dedication

This book is dedicated to my wife, Jody, and my son, Kyle. They sacrificed more than I am able to imagine.

Finally, I take this opportunity to thank my parents for moral as well as financial support during my years in architecture school. Your understanding has been very important.
acknowledgements

I would like to acknowledge:

STUDIO CRITICS:
Paul Kaseau...Design Critic
Jeff Culp...Systems Critic
Jeff Hall...Landscape Critic

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OTHER FACULTY MEMBERS:
Jack Wyman

FRIENDS & PARTNERS IN CRIME
Bob       Jay       Mark
Mike      John      
Ron       Al        
Teresa    Amy       
Steve     Dave      

SKI WORLD:
Phil....vice president
Jim....president
Carl....vice president
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bibliography
This thesis project involved an actual client; therefore major programmatic elements (site selection, ski run layout, skier capacity, lodge functional requirements) were established through meetings with the client or from information developed by ski area consultants hired by the client. The client is an Indiana based corporation operating under the name: SKI WORLD and is located at 3600 Woodview Trace, Suite 420, Indianapolis, Indiana.

The resort is to be located on 250 acres near Harrison, Ohio, and adjacent to the Whitewater River. Vicinity access will be from the I-74/State Road 46 interchange, 2 miles to the northwest. An existing gravel road provides direct site access. The site possesses 384 feet of elevation change, however only 360 feet will be utilized to provide vertical drop for the ski runs. The soil is sedimentary in origin and existing vegetation consists of hardwoods and brambles.

Major programmatic elements are: cafeteria, kitchen, bar; SHOWBIZ PIZZA PLACE, equipment rental facilities, ski school, administrative offices, retail area, day care/first aid, restrooms, locker spaces, on-site parking for about 100 cars and 20-25 buses and, an outdoor organizational space which includes an ice skating rink.
Along with the process of dealing with an actual client and incorporating that information into a design process, the major architectural design problem explored by this thesis was one of inter-related circulation systems. These systems are intra-building (within a single facility), inter-building (between buildings on the site), and exterior circulation from slopes to the slopes, parking lots, etc.

The main purpose of this book is to provide documentation of the project. I believe that, from an educational point of view, the process of arriving at a final design is more important than the final design, therefore the design process as well as the final product will be documented.

The book is organized to take the reader along the path followed by the author.
Consultants’ analysis

Ski World president, Jim Kendall, commissioned two ski area planning consultants; Ed Hannah of Franconia, New Hampshire and Nils Erickson of Ludlow, Vermont, to investigate site suitability for the planned development. Mr. Hannah began ski trail design in 1934 and has been involved in the design of over 250 ski areas from California to Maine. Mr. Erickson is president of Erickson Associates, Inc., an engineering firm specializing in ski lift design and layout, snowmaking system design, as well as ski area master planning. Mr. Erickson has been involved in 55 projects in 15 states as well as Austria and Norway.

A brief summary of their individual reports has been condensed to form the following summary:

A. The site has potential for a ski complex with a capacity of 3,000 skiers.

B. Parts of the face of the hill will require considerable earthwork for reshaping.

C. Two high capacity lifts (probably 4-place chairs) will be required.

D. Slope erosion control will be necessary.

E. For snowmaking purposes provide an off-river/onsite 2 to 3 million gallon pond.

F. Provide parking for about 1,000 cars.

G. A base lodge of 35,000 square feet will be suitable for winter/summer operations.

UPFRONT COSTS: (1981 dollars)

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trails (40 acres)</td>
<td>$280,000</td>
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<tr>
<td>Snowmaking</td>
<td>$750,000</td>
</tr>
<tr>
<td>Lifts</td>
<td>$750,000</td>
</tr>
<tr>
<td>Parking</td>
<td>$75,000</td>
</tr>
<tr>
<td>Lodge (35,000 sf)</td>
<td>$1,400,000</td>
</tr>
<tr>
<td>Maintenance</td>
<td>$75,000</td>
</tr>
<tr>
<td>Vehicles</td>
<td>$280,000</td>
</tr>
<tr>
<td>Utilities &amp; Lights</td>
<td>$200,000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$5,780,000</strong></td>
</tr>
</tbody>
</table>

CONCLUSIONS: The site appraisal indicates the possibility exists for development of a quality winter recreation complex.

* The SHOWBIZ PIZZA PLACE (approx. 5,000 sq. ft.) was, per the owners, added later.
Site Contextual Data

The proximity of the site to I-74 gives the opportunity for strong visual association for the lodge as well as the ski runs. A golf course/residential development opposite the river from the ski area is currently being planned therefore; potential traffic problems exist. An existing road, currently unused, located at the northeast corner of the ski area site will be re-opened, thereby providing golf course/residential area access.

The Whitewater River to the north of the property is a spring, summer and fall recreation area and provides the water source for snow-making activities, as well as a visual focus and property boundary.

Brecksville Reservoir and Whitewater State Park are both within 30 minutes by car and Cincinnati, Ohio, is within an hour. After the ski resort is fully developed, a waterslide will be added.

Since the site will be fully utilized, no expansion beyond the limits of this project is planned.
Site Location Map
Building Contextural Data

A facility of this scale is foreign to the area, therefore consideration of the rural/farming vernacular architecture was essential. However, the client wanted a facility that from I-74 would give a strong visual impact. Some midwest ski areas are nearly 24 hr. facilities therefore, the nighttime image was equally important as the daytime image.

In a larger context however, the ski lodge as a building type generates a set of criteria that may include natural materials, volumetric spaces, and places for comfortable, casual relaxation and conversation.

In summary, the contextural problem was one of proper imagery and maintaining a certain visual "impressiveness."

within the strong vernacular framework currently existing in the area.
Design Goals

* Skiing is a dynamic union of technology and nature; buildings should reflect that concept.
* Provide easy level changes
* Always consider that the facility will be seen from as much as 350' above.
* Buildings should have a nighttime and daytime image.
* Get to & from the slopes easily and quickly
* The parking lot side should have a different image than the image of the slope side.
* Provide for natural lighting
* The facility should be easy to maintain and repair.
* Be conscious of a budget.
Space Summary

Administration Facilities - 2,500 sq ft
Cafeteria - 10,200 sq ft
Kitchen Facilities - 8,440 sq ft
Retail Facilities - 4,200 sq ft
Equipment Rental Facilities - 10,400 sq ft
SKI School Facilities - 1,000 sq ft
First Aid / Day Care Facilities - 1,020 sq ft
Locker Areas - 2,000 sq ft
Bar - 4,180 sq ft
SHOWPIZZA Pizza Place - 5,000 sq ft
TOTAL - 44,540 sq ft

Remote Site Service Building - 3,496 sq ft
Snowmaking Pond - 7.5 gallons/1 cubic foot x 15' dia. depth = 27,000 sq ft

*the "sq ft" indicates square feet
Administration

The image of this portion of the facility should be one of efficiency & business. It should be available to employees, but not all visitors. Location needs to be near the lift ticket sales/equipment rental area, or as stated by the client "near the flow of the money."

The lift ticket sales area must be in a highly visible and accessible location.

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ADMINISTRATION — 12500

- ticket sales booths — 200
- stack/standing area — 1500
- ski area manager — 100
- assistant manager — 120
- secretary — 100
- conference room — 300
- restroom — 30
- storage — 80

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Cafeteria

The cafeteria is to be orientated to provide maximum views to the ski slopes. Because of the large scale, the seating areas should be divided into smaller more human spaces with fireplaces. The space should express an atmosphere of warmth and provide a wide range of experiences, both visual and social.
Kitchen

The image of the kitchen should be clean, efficient, and functional. Internal function must be smooth as the transition of food from prep area to serving line must be efficiently executed. The serving line(s) need adequate stack/standing space, and the check-out areas need to allow people to move quickly into the seating areas.

<table>
<thead>
<tr>
<th>Room</th>
<th>Size</th>
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<tbody>
<tr>
<td>Food prep/dish area</td>
<td>2400</td>
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<tr>
<td>Cooler</td>
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<tr>
<td>Freezer</td>
<td>80</td>
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<tr>
<td>Dry storage</td>
<td>500</td>
</tr>
<tr>
<td>Trash storage room</td>
<td>120</td>
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<tr>
<td>Restroom</td>
<td>30</td>
</tr>
<tr>
<td>Office</td>
<td>80</td>
</tr>
<tr>
<td>Custodian</td>
<td>30</td>
</tr>
<tr>
<td>Employee lounge</td>
<td>100</td>
</tr>
</tbody>
</table>

KITCHEN 3440 sq ft

[Diagram of a kitchen layout with labeled areas such as kitchen, cafeteria, serving lines, and environmental sound barrier.]

Revised

According to a recent study, the demand for a new facility in the downtown area shows promise for increased business. The current building has not been able to accommodate the growing demand over the past few years, and there is a need for a new facility.
Retail

Visual as well as physical access are of paramount importance. The space should be a neutral background for the display of merchandise and should provide specialized areas for clothing and apparel and, boots, skis and poles. The retail facility remains open all year therefore, visual access from the road and parking lot is necessary.
Rental Area

This area must lead the first time skier through the rental process and to the slopes. Circulation is the primary concern and the construction must be durable as the area will be subject to excessive abuse caused by movement of equipment through the facility. The area will eventually house 2000 pairs of skis, 4000 pairs of boots and 3000 sets of poles.

EQUIPMENT RENTAL 10,400 sq ft

- ski & pole storage ----- 3900 sq ft
- boot storage ----- 3500 sq ft
- demo rental area ----- 150 sq ft
- boot fitting area ----- 800 sq ft
- ski equipment repair ----- 400 sq ft
- storage ----- 250 sq ft
- 15% standing/stack space ----- 1500 sq ft

--- highly visible ---

--- protected view areas ---

--- light views ---
Ski School

The ski school facilities should provide a retreat for instructors as well as locker and restroom areas. There will be 10 men and 10 women instructors. A classroom for lectures and films should be provided.
First Aid

These two functions will be run by a common supervisor, probably an L.P.N. Day care should be accessible from the slopes while the first aid station must have parking lot access, then to the road. The First aid station will provide comfort and stabilization for the trip to the hospital at Brookville.
Bar

The bar should be a place for interaction and relaxation. This area is one of the primary functional spaces and should include an outdoor terrace. A place for small musical/entertainment groups should be provided. The area should have views to the slopes and access to a kitchen. Indiana law requires that the facility be lockable.

\[ \text{BAR} \quad \underline{4180} \]

- Stand-up bar: 300 sq ft
- Cooler: 120 sq ft
- Liquor lock-up: 200 sq ft
- Trash room: 100 sq ft
- Snack kitchen: 200 sq ft
- Seating (120 people): 2400 sq ft
- Stage: 400 sq ft
- Restrooms: 240 sq ft
- Waitress station: 100 sq ft
- Video game area: 190 sq ft

* indicates facilities that are shared with SHOWBIZ PIZZA.
Service Building

This building must have access to the entire site. This will be a "shade and shelter" type of construction with space for employee lockers and clothes changing. Vehicle storage, vehicle service, equipment repair and snowmaking pumping equipment storage are the primary functions.

SERVICE BLDG. 3405

- Service office: 1000 ft
- Parts storage: 2000 ft
- Fuel storage: 1500 ft
- Locker rooms: 3750 ft
- Showers: 1400 ft
- Vehicle storage: 2800 ft

Vehicle access

limited access, no public
Plaza

- **skating** - a 3000-5000 sq ft refrigerated area that is secondary to slope-side activities but, primary to plaza activities.
- **gathering place** - a place for large & small group seating. Must have views of skating and skiing activities. Include an area for outdoor cooking, parties etc.
- **orientation area** - An area that, upon arrival or leaving, provides an assembly/orientation node outside the buildings. From here the "places to go" should be easy to see and get to.
- **observation area** - An area for observation of skiing, skating and other social activities.
- **point of reference** - the "meet me here" spot for the entire resort. Research indicates that similar example often have a major vertical identifying element.
- **crossing point** - A times of multiple bus arrival at the drop off area, there will be a large amount of traffic with persons going different locations.
- **social area** - an area to "see and be seen."

Other functions that may work well on the plaza are: daycare/first aid, ski school, equipment rental and repair.

(See over-leaf for plaza schematic diagram)
Research

Introduction

As previously stated, I believe that the process by which a final solution is obtained is of equal importance to the final solution. Therefore, this section of the book will, through sketches, drawings and support text highlight personally significant points in the design process. The reader should be made aware that the information presented is intended to give only a general overview, not a detailed history of all studies and solutions.

Preliminary research consisted of two resources; those being building types studies and documented travel. Buildings type research focused on similar ski-lodge facilities, ski resorts, ski lodges, other convention/assembly facilities as well as other thesis projects. Travel research included ski trips to similar size midwestern ski resorts as well as a trip to a large Rocky Mountain resort. Because of the presence of a client, their collective input proved to be a great help in establishing the imagery criteria they required as well as an informational source concerning the daily "nuts and bolts" level of resort operations.

Major conclusions obtained through the research process were:

A. There exists a specific "image" within the building type.

B. Public outdoor gathering places are very important and can be very enjoyable spaces.

C. For the first time, visiting important spaces (i.e. lift ticket sales, ski rental, ski shop) was sometimes a difficult task.

D. Major gathering places (i.e. bars, cafeterias, etc.) often failed to provide maximum views to the slopes and outdoor areas.

E. Expansions were inappropriate and awkward.
Concept Formation

This conceptual sketch was the result of an idea that all major functional spaces should relate to a central, amorphic circulation spine. The spine would extend beyond the building into the site by the use of land forms and vegetation.

The spine idea appears in the final solution, but in a linear, non-amorphic manner.

**Positive Aspects**
- the linear spine on a linear site.
- variety of experiences

**Negative Aspects**
- the "pods" along the spine can impose an unwanted hierarchy in view potentials.
The idea of an interior centralised plaza was explored by this series of sketches. The concept was multi-level and axial in nature.

**Positive Aspects:**

- Centralised public space
- Things are very accessible

**Negative Aspects:**

- The concentrated compactness of the scheme fights the linear nature of the site, thereby creating extreme distances to and from the extremities of the site.
An early imagery sketch to explore the gable roof, bridges, and laminated timber construction.
These sketches are general studies of section, structure and the introduction of mechanical systems integration.
A sketch to study the idea of a "great wall" idea as viewed from I-74, and the general impact of the ski runs on the landscape.
Sectional and structural studies.
Schematic Design
Jury Summary

- The large V-shaped wall is very imposing. How does a person orient himself along the wall?
- Consider using the patterns of ski storage nicks to an advantage, not an eyesore.
- The symmetry is artificially induced.
- Make more from the outdoor spaces.
- The pond should be more architectural.
- The hi-tech/nature union is a good concept.
- The overall imagery is appropriate.
- The parking lot scale is a real problem.

Personal Crit

The large wall was too much! I felt that, considering the quickness of the design process, the scheme established an overall direction and scale as well as an imagery that worked well.
This sketch established the concept development for the project. A Diagonal circulation spine through a series of spaces.
A sketch of the entrance from the plaza to the main building.
Studies of section, level changes and circulation spine through spatial volumes.
Section study using a flat roof on part of the facility. This sketch was reference for the development of the final solution.
1st Presentation
Jury Summary

Jury members: Meden, Koester, Fellows, DeDeome, Laseau
- overall building form does not express the idea of a "wall" between parking lot and ski slopes.
- The inside/outside relationship is hindered by looking through the roof.
- give a lot of consideration to summer activities.
- consider stronger relation to the river.
- zoning may need re-thinking
- circulation between buildings needs improvement.
- The entire facility needs to become more of a circulation/movement plan.
- need more outdoor terrace areas.

Personal Crit

The variety of interior spaces created are interesting however the zoning of the retail/cafeteria areas do not allow good views from seating to the slopes.

I believe the overall intensity of this 1st quarter presentation was too much. A lot of time was spent on presentation prep that could have been used developing a basically good concept.
A sketch to begin refinement of circulation and zoning. Note the beginnings of the plaza form and the funneling effect created by the two buildings.
A sketch of a plan study. The concept of the wall has been compromised for improved circulation and quality of the plaza space.
A sketch of the plaza showing building orientation similar to the plan shown on the preceding page.
The plaza & building orientation establishing an axis with the skating rink as the focus of the axis.
A perspective sketch of the plaza from the parking lot. The covered arcade was added to increase the sense of entry.
This dormer section was utilized to improve the view of the slopes from the upper levels.
Design Development
Jury Summary

- I should not have worked with an actual client; this may have hurt the thesis process.
- The building form does not reflect the conceptual notion of a wall between the parking and the slopes.
- The systems corridor is a good idea.
- Verbal presentation should reflect more enthusiasm for my project.
- I need to unify the two building concepts into a compositional whole.
- Consider the impact of many people coming from the slopes to the buildings.

Personal Crit

I am fairly pleased with the project. The dormers need better integration into the overall image. I planned to remove all sloped roofs from the north side elevation.
3 Final Product
From the southwest
From the northwest
A Parking lot (Auto)
B Bus and overflow parking
C Service center
D Snowmaking pond
E Base lodge
F Equipment Rental Building
G Skating rink
H Drop-off
I 4-place chair lifts
J T-bar tow (surface lift)

1-6 Main ski runs
7 Beginners area
Plaza Level Plan

A  Cafeteria seating   Sales
B  Apparel Displays   Return
C  Storage
D  Ski/Boot/Pole Displays, Room
E  Assistant Manager and Lockers
F  Manager
G  Conference
H  Secretary
J  Boot Storage

10'  20'  30'
A. Elastomeric Roofing
B. 3" styrofoam insulation
C. 5/8" T-111 plywood
D. Wood "Truss Joists"
E. glu-lam beam
F. 5/8" vinyl-covered sheetrock
G. 6" fiberglass batts
H. 2x4 wood studs & 2x6 furring
I. 3/4" Thermax
J. Flooring
K. 1/2" T&G Flooring
L. 5/8" MDO plywood
M. T-111 plywood (5/8"
N. Hollow metal frames
O. 1" Bronze glass
P. Wood trim
Q. 1/8" T&G Flooring
R. Wood "Truss joists"
S. Suspended ceiling
T. 1" Thermax
U. 8" reinf. conc. walls
V. 4" conc. slab
W. 8" conc. grade. beam
**Structure**

The structural system is set up on a 20' longitudinal and transverse axis. Column members were intended to be 8"x8" wood, however, because of large slenderness ratios, the decision was made to use 8"x8" steel tubes. Primary roof and floor structural members are glulam beams and are, for the most part, running in the longitudinal direction. Depths are between 10" and 24" deep.

Secondary roof and floor structural are wood "truss joints" and spaced at 6'0" on center for floors and 4'0" on center for rafters. The gables over the bar and pizza area are to be timber trusses with glulam purlins @ 4'-0" o.c.

**HVAC**

H.V.A.C. systems will be hydronic and multi-zoned. Because the main lodge will operate only 3 to 4 months on a full-time basis, the system will include a plenum boiler heating plant, thereby allowing partial shut-down.

The cafeteria will have 6 to 8 air-handlers, the bar and pizza areas will have 2 - 3 air handlers and the kitchen will have 1 air-handler unit. Units and main trunk lines will be housed in a mechanical systems corridor that runs almost the entire length. Feeder ducts will be exposed and painted. The main lodge will be air-conditioned while only the administrative offices (served by a heat pump) will be air-conditioned in the rental building.

Fresh air will be brought in through the circular intakes on the north facade, while exhausted air will go through the cylinders on the southern roof.
Conclusions:

- I have learned the value of the quick perspective sketch. It can add life, where a model only gives form; AND IT'S FASTER!!

- Before the design process begins, the problems to be solved must be understood very well because, more problems surface as the process continues.

- Be willing to abandon an idea but never throw out the sketch or forget the idea.

- Don't abandon or eliminate an idea because it may not be "current" because, there is no such thing as "current"!

- Be receptive to ideas obtained from everyone, everywhere and anyone!!

- Future thesis students should be very aware of the commitment they should be making.

- During the first quarter (or early in any design process) spend a lot of time "getting to know" the nuts and bolts of the project.

- Bi-weekly, informal desk critiques by fellow students and faculty might force (gently) all students to keep active in their and each others projects.

- In spite of Professor A.E. Palmer's criticism, the limited amount of client involvement I sought proved to be a benefit. What better way to prepare for the "real world" than by bringing a little to school? Perhaps his comment reflects a shortcoming in that most students one quarter from graduation have not been given this educational opportunity? I would recommend all thesis students at least begin their project as if it were being scrutinized by a client; not as if design decisions are removed from their influences.
- Ski World -

bibliography

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