditions produce physical stress.	Information Team	Statewide	1985		Yes
H	X			4. Provide information on mule deer management program to public, land management agencies and planning commissions.	Landowner Rel. PM Reg. Hab. Bios	Statewide	Ongoing	Yes	Yes

1. PRIORITY				2. ACTIVITY (WHAT)	3. WHO	4. WHERE	5. WHEN	6. 83-85	7. 85-87
A	B	C	D						
				J. CONTROL PROBLEM WILDLIFE					
				GUIDELINES: a. The first choice for control of mule deer damage is recreational hunting. b. The Department will not enter into any new damage control fence construction agreements. c. The Department will furnish fence repair materials under existing repair agreements. d. The Department will not extend damage fence repair agreements.					
H		X		1. Pursue with the legislature repeal or modification of existing damage laws to eliminate or reduce damage payments and the need for fencing at Department expense.	Big Game PM Enforcement Div.	Olympia	Ongoing	X	
M		X		2. Use management techniques such as special permits, antlerless harvest, etc., to reduce or prevent damage.	B/G Invest. PM Reg. W/L Bios Reg. W/L Agents	Olympia Regions 1, 2, 3, 5 Regions 1, 2, 3, 5	Ongoing	Yes	Yes
L		X		3. Maintain winter feeding programs to reduce damage by mule deer on private agricultural lands.	Reg. W/L Bios Enforcement Div. Reg. W/L Agents	Olympia Regions 1, 2, 3, 5	1985		X
M	X			4. Develop and implement a self-help approach to mule deer damage control.	Reg. Enforcement	Regions 1, 2, 3, 5	Continuing	X	X
H		X		5. Respond to 100 percent of mule deer damage complaints within 72 hours.	Reg. Enforcement	Regions 1, 2, 3, 5	Continuing	X	X
H		X		6. Resolve 75 percent of mule deer damage complaints to the satisfaction of the complainant.	Constr. & Maint. Staff, Reg. Enforcement	Regions 1, 2, 3, 5	Continuing	X	X
H		X		8. Condition Section 404 permits for new irrigation projects to remove Department liability for mule deer damage.	Env. Affairs Reg. Hab. Bios.	Olympia Regions 1, 2, 3, 5	1984	X	X
M	X			9. Initiate investigation into new repellents, devices and methods to reduce or resolve mule deer damage problems.	W/L Control PM Reg. Enforcement	Olympia Regions 1, 2, 3, 5	1985		X
M	X			10. Initiate research into methods of determining actual crop loss resulting from mule deer damage.	Research PM W/L Control PM	Olympia Regions 1, 2, 3, 5			

1. PRIORITY				2. ACTIVITY (WHAT)	3. WHO	4. WHERE	5. WHEN	6. 83-85	7. 85-87
A	B	New C	Now D	Stop					
				K. CONTROL WILDLIFE DISEASE					
H		X		1. Collect and examine samples from hunter harvested, road killed ad collected mule deer for general health and parasite levels when outbreaks of disease or parasites are suspected. Coordinate with wildlife disease/parasite specialists at Washington State University.	Reg. W/L Bios Area Bios Reg. W/L Agents WSU	Regions 1, 2, 3, 5	Ongoing	Yes	Yes
				L. ADMINISTRATION/OTHER					
				Not applicable.					

April 1984

Statewide Bighorn Sheep Program

Population Objectives

Increase statewide populations from the 1970-79 mean of 450 sheep to 700 sheep by 1989.

Harvest Objectives

Increase the annual harvest from the 1970-79 mean of 8 rams to 10 by 1989 while maintaining the current hunter success rate of 33 percent.

Key Elements of the Bighorn Sheep Plan

All items contained within the bighorn sheep program management plan are designed to assist in meeting the 1989 population and harvest objectives. There are, however, components of this plan which, if not completed within the necessary time frame, would preclude the achievement of the 1989 goals. These key elements are listed below.

B. Maintain Population Status.
   1. Develop improved system for measuring population parameters, trends and/or estimating populations.

C. Inventory, Protect and Improve Habitat.
   4. Encourage controlled burning and other range improvement techniques to enhance bighorn range.
   6. Identify and seek mitigation/compensation for impacts on bighorn range from logging, mining, road construction, etc., through review of environmental documents.
   9. Encourage U.S. Forest Service and DNR to pattern timber sales to protect habitat at the five-year action plan meetings.

D. Manage Harvest and Use.
   3. Evaluate population dynamics, harvest and other pertinent data; make hunting season recommendations in accordance with above-mentioned data.

E. Obtain Game Law Compliance.
   1. Ensure that 90 percent of the bighorn sheep harvested are lawfully taken.

H. Establish New Populations.
   4. Supplement introduced populations of bighorns five years after original release.

K. Control Wildlife Disease.
   1. Prevent contamination of bighorn ranges by restricting use by domestic sheep and cattle.
   3. Treat sheep to be transplanted with antihelmintics.

1. PRIORITY				2. ACTIVITY (WHAT)	3. WHO	4. WHERE	5. WHEN	6. 83-85	7. 85-87
A	B	C	D						
				A. COLLECT BASIC BIOLOGICAL DATA					
H		X		1. Review recent and existing literature concerning bighorn sheep management and ecology.	Big Game PM	Olympia	Ongoing	Yes	Yes
H		X		2. Assess current research findings and apply to management efforts as required.	Big Game PM	Olympia	Ongoing	Yes	Yes
				B. MONITOR POPULATION STATUS					
H		X		1. Develop improved and standard systems for measuring population parameters, trends, and/or estimating populations.	Big Game PM Research PM Data Processing	Olympia	Ongoing	Yes	Yes
H		X		2. Conduct population surveys to provide needed management data.	Reg. W/L Bios Reg. W/L Agents	Regions 1, 2, 3	Ongoing	Yes	Yes
				C. INVENTORY, PROTECT AND IMPROVE HABITAT					
M		X		1. Inventory present and potential bighorn sheep range.	Big Game PM Regional W/L Bios	Olympia Regions 1, 2, 3	Ongoing	Yes	Yes
M		X		2. Inventory critical ranges periodically to monitor changes utilizing Landsat or other techniques.	Research PM B/G Invest. PM	Olympia	Ongoing	Yes	Yes
M		X		3. Evaluate potential competition from cattle and elk on bighorn range.	Big Game PM Reg. Hab. Mgrs.	Olympia Regions 1, 2, 3	Ongoing	Yes	Yes
H		X		4. Encourage controlled burning and other range improvement techniques to enhance bighorn range.	Big Game PM Landowner Rel. PM Reg. Hab. Mgrs.	Olympia Regions 1, 2, 3	Ongoing	Yes	Yes
M		X		5. Develop programs and agreements with landowners and/or managing agencies to preserve, protect and enhance range.	Big Game PM Landowner Rel. PM Reg. Hab. Bios	Olympia Regions 1, 2, 3	Ongoing	Yes	Yes
H		X		6. Identify and seek mitigation/compensation for impacts on bighorn range from logging, mining, road construction, etc., through review of environmental documents and resource permits.	Reg. W/L Bios Reg. Hab. Bios Env. Affairs Mitigation Team	Regions 1, 2, 3	Ongoing	Yes	Yes
M		X		7. Maintain or improve sheep habitat on HMA's to maximum potential consistent with other species priorities. (Wooten, Sinlahekin, Oak Creek, L.T. Murray).	Big Game PM Reg. W/L Bios Habitat PM	Regions 1, 2, 3	Ongoing	Yes	Yes
L	X			8. Promote legislation which encourages retention and enhancement of bighorn habitat by private landowners.	Big Game PM Administration	Olympia	When Required		

1. PRIORITY				2. ACTIVITY (WHAT)	3. WHO	4. WHERE	5. WHEN	6. 83-85	7. 85-87
A	B	C	D						
				C. INVENTORY, PROTECT AND IMPROVE HABITAT (Continued)					
H		X		9. Encourage U.S. Forest Service and DNR to pattern timber sales to protect habitat at the five-year action plan meetings through review of plans.	Reg. Hab. Bios Reg. W/L Bios Env. Affairs	Regions 1, 2, 3 Olympia	Ongoing	Yes	Yes
				D. MANAGE HARVEST AND USE					
				GUIDELINE: Continue management efforts which favor bighorn sheep in units where bighorns have been given priority.					
H		X		1. Continue to limit harvest to rams with 3/4 curl or greater.	Big Game PM	Olympia	Ongoing	Yes	Yes
M		X		2. Continue to limit harvest by controlled permits.	Big Game PM	Olympia			
MD		X		3. Evaluate population dynamics, harvest and other pertinent data; make hunting season permit requirements in accordance with above-mentioned data.	Big Game PM B/G Invest. PM Reg. W/L Bios	Olympia Regions 1, 2, 3	Ongoing	Yes	Yes
H		X		4. Conduct field checks and collect the following data: a. Hunter's name, address and identifying number (i.e., hunting license, social security, or driver's license). b. Subspecies, sex and age of sheep taken. c. Location of kill by game management unit, local area and county. d. Date of kill. e. Method of take (modern firearm, muzzleloader or archery).	Reg. W/L Bios Reg. W/L Agents	Regions 1, 2, 3	Ongoing	Yes	Yes
H		X		5. Collect incisors from all harvested bighorn sheep and analyze to determine age.	Big Game PM Reg. W/L Bios	Olympia Regions 1, 2, 3	Ongoing	Yes	Yes
MD		X		6. Collect and analyze sheep hunter questionnaire.	Big Game PM	Olympia	Ongoing	Yes	Yes
MD		X		7. Assimilate season recommendations into unified package for presentation to Administration, public and Game Commission.	Big Game PM	Olympia	Spring	Yes	Yes
MD		X		8. Administer controlled hunt permit drawings.	Big Game PM	Olympia	Aug./Sept. Each Year	Yes	Yes
MD		X		9. Review and summarize reports and harvest data. Provide this information to regions.	Big Game PM	Olympia	Ongoing	Yes	Yes

1. PRIORITY				2. ACTIVITY (WHAT)	3. WHO	4. WHERE	5. WHEN	6. 83-85	7. 85-87
A	B	C	D						
				E. OBTAIN GAME LAW COMPLIANCE					
MD	X			1. Ensure that 90 percent of bighorn sheep harvested are lawfully taken.	Reg. W/L Agents	Regions 1, 2, 3	Start 1984	Yes	Yes
MD	X			2. Attain a return rate of 100 percent on sheep hunter questionnaire.	Reg. W/L Agents	Regions 1, 2, 3	Start 1985		Yes
MD		X		3. Ensure a 90 percent compliance rate with rules regulating hunting (i.e., basic license requirement, tags, etc.).	Reg. W/L Agents Commissioned Personnel	Regions 1, 2, 3	Ongoing	Yes	Yes
H	X			4. Design and implement a reward system to encourage participation in controlling unlawful harvest.	Enforcement Div.	Olympia	1985		Yes
H	X			5. Design and implement covert operations to control unlawful harvest and commercialization.	Enforcement Div.	Olympia	1985		Yes
H		X		6. Investigate 100 percent of incidents where commercialization of bighorn sheep is suspected.	Reg. W/L Agents	Regions 1, 2, 3	Ongoing	Yes	Yes
H		X		7. Ensure that 50 percent of special permit holders comply with tooth return requirements.	Reg. W/L Agents	Regions 1, 2, 3	Ongoing	Yes	Yes
H	X			8. Design and implement enforcement activities to control harassment of sheep by recreationists.	Reg. W/L Agents	Regions 1, 2, 3	Ongoing	Yes	Yes
				F. SUPPLEMENT WILD POPULATIONS WITH ARTIFICIAL PRODUCTION					
				Not applicable.					
				G. PROVIDE RECREATION ACCESS AND OPPORTUNITY					
L		X		1. Provide improved access as required to meet management goals.	Landowner Rel. PM Reg. Prog. Mgrs. Reg. W/L Agents Lands PM/Lands Agents	Olympia Regions 1, 2, 3	Ongoing	Yes	Yes
L		X		2. Acquire access rights through mitigation/compensation efforts.	Lands Agents	Regions 1, 2, 3	As Required		
				H. ESTABLISH NEW POPULATIONS					
				GUIDELINE: The Game Department will introduce native bighorn sheep only onto historic native ranges. California bighorns will be released on native California bighorn range and Rocky Mountain bighorns will be released on native Rocky Mountain range.					

1. PRIORITY				2. ACTIVITY (WHAT)	3. WHO	4. WHERE	5. WHEN	6. 83-85	7. 85-87
A	B	New C	Not D						
				H. ESTABLISH NEW POPULATIONS (Continued)					
M		X		1. Re-establish or expand populations onto unoccupied range or in areas where populations are depressed.	Big Game PM Reg. W/L Bios	Regions 1, 2, 3			
M		X		2. Identify areas where re-introductions/expansions are desirable.	Big Game PM Reg. W/L Bios	Olympia Regions 1, 2, 3	Summer 1984	Yes	Yes
M		X		3. Release captured wild stock in appropriate areas.	Reg. W/L Bios	Regions 1, 2, 3	When Appropriate	Yes	Yes
H		X		4. Supplement introduced populations of bighorns 5 years after original release.	Big Game PM Reg. W/L Bios	Regions 1, 2, 3	When Appropriate	Yes	Yes
				I. PROVIDE INFORMATION AND EDUCATION					
M	X			1. Provide training to intra-agency personnel (Regional and Area Biologists, Wildlife Agents and Regional Habitat Biologists) on bighorn sheep management program, techniques and data collection procedures.	Big Game PM W/L Mgmt. Admin. Asst. Information Team	Statewide	Pers. School Reg. Meetings	Yes	Yes
H		X		2. Educate public on various aspects of bighorn sheep management programs including seasons, special hunts and permits, goals and objectives, data collection procedures and population dynamics through news releases, media contacts, publications and public meetings. (One article or news release per year.)	Information Team	Statewide Regions 1, 2, 3	Ongoing Winter	Yes Yes	Yes Yes
H		X		3. Provide information on bighorn management program to public land management agencies and planning commissions.	Landowner Rel. PM Reg. Hab. Bios	Statewide	Ongoing	Yes	Yes
				J. CONTROL PROBLEM WILDLIFE					
				Not applicable.					
				K. CONTROL WILDLIFE DISEASE					
H		X		1. Prevent contamination of bighorn ranges by restricting use by domestic sheep and cattle.	Big Game PM Reg. W/L Bios	Olympia Regions 1, 2, 3	Ongoing	Yes	Yes
H		X		2. Monitor herd health by sampling hunter harvested animals and evaluate for parasite infections.	Reg. W/L Bios	Regions 1, 2, 3	As Required	Yes	Yes
H		X		3. Treat sheep to be transplanted with antihelmintics.	Reg. W/L Bios WSU Vet School	Regions 1, 2, 3	As Required	Yes	Yes

1. PRIORITY				2. ACTIVITY (WHAT)	3. WHO	4. WHERE	5. WHEN	6. 83-85	7. 85-87
A	B	New C	Now D	Stop					
				K. CONTROL WILDLIFE DISEASE (Continued)					
H		X		4. Collect and examine samples from hunter harvested, road killed and collected bighorn sheep for disease and parasites when outbreaks are suspected. Coordinate with disease/parasite specialists.	Reg. W/L Bios Reg. W/L Agents	Regions 1, 2, 3	As Required	Yes	Yes
				L. ADMINISTRATION/OTHER					
				Not applicable.					

TECHNICAL APPENDIX F

Washington Natural Heritage Program
Statements on Special Animal and Plant Species

JOHN SPELLMAN
Governor

FRANK LOCKARD
Director

STATE OF WASHINGTON
DEPARTMENT OF GAME
600 North Capitol Way, GJ-11 • Olympia, Washington 98504 • (206) 753-5700

January 5, 1984

RECEIVED
FEB 7 1984
MEL BORGERSEN & ASSOC.

Mr. Ted Beeler
%Mel Borgersen and Associates
626 Skinner Bldg.
Seattle, Washington 98101

Dear Mr. Beeler:

We have completed a review of the Natural Heritage Data Base for information on significant natural features in the study area. At this time we do not have information on special animal species in the immediate area. Since information is being added to the files daily, a search at some later date may be worthwhile. Please keep this in mind when long-term project planning is involved.

This response is not to be construed as a complete inventory of the project area and does not eliminate the need or responsibility to conduct more thorough research. Data in the Natural Heritage Data Base are limited to significant observations of species of concern only. Significant observations are primarily comprised of breeding site data, but depending upon the species, wintering areas and regular concentrations are also entered. For some particularly rare or secretive species, observations of individuals are considered sufficiently significant for data entry.

If your office should publish or distribute any of the information presented here, please cite the Natural Heritage Data System as follows:

Natural Heritage Data System
Department of Natural Resources and
Department of Game - Nongame Program
c/o The Evergreen State College
3109 Seminar Building, TA-00
Olympia, Washington 98505

We hope this information is useful. If you have further questions or concerns, please feel free to contact us at (206) 754-1449.

Very truly yours,

THE DEPARTMENT OF GAME
Kelly R. McAllister

Kelly R. McAllister
Nongame Data Systems

Department of Natural Resources

Washington Natural Heritage Program
3111 Seminar Building (SE 3109)
The Evergreen State College
Olympia, Washington 98505
(206) 753-2449

BRIAN BOYLE
Commissioner of Public Lands

December 16, 1983

Mr. Ted Beeler
c/o Mel Borgersen and Associates
626 Skimer Building
Seattle, Washington 98101

Subject: Expansion of the Mission Ridge Ski area

Dear Mr. Beeler:

We have completed a search of the Natural Heritage Data System for your study area. At this time we do not have data on special plant species or high quality native plant communities near the area you specified. Information on special animal species will be provided, under separate cover, by the Washington Department of Game, Nongame Program.

Please be aware that the Data System is not exhaustive. There may be special plants or native plant communities occurring in your study area that we do not yet know about. Therefore, this information is not to be taken as a complete inventory of the project area and does not eliminate the need or responsibility to conduct more thorough research.

Please cite the Natural Heritage Data System, as follows, if this letter is referenced in publications or correspondence by your office.

> Natural Heritage Data System, 1983.
> Washington Department of Natural Resources, Natural Heritage Program and
> Washington Department of Game, Nongame Program, Mail Stop SE 3109,
> The Evergreen State College, Olympia, WA 98505.

I hope this information will be useful to you. Please feel free to contact me at (206)753-2449 or (SCAN; 8-234-2449), if you have any further questions.

Sincerely,

Elise Augenstein

Elise Augenstein
Data Manager/Botanist

EA/cn

TECHNICAL APPENDIX G

Background Data on Wildlife and Habitats in the Vicinity of the Project Site

WASHINGTON STATE UNIVERSITY
PULLMAN, WASHINGTON 99164-6410

FORESTRY AND RANGE MANAGEMENT

Main Office: (509) 335-5584

March 26, 1984

Mr. Ted Beeler, Associate
Mel Borgersen and Associates, LTD.
Skinner Building, 1326 Fifth Avenue
Seattle, Washington 98101

Dear Ted:

Elk will begin moving into the impacted area in June from the southeast, along the southwestern side of Naneum Ridge and up Swift Creek. A bit later, smaller numbers could be expected to drift onto the area from the east and northeast, via tributaries of Little Stemilt Creek. Little, if any, spring elk migration is expected up Squilchuck Creek, although elk will likely drift in from that direction in late summer. Mule deer can be expected there in spring, however.

I would expect that summer elk use of existing ski slopes is high, provided permanent sources of water are available and the areas are not heavily stocked with cattle. I would expect proposed runs to contribute towards even higher potential for elk summer range. Currently, those areas are under heavy forest cover and understory production is probably minimal. As indicated above, water is a critical component of the elk carrying capacity equation. I notice several undeveloped springs (sect. 35, NE ¼; sect. 25, SE ¼). Developing these springs to ensure late summer water availability for elk (fenced to exclude cattle?) might make a big difference in the final outcome of elk use, and the gesture would not go unnoticed by the Game Department.

From the proposed ski lift placement in section 35, it looks as though you plan to clear a run down or along Swift Creek. This could become a valuable calving area if handled correctly. The area might already be functioning in that capacity. This should be determined. If it turns out that it already is a calving area, no logging activity should be permitted in the area from mid-May through July, later if possible.

The proposed resort site does not appear to be placed in any strategic elk or deer production area. Besides, it's on private property.

You can expect some deer and elk use around Upper Wheeler Reservoir, provided recreation fishing activity is not heavy. I know nothing about the place, but there is abundant accessibility by road, so any footpath traffic from the north shouldn't additionally impact elk or deer use significantly. Elk and/or deer would be expected to use the area early in the season in forage areas with south and southwest exposure. As the season progresses, they probably will move up the creeks to the west and south from the reservoir. I would expect a good sized band of elk to "hole up" in the canyons (sect. 30, SE ¼) and nearby thermally favorable cover areas and use your proposed ski runs (D-1, D-2).

I hope I have been of some help to you and your company. And, if it develops that you need more input from me, let me know. By the way, I do accept consulting assignments; so, if you need my help in a greater capacity on this or future enterprises, you might consider that approach as well.

Sincerely yours,

Jack

Jack R. Nelson, Professor
Wildlife Habitat Management

JRN:sm

FOREST SERVICE REGION SIX FISH HABITAT MANAGEMENT POLICY

Fish Habitat Protection and Restoration

GOAL: Prevent deterioration of in-stream and riparian physical conditions which provide for food production, cover, and reproduction of fish and other aquatic organisms.

GOAL: Meet State and Federal water quality standards.

GOAL: Improve, where practical, in-stream and riparian physical conditions which affect habitat of fish and other aquatic organisms.

Timber Harvest and Road Construction

GOAL: Prevent massive soil failures associated with timber harvest and roads which adversely affect water quality and fish habitat.

GOAL: Eliminate deficiencies in road construction, maintenance, and timber harvest which, in aggregate, constitute unacceptable damage to water quality and the aquatic habitat.

GOAL: Where practical, improve physical conditions which, as a result of timber harvest or road construction, have affected fish and other aquatic organisms adversely.

FISHERIES OF THE PRINCIPAL STREAMS AND LAKES ON KITTITAS PLANNING UNIT

Water	Fisheries Situation	Remarks
Streams: Yakima River (Main Stem)	Put and take rainbow trout, native cutthroat, Dolly Varden, mountain whitefish and rainbow trout, introduced eastern brook and anadromous fish including spring chinook and silver salmon, and steelhead trout.	See also fish sampling sheet and narrative from Bumping Lake EIS. Needs some treatment for control of nongame fish and establishment of a minimum flow.
Taneum Creek	A potential steelhead stream, with existing populations of cutthroat, eastern brook and rainbow trout.	Needs fish passage facility at I-90 irrigation diversion. Rainbow planted annually on L.T. Murray portion.
Manastash Creek	Native cutthroat trout, rainbow and introduced eastern brook.	Road access to main stem.
Big Creek	Native cutthroat, nearly to the headwaters.	Lightly fished.
Cabin Creek	Section below Cole Creek is anadromous and rainbow, otherwise native cutthroat.	Road access to main stem.
Naneum Creek	Native cutthroat trout to Naneum Meadow vicinity.	Road and trail access to main stem.
Little Creek	Native cutthroat.	Small fish.
Lakes: Manastash	Eastern brook.	Spawning area available, so no restocking is needed.
Lost	Cutthroat trout.	Spawning area available, so no restocking required.
Stirrup	Eastern brook and some rainbow.	Spawning area available, so no restocking required.
Taneum	Cutthroat trout.	No spawning area--- must plant 1,000 fry biennially to maintain.

Table 2 - Continued

Water	Fisheries Situation	Remarks
Lakes:		
Shoestring	Cutthroat trout.	Spawning available, but cannot provide many limits.
Quartz Mountain Pond (SE¼ of Sec. 3)	Cutthroat trout.	Cannot provide many limits.

VERTEBRATES OF THE KITTITAS PLANNING UNIT

Some of the listed species only occur incidentally on the Unit, whereas others may be totally dependent on habitat within the Unit.

FISH, CHAR, ETC.

	Life Form		Life Form
Pacific Lamprey	1	Tui Chub	1
Western Brook Lamprey	1	Bridgelip Sucker	1
*Coho Salmon (Food Fish)	1	Largescale Sucker	1
*Chinook Salmon (Food Fish)	1	Mountain Sucker	1
*Kokanee	1	*Blue Gill	1
*Cutthroat Trout	1	*Smallmouth Bass	1
*Rainbow Trout	1	*Largemouth Bass	1
*Steelhead Trout	1	Prickly Sculpin	1
*Brown Trout	1	Mottled Sculpin	1
*Brook Trout	1	Piute Sculpin	1
*Dolly Varden	1	Torrent Sculpin	1
*Mountain Whitefish	1	Redside Shiner	1
*Common Carp (Food Fish)	1	Northern Squawfish	1
Longnose Dace	1	Chiselmouth	1
Speckled Dace	1		
Leopard Dace	1		

AMPHIBIANS

	Life Form		Life Form
*Bullfrog	1	Cascade Frog	2
Rough-Skinned Newt	1	Spotted Frog	2
Northwestern Salamander	2	Western Toad	2
Long-toed Salamander	2	Great Basin Spadefoot Toad	2
Pacific Giant Salamander	2	Pacific Tree Frog	2
Tiger Salamander	2	Painted Turtle	3
Tailed Frog	2		

REPTILES

	Life Form		Life Form
Western Skink	3	Northern Alligator Lizard	5
Common Garter Snake	3	Racer	5
Side-blotched Lizard	4	Desert Striped Whipsnake	5
Western Fence Lizard	5	Western Garter Snake	5
Sagebrush Lizard	5	Western Rattlesnake	5
Short-horned Lizard	5	Rubber Boa	15

*Wildlife species regulated by the Washington Department of Game or food fish regulated by the Washington Department of Fisheries.

BIRDS

	Life Form		Life Form
California Gull	3	Savannah Sparrow	5
Black Tern	3	Grasshopper Sparrow	5
Spotted Sandpiper	3	Vesper Sparrow	5
Dipper	3	Lark Sparrow	5
Killdeer	3	Dark-eyed Junco	5
American Golden Plover	3	Horned Lark	5
Common Loon	3	Hermit Thrush	5
Eared Eastern Grebe	3	Veery	5
Western Grebe	3	Water Pipit	5
Pied-billed Grebe	3	Western Meadowlark	5
*Green-Winged Teal	3	*Blue Grouse	5
*Blue-Winged Teal	3	*Spruce Grouse	5
*American Wigeon	3	*Ruffed Grouse	5
*Northern Shoveler	3	*Sage Grouse	5
*Redhead	3	*California Quail	5
*Ring-necked Duck	3	*Ring-Necked Pheasant	5
*Canvasback	3	*Gray Partridge	5
Horned Grebe	3	*Turkey	5
*Lesser Scaup	3	Common Nighthawk	6
*Harlequin Duck	3	Townsend's Solitaire	6
*Ruddy Duck	3	Nashville Warbler	6
*American Coot	3	Lincoln's Sparrow	6
*Common Snipe	3	Wilson's Warbler	7
Longbilled Curlew	3	Red-Winged Blackbird	7
Common Yellowthroat	3	Brewer's Blackbird	7
*Canada Goose	3	Brown-headed Cowbird	7
*Mallard	3	Lazuli Bunting	7
*Gadwall	3	Northern Shrike	7
*Pintail	3	Loggerhead Shrike	7
Rock Dove	4	MacGillivray's Warbler	7
Barn Swallow	4	Brewer's Sparrow	7
Cliff Swallow	4	White-Crowned Sparrow	7
Common Raven	4	Swainson's Hawk	7
Canyon Wren	4	Fox Sparrow	7
Rock Wren	4	Song Sparrow	7
Gray-Crowned Rosy Finch	4	Common Redpoll	7
*Chukar	4	American Goldfinch	7
Prairie Falcon	4	Rufous-sided Towhee	7
American Peregrine Falcon	4	Sage Sparrow	7
Turkey Vulture	4	Chipping Sparrow	7
Ferruginous Hawk	4	Eastern Kingbird	7
Marsh Hawk	5	Willow Flycatcher	7
Snowy Owl	5	Sage Thrasher	7
Shorteared Owl	5	Calliope Humingbird	7

*Wildlife species regulated by the Washington Department of Game or food fish regulated by the Washington Department of Fisheries.

Birds (Cont.)

	Life Form
Black-billard Magpie	7
Dusky Flycatcher	8
Bohemian Waxwing	8
Yellow Warbler	8
Yellow Breasted Chat	8
House Finch	9
Cedar Waxwing	9
Western Flycatcher	10
Olive-sided Flycatcher	10
Golden-Crowned Kinglet	10
Clark's Nutcracker	10
Ruby-Crowned Kinglet	10
Western Tanager	10
Yellowrumped Warbler	10
Townsend's Warbler	10
Red Crossbill	10
White-winged Crossbill	10
Evening Grosbeak	11
Purple Finch	11
Cassin's Finch	11
Pine Grosbeak	11
Rufous Hummingbird	11
Western Kingbird	11
Hammond's Flycatcher	11
Western Wood Pewee	11
Gray Jay	11
Steller's Jay	11
Common Crow	11
Merlin	11
Goshawk	11
Long-eared Owl	11
Sharp-shinned Hawk	11
Coopers Hawk	11
*Band-Tailed Pigeon	11
*Mourning Dove	11
Solitary Vireo	11
Warbling Vireo	11
Pine Siskin	11
Varied Thrush	11
Black-headed Grosbeak	11
Great Blue Heron	12
Great Horned Owl	12
Great Gray Owl	12
Golden Eagle	12
Bald Eagle	12
Yellow-bellied Sapsucker	13
Pygmy Nuthatch	13
Red-breasted Nuthatch	13
White-breasted Nuthatch	13
Common Flicker	13
Pileated Woodpecker	13
Lewis' Woodpecker	13
Hairy Woodpecker	13
Downy Woodpecker	13
White-headed Woodpecker	13
Black-backed three-toed Woodpecker	13
Northern three-toed Woodpecker	13
Mountain Bluebird	14
Black-capped Chickadee	14
Chestnut-backed Chickadee	14
Brown Creeper	14
House Wren	14
House Sparrow	14
Vaux's Swift	14
Ash Throated Flycatcher	14
Tree Swallow	14
*Wood Duck	14
*Barrow's Goldeneye	14
*Common Merganser	14
Hooded Merganser	14
Starling	14
Violet-green Swallow	14
American Kestrel	14
Bewick's Wren	14
Western Bluebird	14
Barn Owl	14
Screech Owl	14
Flammulated Owl	14
Spotted Owl	14
Pygmy Owl	14
Saw-Whet Owl	14
Burrowing Owl	15
Bank Swallow	16

*Wildlife species regulated by the Washington Department of Game or food fish regulated by the Washington Department of Fisheries.

MAMMALS

	Life Form
*Yellowbelly Marmot	4
Hoary Marmot	4
*Bobcat	4
Bushytail Woodrat	4
*California Bighorn Sheep	4
Townsend's Big-eared Bat	4
Desert Pallid Bat	4
Western Pipistrelle	4
Big Freetail Bat	4
Pika	4
*Mountain Lion	4
Virginia Opossum	5
Whitetail Jackrabbit	5
*Snowshoe Hare	5
*Blacktail Jackrabbit	5
Wolverine	5
*Lynx	5
*Feral Cat	5
*Rocky Mountain Elk	5
*Mule Deer	5
Porcupine	6
Chickaree	10
Little Brown Bat	14
Yuma Myotis	14
Long-eared Myotis	14
Long-legged Myotis	14
Northern Flying Squirrel	14
California Myotis	14
Silver-Haired Bat	14
Big Brown Bat	14
*Racoon	14
*Marten	14
Fisher	14
Masked Shrew	15
Vagrant Shrew	15
Coast Mole	15
Shrew-Mole	15
Longtail Vole	15
Heather Vole	15
Boreal Redback Vole	15
Oregon Vole	15
Mountain Vole	15
Great Basin Pocket Mouse	15
House Mouse	15
Western Harvest Mouse	15
Deer Mouse	15
Grasshopper Mouse	15
Norway Rat	15
*Eastern Cottontail	15
*Nuttall's Cottontail	15
Pygmy Rabbit	15
Aplodontia	15
Townsend's Ground Squirrel	15
Cascade Golden-mantled Ground Squirrel	15
Least Chipmunk	15
Townsend's Chipmunk	15
Yellow Pine Chipmunk	15
*Shorttail Weasel	15
*Longtail Weasel	15
*Badger	15
Striped Skunk	15
Coyote	15
*Cascade Red Fox	15
*Black Bear	15
Richardson's Vole	16
*Muskrat	16
*Mink	16
*River Otter	16
*Beaver	16

*Wildlife species regulated by the Washington Department of Game or food fish regulated by the Washington Department of Fisheries.

DESCRIPTIONS OF VERTEBRATE LIFE FORMS OCCURRING ON THE KITTITAS PLANNING UNIT

Life Form Number	Reproduces	Feeds
1	In water	In water
2	In water	On ground, in bushes and/or trees
3	On ground around water	On ground, in bushes or in water
4	In cliffs, caves, rims, and/or talus	On ground or in air
5	On ground without specific water, cliff, rim or talus association	On ground
6	On ground	In bushes, trees or air
7	Nests in bushes	On ground, in water or air
8	Nests in bushes	In bushes, trees or air
9	Nests primarily in deciduous trees	In bushes and trees
10	Nests primarily in conifers	In bushes, trees or air
11	Nests in trees	On ground, in bushes, trees or air
12	Nests on very thick branches	On ground or in water
13	Excavates own hole in a tree	In trees, brush or air
14	Nests in a hole made by another species or naturally occurring	On ground, in water or air
15	Underground burrow	On or underground
16	Underground burrow in water	In water or air

FOREST SERVICE REGION SIX DEAD TREE (SNAG) MANAGEMENT POLICY

1. Habitat needs for snag and cavity dependent wildlife will be provided on a majority of commercial forest land on each National Forest. Dead trees, both standing and down, will be provided in sufficient numbers to maintain primary cavity excavators in excess of 40% of their potential population capacity on commercial forest lands.

2. It is not intended or possible that snags be uniformly distributed over every acre. Neither is it intended that high concentrations of dead trees be combined with large areas void of dead trees to arrive at a prescribed average number of snags per acre. Actual snag distribution will be determined through coordination with other functional needs for fire management, safety, timber production, and logging operations.

3. Cavity nesters are not evenly distributed over all forest lands. Certain plant communities or habitats within plant communities such as areas adjacent to water or natural openings in the forest canopy are preferred. Emphasis should be given to these key habitats when coordinating development of Forest wildlife snag management programs.

Each Forest Supervisor will develop and implement management direction to meet these requirements. Technical details for developing and implementing the provisions of this policy are found in Dead Tree ("Snag") Requirements for Dependent Wildlife Species in the Blue Mountains of Washington and Oregon which is a chapter in "Wildlife Habitat Relationships for the Blue Mountains of Washington and Oregon."

Wildlife species in Region 6 that are totally or heavily dependent on dead and defective trees:

BIRDS

Red-breasted nuthatch
White-breasted nuthatch
Pygmy nuthatch
Black-backed three-toed woodpecker
Northern three-toed woodpecker
White-headed woodpecker
Hairy woodpecker
Downy woodpecker
Williamson's sapsucker
Yellow-bellied sapsucker
Pileated woodpecker

Lewis' woodpecker
Common flicker
Wood duck
Common goldeneye duck
Barrow's goldeneye duck
Bufflehead duck
Harlequin duck
Hooded merganser
Spotted owl
Saw-whet owl
Screech owl
Pygmy owl
Flammulated owl
Sparrow hawk
Bald eagle
Golden eagle

BIRDS (Con't)

American osprey
Peregrine falcon
Pigeon hawk
Red-tailed hawk
Rough-legged hawk
Swainson's hawk
Ferruginous hawk
Tree swalow
Purple martin
Western bluebird
Mountain bluebird
Ash-throated flycatcher
Black-capped chickadee
Mountain chickadee
Chestnut-backed chickadee

MAMMALS

California bat
Little brown bat
Big brown bat
Marten
Fisher
Bushy-tailed woodrat
Chickaree

Western gray squirrel
Northern flying squirrel
Red tree mouse

NOTE: Most, if not all, of these species occur on the Kittitas Planning Unit.

Table 1 Hard snag requirements for woodpeckers in the ponderosa pine type(s) and mixed conifer type(s)

Species and Groups	Average Snag Height in feet	Minimum Snag Diameter (inches)	Percent of potential maximum population													
			100			80			60			40			20		
			Snags/ sq. mi.	Snags/ 100 acres	Pairs/ sq. mi.	Snags/ sq. mi.	Snags/ 100 acres	Pairs/ sq. mi.	Snags/ sq. mi.	Snags/ 100 acres	Pairs/ sq. mi.	Snags/ sq. mi.	Snags/ 100 acres	Pairs/ sq. mi.	Snags/ sq. mi.	Snags/ 100 acres	Pairs/ sq. mi.
Hairy woodpecker	26±8	≥ 6	3,840	600	80	3,072	480	64	2,304	360	48	1,536	240	32	768	120	16
White-headed woodpecker	9±6	≥ 10	2,064	323	43	1,651	258	34	1,238	194	26	826	129	17	413	65	9
Williamson's sapsucker	36±8		4,368	683	91	3,494	546	73	2,621	410	55	1,747	273	36	874	137	18
Yellow-bellied sapsucker	31±6		4,368	683	91	3,494	546	73	2,621	410	55	1,747	273	36	874	137	18
Common flicker	23±6	≥ 12	768	120	16	614	96	13	461	72	10	307	48	6	154	24	3
Pileated woodpecker	44±12	≥ 20	288	45	6	230	36	5	173	27	4	115	18	2	58	9	1

Table 2 Hard snag requirements for woodpeckers in the lodgepole pine and subalpine fir type(s)

Species and Groups	Average Snag Height in feet	Minimum Snag Diameter (inches)	Percent of potential maximum population														
			100			80			60			40			20		
			Snags/ sq. mi.	Snags/ 100 acres	Pairs/ sq. mi.	Snags/ sq. mi.	Snags/ 100 acres	Pairs/ sq. mi	Snags/ sq. mi.	Snags/ 100 acres	Pairs/ sq. mi.	Snags/ sq. mi	Snags/ 100 acres	Pairs/ sq. mi.	Snags/ sq. mi	Snags/ 100 acres	Pairs/ sq. mi.
Hairy woodpecker	26±8	≥ 10	3,840	600	80	3,072	480	64	2,304	360	48	1,536	240	32	768	120	16
Northern three-toed woodpecker	17±6	≥ 12	288	45	6	230	36	5	173	27	4	115	18	2	58	9	1
Black-backed three-toed woodpecker	9±6		238	45	6	230	36	5	173	27	4	115	18	2	58	9	1

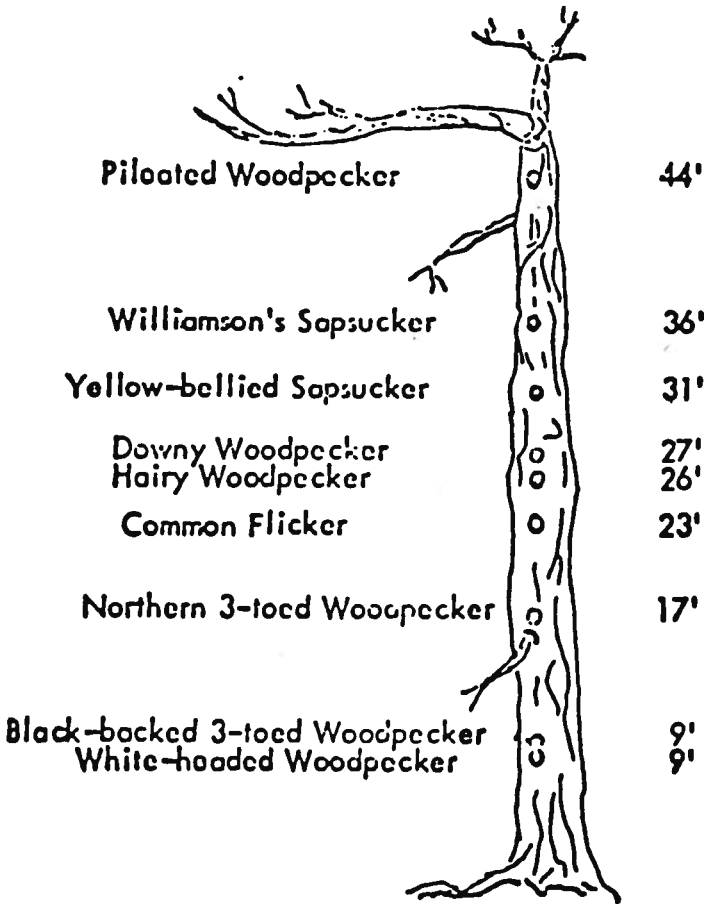


Figure 1. Average height of nest hole. These figures are averages of 217 mentions in the literature of heights of nest holes.

WILDLIFE INDICATOR SPECIES FOR THE WENATCHEE NATIONAL FOREST

Species	Major Habitat	Type of Monitoring
Trout (Cutthroat and other residents)	Aquatic areas.	Creel census.
Elk	Mixed conifer stands with grass-forb openings and available water. Hiding and thermal cover essential.	Number harvested; number/square mile.
Deer	Mixed conifer stands with available browse and water. Escape and thermal cover essential.	Number harvested; number/square mile.
Bobcat 1/	Rocky,brushy areas adjacent to available habitat for prey species. Capable of persisting under a wide spectrum of habitat conditions. Escape cover essential.	Number of pelts taken.
Woodpeckers (Hairy, Downy, Three-toes, Flicker)	Mixed conifer stands with soft snags, well dispersed.	Number of snags per 100 acres.
Pileated Woodpecker	Old growth timber stands with standing dead and down material, well dispersed.	Number of snags per 100 acres.
Songbirds (Townsend's Solitary, Cedar Waxwing, Mountain Bluebird, Hermit Thrush, Evening Grosbeak)	Mixed conifer stands, all elevations, riparian zones. Diversified habitat.	Amount of edge effect including hardwood cover.
Goshawk	Dense old growth, multiple-canopy conifer stands near water.	Known active nests and cyclic chart.
Grouse	Open pine stands with grass-forb undercover, riparian zones, and old growth conifers along ridge tops.	Number harvested and cyclic chart.
Spotted Owl	Old growth stands in mid and upper elevations. Manage for 5% growth.	Owl calling during breeding season in old growth habitats.
Marten	Old growth stands in upper elevations.	Cyclic chart. Acres of mature canopy cover of 30% or more.
Pika (Coney, Rock Rabbit)	Special Habitat. Natural talus slopes.	Acres of undisturbed talus.

In-depth requirements for habitat can be found within "Wildlife Habitat Relationships of Eastern Washington".

1/ Bobcat was chosen because of recent concern for its shrinking habitat and its value as a fur bearer. Habitat maintained for big game could also shelter the predators.

TECHNICAL APPENDIX H

Analysis of Transportation Route Opportunities For Potential Future Mission Ridge Ski Area Development

AN ANALYSIS OF TRANSPORTATION ROUTE OPPORTUNITIES FOR POTENTIAL FUTURE MISSION RIDGE SKI AREA DEVELOPMENT

BY

G. O. KLOCK
G. O. Klock & Associates
Wenatchee, Washington
August 3, 1983

Purpose of Analysis:

To review in terms of construction and environmental concerns the feasibility of several possible transportation routes to service a proposed recreational development providing overnight accommodations in Section 19 near the present Mission Ridge Ski Area.

Problem:

It is anticipated that increased revenues can be expected by greater mid-week visitor use of the Mission Ridge Ski Area. One possible method of increasing mid-week use may be to provide "beds" on the mountain where guests might be expected to stay for extended periods for both alpine and nordic skiing. Rather than meet these needs through "roadside" facilities, a more complete recreational complex appears more compatible with the long range needs of the Mission Ridge Ski Area.

In Section 19, land now under private ownership, a rather unique alpine area exist where space and conditions provide the opportunity to develop a recreation complex with overnight accommodations. Between the present ski area and the area proposed for development, approximately one mile in distance, lies a ridge with very steep slopes. The land in this area is managed by the U.S. Forest Service and has some rather serious environmental hazards to future development, particularly road construction.

This report has been prepared to review five possible alternative

opportunities available to provide access and to move users between the present and proposed facilities. Key construction and environmental concerns will be addressed. A preferred alternative in terms of construction, environmental, and safety concerns is suggested.

Opportunities:

Five alternative transportation routes were considered for access and movement of area users between the present ski area and the proposed recreational development. These alternatives include:

1. A "six-percent" two land road.
2. An "upperslope" two land road.
3. A two lane road from the lower Squilchuck drainage.
4. A two lane road from Wenatchee Heights.
5. A positive rail "people mover" system.

Alternative 1: A "six-percent" two land road.

A two-lane road (30-foot surface width including shoulders) has been proposed leaving the "camper area" of the ski area parking lot and heading east around the ridge to Section 19. The propose route is presently staked at 100-foot intervals through station 27 across U.S. Forest Service land in Section 24. This staked route follows a six percent grade for the first 2,000 feet before crossing more gentle ground. The first 800 feet of the proposed route crosses side slopes ranging from 20 to 60 percent. About one-half of the route in this zone crosses areas with stability problems due to high soil moisture content during the snowmelt runoff season. One perennial stream channel and several ephemeral flow channels cross the proposed route in this area. Special construction practices including adequate drainage and the possible use of "filter cloth" will be required

to protect and stabilize a two-lane road acrossthis zone.

From 800 to about 2,000 feet along the proposed route steep side slopes prevail, often exceeding 100-percent. The "pistol butt" orientation of conifer trees provide evidence ofsurficial soil and snow downslope movement. Slightly below the present staked route several small land slides have occurred in the past on this north facing slope. Near station 14, the vegetation indicates a possible zone of high moisture content in the soil or a possible spring. Engineering design must be prepared to provideadequate drainage on this small cross section to prevent possible surficial mass soil movement.

From near station 20 to station 27 where the proposed route intercepts the property line the route follows a natural land bench and no special construction difficulties or environmental hazards are anticipated.

The special merits of this route are that it is the most direct route between the ski base area and the anticipated recreation complex. It will have the lowest road grade for any direct route between the two facilities. This route appears to provide the most expedient and manageable access to the recreation complex.

Earlier concerns have been expressed about the construction feasibility of this route. The proposed road can be built and maintained without any adnormal construction risk. It will require special construct-tion techniques for crossing the unstable ground from station 0 to 7. Full-bench construction will be required in areas where slopes exceed 40 to 60 percent which will be about 1,000 feet in length. Some engineering improvements can be made by moving the present p-line up slope to reduce the

site impact and construction cost of the road. The present alignment is good, but moving the route about 50 to 70 feet upslope (an additional gain of 30 feet elevation) at station 19 will significantly reduce the site impact. The additional 30 feet elevation can be gained partially by some fill at the creek crossing and present parking area before reaching station 0. This modification will also slightly reduce the impact in the unstable zone early in the route.

Under proper construction techniques the most severe impact of this route will be visual. Itsappearance will be similiar to that of the present Mission Ridge road immediately cross the canyon, but should not have the very raw side slopes created by "side-casting" because of the full-bench recommendation. Cut slopes which will exceed 40 feet in height should be left rough to facilitate revegetation. Construction cost will be high and are estimated at $2,000 per station from 0 to 27 to establish the sub-grade. Excess material from the full-bench construction can be spent on privateland for use in development of the recreation complex.

Alternative 2: An "upper-slope" two-lane road.

As an alternative to crossing the steep side slopes required in alternative one, the U.S. Forest Service road locaters have suggested another route further up the slope. To reach this more favorable ground for road construction across the steep slope area, a series of switchbacks will be necessary to gain elevation from the present parking lot. These suggested road switchbacks would be constructed immediately east of the present Chair 4 and directly across from the Mission Ridge Lodge. An additional 1,500 feet of road would be necessary to reach the more

favorable side slope area. The area in which the additional road construction would be required is on unstable soil conditions which carries substantial surface and subsurface ground water flow during the runoff season. In this unstable area, road bed grades of up to 10-12 percent on a north aspect may be necessary to achieve proper alignment.

From about 2,500 to 3,500 feet along this route the proposed project passes through steep side slopes although not near as steep as those along the proposed alternative one route. In this area "full-bench" construction without side casting would again be required. After 3,500 feet the proposed route follows the same natural land bench as use in the alternative one route. Again, no special construction problems or environmental hazards are anticipated in this area.

The most important advantage of this route is that it passes across the ridge in the area where the side slope is most favorable. To reach this area, however, more than three times as much additional road must be built across very unstable ground with a high spring water content. The avalanche hazard along this route is not assumed to be high.

While the upper-slope route reduces the environmental and construction concerns associated with crossing the much steeper lower slope, the additional road through the unstable area creates a near equal environmental hazard. A road can be built across this unstable ground with special construction considerations. The road bed grade will be steep, will require much cutting and filling to achieve the proper radius of curvature on the switchbacks, and will present special safety hazards during the winter months. The additional road through the unstable ground will create an extremely unfavorable visual impact on the present ski facility base area as well as from much of the ski slope area.

Two possible methods to reduce grades in the switchback area have been suggested. One suggestion is to fill the lower parking lot along a route to the proposed road. The would probably be unacceptable as pointed out by Norm Wallace, Chelan County Road Department. In the early development of the Mission Ridge parking facility the "lower" parking lot was at a higher elevation. Due to the excessive unnatural weight with the additional fill the area showed evidence of serious mass soil movement. Consequently, this section of the parking lot was lowered to reduce the load and stabilize the area. Any additional road fill across this area would be unacceptable because of this stability problem.

The second opportunity to reduce grade would be to extend the first part of the road across the "bunny hill" and through the upper side of the base area facilities. One concern with this suggestion is the loss of valuable beginner ski area. More important, however, is the severe safety hazard created by introducing vehicle travel through a heavy ski traffic area. This suggestion appears unacceptable for this reason.

As in the case of alternative one, this route could cause the loss of perhaps 80 to 100 parking spaces in the present parking lots. Due to the additional length along with the special consideration for construction on the unstable ground, costs are estimated to be similiar if not higher than alternative one. Maintenance cost could be slightly less for this route, but snow removal and sanding would be more difficult, particularly in the area of the switchbacks.

Alternative 3. A two-lane road from the lower Squilchuck drainage.

A transportation route has been suggested from the switchback near Squilchuck Creek, about one mile below the ski area, to the proposed recreation complex. An old logging road now exists part-way along a

possitle route. A brief review of this alternative showed that the road grade necessary without a massive visual impact would be unacceptable for passenger vehicle travel, particularly under snow conditions. This route is not recommended as a feasible alternative.

Alternative 4: A two-lane road from Wenatchee Heights.

An access road to the proposed recreation complex could be constructed from the Wenatchee Heights county road. It would be about 5.5 miles in length. A single lane unsurfaced logging road following the ridge immediately south of the Squilchuck drainage now exists along the proposed route. Much of the necessary gain in elevation required to reach the recreation area is made on the present county road.

The major advantage of this alternative is that road access is already available to the proposed recreation complex. Grades along the present route are generally favorable for passenger vehicle travel and no ground water or unstable soil problems are anticipated. The distance from Wenatchee to the proposed complex is within one mile of the sme distance as from Wenatchee to the present Mission Ridge lodge. No unusual road maintenance requirements are anticipated for this route. There is also considerable opportunity for parking in this area.

The most serious concern with this alternative is that the route does not provide connecting transportation to the ski area other than a 15 mile drive to travel a horizontal distance of less than one mile. The success of this recreation complex, however, will most likely require a direct transportation access to the present ski facility. This alternative would require the construction of near 5.5 miles of road and would need appropriate maintenance and snow removal. Although the grade is more favorable the increased distance will bring construction cost to near that of alternative one and two. One additional concern is that more traffic

through the area will create increased fire hazards to adjacent land owners during the summer months.

Alternative 5: A positive rail "people mover" system.

Rather than construct a high impact road from the ski area to the recreation complex, a 4,500 foot narrow-gage positive rail (cog or otherwise) or similiar "people moving" system is proposed. Often for this purpose aerialtramways are used, but a ground transportation system is more appropriate for this site and provides additional benefits besides transportation.

The proposed rail system would start at the "camper" parking area across Squilchuck Creek from the day lodge and climb rapidly, perhaps at a 15-20 percent grade, until reaching the vicinity of the more favorable side slope crossing area proposed in alternative two. From here it would follow the sameroute to the proposed recreation complex as the suggested roads. The first 500 feet of the rail system would cross the unstable ground. To protect this area and to prevent interferance with water drainage a tressel could be used. A road bed width of no more than ten feet would be required.

The proposed rail system has a number of very favorable advantages over a road system for this area. First, the rail system would provide a controlled access to the recreation complex. In the area of the steep side slopes full-bench construction of the road bed is necessary. The amount of material to move, however, in comparison with a two-lane road is only about ten percent or less. Since the volume of material to move is much smaller side wasting is some areas would be much more acceptable. The cutbank for a rail system would be about 1/3 or less than a road, thereby, increasing the opportunity for using vegetative screening and reducing the visual impact. Elimination of the switchbacks necessary in alternative two

would also reduce the visual impact. The route could serve as the utility corridor for the recreation complex at a minimum additional cost.

A major concern at this point is the possible cost of a rail system. Comparable systems are not found locally, but have been observed in the Rocky Mountain region and Europe. I have requested a rough price estimation for such a facility from both the firms of Von Roll Habegger of America and Montaz-Mautino. Both firms heavily advertize their ability to provide "people-mover" systems for ski resorts,but neither returned a reply to our request for information. A very rough estimate would be that the rail system exclusive of cars would cost 2/3 or less of a two-lane road proposed in alternatives 1,2, and 4. Road bed maintenance cost would be expected to be minimal although operation cost must be considered. Sufficient overnight parking during peak ski use periods is also a conern.

Another limitation to the exclusive use of a rail system to the complex would be the difficulty of transporting construction materials and major supplies. The proposed rail system would not be designed to carry heavy loads of this nature.

Preferred Alternative:

Five alternative transportation routes have been evaluated for access to a proposed recreational complex in terms of construction concerns and potential environmental impacts. The intended complex would be designed to provide overnight accommodations for Mission Ridge Ski Area guest.

In terms of providing minimum environmental impact alternative 5 appears most acceptable. However, the questionable availability of the proper equipment, initial installation cost, service and maintenance requirements, and the relative incompatibility with the long-range development plans of the Mission Ridge Ski Area complex does not appear to provide the possibility that this is an acceptable alternative.

The U. S. Forest Service has suggested the route described in alternative 2. I have inspected this proposed route plus a number of potential modifications on several occasions. Without a major re-location of existing structures in the present base area I can not find any possible modification that would provide a satisfactory transportation route. Due to extremely significant visual impacts, the hazard due to operating passenger vehicles on grades exceeding 8 percent during periods of snow, the severe construction and maintenance requirements necessary, and probably most important,the high risk for skier and visitor safety, I cannot accept alternative 2 as a feasible alternative.

Alternative one, the six-percent grade, will have a significant visual impact, but can be constructed in such a manner as to minimize other possible resource damages. This route is the most expedient and appears to fit the long range needs of the ski area more favorable than any of the other transportation alternatives evaluated. While beset with a number of identifiable concerns the alternative one route appears to be the most acceptable alternative available in terms of contruction

requirements, safety, access, and long-term management needs.

Alternative one must be considered the preferred alternative for providing access to the proposed recreational development through the present Mission Ridge Ski Area facility.

Respectfully submitted,

Glen O. Klock

Glen O. Klock, Ph.D., CPSS
Soil and Water Resource Scientist

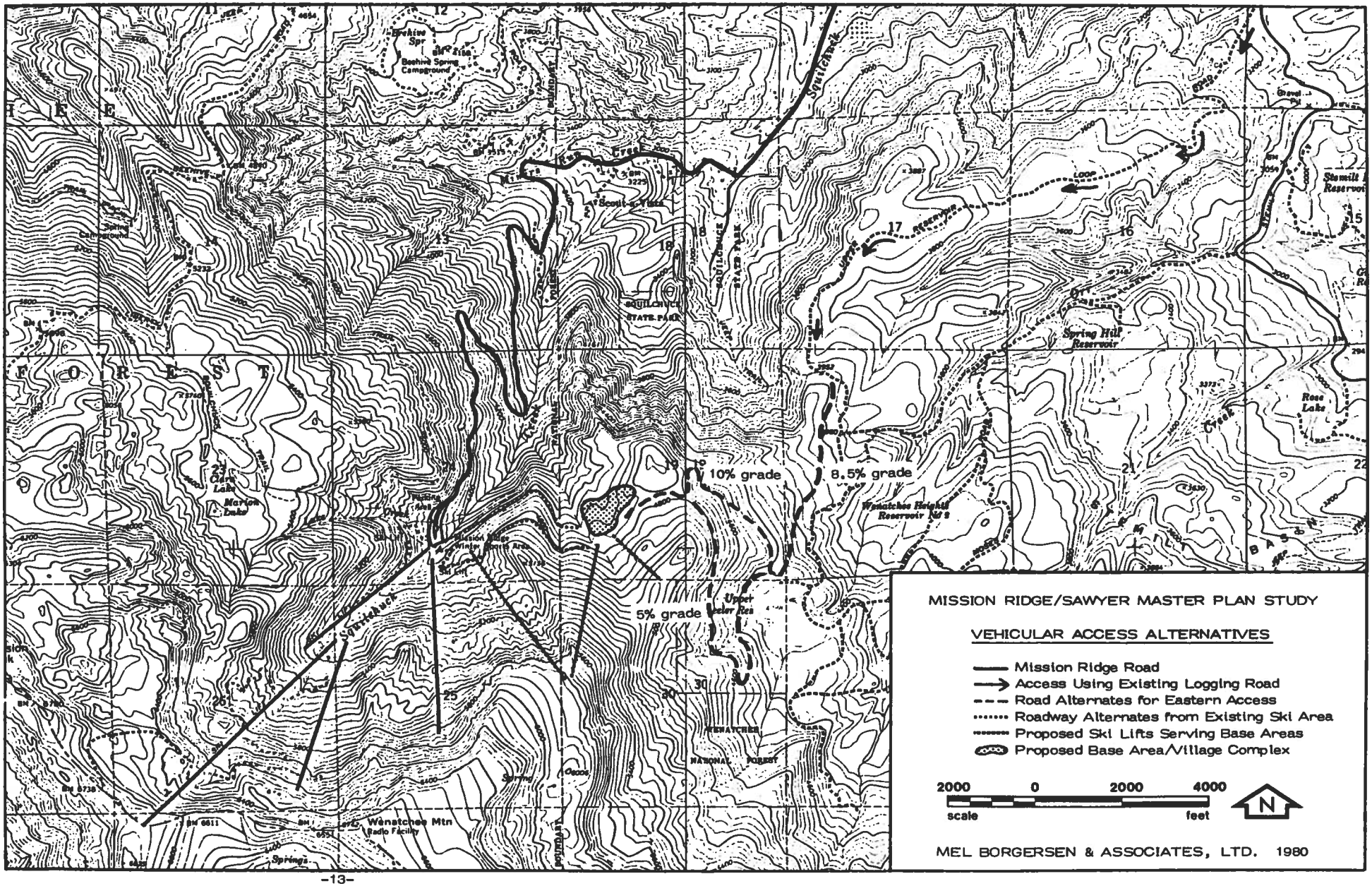
ACCESS ALTERNATIVES TO SECTION 19

Two different modes of access to Section 19 were analyzed. These were various vehicular alternatives and aerial tramways with satellite parking. The aerial tramway was chosen after careful consideration of many other transport systems. (See Appendix)

A. Vehicular Access Alternatives

Vehicular access to the site may be gained by a short roadway segment from the existing Mission Ridge Ski Area or from the Stemilt Loop Road. The relative constraints and opportunities for each alternative are analyzed below. Refer to Exhibit 1.

EXHIBIT 1


10% grade
8.5% grade
5% grade
MISSION RIDGE/SAWYER MASTER PLAN STUDY
VEHICULAR ACCESS ALTERNATIVES
Mission Ridge Road
Access Using Existing Logging Road
Road Alternates for Eastern Access
Roadway Alternates from Existing Ski Area
Proposed Ski Lifts Serving Base Areas
Proposed Base Area/Village Complex
2000 0 2000 4000
scale feet
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1. To connect the existing Mission Ridge base area with the proposed base area/village complex in Section 19, a short segment of roadway could be constructed, measuring approximately 3,500 - 4,500 feet. Two separate alignments were investigated for this route. The first route follows the 4,600 foot contour, exiting from the existing parking lot with a negligible grade and traversing slopes which reach 66 to 70 percent in places. This is similar to the existing Mission Ridge Road which traverses pitched sideslopes of 66 percent in Section 24 prior to entering the parking lot. To lessen the visual impact from a sidecut for a two-lane road, a one-way loop road could be designed and utilized. Length of this roadway would be approximately 3,500 feet.

The other alignment alternate from the existing Mission Ridge parking area would follow the 4,800 foot contour. In order for the road to ascend to the 4,800 foot level from the parking lot (elevation 4,520 feet) it must climb steeply through the area currently used for the lower rope tow. Switchbacks would be required to keep the roadway grade at a minimum, thus precluding the use of this area for skiing. In addition, the rope tow would have to be relocated. Once the 4,800 foot elevation is attained the road would traverse across sideslopes of 28 to 50 percent. However, this route would be at least 1,000 feet longer than the lower elevation alternate and would have steeper road grades due to the initial vertical climb. The roadway would interfere with proposed lift facilities which have base terminals lower than 4,800 feet, and also disrupt present and future skier movement, since the base area is 200 feet lower. Increased snowfall at the higher elevation could create traffic congestion and increased maintenance costs.

2. The only other vehicular access alternate utilizes existing paved and unpaved roadways. Traveling to Section 19 would involve a 12 to 14 mile drive on the Wenatchee Heights Road, Stemilt Loop Road, Wheeler Ridge Road and a new route from Wheeler Reservoir to the proposed village site. The route begins at the Stemilt Road turnoff from the Squilchuck (Mission Ridge) Road. The Stemilt Road (4 miles) is presently a one-lane paved roadway, barely large enough for two vehicles to pass. It is an additional 4.7 miles to Wheeler Reservoir (elevation 4,288 feet) on the Wheeler Ridge Road, for a total vertical gain of 1,188 feet, or an average grade of 5 percent. From Wheeler Reservoir a number of alternatives exist. Logging roads bisect the area and may be utilized where practical but they

are generally too steep for auto use, especially as one gains elevation from Wheeler Reservoir and the snow depth increases. Therefore, a new road 1.5 miles in length would have to be constructed. Numerous choices exist for the location of this route.

This alternate would require considerable capital expense and additional commitment of land resources since it would travel through private, State and USFS properties. Considerable roadway upgrading would have to be implemented to accommodate the increase in traffic. For example, the last 2.5 to 3 miles of the Stemilt Road would require widening and new pavement. The Wheeler Ridge Road would have to be regraded and maintained on a regular basis. Right-of-ways to cross private property would also have to be secured. The final 1.5 miles of roadway from Wheeler Reservoir to Section 19 would be most costly since there is presently no adequate logging road. The terrain in this area is not uncommon with that type encountered for the 3,500 foot alternate in Section 24.

In summary, the most desirable vehicular access route is the short 3,500 foot traverse from the existing Mission Ridge parking lot to Section 19, at the 4,600 foot level. This alignment represents the most functional and least cost of all vehicular alternates analyzed. Salient features are:

- Utilized existing Mission Ridge Road for primary access.
- Shortest route to Section 19 (3,500 feet).
- Requires no major roadway gradient (4% average).
- Minimizes county maintenance requirements.
- Least capital cost of alternates.
- Connects existing and proposed base areas.
- No interference with skier movement.

The final location of the access road from the Mission Ridge parking lot to Section 19 will be dependent upon an exhaustive analysis of engineering details, respective costs and environmental impacts.

B. Tramway Access Alternatives

Public access to Section 19 without the use of the automobile requires a highly technological conveyance system. In the past, ski areas that have had severe parking limitations, access problems or fragile ecosystems have utilized tramways as a means to reach the base area or

village complex. One of the major advantages associated with pedestrian trams is the absence of vehicular traffic in the village area and the freedom of pedestrian movement. Conversely, these systems create logistical problems for the movement of people, goods and supplies to the ski area, are expensive to construct and maintain and require identical amounts of space for parking as would be allocated for a village/ski complex. Three separate alternatives were analyzed to determine the most feasible system for the proposed ski area. Each alternate has 9 to 12 acres for parking or 1,305 to 1,740 cars. Utilizing a multiplier of 3 persons per car, total lot capacity at the tramway terminal for the ski/village complex would be 3,915 to 5,220 people. See Exhibit 2.

1. This alternate would necessitate vehicular access via the Wenatchee Heights Road to the Stemilt Road to the Wheeler Ridge Road, a total distance of approximately 10 miles from the Squilchuck Road. The parking facilities would be located in the western portion of Section 20. The specific lift details are as follows:

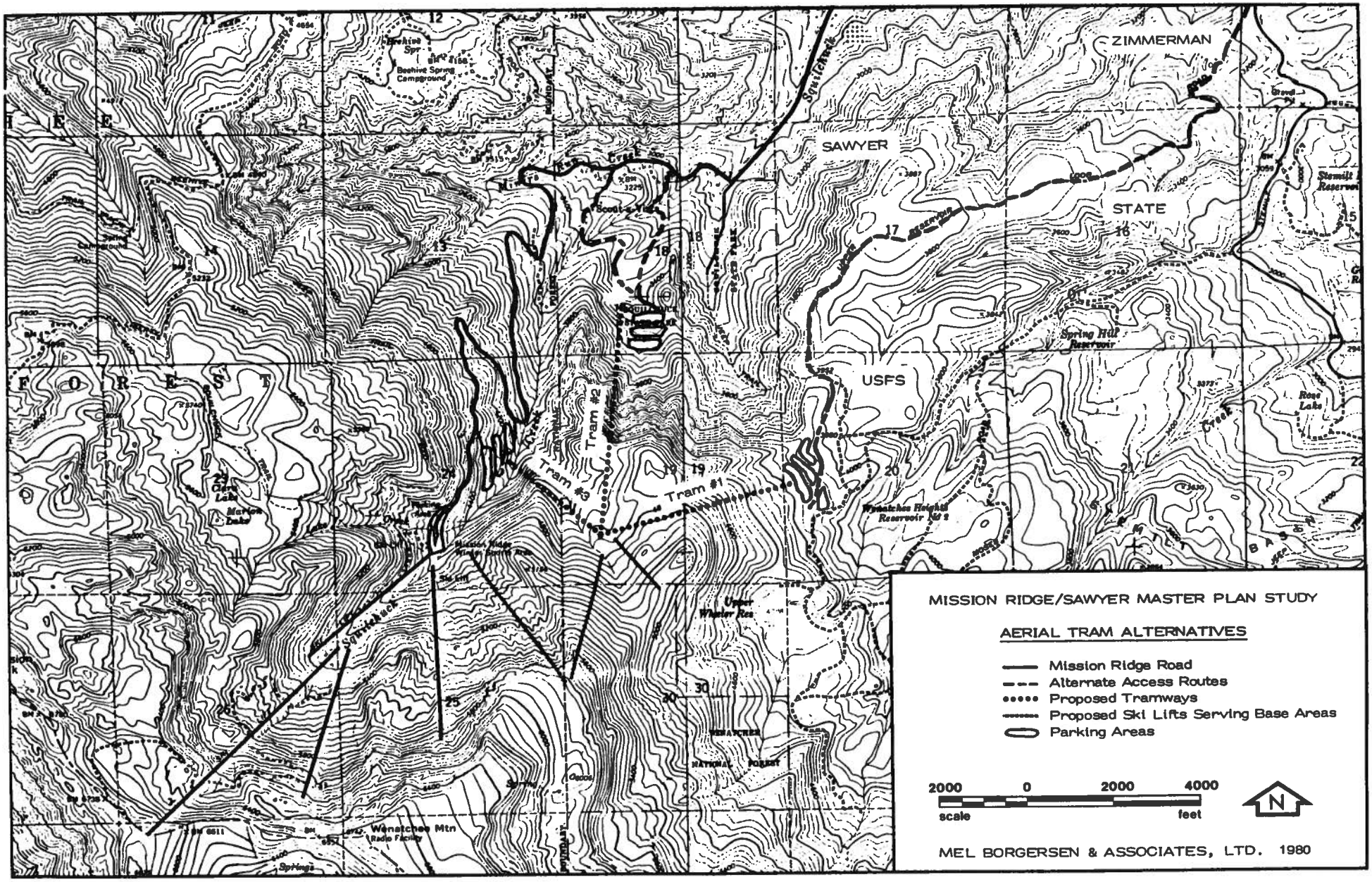
Lower Terminal	4,180 feet
Upper Terminal	4,760 "
Vertical Rise	580 "
Length	4,000 "
Average Rise	18 percent

It was concluded that this alternate would be the least desirable for a tram system due to the need for considerable improvements to the vehicle access route as described in Alternate 2, of the Vehicular Access Alternatives Section.

2. The second tramway system analyzed utilizes the existing Mission Ridge Road for the major access route to the lower terminal area, which is located in the western portion of Squilchuck State Park. Ingress and egress to the State Park for purposes of tramway parking must be through the Scout-A-Vista plat or the Forest Ridge subdivision. Lift specifics are:

Lower Terminal	3,400 feet
Upper Terminal	4,760 "
Vertical Rise	1,360 "
Length	5,200 "
Average Rise	26 percent

EXHIBIT 2


ZIMMERMAN
SAWYER
STATE
USFS
Tram #1
Tram #2
Tram #3
Scott's View
Beehive Spr
Beehive Spring Campground
Spring Campground
Clark Lake
Marion Lake
Spring Hill Reservoir
Rose Lake
Upper Whaler Res
Wenatchee Mtn Radio Facility
Springs
Creek
Ski Run
Ski Lift
Parking
Reservoir
Pipeline
Road
Trail
Fence
Power Line
Boundary
WENATCHEE NATIONAL FOREST
MISSION RIDGE/SAWYER MASTER PLAN STUDY
AERIAL TRAM ALTERNATIVES
Mission Ridge Road
Alternate Access Routes
Proposed Tramways
Proposed Ski Lifts Serving Base Areas
Parking Areas
2000 0 2000 4000
scale
feet
N
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There are many questionable aspects related to this facility. Access through the subdivisions and use of State Park lands may not be deemed appropriate. In addition, future expansion for parking facilities may be limited due to the nature of the terrain in the area. The length of the facility must also be scrutinized due to the high cost of construction.

3. Of the three tram alternatives reviewed, it is our opinion that this facility is the most desirable. The area of the lower tram terminal, located at approximately 4,160 feet on Squilchuck Creek is suited for the expansive parking needs of the ski area. The tiered lots could be located on the east-facing sideslope beneath the Mission Ridge Road and above Squilchuck Creek. Ingress to the three or four lots could be gained from the 4,440 foot level on the Mission Ridge Road with all autos and buses exiting from the lower lot onto the hairpin curve at the 4,000 foot level. The short length of the tramway also contributes to its ranking above the other tram alternates. The figures below demonstrate this fact.

Lower Terminal	4,160 feet
Upper Terminal	4,760 "
Vertical Rise	600 "
Length	2,700 "
Average Rise	11 percent

The estimated cost for the parking facilities and tramway design and construction would be prohibitive.

C. Access Conclusions

The extreme high cost of a tramway system makes it prudent to conduct a thorough comparison of all access alternatives in order to weigh the costs and benefits derived from each. Application of a tram system to one ski area does not necessarily mean that it can be adapted elsewhere. As stated previously, tramways are generally utilized when a site has parking limitations or a major access constraint. In these few instances tramways have been constructed, although at a very high cost. Even in these circumstances the capital outlay often far exceeds the benefit. However, their use does contribute to a better skiing experience, especially when they can also serve as a lift for skiable terrain.

Section 19 does not have any significant constraints which demand the need for an aerial tramway or any other non-traditional conveyance system, nor does the property or terrain possess any natural opportunities that would justify the use of a tram system.

There are no apparent parking limitations in Section 19 and access can be obtained by constructing a 3,500 foot roadway from the existing Mission Ridge parking lot. Paramount to the success of the expansion of the Mission Ridge area and the development of new lifts and base area village for Section 19 is a physical attachment of the two areas. While the roadway between the two areas will create that necessary link, the tramway alternate will not be capable of providing immediate connection. Instead, non-ski trips would require the use of a bus or other transport vehicle to shuttle passengers from the tram terminal parking to the Mission Ridge base area and vice-versa. The tramway alternate also lacks any opportunities pertaining to the skiing experience as the terrain below 4,600 feet is not suitable for skiing. In summary, there are no apparent physical constraints or natural opportunities to warrant the excessive cost of an aerial tramway system.