

SKI YELLOWSTONE SNOW LODGE

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SKI YELLOWSTONE

Snow Lodge

by

Stewart S. Cardon

A thesis document submitted in partial fulfillment
of the requirements for the degree

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Signature Date

To my mother, Jean P. Cardon

ACKNOWLEDGEMENTS

A heartfelt appreciation to the faculty and staff of Montana State University, School of Architecture, for their support and guidance which was always offered in the spirit of friendship.

A special thanks to my thesis advisor, Dr. Harold Nelson, for his highly valued influence.

THESIS DIRECTIVES

FOCUS

To develop an appropriate language of architectural form for the Yellowstone Region.

APPROACH

To analyze the formal implications inspired by the ecological environment of the site, such as, climate, location, geology, topography, vegetation and indigenous materials; and those inspired by the cultural environment, such as, the function of the facility and its role in society. Then, to synthesize these implications, by integrating form, space, order and function, into a cohesive whole that creates a meaningful statement about the Yellowstone Region.

VEHICLE

To draft out a general planning proposal for the development of Ski Yellowstone and to design with "an appropriate language of architectural form of the Yellowstone Region" the base facilities for the ski area of that development.

PURPOSE

To exercise the knowledge and skills I have learned through my curricular experience in setting forth the beginning of my personal search in the meaning of architecture and growth in the profession.

THESIS GOALS

To create a "place" for recreation that respects the ecology of the site and the spirit of youth. This "sense of place" is a phenomenon referred to by Christian Norburg-Schulz as "genius loci."

To create a symbol of recreation that instills an identity with the user.

To gain a cognitive perception of form, space, and order during the process.

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THE PROJECT

Ski Yellowstone is a proposal to place a year-round recreational facility on the Red Canyon alluvial fan, on the north shore of Hebgen Lake, twelve miles north and west of West Yellowstone in Gallatin County, Montana.

The proposal is to develop Hebgen Mountain to the west of Red Canyon as a downhill and cross-country ski area and to provide a marina on Hebgen Lake to the south of Red Canyon. The development is to include year-round lodging facilities, condominiums, private lots and commercial areas. In addition an environmental education center and a backpacking/mountain climbing school are planned. Recreational facilities are to include a base lodge for the ski area, equestrian center, full service marina and tennis courts.

My interest in the project lies in using the information available about the general proposal as guidelines for drafting a master plan for the development of the site. This master plan in turn will provide the framework within which the program for the

base lodge of the ski area will respond. Finally, a design for the base lodge will be proposed as a precurser of form for the rest of the development. As one of the influential structures with regard to image, quality of environment and the success of the development, I see the base lodge as a good vehicle for developing a formal language appropriate for the area. The belief then, is the standard set by the lodge would influence the rest of the development. Thus, my interest in this thesis lies in the image of recreational facilities and in particular those meaning to be associated with the Yellowstone Region.

The development of Ski Yellowstone has been an on-going process for the past ten years. Permission was granted in 1982 for the development by the U.S. Forest Service. A permit for construction will be issued pending financial proof that the developer has the ability to complete the project according to the approved final design submittal.

Recently, the developer, John Hall of Mechanicsburg, Pennsylvania, pleaded guilty to the

theft of two million dollars in securities from his father. Subsequently two liens have been placed on the property by two Bozeman firms; one did the surveying of the property, the other had begun construction of the roads on the site.

The legal hassles of the project do not concern me because I view my thesis purely as an academic exercise. Furthermore, I have received no cooperation from Ski Yellowstone in this endeavor and as such, their problems do not effect this thesis.

In today's high-tech society there is a growing need for outdoor recreation where the urban dweller escapes the hard edged world of commerce to experience the out of doors by swimming, hiking, skiing, etc. In Megatrends, John Nesbitt refers to this environmental relief as "high touch," the balancing antithesis to "high tech" that is a natural response by humans to satisfy their spiritual needs.

The growing impact on Yellowstone National Park, as a result of this high touch trend, has prompted the

park service to encourage private development within 1½ hours drive of the park. By their proximity these developments are to lower the environmental impact of the region by spreading the effects over a larger area.

Ski Yellowstone is intended to be such a development. Located ½ hour's drive from the West entrance to Yellowstone National Park, Ski Yellowstone will provide year-round recreation for thousands of visitors to the region.

As a winter resort the downhill and cross-country skiing on Mount Hebgen will provide a complimentary out door activity to the snowmobiling in Yellowstone Park. As a summer resort Hebgen Lake will provide activities such as water skiing that are unavailable in the park. Also, the accommodations of Ski Yellowstone will provide additional lodging in the area which will reduce the strain on the park facilities.

The scale of Ski Yellowstone has prompted intense opposition from environmental groups who see the development as further deterioration of our natural scenic beauty. However, this is not the intention of

the project and as such, extreme care in planning must be taken in the design of the project to ensure that the air and water qualities remain at a high level and that the visual impact of the structures be contextural with their environment.

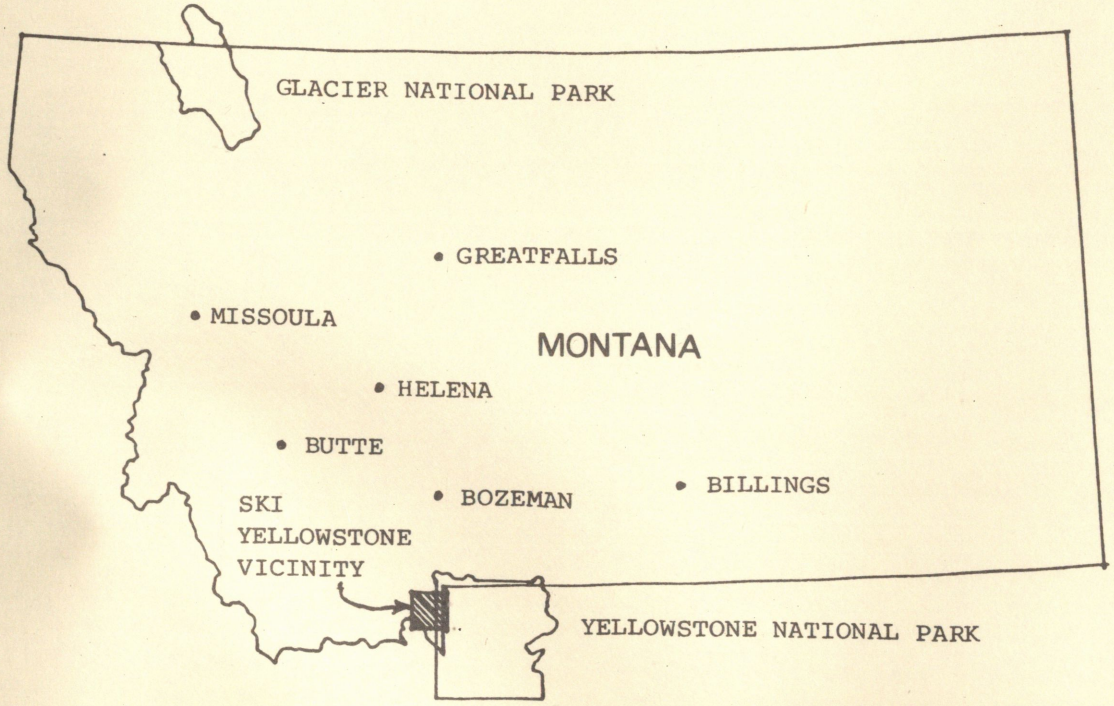
The integrity then, of recreational development lies in the designer's ability to scale the project to its ecosystem, to site the structures to mitigate erosion and build quality designs that accent the environment and endure the test of time. An attitude of coexistance with nature instead of the dominance of nature must be adopted.

Fundamentally, Ski Yellowstone is an economic development. It is considered that it will strengthen the economies of West Yellowstone and Gallatin County. Of course the project is expected to generate a profit for the developers. The success of the project depends on its ability to generate income. Therefore, it is important to understand the nature of the user who is expected to spend money there and the type of environment that allows them to do so, then return.

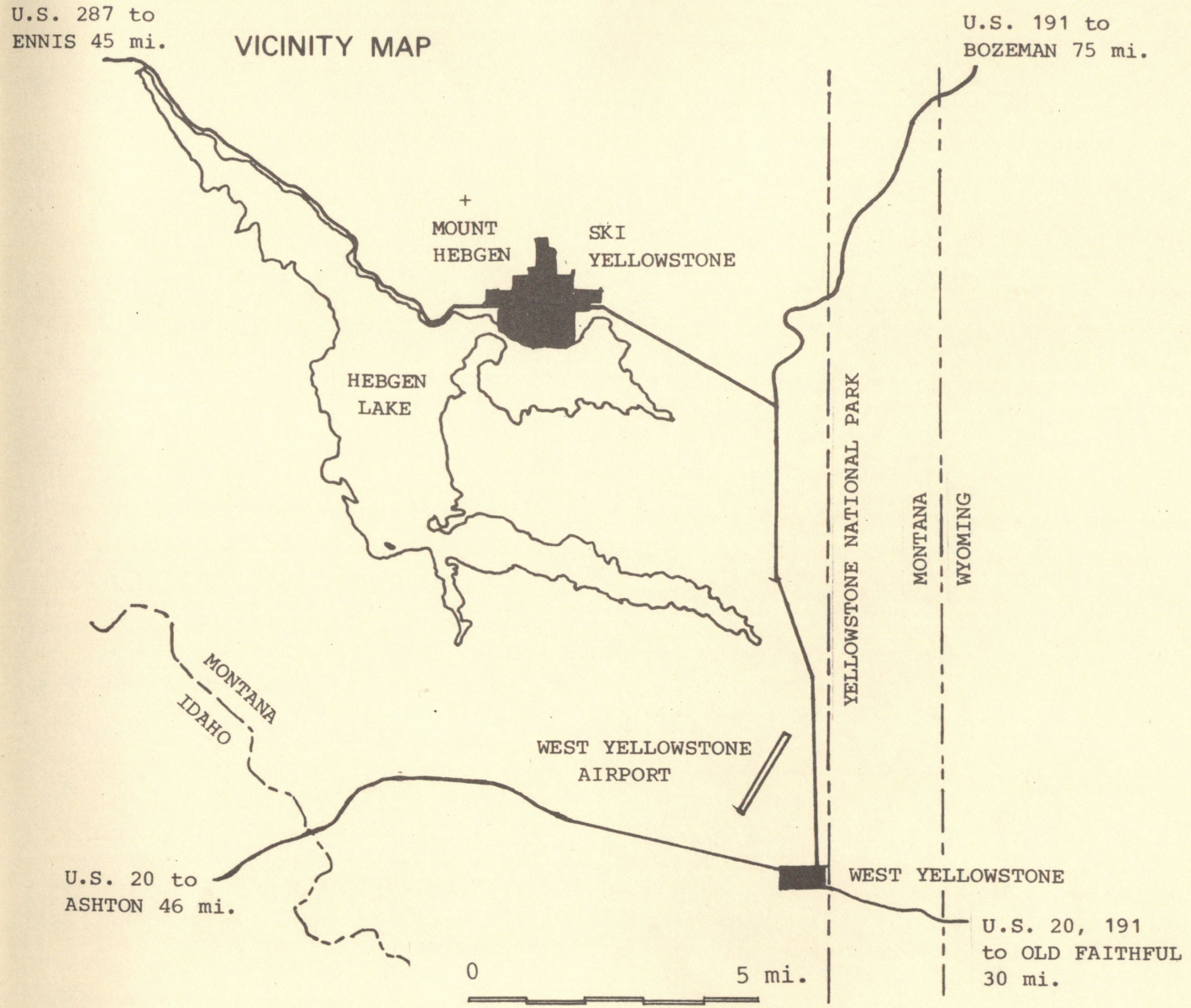
An analysis of the social, cultural and environmental aspects of the project will provide the base from which the project will develop. Successful integration and implementation of this analysis will provide the support from which the project will stand. However, only an identity established in the user with the project will provide the meaning from which the project will work. This identity with the essence of place referred to as "genius loci" by Norburg-Schulz will be the guiding theme towards the development of the project.

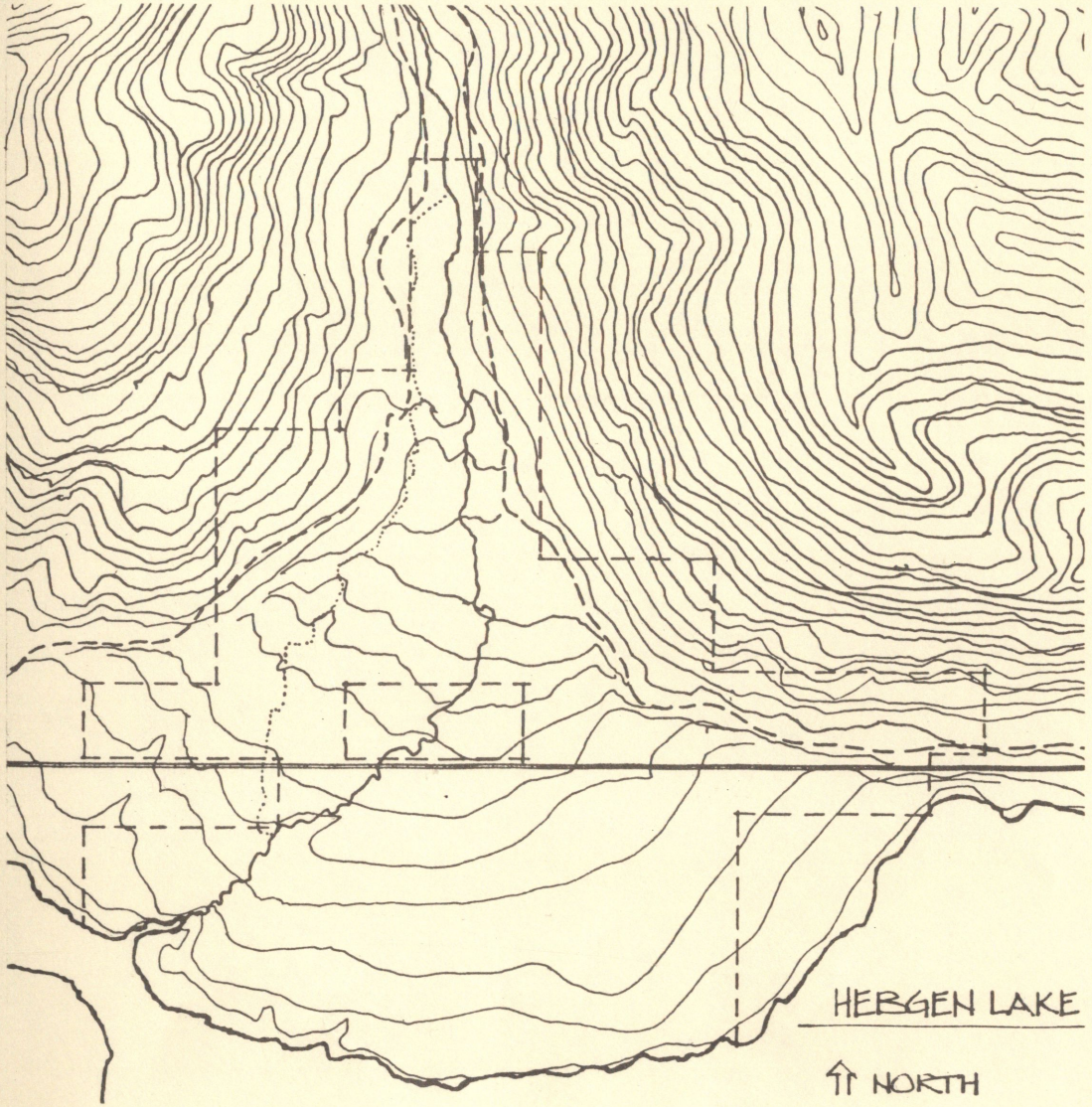
THE SITE

LOCATION MAP



VICINITY MAP





PROPERTY MAP

SKI YELLOWSTONE PROPERTY LINE

EDGE OF SLOPE

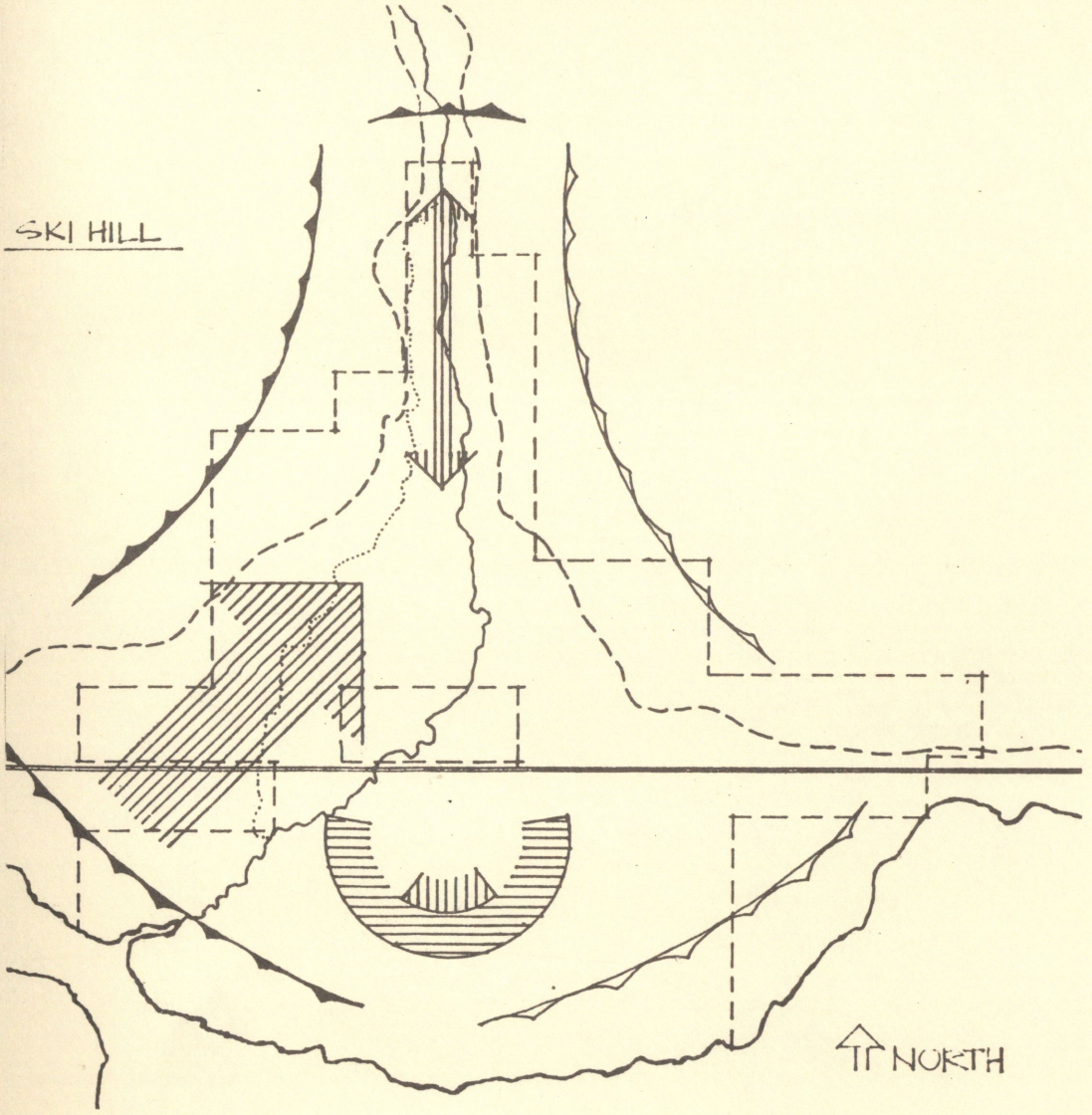
RED CANYON CREEK

RUNOFF OVERFLOW

HIGHWAY 287

SCALE 1" = 2000'

ENVIRONMENTAL CHARACTERISTICS



DISTANT VIEWS
PRIMARY
SECONDARY

CLOSE VIEWS
PRIMARY
SECONDARY

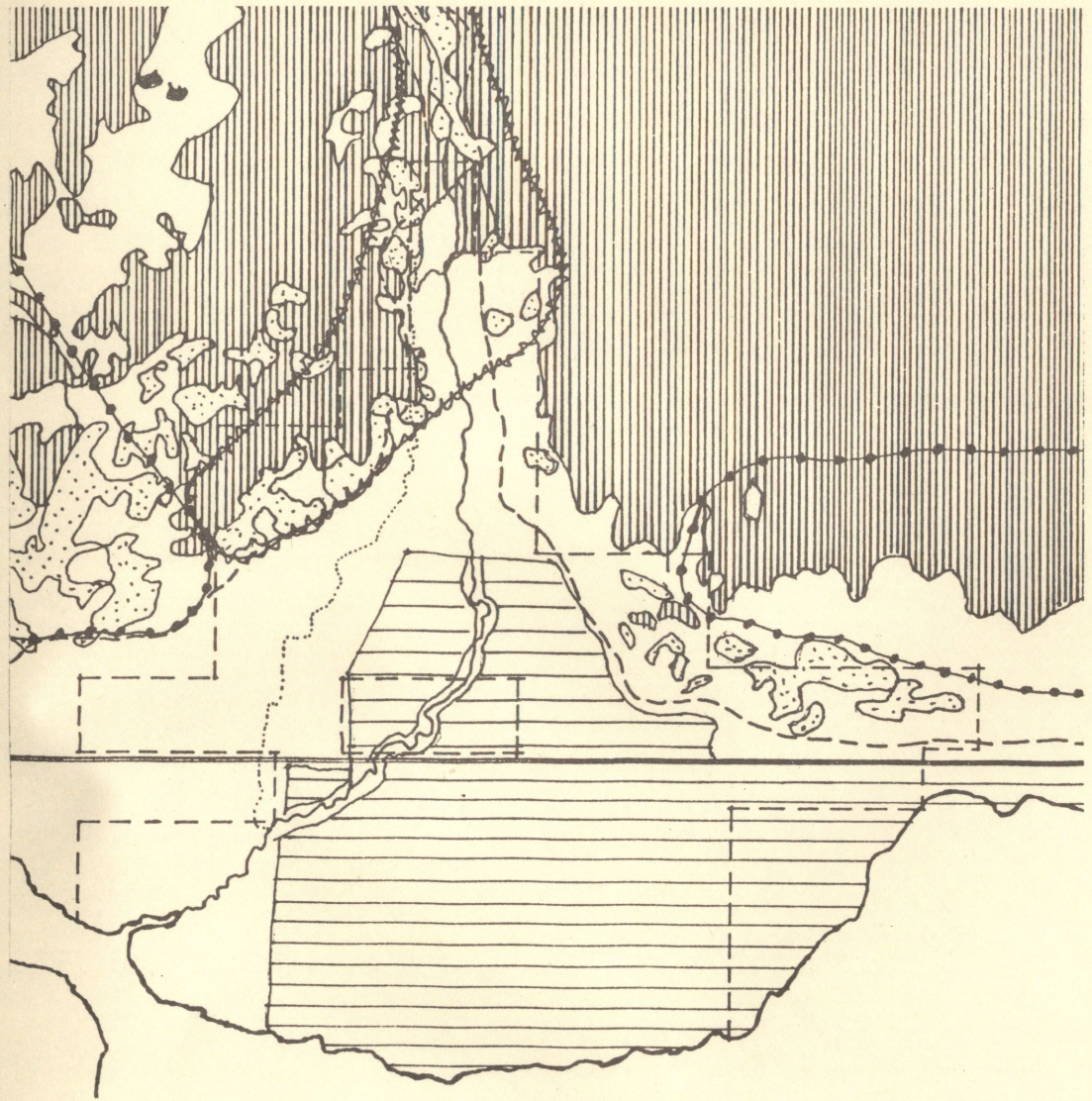
SUMMER SUN JUN 21

WINTER SUN DEC 21

PREVAILING
SOUTHWESTERLY WIND
25 mph MAX SUSTAINED

DIURNAL AIRFLOW
DAYTIME

NIGHTTIME



VEGETATION AND WILDLIFE

CONIFEROUS FOREST
FIR, PINE, SPRUCE

DECIDUOUS FOREST
ASPEN

SHRUB GRASSLAND
BIG SAGEBRUSH, HOARY SAGEBRUSH

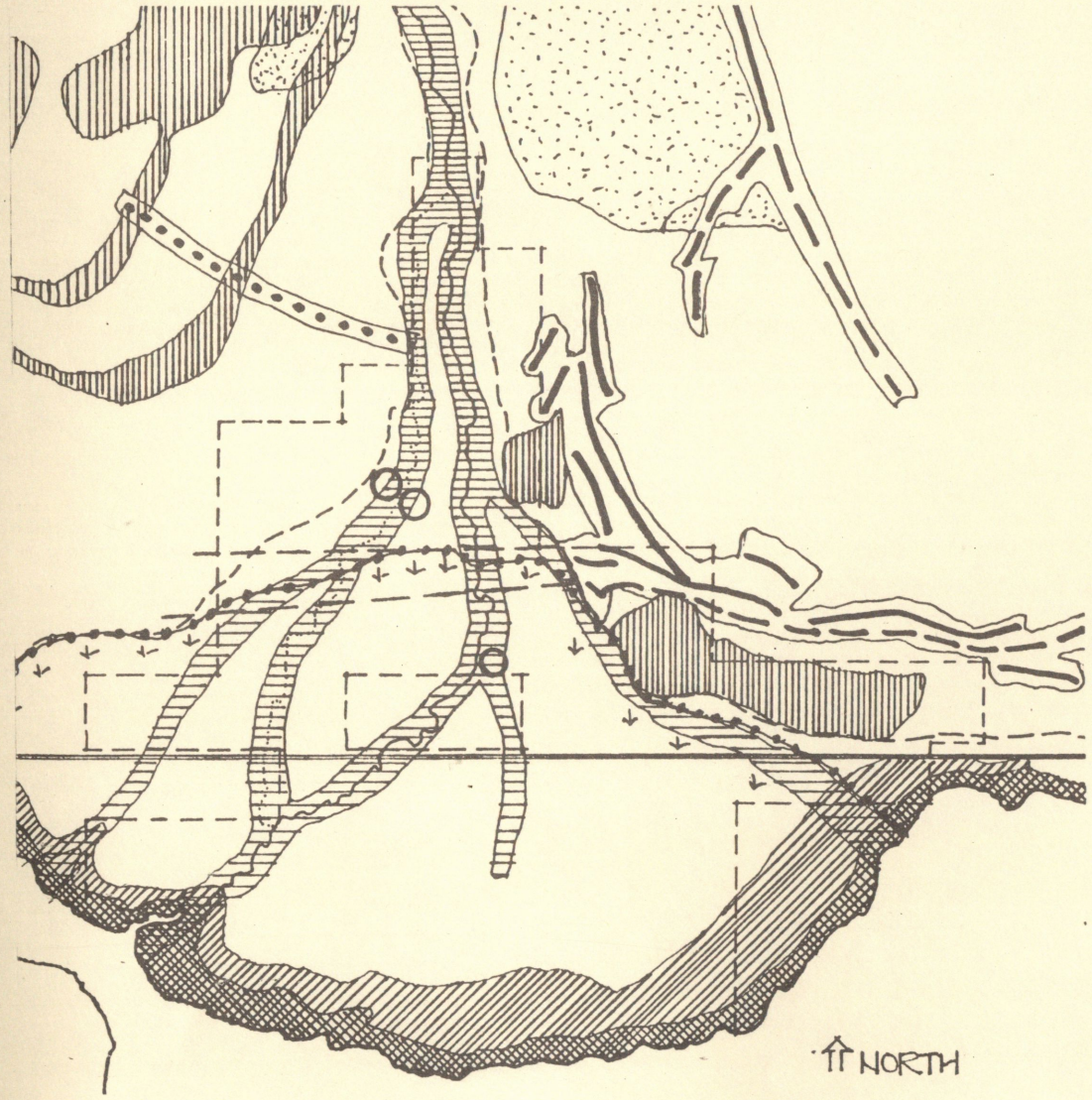
GRASSLAND
BLUEBELL, TIMOTHY

MOOSE WINTER RANGE

ELK WINTER RANGE

EDGE OF SLOPE

DEVELOPMENTAL LIMITATIONS



SEICHE FLOOD ZONE OF POSSIBLE PERMINENT SUBMERSION

SEICHE FLOOD ZONE OF GREATEST FLOODING HAZARD

CHANNELIZED RUNOFF

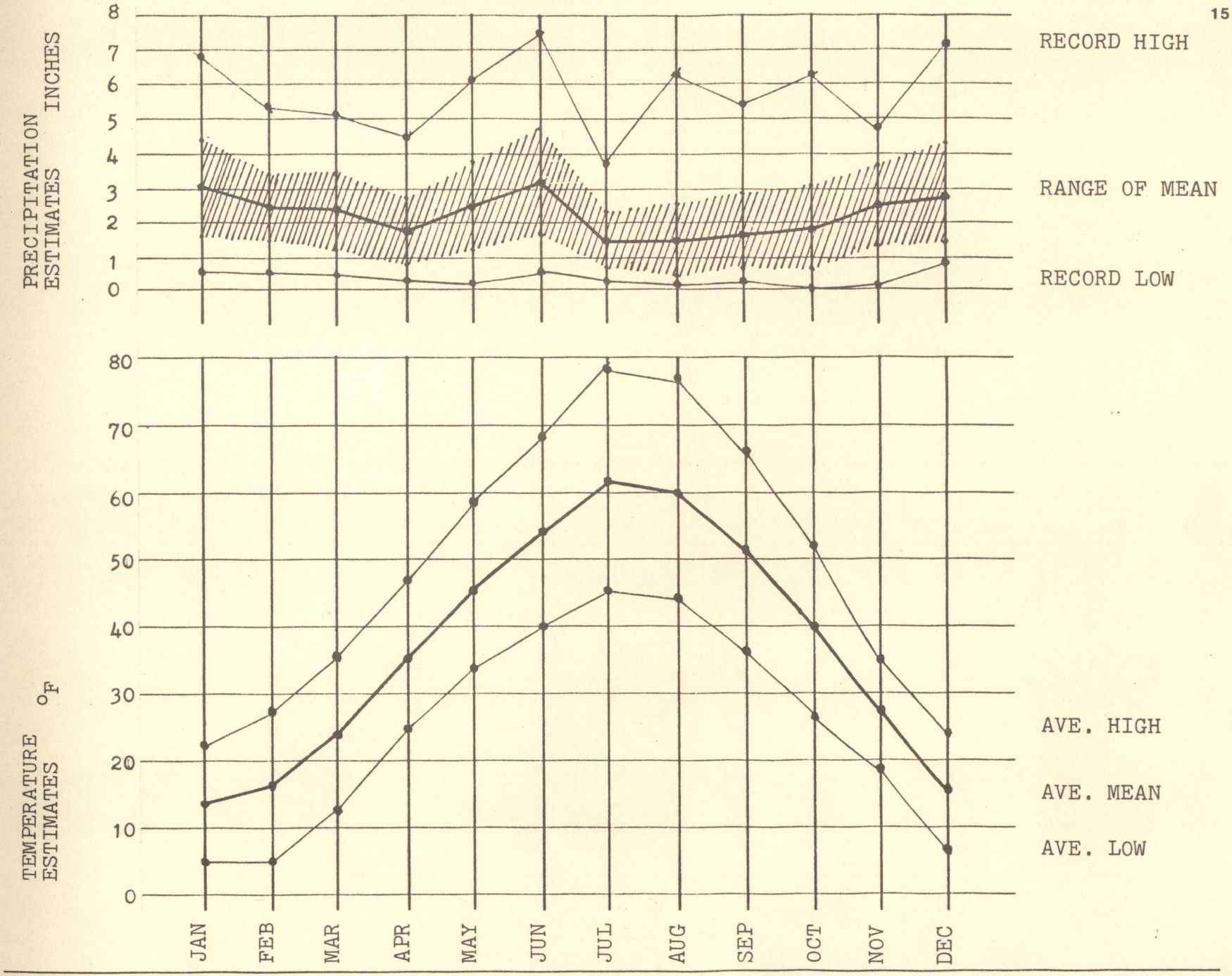
SOIL OF LOW PERMEABILITY SHEET FLOODING

LANDSLIDE AREAS

EXTREME FAULTING OFFSET POS.
MODERATE FAULTING OFFSET POS.

LOW FAULTING OFFSET POS.
LOW RISK FAULT PROJECTION

ROCK FALL AREAS


PRECIPITATION ESTIMATES INCHES
8
7
6
5
4
3
2
1
0
RECORD HIGH
RANGE OF MEAN
RECORD LOW
TEMPERATURE ESTIMATES °F
80
70
60
50
40
30
20
10
0
AVE. HIGH
AVE. MEAN
AVE. LOW
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC

The following plan materials have been identified as being most suitable to Ski Yellowstone terrain and climate.

EVERGREEN TREES
- Douglas Fir
- Engelmann Spruce
- Limber Pine
- Colorado Spruce
- Subalpine Fir
- Western Red Cedar
- Rocky Mountain Juniper
- Scotch Pine

EVERGREEN SCHRUBS & GROUNDCOVER
- Pacific Yew
- Creeping Juniper
- Common Juniper
- Utah Juniper

SHRUBS
- Buffaloberry
- Antelope Bitterbrush
- Caragana
- Common Chokecherry
- Shrubby Unquietoil
- Sticky Currant
- Red Dogwood
- Big Sagebrush
- Silver Sagebrush
- Black Elderberry
- Black Greasewood
- Honeysuckle
- Horsebrush
- Mountain Mahogany
- Russian Olive
- Rabbitbrush
- Yucca

GRASSES
- Kentucky Blue Grass
- Idaho Fescu
- Timothy
- Smooth Brome
- Orchard Grass

DECIDUOUS TREES
- Peachleaf Willow
- Black Cottonwood
- Narrowleaf Cottonwood
- Quaking Aspen
- Green's Mountain Ash
- Thinleaf Alder
- Common Chokecherry
- Curlleaf Mountain Mahogany
- Rocky Mountain Maple
- Mountain Alder
- Lanceleaf Cottonwood

Ecology

- The aspen groves bordering the alluvial fan provide valuable scenic foreground for the development.
- The lake shore is of a delicate nature with grasses growing right to the edge in fine clayey alluvium.
- The dense vegetation at the northern end of the site provides winter range for moose.
- The creek beds of the alluvial fan are rich with archaeological artifacts.

Therefore,

- Village development should leave aspen groves intact, exploiting their beauty as views and edge.
- Development near the lake should be held back from the edge with access to the lake limited to key points.
- Development should not breach the dense vegetation edge with high density functions.
- The creek beds on the alluvial fan should be left in their natural state.
- Overall scale and density of the development should reflect the ecology of the site.

Soils

- increase foundation engineering cost as shrink-swell and frost heave potential increases.
- increase sheet flooding problems and drainage engineering cost as permeability decreases.
- limit the amount of sewage that can be treated by septic tanks and drain fields as permeability decreases.

Therefore,

- A larger percentage of the budget must be allotted to site engineering cost as the amount of development increases in areas with low permeability and severe shrink-swell and frost heave potential.
- The scale of this development requires the use of a sewage disposal system utilizing an aerated pond, completely sealed to prevent leakage into the ground; and sprinkler irrigation for evapotranspiration and utilization of the nitrogen and phosphate from the effluent by crops.

Slope

- increases foundation engineering cost as slope increases.
- increases difficulty of road construction and site circulation.
- aids in sewage disposal system through the use of gravity, provided the system is at a lower elevation than the village.
- requires the use of a pumping station for sewage disposal if village is lower than the system.
- can provide good views through the elevation of the user.
- provides good solar exposure.
- requires drainage engineering for water concentrated by roofs and roads.

Therefore,

- Sloped areas of the site are suitable for development of lighter density where circulation requirements are less and the attractions of good views is a selling point, i.e. condominiums and single family housing lots.
- The location of the village should be above the sewage disposal system.

Hazards

- The existence of possible faulting areas and unstable hillsides prohibits the construction of buildings in the possible faulting areas, on the unstable hillsides or below those hillsides.

Therefore,

- Village development must limit construction in these areas to roads and uninhabited facilities.

Hydrology

- There are meandering creekbeds on the alluvial fan that flood in the spring when the primary east channel, which flows year round, overflows its banks.
- The low permeability of the lower portion of the fan is susceptible to sheet flooding when the creekbeds overflow.

Therefore,

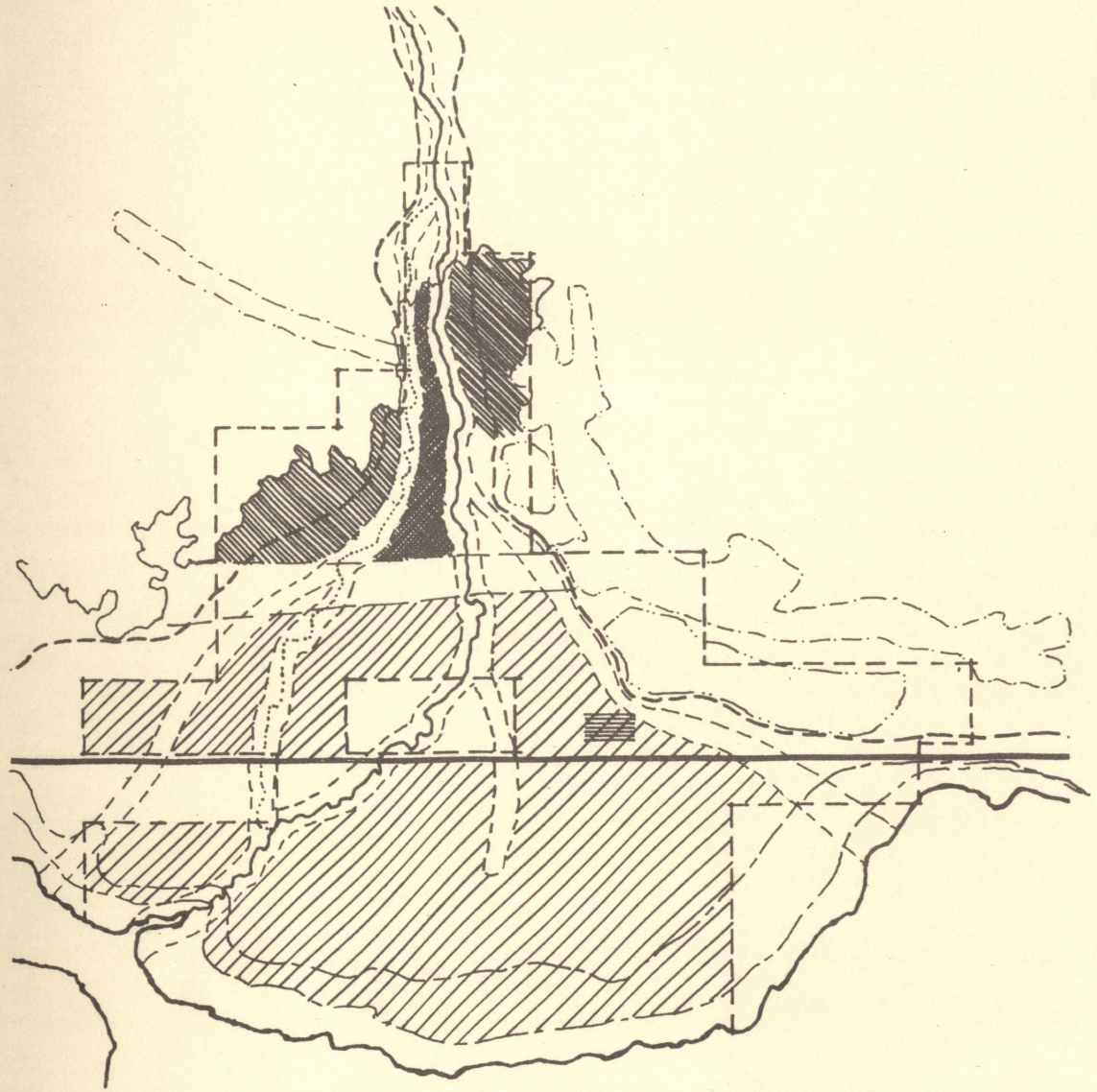
- Minimal site engineering is required to keep water in the primary east channel. Flood control engineering on the northern most fork is needed to direct water down the western channel during periods of high run-off. These two channels provide enough capacity to drain the site effectively.

Climate

- Red canyon runs north-south providing good solar orientation to the majority of the site.
- Prevailing southwesterly wind is reduced as the canyon narrows where a north-south diurnal overflow takes over.
- Snow drifts to the northeasterly side of objects.

Therefore,

- Development should take advantage of southeasterly sun during the winter for morning activities and southern to southwesterly sun for afternoon activities.
- The areas farther up the canyon provide more protection from the wind.
- Sewage disposal facility should be on easterly side of site.



- area most suited for high-density development
- less than 3% slope permits easy circulation required for high density use
- Hebgen Mountain provides wind break from prevailing south-westerly wind
- fine sandy alluvium soil well suited for foundations
- structures would be placed above sewage disposal facility

- area well suited for medium density development
- 10 to 15% slope provides spacial variety with excellent views and good solar orientation
- border scenic edge of aspen groves
- stable hillside of coarse co-alluvium soil good for foundations

- area least suited for development
- open views to lake would be obstructed
- exposure to severe winds in winter
- fine clayey alluvium with severe shrink swell and frost heave potential
- structures would be placed below sewage disposal facility

- sewage disposal site

THE VILLAGE

Isolated from any metropolitan area, Ski Yellowstone must be a destination resort, requiring the development of a village in order to accommodate sufficient clientele to support the project. The image of this village is to be a resort retreat in the mountains. The role as a retreat will be reinforced by concentrating the facilities and accommodations to allow the pedestrian complete access to the village. Upon arrival the automobile will become obsolete and stored until required for departure.

The ecology of the site suggests that development of the alluvial fan south of U.S. 287 be limited to the marina and its amenities with minimum accommodation to satisfy lakeside activities. This is in response to the delicate nature of the lake shore and the poor soil conditions for foundations.

Restricting development to the area between Red Canyon Creek and the marina would leave the majority of the lake shore undisturbed, preserving valuable views allowed by the open character of the fan. Furthermore, the creek and the marina provide the only two topo-

graphical edges along the shore that can be perceived by the visitors, thereby acting as logical brackets to the development. Another limitation to the size of the lake shore development would be severe winter winds coming off the lake, greatly reducing the desirability of accommodations along the shore, conceivably requiring their closure from November to May.

Due to the low permeability of the soils in this area, septic tanks and drain fields are prohibited, requiring a sump station to pump the sewage off the lake development to the sewage treatment plant.

Therefore, small scale development is proposed for the marina area to mitigate the impact on the site while allowing adequate facilities for summer recreation.

The ecology of the northern portion of the site, where the fan narrows into the canyon, allows for a higher density of development. Here the soil is well suited for foundations, the mountains offer more protection from the winds and the adjacency to the ski area is immediate. Furthermore, the natural slope of

the fan will allow gravity to transport the sewage from the village to the sewage treatment plant.

Concentrating the development near the ski area reflects the estimated occupancy of the resort which is expected to be 28% to 70% higher in the winter. The consolidation of commercial facilities at the mountain site would eliminate any competition between the mountain development and the lake development for dominance. The mountain development would clearly become the nucleus of the resort with the marina complimenting as a satelite amenity.

In keeping with the retreat image of the resort, it is considered that user movement from the mountain to the lake in the summer is more adequately accommodated by: walking, jogging, bicycling or horseback riding; than user movement from the lake to the mountain in the winter, probably with ski equipment, by shuttle.

Therefore, the master plan of the development concentrates the facilities near the ski area creating a pedestrian village in a mountain setting. The high

density commercial and lodging areas lie on the alluvial fan with the adjacent hillsides accommodating low density condominiums and lots for private homes.

The village is approached from a road that parallels the creek, following the familiar scenario of movement up a canyon. The base facilities for the ski area reveal themselves as the focus of the village, orienting visitors to their destination. Located on the northern most portion of the site, these facilities act as the vertex from which the rest of the village swings.

The marketing area adjacent to the historical townsite of Grayling acts as a gateway to the village while providing a link to the marina. Here the administrative and sales offices are located along with the environmental education center.

The marina plays a subordinate role with a boathouse character, leaving the openness of the alluvial fan for visual enjoyment.

ESTIMATED OCCUPANCY

WINTER

	Proposed Units	Season Occupancy	Ave. Persons Per Unit	Person Per Day Ave.	Person Per Day Max.
Lodging	600	50%	2	600	1200
Condominiums	493	60%	3	887	1479
Private Lots	60	35%	5	105	300
Sub Totals	1153			1592	2979
Daytrippers	750 parks	50%	3.5/car	1312	2625
Total				2909	5604

SUMMER

Lodging	600				
Condominiums	493	43%	2.5	1239	2882
Private lots	60				
Daytrippers	750 parks	25%	2.5/car	469	1875
Totals				1708	4757

RATIOS WINTER/SUMMER

	Average	Maximum
Village Occupants	1592/1239 = 1.28	2979/2882 = 1.03
Total Users	2909/1708= 1.7	5604/4757 = 1.17

Therefore, on the average, winter usage is espected to be 28% to 70% greater than summer usage.

SUMMARY OF ACTIVITIES/FACILITIES

FACILITIES		ACTIVITIES
ski base facilities	WINTER	downhill skiing
commercial areas		cross-country skiing
restaurants		iceskating
lodging		
private lots	SUMMER	horseback riding
climbing school		backpacking
equestrian center		mountain climbing
environmental education center		hiking
marina		gondola rides
		swimming
		fishing
		boating
		sailing
		waterskiing
		tennis

Character

The village shall compliment the site by:

- relating to the creeks, mountains and lake as edge
- respecting the open character of the sagebrush and grasslands of the alluvial fan
- retaining existing vegetation
- recognizing the influence of the roofscape of the development as a visual landmark seen from highway 287 and by the skiers on the mountain.

Hierarchy

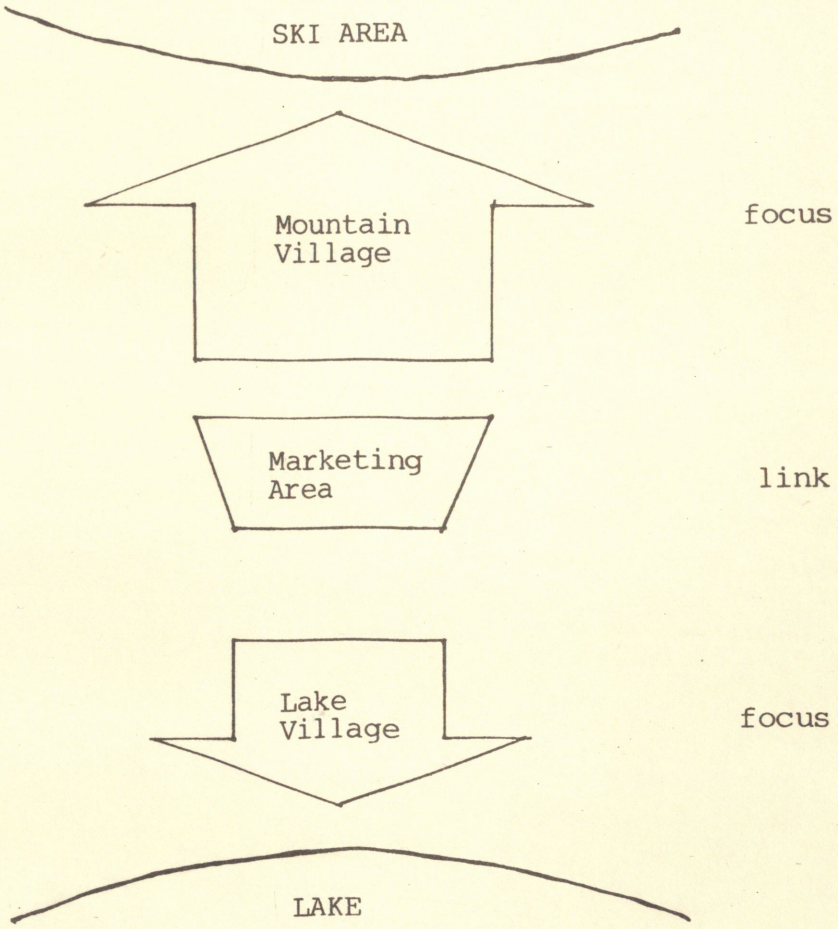
- Primary function zones (i.e. arrival/entry, ski base lodge, marina) and secondary function zones (i,e. commercial space, hotel lodging, condominiums and private housesites) should be arranged to maximize visitor enjoyment and area revenues while minimizing congestion, visitor confusion and area management problems.

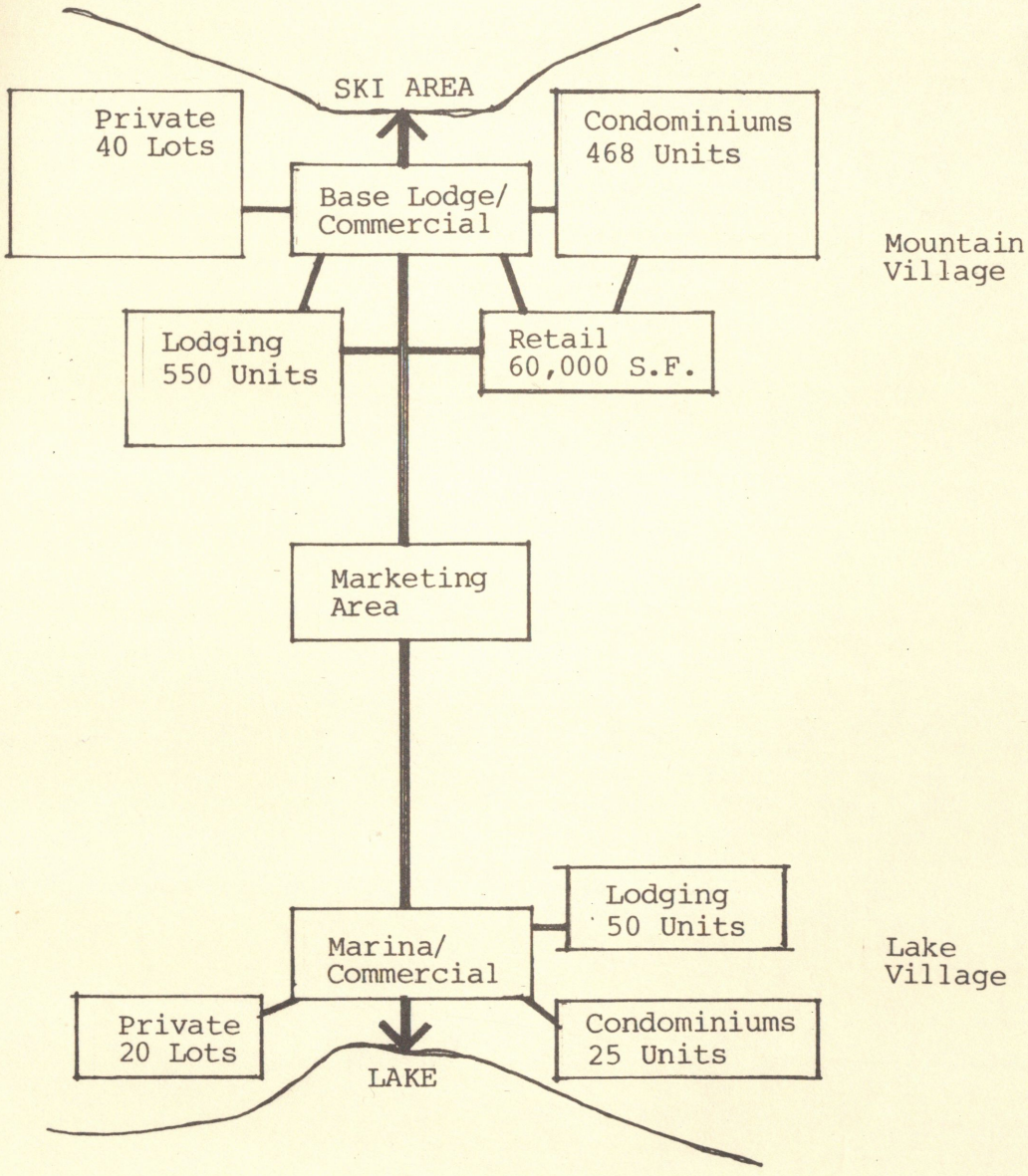
Orientation

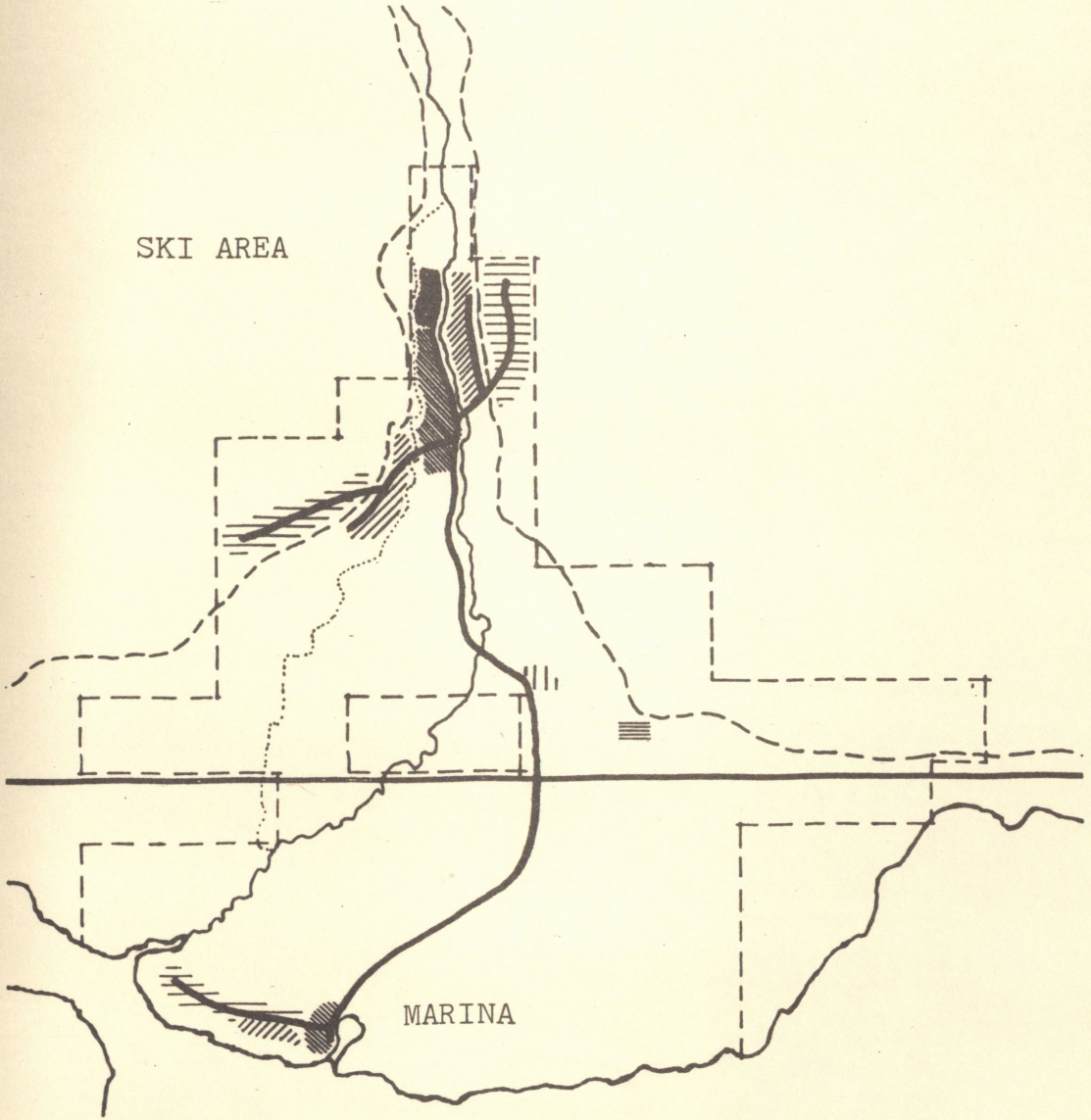
- Maximize solar orientation while minimizing prevailing winds.
- Exploit spectacular views for user enjoyment.

Circulation

- Accommodate heavy arrival and departure flows with ample efficient circulation that minimizes decision points thereby reducing confusion and congestion.


SKI AREA
Mountain Village
focus
Marketing Area
link
Lake Village
focus
LAKE


SKI AREA
Private
40 Lots
Condominiums
468 Units
Base Lodge/
Commercial
Mountain
Village
Lodging
550 Units
Retail
60,000 S.F.
Marketing
Area
Lodging
50 Units
Marina/
Commercial
Lake
Village
Private
20 Lots
Condominiums
25 Units
LAKE



LAND USE MASTER PLAN

SKI AREA BASE FACILITIES

HIGH DENSITY COMMERCIAL AND LODGING

LOW DENSITY CONDOMINIUMS

PRIVATE LOTS

MARKETING AREA

SEWAGE DISPOSAL SITE

THE LODGE

The concept of the ski lodge is drawn from its principle manifest and latent functions of shelter and gateway respectively.

The principle manifest function is considered to be that of providing shelter in a harsh environment. The Madison basin, in which the project lies, has recorded the greatest number of coldest days and the record low in the lower 48 states for the last two years. In contrast to these harsh realities, Ski Yellowstone is to develop outdoor recreation. The profound role of shelter implicit in architecture then, is seen as basic to the formal implications of the lodge.

The principle latent function (and in this thesis the more important) is the role of the lodge as the gateway to the mountain; the interface between the routine of corporeal daily activities and the spiritual exhilaration of skiing, where the forces of nature are engaged with graceful rhythms in an endeavor to master gravity and incline, the two elements of the mountain that give it mystique.

As a gateway to this exalted realm of existence the lodge is held in reverence. It holds a place of prominence in the village. It is set apart in experience, it is mimicked in style.

Other manifest functions reflecting the nature of our society are the inclusions of a daycare facility, reflecting the increase in young mobile families, and a handicap center, reflecting the movement to include the handicapped in our social activities.

Economic demands placed on the development require the accommodation of day skiers adding a vehicular circulation element to be dealt with, without compromise to the pedestrian concept of the village.

As a matter of scale, the lodge is designed to serve approximately one-fourth of the skiers on an average day at any one time. This is in compliance with current industry standards. Also, it is considered that busy days will mostly coincide with good weather, allowing deck spaces to absorb overflow. In addition, the commercial areas of the village are available to visitors, releaving some of the demand on the lodge.

Character

- The lodge design shall compliment the site utilizing existing grades where possible to minimize site disturbance.
- Existing vegetation should be retained.
- Building forms should symbolically represent the site.
- Colors should be harmonious with the environment.
- Materials should be of the site.

Hierarchy

- Primary function zones (i.e. entry/arrival, ticketing, restrooms, information, staging); secondary function zones (i.e. retail, ski rental/ repair, ski school, nursery, public lockers, food and beverage); and tertiary function zones (i.e. operational/service, kitchen, storage, first aid) should be arranged horizontally and vertically to maximize visitor enjoyment and facility revenues while minimizing congestion, visitor confusion and facility management problems.
- Separate public skier functions from administrative and support functions where possible.

Orientation

- The lodge should be discreetly visible from the approach to act as an invitation to the public and to act as a visible landmark in guiding first-time visitors.
- Utilize morning sun with arrival activities.
- Utilize afternoon sun with lunch and afternoon activities.
- Exploit spectacular views for user enjoyment.

Circulation

- Accommodate heavy arrival and departure flows with ample efficient circulation that minimizes decision points, thereby reducing congestion and visitor confusion.
- Provide "limited access" points to separate service vehicular traffic from public vehicular traffic.
- Pedestrians should not be forced to cross major vehicular roadways from parking areas.
- Pedestrian walkways must be well defined and interconnect parking areas, condominiums, lodging and commercial space to the base lodge.
- Provide pedestrian load/unload zones for buses and cars.
- Provide barrier free environment with separate load/unload zone for the handicapped.
- Skier movement should flow easily away from base structures to lift terminals and from ski runs back to base structures with negligible slopes.

Parking

- Parking areas should be designed to fill from closest proximity to the base structures outward to minimize vehicular pedestrian conflict.
- Parking areas should be as visually unobtrusive as possible.
- Most distant parking stalls should not exceed comfortable walking distance (300 yards).
- Parking lot grades should not exceed 5% longitudinally or 3% cross slope to facilitate easy pedestrian and vehicular movement on snow or ice.
- Give preference to charter buses by providing convenient parking area.
- Provide separate employee parking.

PRIMARY FUNCTION ZONE

Arrival/Entry	Outside
Entrance/Lobby	1,500 S.F.
Ticketing	800 S.F.
general tickets	200 S.F.
special group	150 S.F.
ski school	150 S.F.
season pass	100 S.F.
accounting	200 S.F.
Restrooms	1,600 S.F.
mens (2)	700 S.F.
womens (2)	900 S.F.
Handicap Ski Center	2,150 S.F.
office	180 S.F.
lounge	220 S.F.
fitting rooms (2)	220 S.F.
restrooms (2)	130 S.F.
storage	900 S.F.
locker area	500 S.F.
Staging	Outside
Circulation	3,400 S.F.

SECONDARY FUNCTION ZONE

Dressing Rooms	800 S.F.
mens	400 S.F.
womens	400 S.F.
Lockers	2,200 S.F.
seasonal, 50 openings	1,500 S.F.
ski rental, 100 openings	200 S.F.
dressing rooms, 250 openings	500 S.F.
Rental/Repair (Ski Shop)	2,000 S.F.
Retail (Ski Shop)	1,200 S.F.
Scramble	1,000 S.F.
Cafeteria	6,000 S.F.
inside, 400 seats	4,800 S.F.
deck, 100 seats	1,200 S.F.
Restaurant	1,800 S.F.
inside, 120 seats	1,440 S.F.
deck, 30 seats	360 S.F.
Lounge/Bar	1,200 S.F.
bar	150 S.F.
inside, 70 seats	840 S.F.
outside, 30 seats	360 S.F.
Daycare	1,020 S.F.
nursery	360 S.F.
nap area	200 S.F.
kitchen	140 S.F.
restrooms (2)	100 S.F.
laundry	100 S.F.
office	120 S.F.

TERTIARY FUNCTION ZONE

Storage/Entrance (Ski Shop)	1,400 S.F.
Kitchen	2,000 S.F.
Storage/Entrance (Kitchen)	1,785 S.F.
receiving storage	500 S.F.
dry storage	500 S.F.
freezer	200 S.F.
cooler	200 S.F.
employee restroom	65 S.F.
office	120 S.F.
trash	200 S.F.
Employee Cafeteria	500 S.F.
Administration	3,010 S.F.
board room	300 S.F.
operations manager	230 S.F.
handicap director	180 S.F.
ski patrol manager	180 S.F.
lift manager	180 S.F.
slope maintenance	180 S.F.
ski school director	180 S.F.
food service manager	180 S.F.
reception	400 S.F.
general file	200 S.F.
studio	800 S.F.

TERTIARY FUNCTION ZONE (cont.)

Ski Patrol/First Aid	1,260 S.F.
treatment area	580 S.F.
recovery	300 S.F.
waiting area	200 S.F.
restrooms (2)	80 S.F.
storage	100 S.F.
Ski patrol/Locker Room	1,200 S.F.
mens	600 S.F.
womens	600 S.F.
Mechanical	2,600 S.F.
TOTAL	40,575 S.F. Gross

NOTE: Square footages were calculated assuming 3000 skiers per average day as the design capacity and the "average" SQUARE FEET/DESIGN CAPACITY coefficients.

PLANNING PARAMETERS - SKI AREA BASE LODGE[1]

FUNCTION	SQUARE FEET/DESIGN CAPACITY		
	Minimum	Average	Maximum
Food Service Seating*	2.40	3.00	4.00
Kitchen and Scramble	.58	.99	1.81
Rest Rooms	.34	.54	1.12
First Aid and Ski Patrol	.19	.65	1.87
Ski School	-0-	.28	.69
Retail Sales	-0-	.29	.44
Equipment Rental	-0-	.66	.84
Public Lockers	-0-	.81	1.23
Administration	.27	.54	1.26
Tickets	.08	.15	.23
Employee Lockers	-0-	.11	.11
Bar/Lounge	-0-	1.02	1.02
Nursery	-0-	.34	.34
Storage	.07	.27	.61
Mechanical			
Circulation	.15	.49	1.30
Walls/Waste	---	---	---
Total	4.08	10.14	17.07

*Based on 12 S.F. seat; Minimum at 20% or 1 seat/5 skiers and, Average at 25% or 1 seat/4 skiers and, Maximum at 33% or 1 seat/3 skiers.

[1]Barnhart Associates, Planning & Design, Bloomfield, CO

SPACE/AREA Arrival/Entry (Outside)

FUNCTIONAL ZONE Primary

ENVIRONMENTAL CHARACTER

Arrival to the lodge should be simple and direct. The option to use the drop-off area to unload passengers and equipment should be obvious and compatible with the circulation path to parking areas, between 5 to 20 percent of the visitors arriving by car will use a drop-off area. Cars and buses parked for loading and unloading shall not impede site circulation. As a focal point for gathering visitors, the area will require orienting elements which speak of the central role the lodge plays in the village.

ADJACENCY Entrance/lobby, ticketing.

EQUIPMENT

LEGAL/SAFETY REQUIREMENTS

The safe transition from vehicular to pedestrian movement.

SPACE/AREA Entrance/Lobby 1500 S.F.

FUNCTIONAL ZONE Primary

ENVIRONMENTAL CHARACTER

The main entrance to the lodge engrains a lasting impression on the skier. A celebration of entrance would add to the ski experience by evoking a sense of privilege in the skier, aiding in the creation of a user identity with the area. The entrance lobby is the receiving area for large volumes of skiers, it terminates the entrance sequence and acts as a hub about which the other activities of the lodge revolve. It is an inspirational space that reveals the order of its structure and the logic of its function. This order and logic will foster a sense of familiarity reinforcing a user identity with the area.

ADJACENCY Change area, ski shop, food service, ski school.

EQUIPMENT Double vestibule.

LEGAL/SAFETY REQUIREMENTS Minimum two exits.

SPACE/AREA Ticketing 800 S.F.

FUNCTIONAL ZONE Primary

ENVIRONMENTAL CHARACTER

The ticketing areas must be able to handle large crowds in an efficient manner, one window is required per 500 skiers of daily capacity. The majority of the windows will be outside windows semi-enclosed and protected from the weather. An inside ticket window for special groups and ski school is desirable. If integrated into the lodge, the ticket area should be treated as a vestibule to limit air exchange for energy considerations. Counter space for gloves and wallets should be provided for the skiers.

General Tickets	200 S.F.
Special Group	150 S.F.
Ski School	150 S.F.
Season Pass	100 S.F.
Accounting	200 S.F.

ADJACENCY Main public circulation, restrooms.

EQUIPMENT 6 windows, trash recepticals, ski racks, safe.

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Restrooms 1600 S.F.

Mens (2)	700 S.F.
Women (2)	900 S.F.

FUNCTIONAL ZONE Primary

ENVIRONMENTAL CHARACTER

The public restrooms should be light and airy with plenty of room between the stalls, lavatories and hand dryers to allow for free movement of the users. Lavatories should be mounted in counters to protect plumbing, additional counters should be provided for people using mirrors and for general convenience. Floors and wainscoat must be indestructible by ski boot damage.

ADJACENCY Entrance lobby, dressing room, food service.

EQUIPMENT Toilets, lavatories, hand dryers, mirrors.

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Handicap Ski Center 2150 S.F.

FUNCTIONAL ZONE Primary

ENVIRONMENTAL CHARACTER

Skiing for the handicapped is becoming a popular part of handicapped recreation. An effective handicapped program will require a handicapped ski center. The center should have convenient vehicle loading and unloading access separate from the main drop-off and be close to the lifts. However, the center is not to be isolated and is to share in the same ambiance of joy as the rest of the lodge.

Office	180 S.F.
Lounge	220 S.F.
Fitting Rooms (2)	220 S.F.
Rest Room (2)	130 S.F.
Storage	900 S.F.
Locker Area	500 S.F.

ADJACENCY Vehicular circulation, ski slopes.

EQUIPMENT

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Circulation 3400 S.F.

FUNCTIONAL ZONE Primary, Secondary, Tertiary

ENVIRONMENTAL CHARACTER

Circulation should be well ordered and comprehensible to minimize the use of signage. Materials must be chosen to withstand the punishment of ski boots and to reduce the noise caused by them, in primary and secondary function zones.

ADJACENCY

EQUIPMENT

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Staging (Outside)

FUNCTIONAL ZONE Primary

ENVIRONMENTAL CHARACTER

The staging area is used for donning ski equipment. It is a transitional area between the lodge and the ski lifts and as such provides valuable visual activity for spectators in the lodge. It must be relatively flat ground and spacious to avoid injuries due to skiers coming off the slopes hitting skiers donning equipment.

ADJACENCY Ticketing, entrance lobby.

EQUIPMENT Ski racks.

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Dressing Rooms 800 S.F.

Mens	400 S.F.
Womens	400 S.F.

FUNCTIONAL ZONE Secondary

ENVIRONMENTAL CHARACTER

Mens and womens dressing areas should be located off of their respective restrooms adjacent to the entrance lobby, to prevent the restroom stalls from being used as dressing areas. The dressing rooms should be light and airy and provide some individual privacy to the users.

ADJACENCY Public restrooms, pay lockers.

EQUIPMENT Benches, mirrors, hand dryers.

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Lockers 2200 S.F.

FUNCTIONAL ZONE Secondary

ENVIRONMENTAL CHARACTER

Recent ski industry experience suggests a country club type atmosphere wherein the clientele leave their ski equipment throughout the week and change into ski gear upon arriving at the area.

Seasonal lockers should be capable of handling 2 to 3 pairs of full length skies and located separately for seasonal, monthly and weekly rentals. Aisle space must be adequate to accommodate a bench between locker rows and provide easy access.

Pay lockers must be large enough to accommodate skiers' shoes and personal items, and should be located near ski rental and dressing rooms.

Seasonal	50 units	1500 S.F.
Ski Rental	100 units	200 S.F.
Dressing	250 units	500 S.F.

ADJACENCY Ski rental, dressing rooms.

EQUIPMENT

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Rental/Repair 2000 S.F.

FUNCTIONAL ZONE Secondary

ENVIRONMENTAL CHARACTER

The rental area should provide a flow in which the skier fits his boots, skis and then picks up his poles as he goes out. The boot fitting area should be large enough to accommodate 30 skiers at one time. Pay lockers (100 openings) should be placed on the walls for skiers' shoes and personal items. The ski fitting area should have pits for the fitter so that the skier has only to walk beside the pit to be fitted to the ski. Storage space for rental boots and skis should be adjacent to allow personnel to work both areas. A separate area should be provided for overnight rental storage.

ADJACENCY Retail, main circulation, ski slopes.

EQUIPMENT Fitting pit, storage racks, lockers, work bench, cash register.

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Retail 1200 S.F.

FUNCTIONAL ZONE Secondary

ENVIRONMENTAL CHARACTER

The retail area should be adjacent to the rental area. Public access to the retail area, however, should be separate from the rental area. High visibility from the main circulation is important for the successful retail space. The ski accessories should be toward the front for easy access. Clothing and fitting rooms should be in a quieter area. Good lighting and a spacious dynamic volume is conducive to impulse buying.

ADJACENCY Rental, main circulation, ski slopes.

EQUIPMENT Fitting rooms, display, cash register.

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Scramble 1000 S.F.

FUNCTIONAL ZONE Secondary

ENVIRONMENTAL CHARACTER

The scramble is a self-service area where the customer is able to select from a variety of entrees without a linear progression. Therefore, ample room is required between the beverage, food and check-out station to allow free movement of large amounts of people from station to station.

ADJACENCY Kitchen, cafeteria.

EQUIPMENT Beverage dispensers, food warmers, check-out stations.

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Cafeteria 6,000 S.F.

FUNCTIONAL ZONE Secondary

Cafeteria	400 seats	4,800 S.F.
Deck	100 seats	1,200 S.F.

ENVIRONMENTAL CHARACTER

The cafeteria will serve lunch only and provide the food for the majority of the skiers buying lunch. It should use the scramble system of self-service and self-bussing should be encouraged by the careful placement of refuse recepticals. It should be light and airy with a view of the ski area. Additional deck seating should be provided with southern exposure and protection from the wind. Convenience and ease of circulation is a must for a quick bite to eat. Flooring materials should be chosen to reduce noise from ski boots.

Interior space is designed to accommodate an average user day. It is considered that the majority of busy days will coincide with nice weather, allowing the deck seating to accomodate the overflow.

ADJACENCY Scramble, main circulation, restrooms.

EQUIPMENT Tables, chairs, refuse recepticals.

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Restaurant 1800 S.F.

FUNCTIONAL ZONE Secondary

Restaurant	120 seats	1,440 S.F.
Deck	30 seats	360 S.F.

ENVIRONMENTAL CHARACTER

The restaurant is intended to be a sit down and waited service affair. The atmosphere should be comfortable with the ability to don a formal atmosphere in the evenings. Views of the ski area and primary distant views should be exploited. Additional deck seating should be provided with southern exposure and protection from the wind. Floor materials should be chosen to reduce noise from ski boots. The restaurant will serve breakfast lunch and dinner.

ADJACENCY Main circulation, kitchen, restrooms.

EQUIPMENT Tables, chairs.

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Lounge/Bar 1200 S.F.

FUNCTIONAL ZONE Secondary

Bar		150 S.F.
Lounge	70 seats	840 S.F.
Deck	30 seats	360 S.F.

ENVIRONMENTAL CHARACTER

The lounge acts both as an extension of the restaurant and as a separate entity. Views of the ski area and primary distant views should be exploited. Additional deck seating should be provided with southern exposure and protection from the wind. Floor materials should be chosen to reduce noise from ski boots.

ADJACENCY Restaurant, main circulation, restrooms.

EQUIPMENT Tables, chairs, wet bar, dishwasher.

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Daycare 1020 S.F.

FUNCTIONAL ZONE Secondary

ENVIRONMENTAL CHARACTER

The daycare function should be located in an area which is open to substantial natural light, easy to find by the public, adjacent to a safe, well protected play yard, yet in a portion of the complex where the noise of children playing is not objectionable. The daycare operation works with children ages 6-10 and is utilized as a play, staging, lunch and rest area for the children.

Nursery	360 S.F.
Nap Area	200 S.F.
Kitchen	140 S.F.
Restrooms	100 S.F.
Laundry	100 S.F.
Office	120 S.F.

ADJACENCY Play yard (outside), main circulation.

EQUIPMENT Kitchen appliances, service sink.

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Storage/Entrance 1400 S.F.

FUNCTIONAL ZONE Tertiary (Ski Shop)

ENVIRONMENTAL CHARACTER

A common storage space can be used for the rental/repair and retail areas. Access for loading and unloading merchandise would be located to limit public contact. An employee restroom may be convenient depending on the adjacency of public restrooms.

ADJACENCY Rental/repair, retail, service circulation.

EQUIPMENT

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Kitchen 2000 S.F.

FUNCTIONAL ZONE Tertiary

ENVIRONMENTAL CHARACTER

One central kitchen is desirable to serve the cafeteria, restaurant and employee cafeteria. It must have negative air pressure to prevent odors from reaching dining areas. This area is intended for the use of food preparation and dishwashing/bus area. No bulk storage is intended in this area.

ADJACENCY Scramble, restaurant, service entrance, employee restroom.

EQUIPMENT Ovens, stoves, counterspace, preparation equipment.

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Storage/Entrance 1785 S.F.

FUNCTIONAL ZONE Tertiary (Kitchen)

ENVIRONMENTAL CHARACTER

The storage/entrance area is for the receiving and storage of supplies and kitchen administration. A loading dock large enough to handle trucks is required. The dock should be placed to limit public contact.

Receiving Storage	500 S.F.
Dry Storage	500 S.F.
Freezer	200 S.F.
Cooler	200 S.F.
Employee Restroom	65 S.F.
Office	120 S.F.
Trash	200 S.F.

ADJACENCY Kitchen, service dock.

EQUIPMENT Cooler, freezer.

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Employee Cafeteria 500 S.F.

FUNCTIONAL ZONE Tertiary

ENVIRONMENTAL CHARACTER

The employee cafeteria will act as a social space where employees will have an opportunity to eat and "take a break" without public contact or without taking potential customer space. Access to food service without public contact will speed up lunch breaks and offer the employee an alternative to the sack lunch. Views and outside decks will provide the employee an atmosphere of brief relaxation during the working day.

ADJACENCY Kitchen, employee restroom, circulation.

EQUIPMENT Tables, chairs.

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Administration 3010 S.F.

FUNCTIONAL ZONE Tertiary

ENVIRONMENTAL CHARACTER

The administration performs duties that do not directly involve the skiers, therefore it could be separated to avoid distracting public contact. The administrative functions will deal with the operation of the mountain and not the development as a whole. Each division will need a degree of autonomy, however, the working configuration should allow for interaction between the departments. Office space should be light and airy with degrees of privacy as required. A sense of isolation should be avoided in all spaces no matter how private the function. Views and natural light are important for worker morale and the space should be flexible enough to allow for worker personalization with plants, furniture and accessories.

Board Room	300 S.F.
Operations	230 S.F.
Handicap Director	180 S.F.
Ski Patrol Manager	180 S.F.
Lift Manager	180 S.F.
Slope Maintenance	180 S.F.
Ski School Director	180 S.F.
Food Service Manager	180 S.F.
Reception	400 S.F.
General File	200 S.F.
Studio	800 S.F.

ADJACENCY

EQUIPMENT Office equipment, computer, copier.

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Ski Patrol/First Aid 1260 S.F.

FUNCTIONAL ZONE Tertiary

ENVIRONMENTAL CHARACTER

The ski patrol transports injured skiers from the mountain to a first aid area where minor injuries are treated and major injuries are prepared for transport to a hospital. The first aid and ski patrol room will have direct access from the ski slopes to allow the patrol to bring accident victims in by toboggan. The treatment area should contain four treatment stations with curtains, hot and cold water, and medical supplies. The recovery area will have 6 to 10 beds. Direct vehicular access must be provided for the transfer of accident victims to ambulances. Waiting area with restrooms is also required.

Treatment Area	580 S.F.
Recovery	300 S.F.
Waiting Area	200 S.F.
Restrooms	80 S.F.
Storage	100 S.F.

ADJACENCY This area should be separated so as not to interfere with other skiers' routine.

EQUIPMENT Medical equipment, beds.

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Ski Patrol/Locker Room 1200 S.F.

Mens Room	600 S.F.
Womens Room	600 S.F.

FUNCTIONAL ZONE Tertiary

ENVIRONMENTAL CHARACTER

The ski patrol area will require a separate locker area with men's and women's dressing rooms, showers and restrooms. The locker area will provide the employees brief social interaction before and after the working atmosphere of the day.

ADJACENCY Ski patrol/first aid.

EQUIPMENT Lockers, showers.

LEGAL/SAFETY REQUIREMENTS

SPACE/AREA Mechanical 1400 S.F.

FUNCTIONAL ZONE Tertiary

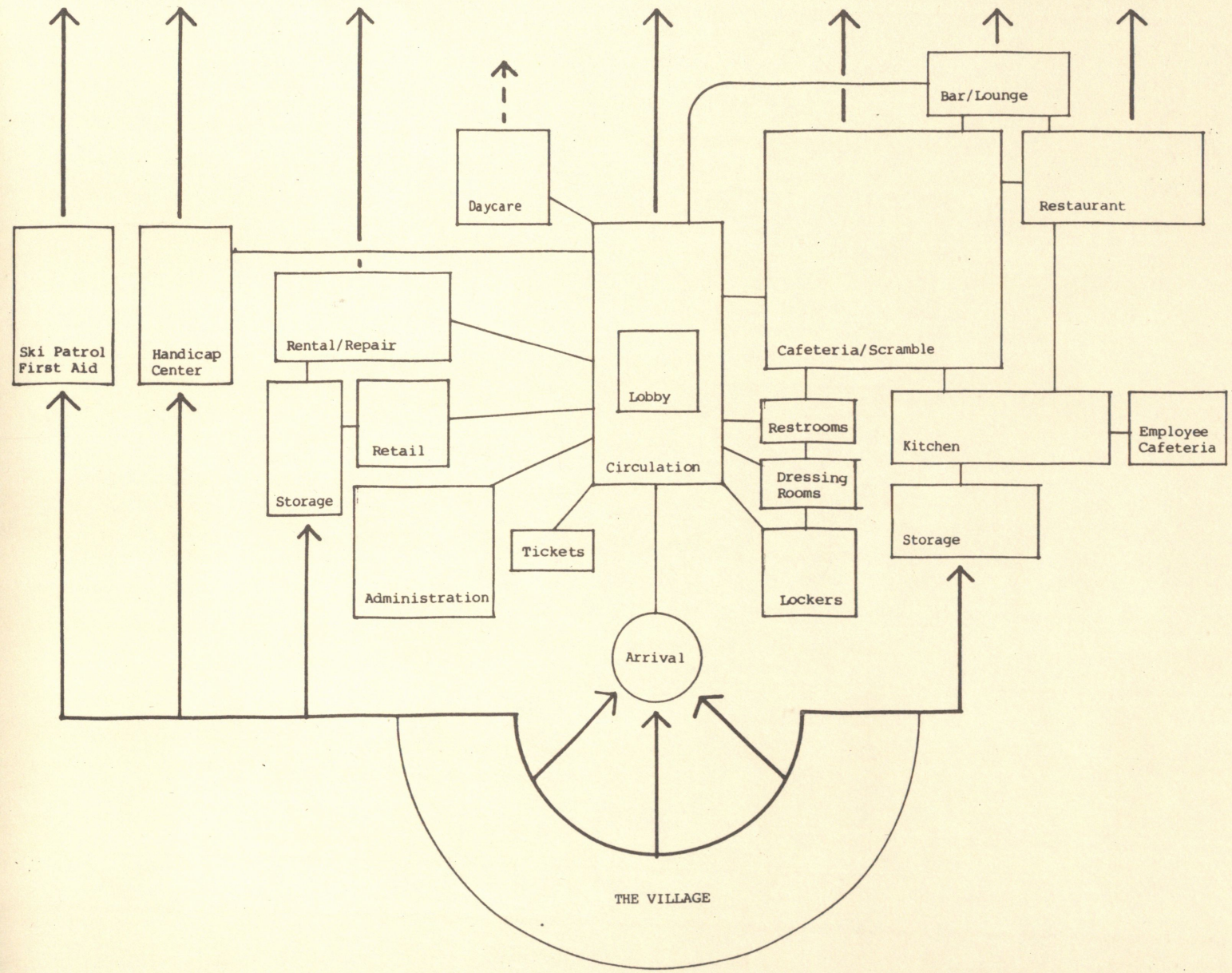
ENVIRONMENTAL CHARACTER

Mechanical spaces house HVAC equipment, water systems and electrical panels. Janitor maintenance areas and elevator shafts may also be included.

ADJACENCY Centroidal area of the facility.

EQUIPMENT Furnace, water heater, water pump.

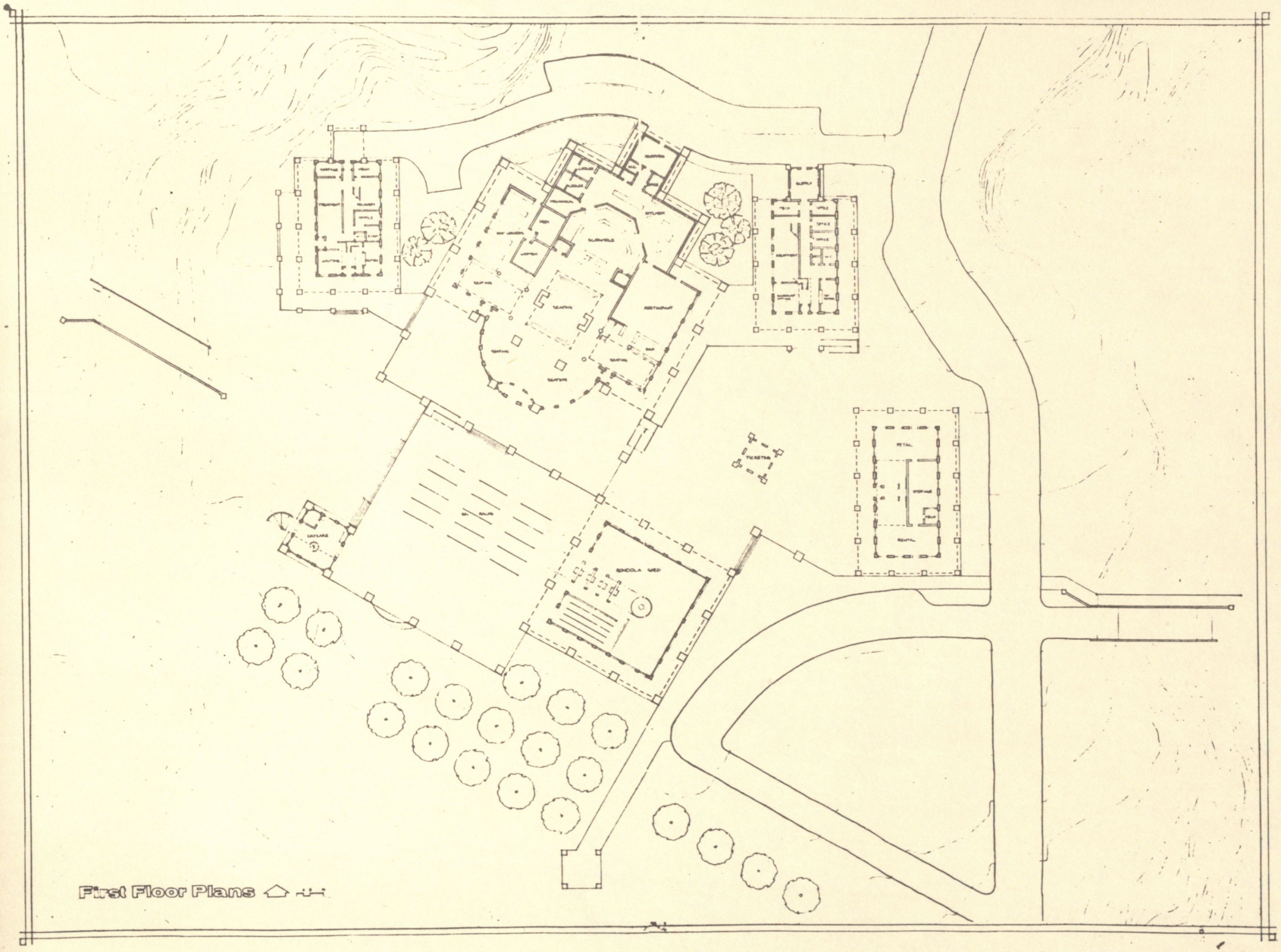
SPACE SUMMARY

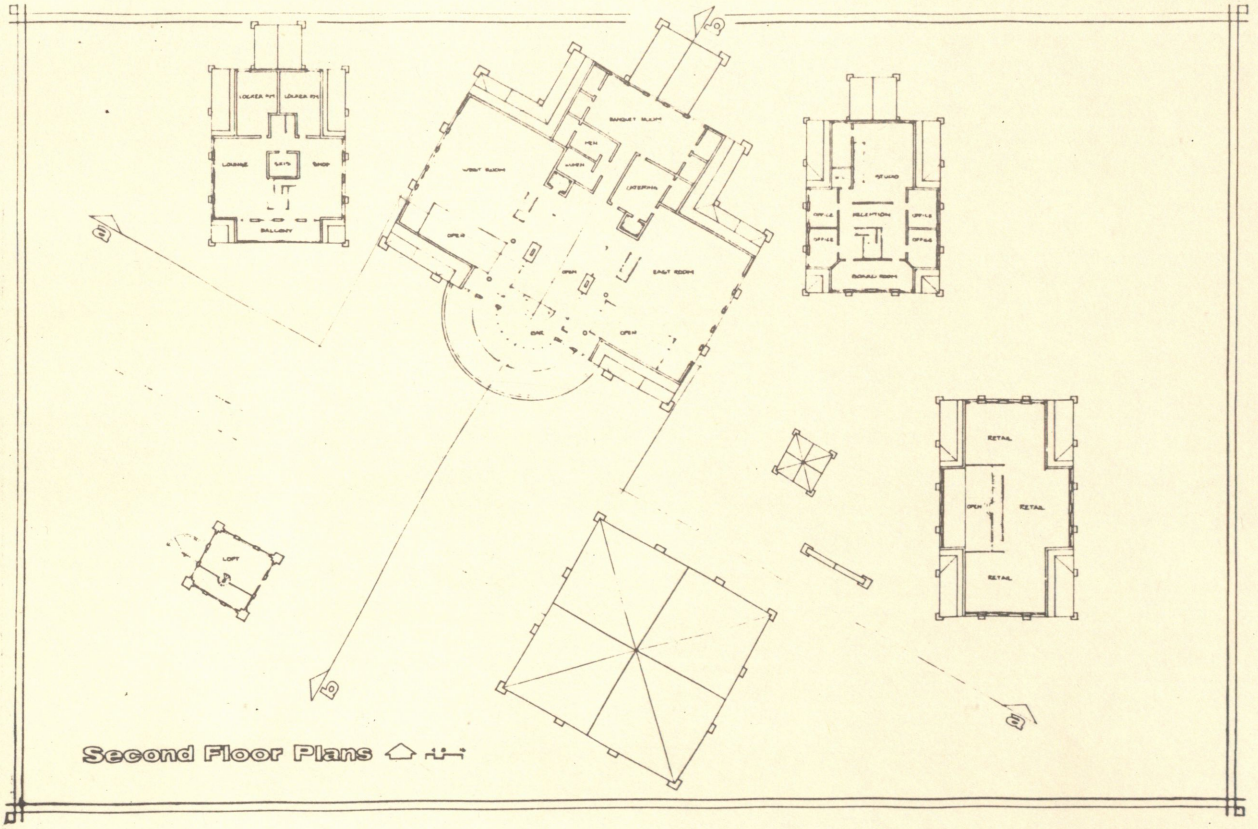

SKI SLOPES
Bar/Lounge
Daycare
Restaurant
Ski Patrol First Aid
Handicap Center
Rental/Repair
Lobby
Cafeteria/Scramble
Retail
Restrooms
Kitchen
Employee Cafeteria
Storage
Circulation
Dressing Rooms
Tickets
Storage
Administration
Lockers
Arrival
THE VILLAGE

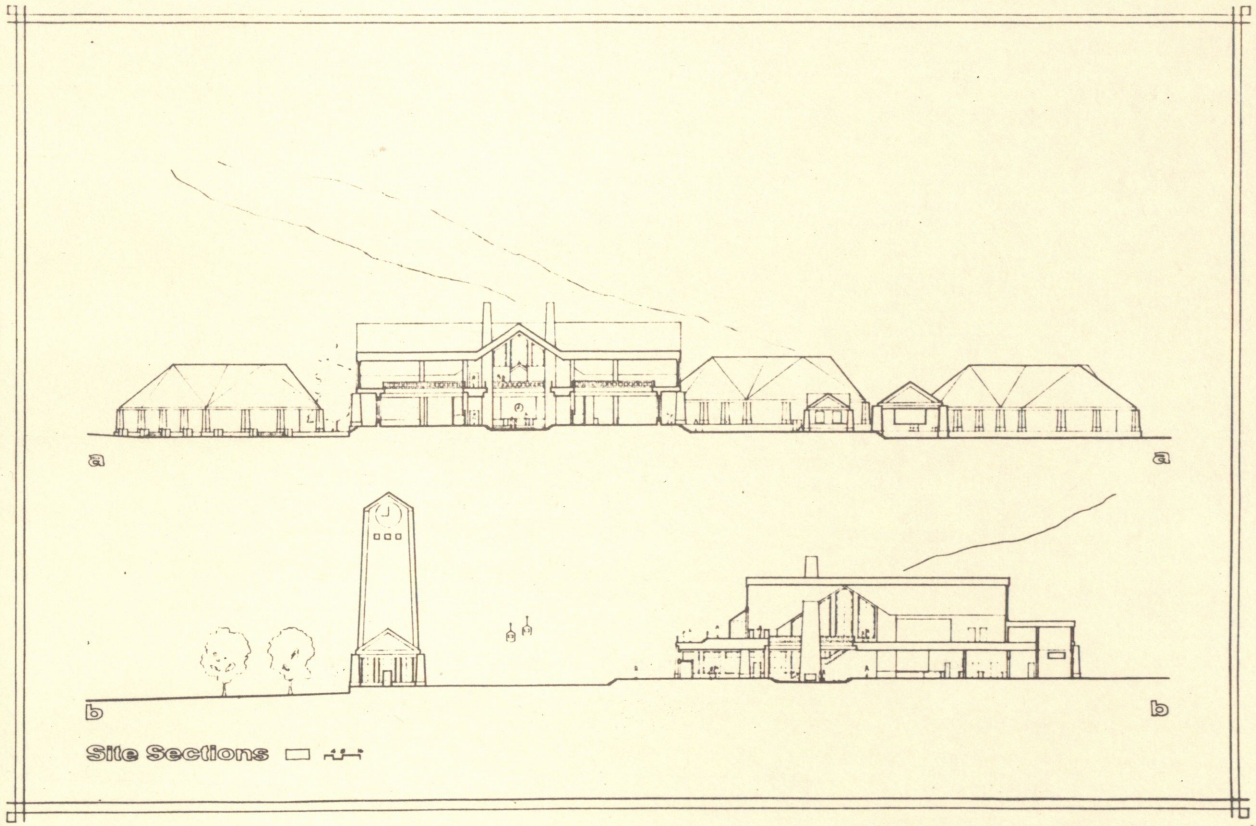
THE DESIGN



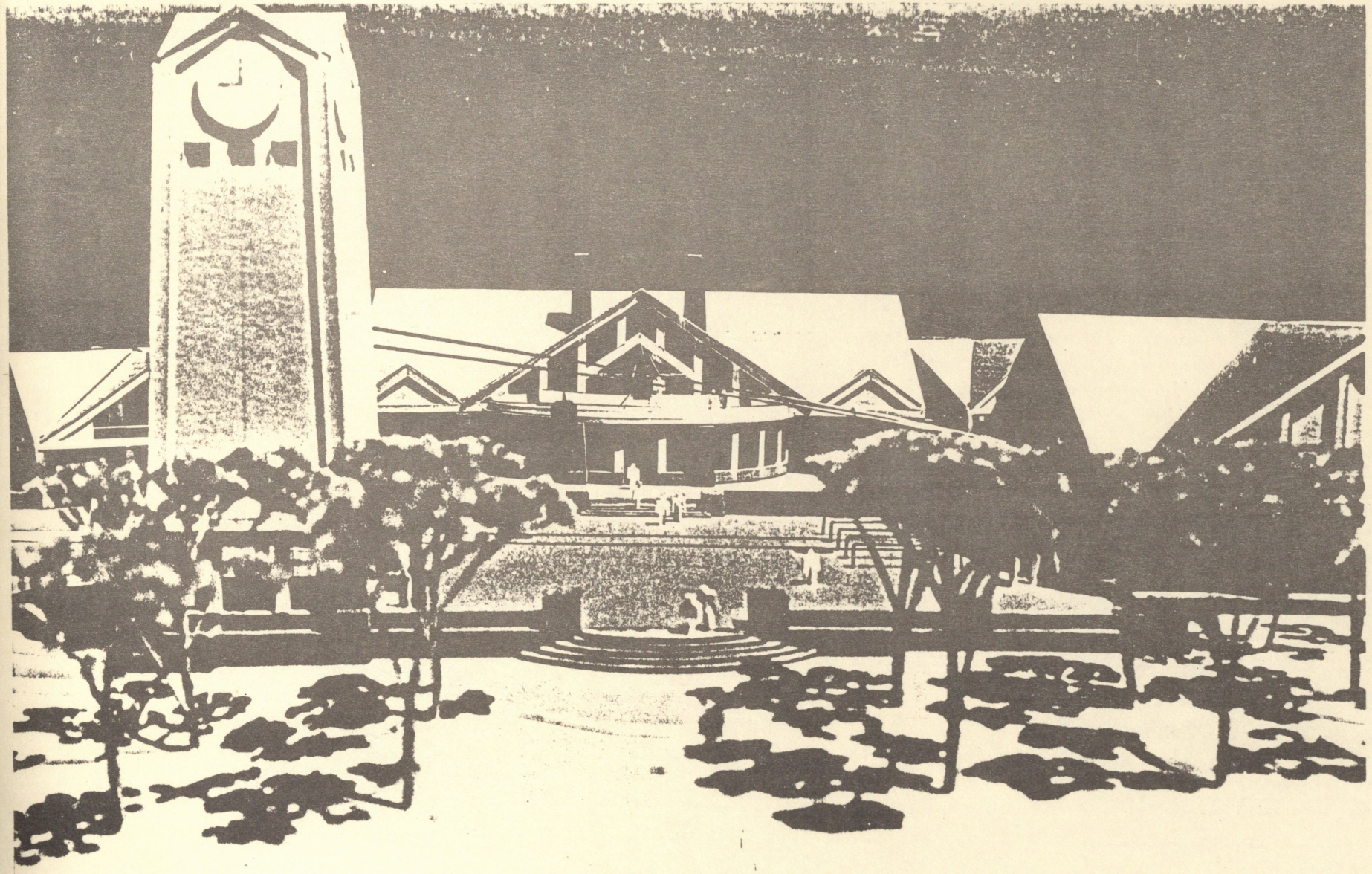



First Floor Plans


RETAIL
RETAIL
RETAIL
OPEN
LOFT
Second Floor Plans


a
a
b
b
Site Sections





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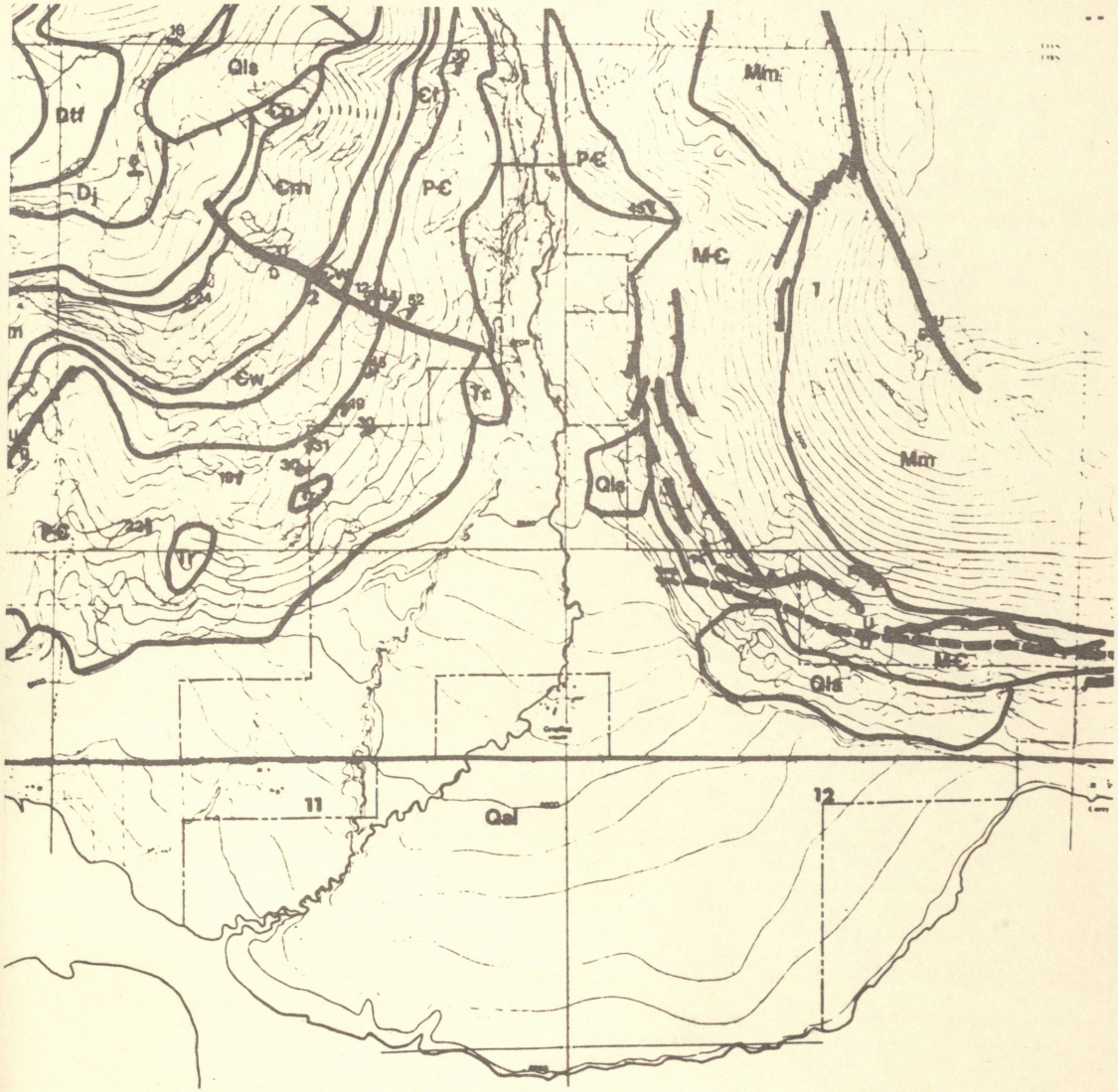
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APPENDIX



BEDROCK GEOLOGY INVENTORY

BY: J. MONTAGNE AND R.H. PAGE

STRATIGRAPHY

QUATERNARY	Qal	ALLUVIUM
	Qgb	GLACIAL BOULDERS
	Qls	LANDSLIDES OF VARIOUS TYPES
TERTIARY	Tr	RHYOLITE WELDED TUFF AND FLOWS
MISSISSIPPIAN	Mm	MADISON LIMESTONE GROUP
DEVONIAN	Dtf	THREE FORKS SHALE FORMATION
	Dj	JEFFERSON DOLOMITE FORMATION
M€ DEVONIAN AND CAMBRIAN STRATA UNDIVIDED		
CAMBRIAN	€pl	PILGRIM LIMESTONE FORMATION
	€p	PARK SHALE FORMATION
	€m	MEAGHER LIMESTONE FORMATION
	€w	WOLSEY SHALE FORMATION
	€f	FLATHEAD SANDSTONE FORMATION
PRECAMBRIAN	P€	UNDIFFERENTIATED METAMORPHIC BASEMENT ROCKS

APPROXIMATE FORMATION CONTACTS

FAULTS

COMPRESSIONAL (THRUST)
BARBED ON SIDE ORIGINALLY UPTHROWN
DASHED WHERE UNCERTAIN
REACTIVATED AS TENSIONAL FAULT BEFORE 1959.
U, UPTHROWN SIDE. D, DOWNTHROWN SIDE

TENSIONAL (NORMAL)
DASHED WHERE UNCERTAIN, NOT RECENTLY ACTIVE
U, UPTHROWN SIDE. D, DOWNTHROWN SIDE

1959 FAULT OR SLUMP SCARP, HACHURES ON DOWNTHROWN SIDE

12 — STRIKE AND DIP OF SEDIMENTARY BEDS

34 — STRIKE AND DIP OF FOLIATION IN METAMORPHIC ROCKS

AUGMENTED AND MODIFIED FROM WITKIND ET. AL., (1964), U.S.G.S. PROFESSIONAL PAPER 435

SKI YELLOWSTONE

SKI YELLOWSTONE INC.

WEST YELLOWSTONE, MONTANA

SCALE: 1" = 2000'



GEOLOGY
DEVELOPMENT
LIMITATION ZONES

BY J. MONTAGNE & R. H. PAGE

LIMITATION

SEICHE

ZONE OF POSSIBLE PERMANENT SUBMERSION

S2 ZONE OF GREATEST SEICHE FLOODING HAZARD

ROCKFALL

ZONE OF EXTREME HAZARD DURING AN EARTHQUAKE & MODERATE DANGERS AT OTHER TIMES

R2 ZONE OF SERIOUS HAZARD DURING AN EARTHQUAKE & LOW HAZARD AT OTHER TIMES

R3 ZONE OF MODERATE HAZARD DURING AN EARTHQUAKE AND VERY LOW AT OTHER TIMES

SNOW AVALANCHE (UNDER EXISTING TREE COVER)

ZONE OF EXTREME HAZARD

A2 ZONE OF LOW TO MODERATE HAZARD

A3 ZONE OF VERY LOW HAZARD - SEE TEXT

MASS MOVEMENT

ACTIVE MASS MOVEMENT WITH EXTREME LIMITATIONS TO CONSTRUCTION

ROCK UNITS NOW STABLE BUT PRESENTING SERIOUS HAZARD OF MASS MOVEMENT INITIATION IF DISTURBED OR WETTED

M3 ROCK UNITS NOW STABLE BUT PRESENTING MODERATE HAZARD OF MASS MOVEMENT INITIATION IF DISTURBED OR WETTED

LIMESTONE SOLUTION COLLAPSE - LOW RISK

C1 ZONE CONTAINING ACTIVE COLLAPSE FEATURES

C2 ZONE WITH POTENTIAL FOR DEVELOPMENT OF COLLAPSE FEATURES

FAULTING OFFSET

EXTREME POSSIBILITY OF OFFSET

MODERATE POSSIBILITY OF OFFSET

LOW RISK FAULT PROJECTION ZONE (SEE TEXT)

LOW POSSIBILITY OF OFFSET

DEGREE OF LIMITATION

HIGH

MODERATE

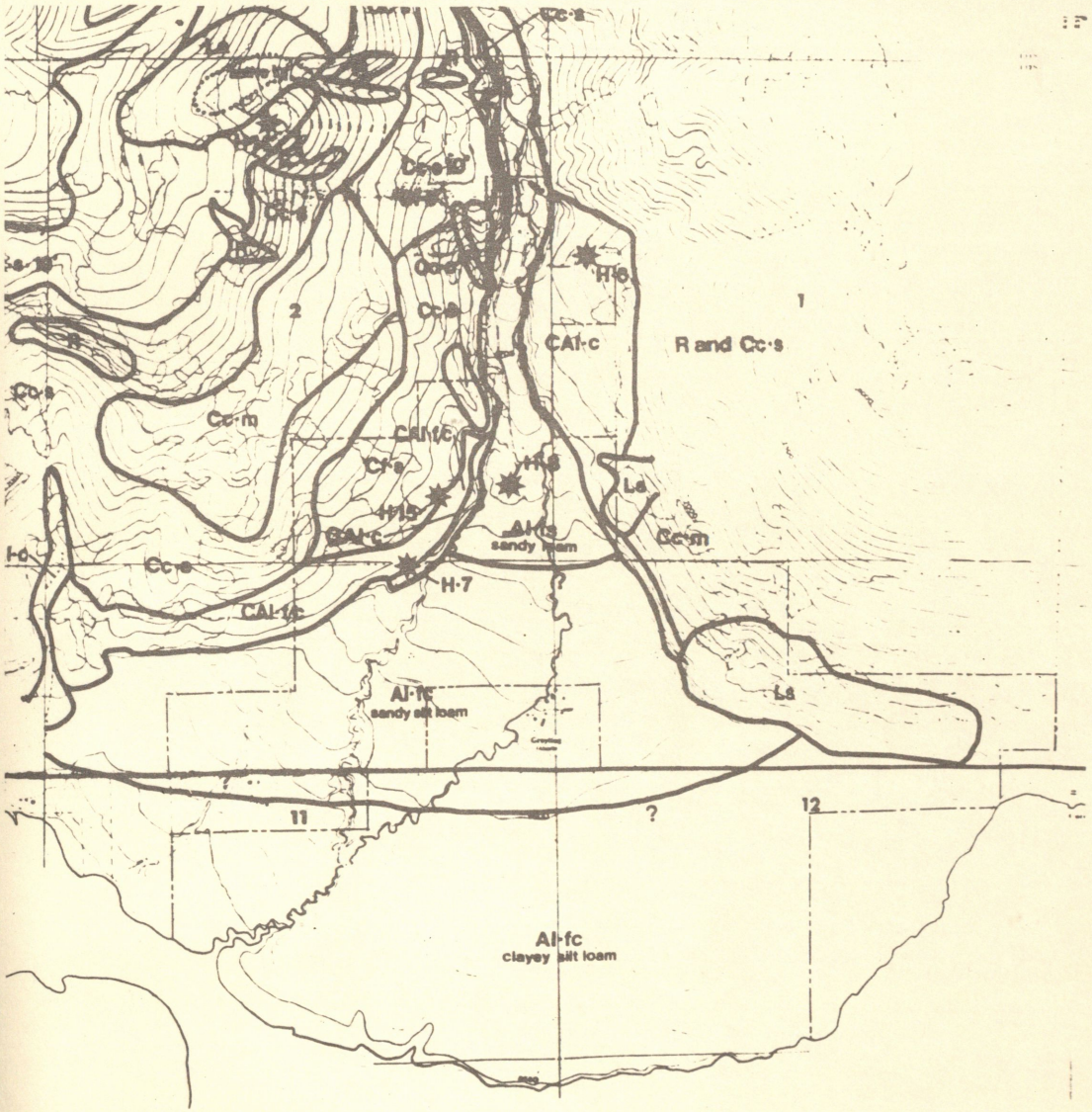
LOW

SKI YELLOWSTONE

SKI YELLOWSTONE INC.

WEST YELLOWSTONE, MONTANA

SCALE: 1" = 2000'



SOILS · SURFICIAL GEOLOGY INVENTORY

BY CLIFFORD MONTAGNE

SYMBOL	UNIT NAME
Al-c	COARSE ALLUVIUM
Al-fs	FINE SANDY ALLUVIUM
Al-fc	FINE CLAYEY ALLUVIUM
CAl-c	CO-ALLUVIUM, COARSE
CAl-f/c	CO-ALLUVIUM, FINE OVER COARSE
Cc-c	COARSE COLLUVIUM, CLAYEY
Cc-s(10', where on gentle slope)	COARSE COLLUVIUM, SANDY
Cc-m	COARSE COLLUVIUM, MIXED
Cf-c	FINE COLLUVIUM, CLAYEY
Cf-s	FINE COLLUVIUM, SANDY
Cf-m	FINE COLLUVIUM, MIXED
Ls	LANDSLIDE
R-f	RESIDUUM, FINE
R-c	RESIDUUM, COARSE

MAPPING UNIT BOUNDARY

DIRECTION OF SLOPE MASS MOVEMENT

? QUESTIONABLE OR DIFFUSE BOUNDARY

ACTIVE MASS MOVEMENT CRACK

SAMPLE LOCATION & NUMBER

SKI YELLOWSTONE

SKI YELLOWSTONE INC.

WEST YELLOWSTONE, MONTANA

SCALE: 1" = 2000'



SOILS· SURFICIAL GEOLOGY DEVELOPMENT LIMITATION ZONES

BY CLIFFORD MONTAGNE

LIMITATION TYPES.....

- LIMITATION FOR CONSTRUCTION: ACTIVE LANDSLIDE OR HIGH POTENTIAL FOR MASS MOVEMENT
- LIMITATION FOR SEPTIC TANK DRAINFIELD: LOW PERMEABILITY
- LIMITATION FOR CONSTRUCTION: INACTIVE LANDSLIDES
- LIMITATION FOR CONSTRUCTION: WET CLAYEY SOIL ON STEEP SLOPES
- LIMITATION FOR CONSTRUCTION: HIGH SHRINK SWELL AND FROST HEAVE POTENTIAL
- C1 — ROAD CONSTRUCTION & SKI TRAIL CLEARING IMPACT: SOIL EROSION ON STEEP SOUTH FACING SANDY PREVIOUSLY VEGETATED SLOPES
- C2 — LIMITATION FOR CONSTRUCTION: SHALLOW DEPTH TO BEDROCK

DEGREE OF LIMITATION/IMPACT.....

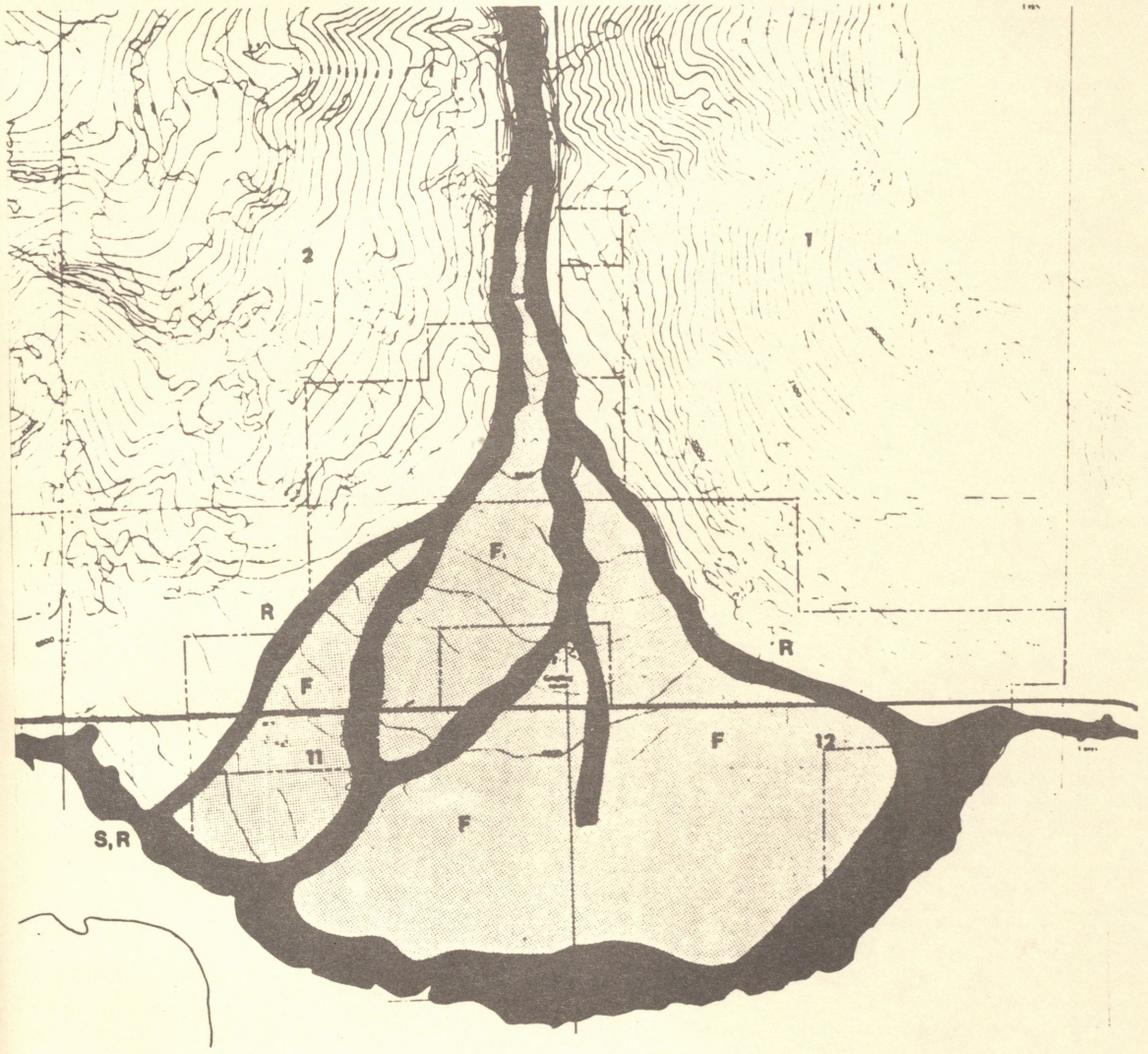
- SEVERE LIMITATION
- MODERATE LIMITATION
- SHORT-TERM MODERATE IMPACT OR LIMITATION

SKI YELLOWSTONE

SKI YELLOWSTONE INC.

WEST YELLOWSTONE, MONTANA

SCALE 1" 2000'



HYDROLOGY
DEVELOPMENT LIMITATION ZONES

BY DONALD ALFORD

LIMITATION TYPES

- CHANNELIZED RUNOFF
- SEICHE FLOODING: ASSOCIATED WITH SEISMIC ACTIVITY
- F — SHEET FLOODING: RESULTING FROM OVERFLOW FROM MAIN DRAINAGE CHANNELS
- QUESTIONABLE BOUNDARY

DEGREE OF LIMITATION

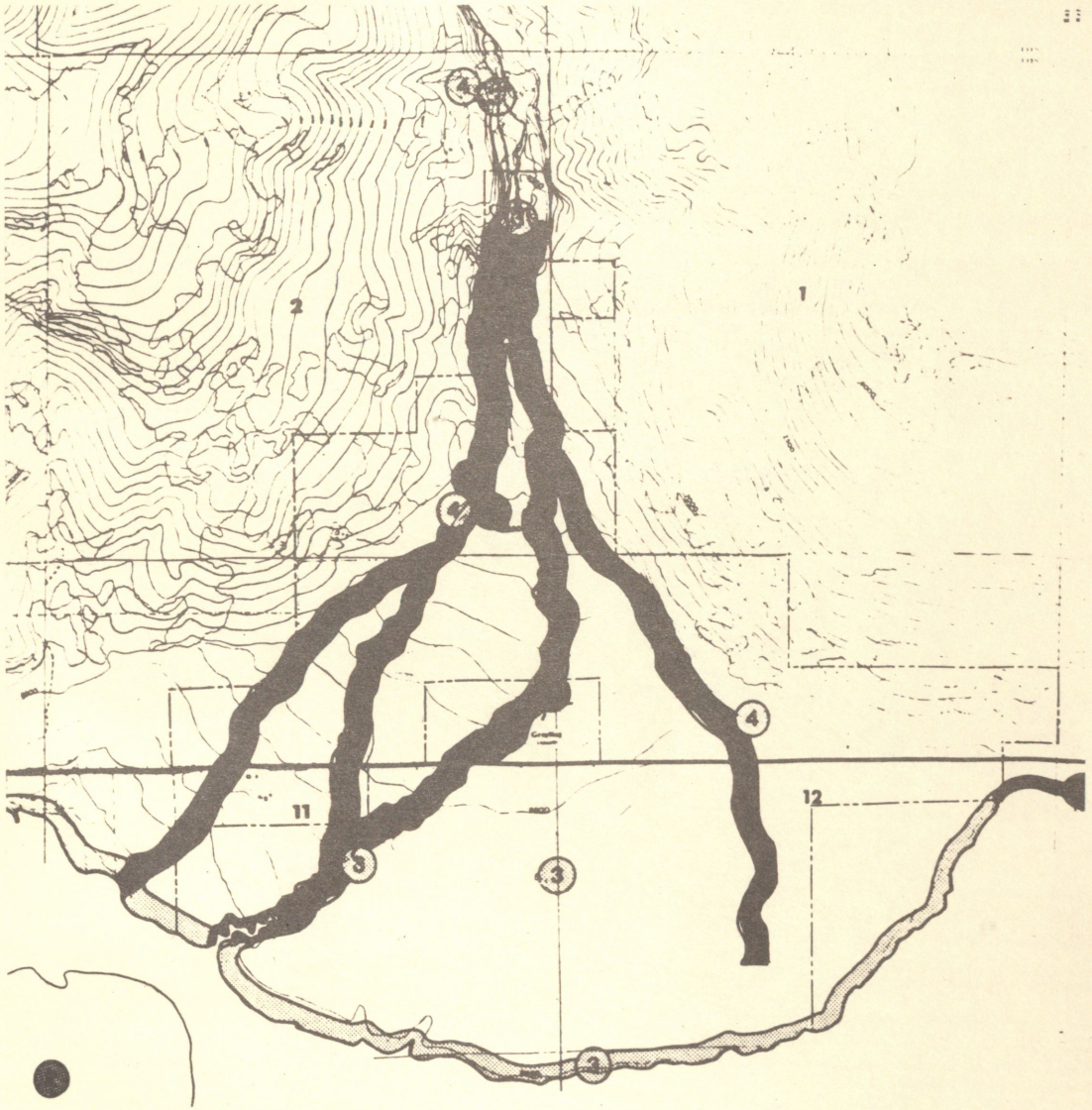
- HIGH INTERMITTENT
- LOW INTERMITTENT

SKI YELLOWSTONE

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ARCHAEOLOGY
DEVELOPMENT
SENSITIVITY ZONES

BY LESLIE B. DAVIS

FIND SPOTS AND DESIGNATED SITES
(SEE TEXT)

- HIGH SIGNIFICANCE
- MEDIUM SIGNIFICANCE
- (3) LOW SIGNIFICANCE
- (4) LEAST SIGNIFICANCE

DEGREE OF SENSITIVITY

- POTENTIAL HIGH IMPACT
- POTENTIAL MODERATE IMPACT
- POTENTIAL LOW IMPACT

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SCALE 1" 2000'



VEGETATION INVENTORY

BY BRENT M. HAGLUND

CONIFEROUS FOREST (CF)

- CF1 DOUGLAS FIR-SNOWBERRY
- CF2 DOUGLAS FIR-(SUBALPINE FIR)-SNOWBERRY
- CF3 DOUGLAS FIR-WHITEBARK PINE-BALSAMROOT
- CF4 SUBALPINE FIR-GROUSE WHORTLEBERRY
- CF5 SUBALPINE FIR-WHITEBARK PINE-GROUSE WHORTLEBERRY
- CF6 LODGEPOLE PINE-(SUBALPINE FIR)-GROUSE WHORTLEBERRY
- CF7 ENGLEMANN SPRUCE-GROUSE WHORTLEBERRY
- CF8 ENGLEMANN SPRUCE-WILLOW

DECIDUOUS FOREST (DF)

- DF ASPEN

SHRUB COMMUNITY (S)

- S1 BIG SAGEBRUSH-SNOWBERRY
- S2 WILLOW

SHRUB-GRASSLAND (SG)

- SG1 BIG SAGEBRUSH-IDAHO FESCUE
- SG2 BIG SAGEBRUSH-HOARY SAGEBRUSH-IDAHO FESCUE
- SG3 BIG SAGEBRUSH-WHEATGRASS
- SG4 BIG SAGEBRUSH-BALSAMROOT
- SG5 SNOWBERRY-(DOUGLAS FIR)-FIREWOOD*

GRASSLAND (G)

- G1 BLUEBELL-TIMOTHY-SMOOTH BROME
- G2 IDAHO FESCUE

FORB COMMUNITY (F)

- F1 BLUEBELL
- F2 CONEFLOWER-HORSE MINT-COW PARSNIP

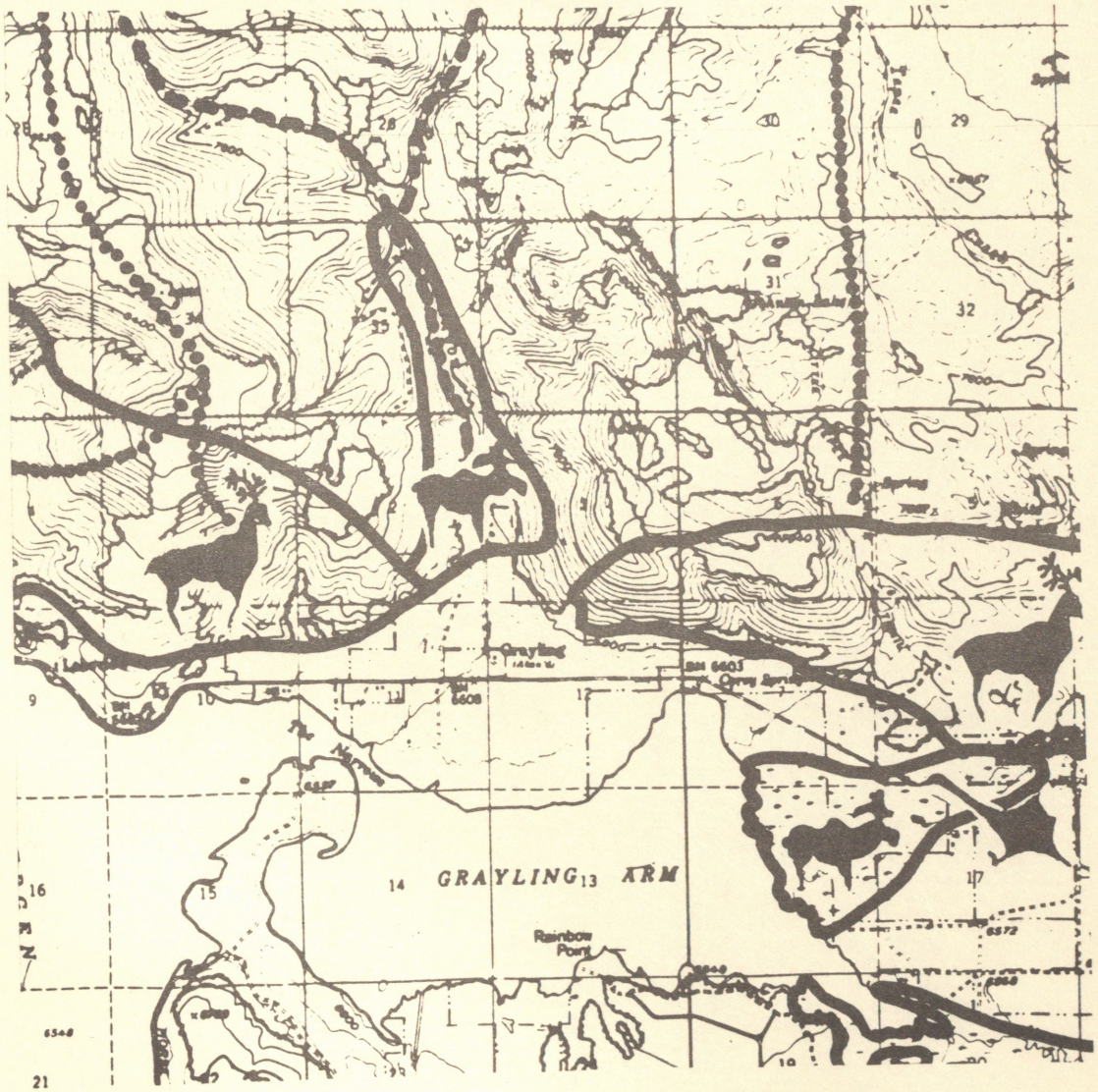
RUSH-SEDGE COMMUNITY (R)

- R RUSH-SEDGE

NOTES:
1. PARENTHESES INDICATE INVASION BY THAT SPECIES AND ITS EVENTUAL DOMINANCE AT THE SITE.
2. *CLEAR CUT SITE.
3. b-EVIDENCE OF RECENT BURN.

SKI YELLOWSTONE

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WILDLIFE

INVENTORY

LEGEND

MOOSE WINTER RANGE

ELK WINTER RANGE

ELK MIGRATION ROUTE

MOOSE MIGRATION ROUTE

WATER FOWL NESTING AREA

GRIZZLY BEAR RANGE

ELK SUMMER RANGE

MOOSE SUMMER RANGE

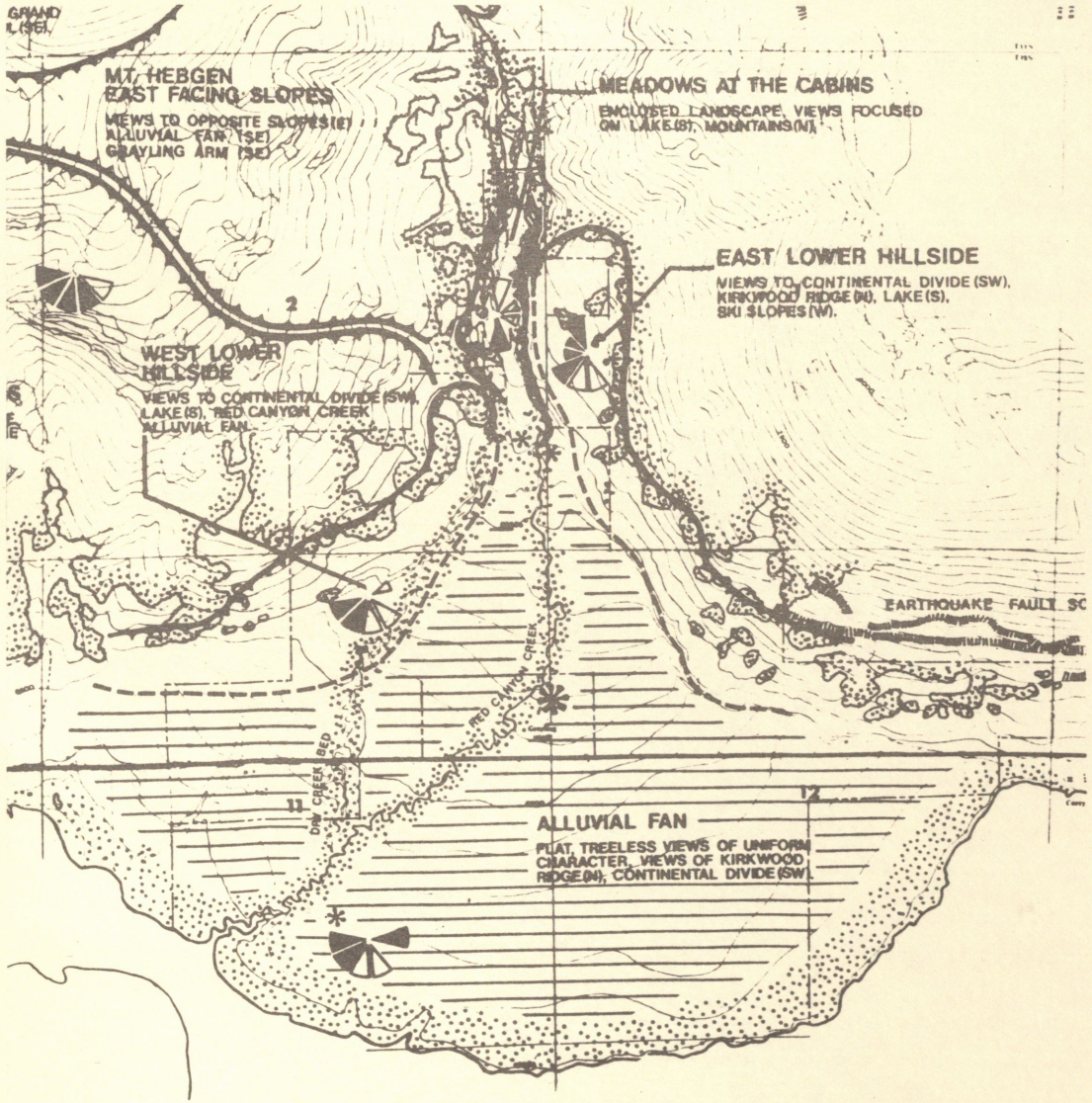
SKI YELLOWSTONE

SKI YELLOWSTONE INC.
WEST YELLOWSTONE, MONTANA

SCALE 1:62500

0 5000 10,000 FEET

0 1 2 MILES



SCENIC RESOURCES

VISUAL ANALYSIS

BY BEARDSLEY, DAVIS ASSOC. INC.

LANDSCAPE UNITS OF UNIQUE CHARACTER AND HIGH VISUAL QUALITY

OPEN BOUNDARY

AREAS OF UNIFORM CHARACTER

VALUABLE FOREGROUND:
- TREE EDGES
- CREEK BEDS
- WATER EDGE

UNIQUE LANDSCAPE FEATURES:
- FAULT SCARPS
- ROCK OUTCROP

STRUCTURES OF HISTORIC INTEREST

SIGNIFICANT VIEWS

FAR VIEWS OF HIGH QUALITY

FAR VIEWS OF LESSER QUALITY

NEAR VIEWS OF HIGH QUALITY

NEAR VIEWS OF LESSER QUALITY

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