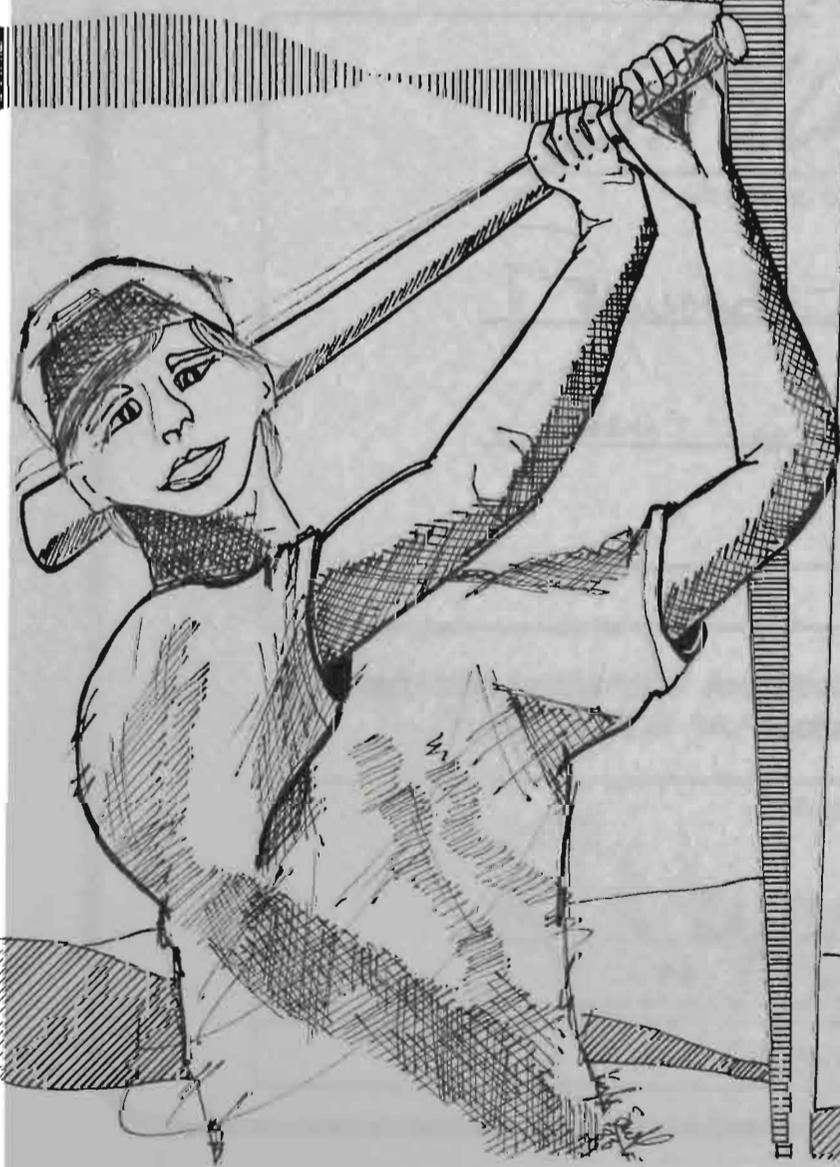
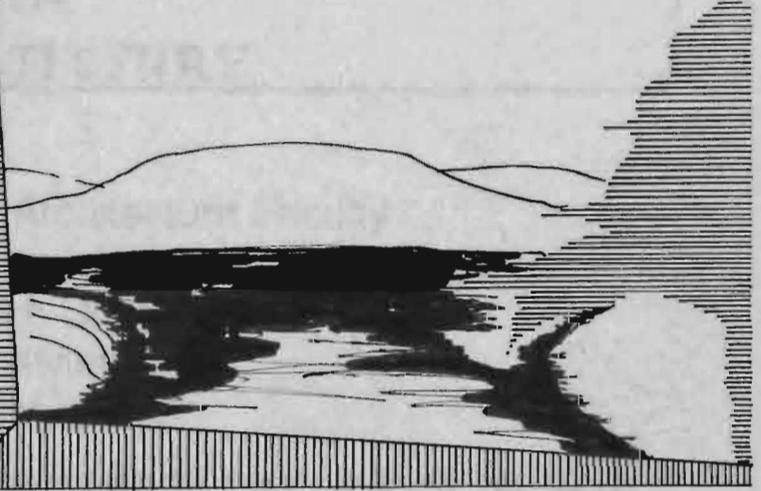
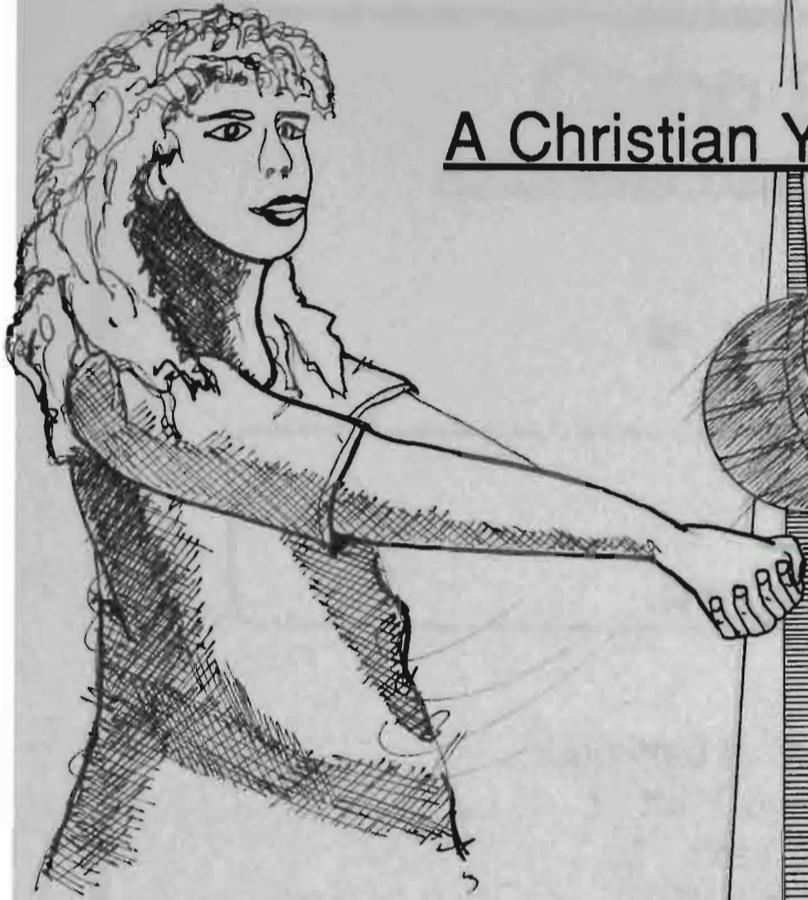


Camp Bright Star

A Christian Youth Athletic Encampment



Camp Bright Star

A Christian Youth Athletic Encampment

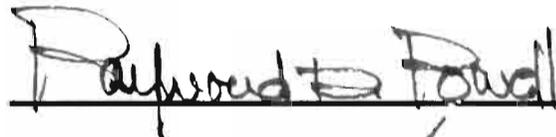
by
Mr. Kyle Bradley Smith

A THESIS
IN
ARCHITECTURE

Submitted to the Architecture Faculty
of the College of Architecture
of Texas Tech University in
Partial Fulfillment for
the Degree of

BACHELOR OF ARCHITECTURE


Chairman of the Committee





Programming Instructor of Architecture 4395: Dr. R.A. Petrini de Monforte
Design Critic of Architecture 4631: Professor Lehmann

Accepted


Dean, College of Architecture

December, 1988

ARCH

AC

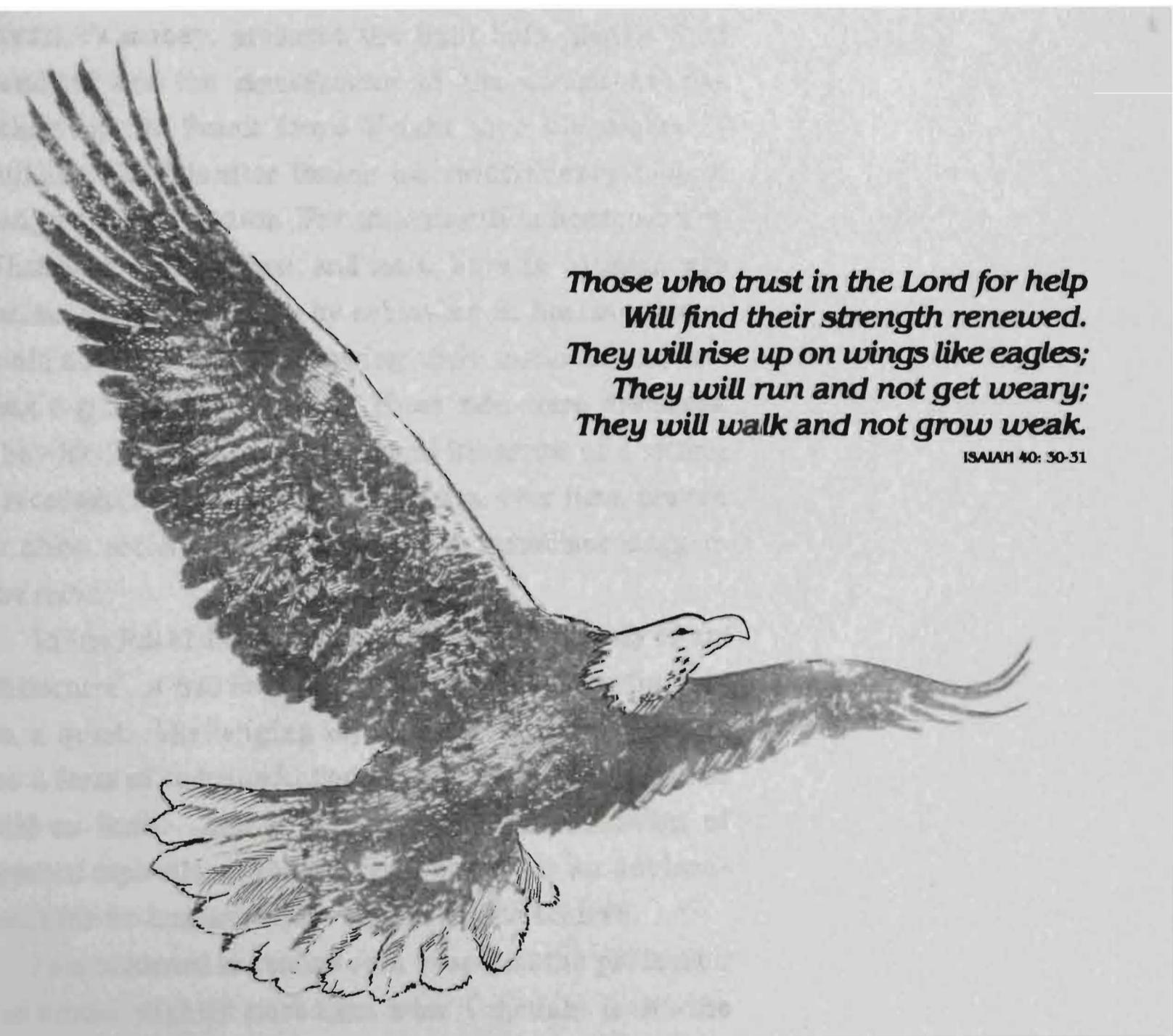
SOB. 2

T3

1988

no. 51

This program, indeed the pursuit of my architectural dream, is in dedication to the unrelenting parental and financial support given by Dean and Raylene Smith.



***Those who trust in the Lord for help
Will find their strength renewed.
They will rise up on wings like eagles;
They will run and not get weary;
They will walk and not grow weak.***

ISAIAH 40: 30-31

Preface

From time to time we humans are challenged in our capabilities. Usually it is only by a challenge that we can understand if what we are pursuing is worthwhile or if it is not. And usually it is only by a challenge that achievement is attained. Consider, as a matter of precedent, that Thomas Edison, after several attempts of burning up his investor's money, produced the light bulb; Henry Ford persisted and the manufacture of the automobile was achieved; and Frank Lloyd Wright shed the doubts of building officials after testing his revolutionary column design for the Johnson Wax administration headquarters. What each of these men, and more, have in common was meeting their challenge by achieving it, hearing that it could not be done but following their instincts, and setting a goal and reaching it. These men were dreamers. They lived a life of seeing beyond tomorrow and setting precedent in their day. The result has, over time, proven to affect society at a dimension that sometimes staggers the mind.

In the fall of 1982 I began a challenge; the study of architecture. It has been, and I believe it will continue to be, a quest. Challenging my intellect, architecture is to me a form of communication as delicate as Chopin and as bold as Bach. And it is this built communication of dreams, aspirations, and desires that creates an environment for we humans to live out our life—to achieve.

I am saddened to realize each year that the profession has eroded slightly more than what I thought it was the year before. Notwithstanding the fact that architects have given up landscape design, interior design,

structural design, electrical design, and the list goes on; architects have, for the moment, given up the art of building. Relating the fertile imagination of Brunelleschi that led to a new usage of classical architecture in the construction of the Cathedral of Florence to the over 1500 fallen glass panes of Pei's Hancock Building; one becomes convinced that architects have forgotten how to build. The awe of building the magnificent no longer exists. Unfortunately, the lay person perceives this phenomenon and thus places little importance on the need to hire an architect.

I recently overheard a traveler comment about an airport on the east coast. He said, "...and I didn't realize that so much design went into an airport...". Of course that remark is ludicrous to the architect but it is typical of today's mindset in America. This attitude stems from a lack of urgency leading to a notion that architects no longer have anything to offer society.

The truth is quite the reverse. Architects are the ones who are responsible to the environment; accountable to the building requirements with state-of-the-art technologies; creators of the visual continuity of the city's aesthetics; and solvers of the needs of the user by satisfying our behavior characteristics. Architecture is that discipline which has the knowledge and skill to recognize and understand the client's aspirations, dreams, and desires and the talent to transform them into reality. The architect is the motivator; the creator of beauty, perceived at first by one, is successful when perceived by many.

Students and architects alike must realize that the profession's deterioration is self induced and only architects can reverse this trend if employment is to be ascertained by the turn of the century. When architects regain the art of building, a reeducation of the client will ensue; only then will the profession begin a revival.

Most recently I finished my first residential commission of the design and construction of a swimming pool. It was truly a labor of love to experience the precision of the drafting table carried over to the job site. I shall never forget the paradox of a five ton back-hoe excavating the delicate curves of my design. My plumbing, forming, welding, and supervising the construction reinforced to me that the designer does not only belong in the office but at the job site as well. To feel our materials and to build as we specify is to achieve our challenge.

Architects have been labeled egocentric throughout history—and many have been. It has been suggested that architects must possess the quality of egotism in order to solve the design problem; seeing all aspects of a problem the architect is located at the foci to observe what is in front, behind, at the sides, above, and below. I agree, in principle, with this philosophy. But as a matter of practice I believe the world does not revolve around the architect, rather the architect revolves about the world. Our many customs, cultures, religions, and languages are so varied that the architect must be at the outside looking in as well.

My Roots—

To facilitate my mission, I must first acknowledge a basis upon which my experiences have been built. I have only traveled the world with books and magazines; I have limited experience traveling the country. But what I have observed is that no matter the place, it is the interaction of people that defines a society. And that society is irrevocably destined to the norms and values exhibited by her people. Moreover, that society is formulated by one's introduction to life—an introduction encouraged by the family unit.

I am a most fortunate individual who has a strong family to rely upon. My father and mother have provided me, as well as all members of my family, the best years of their life, giving me a middle class family unit by the world's standards but exemplifying to me moral integrities by God's standards. I am fortunate to inherit commitment, honesty, and patience from my father; and articulation, conviction, and persistence from my mother. My older sisters, Nancy and Sheri, have been, and always shall be, very close to my heart and my thoughts. They are perhaps spending their life in a most important role. Nancy, the artist, is lending her talents in the education of an invaluable resource—children; while Sheri is furthering the heritage of the family unit as a mother and yes, there is such a thing, a home-maker. My older brothers, Kelly and Greg, were a most troublesome pair as I was growing up and it is only recently that I have come to realize an appreciation for them both, in their own right. I have learned, perhaps in the past five years or so, a great respect for Greg as he is doing the Lord's work and isn't that what its really all about? To all of my family, immediate and not, I thank God for you.

Moreover, experiences which have shaped the formulation of the thesis include persons that I have engaged in friendships with while researching the topic in Virginia. Without the help of Trish Johnson, a most delightful personality, my fifty rolls of film would have become quite disorganized; my pilot, Kevin Johnson, kept the action of the site aerial reconnaissance alive with skill and perfection levels levied on him, indicative of his professionalism. Persons of whom the thesis was researched, in part, provided me with an excitement and reflection of my youth; Wendy Hale, Ali Hoskins, Rachel Tate, Bryan Fisher, Todd Spangler, and Philip Pyles I thank you.

Most importantly, however, was the sense of immediacy, the calling and answering of the question: Why should I devote a year of academic study to this topic? I grasped this question in the summer of 1987 and my decision was reaffirmed in 1988 via the fervent delivery of Dr. Charles Fuller's messages. For it is the message that is most powerful; the primary instrument of urgency to me was this messenger.

The Mission—

I hold that architecture is composed of art and craft based in theory. The artistry of architecture is the painting of space with illumination. Forms, solids, and voids are visually perceived by the individual only with light. But architecture is also felt—both physically and psychologically. The pallet then becomes responsible for textures of materials to be perceived by the touch and under foot solely to complement perception. Additionally, architecture is heard. The acoustics of a space either project sound or retain sound. It is the artistry of architecture which creates perceptions.

Architecture is also a craft. If space is to the architect like the scalpel is to the doctor, then space is the tool of the architect. By cutting, compressing, and pulling a volume, space is crafted. Mathematics facilitates the proportioning of space and engineering facilitates the building of what has been crafted. The craft of architecture is responsible for accommodating an activity or series of activities. When the craft links space, a progression through time begins. It is the craft of architecture which creates experiences.

A theory can be described as a systematic ordering of knowledge which is applicable to a variety of life's situations. Architecture is foundationally based in theory which is tested daily by our living, working, and worshipping. Many times the *who* and *what* of architecture

are less difficult to define than the *why*. An architectural theory I would like to base my hypothesis' *why* upon is the "Organic Theory". This theory postulates that the whole is more than the sum of the parts and that if each part is to be understood, it must be studied in terms of its relationship with the whole. For example; by studying the hand of an individual, one would not understand the individual until the relationships with the arm, body, and mind are understood. This theory holds that function and form are elements and if form is to function it must be beautiful, and if so they are thereby indivisible.

Therefore, architecture is an experience reinforced by perception; with origins in theory, space is created for the living out of one's life.

-Kyle B. Smith

Table of Contents

Preface i

Chapter One Camp Bright Star

Project Statement 1

Chapter Two The Context

Major Landforms of Virginia	3
The Jefferson National Forest	4
The George Washington National Forest	5
The Blue Ridge Parkway	6
Bedford County, Virginia	7
The District	8
Resource Inventory	9
Smith Mountain Lake	12
Soil Erosion and Runoff	14
Transportation	14
Rail Lines	15
Water	15
Wastewater	16
Solid Waste	16
Emergency	17

Chapter Three The Site

The Reconnaissance Survey	20
Deer Migration	22
Land Configurations	23
Physiographic Character	24
Sensory Qualities	25
Vegetation	26

Chapter Four The Issues

Issues Addressed 34

Chapter Five Goals and Objectives

Relative to the Users	55
Relative to Society	57
Relative to Design	55

Summaries

Chapter Six Contextual Study

Historical	59
Environmental	61
Cultural	64

Chapter Seven Activities Study

Administration	67
Food Service	76
Athletics	88
Living	101
Spiritual Growth	104
Outdoor Growth	106

Chapter Eight Spatial Study

Summary by Activity Type	111
Summary by Occupancy Type	116
Summary by Site Development Type	116

Chapter Nine Performance Study

Acoustics	117
Communication and Signal Systems	121
Fire	121
Illumination	123
Thermal Control	127
Transportation Systems	128
Water Systems	129

Chapter Ten Cost Study

Buildings	133
Site Improvements	133
Site Preparation	134

Case Study

Table of Illustrations

1. Major Landforms of Virginia	3
2. Jefferson National Forest	4
3. George Washington National Forest	5
4. Blue Ridge Parkway	6
5. Bedford, County, Virginia	7
6. Geologic Divisions	10
7. Smith Mountain Lake	12
8. General Soils	14
9. Automobile Transportation	14
10. Rail Lines	15
11. Water Systems	15
12. Wastewater Discharges and Treatment Systems	16
13. Solid Waste Landfill and Greenbox Sites	16
14. Emergency Support	17
15. Orientation Grid For On Site Survey	20
16. Deer Migration and Sightings	22
17. Land Configurations	23
18. Physiographic Character	24
19. Sensory Qualities	25
20. Vegetation-Trees	26
21. Roof Monitors	123
22. Clerestory	124
23. Passive Ventilators	127
24. Elevator Opening Clearance	129

Table of Tables

A. Sound Absorption Targets	118
B. Sonic Territoriality	119
C. Water Recycling	131

List of Maps

Topographic of the site	19
-------------------------	----



Project Statement

1

Camp Bright Star

Bright Star— Historically, the site area has been referred to as the "Bright Star" of Virginia. Roanoke, a city 30 miles west of the site, has been coined the *bright star* of southwestern Virginia. In fact, this community has placed a gigantic steel and neon 5 point star of David atop the nearby Mill Mountain as a reference to the community spirit present in the attitudes of her people. Symbolically, I am using the term *bright star* to indicate enlightenment; this term postulates that no matter how dark—a bright star in the distance brings light, brings a life changing experience, and brings the dawn of a new day. It is the *changed for the better* individual that I am concerned with; an encampment is an indicator that one who goes in is not by necessity the same one that comes out. This means the encampment is of *enrichment* rather than of *riches*.

Project Statement

Mission—

The mission of the encampment can be described by the following special characteristics:

- The mental development of the individual by the converging of different youth, from cities throughout the country, developing a comradery, friendship, and closeness that heightens social and emotional growth of the individual. This growth occurs in the living, eating, and campfire domains of the encampment.
- The physical development of the individual via sports skills awareness which instills a respect of the body thru a strive for athletic excellence. This sports skills awareness occurs in classroom places and the physical growth of the individual occurs in athletic places like swimming pools, athletic fields, and athletic courts.
- The spiritual development of the individual, thru a medium called athletics, so that, through Christ, a foundation for living may be ascertained. In this context, athletics is used in physical settings to illustrate Christian ideologies in practice and in patience. Spaces required for this characteristic include: Bible study places, devotional places, and worship places to provide fostered human environments.
- The observation and exploration of the environment which induces the individuals growth, as a human, recognizing one's unique kinship with nature. This kinship is experienced by the encampment's human users through hiking paths, unique observation points about the path, and outpost living domains from the main camp setting.

Scope—

The distribution of users in this setting is: 760 youth per session, seasonally administering 3040 youth supported by a personnel of 76 adult counselors and administrative staff of 60. Activity groups of this setting include: aquatics, land sports, indoor sports, outdoor growth, worship, living, administration and maintenance.

Location—

The site is located at Smith Mountain Lake, Bedford County, Virginia (illustration 7). And is situated on approximately 293 acres of land. The site is bounded by a state park property line to the north and east, the state park entrance road 911 to the south, and Walton Creek to the west. The site is accessed (illustration 9) from ground by county road 626 south of the City of Bedford and accessed from air by the Smith Mountain Airport.

Major Architectural Thrust—

The mission of this facility possesses characteristics of campus planning. These characteristics are: group living domains, both eating and sleeping; group athletic places; and group worship places. Additionally, the mission characteristics are of an individual nature; experiencing the native environment and experiencing the spiritual philosophy are elements to be perceived by the user. In both cases, group interaction or individual interaction, campus planning is required to link these elements.

By creating paths, architecture creates the campus' circulation. It is how I can facilitate the movement of people throughout the campus while at the same time be sensitive to the environmental context. This sensitivity may come in the form of allowing the path to conform with the topography or by making a design decision not to pave any exterior path in fear of not respecting the context.

By creating places, architecture creates various moods of the campus. The mood of the experience is remembered by the user in living, learning, and worshiping. I can orchestrate a place's mood by articulating daylight. Moreover, I can utilize symbols to give meaning to places. This may be in the form of using known symbols for the mission or designing the space as a symbol of the mission's function.

And by creating domains, architecture orchestrates behavior settings within the campus. These settings can be introverted to focus on an activity, for example learning a sports skill; or extraverted to allow freedom, for example hiking along the trail to become "lost" in the wilderness.

Campus planning is a form of city planning. Administration, maintenance, and infrastructure criterion are examples of why this is true. Therefore, the major architectural thrust is not only in building design but in how and why buildings are and their relationships with each other as an integrated whole, hence campus design.





ILLUSTRATION 1

The primary landforms which describe Virginia are the Appalachian Mountain Range, to the west, and the Atlantic Ocean, to the east. The entire state is characterized by rolling landscapes, open grasslands, and tree blanketed mountains.

The Appalachian Mountains was the home for Native Americans such as: the Erie, Honiason, Moneton, and Cherokee. These Indian tribes lived in the mountains and the British Colonies settled the lower lands to the east.¹ Beyond the summit of the Appalachians, to the west of this landform, LaSalle began his journey south to chart the French exploration of America in 1861.

Today, the Appalachian Mountain range is the location of two eastern national parks; The Shenandoah and The Great Smoky Mountain. These parks have access to 60+ million Americans, although attendance to the parks average 5 million yearly.² Additionally, the Appalachian Trail meanders through this mountain range which is a pedestrian path that links the states of Main and Georgia.

The Blue Ridge Mountain Range, a subsidiary range of the Appalachian formation, connects the states of North Carolina and Virginia. The name "Blue Ridge" came about as a characteristic of light refracting from particles in the atmosphere, or the mist in the air, forming a haze above this range perceived as blue.³ This haze is a unique characteristic of this area's air movement system; called an inversion, the haze is present year-round but lessens in intensity during the spring months.

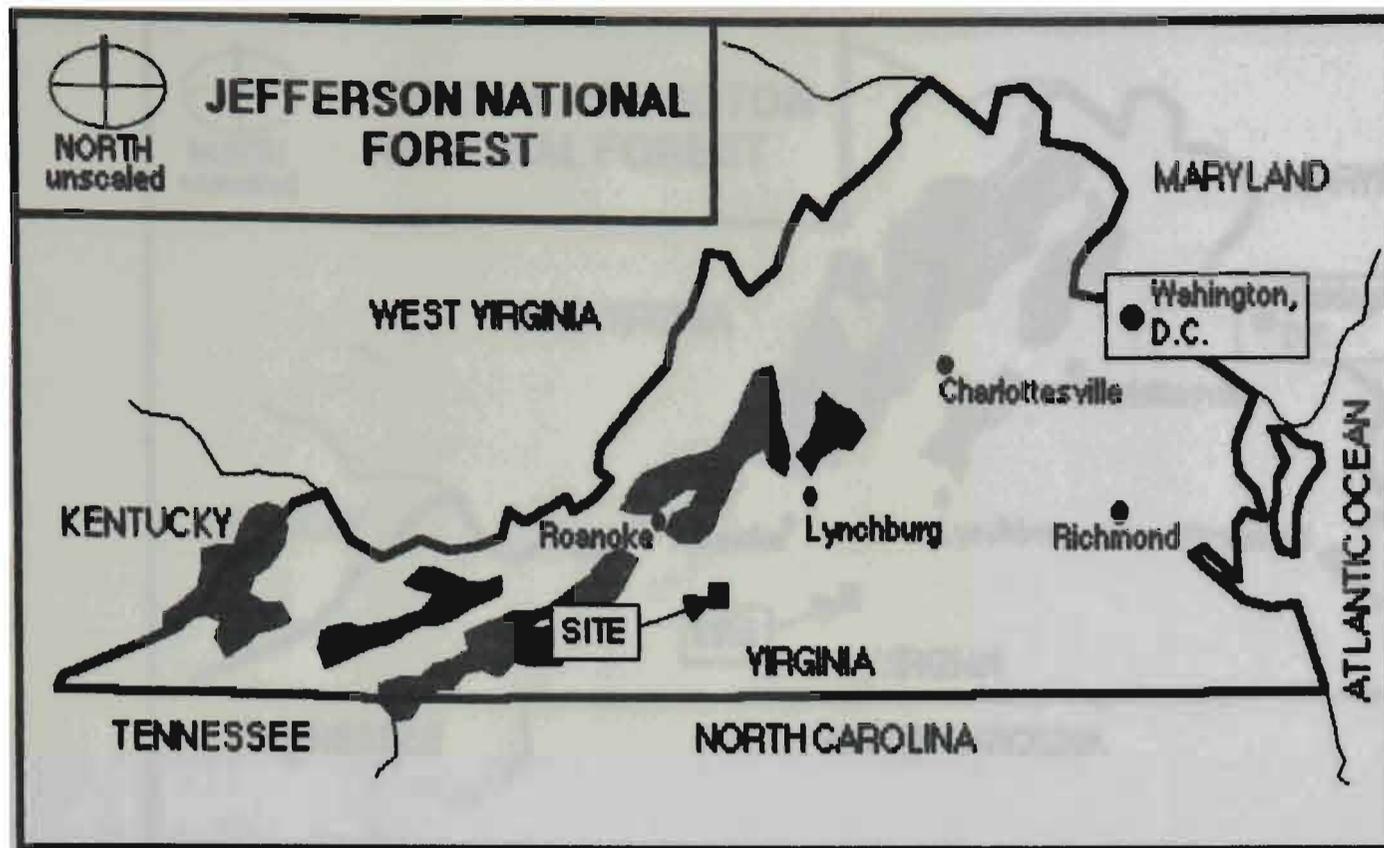


ILLUSTRATION 2

The Jefferson National Forest is located as close as 30 miles from the site and is one of the major native environmental influences to the site. This 700,000 acre forest land follows the Appalachian Mountains for 218 miles and provides spectacular vistas and quiet mountain valleys.⁴

Moreover, there are more than 200,000 acres of congressional designated special areas on the Forest, including the Mount Rogers National Recreation Area, nine wilderness areas, and part of the Main to Georgia Appalachian National Scenic Hiking Trail. In addition, there are eight fishing lakes and more than 400 miles of trout streams and approximately 1000 miles of hiking trails which meander to individual primitive campsites.

Popular activities encompassed within the Forest are horseback riding and hiking. In this forest, the National Forest Service does not provide individual campsite hook-ups, such as electricity, but does provide drinking water, toilet facilities and in some cases warm water shower facilities as contrasted with George Washington National Forest which does provide these infrastructure elements.

The Forest is also interspersed with thousands of small clearings maintained and reserved for wildlife observation. Additionally, there can be a variety of birds observed in the Forest and seasonal changes note large numbers of broad-winged hawks climbing thermals as they migrate across this part of the United States. The broad-winged hawk is a protected species of bird that also migrates across the site.



ILLUSTRATION 3

Situated less than 60 miles from the site is George Washington National Forest. This one million acre forest land is accessible to 54 million people within a day's drive, however only 4 million people visit the forest each year.⁵ There is no single use offered by the forest to its owners, the American people and animals; but rather various uses to the variety of owners: backpackers, lumbermen, hikers, hunters, off-road vehicle users, hang gliders, deer, bears, and flying squirrels.

This resource provides irreplaceable historic features like Indian burial mounds, rare wild flowers like the barren primrose, and endangered species like the northern flying squirrel. But what the forest offers is vastness, and it offers it to a degree that the public can experience in few other places in the state. For example; extended back-country camping, hunting beyond the ear shot of a fellow hunter's gun, hiking without ever reaching the end of a trail, fishing in a secluded native trout stream, and resting in the shade of virgin hemlocks.

The environmental context of both forests is the paradigm of conditions at the site. Although scaled up some 3500 fold of the project site, these models share the same basic ecological and environmental issues and opportunities for development. The native environment is special, human influence in the development of buildings is sensitive to these environments, and natural animal migration paths and habitats are interfered with by humans minimally, if at all. The majesty of these environments is reflected in the character of the site and should be used as the environmental guide in design.

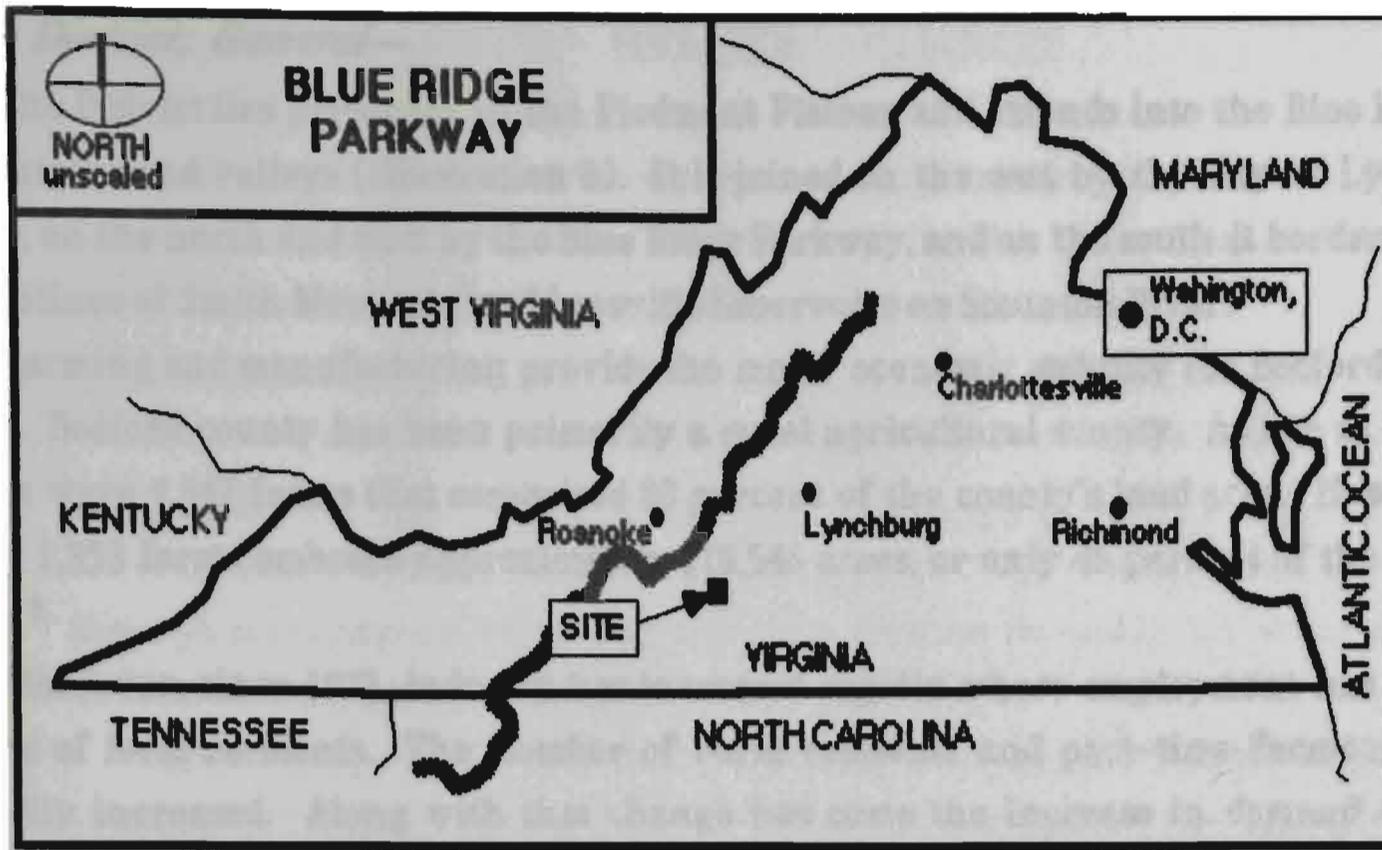


ILLUSTRATION 4

The Blue Ridge Parkway is a meandering scenic automobile path which extends 469 miles along the crests of the Southern Appalachians and links two eastern national parks—Shenandoah and Great Smoky Mountains. The origin of the highway's design dates to the period of World War 2 for motor vehicle recreation but began in another effort; when, as a matter of national security, the highway was constructed to disguise movement of personnel and equipment from aerial reconnaissance under the deep foliage along the route.⁶ Today, it is the movement of vacationers as traveling path from North Carolina into Virginia and vice-versa. The Parkway begins at Rockfish Gap which is 23 miles southwest of Charlottesville, Virginia and meanders in a general southwest direction terminating at the Oconaluftee visitor center approximately 5 miles northwest of Cherokee, North Carolina. At 95 miles from Rockfish Gap, the project site is 35 miles due east. This path is as close as 15 miles to the site.

Whatever the season, the traveler along the path is exposed to a myriad of tree species and colors. Dogwood, sourwood, and blackgum turn deep red in late September. Tulip-trees and hickories turn bright yellow, sassafras a vivid orange, and red maples add a colored flavor to the landscape. Finally, various oaks add russet and maroon colors as well. The evergreen tree species include Virginia pine, white pine, hemlock, spruce, and fir. Similar to the variety of tree species and color, various flowering shrubs are abundant along the path. Because of the range in elevation from 649 feet to 6,053 feet, peak blooming occurs at different times of the year and at different places—generally earlier in Virginia than North Carolina.

The District; General—

The District lies primarily in the Piedmont Plateau and extends into the Blue Ridge mountains and valleys (Illustration 6). It is joined on the east by the City of Lynchburg, on the north and west by the Blue Ridge Parkway, and on the south it borders the shorelines of Smith Mountain and Leesville Reservoirs on Staunton River.

Farming and manufacturing provide the major economic stability for Bedford citizens. Bedford county has been primarily a rural agricultural county. As late as 1935, there were 4,347 farms that comprised 80 percent of the county's land area. Now less than 1,353 farms embrace approximately 218,546 acres, or only 46 percent of the land area.⁹

Moreover, since 1935, industry has increased rapidly where employment has consisted of local residents. The number of rural residents and part-time farmers has steadily increased. Along with this change has come the increase in demand for a wholesome water supply. The consumption of water per person has greatly increased over the past several years. This is the result of more industries making use of water as well as each person making more liberal use of water. By far the greatest increase in water consumption has taken place in heavy industry such as steel, paper, and rubber. It has been estimated the need for water in the United States will increase five-fold over the next 50 years.¹⁰ Likewise, Bedford County will experience a greater need for water in the same time period. Efforts to anticipate the need for increasing the County's infrastructure has included building additional wastewater treatment facilities, improving rural roads, and projecting new landfill sites.

Bedford County is joined by two metropolitan areas. The City of Roanoke is to the west of the county and the City of Lynchburg is to the northeast. Both of these areas have mutual interactions with the site because of living and recreational opportunities near or on Smith Mountain Lake. Those opportunities include a 4-H club and camp, seasonal boat, fishing and hunting tournaments, and second-home sites of Roanoke and Lynchburg residents or retirement home sites.

Therefore, the district of Bedford County is experiencing growth and has begun to change from an economic linkage of its people and industry to an economic anchor. This is evidenced by the consolidation of smaller farms to a larger farm; redistributing ranching land to urban development, and strengthening native environmental features of the area as protected wilderness places and as recreation places. Moreover, timbering and reforestation is being used as a common economic resource by most of the communities in the district.

Resource Inventory

Land; Soils—

The soils of Bedford County were formed in a humid climate under hardwood forest type vegetation. The various kinds of soils which developed in this county are primarily the result of differences in parent material and slope.

The major soil associations that affect the site are located in the division known as Cecil-Madison.

Cecil-Madison associations consists of very deep, well drained, gently sloping through steep sloping soils. They have clay subsoils; formed in the weathered products of mica schist, mica gneiss and/or granite gneiss.¹¹

The landscape is characterized by long, broad to narrow ridges dissected by short drainageways. The ridgetops are commonly gently sloping or strongly sloping and the sides of the ridges are mostly strongly sloping though steep. Slopes dominantly range from approximately 2 to 45 percent. A large percent of the soils on the sides of the ridges in this division are typically severely eroded. Numerous short drainageways join together to form creeks and small rivers flow in meandering courses through narrow floodplains. This area is drained by small perennial streams, the James River, Judith Creek, Ivy Creek, Big Otter River, Goose Creek, and the Roanoke River. About 60 percent of the acreage of this division has been cleared for cultivated crops, pasture, and hay.¹² The dominant natural vegetation in the uncleared areas is mostly mixed hardwoods and some scattered pines. This division is approximately 43 percent Cecil soils, 26 percent Madison soils, and 31 percent minor soils. The minor soils are Poindexter, Cullen, Sweetapple, Mecklenburg, Turbeville, and Tobacco soils.

Approximately 40 percent of the acreage in this division is woodland. The soils in this area have moderate to high potential for tree growth and sustenance. Oaks, yellow-poplar, hickory, maple, Virginia pine and shortleaf pine are the major tree species in this division. Furthermore, there are scattered tracts of woodland that have been reforested with loblolly pine. Slope, equipment limitations and erosion hazard are the major limitations of the soils for woodland use and management thereof.

The soils of this division have large areas that are well suited for building site development and installation of sanitary facilities such as: septic tanks, absorption fields, sewage lagoons, and sanitary landfills.¹³ However, slope and clay subsoils are the major limitations of the soils for those uses in other areas. The conditions at the site are of the former case. Considerable housing development is occurring throughout this divi-

sion. Rural development is the case in the northeastern part of this division, the west and south of the city of Lynchburg, and in the southern vicinity of Smith Mountain Lake.

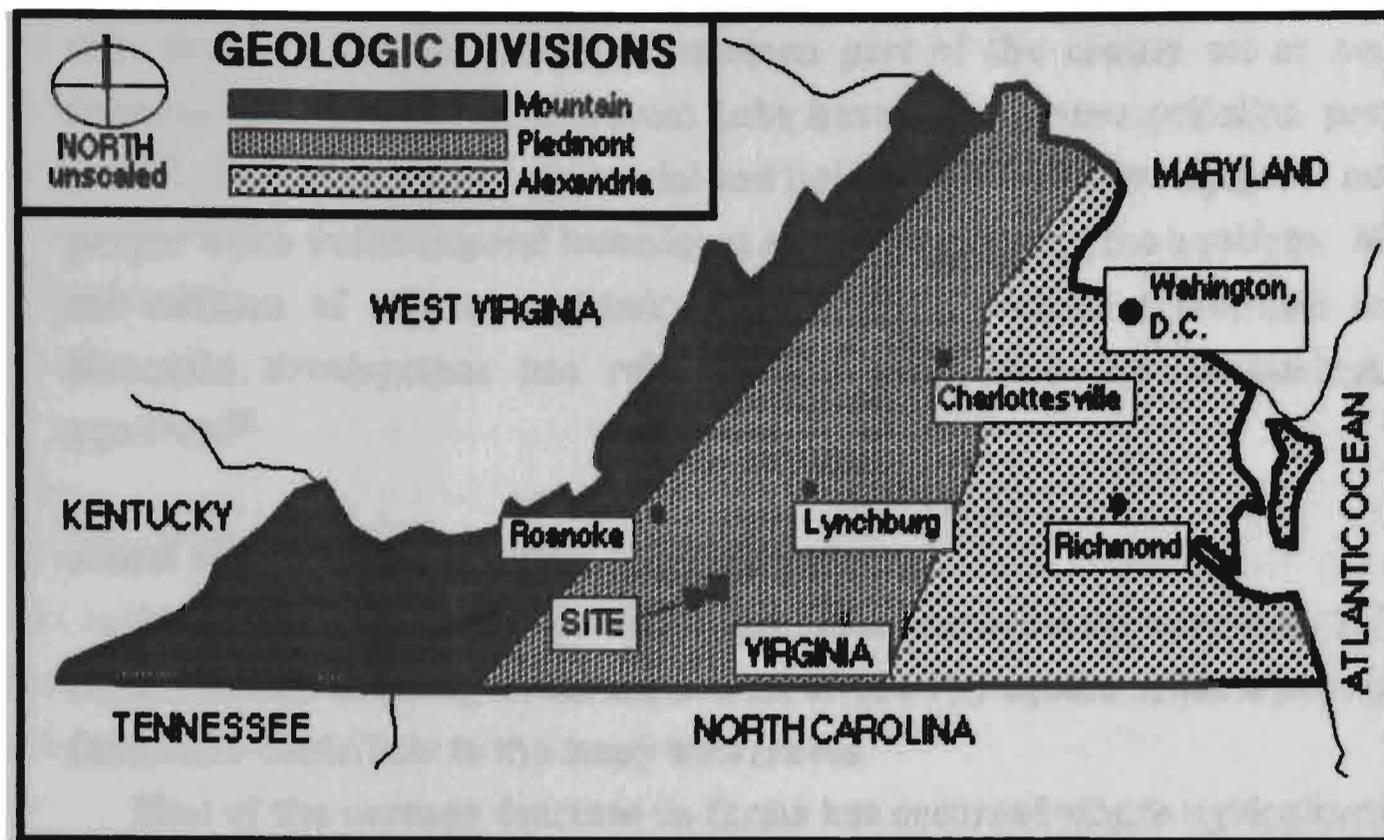


ILLUSTRATION 6

Land; Geology—

Rocks underlying the county had their origins millions of years ago as layers of sand, gravel, silt, clays, etc. Subjected to pressures for long periods of time, these layers evolved into sedimentary rock or metamorphic rocks – shale, sandstone, granite, and diorite. Subsequent faulting, tilting, folding, and uplift, followed by deep-cut erosion, exposed the rocks which shape the county's landscape.

Bedford County is located in the Piedmont physiographic province (Illustration 6), and extends westerly to the crest of the Blue Ridge Mountains. Metamorphic and igneous rocks of the Pre-Cambrian age underlie most of the county. The western two-thirds of the county is mostly underlain by granite gneiss and biotite gneiss of the Marshall foundation.¹⁴ This gneiss is generally thick-bedded and forms much of the mountains terrain in the western part of the county, including much of the Blue Ridge. Quartz, feldspar, and biotite are the major minerals in the rocks of this formation. Within this formation are found beds of micaceous and other thin-bedded, schist-like gneiss that were less resistant to erosion. As a result, these eroded areas have produced the lowland areas along the valleys and streams.

Ground Water—

Ground water occurs in the valley alluvium as a free water table in sand and silts. In upland areas the water table lies far below the surface. In granite gneiss and igneous rock, joints and fractures are found to be the main supplies of water. Additionally, faults in the northern and western part of the county act as aquifers. The Roanoke River and Smith Mountain Lake have had a severe pollution problem in the past.¹⁵ This is a result of residential and light commercial developments not respecting proper waste water disposal techniques and contaminating the aquifers. Most recently the addition of several sophisticated wastewater treatment facilities at the Smith Mountain development has relieved and diminished the contamination of the aquifers.¹⁶

Land Uses; Agriculture—

Although the 1980 U.S. Census of Agriculture accounts for only 46% of the land area in this county as being in farms; yet, all of the 753 square miles which make up the farms also contribute to the many watersheds.

Most of the acreage decrease in farms has occurred where agriculture production has ceased and the tract of land has been divided into smaller tracts for rural home sites. Other tracts are vacant or have been converted to commercial forest land. Considerable acreage is being used as converted recreational land along Smith Mountain Lake (at the site), or for housing in the forest area adjacent to Lynchburg.

Grassland protects the soil with a minimum amount of attention, and the fact it can be harvested by livestock makes it more attractive to the part-time farmer or rural resident landowner. Although some of the pasture land is now adequately treated, it should be recognized that all pasture land has required maintenance and management.

Land Uses; Woodland—

The most recent inventory indicates there are 292,451 acres of forest land, including federally-owned land, in Bedford County, or approximately 60 percent of the total area.¹⁷ Approximately 82% of Bedford County forest area is controlled by private landowners. Therefore, historically, the consideration of and implementation of forest management has naturally been accomplished through the private sector.

Over 14% of Bedford County's work force is employed in the forest products industry.¹⁸ Pulp and paper manufacturing is a large part of the local industry, as is the production of lumber and cross-ties by eleven stationary sawmills and several portable

mills. Local production of furniture, pallets, and veneer logs for export also stems from Bedford County's forest resource.

There is very little original growth timber to be found in the county. Native species of pine have generated from natural reseeding and hardwoods from seed and sprout growth. Loblolly pine resulting from planted stock is now at near merchantable size. Therefore, the quality of woodland and the quality of timber produced is related to the use of good woodland management practices.

Air Quality—

The overall air quality in Bedford County is generally considered to be excellent based upon available data from air quality monitoring stations in the county. This judgement has been attributed to considerable forest cover and sufficient yearly rainfall to maintain air purity. The State Air Pollution Control Board has amended the Clean Air Act and enforces the regulations thereof. There are several air monitoring stations throughout the county and two SO₂ monitoring stations, one in the City of Bedford and the other at the Peaks of Otter district.

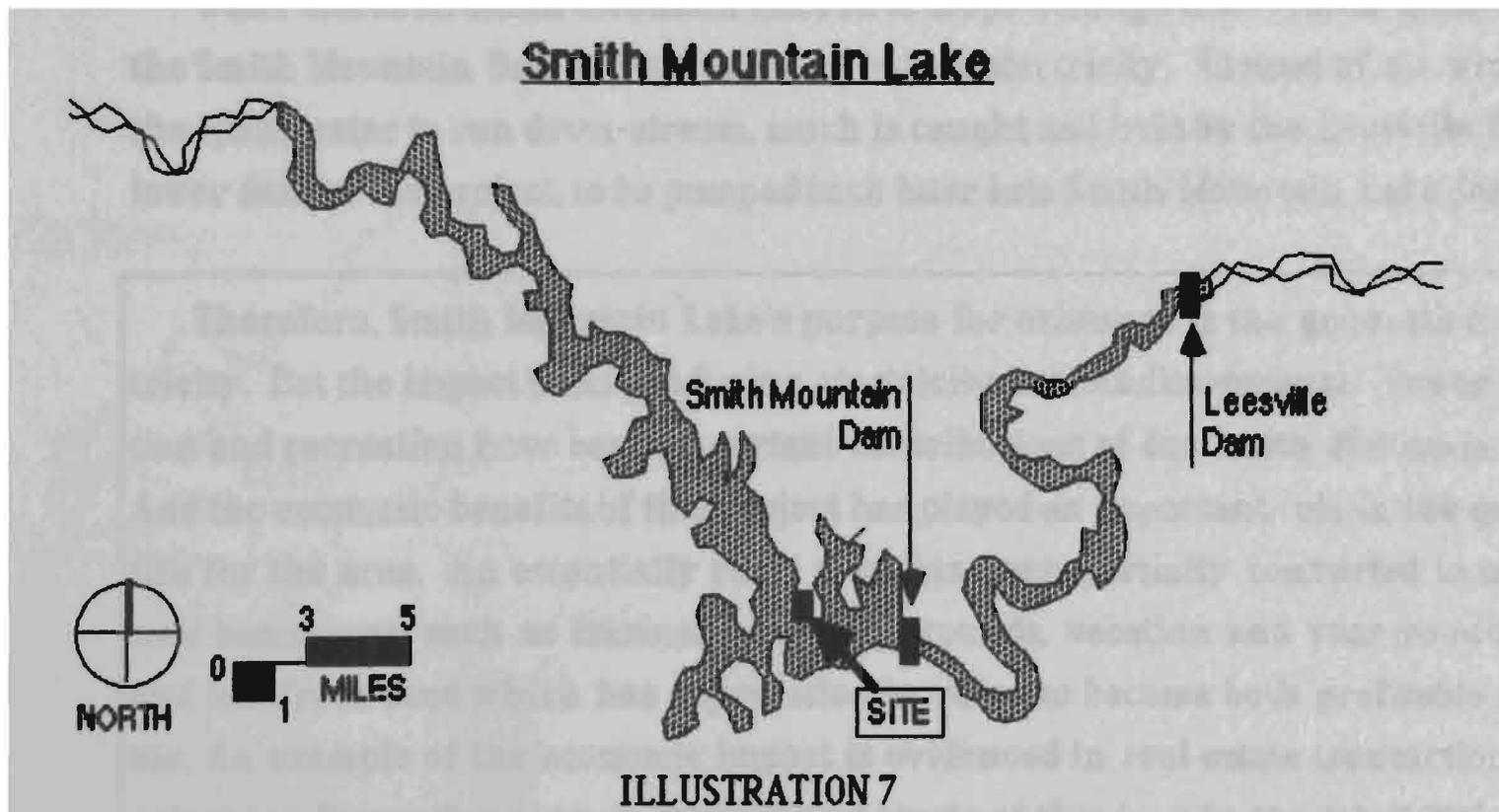


ILLUSTRATION 7

The history of this waterway dates to 1966, when the Appalachian Power Company completed a 235 foot high, \$85 million dollar dam across the Roanoke River.¹⁹ As rising waters engulfed the valley below, debris and rubble were cleared and the new 20,000 acre lake with its 500 mile shoreline emerged.

Today, Smith Mountain Lake is one of the premier lakes of the eastern United States. It is best known throughout this part of the country for its Striped Bass.²⁰ Moreover,

large and small mouth bass, rock bass, bream, muskie, crappie, northern pike, trout and walleye also populate the lake. And 5,000 acres of land has been set aside as wildlife management areas for hunting. This land is managed and maintained by the Virginia Commission of Game and Inland Fisheries. Game population includes deer, turkey, quail, rabbit, and squirrel.

Also, boating is a major attraction at the lake serviced by 20 marinas. And sailing is a popular sport at this lake with yacht club associations sponsoring spring and fall races from time to time.

Smith Mountain Lake's Foundation—

Appalachian Power Company's Smith Mountain Pumped Storage and Hydroelectric Project was built expressly for generation of electricity during the times of peak demand. Units at the two dams are capable of being started and brought into full operation within minutes.

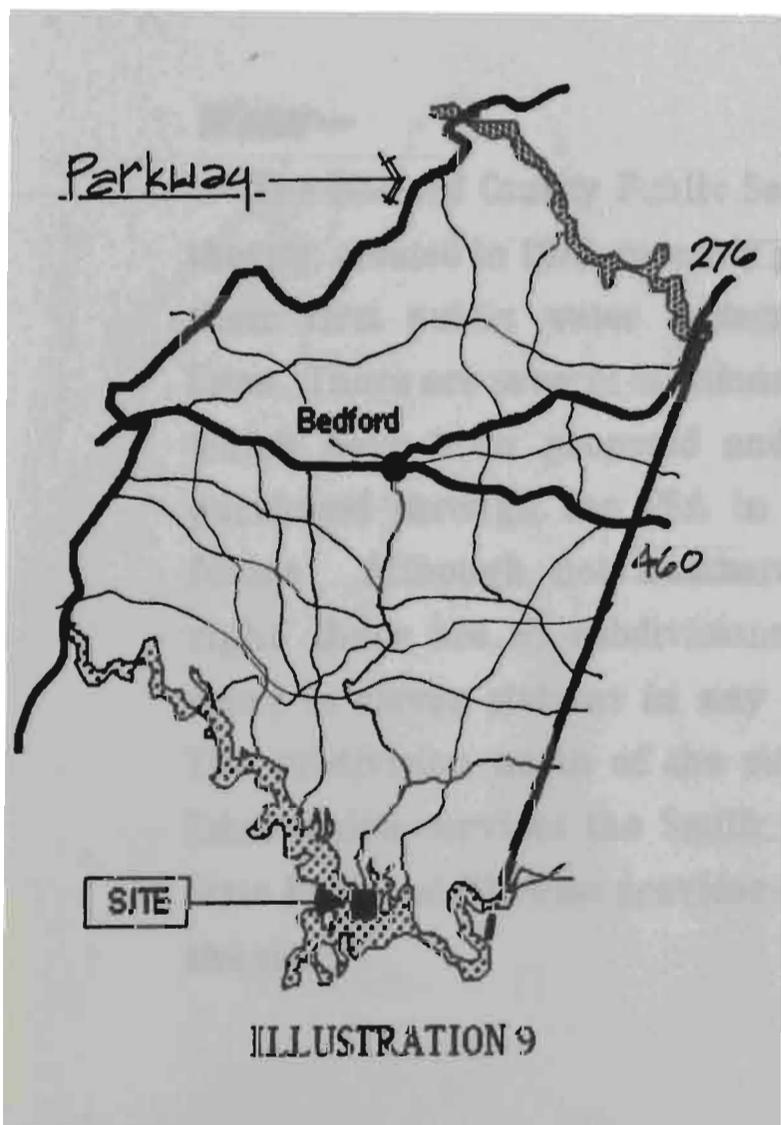
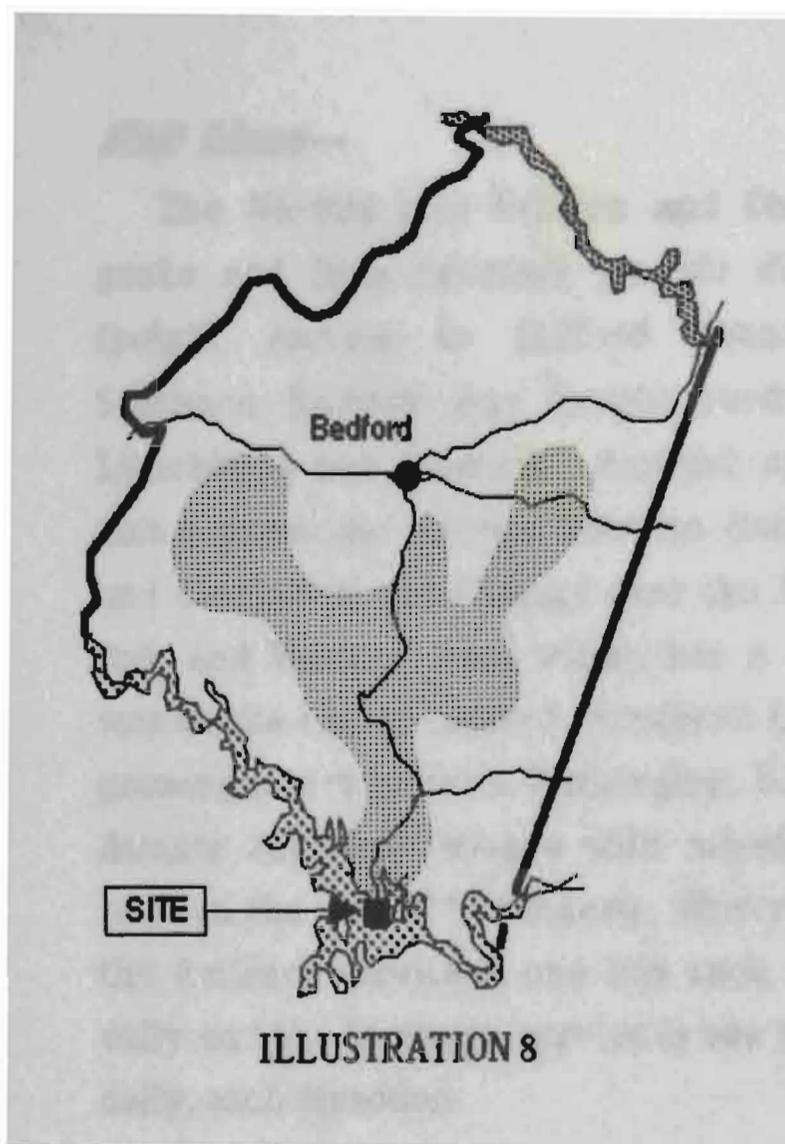
Operation of the project makes maximum use of two natural resources—water and coal. This is accomplished through a process called pumped storage.

Water stored in Smith Mountain Lake first drops through the turbine-generators in the Smith Mountain Dam powerhouse to produce electricity. Instead of allowing all of the spent water to run down-stream, much is caught and held by the Leesville Dam, the lower dam in the project, to be pumped back later into Smith Mountain Lake for re-use.

Therefore, Smith Mountain Lake's purpose for existence is the generation of electricity. But the impact of its producing electricity is multidimensional. Power production and recreation have been important contributions of the Smith Mountain Project. And the economic benefits of this project has played an important role in the quality of life for the area. An essentially rural area has been partially converted to one with new businesses, such as marinas and campgrounds, vacation and year-round homes, and lakefront land which has appreciated in value to become both profitable and stable. An example of the economic impact is evidenced in real estate transactions. Appalachian Power Company purchased vast tracts of this land in the late 1950's for \$85 an acre. Upon developing the two dams, thus the lake, current lakefront property now sells for \$9,800 an acre.²¹ Moreover, the economic impact of this hydroelectric node has stretched beyond the lake's area with boat, camping equipment, lumber and other supply sales receiving a growth in locations such as Roanoke, Lynchburg, Danville, and Martinsville.

Soil Erosion and Runoff—

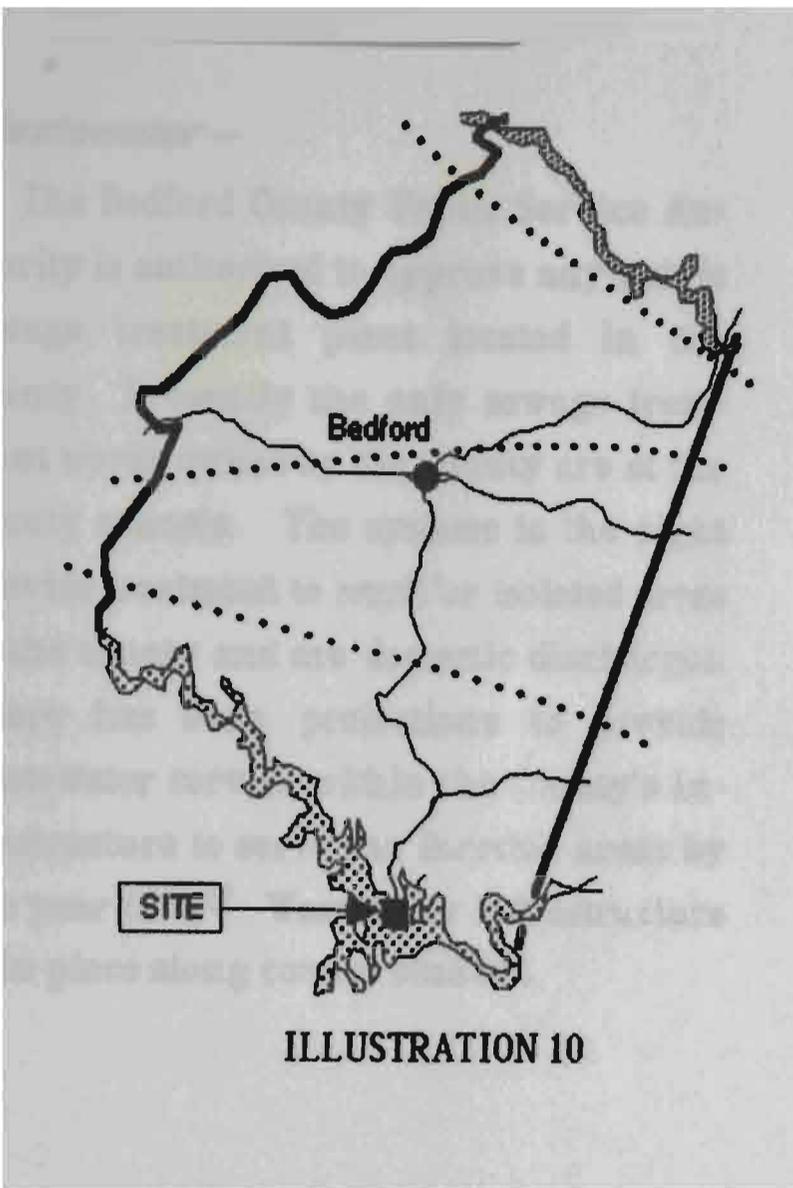
Soil erosion is a substantial problem in the micaceous soils of the county as outlined to the right. These soils are extremely erosive because it forms tiny slippery platelets that slide easily over one another. This action produces a very unstable condition resulting in erosion and on steeper areas, landslides or mud slides. Measures taken by the county include reforestation on woodland areas when disease of trees have required timbering and encouraging the cultivation of crops on the grasslands.²² Site development should be sensitive to not encourage this problem.



Transportation—

Automobile transportation facilities in Bedford County include 150 miles of major highways, 60 miles of railway, 2 general utility airports, and 2250 miles of county roads and streets.²³

The Smith Mountain Airport, located adjacent to the west boundary of the site, has a hard surface runway of 3080 feet. Moreover, the airport is equipped with a rotary beacon and runway markers and lights. This airport is operational only during the daylight hours.²⁴

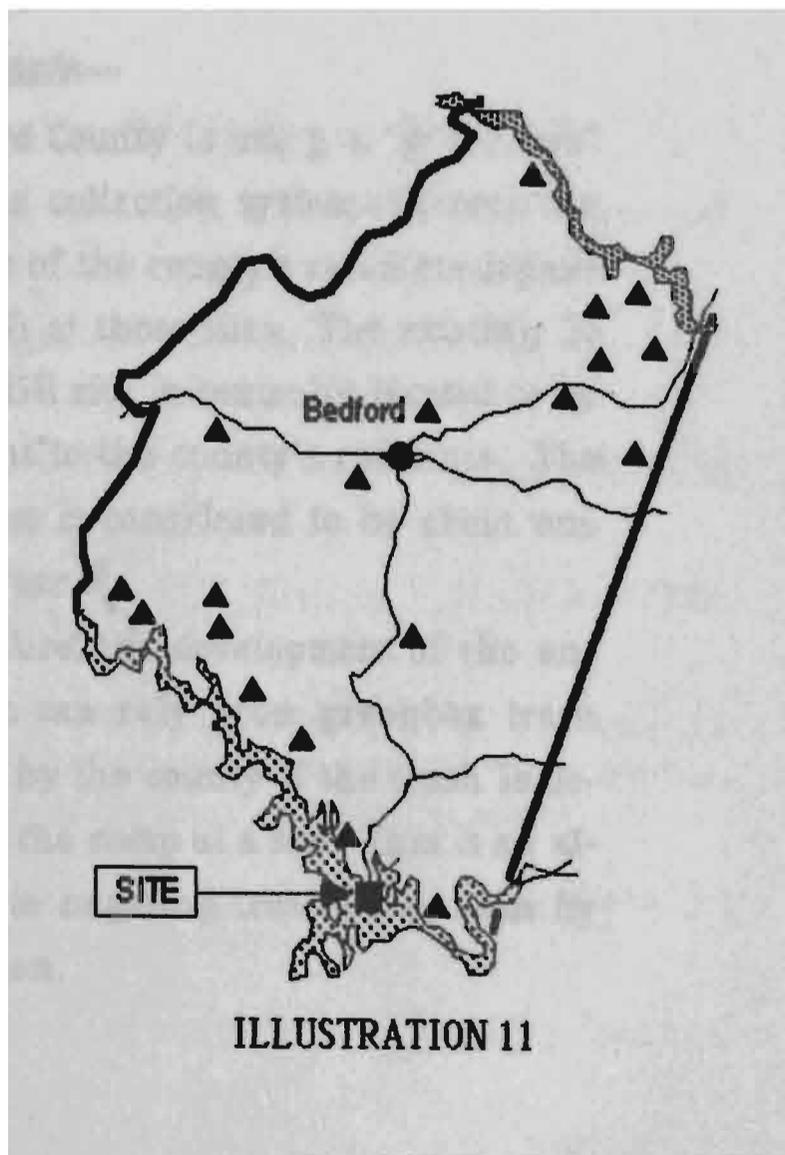


Rail Lines—

The Norfolk and Western and Chesapeake and Ohio railroads provide direct freight service to Bedford County.²⁵ Southern Railway has freight yards at Lynchburg and Altavista. Amtrack operates a passenger service between Norfolk and Cincinnati and Chicago over the Norfolk and Western lines which has a flag stop in the city of Bedford. Southern has a passenger service from Washington, D.C. to Atlanta and New Orleans with scheduled stops in the city of Lynchburg. Moreover, the Amtrack service is one trip each way daily and the Southern service is two trips daily, each direction.

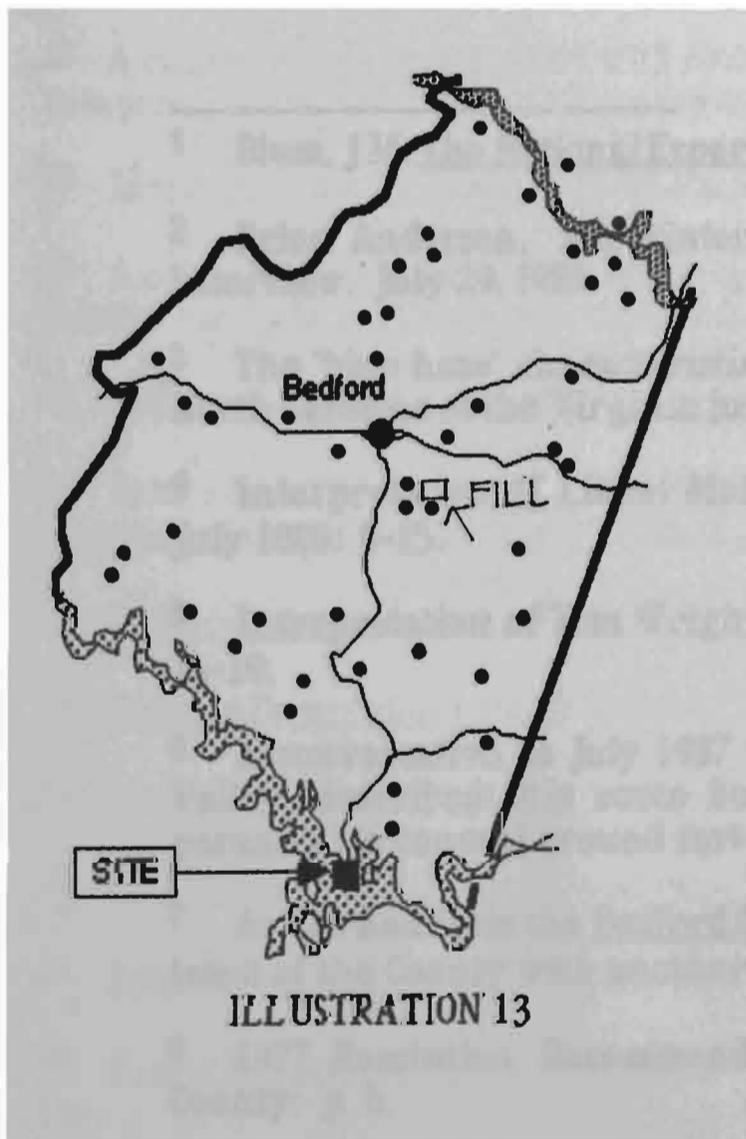
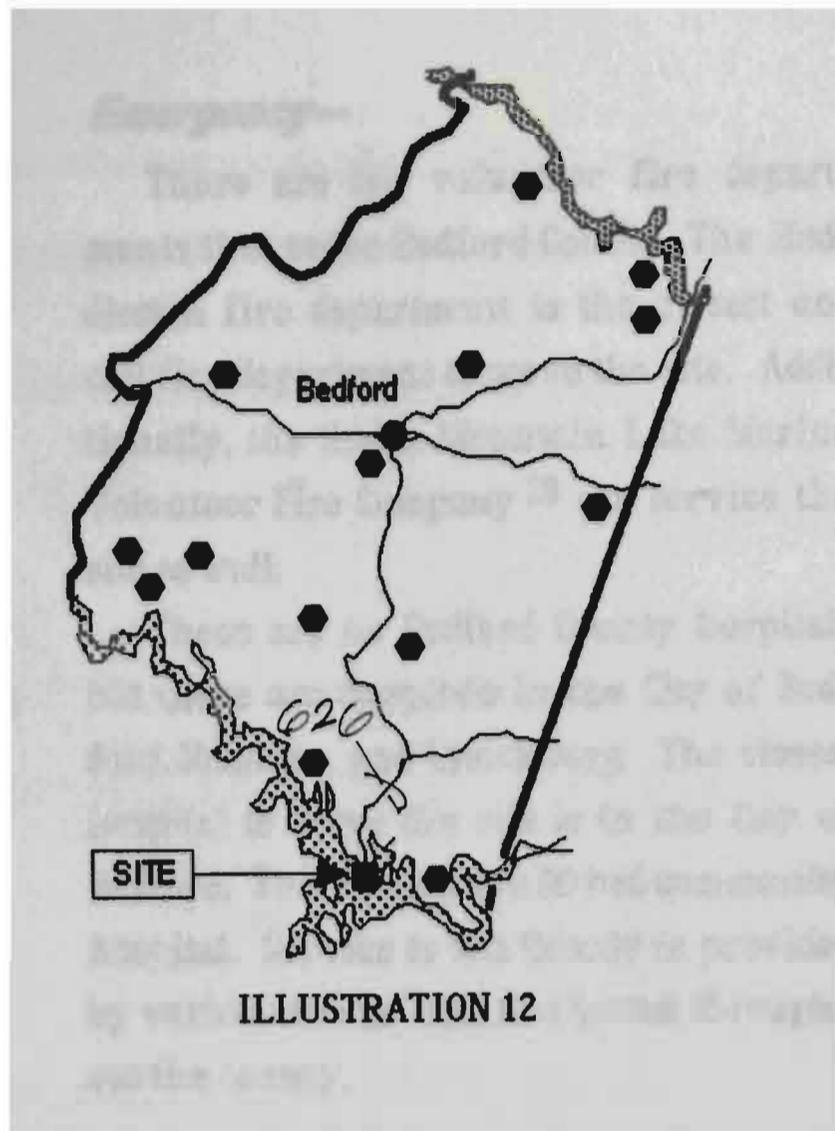
Water—

The Bedford County Public Service Authority, created in 1970, recently purchased their first public water system at Lake Estes. There are several additional systems which have been proposed and may be purchased through the PSA in the near future. Although not numbered to the right, there are 65 subdivisions with as many as eleven stations in any one area. The subdivision north of the site is Lake Estes which services the Smith Mountain State Park and likewise provides service to the site.²⁶



Wastewater—

The Bedford County Public Service Authority is authorized to approve any public sewage treatment plant located in the county. Presently the only sewage treatment works owned by the County are at the county schools. The systems to the right provide treatment to small or isolated areas of the county and are domestic discharges. There has been projections to provide wastewater service within the County's infrastructure to serve the forested areas by the year 1990.²⁷ Wastewater infrastructure is in place along county road 626.



Solid waste—

Bedford County is using a "green-box" solid waste collection system whereas the solid waste of the county's residents deposit their trash at these sites. The existing 22 acre landfill site is centrally located to be convenient to the county's residents. The present use is considered to be about one acre per year.²⁸

Therefore, the development of the encampment can rely upon greenbox trash collection by the county if the trash is deposited by the camp at a site. This is an alternative to negating trash other than by incineration.

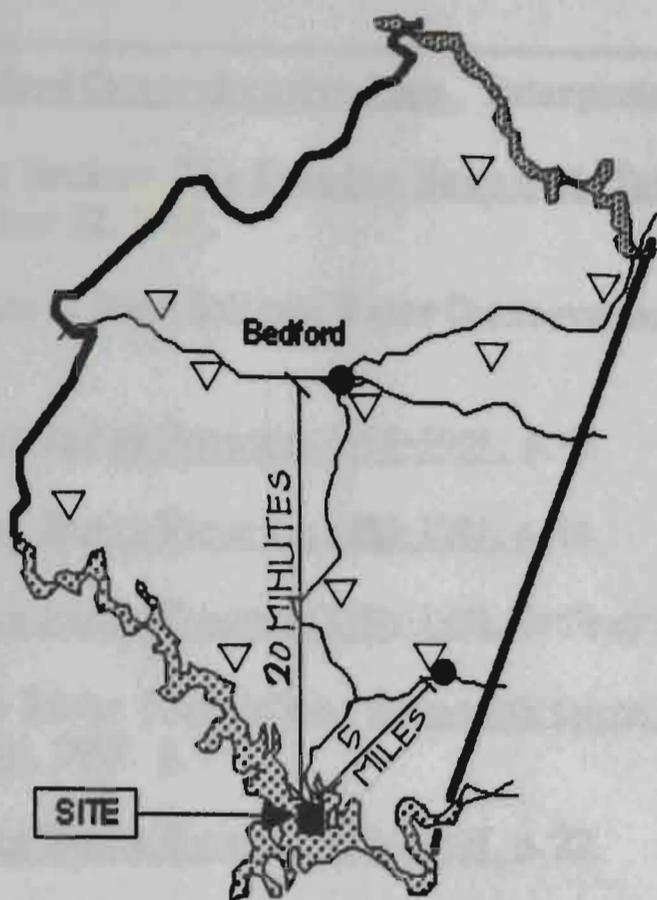


ILLUSTRATION 14

Emergency—

There are ten volunteer fire departments that serve Bedford County. The Huddleston fire department is the closest on-call fire department to serve the site. Additionally, the Smith Mountain Lake Marine Volunteer Fire Company²⁹ can service the site as well.

There are no Bedford County hospitals but there are hospitals in the City of Bedford, Roanoke, and Lynchburg. The closest hospital to serve the site is in the City of Bedford. This facility is a 90 bed community hospital. Service to the County is provided by various rescue squads situated throughout the county.

NOTES:

- ¹ Blum, J.M. The National Experience. 5th ed. Jovanovich: New York, 1981. pp 76-77.
- ² Brian Anderson, Superintendent of Smith Mountain Lake State Park. Personal interview. July 29, 1988.
- ³ The 'blue haze' characteristic is also prevalent in the upper Smoky Mountains of North Carolina at the Virginia juncture.
- ⁴ Interpretation of Lionel Melancon's "You're Missing the Best." Virginia Wildlife July 1988: 8-15.
- ⁵ Interpretation of Tom Wright's "Happy Trails To You." Virginia Wildlife July 1988: 16-19.
- ⁶ A conversation in July 1987 with Jim Hesser, a long-time resident in the Roanoke Valley, described this route built by post WW2 veterans as a result of [national paranoia] to conceal ground movement in the event of another Japanese attack.
- ⁷ As learned from the Bedford County Comprehensive Plan of 1977. This Plan was the latest of the County with another Plan to be published in early 1989.
- ⁸ 1977 Resolution Recommending Adoption Of Comprehensive Plan For Bedford County: p. b.

- 9 Bedford Comprehensive Plan. Interpretation of economic stability patterns: p. 9.
- 10 Tom Brokaw, The Evening News with Tom Brokaw. NBC. KCBD 11, Lubbock, Texas. September 22, 1988.
- 11 Peaks of Otter Soil and Water Conservation District. Long Range Program 1986-1991. p. 15.
- 12 Long Range Program 1986-1991. p. 16.
- 13 Long Range Program 1986-1991. p. 16.
- 14 Long Range Program 1986-1991. Geology: pp. 21-22.
- 15 The River Foundation. Reconnaissance Survey Of The Roanoke River Parkway Corridor. 1987. p. 7.
- 16 Long Range Program 1986-1991. p. 22.
- 17 Long Range Program 1986-1991. p. 23.
- 18 General Population Characteristics of the 1980 Census. U.S. Department of Commerce; Bureau of the Census. p. 210.
- 19 A conversation in July 1988 with Tom Blanding, an engineer of Appalachian Power Company, conveyed the dam's purpose and process to me.
- 20 Interpretation of "A Guide To Smith Mountain Lake". Lake Country. July 1988: 2-4.
- 21 A conversation in July 1988 with Gail Dove, a real estate broker for Owens Country Realty, Virginia, related to me various land values and acreage at Smith Mountain Lake.
- 22 Bedford Comprehensive Plan. General Soils. p. 18.
- 23 Interpretation of Virginia Department of Highway and Transportation: 1985 Functional Classification of Rural roads and highways.
- 24 Bedford Comprehensive Plan. p. 30.
- 25 Bedford Comprehensive Plan. p. 29.
- 26 Interpretation of Bedford Comprehensive Plan. p. 32.
- 27 Interpretation of Bedford Comprehensive Plan. p. 34.
- 28 Bedford Comprehensive Plan. p. 77
- 29 Bedford Comprehensive Plan. This fire department is located within 5 miles of the site. p. 55.

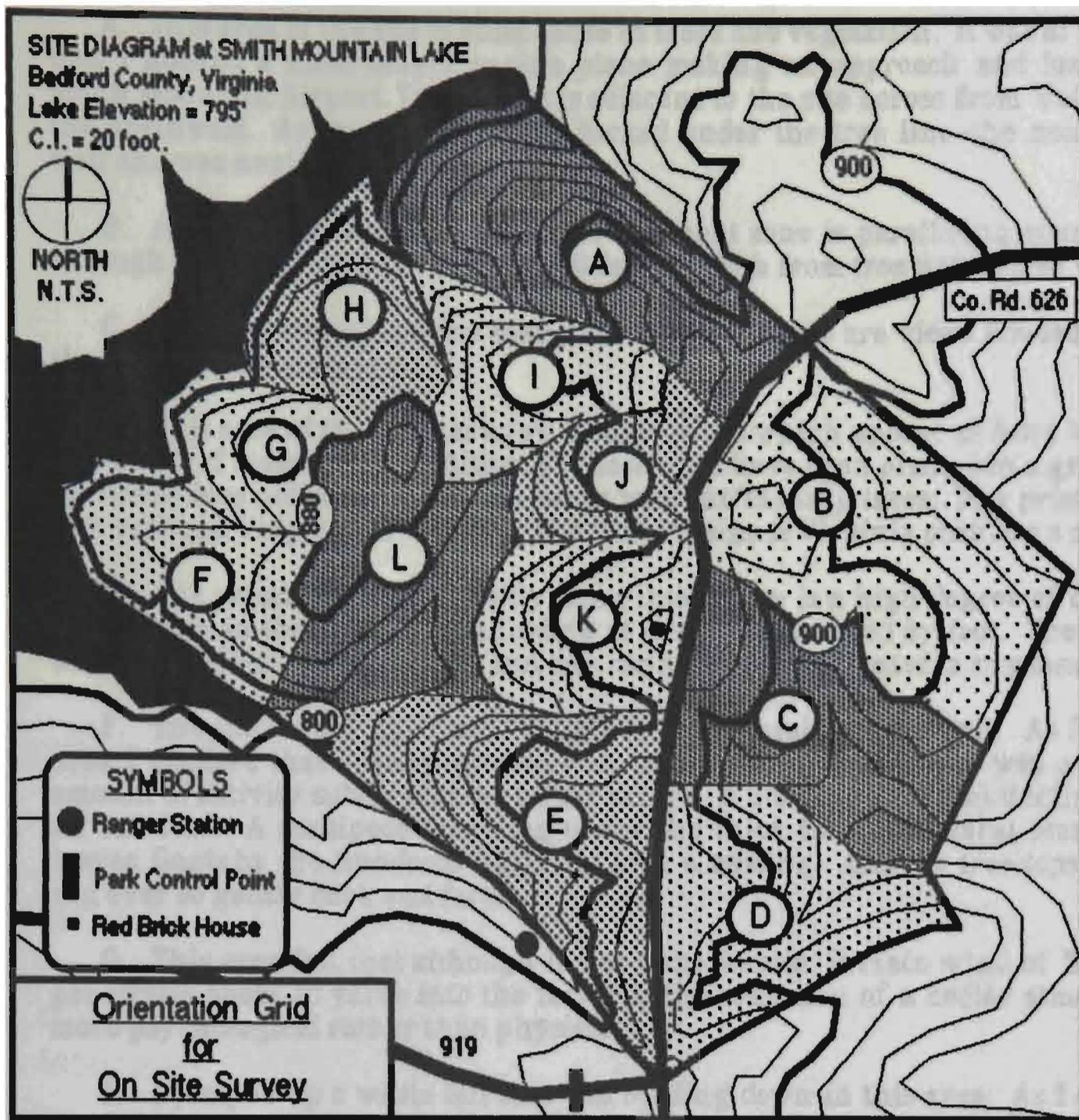


ILLUSTRATION 15

The Orientation Grid was used to divide the site into manageable study fields for audio notes, sketches, and photographs by distinct walking areas. A transcription of the field notes follow to outline the major characteristic of a given area. Moreover, this base map¹ was used to establish the specific fields of study, occurring at the on site survey including:

1. Animal Migration Paths and Sightings
2. Major Land Configurations
3. The Physiographic Character
4. Sensory Qualities
5. Vegetation - Trees

A. This area of the site is quite dense in trees and vegetation. It was at this location that I noticed a small single engine plane making an approach and landing at the Smith Mountain Airport. The airport is adjacent to the site across from Walton Creek to the northwest. As soon as the plane ducked under the tree line—the noise ducked as well and was negligible.

B. A telephone and electric service easement zone is paralleling county road 626 through the site. This zone is about 200 feet in width from tree wall to tree wall.

C. This area contains some dead, fallen trees. There are views framed by trees on the ridge of this landform.

D. This area of the site has a few loblolly pines which appear to have been planted as a result of diseased trees. Although these trees have been planted in a grid, their appearance does not seem out of character with the existing trees. The primary distinction between Virginia, or old, pine and loblolly pine is Virginia pine has a rough skin.

E. The primary sensory quality along this ravine is a high degree of closure. The tree density in this area gives a feeling of a maze as traveled by foot. There is no orientation; unless one follows the sun one cannot become oriented to any landmark.

F. The site is very quiet and I did not see any squirrels or birds. As I walked this area I realized that I was a spectator in this environment. There was a tremendous amount of activity subtly playing on my senses. A blue and yellow butterfly landing on an oak leaf. A centipede traveling under the thick floor of several seasons of dead leaves. Gnats by the hundreds hovering over a nesting. And the tree tops were swaying ever so gently back and forth.

G. This area felt cool although it was quite humid. Surface wind of Walton Creek penetrates about 10 yards into the forest so the sensation of a cooler atmosphere was more psychological rather than physical.

I. I jumped-up a white tail that was bedding down in this area. As I drove to the site another deer was grazing just off the road in grid E.

K. The only existing structure, and only built structure on the site,² is a wood framed house clad with red brick. It's about 50 feet from the highway; unused and in dilapidated condition. It is fenced off and not accessed by the public.

L. There were periodic markers of orange lineman tape and paint which served as a reference. Walking the land reminded me of walking in a gigantic compost pit; the depth of dead leaves ranged from 2 inches to 6 inches.

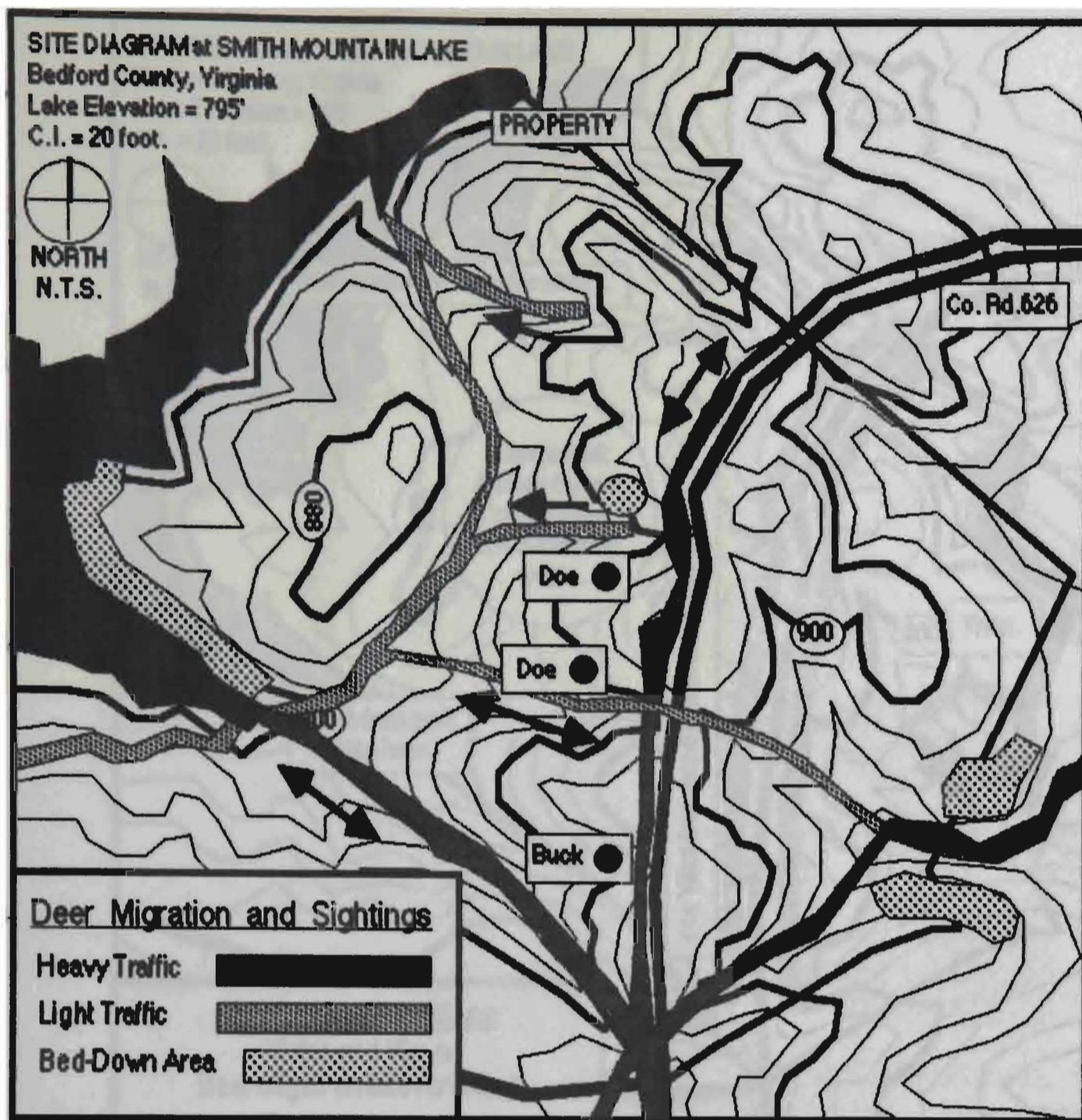


ILLUSTRATION 16

Deer is the primary animal that transverses the site. However, squirrels and turkey have frequented the area.³ Although deer do not necessarily migrate through the site, their behavior patterns are identifiable as frequenting the site. Evidenced by hoof prints, beaten trails, and flattened grass the deer population could experience their territory lessened by site development. And development of the land should be sensitive to the two focus nodes of these paths. The southern corner of the site is a major junction. This predictable pattern allows the possibility of integrating an observation place within the camp setting or as an outpost location.

Bird migration is black hawk across the state and site, additionally it is not unusual for one to see cardinals, pigeons, and blue quail in the area. The only bird species of the site that is legally protected under the Endangered Species Act is the Black Hawk.

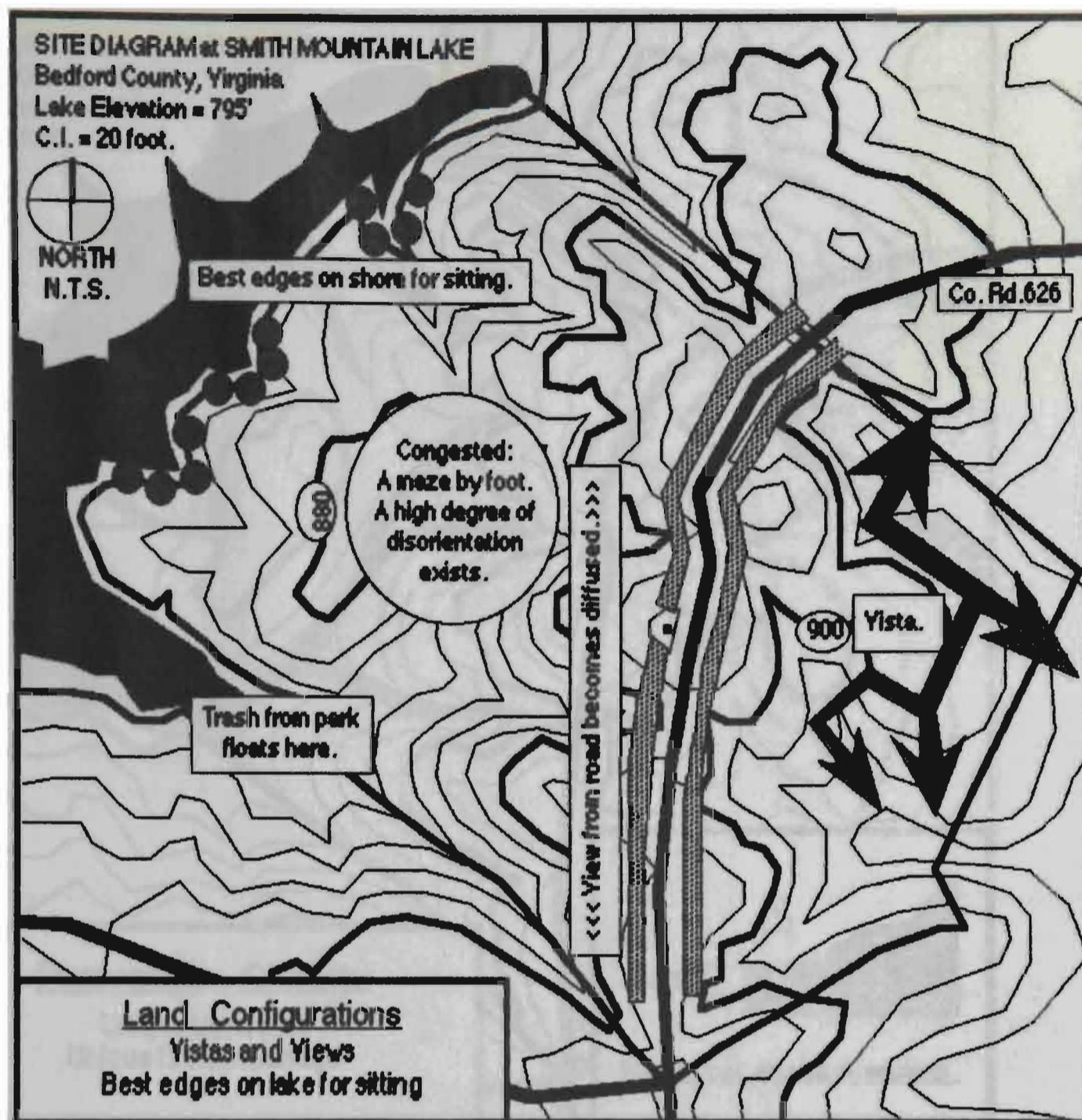


ILLUSTRATION 17

The major man made land alteration is an asphalt automobile path which divides the site in approximately a 2/3 ratio. Moreover, the view from this path, on either side, into the site is terminated by a wall of trees. The density of trees throughout the site have a tendency to frame views which are near by but a view further than 25 feet becomes lost in the fabric of the environment.

Often is the case where views are linked by proximity of sloping sides with a valley below. Viewed from 2000 feet the site is characterized as one mass, with the exception of the automobile path. At datum, the best edges for sitting are identified above. These edges are characterized by clearings averaging 2500 square feet with unobstructed views to the adjacent shoreline; also multiple views may be established from one vantage point.

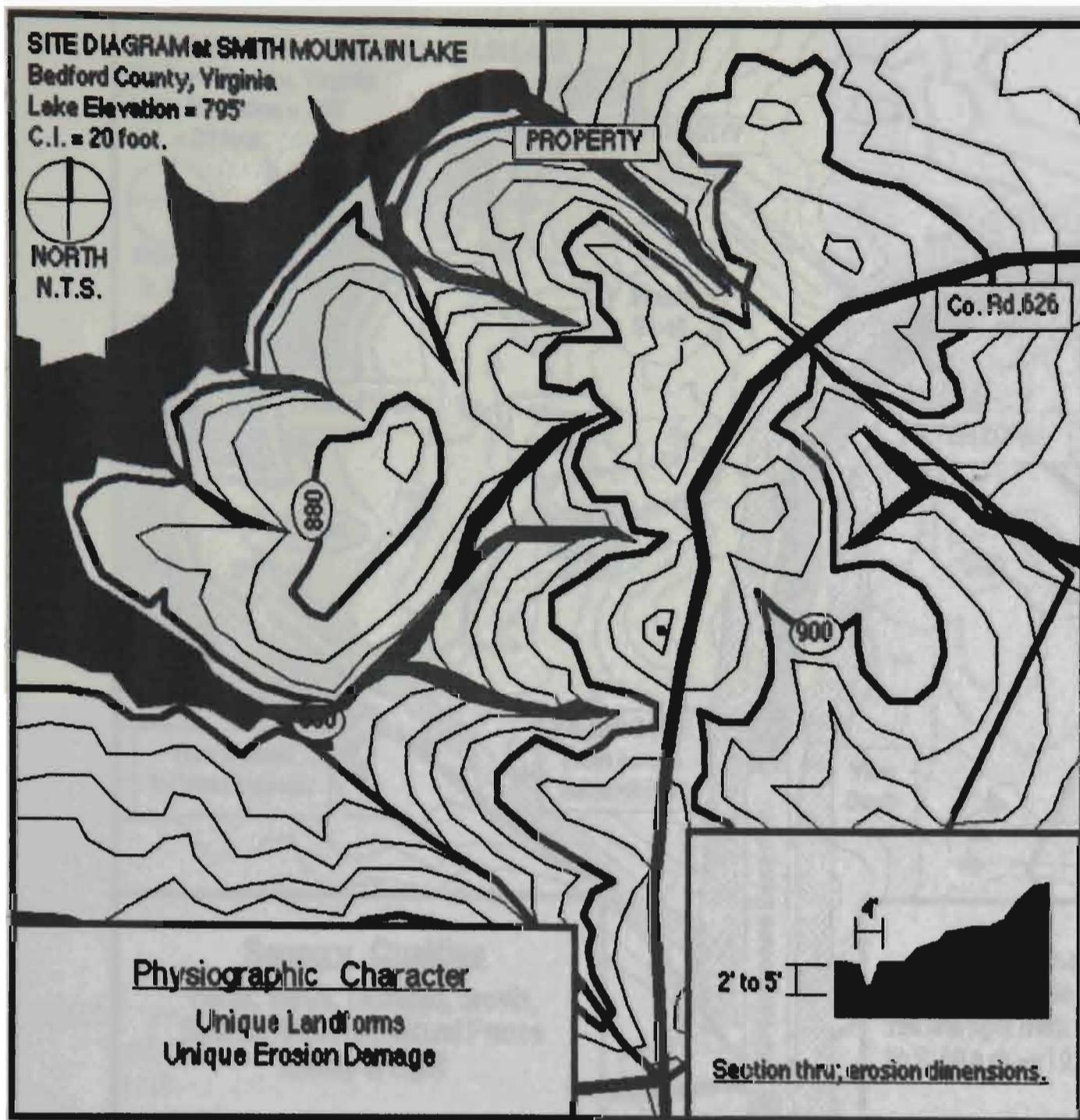


ILLUSTRATION 18

The major physiographic characteristic of the site is the erosion channels. These channels connect and lead to the lower elevation of Walton Creek in general; the channels are dimensioned as a character detail in particular. Exposing the roots of trees situated too close, this landform characteristic is cancerous. Therefore, design considerations should encompass both orienting buildings which allow runoff to these channels and matting these channels with appropriate erosion control technology and materials.

Walton Creek, the western border of the site, is -60 feet deep from the normal water elevation of 795 feet above sea level. Wave action of the creek is minimal in the body and tip, however greater waves do occur at the mouth of the creek. Therefore, the body and tip of the creek could be developed for boat launching and swimming.

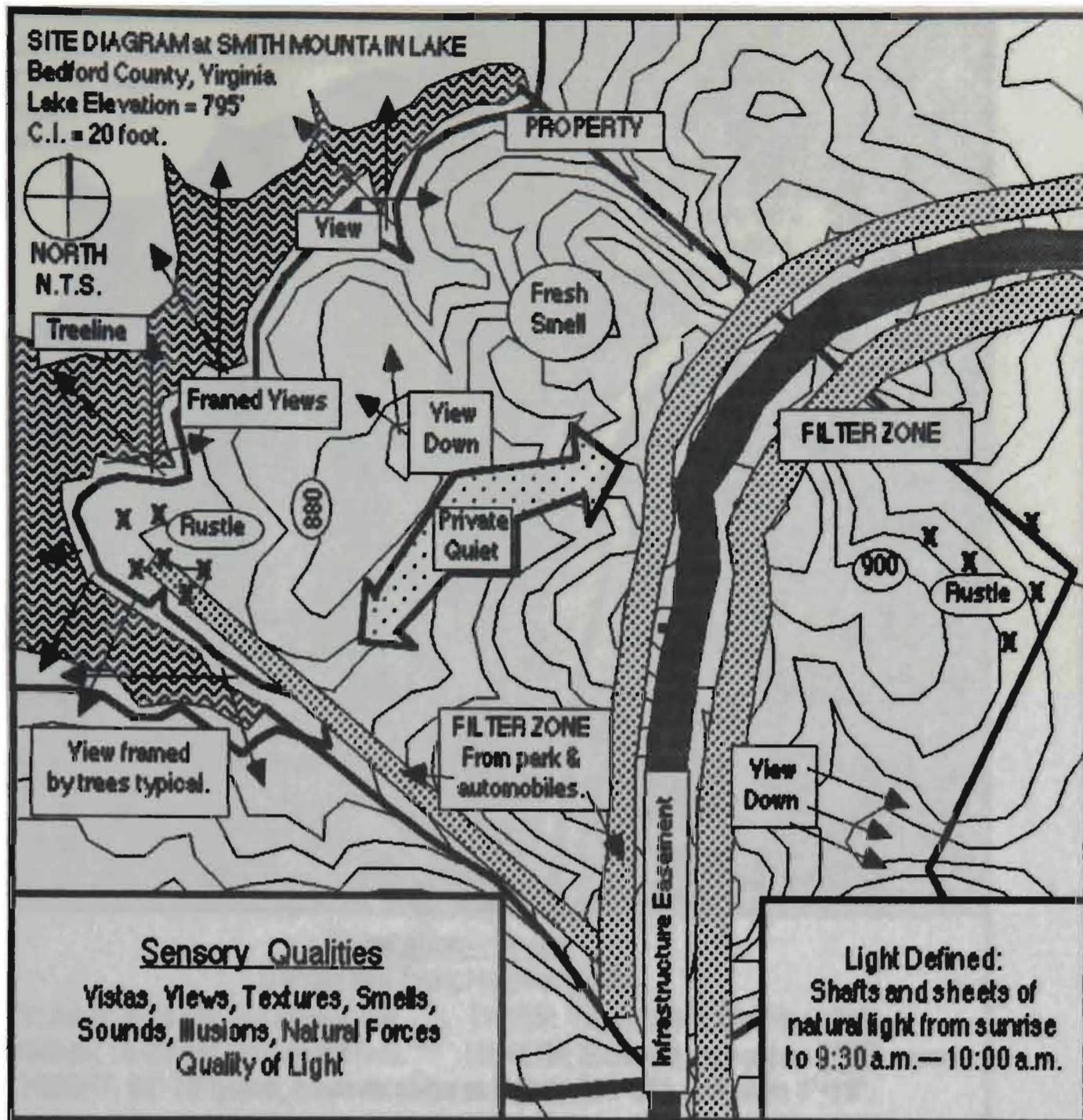


ILLUSTRATION 19

A most dominant feature that affects one's perception is the quality of light experienced at the site from sunrise to 9:30 a.m.—10:00 a.m. The inversion of mist which forms a haze at this time, breaks-down light to form distinct sheets and shafts of light; penetrating through trees and spilling onto the ground. The valley's inversion is lessened in the spring months, grows in the summer and fall, and peaks in the winter months. Therefore, illusions created by unique sheets of light occurring from the climate's inversion is dependant on the areas air movement system.

The sound filter zones represents a 200 to 225 foot sound boundary from the automobile path. Sight of the automobile is lost 150 feet from the path, on either side. The southern filter zone relies on the topography of the site lowering at the property line—this is a natural element filtering park noises. The north/south filter zone is situated on a plateau of 900 feet and is the highest elevation of the site.

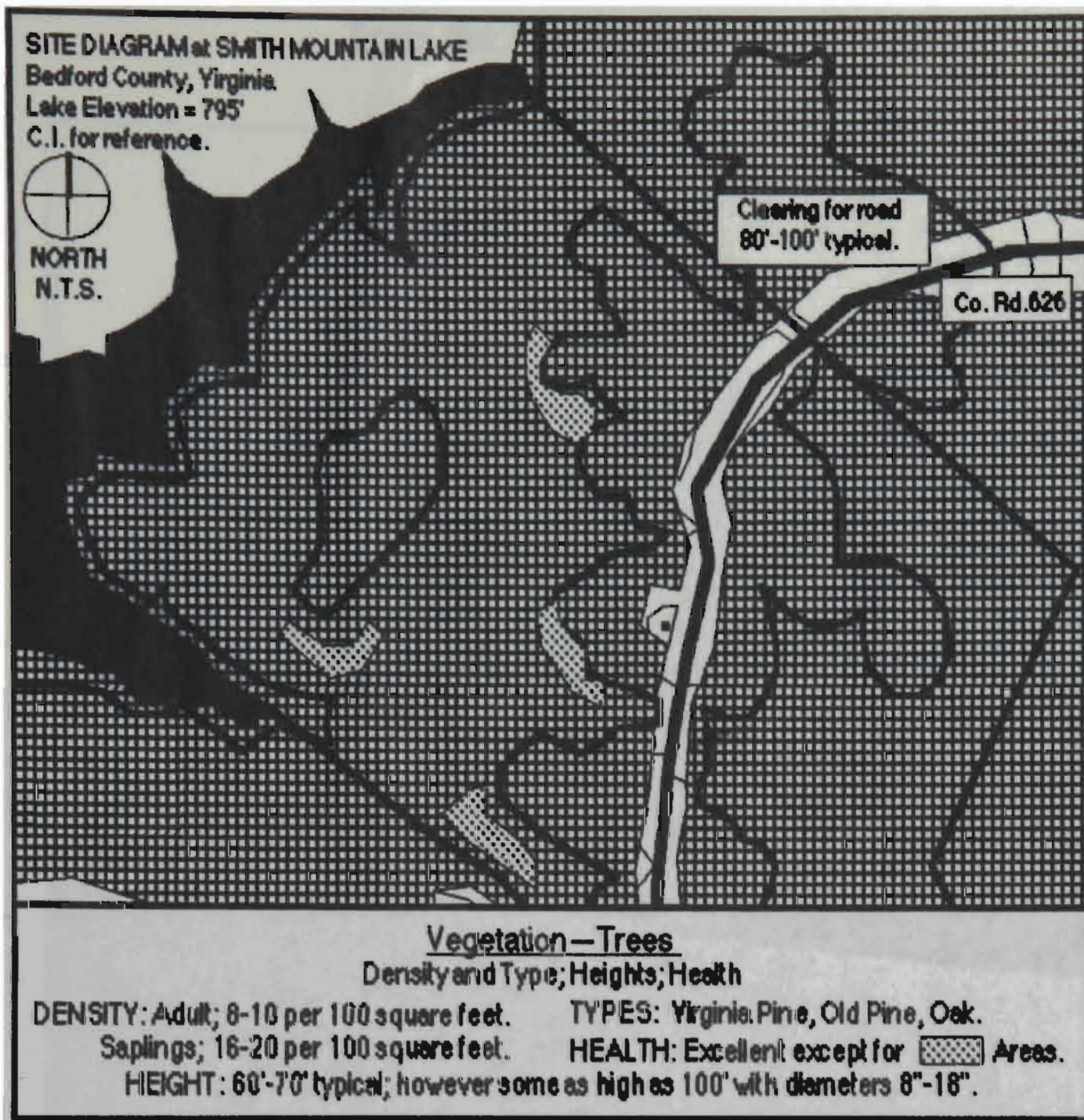


ILLUSTRATION 20

The site is virtually forest⁴ and is very dense with trees and vegetation. The only area planted with loblolly pine occurs in the south east corner of the site because of diseased trees and/or timbering.

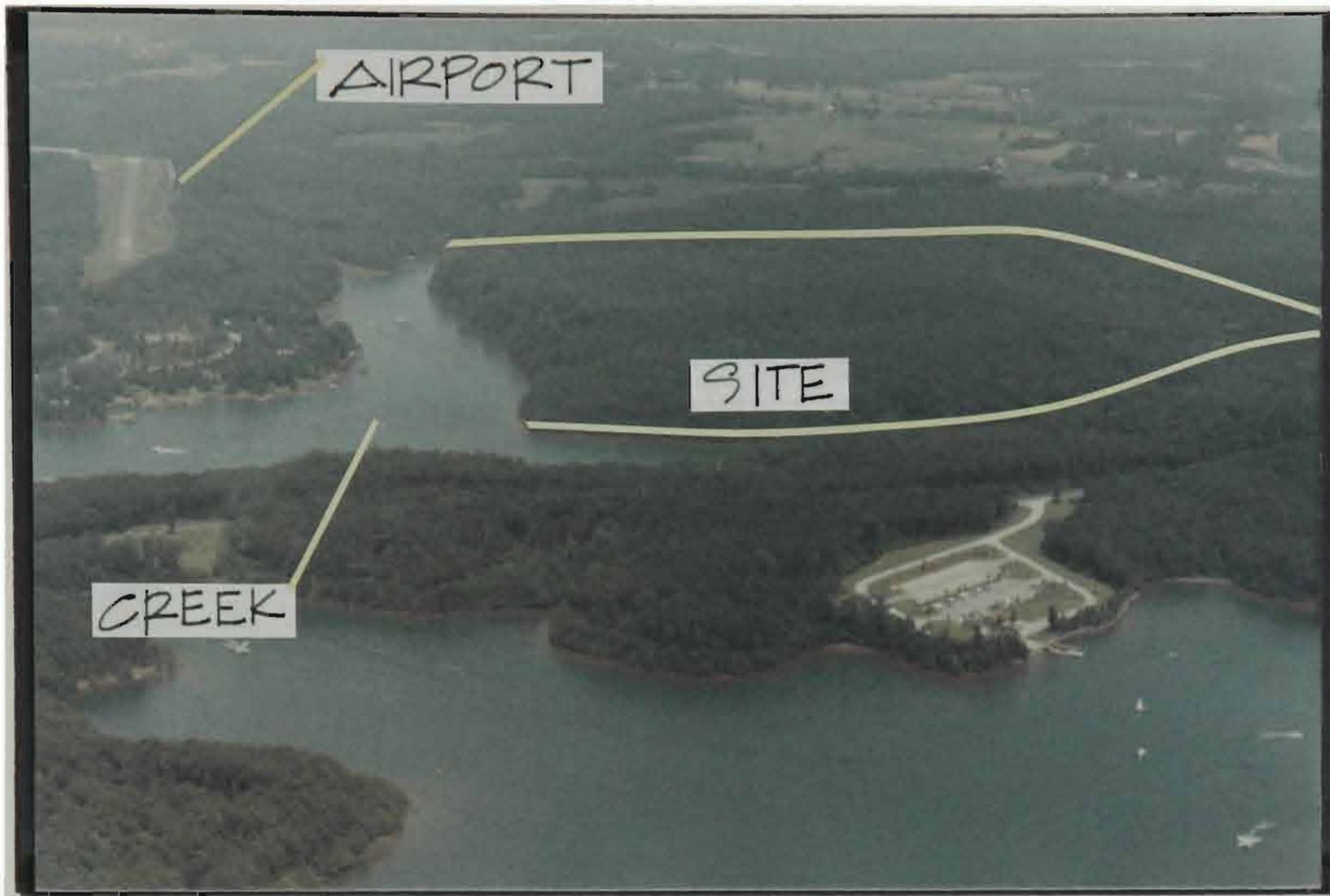
An area adjacent to the site was planted with Autumn Olive and Bicolor Lespedeza in 1984 in an effort to increase food and cover for wildlife. Therefore, if planting or reforestation is required, the same variety of vegetation and trees should be used to remain in indigenous context with the site. Additionally, it is not unusual to see outgrowths of mushrooms at the base of the trees.

Site habitats which are not favorable to humans are the Brown Recluse spider and Rocky Mountain Spotted tick. These insects can be found under the dead and fallen trees. And poison ivy is interspersed throughout the site. There are, however, many lightning bugs at night in the summer months.

From the Site Reconnaissance Survey



A typical view⁴ one experiences through the rural landscape by automobile. The approach to the site is very similar in character of this scene. Tree blanketed mountains front both sides of the highway and in most cases the highway's shoulder is broad for anticipating curves and changes in elevation. Most county roads are asphalt and the roads traveled from Roanoke to the site are in good repair.



The site in relationship to Walton Creek and the Smith Mountain Airport.



The Smith Mountain Airport, operational only during the daylight hours.



The closest development 500 yards west of the site.



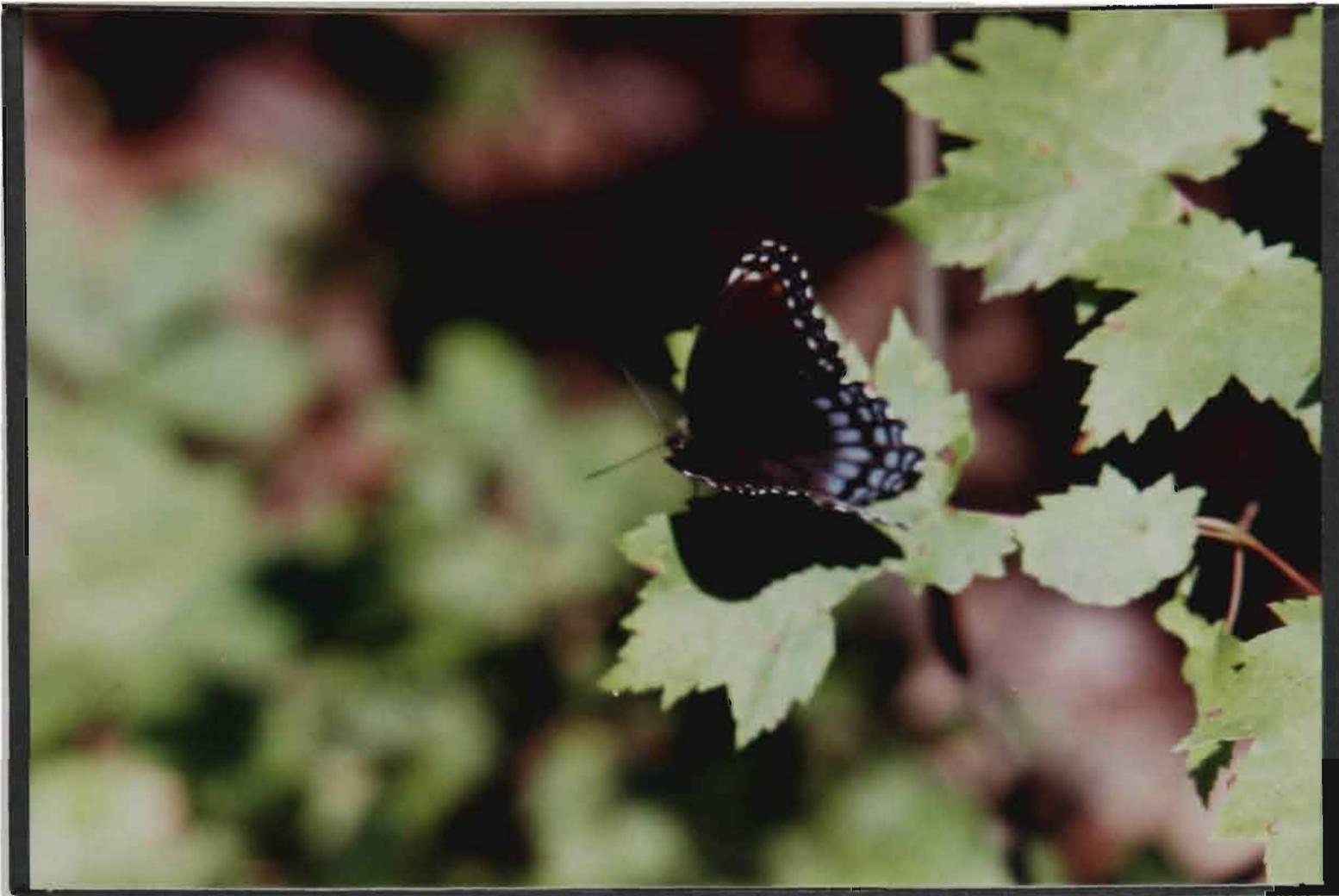
The closest development one-half mile east of the site.



Autumn Olive as wildlife food and cover.



Bicolor Lespedeza as wildlife food and cover.



The site has many delicate elements like this butterfly's resting on a leaf.



The only built structure on the site is a dilapidated red brick house.



An edge along the bank of the site.



View to the site from the mouth of Walton Creek looking northeast.

NOTES:

-
- 1 The base map was configured from a topographic map of Smith Mountain Lake after selection of the site took place. Since the field map was enlarged without scale, the diagrams in this program are likewise unscaled but in proportion. The reconnaissance survey took place August 4 and 5, 1988.
 - 2 According to a Smith Mountain Lake State Park ranger, this land was only used as farmland years ago and now remains as woodland.
 - 3 Hunting is not permitted at the site or any other area within ten miles of the site. The park rangers know of a family of 2 fawns and 1 doe in the park area. The fall season brings more deer into the area.
 - 4 This photograph by The Reconnaissance Survey of the Roanoke Parkway. Volume One. The River Foundation. Roanoke, Virginia. p. 8.



Issues

4

Younger Youth—

Seventh thru ninth graders are undergoing tremendous physical changes. Their skeletal and muscular structures are developing. Their bodies are maturing sexually. Their physical growth usually accelerates during these years, and often development of coordination and control lags behind. This makes the younger youth appear awkward at times. In spite of these difficulties, their sports skills and physical abilities are rapidly developing. During this age girls are usually slightly ahead of boys in physical development and social maturity. Both boys and girls share a common characteristic however; a self-conscious appraisal of themselves leads many younger youth to withdraw from "normal" social intercourse.¹

A transferral of authority begins at this stage of development. The youth have, by necessity, depended upon their parents for life's needs. Now they begin to feel the desire to be independent. This is a necessary step in the maturing process. Since the youth is trying to seek group approval, this transfer of authority manifests itself toward the collective authority of the group. The group then becomes the major influence of tastes in clothing, hair styles, life-styles, and language. In effect this peer group has control over the individual and behavior patterns will, most likely, change.

Mentally, seventh thru ninth graders are developing rapidly from concrete to abstract thinkers. Their ability to reason is increasing. They have the desire and ability to discuss abstract ideas such as faith and love, furthermore their attention span is longer. Their imagination is very active at this stage of development as well.

The younger youth are still involved in two worlds; that of the child and that of the adult. In any given instance the youth may act like an adult and later behave childishly. The opposite is true as well.

Older Youth—

Physically, older youth, the tenth and eleventh graders, are practically adults. Most of their skeletal growth has taken place. They are conscious of their personal appearance and usually self-conscious about their physical structure, especially if they have some particular feature which is unusual. The girls are concerned about their figure and not always interested in good nutrition. The boys, on the other hand, will usually eat anything put before them. The imagination of the older youth is still very active. Now, instead of simple "flights of fancy," their dreams, and ambitions, may be based on some concrete accomplishments made in life. Idealism is very strong, and they are

very quick to spot, and point out, hypocrisy. Older youth are eager to be independent and are very sensitive about any suggestion that they need help or are inadequate for a given situation.

Friends are very important to this group. They are beginning to feel self-confident about the opposite sex, and the dating process is usually well developed among the older youth. While they enjoy dating, they also find meaning in being friends with the opposite sex. The pressures of peer group to conform is tremendous because they want to be accepted. The older youth tend to settle into social cliques very quickly. Tenth grade girls are usually more interested in boys than boys in girls. The interest tends to equalize by the eleventh grade.

Older youth tend to be very concerned about being popular. They have a mental image of the type of person they want to be. Any failure to meet this standard irritates them, but when they are successful they are very happy and pleased with themselves. These feelings, coupled with the approval or disapproval of their friends, makes their moods erratic. As maturity comes, they develop the ability to laugh at themselves and their mistakes. This eases emotional stress and allows them to become better adjusted to this phase of the human development phenomenon.

The older youth is usually at a precarious stage in his/her spiritual life. Many youth who have come up through the years of Sunday School will know many Bible characters, stories, and Scriptural facts. However, they may have no concept of the chronology of the Bible or how the spiritual concepts of the Christian life interrelate. The Bible may seem confusing and at times contradictory because they do not fully understand the background and setting of the Scriptures. When older youth experience a conflict between belief and behavior, the pressure of their own desires and social pressures of peer group may cause them to rationalize their actions as right and adjust their 'beliefs' accordingly. Two things are extremely helpful during this stage of development: a friend who listens, shares, and helps in the pursuit of truth; and a living example of a life reborn, saved, and lived thru the grace of Jesus Christ. When the gospel is adequately presented in life and lesson, the youth will respond. Their basic spiritual problem stems from trying to face adult problems with childish or immature faith. When the individual's concept of spiritual life matures, their childish faith will develop into a childlike faith in its completeness of commitment.

Therefore, both youth require environments to facilitate:

The education about their bodies and responsibilities thereof.

- Intimate spaces which may be exteriors,
 - Classroom spaces.

The development of their muscular structure.

- Athletic spaces,
 - Sleeping domains.

The development of their spiritual foundation.

- Worship places,
 - Bible study places,
 - Devotional places.

The development of their social attitudes.

- Gathering places,
 - Dancing places,
 - Relaxation places,
 - Performing places ie; song, skits etc....

The development of their mental limits.

- Settings to encourage abstract thinking,
 - Under supervision—proximity of counsellor as living monitors.

Responsibilities leading to independence.

- Living environments away from the main camp setting,
 - Living quarters up-keep,
 - Table waiting at their living unit's eating place
 - Accomplishments of increasingly difficult designed sports skills levels.
-
-

The Counsellors—

The characteristics of the counsellors are dedicated Christians, usually emotionally and socially mature, and in good health.² Some things which are important to quality of the counsellors are things which cannot be instructed such as: an innate love for people and the ability to adjust to changing circumstances. The counsellors may have been previous campers, college students, vacationing from a full-time job, or retired personnel. However experienced, a new staff member may feel nervous about a new environment as well as a new employer.

Therefore, counsellors require additional environments to facilitate:

The execution of their duties and responsibilities as camp staff.

- Organization roles in scheduling places,
- Supervision roles in living unit domains and activity places,
- Leadership roles in outpost camping places, devotional places, and hiking paths.

Environmental Issues

In order to compose architecture's pallet and thus begin to craft the space, certain elements should be brought together in an effort to form a homogeneous whole:

Acoustics—

The acoustics of architecture is the manipulation of technology of designing space to meet hearing needs. With proper design, 'wanted' sounds can be perceived and 'unwanted' sounds or 'noise' can be attenuated to the point that it does not provide an annoyance. However, in achieving good acoustical quality of the space has become increasingly challenging; lighter construction materials have replaced denser materials thus transmitting more sound.³ Moreover, as much as 40% of a building budget may be dedicated to the building's mechanical equipment—all of which makes noise. And the importance of proper acoustic design must be initially designed as retrofits are many times expensive and frequently impossible without substantial structural alterations.

Comfort vs. Climate—

One of the earliest reasons for building was to create shelter from the climate; to enhance thermal comfort. The caveman sought out the cave and, after a period of time, realized that trees could be timbered, thatches could be made, and huts could be built. The rationale for inventing heating, ventilation, and air conditioning was to provide direct control of interior climate for the comfort of the human user. Considerable space is required for HVAC equipment as well as other components of the building's infrastructure which should be designed for.

Therefore, an interrelationship between bodies, buildings, and climate exists which constitutes comfort.

Communication and Signal Systems—

There probably has not been any area of industrial design which has effected building design greater than the application of various signal systems to the building. This issue is based in theory that all signal, communication, and control equipment's function is to assist in effecting proper building operation. Included are fire and interior alarms; telephones, intercoms, and televisions; and timing equipment such as clocks and alarms.

Energy—

The trend today in architecture is being advocated by two assumptions: one, designers can have a positive impact on society through energy conservation, and two, buildings that encourage their users to directly experience the natural environment will both facilitate energy conservation and enrich the users architectural experience.

Most projections of future U.S. energy consumption assumes continued, though less rapid, growth in demand. The views on supply and demand do not necessarily provide predictability; this years estimate does not assure next years performance. Most critical is the issue of the camp being dependant on one form of energy, on electricity. Although Smith Mountain's massive hydro-electric generating plant is less than five miles from the site, an all electrical camp does not have to be designed. This posture arises, in part, from three critical issues as a result of the invention of electricity.⁴

Consumption of electricity is expected to rise approximately twice as fast as the overall energy demand.

Electricity is almost the only source of illumination in a structure, other than daylight.

Electricity is a convenient source of energy as it can provide power to high grade tasks.

Therefore, consideration of electrical usages may be practical but use of other forms of energy should be encouraged.

Fire—

The designer can control the structure and thereby is the authority as to what is put into the space.

Illumination—

The provisions for daylight in structures in the U.S. had, in the recent past, largely been considered an amenity rather than a necessity. As such its provision to the user lies in the providence of architecture rather than lighting design. The fenestrations of the space establish visual contact with the outside resulting in a bright, pleasant, airy, ambience.

Therefore, perceptions to create mood are directed by the window. And daylighting is necessary to enhance the space which may be supplemented by artificial lighting.

Thermal Control—

Human comfort is the objective of any calculations made to size equipment for this camp's performance. However, comfort is not attained by calculations alone; psychological factors have as much influence on comfort as temperature, illumination, humidity, and air motion. To attain thermal comfort is to employ mechanical systems that heat, cool, and circulate air about the body, throughout the space.

The Site's Resources vs. Climate—

Site planning is greatly influenced by economic considerations, zoning regulations, and adjacent developments, all of which interface with with the design of a site to utilize the sun and wind. Integration of these concerns is the first steps in planning the site for development and its relationship with its microclimate. The microclimate is influenced by the interaction of both site characteristics and climate characteristics:

<i>The Site</i>	<i>The Climate</i>
Soil type	Sun
Ground surface	Temperature
Topography profile	Humidity
Vegetation	Precipitation
Water presence	Air motion
View	Air quality

Human activities: heat, noise, etc...

Transportation—

The building's circulation is determined by the ease of moving people and equipment thru the space; vertical and horizontal transportation constitute circulation. Vertical transportation can come in the form of elevators and escalators, as well as stairs. And horizontal transportation can come in the form of moving sidewalks. Special care must be taken in the design of the building's transportation system as many times this can be as much as 10% of the building cost and provides a greater percentage of gross square footage than useable net square footage.⁵

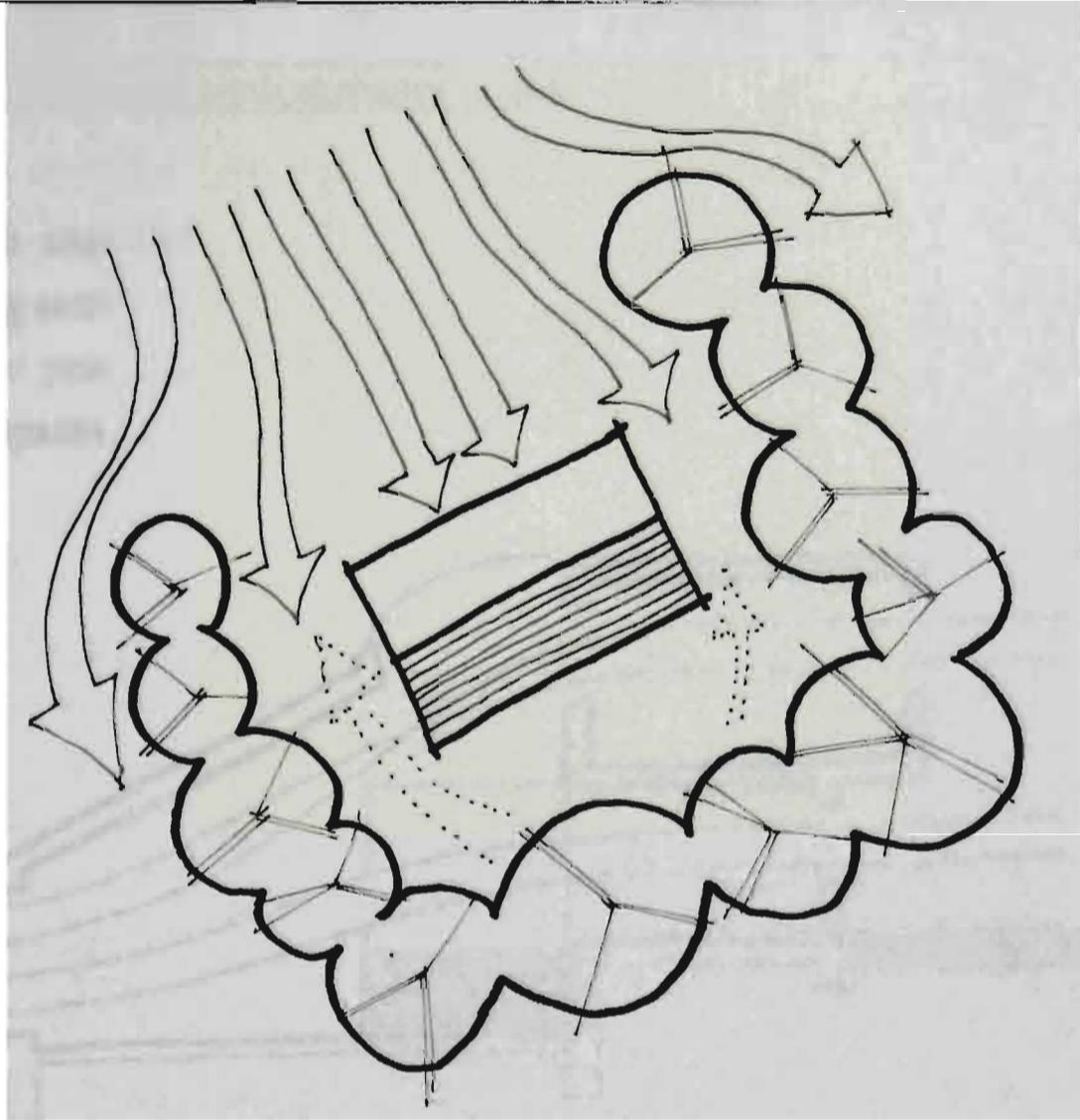
Water in Architecture—

Throughout history, in nearly all climates and cultures, the designer's major concern about water was how to keep it out of a building. Only in the past 100 years has the designer become concerned as to provide a water supply within the building. This has been mandated by the need for: cleansing and hygiene, nourishment, ceremonial uses, transportation of wastes, cooling, ornamental uses, and protection in the event of fire.

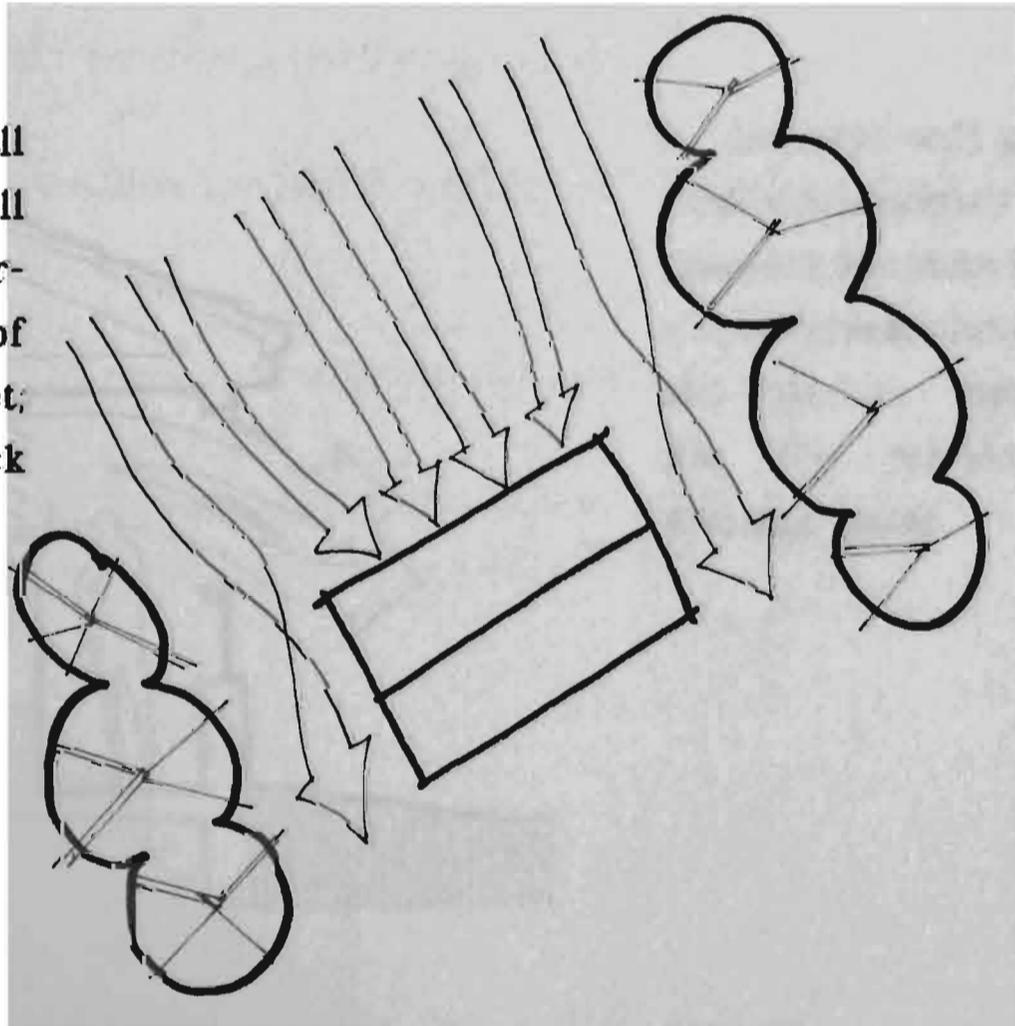
Therefore, compose the pallet with these elements and craft the space as a response to these elements.

Tree placement can be used to guide wind into the structure

- **Poor design:** Although side tree wall increases driving pressure of wind, the rear tree wall pressurizes the suction zone on the leeward side, thus reducing overall pressure differentials.

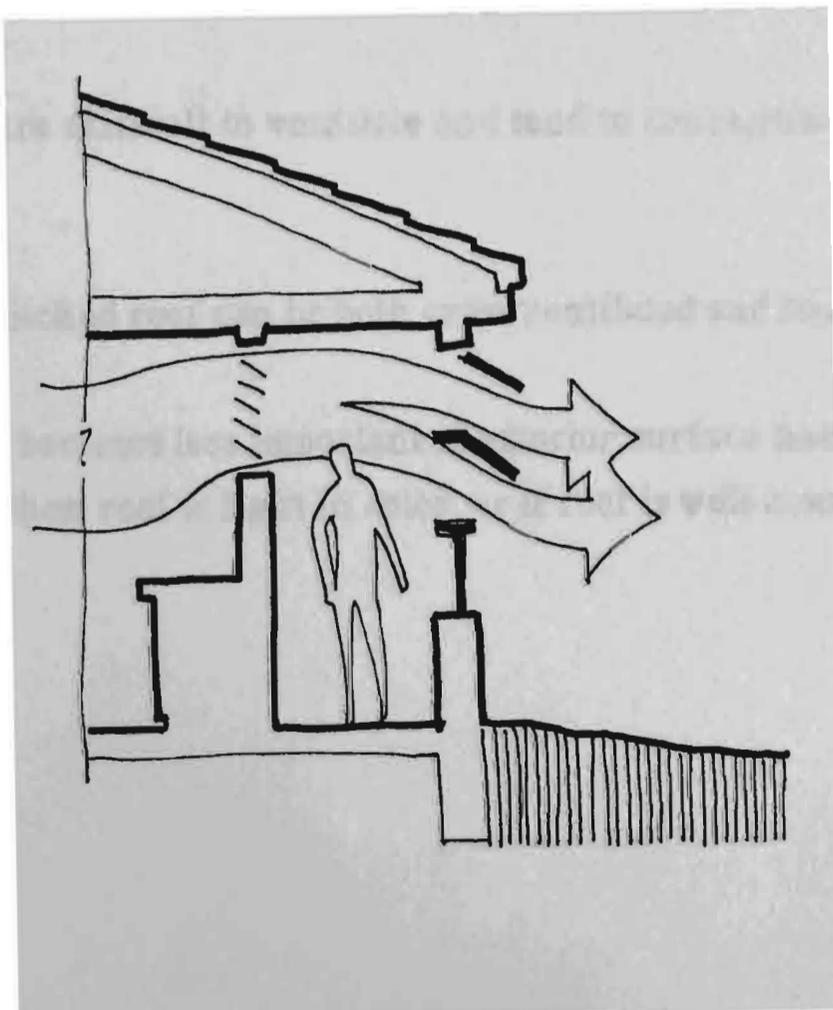
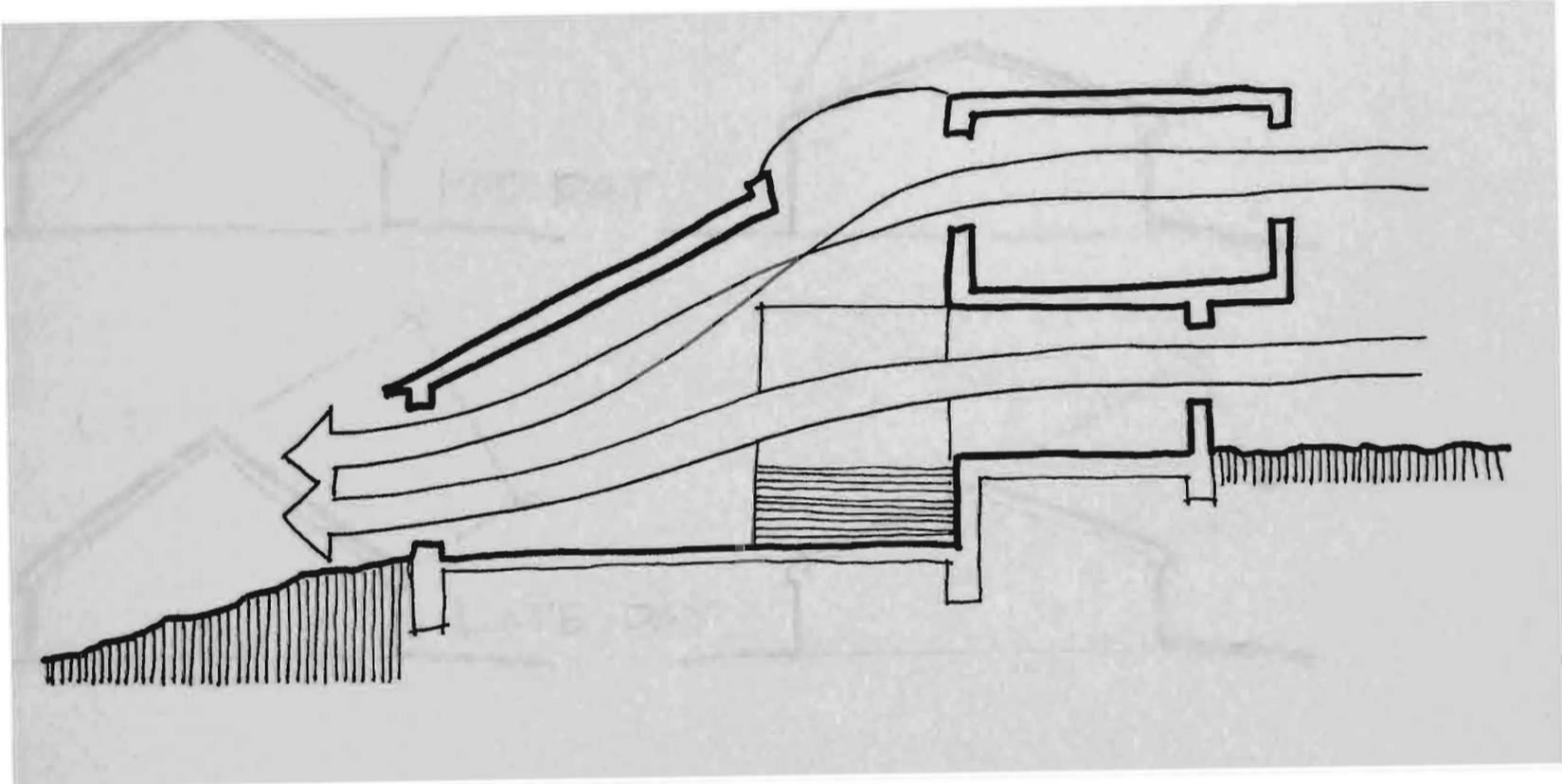


- **Good design:** Tree wall allows free venting as well as funnel at front. The narrow corridor at sides of structure create an air-jet; good ventilation for deck placement.



Open plan interiors promote interior air flow.

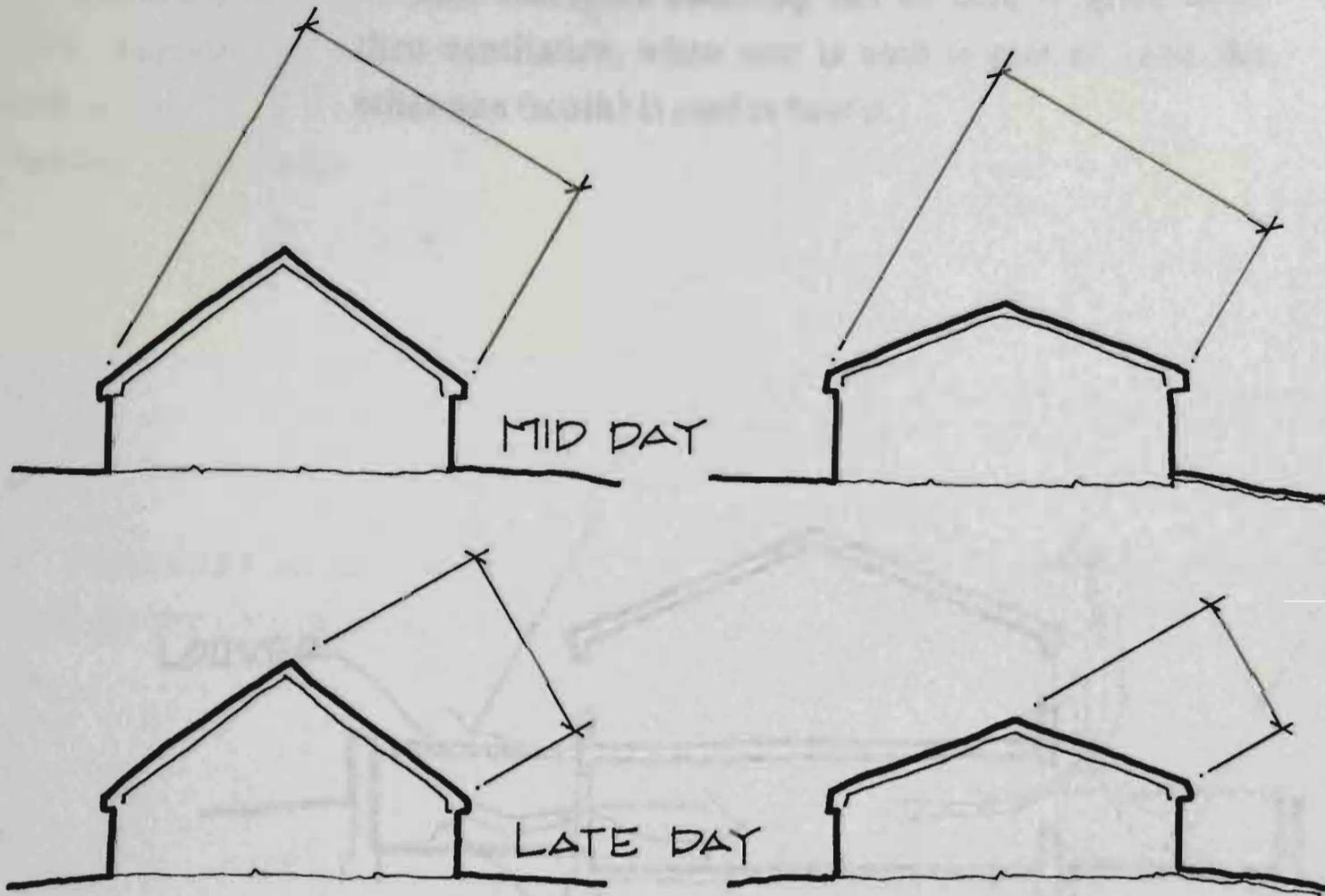
- Open plan can be executed in an overlooking mezzanine arrangement to provide privacy between spaces.



- Louvered wall panel affords visual privacy between spaces on the same level and a sensible semi-direct link to the exterior. Appropriate use for corridors, and dressing spaces.

Summer—

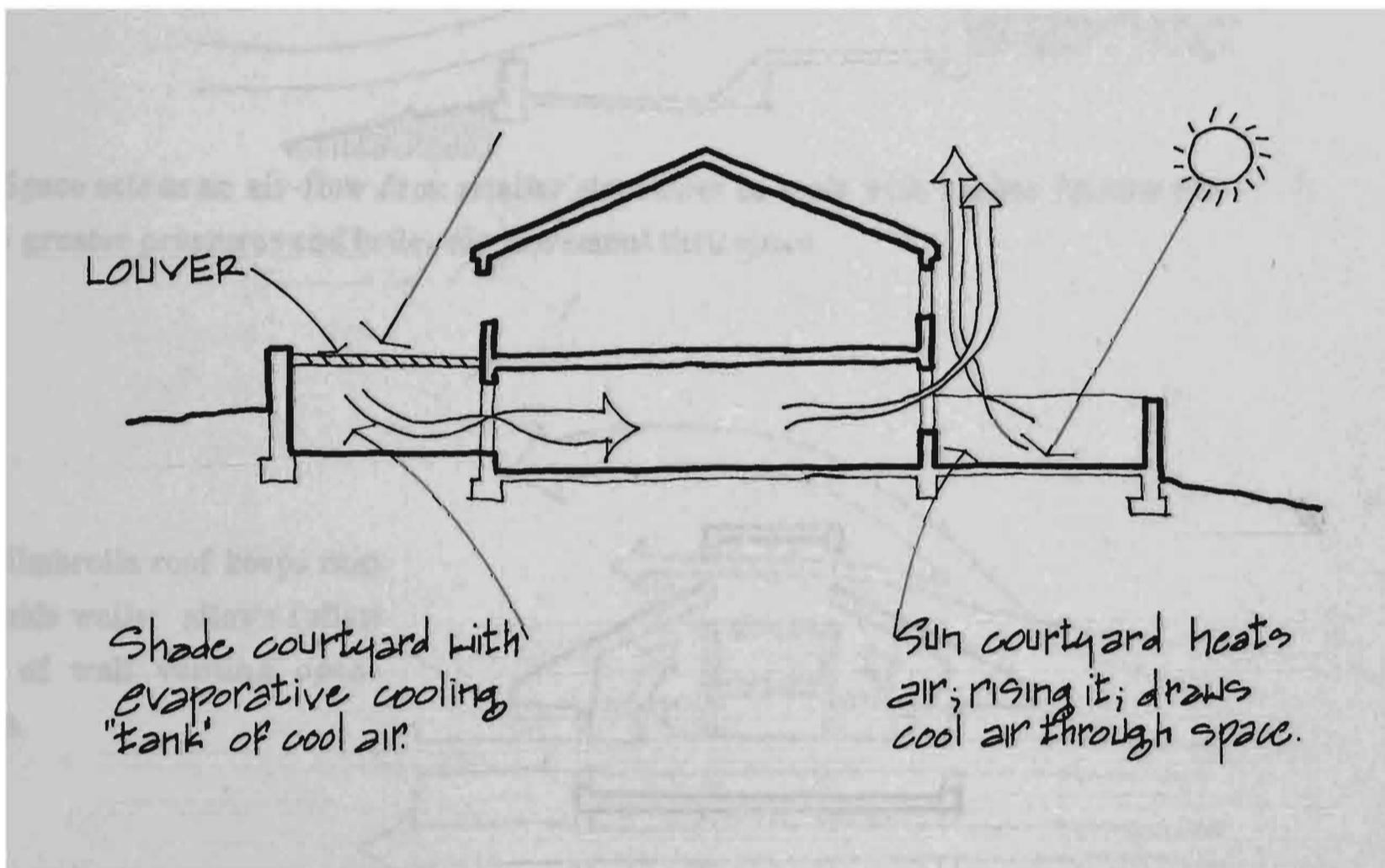
Minimize roof shape and pitch exposure to summer sun.



- Roof shape has little effect on midday gain when sun is high.
- Flat roofs are difficult to ventilate and tend to concentrate noon sun on small surface areas.
- A higher pitched roof can be both cross ventilated and stack ventilated.
- Roof shape becomes less important if exterior surface has a high coefficient of reflectivity, or when roof is light in color, or if roof is well insulated.

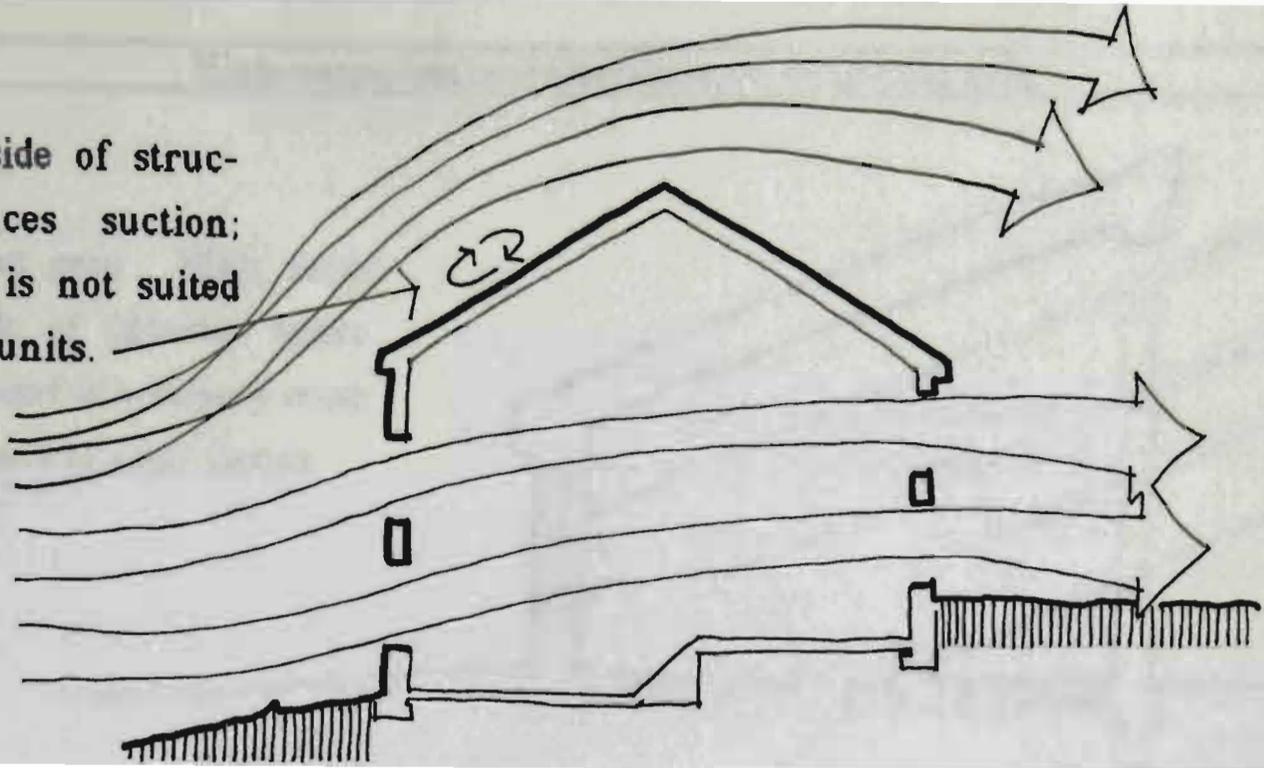
Maximize natural on-site evaporative cooling.

- Dual courtyard planning can be used to drive flow-thru ventilation, when one is used to cool air, and the other one (south) is used to heat it.



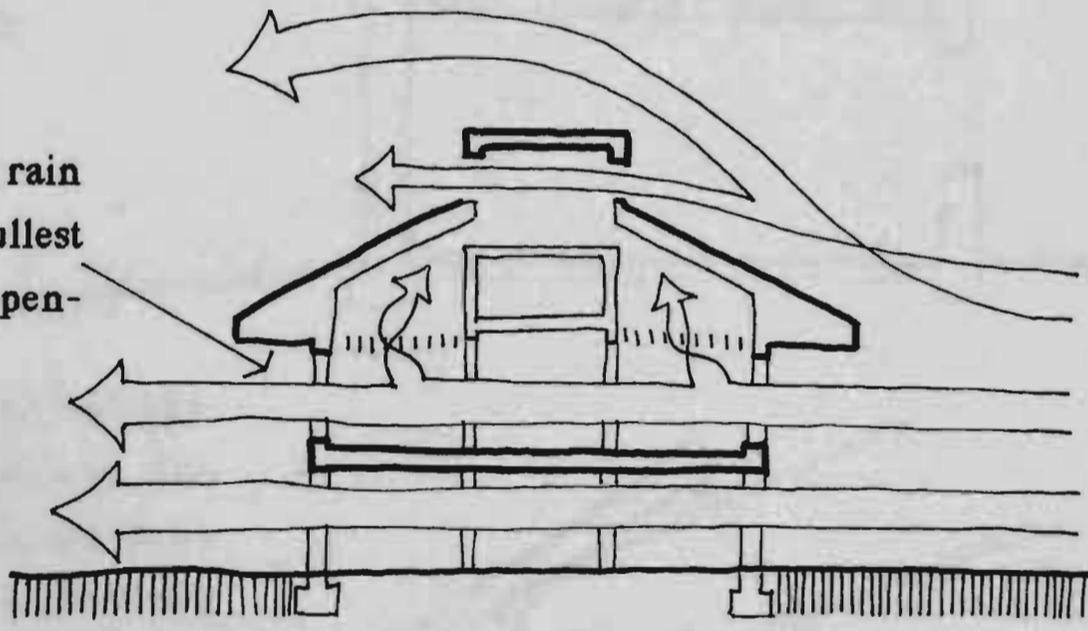
Maximize space orientation and shape for summer breeze exposure.

- Windward side of structure experiences suction; this condition is not suited for ventilation units.



- Space acts as an air-flow dam; smaller structures in scale with higher facades provide greater pressures and better air movement thru space.

- Umbrella roof keeps rain off side walls; allows fullest use of wall venting openings.

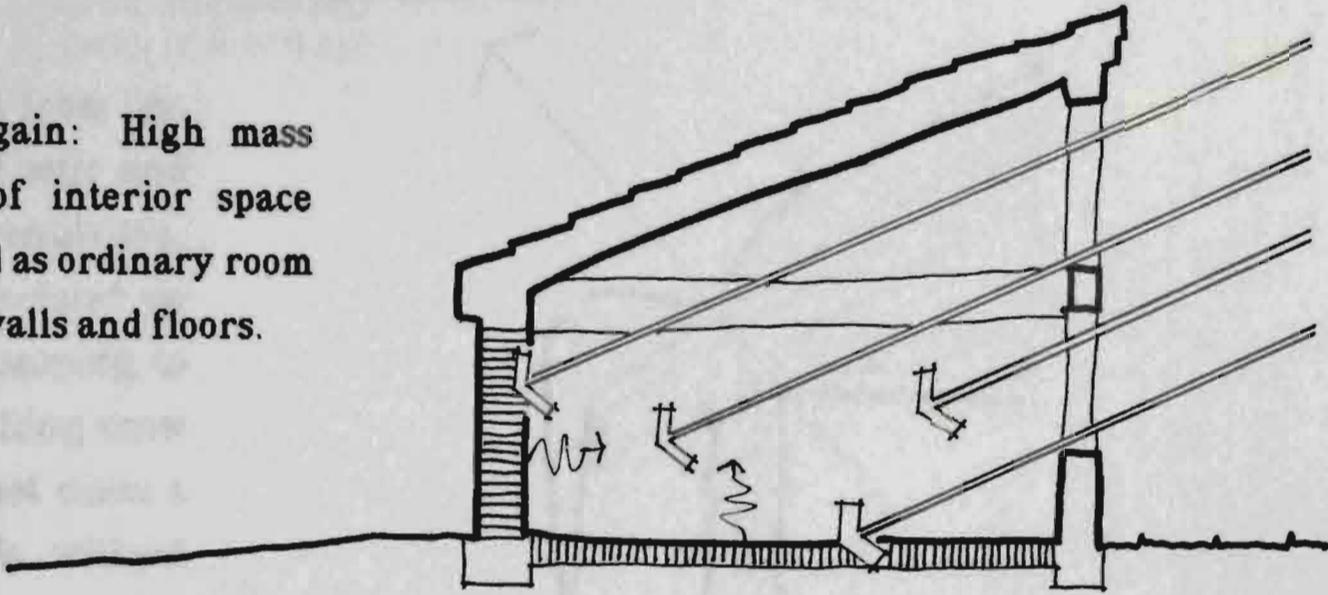


- Configuration of a 'piano nobile' directs air currents stronger and higher above the surface. The elevated floor keeps the underside of the structure dry. Especially useful in coastal areas with high humidity levels.

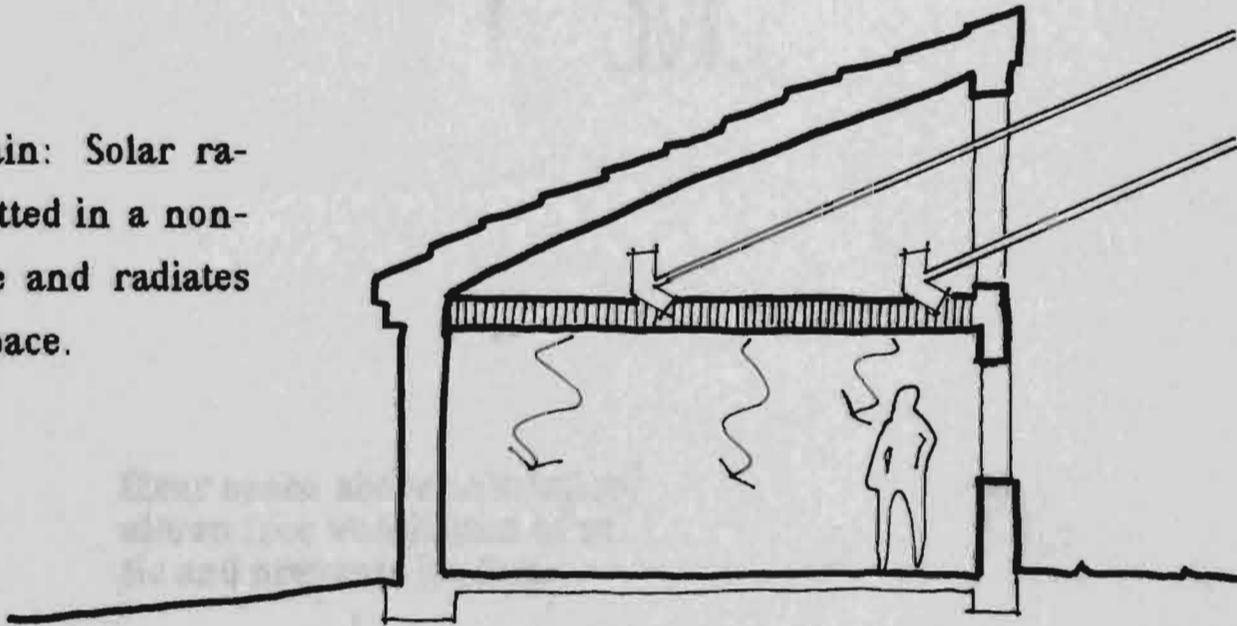
Winter—

High-capacitance materials store solar heat gain.

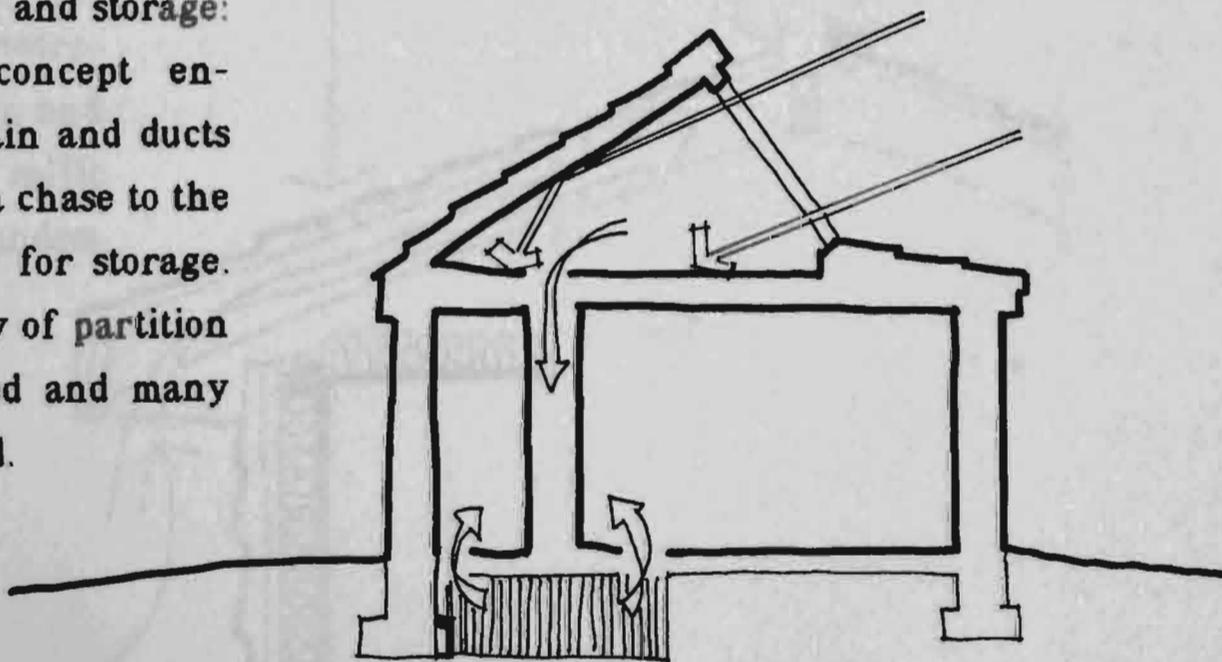
- **Direct gain:** High mass materials of interior space are exposed as ordinary room elements; walls and floors.



- **Indirect gain:** Solar radiation is admitted in a non-occupied space and radiates to the living space.



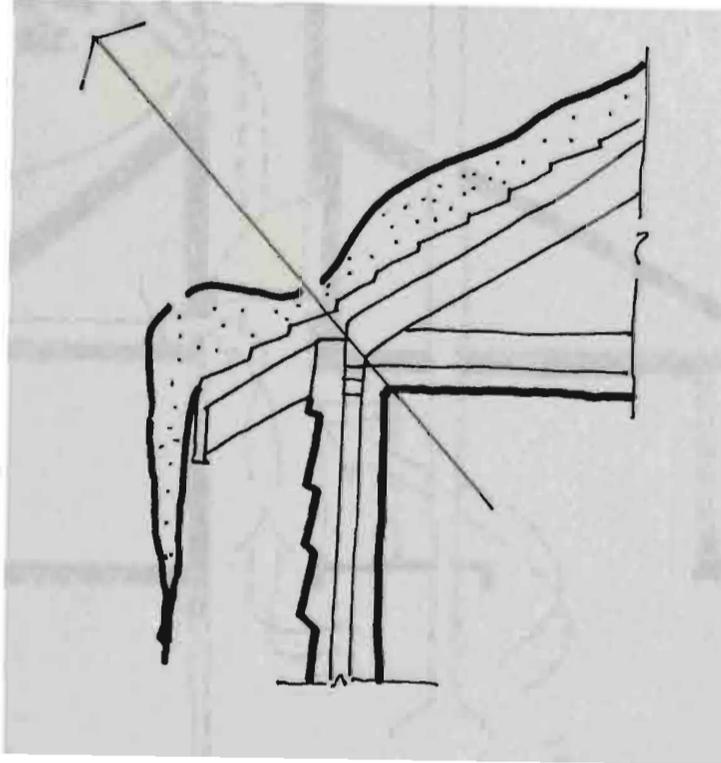
- **Remote gain and storage:** "Solar attic" concept enhances solar gain and ducts this gain thru a chase to the rock bed below for storage. Storage capacity of partition becomes reduced and many times eliminated.



Attic spaces can be a buffer zone between interior and exterior climate.

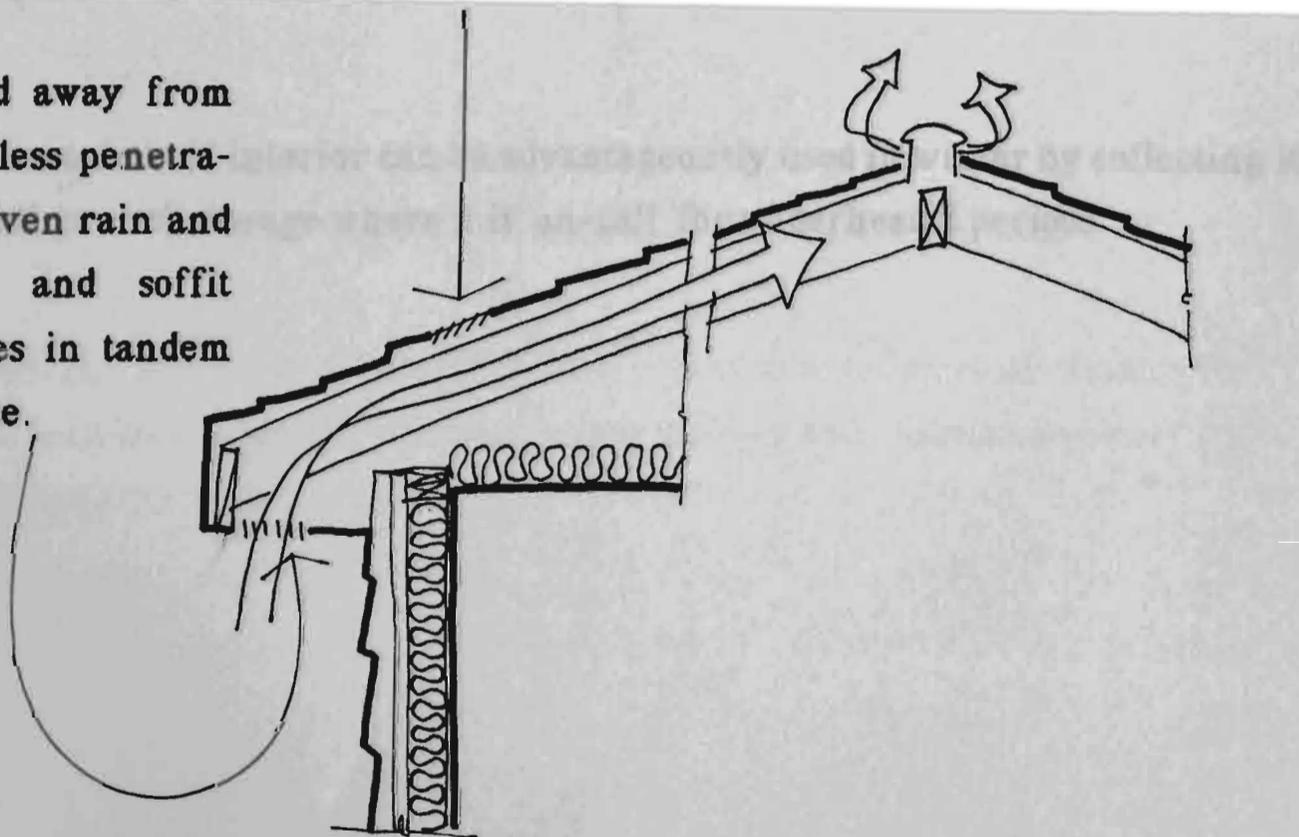
Heat conduction thru thermal bridge melts snow.

- Ice dams result from improperly insulated attic and insufficient attic ventilation. Attic floor is insulated to keep heat from escaping to attic space and melting snow too rapidly as to not cause a sudden snow slide without warning.

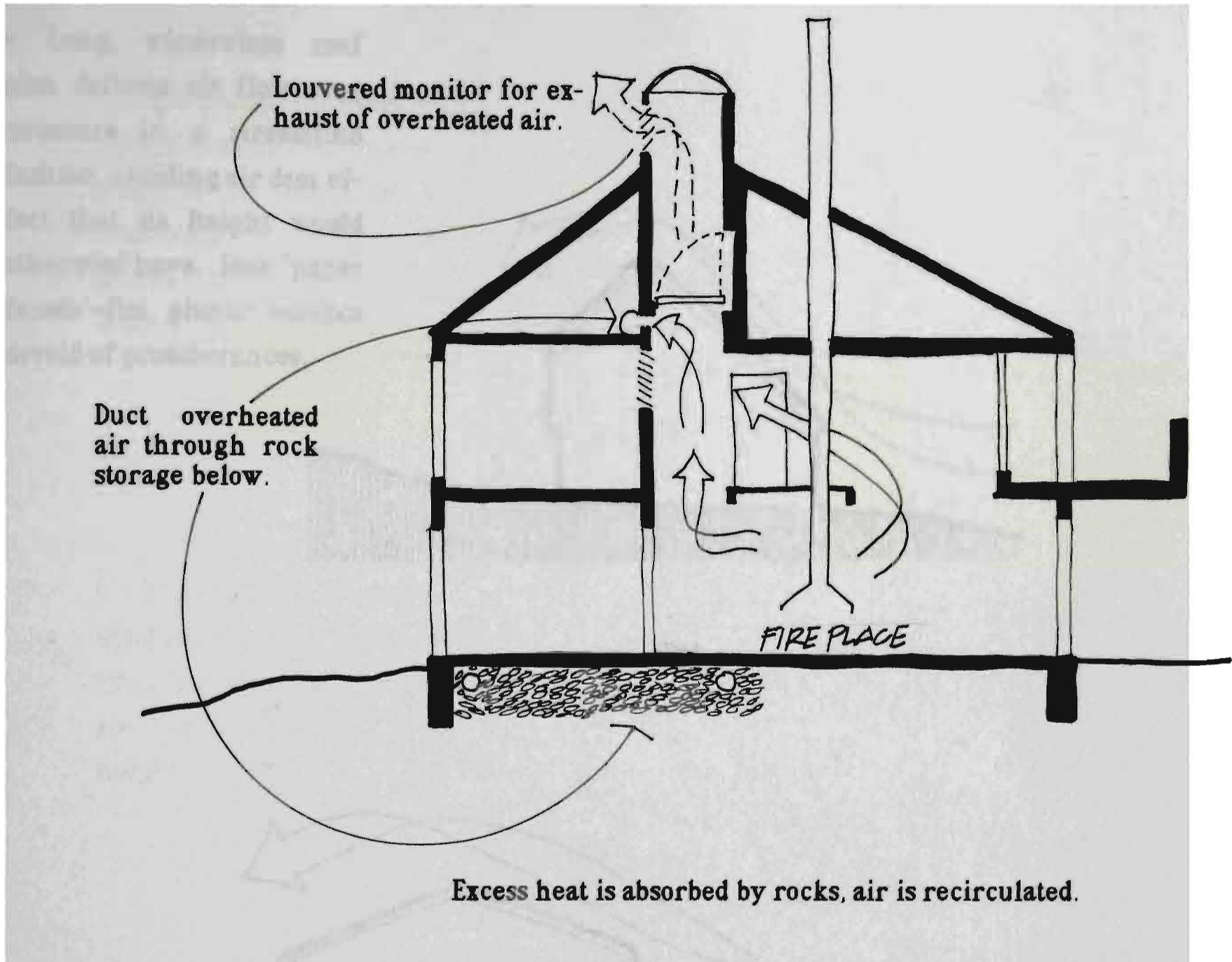


Clear space above insulation allows free ventilation of attic and prevents ice dams.

- Vent located away from wall to provide less penetration of wind driven rain and snow. Ridge and soffit venting operates in tandem to cool attic space.



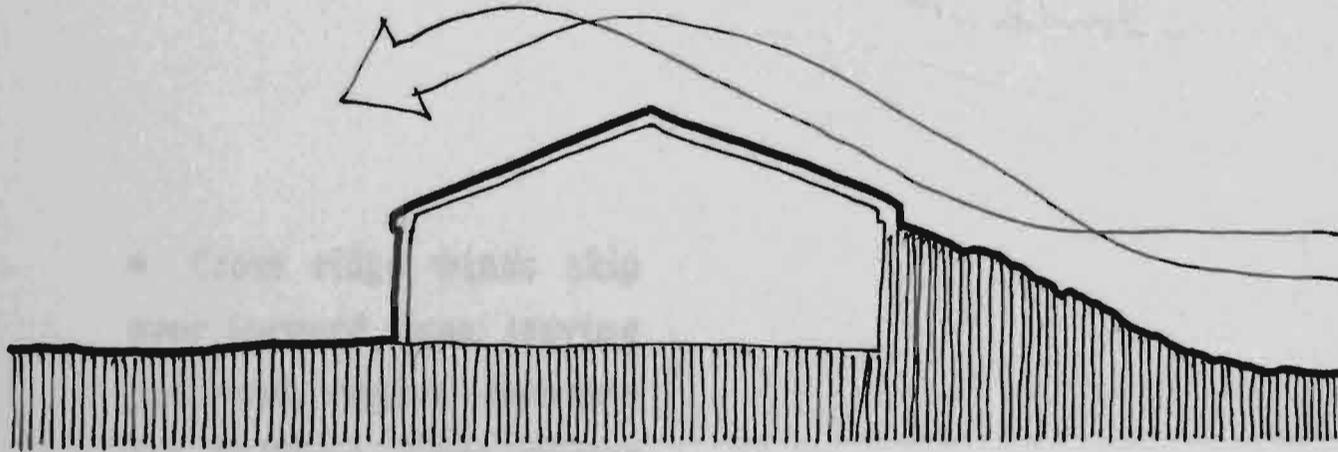
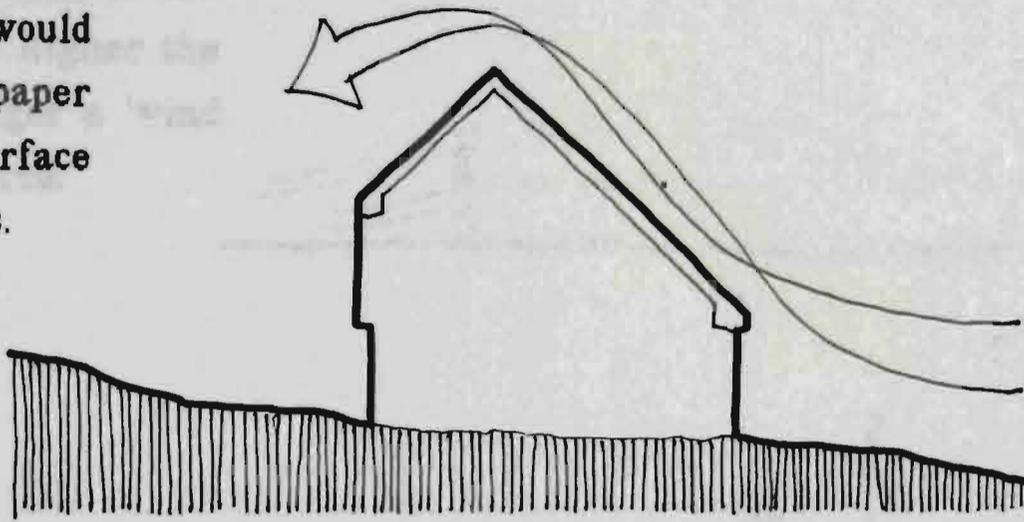
Air shafts can provide for natural and/or mechanically assisted heat recovery of space.



- Overheated air of interior can be advantageously used in winter by collecting it and piping it thru rock storage where it is 'on-call' for underheated periods.

Shape and orient the building shell to minimize winter winds and turbulence.

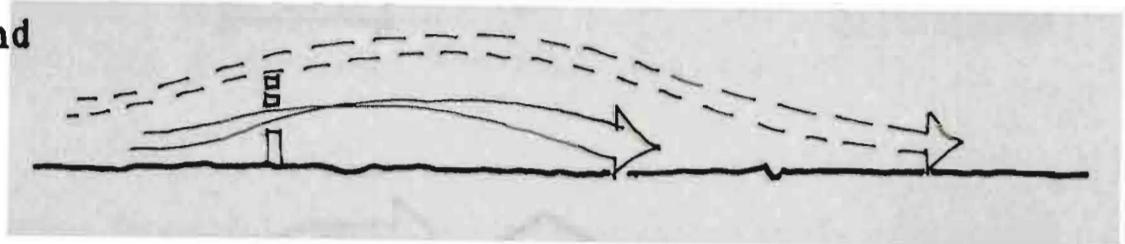
- Long, windowless roof plan deflects air flow over structure in a streamline fashion, avoiding air dam effect that its height would otherwise have. Note 'paper facade'—flat planer surface devoid of protuberances.



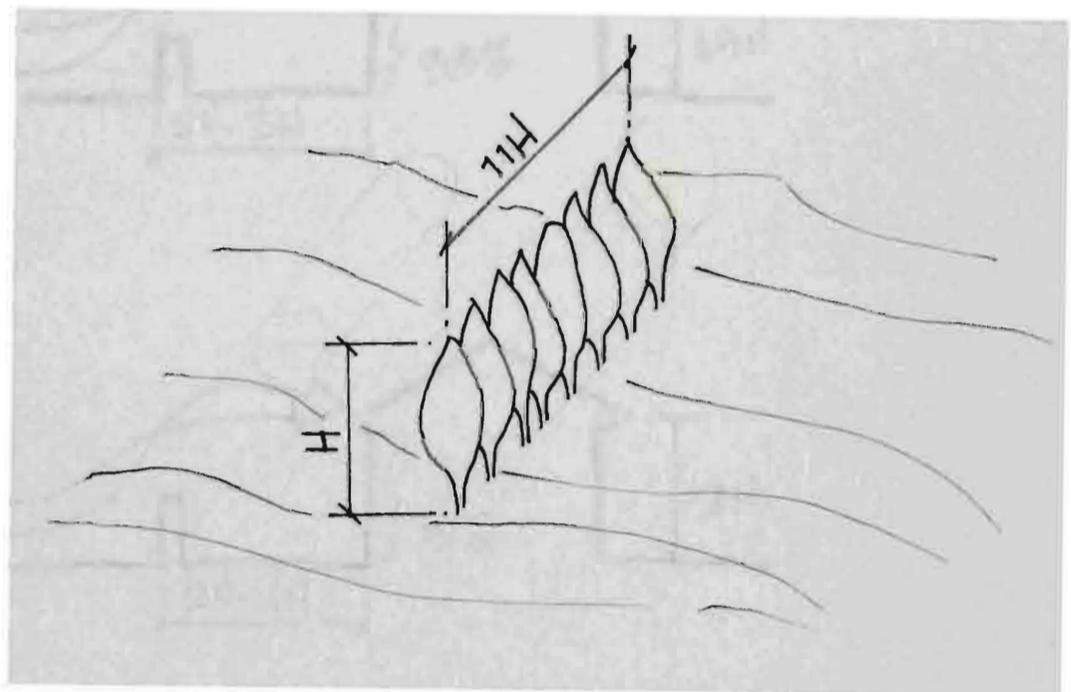
- Berming, or earth sheltering, on the windward side of the structure eliminates infiltration at band joist and reduces infiltration at top plate as well. Streamline roof reduces conduction-convection losses thru roof.

Neighboring landforms and vegetation serve winter wind protection.

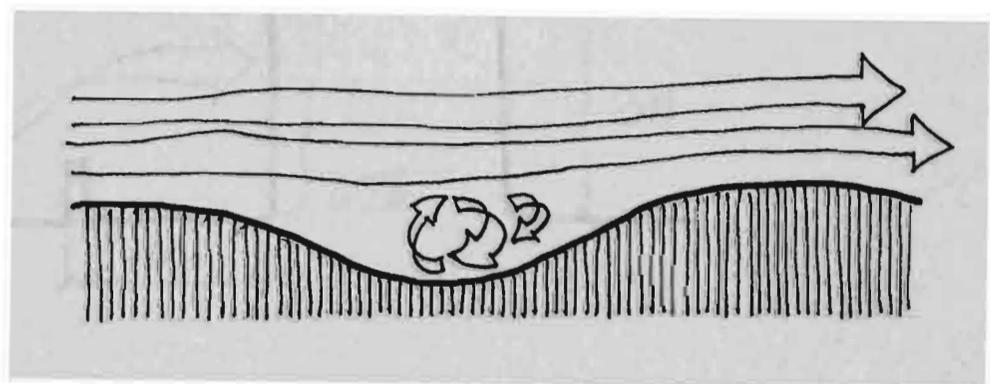
- The range of protected area downwind is proportional to the height of the windbreak. The higher the barrier, the longer a 'wind shadow' is produced.



- The maximum length of a wind shadow is attained only when the width of the barrier is eleven times its height.

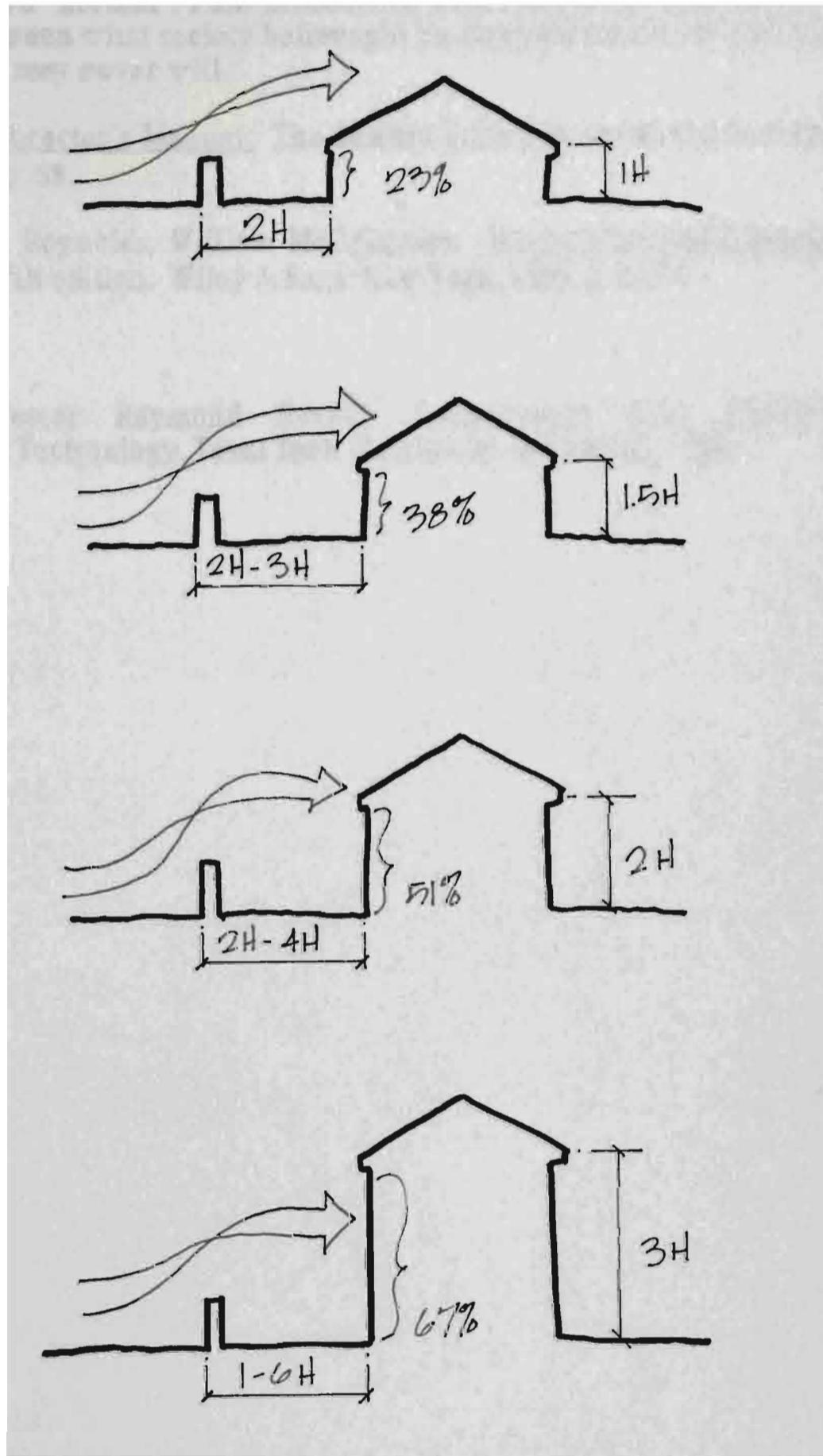


- Cross ridge winds skip over leeward slope; leaving protected region desirable for building since winter winds often come from the north and northwest in this hemisphere. Slope in the shadow of the wind will often be southerly exposed.



Man made walls and fences offer winter wind protection.

- Fence/facade relationship: Wind impact on a structure is related to its height and distance away from windbreak.



- Solid or impenetrable wind barriers should be avoided as turbulent conditions are created on leeward side.

- Increasing the thickness of shelterbelt does not increase the length of its wind shadow; however, the density of the shelterbelt can reduce noise penetration.

NOTES:

¹ In reference to the word "normal"; I am proceeding with the understanding of the reader differentiating between what society believes to be accepted standards and what man has yet to define, and may never will.

² John LaNouse. Camp Director's Manual. The Sunday School Board of the Southern Baptist Convention. 1976. p. 68.

³ Benjamine Stein, John Reynolds, William McGuinness. Mechanical and Electrical Equipment for Buildings. 7th edition. Wiley & Sons: New York. 1986. p. 1229.

⁴ Ibid. p. 20.

⁵ Lecture notes. Professor Raymond Powell. Architecture 4351 Advanced Architectural Systems and Technology. Texas Tech University. October 25, 1988.



Goals and Objectives

5

Goals and Objectives

Relative to the users—

GOAL: To develop an understanding of, an appreciation for, and a responsibility toward the natural environment.

OBJECTIVES: Participation of daily activities that take place in or utilize the environment such as: nature hikes on trails, swimming in Walton Creek, or observing the natural wildlife and flora.

Participation of each camper in two or more of the following projects while at camp:

- Ecology study and documentation,
- Interpretation of the quality of the environment,
- Preservation activities or projects,
- Dramatic activities or projects with environmental themes, and
- Other types of environmental activities or projects.

QUALITY: Articulate the pallet to take advantage of natural illumination and let the path bring the user into an identifiable setting unique to the individual.

GOAL: To develop an understanding of and an appreciation for the mind.

OBJECTIVES: Provision of daily camper communication with other campers and staff.

Demonstration of daily consideration for others.

Encouragement on the part of the counselor to foster the beginnings of new friendships between campers by session end.

QUALITY: Craft the space to focus on human to human communication.

GOAL: To develop an understanding of, an appreciation for, and a responsibility toward the body.

OBJECTIVES: Provide in the program scheduling an opportunity for each camper to participate daily in three of the four core activities:

- Basketball,
- Volleyball,
- Soccer,
- Baseball or Softball.

Employ seasonally program specialists and counselors that are disciplined toward the body as demonstrated by non-smokers, non-alcoholics, and non-drug abusers.

Maintain constantly a strive for athletic excellence in the philosophy of the camp administration, the program specialists, the counselors, and the campers.

QUALITY: Let the pallet reinforce spatial perception by introducing natural illumination and promoting natural ventilation. Also craft the space in a manner to epitomize the core activities.

GOAL: To develop a spiritual awareness as mature Christians through commitment of thyself to Christ, introduced and reinforced at camp.

OBJECTIVES: The long-term developing of a deepening personal relationship with a living God:

- Becoming aware of and having an experience with the reality of God's presence.
- Communicating with God through Scripture, prayer, and the Holy Spirit.
- Accepting God's offer of salvation by grace thru faith.
- Developing a life-style which includes time for prayer, personal Bible study, and meditation upon application of God's truths to daily life and its relationships.

The discovering of special abilities, known as talents, that God has given each human.

- Acceptance of and gratitude for God's design of their physical person and personality.
- A search of the Scriptures and the personal life to determine God's "special" gifts to the individual.
- Verification and confirmation of these gifts and their place in the individual's life through the ministry of the camping experience.

The long-term discovering of God's will for the application of these talents to the needs of the world.

- A realistic appraisal of the individual and social needs of our world today.
- An evaluation of campers' abilities and the place of those abilities in the service of the camp, the church, and the world.
- An understanding of the necessity for the best possible preparation, both academic and skill development, for Christian service, society service, and human service.

The commitment of thyself to the joy and obedience of God's will.

- An opportunity and encouragement for the total dedication of one's life and abilities to God's service.
- A sense of unity and consistency in the fellowship of Christians, and the way in which their abilities and resources blend to serve the Lord.
- Training as to how the campers will carry over the atmosphere of the camping experience to the atmosphere of the daily family living experience.

QUALITY: Develop the pallet to evoke a sense of awe by the part of the user and craft the worship and campfire space in a scale that reinforces this perception.

Relative to society—

GOAL: To encourage a juvenile from a life of delinquency.

OBJECTIVES: Implement a policy with the courts for first time juvenile offenders, of nonviolent offenses, to serve probated sentences as special camp guests under the guidance of the counselor.

Seek out, through the boys and girl clubs, the courts, social workers, and other places of the disadvantaged youth network, a percentage of disadvantaged youth for the camp program at least one session seasonally.

Seek out State revenues to foster a program for the financing of the above objectives.

GOAL: To provide a policy that "any youth who wants to come to camp, comes to camp."

OBJECTIVES: Make known this goal to various churches, school system athletic departments, and city recreation departments before the operating season commences.

Provide within the camp program a percentage of this youth beginning the first season.

Seek out corporate and private sponsorships to finance this program beginning before the first season.

Relative to Design—

GOAL: To develop the environmental context of the site with the Mission.

OBJECTIVES: Define the physical environment concerning the users orientation based on a form study and functionalism study.

Define the social environment of conversation based on an occupant study and functionalism study.

Define the task environment of comprehension based on a task study and functionalism study.

GOAL: To develop the conceptual general building system of the campus.

OBJECTIVES: Define the architectural—environmental parameters of the campus plan.

Define the building form, orientation, and location in relation to the campus and other buildings based on a site analysis.

Define the building materials and methods of construction.

GOAL: To develop the nature of the activity spaces into space concepts.
OBJECTIVES: Define the basic opportunities and limitations regarding space volume and form.

Define basic opportunities and limitations regarding light source selection, brightness and comfort controls, and positioning of luminaire elements.

Define basic opportunities and limitations regarding surface forms, materials, finishes, and assemblies.

Define basic opportunities and limitations regarding air handling elements and noise generating devices.

Define the essential nature of the control systems pertaining to lighting, electrical service, electronic acoustical equipments, signal elements....

GOAL: To develop the nature of interior transitions and interior barriers.
OBJECTIVES: Locate and define situations where continuity and/or circulation flow is required between adjacent spaces.

Locate barriers and define their essential nature.

Define basic opportunities and limitations regarding cosmetic requirements and functions associated with the barrier.

GOAL: To develop the nature of the environment.
OBJECTIVES: Define the basic opportunities and limitations regarding the heat sources, fuel selection, and related apparatus equipment.

Define the basic opportunities and limitations regarding the cooling and ventilation apparatus requirements.

Define the basic opportunities and limitations regarding equipment space requirements and housing characteristics.

Define the basic opportunities and limitations regarding the thermal distribution medium and network.



Contextural Summary

6

Historical—

It was a cold, rainy day as the wooden ship creaked to the pitch and throw of the twenty foot Atlantic ocean swales. It was the returning voyage from the New World back to England for the soldier of fortune named Humphery Gilbert. Along with Gilbert, a younger half-brother named Sir Walter Raleigh returned to England with glowing descriptions of the previously explored region; Raleigh named this region Virginia, in honor of Elizabeth, the Virgin Queen.

The year was 1585 when Raleigh outfitted an expedition to settle Roanoke Island, near the present day boundary between Virginia and North Carolina. The group included John White, a noted artist who rendered the American Indian and Thomas Hariot, a noted mathematician. It was Hariot who compiled the first accurate chart of this new land mass.¹ However, instead of digging in, this expedition set out to discover the treasures of Virginia's rivers for the Pacific and streams for gold. The effort was to no avail. Discouraged, the expedition joined forces with Sir Francis Drake and searched for gold in the West Indies.

Raleigh tried the region again in 1587 by sending one hundred twenty persons under the command of John White. White spent a month settling Roanoke Island and then returned to England, leaving his family, for supplies and equipment. It was not until 1590 before White sailed back to the colony finding only that the colonists had vanished. Presumably, the colonists had been overtaken by Indians, but to this day no real clue exists as to their fate.²

Actually Gilbert and Raleigh were as wrong, in their own way, as Columbus. They expected to find China and found America. With this reality, expectations as not only to settle North America but to make a profit out of it, were at the forefront of priorities. But Gilbert and Raleigh were not the last to be mistaken about the New World. In 1606 another group of English investors risked their money, and lost it, in an enterprise from which the fullness of time has grown to become the United States.

The Founding of Virginia—

At the ending reign of Queen Elizabeth, James I ascended the throne and ended the war with Spain in 1604. What the English wanted, however, was information leading to the supply of gold which precipitated the war to begin with. Efforts to find it in North America had so far been unsuccessful, although no one had really tried. Even if gold was found, the continent might hold other things of value. After the Roanoke venture

of 1587, Thomas Hariot had described some promising commodities, including sassafras, a root that the Spanish were selling as a cure for syphilis. And piracy itself, although forbidden by the king, could be carried out at a place far removed from the grasp of the Royal throne. Therefore, the tantalizing possibility of riches from America again lured Englishmen to try and plant a colony.

In 1606 a number of noblemen, gentlemen, and merchants joined forces to petition the king for authority to establish colonies in America.³ Merchants had discovered a way by which the undertaking of large and dangerous enterprises could be developed without risking financial ruin. Their idea was the joint-stock company, in which participants profited or suffered in direct proportion to their investment. By investing modestly in a number of companies one could limit one's losses but would only achieve modest gains. In this way, through many small contributions, it was possible to accumulate the large amounts of capital necessary for undertakings that were far beyond the range of private fortunes. Therefore, the joint-stock company became the principle instrument of England's early overseas exploration and thus the seedling of America.

The men were granted a petition from the king and formed two joint-stock companies for the colonization of North America; the Virginia Company of Plymouth and the Virginia Company of London. The concept of these two companies was to finance the emigration of settlers who would agree to relinquish the fruits of their labors to the investors for a period of the first seven years; after that the settlers could enrich themselves by whatever means and enjoy a one hundred acre tract of land, compliments of the company, of course. The Virginia Company of London, in December 1606, sent over the first wave of settlers; one hundred men and four boys crammed aboard one of three small ships, the *Susan Constant*, the *Godspeed*, and the *Discovery*. In May 1607 they sailed up a river they named *James* and landed on a peninsula they named *Jamestown*. The settlement was characterized as chaotic; a lack of organized planning and development of shelters precipitated the demise of many settlers. However, within this group, a young 27 year old, John Smith assumed authority and began developing the land for corn crops and began erecting shelters. The colony was planted; they survived the next winter, and were here to stay; Virginia was born!

But the men who left England wanted more than corn bread and a place to call home. To them survival was simply a means to an end, and they kept looking for a way to wealth; looking for a way to live better in Virginia than they did in England. Since they had found no gold or silver they searched for some other commodity of high value which could be mass produced with sufficient ease. They tried cedar production. They

tried sassafras. But the world market was flooded with those products. The investors of the company had high hopes at different times for wines, silk, iron, and tar. But in 1612, though they were not at once aware of it, the colonists discovered their future—in smoke.

Environmental—

Tobacco was native to America. The Indians had taught the Spanish to use it, and the Spanish had taught the rest of Europe.⁴ At first tobacco was considered a medicine, said to cure any affliction from the waist up. But by the end of the sixteenth century, people were smoking for recreation purposes. Additionally, the West Indies variety of tobacco grew quite well in the virgin soil and the settlers turned enthusiastically to growing it. By 1617 the settlers were capable of shipping twenty thousand pounds of tobacco to England for worldwide market distribution.

The stockholders of the Virginia companies were pleased to finally see a productive return of their investment. However, the men which agreed to provide the labor necessary for whatever production had served out their seven year contract; the time for an independent wealth generating society was fast approaching. An investor meeting of 1616 in London, decided to not send over additional men, as this would be considered throwing good money after bad. Moreover, when the time came to divide up the profits, nothing was left except the land, and to many of them it hardly seemed worth dividing. Another solution was sought. In 1618 a plan was devised to regenerate the interest of investors whereby more planters (settlers) and servants could again become a cash producing investment. This plan, headed up by the English House of Commons, contained a four point plan of action of environmental consequence which laid the foundation for generations to come in the present day State of Virginia.

1. By overhauling its land policies the company made both investments and emigration more profitable. Henceforth, anyone who paid the fare to Virginia for himself or anyone else received a "headright" of fifty acres of land on which he would pay a quarter of a shilling a year to the company. What this meant to investors was to acquire very large tracts of land by simply sending men to cultivate them on a share-cropping basis. The company in turn, with almost unlimited acreage at its disposal, would gain a perpetual income from its share-croppers. Obviously, as a result of the Declaration of Independence in 1776, most investors lost this right of ownership, but the land has remained in the family name of many Virginians to this day.

2. To make life in Virginia more like life in England, the company relaxed the severity of its discipline; thereafter the colony would be governed by English law and the colonist would have the rights of Englishmen. This gave rise to jail buildings as well as law enforcement outposts.

3. The planters were allowed to elect councils and make laws for the colonies. Moreover, the cost of government was to be borne by assigning lands to each government office.

4. The final point of the program called for an all-out effort to diversify the colony's activities. The company itself took responsibility for sending over various craftsmen: vinters, ironworkers, brick-makers, masons, and glass-blowers. It was conceived that perhaps with these skills, a healthy and productive economy base could be built in which tobacco growing was only a part.⁵

As a result, land was excavated, trees were timbered, and working places, as well as living places, were erected in most cases the best of housing was reserved for the rich. For five years, and then some, new settlers flowed into the colony. By the end of 1624, some 5,000 immigrants arrived at Virginia.⁶ To judge by the number of ships landing passage, the colony was a success. However, to judge by the number of graves, it was not. In spite of the heavy immigration, the 1625 population count stood at only 1,210. Some of the settlers had returned to England, as they found the land too hard to work and the living conditions unbearable; but for most of them the colony had been a death trap. Shipload after shipload of immigrants arrived without any supplies or equipment. Ill fed, ill clothed, and ill housed, they sickened and died. In 1622 the Indians rose up and killed 347.⁷

Those who survived found themselves being exploited severely, unlike anything ever known to England. Skimming of profits off the top by the part of plantation managers resulted in their independent wealth but the company's loss and eventual bankruptcy. Moreover, men and boys were being sold back and fourth in Virginia like horses.

In 1624 when James I appointed a commission to investigate, the commission returned reports of such shocking treatment of the settlers that the king dissolved the companies and resumed control himself. Thus ended the Virginia Company of London. At the cost of £100,000 it had, over the course of eighteen years, established only twelve hundred settlers in America. But in spite of its wretched beginnings, the colony was there to stay.

Therefore, an establishment of English colonies found its way as the beginnings of Virginia, indeed as the beginnings of America. The land offered rich soil to grow and cultivate corn and tobacco. And the land was abundant in lakes and streams. Although other vocations were provided to the colonists, they returned to tobacco growing as a main stay for economic viability. Living places, working places, and worship places were developed and by 1619 the colonists met and formulated their first laws. Furthermore, one can only surmise that Smith Mountain was named after John Smith, the James River after king James I, and the state after Queen Elizabeth.

Clearly, the Pilgrims, the settlements at Plymouth, and companies like the Massachusetts Bay Company have historic and environmental ties with Virginia. Additionally, events and circumstances such as the drafting of The Declaration of Independence at Monticello, Virginia by Thomas Jefferson, the battles of independence across the State, and Civil War events carried out within the State have very important historical ties to the project. An acknowledgement is made to this fact, but to study and relate the specifics is not the purpose of the thesis; however the implementation of the importance of the beginnings is. For it is only through the efforts of the colonists, and God's will which directed them, that the United States was born and born in part by the development of settlements in Virginia.

In fact, illustrated by the First Charter of Virginia (a Jamestown document written before the Puritan Pilgrims arrived in America) dated April 10, 1606, the charter reads, in part:

"We, greatly commending, and graciously accepting of, their Desires for the Furtherance of so noble a Work, which may, by the Providence of Almighty God, hereafter tend to the Glory of His Divine Majesty, in propagating of Christian Religion to such People, as yet live in Darkness and miserable Ignorance of the true Knowledge and Worship of God, and may in time bring the Infidels and Savages, living in those Parts, to human Civility, and to a settled and quaint Government."⁸

When the settlers who founded the Jamestown colony landed at Cape Henry in April of 1607, they erected a rough seven foot wooden cross in the sand and held a prayer meeting.⁹ It was their first act in the new land they had come to settle. Moreover, major Christian events lie not only behind the founding of America as a nation, but also behind many of its individual states. Indeed, the charters of all fifty states carry religious language and have acknowledged their foundations in God.

Cultural—

This area of the country has been, historically, regarded as the *melting pot* of America. Meaning that all types and personalities of individuals have their beginnings in the east leading to the settlement of America's western frontier. After a period of time, the entire country has become the *melting pot* of the world. However, in the east, a feeling of diversity exists within its culture that one experiences who is not native to the region. Thomas Jefferson summed up the general characteristics of the eastern states, traveling north to south, in a letter dated September 2, 1785:¹⁰

In the North they are:

- cool
- sober
- laborious
- independent
- interested
- chicaning
- superstitious and hypocritical in their religion

- jealous of their own liberties, and just to the liberties of others.

In the South they are:

- fiery
- voluptuary
- indolent
- independent
- generous
- candid
- without attachment or pretensions to any religion but that of the heart
- zealous for their own liberties, but trampling on those of others.

He concluded that, "...these characteristics grow weaker and weaker by gradation from North to South, insomuch that an observing traveller, without the aid of a quadrant may always know latitude by the character of the people among whom he finds himself." My travels in this region have persuaded me to agree with Jefferson.

Cultural Resources—

For several centuries, significant paths, trails, and roads paralleling mountains and ridges meandered through southwestern Virginia. Extending from Philadelphia in the northwest all the way to the Cumberland Gap¹¹ in the southeast, these natural routes served animals as well as humans. Buffalo, particularly, moved great distances in search of forage and minerals such as salt licks.

Native Americans made good use of these well-defined routes. From the southeast, northeast, and Ohio Valley, they constantly moved up and down, what was then known as, the "Warriors Path" to trade and make war. However, by 1700, the Roanoke Valley had been all but vacated by Indian tribes because of the influence of the Iroquois Confederation to the north, and powerful tribes such as the Cherokee and Creek in the southeast and southwest.

Although preceded by others, Thomas Batts and Robert Fallam have the distinction of making the first recorded journey into the Roanoke Valley (thirty miles from the site). Exploring southwestward from Petersburg in 1671, searching for a western waterway and tribes with which to trade, Batts and Fallam struck the Roanoke River, which incidentally supplies the site's Smith Mountain Lake. Early in the 18th century, officials in colonial Virginia began to encourage settlements in the frontier beyond the Piedmont and west of the Blue Ridge Mountains. They viewed these settlements as a buffer from not only the Native Americans, but also from the French who were moving into the area beyond the Appalachian Mountains. This southward movement continued steadily as Germans and Scotch-Irish, mostly from Pennsylvania, and Tidewater grantees, sought new lands and patents in the Great Valley.

Between 1796 and 1802, land speculators and promoters laid out the towns of Amsterdam, Antwerp, and Salem in the Roanoke Valley.¹² These communities, founded on an agricultural economic base, slowly grew as centers for an area evolving from subsistence to commercial agriculture—primarily grains, tobacco, and hemp.

Therefore, historical, environmental, and cultural resources have established a context with which to design. These resources, of any particular area, have exerted a strong influence, on exploration and settlement. The first whites to explore this region were those searching for a water route into the interior of the continent, and those seeking to establish trade with the Native Americans inhabiting the area.

Moreover, the first major wave of immigrants into the Roanoke Valley included those lured by the potential of land for planting, grazing, or speculation. Initially, agriculture was produced simply for family subsistence. Gradually, agriculture commercialized as small farms grew larger, and crops such as grains, hemp, and tobacco, along with livestock, became income producers.

Additionally, agriculture helped spawn commercial development, and, with heavy traffic on major roads, an economic base for the Roanoke Valley became identifiable. The discovery of iron ore deposits in nearby Botetourt and Franklin counties (counties adjacent to Bedford county) attracted other entrepreneurs. Heavy industry followed the railroad into the valley in the mid-19th century to use coal mined from the hills of West Virginia and Kentucky. In fact, it was railcar production that initially industrialized the City of Roanoke.¹³

NOTES:

- 1 John Blum et. al. The National Experience. Jovanovich: New York. 1981. p. 18
- 2 Historians have speculated that the settlers were involved in a massacre by the Indians. It is interesting that history, for the most part, has recorded Indian victories as massacres rather than as confrontations or battles.
- 3 Ibid. p. 19.
- 4 Ibid. p. 21.
- 5 Ibid. p. 21.
- 6 The census of this period in history was a guess at best. Figures compared from settlers leaving Europe and arriving at Cape Henry, Virginia were often conflicting as many died of various diseases aboard ship. The passenger records reflected only those who paid to come to the New World, not those who actually arrived.
- 7 Ibid. p. 22.
- 8 "The Invisible Hand: God's Influence In America's History." The Rebirth of America. The Arthur S. DeMoss Foundation. 1986. p. 46.
- 9 America Your Too Young To Die!. Arthur S. DeMoss Foundation. 1986.
- 10 The National Experience. p. 123.
Also, this letter, to Marquis de Chastellux, is on display as part of Jefferson's writings in his Montecillo, Virginia residence.
- 11 Cumberland Gap was the gateway to the west for the people of early America. It is the junction of Virginia, Kentucky, and Tennessee. It is also an area where the Appalachian Mountain Range is gentler by foot—and today by automobile.
- 12 Ibid. p. 99
- 13 The Transportation Museum in downtown Roanoke attests to the importance of the railroad system as industrializing this area of Virginia. As late as 1987 the museum was seeking status in the National Register of Historic Places.



Activities Summary

7

Activities and Spatial figures:

Any empirical values relating to spatial requirements have been derived by observation or by researching building codes. But the architect has the power to change building codes and observations can be misleading because they are based on another's design. Therefore, the figures given can, at best, be considered only a starting place leading to design.

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

DIRECTING
CAMP

Camp Bright Star:
A Christian Youth Athletic Encampment

Division:
ADMINISTRATION

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The act of implementing the camps program of operation. This activity and responsibilities thereof may be carried throughout the year.

3 Secondary Activity:

- SCHEDULING
- BOOKKEEPING
- CAMP COMMUNICATIONS

ADJACENT?

YES
NO
YES

4 Users:

1 DIRECTOR
18 P. SPECIAL.
1 PROG. DIR.

5 Spatial Requirement:

OFFICE 300 SQ. FT.
OFFICE 100 SQ. FT./EA.
OFFICE 300 SQ. FT.

6 Storage Needs:

books.
files.
office supplies.

7 Equipment Needs:

- HYAC
- LIGHTING
- COMPUTER(S)
- FURNITURE

8 Sketch Box:

- THE "DIRECTOR" OF THE CAMP IS USUALLY REFERRED TO AS THE "EXECUTIVE ADMINISTRATOR".
- THE "PROGRAM SPECIALIST" IS A TERM USED TO INDICATE THE SPORTS INSTRUCTORS.

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

BOOKKEEPING &
ACCOUNTING

Camp Bright Star:
A Christian Youth Athletic Encampment

Division:

ADMINISTRATION

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

Keeping the camp's finances operational, and camper registrations in order.

3 Secondary Activity:

VAULTING MONEY
FILING RECORDS & "BOOKS"

ADJACENT?

YES

YES

6 Storage Needs:

- VAULT
- OFFICE SUPPLIES
- COMPUTER " "
- FILES/RECORDS

4 Users:

1 ACCOUNTANT

5 Spatial Requirement:

OFFICE 350 SQ.FT.

7 Equipment Needs:

- FURNITURE
- COMPUTER(S)
- PHOTOCOPIER
- HYDR/LIGHTING

8 Sketch Box:



HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

SCHEDULING

Camp Bright Star:
A Christian Youth Athletic Encampment

Division:

ADMINISTRATION

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The coordination of activities and events as determined by the camp staff and administration.

3 Secondary Activity:

- CAMPER EVALUATIONS
- STAFF MEETINGS

ADJACENT?

6 Storage Needs:

OFFICE SUPPLIES
PROJECTOR(S)

4 Users:

- 1 DIRECTOR
- 1 PROG. DIR.
- 1 BUS. MGR.
- 1 MEDICAL DIR.
- 8 HEAD COUNS.
- 18 PROG. SPECIAL.

5 Spatial Requirement:

CONFERENCE 360 SQ. FT.

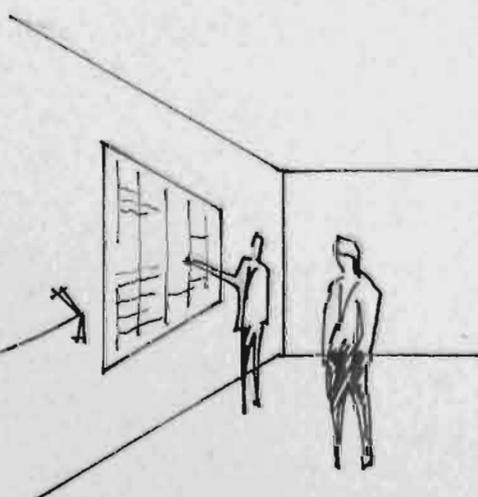
Toilet

7 Equipment Needs:

ORGANIZATION BD.
FURNITURE
HYDR/LIGHTING

8 Sketch Box:

Large
Organization
Board.



SHOWERS:
Who is where at a
specific time.

- AND -
Who is responsible
for what.

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

CAMP
MARKETING

Camp Bright Star:
A Christian Youth Athletic Encampment

Division:

ADMINISTRATION

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

BUYING and selling camp memorabilia as well as land sports equipments.

3 Secondary Activity:

STOCKING SUPPLIES AND INVENTORY
ACCOUNTING OF SALES AND " " -YES

ADJACENT?

6 Storage Needs:

INVENTORY OF
OVERSTOCKED
ITEMS

4 Users:

FLEXIBLE

5 Spatial Requirement:

DISPLAY:
CAMP STORE 2000 SQFT.
PRO SHOP 1000 SQFT.
Toilets

7 Equipment Needs:

HYDR/LIGHTING
SECURITY

8 Sketch Box:

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

HEALTH CARE

Camp Bright Star:
A Christian Youth Athletic Encampment

Division:

ADMINISTRATION

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The medical attention of all persons while at camp.
Also, the medical screening of campers upon arrival.

3 Secondary Activity:

INSTRUCTING FIRST-AID & CPR
DOCTOR SLEEPING

ADJACENT?

YES
YES

6 Storage Needs:

DISPENSARY
LINEN
SUPPLIES
FILES

4 Users:

FLEXIBLE
AS
FULL CAMP
COMPLEMENT

5 Spatial Requirement:

INFIRMARY	1080 SQFT
SCREENING	1200 SQFT
DISPENSARY	500 SQFT
LINEN: CLEAN	50 SQFT
SOILED	25 SQFT
DR. SLEEPING	400 SQFT
OFFICE	200 SQFT
Toilet	200 SQFT

7 Equipment Needs:

HVAC/LIGHTING
LAUNDRY
MEDICAL

8 Sketch Box:

UBC CODE: 1 BED PER 50 OCCUPANTS AS: 700 YOUTH
ACB CODE: " " " " 76 COUNSELLORS
18 PROG. SPECIAL
25 W.S.I.
17 STAFF
896 = 18 BEDS

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

VEHICULAR
TRANSPORTATION

Camp Bright Star:
A Christian Youth Athletic Encampment

Division:
ADMINISTRATION

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The transportation of campers and counsellors during both:
planned transportation about Smith Mountain Lake, and
unplanned: emergency transportation to hospital.

3 Secondary Activity:

REFUELING AND REPAIR

ADJACENT?

YES

6 Storage Needs:

VEHICLES
OIL + PARTS
GASOLINE
TOOLS

4 Users:

FLEXIBLE

MECHANIC

5 Spatial Requirement:

2-15 PASSENGER VANS
3-40 PASSENGER BUS
2- JEEPS + TRAILER
OFFICE 200 SQFT
SHOP 1000 SQFT
GARAGE 2400 SQFT
TOILET 150 SQFT

7 Equipment Needs:

TOOLS
HYDROLIC LIFT
LIGHTING
TELEPHONE

8 Sketch Box:

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

MAINTENANCE
GROUNDKEEPING

Camp Bright Star:
A Christian Youth Athletic Encampment

Division:

ADMINISTRATION

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The keeping of the camp's basic equipment in good repair; inclusive of maintaining filtered water bodies, timbering, and landscaping criterion of the camp.

3 Secondary Activity:

LIVING ON SITE
FIREWOOD COLLECTION

ADJACENT?

NO

NO

6 Storage Needs:

PARTS
TOOLS
PAINT

4 Users:

2 STAFF

5 Spatial Requirement:

SHOP 1000 SQFT

TRACTOR/TRAILER 300#

7 Equipment Needs:

TOOLS - WELDER
AIR COMPRESSOR
TRACTOR
FOGGER, RAKE etc...

8 Sketch Box:

THE CHARACTERISTICS OF THIS ACTIVITY REQUIRE A BUILDING TYPE TO CONFORM WITH STORAGE OF FLAMMABLE GAS.

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

Camp Bright Star:
A Christian Youth Athletic Encampment

LIFEGUARDING

Division:
ADMINISTRATION

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The supervision of all swimmers at the waterfront and swimming pool (when applicable) inclusive of: prevention of drowning, revival attempts, minor first aid and enforcement of rules.

3 Secondary Activity:

INSTRUCTING SWIMMING LESSONS

ADJACENT?

YES

6 Storage Needs:

CLOTHES

4 Users:

25 GUARDS*
250 SWIMMERS

5 Spatial Requirement:

STAND 25# each.
WATERFRONT 12,500#

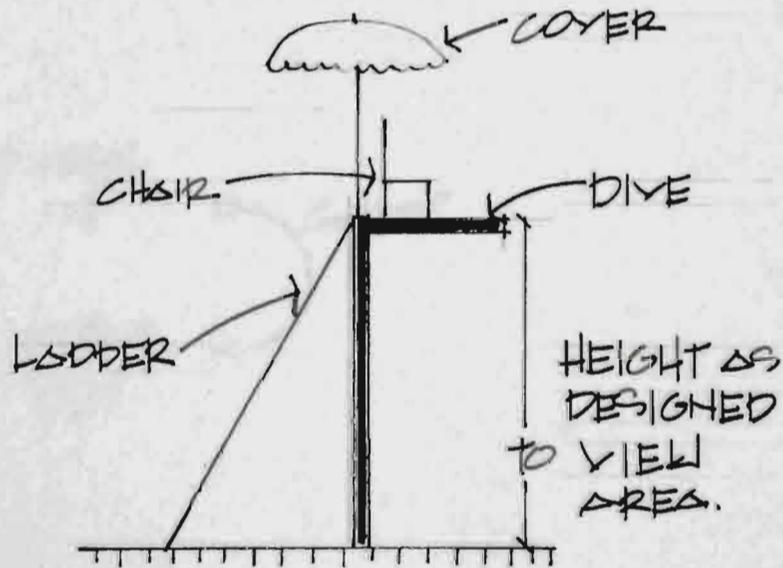
7 Equipment Needs:

WHISTLES
RING BOLT - RESCUE
TUBE - SHEPHERDS
CROOK etc...
COMMUNICATION

8 Sketch Box:

*GUARD TO SWIMMER
1 : 10

OBSERVATION:
WALKING: DECK
SITTING: STAND



HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

Camp Bright Star:
A Christian Youth Athletic Encampment

PARKING

Division:
ADMINISTRATION

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

Loading and unloading campers at beginning and end of term.
Long term parking for camp staff.

3 Secondary Activity:

ADJACENT?

6 Storage Needs:

4 Users:

76 COUNSELLORS
18 PROG. SPECIAL.
25 WBI.
- FLEXIBLE -
300 CAMPERS

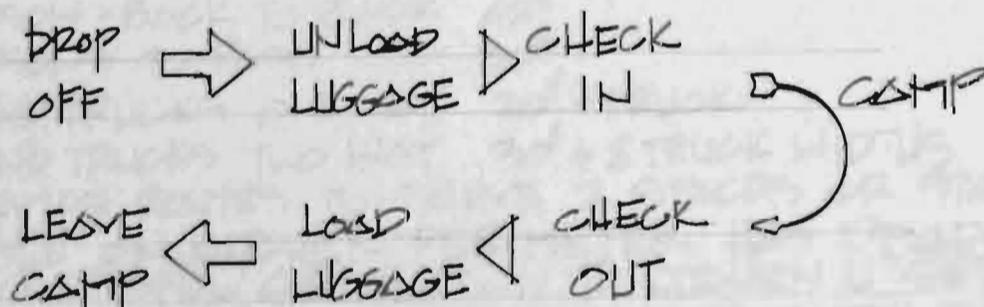
5 Spatial Requirement:

LONG TERM:
 $119 \times 320 \# = 38,080 \#$

SHORT TERM:
 $300 \times 350 \# = 105,000 \#$

7 Equipment Needs:

8 Sketch Box:



1 Primary Activity:

OPERATING
THE KITCHEN

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: ADMIN.
FOOD SERVICE

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

1. Purchasing food, cost control, establishing a menu, supervision of personnel & hygiene in the kitchen.
2. Controlling inventory, placement of goods, linen, staple handling.

3 Secondary Activity:

Bookkeeping

ADJACENT?

YES

6 Storage Needs:

LINEN

4 Users:

- 1 - CHEF DE CUISINE
- 1 - CONTRÔLEUR

5 Spatial Requirement:

OFFICE	150 #	
OFFICE	150 #	
TOILET (2)	200 #	300 # ea.
RECEIVING	100 #	
GARBAGE	150 #	
JANITORIAL	100 #	
LOCKERS	80 #	

7 Equipment Needs:

LINEN
LIGHTING
TELEPHONE

8 Sketch Box:

- CIRCULATION:
- 1 PERSON 24"-36" (KEEP TO A MINIMUM)
 - 2 PERSON - BACK TO BACK 42"
 - 2 PERSONS TO PASS 30"
 - 2 HAND TRUCKS ONE WAY 20" + TRUCK
 - 2 HAND TRUCKS TWO WAY 30" + 2 TRUCK WIDTHS.
 - SERVICE ROUTES TO SERVE 2 SPACES OR STATIONS.
 - AISLE ON KITCHEN PERIMETER HAS DISADVANTAGES.
 - SUCCESSFUL CIRCULATION TO KITCHEN USERS:
DESIGN FOR TASK TO BE ACCOMPLISHED BY "ROTATING" BODY RATHER THAN "WALKING THRU" TASK.
"THINK VERTICAL" FOR TASK STATION PLANNING!

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

MAIN COOKING

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: ADMIN.
FOOD SERVICE

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

COOKING both meats and vegetables received from the food preparation areas.

3 Secondary Activity:

FOOD PREPARATION
BAKING

ADJACENT?

YES
NO

6 Storage Needs:

UTENSILS
POTS/PANS

4 Users:

ALL COOKS

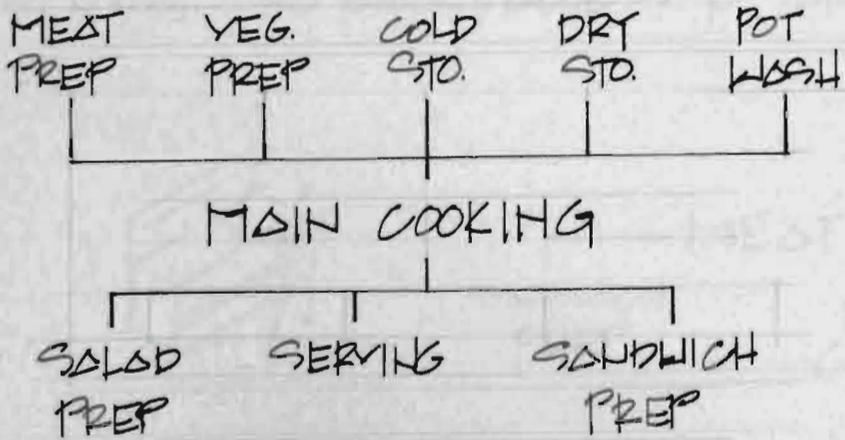
5 Spatial Requirement:

STATION 230#

7 Equipment Needs:

RANGE 24#
BROILER 6#
3 FRYERS = 12#
STEAM TABLES 20#
VENTILATOR design.

8 Sketch Box:



CONVECT. OVEN 15#
STEAM KETTLE 15#
CONV. STEAMER 15#
UTENSIL RACK to 16#
HAND SINK - varies
REFRIGERATOR 40#
MOBILE RACK to 16#
FLOOR PAD

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

MEAT PREPARATION

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: ADMIN.
FOOD SERVICE

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The taking of delivered meats⁺ and preparing them for roasting, frying, or grilling.
⁺Delivered meats have become more cost effective to butchering.

3 Secondary Activity:

MAIN COOKING

ADJACENT?

YES

6 Storage Needs:

COLD
GARBAGE

4 Users:

1-ROTISSSEUR

5 Spatial Requirement:

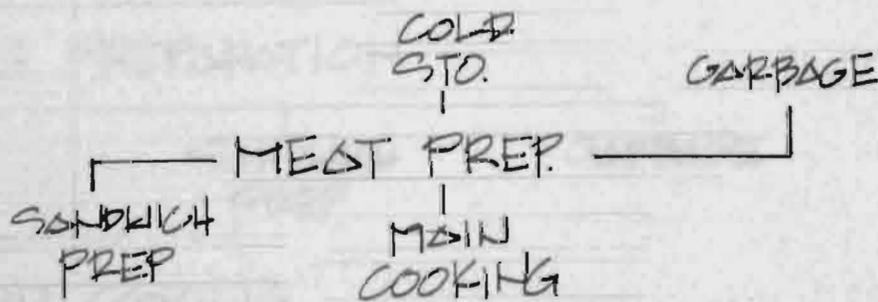
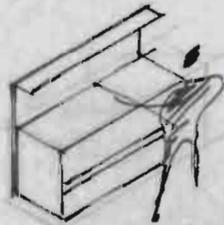
STATION - 45#

7 Equipment Needs:

UTENSILS
PREP TABLES
HAND SINK
FOOD SINK
BAIN MARIE

8 Sketch Box:

1 PREP TABLE = 20# TO INCLUDE OVER SHELF, UNDER SHELF, CHOPPING/CUTTING BLOCK; ACCESS TO SLICER



HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

VEGETABLE PREPARATION

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: ADMIN.
FOOD SERVICE

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The preparation of fresh vegetables and soups for cooking.

3 Secondary Activity:

SALAD PREPARATION

ADJACENT?

YES

6 Storage Needs:

COLD
GARBAGE
COLD-HOLDING
DRY

4 Users:

1-ENTRÉMETIER

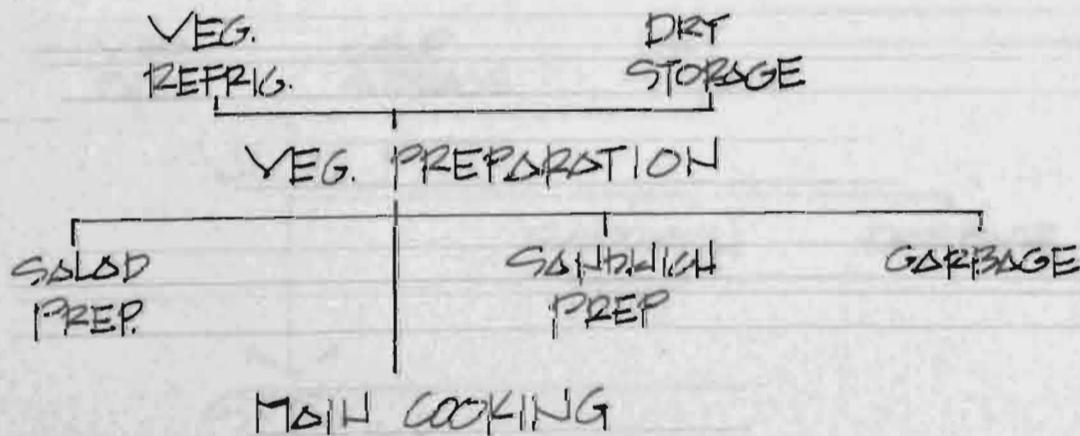
5 Spatial Requirement:

2 PREP. TABLES	40#
UTENSIL RACK	6#
CHOPPING BLOCK	14#
STEAMER	10#
• STATION	70#

7 Equipment Needs:

HAND SINK
FOOD SINK
HOLDING REFRIG.

8 Sketch Box:





HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

SALAD
PREPARATION

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: ADMIN-
FOOD SERVICE

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

Supported by the vegetable prep; also composed with fruits and dry food stuffs. [IF INDIVIDUAL SALADS ARE COMPOSED, THIS ACTIVITY SHOULD BE LOCATED BETWEEN VEG. PREP & SERVICE]

3 Secondary Activity:

Supply ready cut meat & fish

ADJACENT?

NO

6 Storage Needs:

COLD - DRY
GARBAGE

4 Users:

1 - GARDE-MANGER

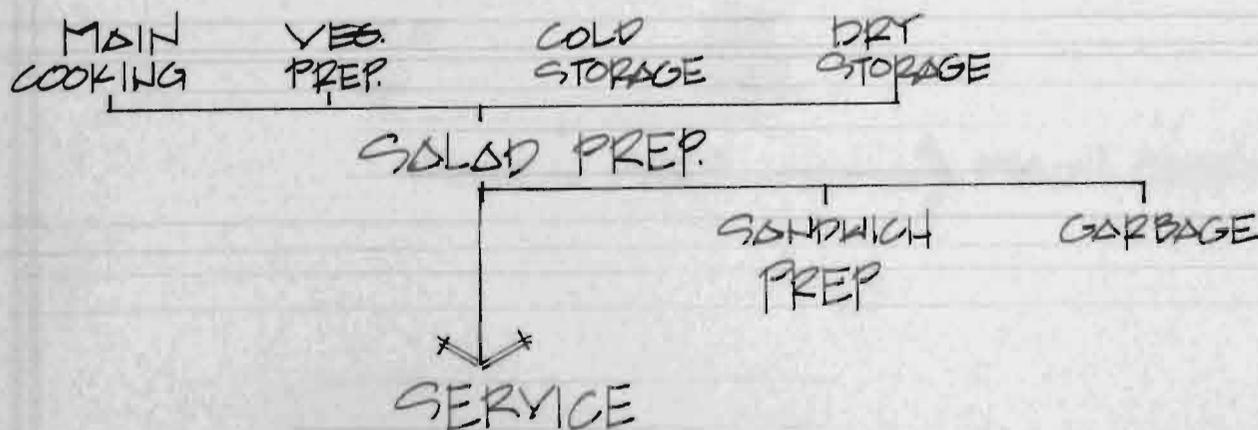
5 Spatial Requirement:

MOBILE CART	15#
PREP. TABLE	20#
• STATION	35#

7 Equipment Needs:

HAND SINK
FOOD SINK
UTENSILS
CUTTING BLOCK

8 Sketch Box:





HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

SAUCE
PREPARATION

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: ADMIN
FOOD SERVICE

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The preparation of all sauces and meals that go with them, as well as all fish dishes and responsible for work at the kitchen range.

3 Secondary Activity:

ADJACENT?

ASSUMES FUNCTIONS OF CHEF'S ASST.

6 Storage Needs:

DRY - COLD
GARAGE

4 Users:

1 SAUCIER

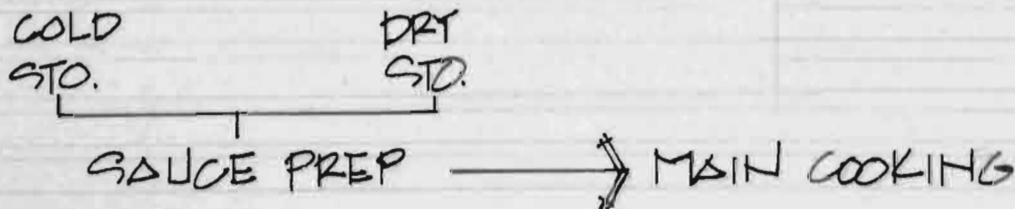
5 Spatial Requirement:

STATION - 40 #

7 Equipment Needs:

MAIN COOKING.

8 Sketch Box:



HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

ROASTING
FRYING, GRILLING

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: ADMIN.
FOOD SERVICE

Cross Reference:
Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The roasting, frying, and grilling of prepared meats and fish at the main cooking area.

3 Secondary Activity:

ACCESS TO MEAT PREP.

ADJACENT?
YES

6 Storage Needs:

LINEN
SHORT TERM COLD

4 Users:

1-ROTISSSEUR

5 Spatial Requirement:

AT MAIN COOKING

7 Equipment Needs:

UTENSILS
HAND SINK
SPICE RACK

8 Sketch Box:

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

SANDWICH
PREPARATION

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: ADMIN.
FOOD SERVICE

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The ordering of various food stuffs in a single composition called a "sandwich".

3 Secondary Activity:

VARIOUS KITCHEN DUTIES

ADJACENT?

NO

6 Storage Needs:

DRY, COLD
GARBAGE

4 Users:

FLEXIBLE

5 Spatial Requirement:

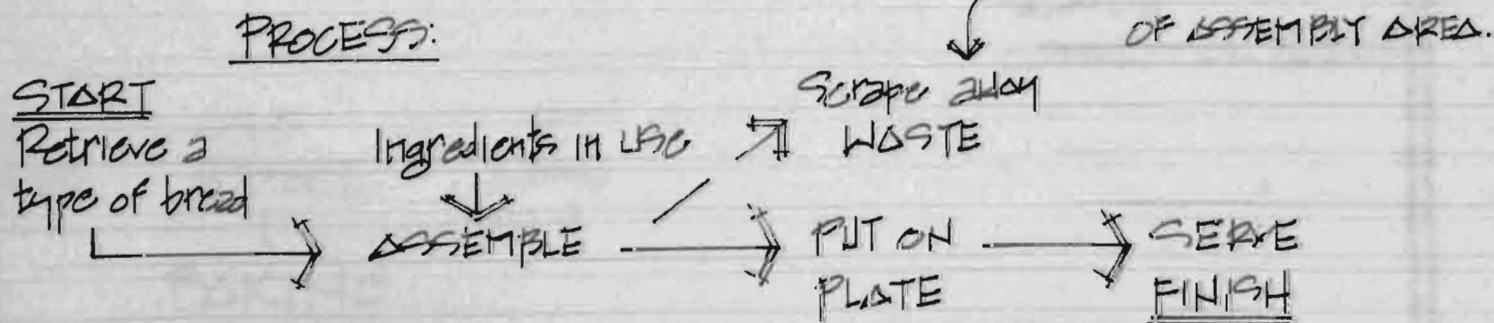
PREP COUNTER:
30" x LENGTH \approx 25'

2 STATIONS = 50'

7 Equipment Needs:

HAND TOOLS
HAND SINK
CUTTING BLOCK
DISH DISPENSER
TOASTER(S)

8 Sketch Box:



CONFIGURATION OF STATION: L, U, —, O

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

BAKING

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: ADMIN.
FOOD SERVICE

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The baking of the camps breads, cookies, cakes, and pastries.

3 Secondary Activity:

PREPARATION OF DOUGH

ADJACENT?

YES

6 Storage Needs:

COLD DRY
POTS
GARBAGE
TOOLS

4 Users:

1. PÂTISSIER

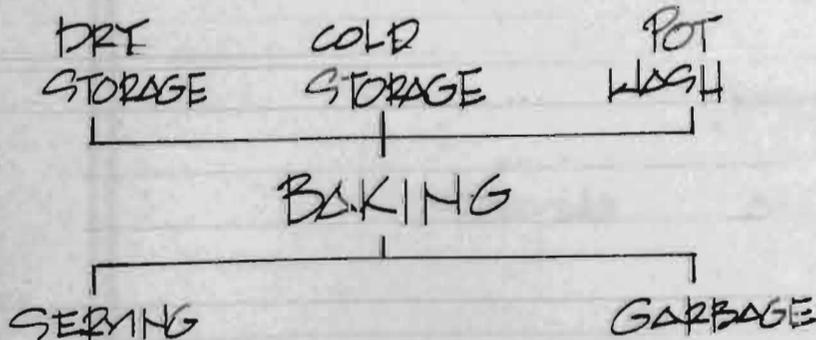
5 Spatial Requirement:

STATION PREP	20¢
FLOOR EQPT	85¢
STORAGE	10¢
TOTAL	115¢

7 Equipment Needs:

HAND SINK
PREP SINK (DBL)
PORTABLE RACKS
SPICE BINS
PROOFING CABINET

8 Sketch Box:



MIXER
KNEADER
SCALE
CONVECTION OVENS

PROVIDE SEPARATE CONVECTION OVENS FOR THIS ACTIVITY!!

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

DISHWASHING

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: ADMIN.
FOOD SERVICE

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The washing of plates, dishes, glasses and utensils after use and before reuse. can be automated.

3 Secondary Activity:

Kitchen clean-up
HELPING IN FOOD PREPARATION (Kitchen boy)
POT WASHING

ADJACENT?

YES

6 Storage Needs:

PLATES, DISHES
UTENSILS
GARBAGE: WET
GARBAGE: DRY

4 Users:

2-KITCHEN BOYS

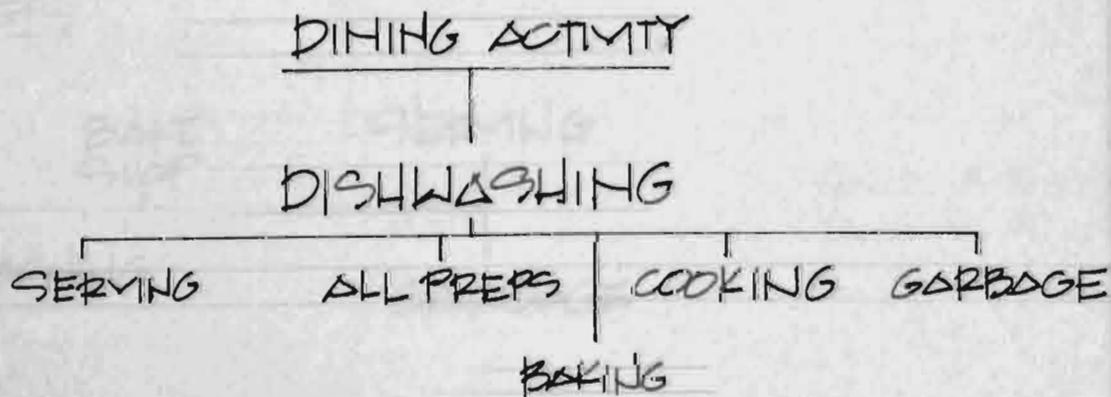
5 Spatial Requirement:

COUNTER	60#
STORAGE	40#
STATION	100#

7 Equipment Needs:

AUTO WASHERS
TRIPLE SINK
FOOD DISPOSAL
DRY COMPACTOR

8 Sketch Box:





HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

POT WASHING

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: ADMIN.
FOOD SERVICE

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The washing of pots and pans which, in most cases, have built up during the food preparation and cooking process.

3 Secondary Activity:

DISHWASHING

ADJACENT?

YES

6 Storage Needs:

POTS, PANS
LARGE TOOLS

4 Users:

1 KITCHEN BOY

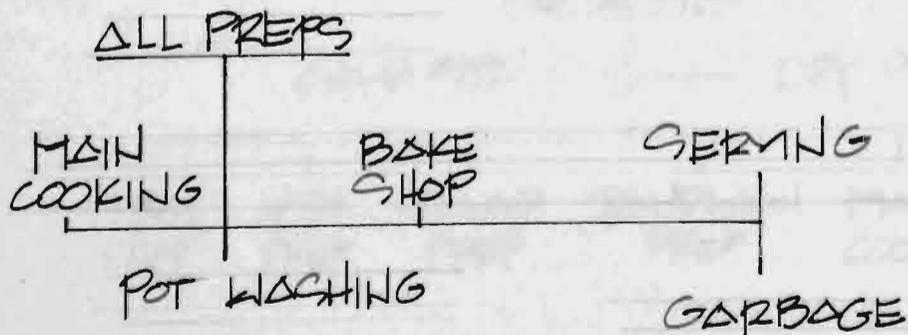
5 Spatial Requirement:

STORAGE	80¢
COUNTER	40¢
STATION	120¢

7 Equipment Needs:

3 BAT POT SINK
FOOD DISPOSAL

8 Sketch Box:



HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

FOOD STORAGE

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: ADMIN.
FOOD SERVICE

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

Placement of food inventories for storage and use.

3 Secondary Activity:

ADJACENT?

6 Storage Needs:

4 Users:

ENTRÊMETIER
ROTISSEUR
GARDE-MANGER
PÂTISSIER
CONTRÔLEUR
CHEF de CUISINE
SAUCIER

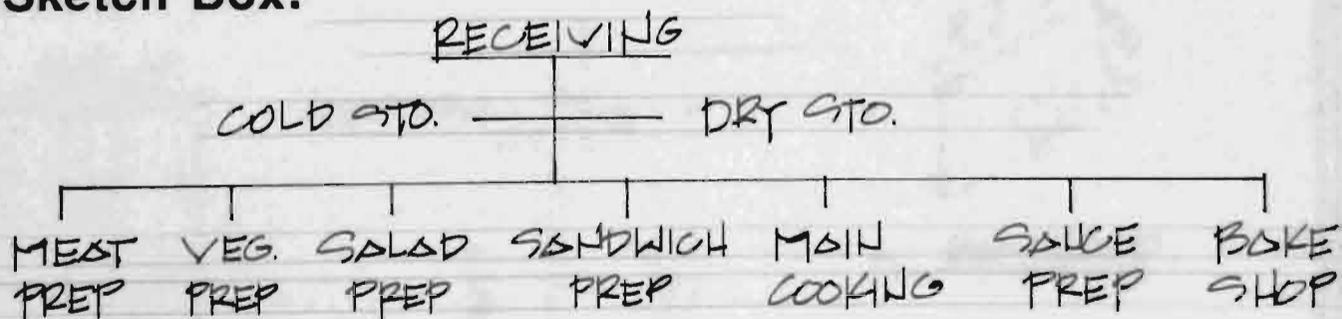
5 Spatial Requirement:

DRY WALK IN 200[#]
COLD WALK IN 120[#]
FREEZER 60[#]

7 Equipment Needs:

PACKAGE UNIT

8 Sketch Box:



HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

- CORE ACTIVITY -

BASKETBALL

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: L. SPORT
ATHLETICS

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The instruction and learning of basketball skills including: Dribble, Free throws, passing, shooting, lay-ups, offense, defense strategies, court decorum and rules of the game. Stressing eye-hand coordination, group participation, sportsmanship.

3 Secondary Activity:

LAND SPORTS PRO SHOP ACCESS	ADJACENT? YES
ACTIVITY WARM-UP	YES

6 Storage Needs:

EQUIPMENT

4 Users:

190 YOUTH
19 COUNSELLOR
4 P. SPECIALIST

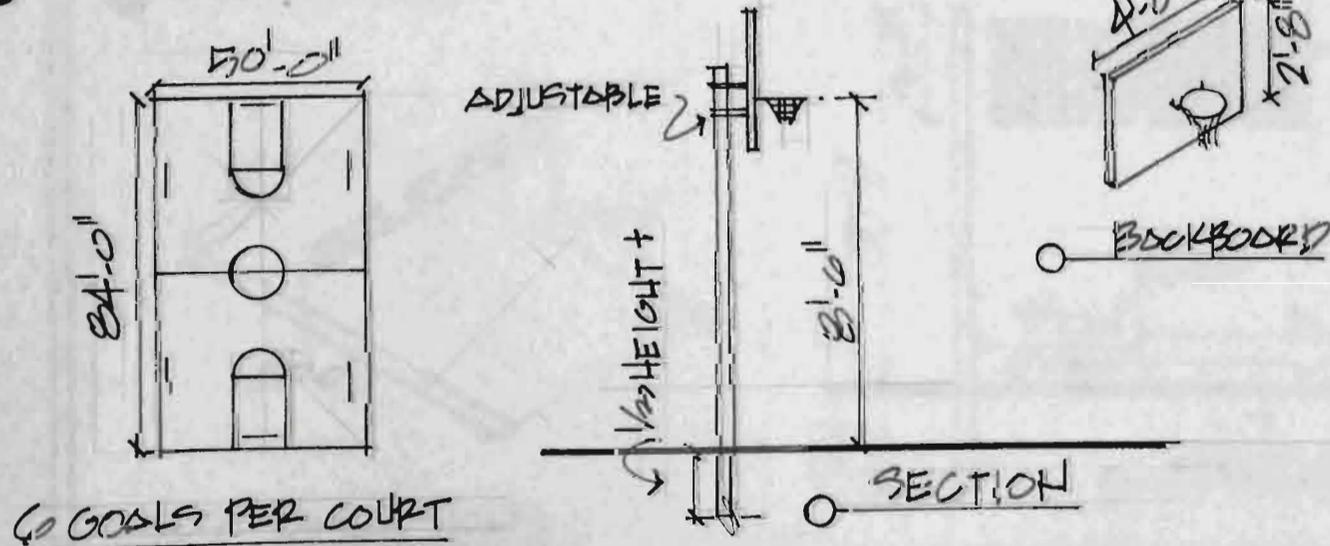
5 Spatial Requirement:

4 COURTS @ 4,200[#] ea.
CLASSROOM 400[#]
PRACTICE STATION WITHIN COURT SPACE
DESIGN COURTS 16,800[#]
EXTERIORS

7 Equipment Needs:

BASKETBALLS
LIGHTING
SCORE TABLES
CLOCKS
GOALS/B. BOARD

8 Sketch Box: NCAA REGULATION





HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

— CORE ACTIVITY —

VOLLEYBALL

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: L.SPORT
ATHLETICS

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The instruction and learning of volleyball skills including: volleying, serving, defending, court decorum, rules of the game and sportsmanship thru group participation.

3 Secondary Activity:

LAND SPORTS PRO SHOP ACCESS YES
ACTIVITY WARM-UP YES

ADJACENT?

6 Storage Needs:

EQUIPMENT

4 Users:

190 YOUTH
19 COUNSELLORS
6 P. SPECIALIST

5 Spatial Requirement:

6 COURTS @ 4,000\$ ea.
CLASSROOM 400\$ ea.

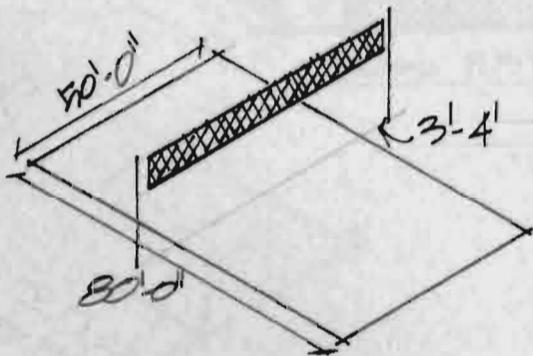
DESIGN COURTS 24,000\$

EXTERIORS

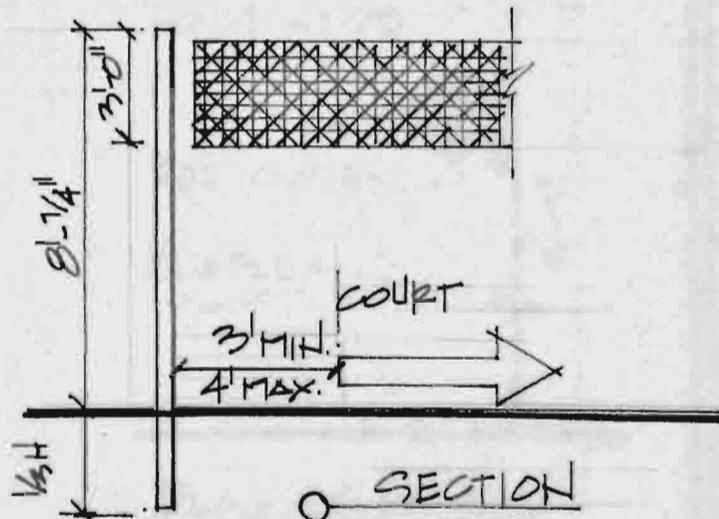
7 Equipment Needs:

Volleyballs
SCORE TABLES
LIGHTING
CLOCKS
NETS

8 Sketch Box:



GROSS DIMENSIONS



HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

— COPE ACTIVITY —

SOCCER

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: L. SPORT.
ATHLETICS

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The instruction and learning of soccer skills including: fielding, kicking, passing, rules of the game, field decorum as practiced with drill methods. stresses eye-foot coordination and group participation

3 Secondary Activity:

ADJACENT?

LONG SPORTS PRO SHOP ACCESS	YES
"OUT OF GAME" RESTING	YES
PRACTICE KICKING CAGE	YES

6 Storage Needs:

EQUIPMENT

4 Users:

190 YOUTH
19 COUNSELLORS
3 P. SPECIALIST

5 Spatial Requirement:

2 MALE FIELDS @ 72,000 \$
1 FEMALE FIELD @ 28,800 \$

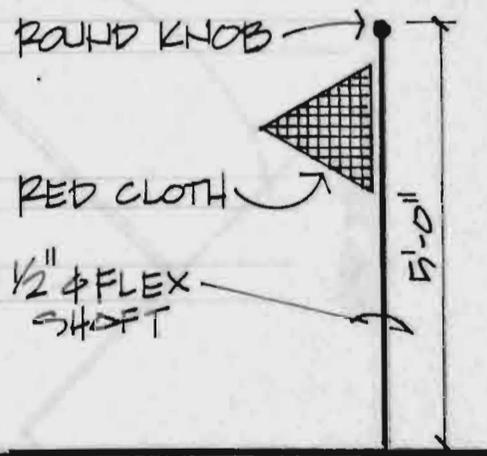
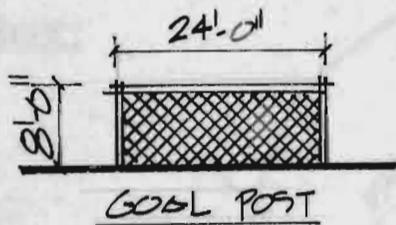
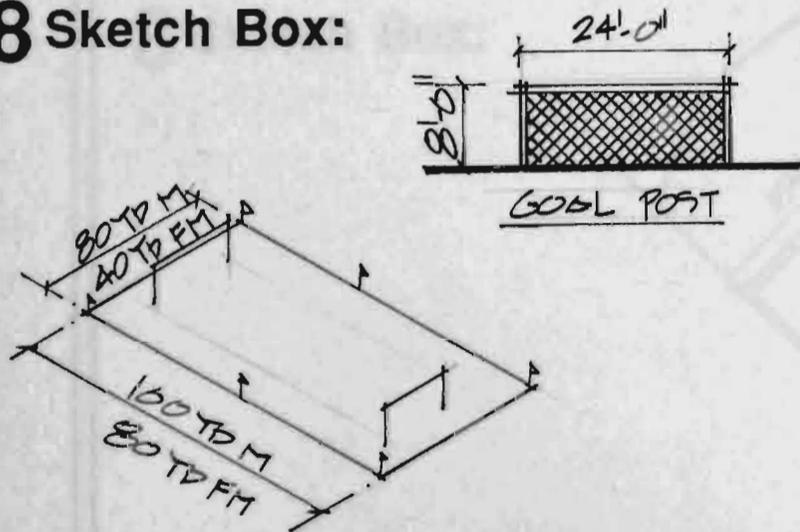
DESIGN FIELDS 172,800 \$
KICKING CAGE 7,500 \$
(15 STATIONS)

EXTERIORS

7 Equipment Needs:

SOCCER BALLS
FLAGS
CHALK + BOX
NETS
LIGHTING

8 Sketch Box:



FLAG 6 per field

GROSS DIMENSION

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

— CORE ACTIVITY —

SOFTBALL

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: L. SPORT
ATHLETICS

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The instruction and learning of softball skills including: pitching, catching, batting, fielding, rules of the game and group participation. Stressing eye hand coordination.

3 Secondary Activity:

ADJACENT?

BATTING PRACTICE YES
ACCESS TO LAND SPORTS PRO SHOP YES
"DUG OUT" RESTING YES

6 Storage Needs:

EQUIPMENT

4 Users:

160 YOUTH
16 COUNSELLORS
4 P. SPECIALIST

5 Spatial Requirement:

4 FIELDS @ 75,025#
10 BATTING CAGE @ 500#

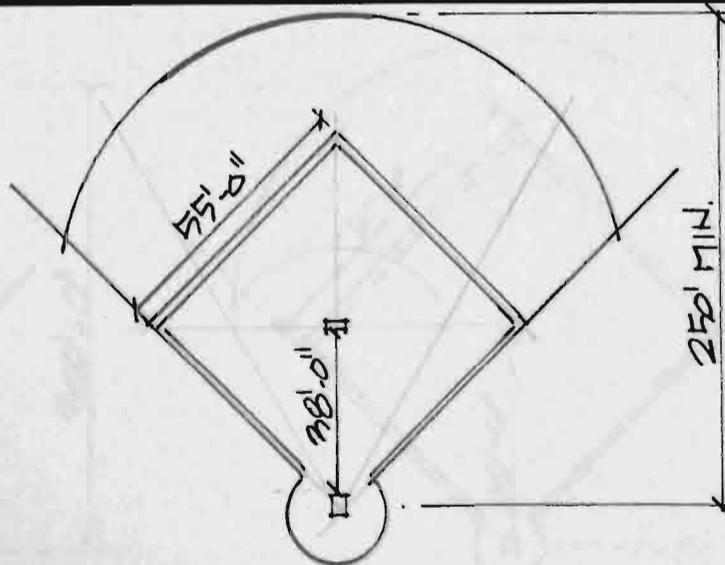
DESIGN:

ALL FIELDS 302,500#
BATTING CAGE 5,000#

7 Equipment Needs:

Softballs, bats
CHALK
BASES
LIGHTING

8 Sketch Box:



16" SLOW PITCH

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

— CORE ACTIVITY —

BASEBALL

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: L. SPORT.
ATHLETICS

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The instruction and learning of baseball skills including: pitching, batting, fielding, catching, rules of the game and group participation. Stressing eye-hand coordination.

3 Secondary Activity:

ADJACENT?

BATTING PRACTICE	YES
LAND SPORTS PROSHOP ACCESS	YES
"DUG OUT" RESTING	YES

6 Storage Needs:

EQUIPMENT

4 Users:

80 YOUTH
8 COUNSELLORS
2 P. SPECIALISTS.

5 Spatial Requirement:

YOUNGER YOUTH - FIELD A
OLDER YOUTH - FIELD B
15 BATTING CAGES

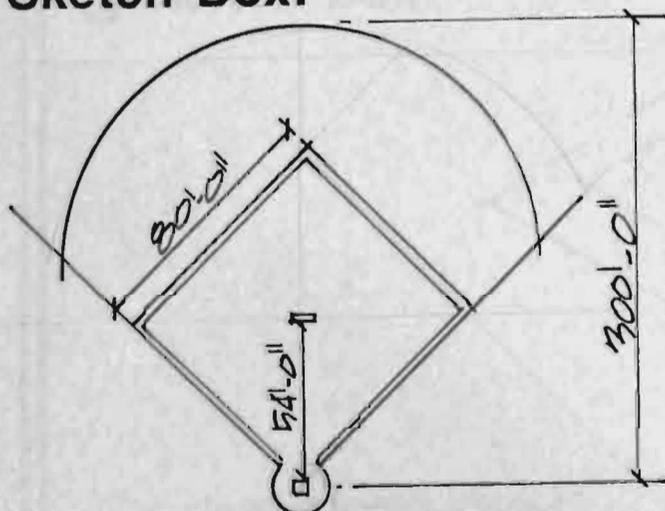
DESIGN:

FIELD A -	87,104#
FIELD B -	30,656#
BATTING CAGES -	7,500#

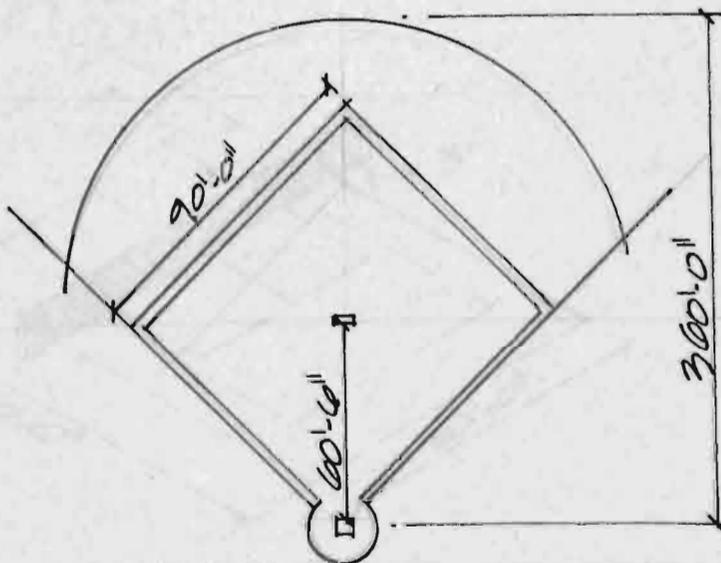
7 Equipment Needs:

BASEBALLS, BATS
BATTING HELMETS
PITCHING MACHINES
BONES - CHALK
LIGHTING

8 Sketch Box:



FIELD A



FIELD B

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

TENNIS

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: L. SPORT
ATHLETICS

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The instruction and learning of tennis skills including: serving, volleying, court decorum and rules of the game.

3 Secondary Activity:

TENNIS PRO SHOPPING & CLASSROOM
PRACTICE SERVING

ADJACENT?

YES
YES

6 Storage Needs:

EQPT. 200#

4 Users:

40 YOUTH
4 COUNSELLORS
4 P. SPECIALIST

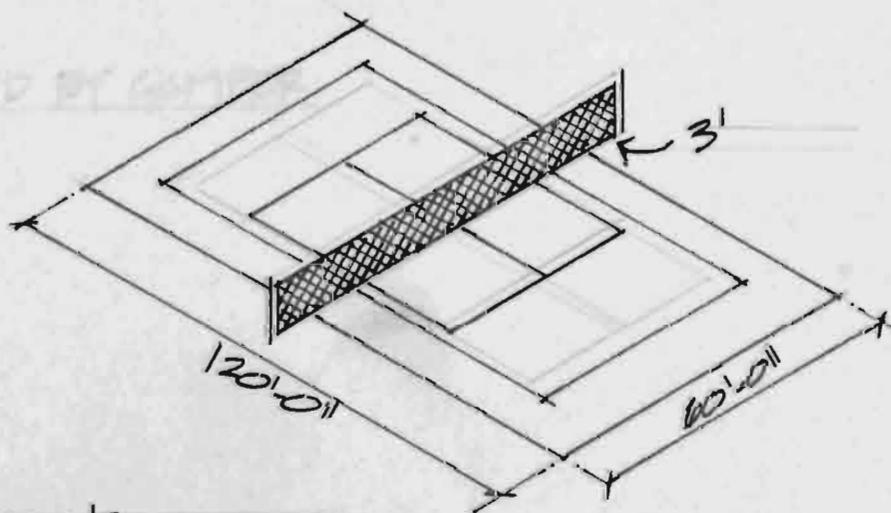
5 Spatial Requirement:

4 COURTS @ 7200# ea.
CLASSROOM 400#
PRO SHOP 800#
TOILET 300#
SERVING CAGE @ 600# ea.
DESIGN COURTS 28,800#
16 CAGE TOTAL 9,600#
EXTERIORS

7 Equipment Needs:

Racquet restrainer
Auto servers
Ball catchers
T Balls & Racquets
LIGHTING

8 Sketch Box:



GROSS DIMENSIONS

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

CYCLING

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: SPORTS
ATHLETICS

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

Long duration of group bicycling to develop cardiopulmonary endurance.

3 Secondary Activity:

"COOL DOWN" AFTER RIDE

ADJACENT?

YES

6 Storage Needs:

50 BIKES

4 Users:

FLEXIBLE

5 Spatial Requirement:

AMPLE PAVING FROM
CO. RD. 626 THEREFORE,
PROVIDE ACCESS.

7 Equipment Needs:

SECURITY
PUMPS/TUBES
SMALL TOOLS

8 Sketch Box:

BIKES ARE PROVIDED BY CAMPER.

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

Camp Bright Star:
A Christian Youth Athletic Encampment

GOLF

Division: L. SPORT
ATHLETICS

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The instruction and learning of golf MECHANICS. The game

3 Secondary Activity:

ADJACENT?

Playing @ 1 & 3 S.M.L. COURSES
ACCESS TO GOLF PROSHOP

NO
YES

6 Storage Needs:

CLUBS - BALLS

4 Users:

40 YOUTH
4 COUNSELLOR
2 P. SPECIALIST

5 Spatial Requirement:

CLASSROOM 400[#]
PRO SHOP 800[#]
STORAGE 200[#]
TOILET 300[#]
DRIVING RANGE 375⁺
PUTTING COURSE 2000[#]

7 Equipment Needs:

MANICURE

8 Sketch Box:



1 Primary Activity:

SWIMMING

Camp Bright Star:
A Christian Youth Athletic Encampment

Division: ATHLETIC
AQUATICS

Cross Reference:
Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The instruction and learning of basic swimming skills including: floating, treading, basic strokes, and simple diving. Instruction of waterfront criterion pertaining to "Advanced Lifesaving" occurs within this activity.

3 Secondary Activity:

CHANGING CLOTHES
ACCESS TO WATERFRONT PRO SHOP

ADJACENT?

YES

PRO SHOP YES

6 Storage Needs:

RESCUE EQPT.

4 Users:

250 YOUTH
25 COUNSELLOR
25 W.S.I.'s

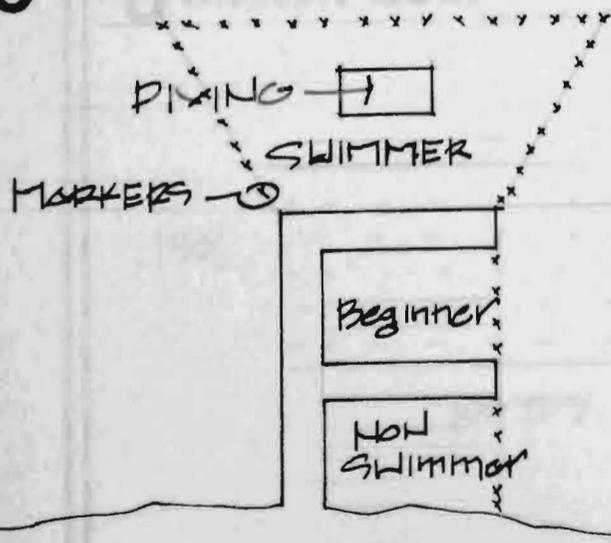
5 Spatial Requirement:

SURFACE	12,500 #
CLASSROOM	400 #
PRO SHOP	800 #
Toilet	300 #

7 Equipment Needs:

LIFEGUARD STANDS
BOUYS
LIFE LINES

8 Sketch Box:



HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

BOATING

Camp Bright Star:
A Christian Youth Athletic Encampment

Division:

AQUATICS

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The development of upper body conditioning and endurance via kayak and canoe practice and competition. Waterskiing occurs within greater Smith Mountain Lake.

3 Secondary Activity:

DOCKING BOATS

ADJACENT?

YES

6 Storage Needs:

KAYAKS
CANOEES
BOATS
P.F.D.'S

4 Users:

30 YOUTH
3 COUNSELLORS
1 P. SPECIALIST

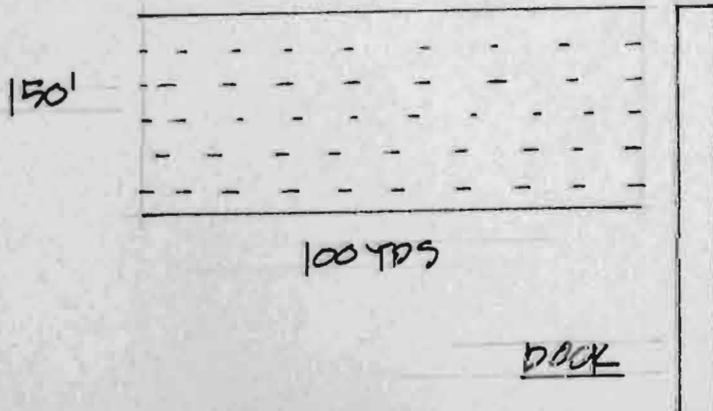
5 Spatial Requirement:

COURSE: 45,000'
BOAT STORAGE: 1560'

7 Equipment Needs:

WATER SKIS
P.F.D.'S
BOLYS

8 Sketch Box:



HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

CARDIOPULMONARY DEVELOPMENT

Camp Bright Star:
A Christian Youth Athletic Encampment

Division:

ATHLETICS

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

To facilitate the strive for athletic excellence thru respect and improvement of the body. Heart, lung, and muscle development via station attentuation.

3 Secondary Activity:

Basketball + classroom + lockers
SHOWERS + TOILET

ADJACENT?

YES
YES

6 Storage Needs:

LINEN
JANITORIAL 600#
EQUIPMENTS
MATS

4 Users:

FLEXIBLE
150 YOUTH
15 COUNSELLORS
CAMP STAFF

5 Spatial Requirement:

WEIGHT LIFTING 1250#
WRESTLING 4096#
LIFE CYCLES 375#
TREADMILLS 375#
PRO SHOP 1000#
RACQUETBALL 3840#
FLOOR EXERCISE 4096#
INTERIORS

7 Equipment Needs:

HYAC
LIGHTING
LAUNDRY

8 Sketch Box:

FREE WEIGHTS ARE NOT APPROPRIATE FOR YOUTH THEREFORE, NAUTALUS EQUIP. GOVERNS

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

CARDIOPULMONARY DEVELOPMENT

Camp Bright Star:
A Christian Youth Athletic Encampment

Division:
ATHLETICS

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

CONTINUE FROM # with emphasis on competitive swim + dive.

3 Secondary Activity:

LAP SWIMMING
INDOOR SPORTS

ADJACENT?

-
YES

6 Storage Needs:

CHEMICALS
STARTING BLOCKS
JANITORIAL
EQUIPMENTS
LINEN

4 Users:

FLEXIBLE

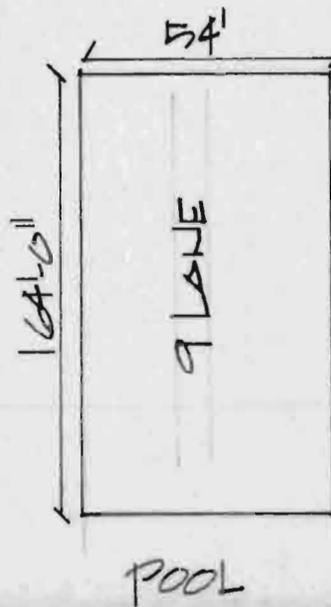
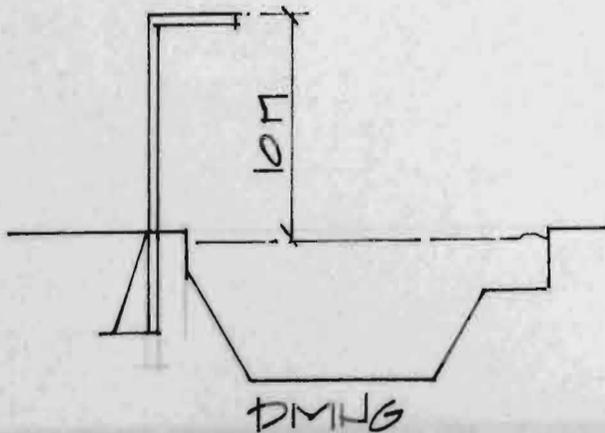
5 Spatial Requirement:

50M POOL	8856#
10M PLATFORM	4000#
LOCKERS + TOILET	4000#
MECHANICAL	1000#
<u>INTERIORS</u>	

7 Equipment Needs:

PUMP. FILTER. CL₂
HEATERS
LIGHTING
RESCUE
DIVING BOARDS
DIVING BLOCKS

8 Sketch Box:



HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

BASKETBALL

Camp Bright Star:
A Christian Youth Athletic Encampment

Division:

ATHLETICS

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The playing of championship games and tournaments. Some skills development as extensions, but requirements of controlled environments prevail. Spectator seating.

3 Secondary Activity:

ADJACENT?

WARM-UP DRILLS	YES
VOLLETBALL - WEIGHT LIFTING	YES
CARDIOPULMONARY STATIONS	YES

6 Storage Needs:

JANITOR. MECT.
LINEN
EQUIPMENTS

4 Users:

FLEXIBLE
60 PLAYERS
6 OFFICIALS
6 P. SPECIALIST
300 SPECTATOR
+

5 Spatial Requirement:

<u>INTERIORS</u>	
3 COURT SPACE	15,000 \$
LOCKER+SHWR	4,080 \$
CLASSROOM	1,200 \$
OFFICIAL'S RM+SHW.	350 \$
P. SPECIALIST'S RM	300 \$
SEATING	1160 \$
PUBLIC TOILET	1200 \$

7 Equipment Needs:

HYDRALIGHTING
BALLS/CLOCKS
SCORE TABLES

8 Sketch Box:

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

SLEEPING

Camp Bright Star:
A Christian Youth Athletic Encampment

Division:

LIVING

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The organization of the camps living units rely on the sleeping domains. Based on age then segregated by sex.

3 Secondary Activity:

PERSONAL HYGIENE
EATING

ADJACENT?

YES
VAR.

6 Storage Needs:

CLOTHES: SOILED
CLEAN
LUGGAGE

4 Users:

200 - 13 YR OLD
200 - 14 YR " "
200 - 15 YR " "
160 - 16; 17 YR OLD
COUNSELLORS
P. SPECIALIST
LIFEGUARDS
STAFF

5 Spatial Requirement:

DORMITORY	10,000#
" "	10,000#
" "	10,000#
" "	8,000#
INCLUSIVE	3,800#
QUARTERS	900#
QUARTERS	1,250#
QUARTERS	5,000#

7 Equipment Needs:

HVAC
LIGHTING

8 Sketch Box:

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

EATING

Camp Bright Star:
A Christian Youth Athletic Encampment

Division:

LIVING

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

Eating the daily camp meals by living group units.

3 Secondary Activity:

COOKING

ADJACENT?

YES

6 Storage Needs:

FURNITURE

4 Users:

760 YOUTH
76 COUNSELLOR
18 P. SPECIALIST
25 WSI
12 ADMIN STAFF
9 VIP

900 USERS

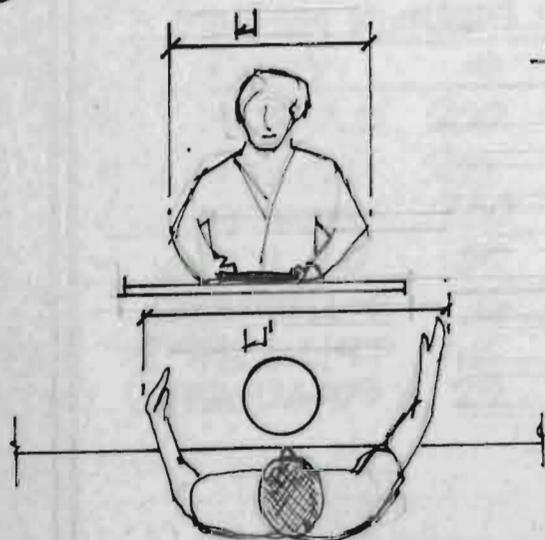
5 Spatial Requirement:

SEATING : 5400 #
TOILET : 400 #

7 Equipment Needs:

FURNITURE
JANITOR

8 Sketch Box:



SYNTHESIS: 6# normal eating: sitting

WIDTH W: SITTING AT TABLE WITHOUT TOUCHING NEIGHBORS ELBOW WHILE EATING
W1: REACHING DISTANCE; PERSONAL EATING OR PLATE SPACE.

EMPIRICAL:	W	W1
SELF	18"	26 1/2"
YOUTH	16"-22"	23"-32"

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

PERSONAL HYGIENE

Camp Bright Star:
A Christian Youth Athletic Encampment

Division:

LIVING

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The clearing of the body.

3 Secondary Activity:

DRESSING
SHAVING, BRUSHING TEETH etc...
TOWELING

ADJACENT?

YES
YES
YES

6 Storage Needs:

JANITOR

4 Users:

100 13 YR. ea.
100 14 YR. ea.
100 15 YR. ea.
80 16/17 YR. ea.
38. COUNSELLOR
9 P. SPECIALIST
12 LSI ea.

5 Spatial Requirement:

M	FM
700#	850#
700#	850#
700#	850#
500#	650#
300#	350#
200#	300#
200#	300#

7 Equipment Needs:

WATER HEATERS
LIGHTING

8 Sketch Box:

MINIMUM FIXTURES SUBJECT TO CHANGE UPON TIME MOTION STUDIES:

USERS	#	[M] TOILET	SHWR.	[FM] TOILET	SHWR.
13 YR. OLD	200	7	7	10	7
14 YR. OLD	200	7	7	10	7
15 YR. OLD	200	7	7	10	7
16-17 YR. OLD	160	5	5	8	5
COUNSELLOR	76	3	3	4	3
P. SPECIALIST	18	2	2	3	3
LIFEGUARDS	25	2	2	3	3

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

CAMPWIDE
GATHERING

Camp Bright Star:
A Christian Youth Athletic Encampment

Division:

SPIRITUAL GROWTH

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The gathering of youth, counsellors and camp staff in song, prayer, skits,

3 Secondary Activity:

WORSHIP SERVICE
CAMP FIRE

ADJACENT?

6 Storage Needs:

FIREWOOD
P.S. EQUIP
PROPS, SETS

4 Users:

FULL CAMP
COMPLEMENT
900

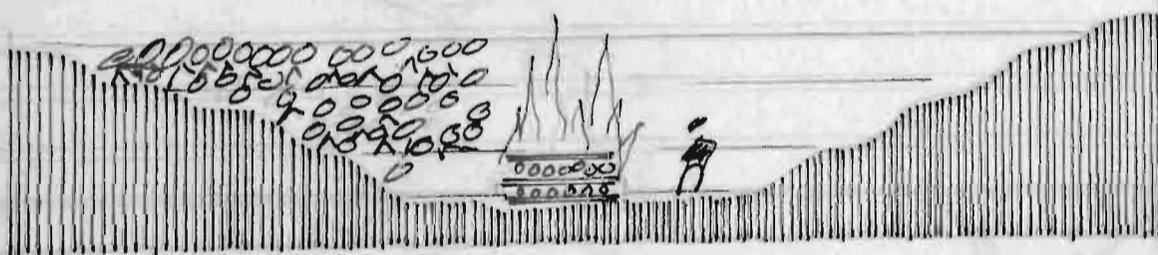
5 Spatial Requirement:

SEATING 13,500#
FIRESPACE 500#
CLEAR 800#

7 Equipment Needs:

EXTINGUISHING
PUBLIC ADDRESS
LIGHTING
+ COMMUNICATION...

8 Sketch Box:



HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

BIBLE STUDY

Camp Bright Star:
A Christian Youth Athletic Encampment

Division:
SPIRITUAL GROWTH

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The searching of the scriptures to find God's will in the life of the youth.

3 Secondary Activity:

DEVOTIONALS

ADJACENT?

6 Storage Needs:

4 Users:

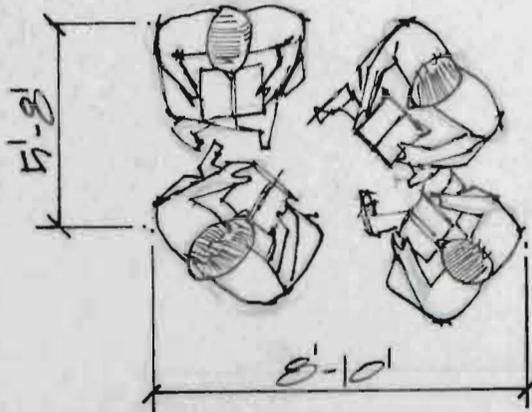
FLEXIBLE

5 Spatial Requirement:

EXTERIORS 300# sq.

7 Equipment Needs:

8 Sketch Box:



1 Primary Activity:

HORSEMANSHIP

Camp Bright Star:
A Christian Youth Athletic Encampment

Division:

OUTDOOR GROWTH

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The learning and caring for horses; English seat riding techniques.

3 Secondary Activity:

OUTPOST CAMPING

ADJACENT?

NO

6 Storage Needs:

MANURE
FEED

4 Users:

FLEXIBLE

1-WRANGLER

5 Spatial Requirement:

22 LOOSE BOXES	5632#
1 FEED ROOM	450#
1 TACK ROOM	650#
1 WASH ROOM	450#
1 UTILITY BOX	1530#
OFFICE	150#
TOILET	300#
YARD	5000#

7 Equipment Needs:

TACK + GROOM
COMMUNICATIONS

8 Sketch Box:

HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

HIKING
NATURE STUDY

Camp Bright Star:
A Christian Youth Athletic Encampment

Division:

OUTDOOR GROWTH

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

Exploring the environment via trails and learning about unique natural elements (geology, vegetation, animal etc...) along this trail via nature study outposts.

3 Secondary Activity:

OUTPOST CAMPING

ADJACENT?

YES

6 Storage Needs:

4 Users:

FLEXIBLE

5 Spatial Requirement:

PATH AS DESIGNED
NATURE STUDY to 150#

7 Equipment Needs:

8 Sketch Box:



HUMAN ACTIVITY STUDY

ACTIVITY # _____

1 Primary Activity:

OVERNIGHT
CAMPING EXPEDITION

Camp Bright Star:
A Christian Youth Athletic Encampment

Division:
OUTDOOR GROWTH

Cross Reference:

Activity # _____ NOTES: 1 2 3

2 Primary Activity Description:

The learning and sharing of a common experience by small living groups away from the main camp setting.

3 Secondary Activity:

HIKING

ADJACENT?

YES

6 Storage Needs:

HORSE PROVISION
WATER

4 Users:

10 YOUTH
1 COUNSELLOR

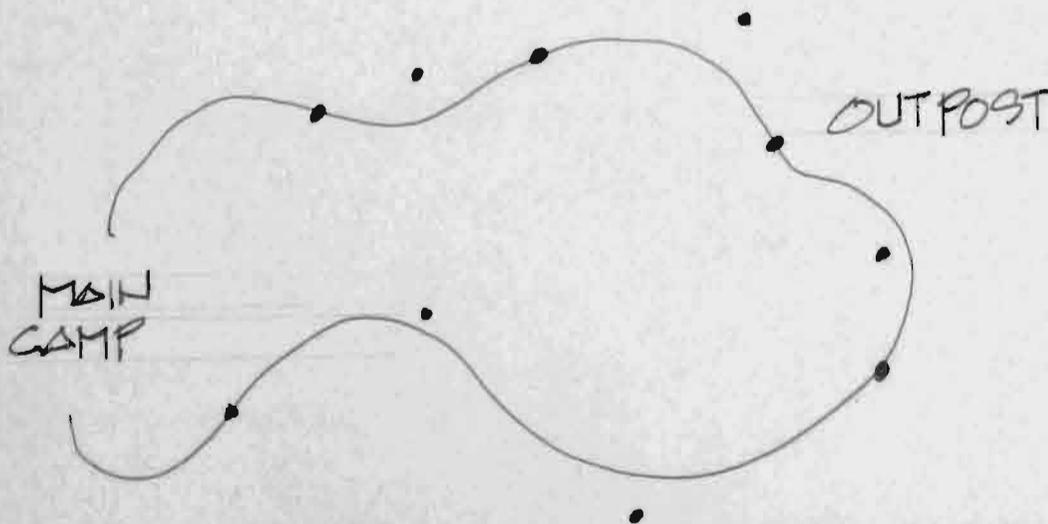
5 Spatial Requirement:

SHELTER 450#

7 Equipment Needs:

BACKPACK / BEDROLL
LIGHTING
COMMUNICATION

8 Sketch Box:





Space Summary

8

Space Summary by Activity Types

ADMINISTRATION—

ACTIVITY	COMMON NAME	QUANTITY	SQ.FOOT
Camp Administrator	Office	1	300
Program Director	Office	1	300
Business Director	Office	1	300
Bookkeep/Accounting	Office	1	350
Program Specialist	Office	18	1800 @100
Scheduling	Conference	1	360
Records Vault	Storage	1	500
Office Supply	Storage	1	150
Photocopy	Work room	1	200
Communications	Station	1	150
Transition	Lobby	1	500
	Toilets	2	300 @150
	Mechanical	1	300
	Total this area:		5510
Camp Store and Laundry	Display	1	2000
	Checkout	1	200
	Storage	1	500
	Laundry	1	250
	Transition	1	100
	Total this area:		3050
Health Care	Infirmery	18	1080 @60
	Screening	1	1200
	Dispensary	1	500
	Linen Storage (clean)	1	50
	Linen Storage (used)	1	25
	Supplies	1	100
	Dr. Sleeping	1	400
	Dr. Office	1	200
	Toilet	2	300 @150
	Transition	1	150
	Mechanical	1	300
	Total this area:		4305
Vehicle Transportation	Garage	1	1900
	Shop	1	800
	Toilet	1	150
	Total this area:		2850
Maintenance Groundskeeping	Shop	1	1000
	Shop	1	1000
	Office	1	200
	Mechanical	1	300
	Total this area:		2500

ACTIVITY	COMMON NAME	QUANTITY	SQ.FOOT
Pro Shopping and Learning	Golf	1	800
	Golf Storage	1	200
	Golf Classroom	1	400
	Tennis	1	800
	Tennis Storage	1	200
	Tennis Classroom	1	400
	Waterfront	1	800
	Waterfront Storage	1	200
	Waterfront Classroom	1	400
	Land Sports	1	1000
	Land Sports Storage	1	250
	Land Sports Classrooms	6	2400 @400
	Toilets	4	1200 @300
	Total this area:		
Lifeguarding	Stand	As designed	25 each
Food Service	Office	2	300 @150
	Receiving	1	100
	Toilets	2	200 @100
	Main Cooking	1	230
	Meat Preparation	1	45
	Vegetable Preparation	1	70
	Salad Preparation	1	35
	Sauce Preparation	1	40
	Sandwich Prep.	2	50 @25
	Baking	1	115
	Serving	1	150
	Cold Food Storage	1	180
	Dry Food Storage	1	200
	Dish washing	1	100
	Pot washing	1	120
	Janitorial	1	100
	Garbage Storage	1	150
	Station Garbage	5	20 @4
Mechanical	1	300	
Total this area:			2487
Eating	Camp Complement	900	5000
	Broom/Mop	2	200 @100
	Mechanical		300
	Total this area:		
Parking	Short term	300	105000 @350
	Long term	100	32000 @320
	Total this area:		

ATHLETICS—

ACTIVITY	COMMON NAME	QUANTITY	SQ.FOOT	
Land Sports	Basketball	4	16800 @4200	
	Volleyball	6	24000 @4000	
	Soccer Male	2	144000 @72000	
	Soccer Female	1	28800	
	Kicking Cage	15	7500 @500	
	Softball	4	302500	
	Baseball (Y Youth)	1	87104	
	Baseball (O Youth)	1	130656	
	Batting Cage	25	12500 @500	
	Tennis	4	28800 @7200	
	Tennis Serving Cage	16	9600 @600	
	Golf Driving Station	25	375 @15+	
	Golf Putting Station	10	2000	
	Waterfront	1	12500	
	Kayak/Canoe	1	45000	
	Water Skiing	-	-	
	Storage: Boats	3	1560 @520	
		Kayak/Canoe	25	3000 @120
		Total this area:		856,695
	Indoor Sports	Basketball	3	15000 @5000
Weight lifting		1	1250	
Wrestling		1	4096	
Life Cycles		25	375 @15	
Treadmills		10	375 @15	
Racquetball		4	3840 @960	
Pro Shop		1	1000	
Classroom		3	1200 @400	
Officials room		1	300	
Official showering		1	50	
Locker Room		Dressing	4	6000 @1400
		Showering	4	480 @120
		Toweling	4	480 @120
		Toilet	4	1200 @300
Toilet		Instructor's room	2	300 @150
		Public Male	2	600 @300
Spectator		Public Female	2	600 @300
		Seating	532	1160
Competitive Swimming		Pool 50M	1	8856
Competitive Diving		to 10M platform	1	4000
	Mechanical (Pumps)	1	2000	
	Mechanical	1	600	
	Janitorial	2	600 @300	
	Total this area:		54,362	

LIVING—

ACTIVITY	COMMON NAME	QUANTITY	SQ.FOOT
Sleeping: Campers and Storage	13 year olds	200	10000
	Transition	1	210
	14 year olds	200	10000
	Transition	1	210
	15 year olds	200	10000
	Transition	1	210
	16/17 year olds	160	8000
	Transition	1	160
	Mechanical	4	1200 @300
Sleeping: Counsellors		76	3800
Total this area:			43,790
Sleeping: Program Specialists		18	900
Sleeping: WSI		25	1250
Camp Administrator	Private quarters	1	1500
Program Director	Private quarters	1	1200
Camp Chef	Private quarters	1	1200
Medical Director	Private quarters	1	1200
Administration	Season quarters	10	5000 @500
VIP guests	Private quarters	3	2700 @900

		Users	Toilet	Shower	SQ.FOOT
Personal Hygiene	13 year olds Male	100	7	7	700
	13 year olds Female	100	10	7	850
	14 year olds Male	100	7	7	700
	14 year olds Female	100	10	7	850
	15 year olds Male	100	7	7	700
	15 year olds Female	100	10	7	850
	16/17 year olds M	80	5	5	500
	16/17 year olds FM	80	8	5	650
	Counsellor Male	38	3	3	300
	Counsellor Female	38	4	3	350
	Prog. specialist M	9	2	2	200
	Prog. specialist FM	9	3	3	300
	WSI Male	12	2	2	200
	WSI Female	13	3	3	300
	Mechanical	7			2100
Total this area:					9950

OUTDOOR GROWTH—

ACTIVITY	COMMON NAME	QUANTITY	SQ. FOOT
Horsemanship	Loose boxes	22	5632 @256
	Feed room	1	450
	Tack room	1	650
	Wash room	1	450
	Utility box	1	1536
	Office	1	150
	Toilet	2	300 @150
	Yard	1	5000
	Mechanical	1	300
		Total this area:	
Hiking	Trail		As designed.
Nature Study	Outpost	8	1000 @125
Expedition Camping	Outpost	10	4500 @450

SPIRITUAL GROWTH—

ACTIVITY	COMMON NAME	QUANTITY	SQ. FOOT
Campfire and Worship	Camp Complement	900	13500
	Fire space	1	575
	Clear space	1	800
		Total this area:	
Bible Study	Intimate Exteriors	25	7500 @300
Devotional Talks	Intimate Exteriors	3	1500 @500

Space Summary by Occupancy Types

BUILDING NAME	Occupancy/ Division	NET SQ.FT	CIRC. MULT.	GROSS SQ.FT	VOLUME CU.FT
Administration	B/2	5480	1.25	6850	51375 - 82200
Athletic Complex	A/2.1	54362	1.25	67952	1359040 - 2718080
Bible Study Pavilions	A/3	7500		7500	open exteriors
Camp Garage	B/1	2850	1.30	3705	74100
Camp Store/Laundry	B/2 & A/3	3350	1.25	4188	31406 - 41880
Dining Hall/Kitchen	A/2	8487	1.30	11033	136262 - 175194
Equestrian Stable	M/1.1106	9468	1.25	11835	118350 - 142020
Health Lodge	I/3	4305	1.25	5380	40360 - 64560
House: Administrator	R/3	1500	1.20	1800	13500 - 18000
House: Camp Chef	R/3	1200	1.20	1440	10800 - 14400
House: Medical Director	R/3	1200	1.20	1440	10800 - 14400
House: Prog. Director	R/3	1200	1.20	1440	10800 - 14400
Lodging: Administration	R/3	5000	1.25	6250	46875 - 62500
Lodging: Bath House	R/3	9950	1.25	12437	93280 - 124370
Lodging: Camp Outposts	R/3	5500	1.25	6875	55000 - 68750
Lodging: Campers/Coun.	R/3	43790	1.25	54738	410530 - 656856
Lodging: Prog. Specialist	R/3	900	1.25	1125	8427 - 13500
Lodging: VIP's	R/3	2700	1.25	3375	25312 - 33750
Lodging: WSI's	R/3	1250	1.25	1563	11718 - 18756
Maint./Grounds Barn	M/1	2500	1.25	3125	20625 - 43750
Pro Shops	A/3 & B/2	9050	1.25	11312	84843 - 135744
Total this area:		225363			

Space Summary for Site Development

ITEM	SQ.FT.	ACRE	GRADING	PAVING	EXCAVATION
Buildings	221,545	5.08	Yes	No	Mixed
Hiking Trails	As designed	As designed	No	Limited	No
Land Sports	856,695	19.67	Yes	Mixed	Limited
Equestrian Yard	5,000	.15	Yes	No	No
Parking	136,000	3.12	Yes	Limited	No
Campfire	14,875	.35	Yes	No	Limited
Total this area:	1,012,570	23.50			
Grand Totals:					
Buildings		5.08			
Non-buildings		23.50			
Site Area		293.00			



System Performance

9

System Performance Study Summary

Acoustics—

Hearing is often the decisive sense for precise communication of ideas between individuals and is particularly dominant when visual conditions are poor. Hearing may also direct an individual's spatial orientation and direction; we humans possess an instinctive desire to identify and locate the source of sonic signals. The full range of human response to sound involves a frequency spectrum that ranges from approximately 30 Hz. to 1000 Hz. For the youth, not constantly exposed to very loud music, the range of sensitivity extends as low as 20 Hz. or as high as 20,000 Hz.¹

The sole purpose of architectural acoustics is to either project sound or retain sound within a space or series of spaces. This is accomplished by recognizing that all building and finishing materials have distinct acoustical properties and can be articulated to create an appropriate sonic environment for a given activity. The subjective sensation of the sonic environment is primarily a function of reverberation.² When a sound source ceases to emit energy, the direct sound stops immediately, however the sound energy within an enclosed space does not necessarily stop, this is reverberation. Air molecules continue to transfer sound energy which bounces off the space's surfaces and occupants. After a period of time, the energy is lessened and diminishes to a point of inaudibility. Reverberation of an appropriate duration is desired within a space. Short reverberation time is a rapid decay of sound energy within a space, usually desired in spaces like the camp's eating space where many occupants and kitchen activities could create an annoyance to the comfort of eating or talking. Long reverberation time is a slower decay of sound within a space. This effect of sound is appropriate in spaces where oral communication, not electronically reproduced, dominates an activity such as the administration's conference space. An echo is simply a reverberation of longer duration and should be avoided, in most cases, when designing the sonic environment.

Therefore, reverberation is a governing criterion for controlling the sonic environment. A space can be perceived to be acoustically "dead" with low reverberation times or can be acoustically "live" with higher reverberation times. Material articulation of interiors is not the only manner in which the sonic environment can be controlled. The placement and/or timbering of trees and vegetation can alter the sonic environment between buildings. An example of when this would be appropriate is the isolation of a sound source from the athletic field projected to the administration space, when privacy concerns may prevail, in which case vegetation can be used as sound

buffers. The concept of controlling the sonic environment relies on establishing quantitative values for materials determined by its sonic reflective or retention properties. These properties translate into an average noise reduction coefficient which the designer can predict to best articulate a space's sonic environment. Table A outlines established sound absorption targets for preliminary material selections for a desired use.³

Table A. Sound Absorption Targets.

<i>Mean Noise Reduction Coefficient for Materials in the Space (\bar{A})</i>	<i>Subjective Listening Conditions</i>	<i>Suitable Use</i>
0.4 to 0.5	"Dead" or "soft" room	Theater, lecture halls, and other spaces where use of electronic sound is intended; recording studios; spaces where significant and obtrusive background or equipment levels are present
0.25 to 0.4	"Medium" to "dead" room	Medium activity spaces, such as elementary classrooms, corridors, general offices
0.25	"Medium" room	Low activity spaces, such as private offices, small stores
0.05 to 0.25	"Medium" to "live" room	Spaces where oral communication predominates as an activity, such as conference rooms
0.05	"Live" or "hard" room	Gymnasiums, large churches or cathedrals

Speech involves a variety of frequencies and intensities. Each letter or syllable is enunciated as a characteristic sound, and comprehension depends on the listener's ability to perceive each signal and distinguish it from other subtle but different signals. Architecture recognizes this ability to perceive sound and in effect creates sonic territories for occupants. The exact limitations of this sense of personal space will vary with cultural backgrounds and with specific activities; but this influence is generally present to some degree and tends to define proximity between users. Table B outlines considerations for the designing of sonic territories.⁴

Table B. Sonic Territoriality.

<i>Appropriate Audible Signal</i>	<i>Typical Intensity Range (decibels)</i>	<i>Sense of Personal Space</i>	<i>Physical Proximity</i>	<i>Implies</i>
Soft whisper	—	Very close	3 to 6 in.	Top secret communication
Audible whisper or intimate voice	44-69	Close	8 to 20 in.	Confidential communication
Normal voice	50-75	Neutral	20 to 60 in.	Personal communication
Loud voice	56-81	Public (near)	5½ to 8 ft.	Nonpersonal communication or group information
Overloud voice	62-87	Public (across room)	8 to 20 ft.	Group address
Shouting	68-93	Upper limit	Over 20 ft.	Hailing

Impact sounds are generated by objects striking, vibrating, or sliding against a component of a building.⁵ This would occur in basketball spaces, racquetball spaces and any other sports activity area with running and jumping. If the points of impact occur on a floor which is also a ceiling for an activity below, these impacts would be distracting to the below activity. Additionally, the effects of footsteps, moving furniture, and slamming doors generate impact sounds. These sounds could occur in the living spaces of the camp, particularly noticeable if multi-level configurations are designed. And mechanical equipment vibration causes impact generated sounds.⁶ Therefore, the design of the sonic environment must include provisions for the insulation of impact sounds. The Impact Insulation Class⁷ is a useful method for quick evaluation and prediction of the ability of a given floor-ceiling construction to resist and subsequently reduce common impact sounds.

Natural Sound Reinforcement:

Special objectives to successfully design natural amplification systems are:⁸

- To develop ceiling and wall forms to maximize the useful reflector surface.
- To avoid 'standing waves' whereas sound would be reflected back and forth between two parallel surfaces of approximately equal dimensions.
- To avoid focusing effects, such as those created by concave curvature.
- To provide for blending of sound via the faceting of major surfaces.
- To arrange useful facets so that first reflection sounds arrive .035 seconds or less after direct signal.
- To manipulate materials and forms in a manner that will prevent an echo.
- To manipulate materials and space volume to provide the proper reverberation time.

Electronic Amplification:

As a general rule, seating capacities of 600 or less should be capable of adequate signal reinforcement by natural means, while occupant capacities of 1,000 or more will nearly always require some kind of electronic amplification of sound.⁹ The major activity spaces of the camp that would require articulation of this criterion are: the campfire space, the worship space, and the dining space. These spaces are sedentary in nature. Additionally, electronic amplification may be required in the design of the athletic fields as communication by natural amplification would not generate sufficient decibels over the anticipated distance.

Usually a central speaker or speaker cluster is preferred and location near the visual source is preferable over a distributed speaker system.¹⁰ The logic of this configuration is to provide as much synchronization between emitted sound and received sound as possible. Additionally, listeners should have a "line of sight" to this speaker or cluster of speakers for visual and auditory continuity. For example: higher frequencies, like the playing of a clarinet during a campfire service, is very directional. If this sound was perceived in conflict with the accompanying visual direction, the listener would be disoriented, thus uncomfortable.

The elimination of feedback¹¹ is a necessary criterion for electronic amplification. For exteriors, like the campfire space, a large highly directional speaker should be used. This is usually termed a 'high level system'. For interiors, like the dining hall, a 'low level' system could be employed. This speaker configuration is characterized as a multiple of smaller speakers installed in the ceiling plane to project sound directly down. In either case, electronic amplification should not rely on interior room surface reflections. "Dead" or soft room acoustical conditions should be provided if electronic amplification is to be successful.

Control Of Internal Noise:

When the design of space requires the dampening of sound energy, a material should exhibit a high absorption coefficient such as: carpeting, heavy fabrics, clothing, upholstery, acoustical blankets, or acoustical tiles. Moreover, the application of vertical or horizontal influences the effectiveness of these materials and should be considered within the conceptual phase of design.

Internal noises of the mechanical system can be controlled by the use of baffles or canvas bellows at system interfaces as well as insulating the interior of the ductwork. Insulation of this type should be constructed as not to release fiber particles into the airstream and likewise into the space.

Communication and Signal Systems—

The criteria in designing the communication system of the camp is influenced by meeting the following critical needs:

- The direct communication of the camp administration to emergency fire, ambulance, rescue squad, and law enforcement protection agencies. This could be in the form of a 'priority use only' telephone line or other similar configuration of telephone service.
- The direct communication of any swimming area of the camp to the administration and health services facility. This could be in the form of an inter-com system which provides for two-way voice communication or a protected signal system which is activated by a lifeguard triggering a warning device in the camp offices and health services facility. In either case the most important element for successful communication is that a receptor for help can be summoned immediately.
- A communication system between the camping outposts and main camp setting. Also a communication system between the camp maintenance personnel and camp administration. This could be in the form of a multi channel 2-way radio system which is portable, rechargeable, and linkable to a base unit.
- A master communication system which links all activity nodes and interiors of the camp together. For interiors this system may be accessed by the counsellors, medical service personnel, and food service personnel. For exteriors this system may be accessed by the program specialists, maintenance personnel, and groundskeeping personnel. This could be in the form of a telephone communication system.
- A telephone communication system which provides for youth, counselor, and administration persons to call persons outside of the main camp setting.
- A signal system of interiors which can be activated unknowingly by illegal entry of persons during times of a closed camp. This signal system should be linked with appropriate law enforcement personnel or services.

Fire—

1. Sources of ignition usually are chemical, electrical, or mechanical.¹² Chemical ignition may be spontaneous from a collection of oil and gasoline saturated rags insulated in a cardboard box. This configuration is usually present in garages and other automotive facilities and should not be promoted by the design. Electrical ignition may be from static electricity build-up and arcing of electrical contacts. The former case is most prevalent in electrical service boxes.¹³ And mechanical ignition is a result of friction which may occur by the overheating of machinery. Therefore, appropriate design includes recognizing sources of ignition and limiting its destructive potential.

2. Design deficiencies that can contribute to the spread of a fire within a building:¹⁴

- Lack of or inadequate vertical and/or horizontal fire separations.
- Combustible interior finish, including combustible protective coatings and insulation.
- Combustible structural members framed into fire walls.
- Improper extinguishing means for a specific fire class.
- Lack of an appropriate method of ventilating fire gasses.

Design deficiencies that can contribute to the spread of a fire among buildings:

- Inadequate separation distance.
- Inadequately protected openings in fire division walls between adjoining buildings or in firewalls between detached buildings.
- Combustible roofs, roof coverings, eaves, trims, etc....

3. Smoke management systems should be employed such as the usage of fire dampers in HVAC ductwork to limit the spread of smoke upon evacuation of the structure.

4. Confinement of smoke and fire to a specific area of the building via compartmentation.

5. Special exhaust systems are becoming more common for evacuation.¹⁵ This option for the designer would provide a relationship between the building's HVAC system and fire detection and suppression system. The detection system would override the HVAC system and configure the air handlers to intake 100% outside air and simultaneously block the return duct system. This action pressurizes each HVAC zone to create barrier against entering smoke.

6. Fire suppression systems like sprinklers can be used. However, sprinkler systems can hamper the functioning of a smoke exhaust system by creating a curtain of water that inhibits the exhausting of the smoke. Additionally, sprinklers cool the temperature of smoke thus reducing its buoyancy which, in effect, renders an exhaust system useless.

7. Fire authorities agree that most fires pass through four stages of development, the last of which is a visible flame.¹⁶ They are: ionization of the local atmosphere, called the incipient stage; smoldering; flame; and heat—the most hazardous stage. Early warning devices are manufactured which detect each stage of a potential fire.

8. The priority of protection of human life, property, and then continuity of operation should direct all design decisions relative to the ease of building evacuation including the location of emergency exits, selection of materials, and site planning.

Illumination—

Daylighting:

Since light is required for visual work, spatial definition and coordination as well as spatial orientation, interiors must introduce light either by natural or mechanical means. The most common natural means are windows, clerestories and roof monitors, and roof openings and skylights. And the most common mechanical means is by electricity. Daylighting a building can be quite dramatic and dynamic since the earth is in motion about the sun; light is a tool of the designer which can be controlled. To introduce daylight into a space a comparison and analysis of three elements constitute architectural daylighting. Direct sunlight, which passes from the east to south to west exposures of a building in the northern hemisphere can be used. Skylight which is usually consistent on all exposures of a building; and reflected light from the ground and from nearby elements can be used.

Windows provide building occupants with a view to the outside and need not be large to accomplish this. However, the quantity of light introduced into an interior depends on the window size, transmittance of the glazing, and proximity to the ceiling. To achieve a general uniform level of brightness from the window, the depth of interiors should be limited to a maximum of 2.5 times the distance from the floor to the window head.¹⁷

Clerestories and roof monitors can overcome window-to-width ratio limitations. This is a device that provides a means to emit light into a remote interior or areas which are located immediately below the roof (illustration 21).

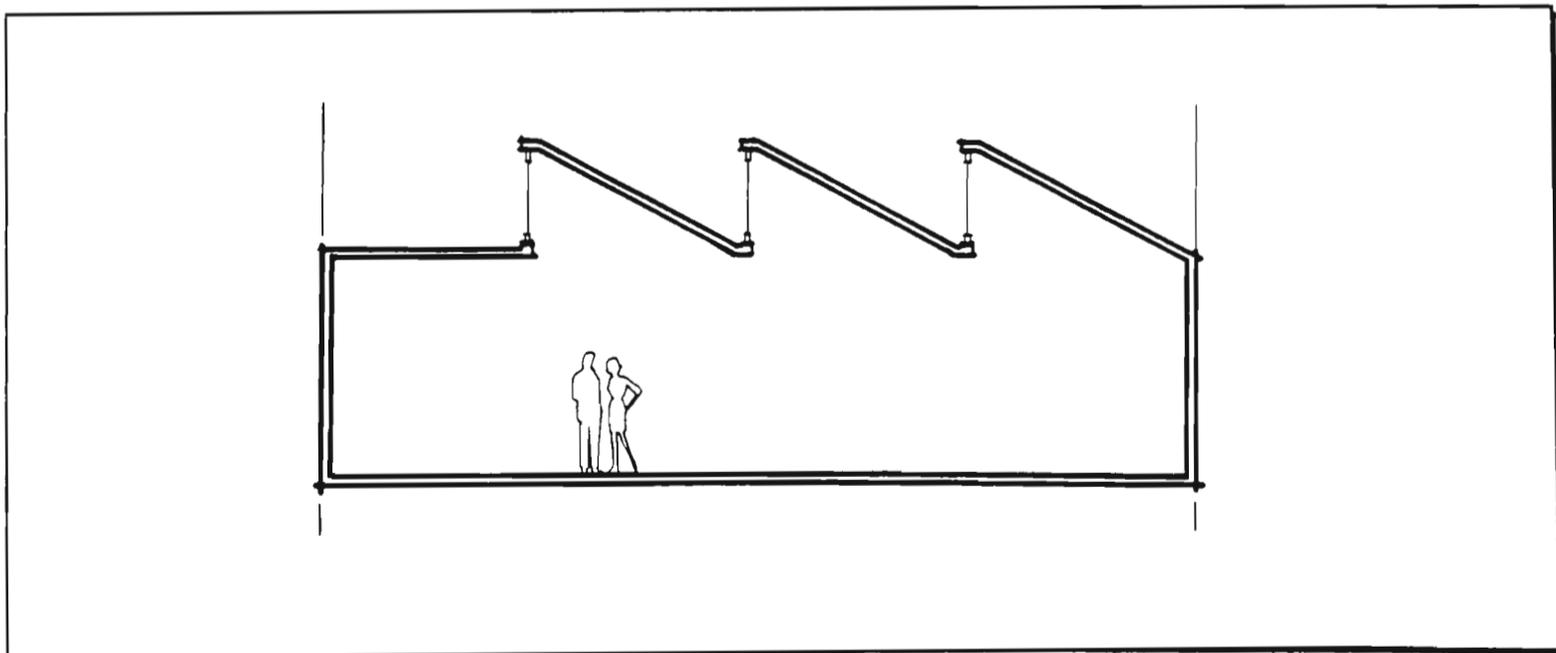
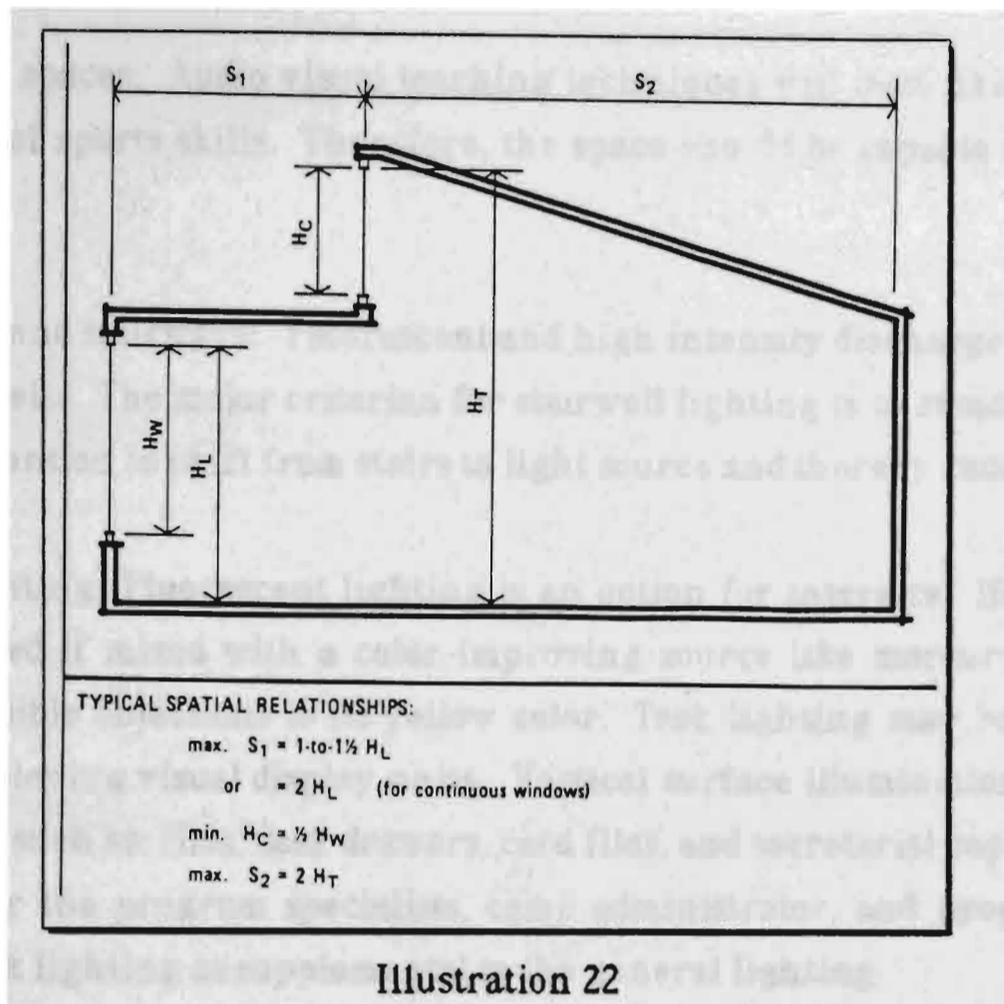


Illustration 21

If a combination of window walls and clerestory windows are designed, both openings should be oriented in the same direction.¹⁸ The setback distance should be approximately 1.5 times the window height. If continuous windows are used, the setback distance can be increased to 2 times the window height (illustration 22)



Electrical lighting:

The supplemental lighting of a space is determined by the nature of the activity occurring in the space. Methods with which to design the lighting of a space are:

1. General lighting whereas a uniform horizontal plane of light is considered.
2. Local and supplementary lighting whereas local lighting provides an area with light but does not contribute to the general lighting. Supplementary lighting provides an area with higher intensity and contributes to the general lighting.
3. A combination of general and local lighting when the general visual task is low but supplementary lighting is required to fulfill a task.

And types of illumination losses considered when designing the lighting system of a space include: Losses within the lighting equipment, losses at room surfaces, losses due to room proportion, and losses caused by light distribution are all factors to be considered. Therefore, the coefficient of utilization¹⁹ is a calculation used to summarize the losses of electrical illumination and provides a standard with which to design.



General lighting requirements:

Indoor courts: The fixtures should be sturdy and guarded. Phosphor-coated mercury, High Pressure Sodium, and CRI metal-halide are choices to be considered for color, life, control, and efficiency. The fixtures should be designed for relamping from the floor.

Classroom spaces: Audio visual teaching techniques will most likely reinforce the instruction of sports skills. Therefore, the space should be capable of multiple lighting levels.

Corridors and stairways: Fluorescent and high intensity discharge sources can be used for stairwells. The major criterion for stairwell lighting is to avoid direct glare, which causes attention to shift from stairs to light source and thereby causing a hazard.

Office lighting: Fluorescent lighting is an option for interiors. High pressure sodium can be used if mixed with a color-improving source like mercury or metal-halide to avoid possible objections to its yellow color. Task lighting may be required for work areas employing visual display units. Vertical surface illumination is required for visual tasks such as: files, desk drawers, card files, and secretarial copy stands. Individual offices for the program specialists, camp administrator, and program director could utilize task lighting as supplemental to the general lighting.

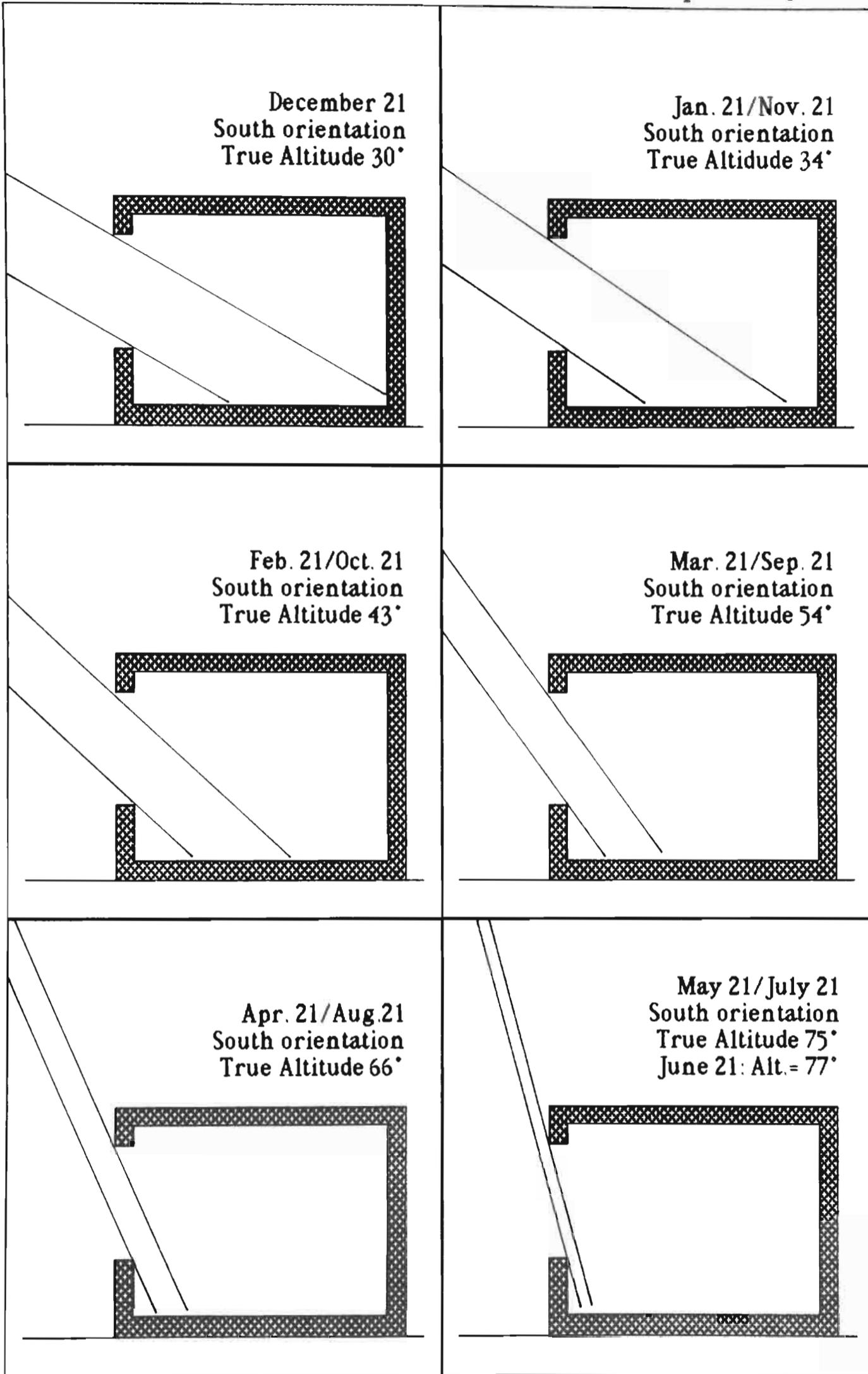
Dwelling units: Should encompass general lighting criteria but consideration for limited night use as well. For example: if one needs to go to the toilet in the middle of the night, the lighting criteria is that the main floor lighting would not have to be turned on, thus not disturbing other users of a common sleeping space. Illumination levels of the circulation path could be quite low and indirect lighting could be employed.

Exterior lighting: The lighting of the buildings exterior should be provided as well as the lighting of main paths between buildings. Floodlights could be used.

Emergency lighting: Emergency lighting must be employed for all sleeping areas and egress spaces for evacuation purposes. Standby lighting could be employed for security, entrance, office, and mechanical spaces. Emergency lighting electrical supply could be battery driven until an engine-driven generator comes on line. Standby lighting could be dedicated by engine-driven generation.



Configurations for Architectural Daylighting: As maximums to be expected at 37° N Lat.





Thermal Control—

The transfer of heat from the exterior to the interior is an element of thermal control which occurs through the buildings skin. Factors which influence this transfer at the site's north temperate zone categorically include:

- Instantaneous heat gains thru transparent openings of the building's enclosure system such as fenestrations.
- Delayed heat gains thru opaque surfaces of the building's enclosure system.
- Heat gains and losses associated with conduction between the building's shell and outside air.
- Heat gains and losses associated with intentionally exhausting the indoor air and replacing it with outside air.

Therefore, the building is subject to four categories of heat transfer which can be designed to control the thermal environment via: orientation on site, selection of transparent and opaque material values, wall and roof enclosure system selection and mechanical heating, cooling, and ventilation selection.

Natural ventilation of the sleeping, eating, and personal hygiene spaces should be encouraged. Illustration 23 outlines options to design with passive ventilators.²⁰

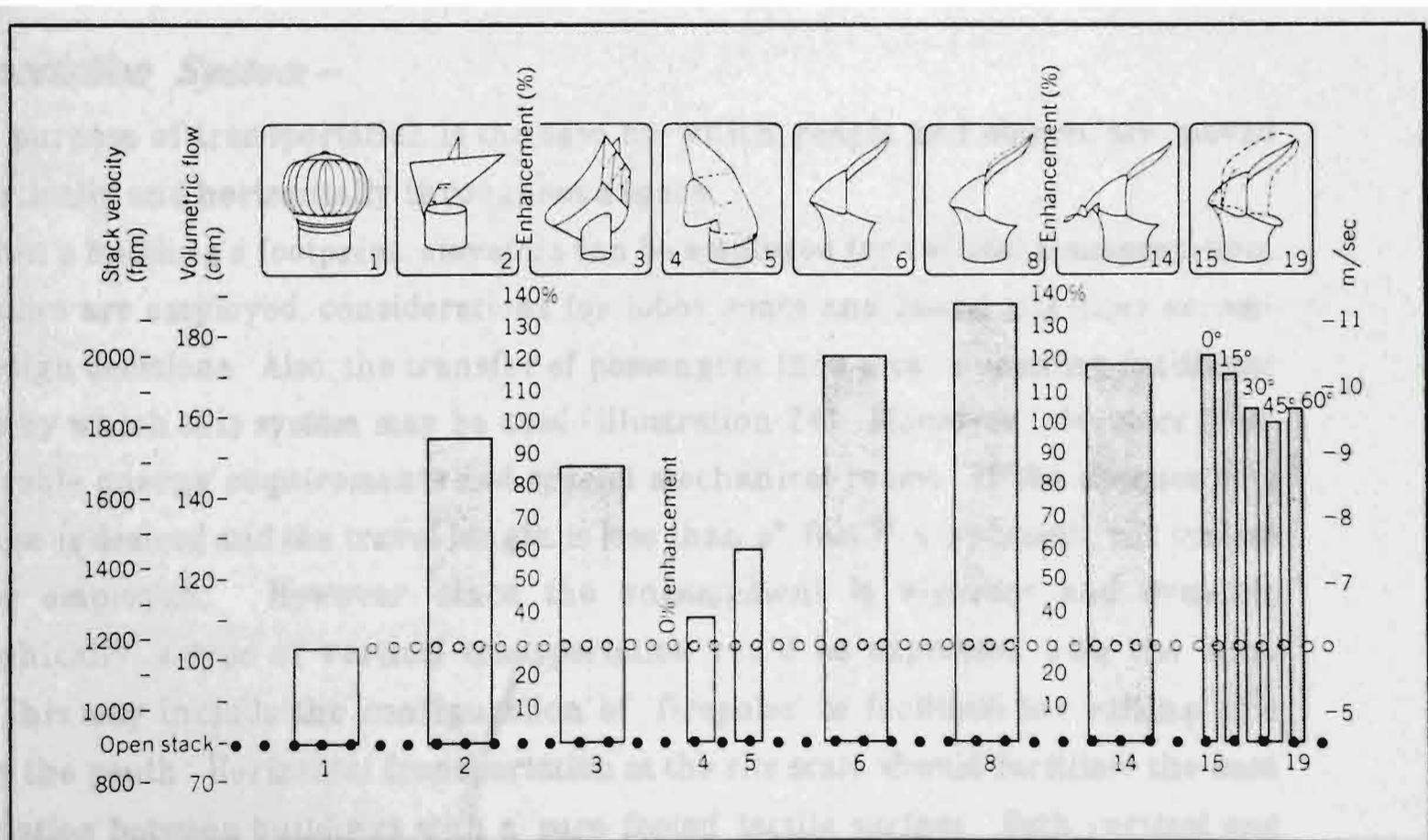


Illustration 23



00
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99

Mechanical heating, cooling and ventilation is an option for attaining thermal control, however the activity types in buildings throughout the campus require diverse systems to facilitate the comfort of people in:

- The administration offices, administration housing, pro shops, and health lodge are similar in activity types, as far as heat output from people is concerned, and could be zoned as such. Air changes per hour are recommended between 6 to 20.²¹

- The lodging facilities for campers, counsellors, program specialists and life-guards are similar as sedentary activities but a higher density of users predominates. This zone of air changes per hour are recommended between 15 to 25.

- The indoor athletic complex, dining hall and kitchen, and camp laundry are similar either as high heat output by the users, high density of users, or high heat output from equipment. This zone of air changes per hour are recommended between 10 to 30.

In all cases the performance of the heating, cooling, and ventilation system should be selected on the basis of estimated heat gains (cooling loads) by: gains through roof and wall systems; gains through glass; gains from outdoor air; gains from people and their activity; gains from lights; and gains from equipment.

Transportation System—

The purpose of transportation is the ease by which people and objects are moved both vertically and horizontally throughout a space.

Within a building's footprint, elevators can be employed for vertical transportation. If elevators are employed, considerations for lobby space and round trip time accompany design decisions. Also, the transfer of passengers thru a car's opening facilitates the ease by which this system may be used (illustration 24). Moreover, elevators draw considerable energy requirements and special mechanical rooms. If the absence of a penthouse is desired and the travel length is less than 65 feet,²² a hydraulic lift system could be employed. However, since the encampment is vigorous and dynamic philosophically, a type of vertical transportation could be expressed with the same vigor. This may include the configuration of 'firepoles' to facilitate the exiting of a space by the youth. Horizontal transportation at the site scale should facilitate the ease of circulation between buildings with a 'sure-footed' tactile surface. Both vertical and horizontal transportation should be wheelchair accessible. Therefore, material considerations interface with horizontal transportation criteria and should be sympathetic with both the site and the user.



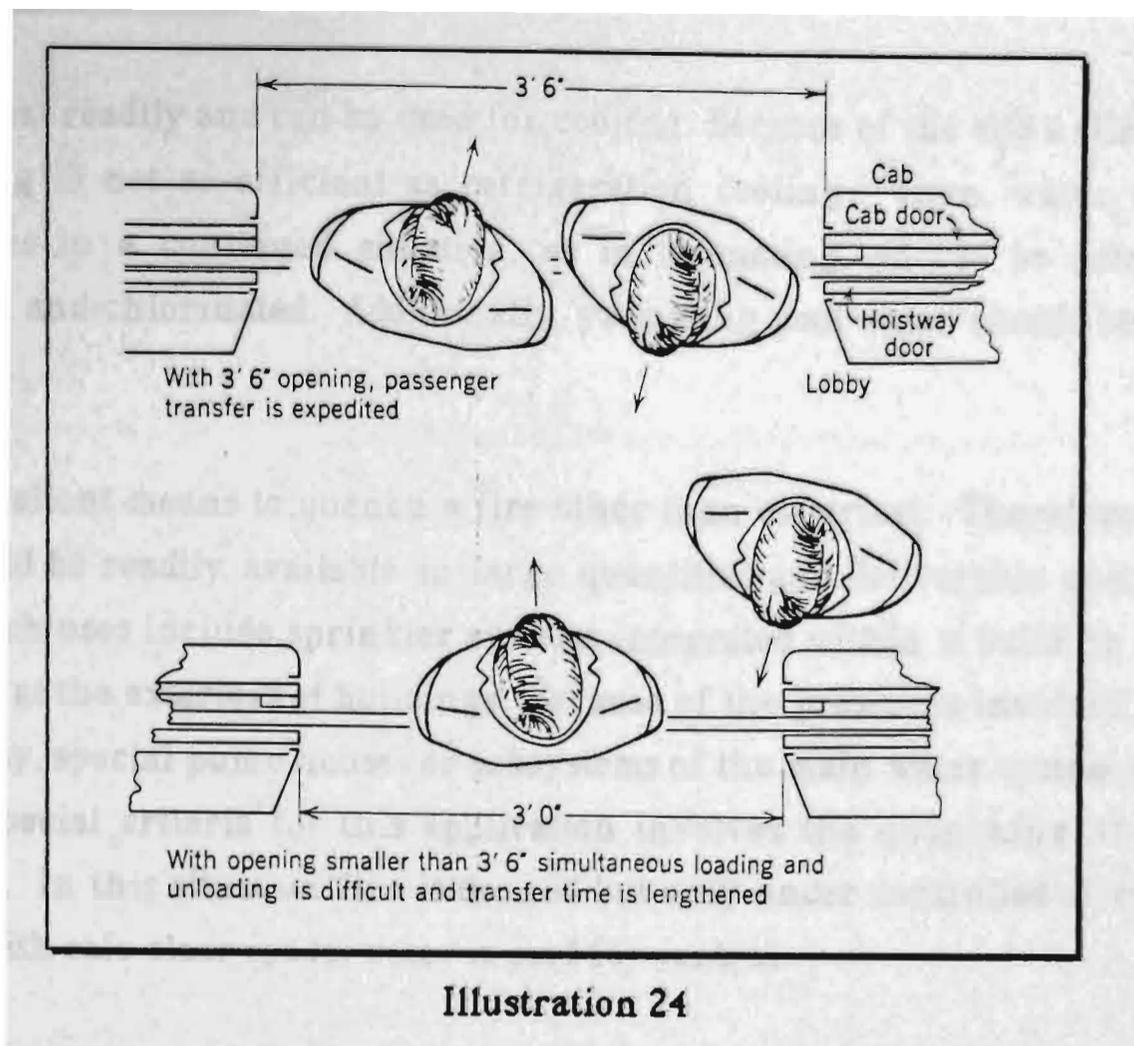


Illustration 24

Water Systems—

Water's potential contributions to life-style and architecture are appropriate design responses to the supply, usage, and return of such a versatile commodity.²³ The performance of water in architecture includes:

Nourishment:

Water for human bodily intake should be potable and conveyed from supply point to point of application free of contamination.

Cleansing and Hygiene:

Water is nearly an ideal medium for the removal of organic wastes of the body. American cultural standards for bathing places of youth camps prescribe that bathing should be a personal nature and private for females; personal and semi-private for males. The quality of water in these places should be potable.

Ceremonial and Ornamental:

Aesthetic expressions of water are particularly opportune in ceremonial usages. Water can define an edge along a path or collect in pools. Water for ceremonial use can be static, as in the case of reflecting pools; or dynamic, as in the case of fountains or spillways. The quality of water for this use need not be potable but may need to be treated if in a contained water body.



PT
CA
IL
D
P

Cooling:

Water stores heat readily and can be used for cooling. Because of the site's climate, evaporative cooling is not as efficient as refrigeration cooling. Then, water as a coolant for humans in a contained situation, as in swimming, should be potable, filtered, circulated, and chlorinated. Additionally, swimming pool water should be ph. balanced.²⁴

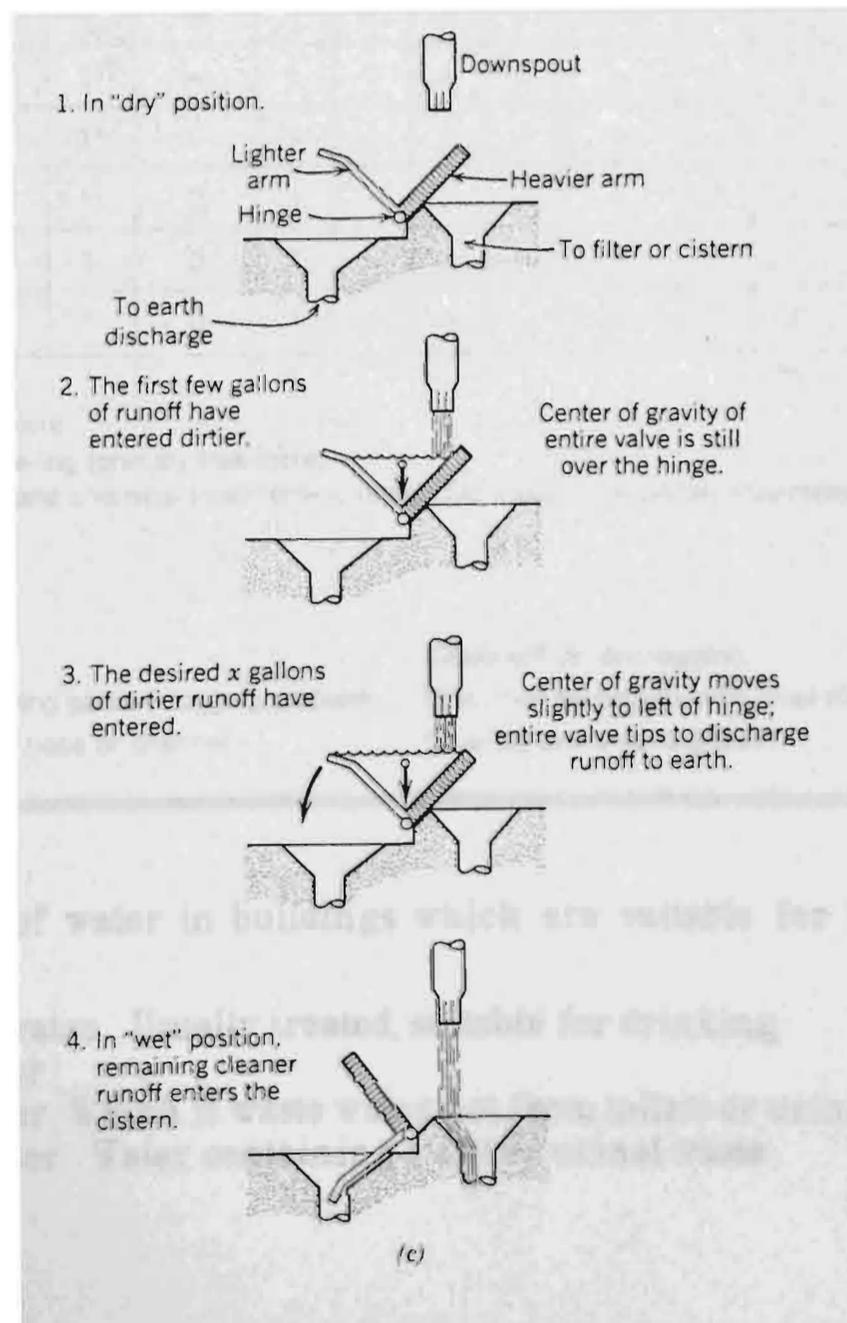
Protective:

Water is an excellent means to quench a fire other than electrical. Therefore, its performance should be readily available in large quantities and deliverable quickly. The options for such uses include sprinkler systems integrated within a building and standpipes situated at the exteriors of buildings. Because of the pressures involved and demand for quantity, special pump houses or subsystems of the main water system may be employed. A special criteria for this application involves the quenching of the campfire pit space. In this situation fire is desired but only under controlled circumstances. Coupled with safe clear space, water is used for control.

Rainwater:

Rainwater collection and usage is a viable alternative to supplementing the camps bathing, laundry, and toilet flushing needs. The average annual rainfall at the site is 43 inches.²⁵

A method by which rainwater could be collected after the roof washing operation is a "tipping valve" configuration which tips the first X number of gallons of water of each rainfall to a cistern. After each rainfall, the valve must be manually or spring reset to the "ready" position to intercept dirty water for the next rain cycle.²⁶ The architectural implications require for a cistern system that separates sediments and provides for uncontaminated transportation and storage and if used as the primary supply, major form issues accompany the design solution.





Water and Waste:

Although a sewer main is provided, a consideration for recycling water exists. Therefore, the disposal of organic waste and the opportunity to recycle some water could be designed for. Table C outlines the potential for recycling greywater and blackwater.²⁷

TABLE C

Original Use	Reuse											
	Toilet	Irrigation	Sprinkler	Kitchen Sink	Carwash	Laundry	Pool	Shower/Tub	Bathroom Sink	Dishwasher	Drinking	Cooking
1. Toilet ^a	2	-	-	-	-	-	-	-	-	-	-	-
2. Irrigation ^b	1	1	1	-	1	-	-	-	-	-	-	-
3. Sprinkler ^c	1	1	1	-	1	-	-	-	-	-	-	-
4. Kitchen sink with grinder	1	0	1	-	-	-	-	-	-	-	-	-
5. Carwash*	1	0 ^o	1 ^o	-	1	-	-	-	-	-	-	-
6. Laundry ^d	1	0 ^o	1 ^o	-	1	1	-	-	-	-	-	-
7. Pool (chlorinated)	1	-	-	-	1	1	2	-	-	-	-	-
8. Shower/tub	1	0 ^o	1 ^o	-	1	1	-	1	-	-	-	-
9. Bathroom sink ^e	1	0 ^o	1 ^o	-	-	-	-	-	-	-	-	-
10. Dishwasher	1	0 ^o	1 ^o	0	1	-	-	-	-	0	-	-
11. Drinking*	1	0	1	0	1	-	-	-	-	-	-	-
12. Cooking	1	0	1	0	1	-	-	-	-	0	0	0

Legend

- 0 Reusable directly, without treatment.
- 1 Reusable with settling and/or filtering (primary treatment).
- 2 Reusable with settling, filtering, and chemical treatment—usually chlorination (secondary treatment).
- Not reusable.

Source: Milne (1976).

*Very difficult to collect.

^oSpecial soaps required.

^aSmall valves and underwater moving parts—clogging problem.

^bLarge orifice: unpressurized open hose or channel.

^cSmall orifice: pressurized.

^dAssumes no diapers with fecal matter.

^eShaving and brushing teeth.

The four common "grades" of water in buildings which are suitable for various purposes:

- Potable water. Usually treated, suitable for drinking.
- Rainwater.
- Greywater. Which is waste water not from toilets or urinals.
- Blackwater. Water containing toilet or urinal waste.



NOTES:

¹ John Flynn, Arthur Segil, Gary Steffy. Architectural Interior Systems. Van Nostrand Reinhold: New York. 1988. pp. 62-63.

² Ibid. p. 68.

³ Ibid. p. 69.

⁴ Ibid. p. 75.

⁵ Ibid. p. 83.

⁶ A clarification is made at this point whereas technically these are sounds but because of the nature of these sounds we call them noises—that is to say, unwanted sounds.

⁷ Ibid. p. 83.

⁸ Ibid. p. 173.

⁹ Ibid. p. 175.

¹⁰ Ibid. p. 175.

¹¹ Feedback is a term which describes reflected amplified sound returning to the microphone causing conflicting wavelength interpretations which lead to a 'squeal'.

¹² Ibid. p. 663.

¹³ A special consideration of electrical arcing exists in the pump house for the swimming pool. This would most likely be the result of a gaseous chlorine leak not immediately corrected. Since Cl_2 is an oxidizer and most electrical service is copper, a potential for electrical arcing exists if contacts become fused, hence an electrical fire. If this concern interfaces with the signal system then not segregating chemical and electrical spaces would be appropriate.

¹⁴ Ibid. p. 665.

¹⁵ Ibid. p. 673. This arrangement has greater initial expense but is advantageous over simple confinement or dilution approaches.

¹⁶ Ibid. p. 697.

¹⁷ Architectural Interior Systems, p. 124. Relative to the region in which the site is located.

¹⁸ Ibid. p. 127.

¹⁹ Where $E_i = LL \times CU / A$; LL is light loss factor, CU is coefficient of utilization supplied by the manufacturer; A is surface area. Gives E_i of average initial illuminance in lumens per square foot.

²⁰ Mechanical and Electrical Equipment For Buildings, p. 311.

²¹ Ibid. p. 200; Table 5.12.

²² Ibid. p. 1192.

²³ Ibid. p. 461.

²⁴ ph. refers to a liquid's hydrogen ion concentration on a scale of 0 to 14; with 7 considered neutral. Water with a ph. less than 7 is acidic and is corrosive to metal plumbing and water with a ph. above 7 is basic and impedes the proper chlorination of the pool. To provide for human comfort, a ph. of 7.2 to 7.6 should be maintained as the ph. of the human eye is 7.5.

²⁵ The Peaks of Otter Soil and Water Conservation District. Long Range Program 1986-1991, p. 28.

²⁶ Mechanical and Electrical Equipment For Buildings, p. 478-479.

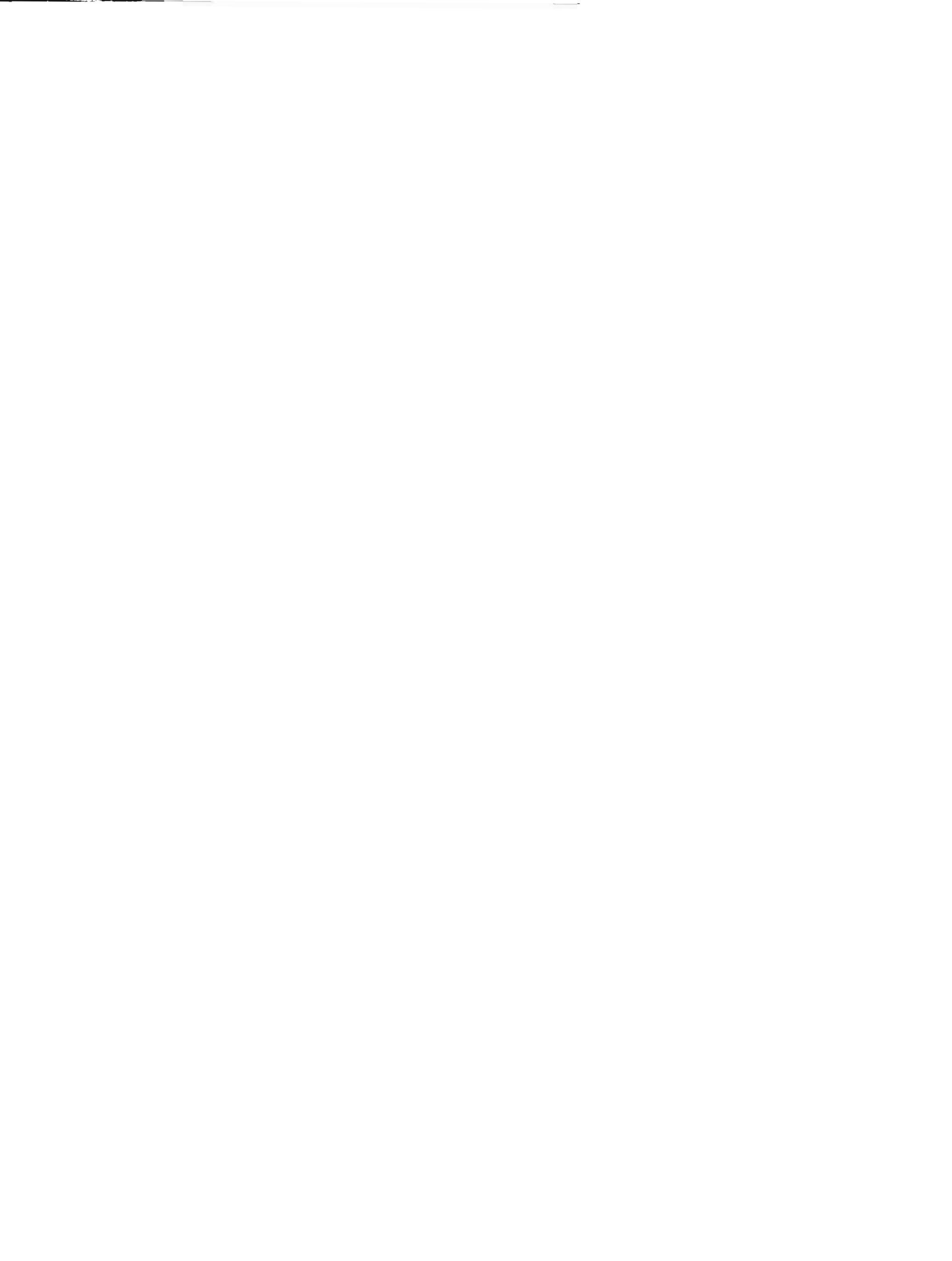
²⁷ Ibid. p. 571.





Cost Summary

10



Cost Study

Project Construction—

The figures below represent standard site preparation, excavation, plumbing, and electrical configurations as combined project material and labor costs of building types.¹

BUILDING NAME	GROSS SQ.FT.	COST SQ.FT.	AMOUNT
Administration Offices	6850	55.40	379,500.00
Athletic Complex: Indoor Sports	55096	47.15	2,598,000.00
Athletic Complex: Swimming & Diving	12856	68.00	874,200.00
Camp Garage	3705	44.65	165,400.00
Camp Store/Laundry	4188	42.00	175,900.00
Dining Hall/Kitchen	11033	82.30	908,000.00
Equestrian Stable	11835	43.54	515,300.00
Health Lodge	5380	69.90	376,000.00
Total this area:			5,992,300.00
House: Camp Administrator ²	1800	59.10	106,300.00
House: Camp Chef	1440	64.35	92,600.00
House: Medical Director	1440	64.35	92,600.00
House: Program Director	1440	64.35	92,600.00
Total this area:			384,100.00
Lodging: Administration	6250	52.05	325,300.00
Lodging: Camper/Counsellor/Bathing	12437	61.45	764,200.00
Lodging: Camp Outposts	6875	52.05	357,800.00
Lodging: Program Specialist	1125	52.05	58,500.00
Lodging: VIP's	3375	52.05	175,600.00
Lodging: WSI's	1563	52.05	81,300.00
Total this area:			1,762,700.00
Maintenance/Grounds Barn	3125	42.25	132,000.00
Pro Shops	11312	55.40	626,680.00
Total this area:			758,680.00
Total All Buildings			\$ 8,897,780.00

SITE IMPROVEMENT³	QTY	COST	AMOUNT
Baseball Playfield	4	2,525.00	10,100.00
Basketball Courts	4	815.00	3,260.00
Soccer Playfield	3	1,400.00	4,200.00
Softball Playfield	4	2,525.00	10,100.00
Tennis Courts	4	970.00	3,880.00
Volleyball Courts	6	815.00	4,890.00
Total Site Improvement			\$ 36,430.00

SITE PREPARATION	Acre	COST/Acre	AMOUNT
Timbering and Clearing: Buildings	5.08	3,075.00	15,600.00
Timbering and Clearing: Campfire	.35	3,075.00	1,000.00
Timbering and Clearing: Equestrian Yard	.15	3,075.00	460.00
Timbering and Clearing: Land Sports	19.67	3,075.00	60,500.00
Timbering and Clearing: Parking	3.12	3,075.00	9,500.00
Total Site Preparation			\$ 87,060.00

Summary—

Land Cost: 293 Acres X \$9,800.00 per acre ⁴	2,871,400.00
Buildings	8,897,780.00
Site Improvements	36,430.00
Site Preparation	87,060.00
Total Construction Costs	\$ 11,892,670.00

Notes:

¹ Building Construction Cost Data. E. Norman Peterson: 1988.

² Ibid. Housing section considering:
 A distinct residence from designer's plans / Wood frame.
 Single family – 1 full bath, 1 kitchen.
 No basement.
 Asphalt roof shingles/drywall interior.
 Forced air HVAC.

³ Site development costs include grading and equipment per field unit.

⁴ From Gail Dove, Realtor; Owens Reality, Roanoke, Virginia. Lakefront property at Smith Mountain Lake.

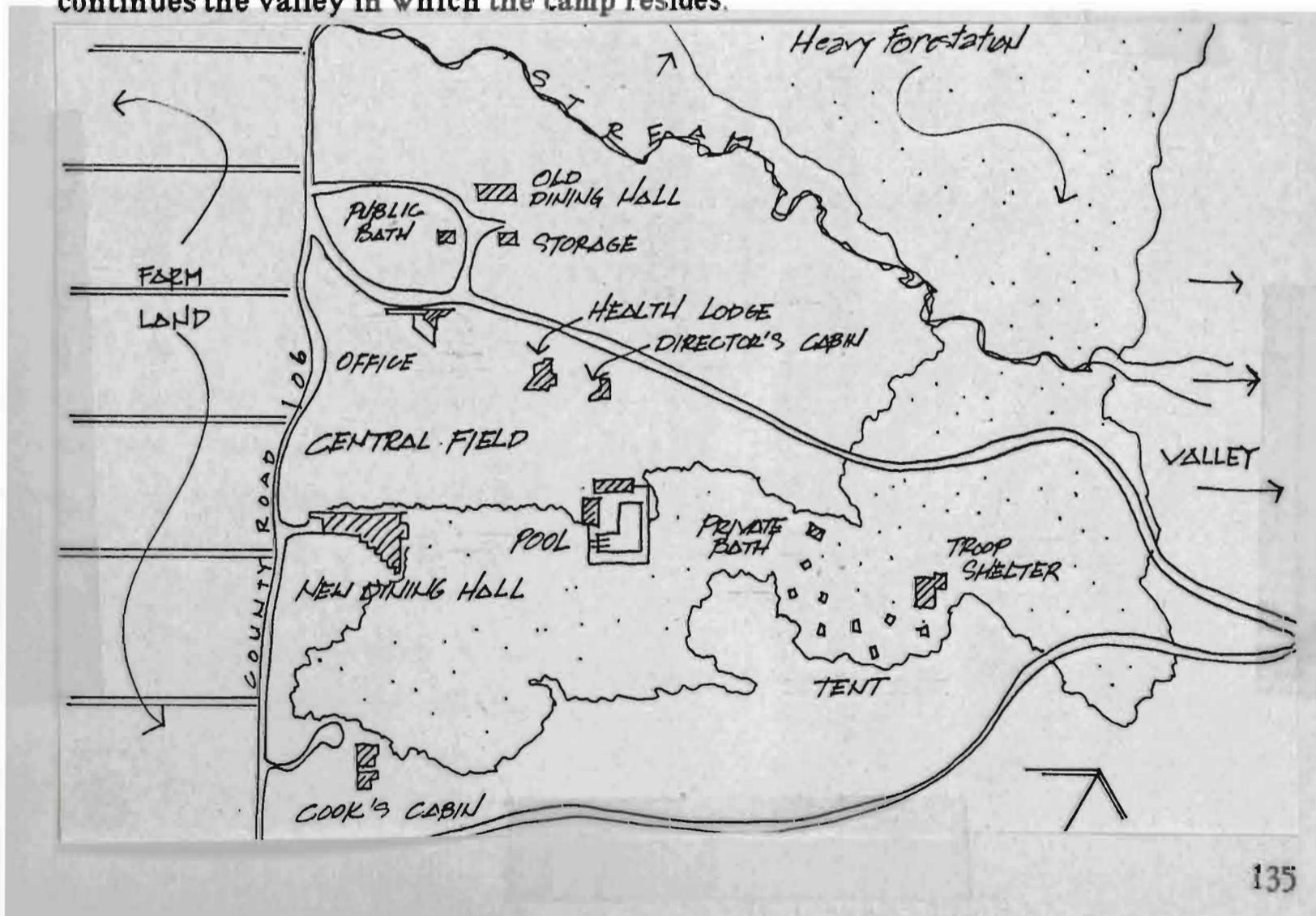


Case Study

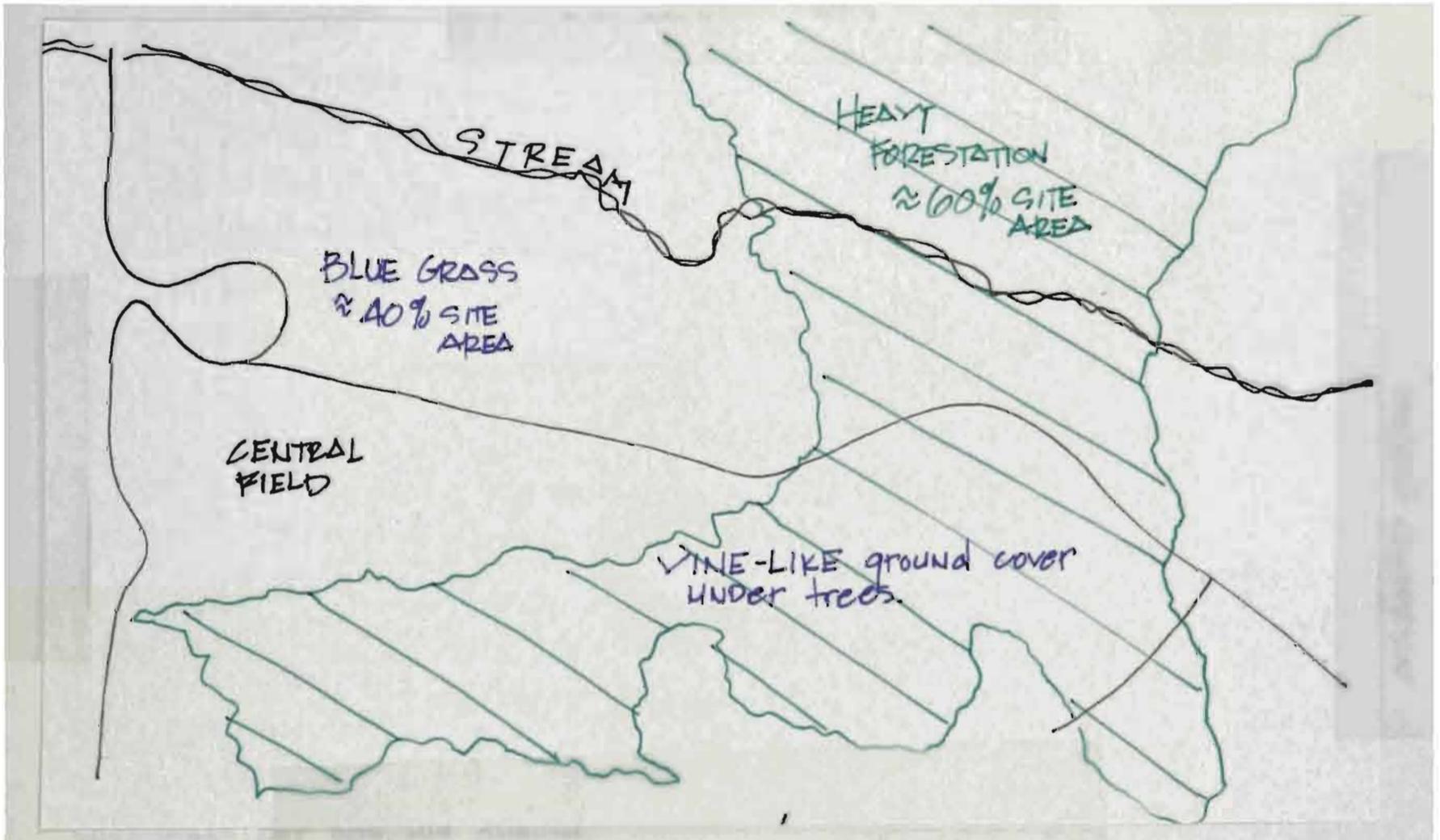
CAMP LOUISE
A Girl Scout Camp in Pennsylvania

PHYSICAL STUDY

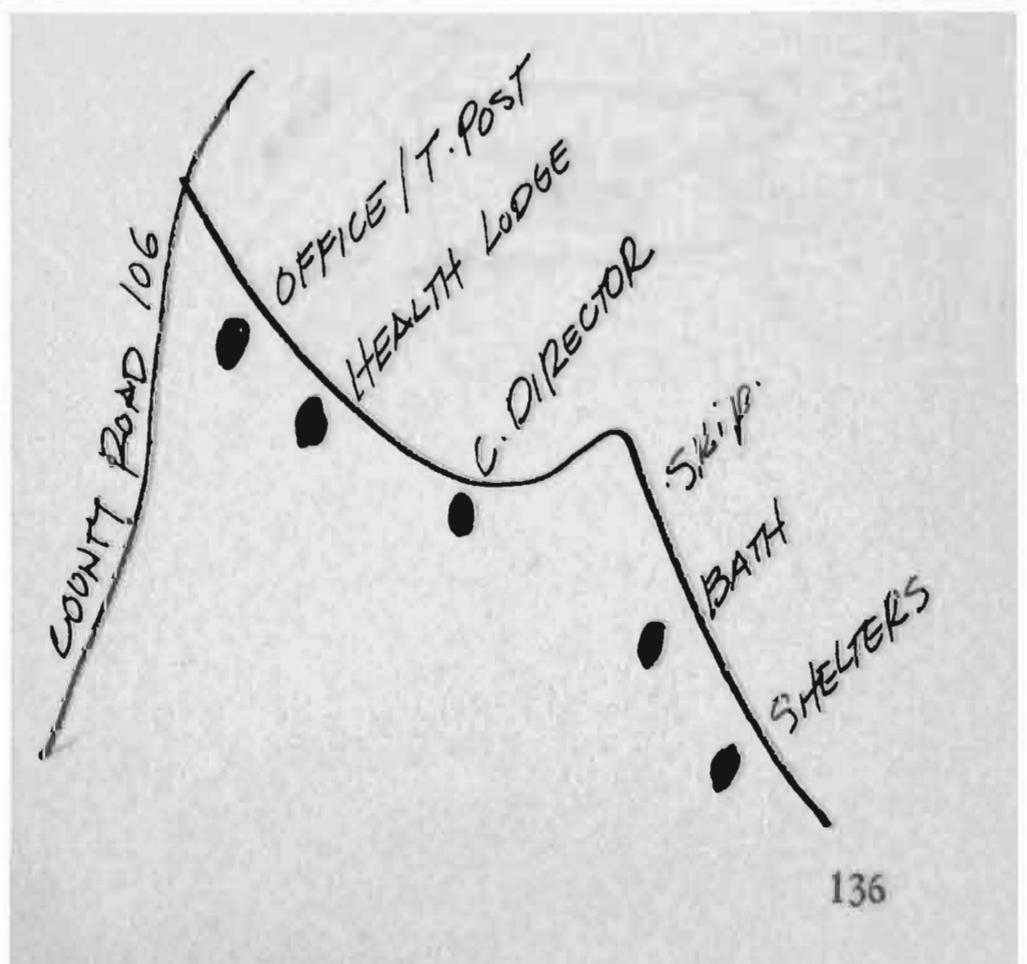
Context: Camp Louise is nestled in a northeastern wooded valley in the State of Pennsylvania. This 186 acre camp is impacted by several key things including 11 different structures, 1 major roadway, heavy forestation in selected areas, and a stream. The roadway provides the southwest definition of the property line, however, an access hard top was built on the campus which bisects the site into an unequal parcel, approximately a 2/3 to 1/3 ratio of land use currently exists with the camp mainly utilizing the larger portion. This access road loops around the camp proper and rejoins the main road. The forestation consists of live oak and dogwood trees, however pine trees dominate the site. The northwest/northeast stream provides the northern definition of the property line with heavy grass blanketing the open spaces. Therefore, with the site laid out, a description of the adjacent spaces may ensue. To the north and south one will find very heavy forestation and an unbuilt environment as this land is owned by the state and reserved for game. To the west, farmland in rectangular sections exist (it is unknown how far this land extends before civilization is found). And to the east continues the valley in which the camp resides.



Site and Project: The nature of the site has several interesting landscape configurations. As of this writing the topographic map has not come in but certain assumptions as to the slope are made from photographic excerpts used for the case study. Columnar shaped trees dominate the site as does heavy growth of Kentucky blue grass along the open spaces. Groundcover which occurs directly under the trees seems to be vine-like and the heavy grass is absent.

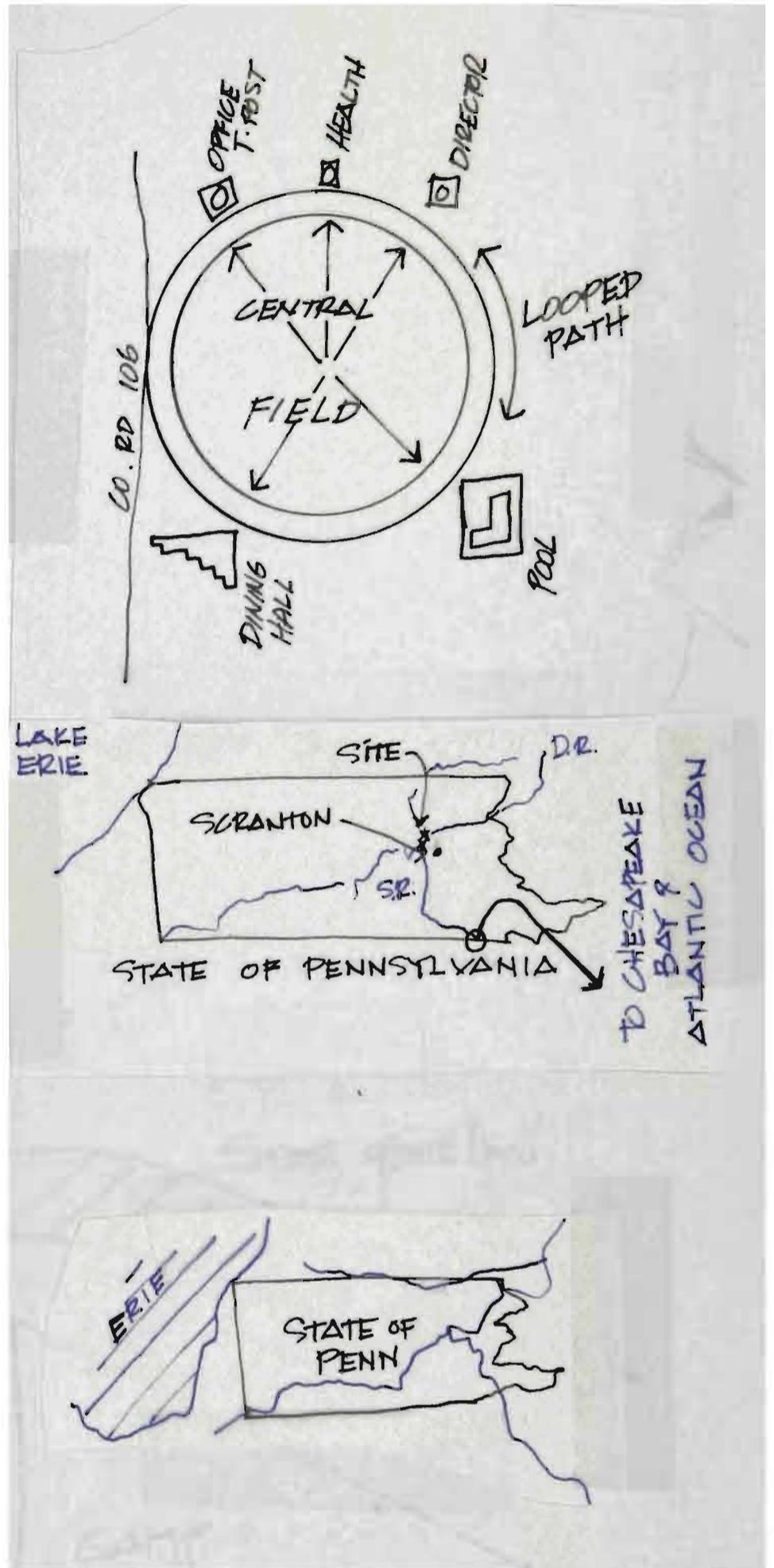


The nature of the building configurations identified as certain typeologies lends itself to the nature of the site as well. One pattern is an axial condition along a path. Here we see a certain progression of space and sequential link from the camp office/trading post to the health lodge to the director's cabin; skipping in the rhythm a wash house and troop shelter all occur along this path.



Another pattern of building configurations occur in the camp. Actually this other pattern is a hybrid of two clustered organizations. One being a centralized pattern, the other a looped path. The buildings that occur along this hybrid are once again the camp office/trading post and health lodge, the swimming pool complex, and new dining hall. These spaces move about the perimeter of the central field, moreover, the looped path allows pedestrian circulation to coincide with the scout's program of daily activities.

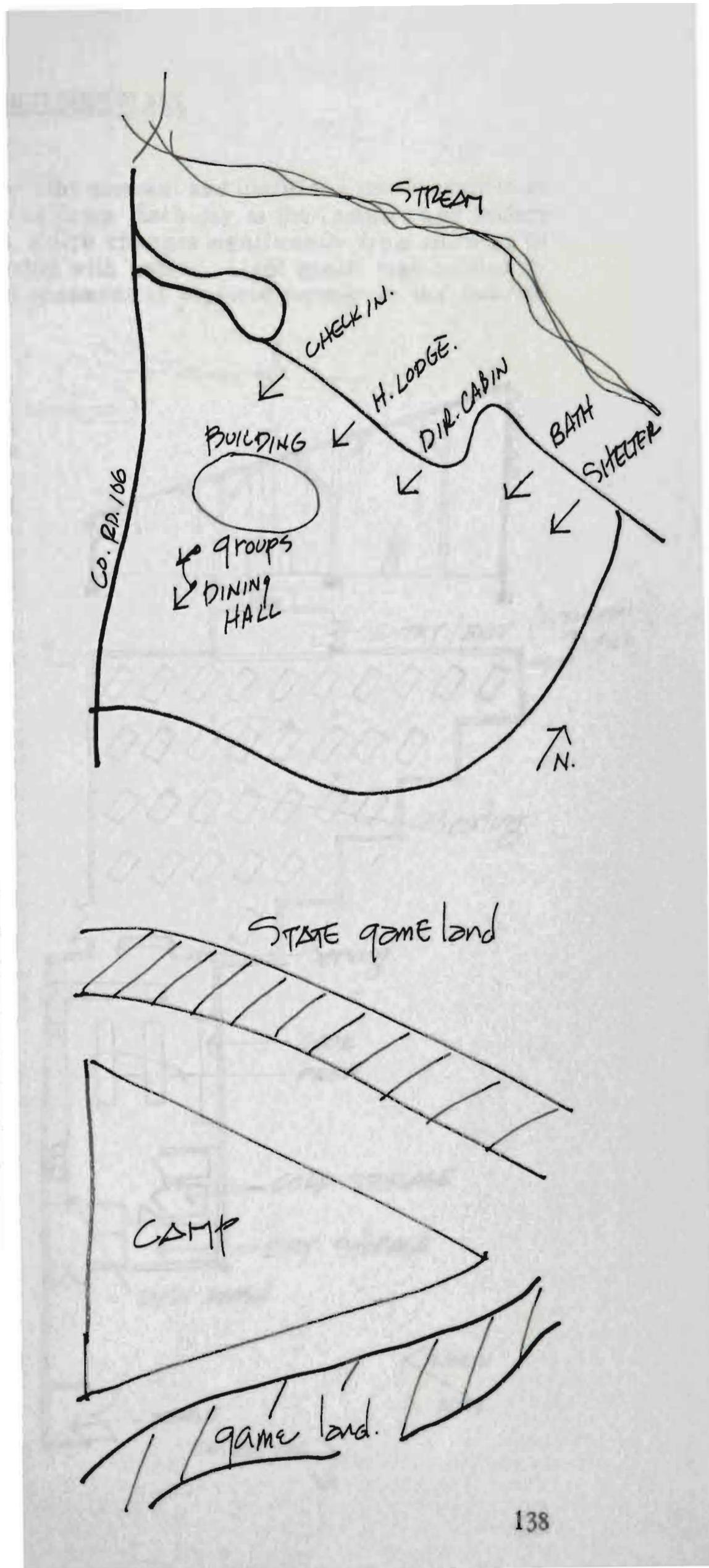
At the macro scale the site is accessed by county road 106 which spurs from state highway 81. The closest water system is a creek on the site fed from the Delaware River. This water system eventually terminates into the Susquehanna River which leads directly into Chesapeake Bay and the Atlantic Ocean. The state population in 1980 was 11,866,700. The closest major city to the site is Scranton; population 88,177; approximately 25 miles. The closest town to the site is Carbondale; population 11,255; approximately 8 miles.





At the micro scale the site does not derive its strength from the buildings but rather the buildings are sympathetic reinforcements of the natural qualities. For example, as we will see in the building plans, the dining hall turns its tall facade to the sun, a long low one to the central field of the camp on which it is built. Thus, the field itself and its relation to existing hedgegroves of adjacent state game lands dominates. Furthermore, the building groupings reside in the groupings of forestation and between these groupings a loose organization of pedestrian pathways is interwound; perhaps somewhat reflective of the nearby stream or contours.

So this relationship can be identified by the site's location in the state as somewhat isolated from the built environment but having ties with major water systems via the Susquehanna River. Moreover, the site is buffered by state game lands which offers prime examples of the natural environment; examples for learning things which this camp is all about.





BUILDING PLANS

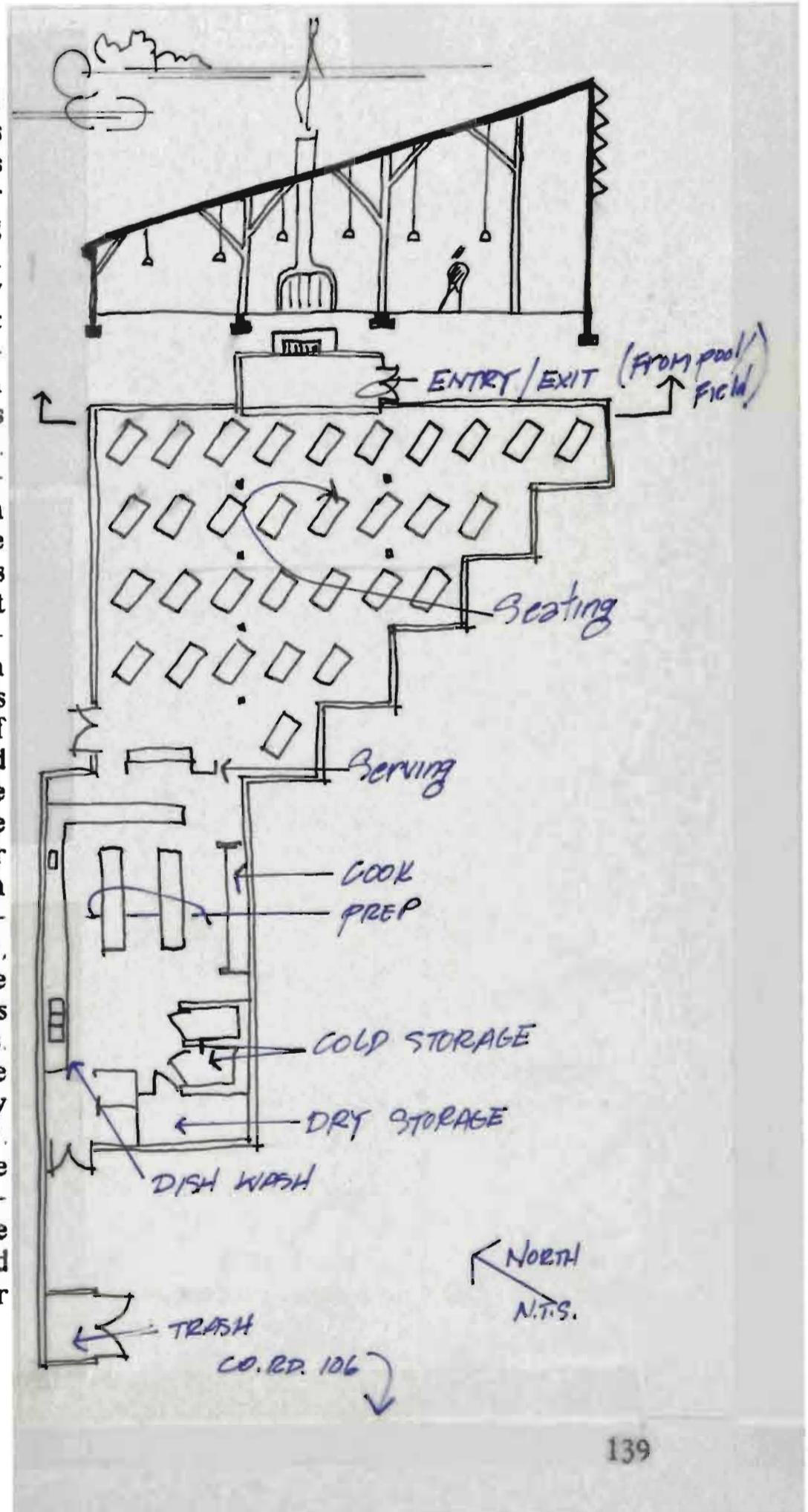
The Dining Hall

The dining hall carries the idiom beyond the pleasant and useful to a poetic expression of community spirit which embodies the camp. Each day as the campers and leaders gather for meals, the quality of light, which changes significantly from morning to night, will remind them of their kinship with nature. Light gently manipulated by primary colors is the building's only ornament as explored further in the interior studies section.

Space Allocation:

The dining hall consists of 31 eight foot wooden tables and benches fixed at either side. Seating for 8 sets the capacity at 248 diners. Seating for 10 sets the capacity at 310. The dining square footage is 2200 and kitchen footage is 2700. More importantly however, the seating volumetric footage is 33,000 cuft. This is a dynamic usage of space as illustrated in the section. The kitchen space is typical of commercial kitchen layouts. Within the kitchen 2 large preparation tables reside in the center with ovens, cooktops, and sinks about the prep tables. Two refrigerated spaces and 1 dry goods space are tucked out of the way to the west. The rear access leads to the trash collection bin and the hall is serviced directly at this point. The sequential ordering of spaces is logical as the campers need not pass by the service end of the building and therefore enter the building from the central field or swimming pool. The materials used in the dining hall will be explored further in the interior/exterior study, however, important to the section we see the columns built up of five 3x12's and the beams built up of five 3x14's.

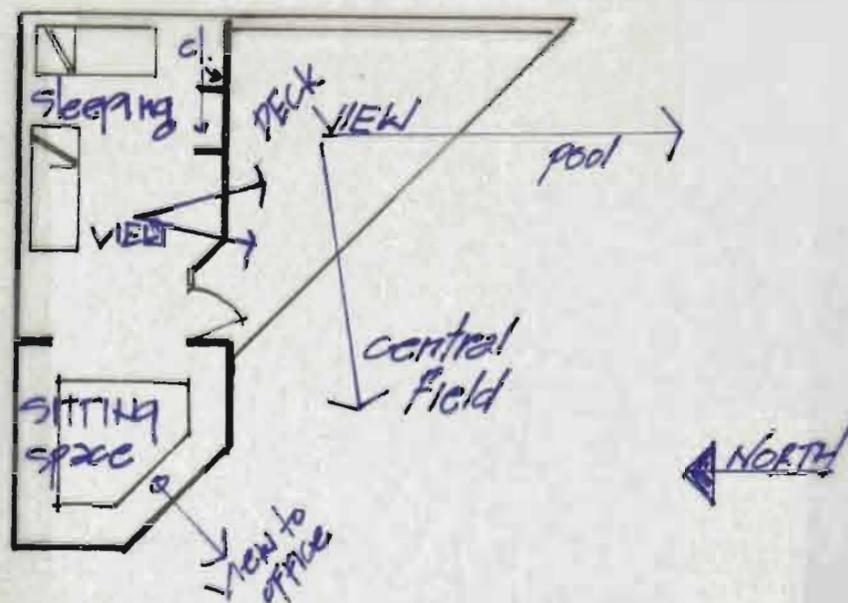
The diagonal knee braces are made up of 3x10's and are accepted by the beams via a bolted connection. Special steel column bases tie the members to the foundation. The incandescent fixtures hang from the roof deck as shown by the section and as explored further in the interior study.





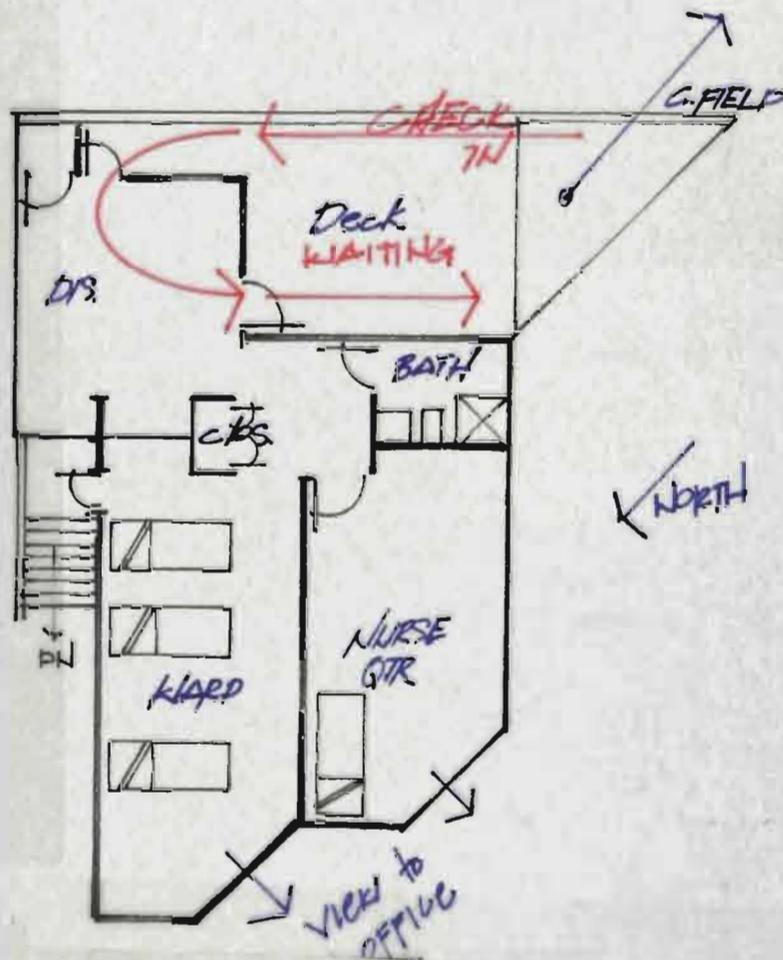
Director's Cabin

The camp director's cabin is located near midway on the site plan occurring on the camp hard top. The cabin is a compact space which contains two single beds. A sitting area has been designed for the cabin and could perhaps be used for sleeping if needed. The space allocation calls out a third space, which is the outside deck. Square footage is 500 and volumetric footage is 4500 cuft. This is a simple structure using post and beam.



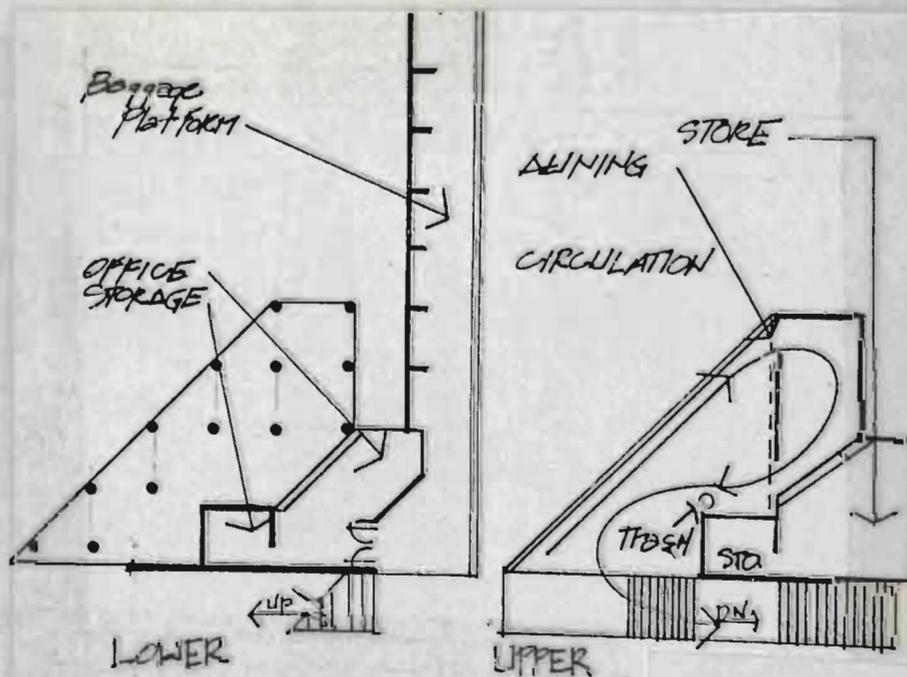
Health Lodge

The health lodge is likewise located near midway on the camp hard top, adjacent to the director's cabin. The space allocation calls out a nurse's quarters which has provisions for a clothes closet and shower, lavatory and water closet. The camp's medical ward is located in this structure. Three single beds are furnished in the ward space. A small supply closet has been designed and located in the semi-public portion of the building. The most active area of the building is the dispensary. This space has been designed to function at the entrance and operates as the place for medical check in upon camp arrival. The circulation is outlined in the sketch and thus provides the most checks in the least amount of time.



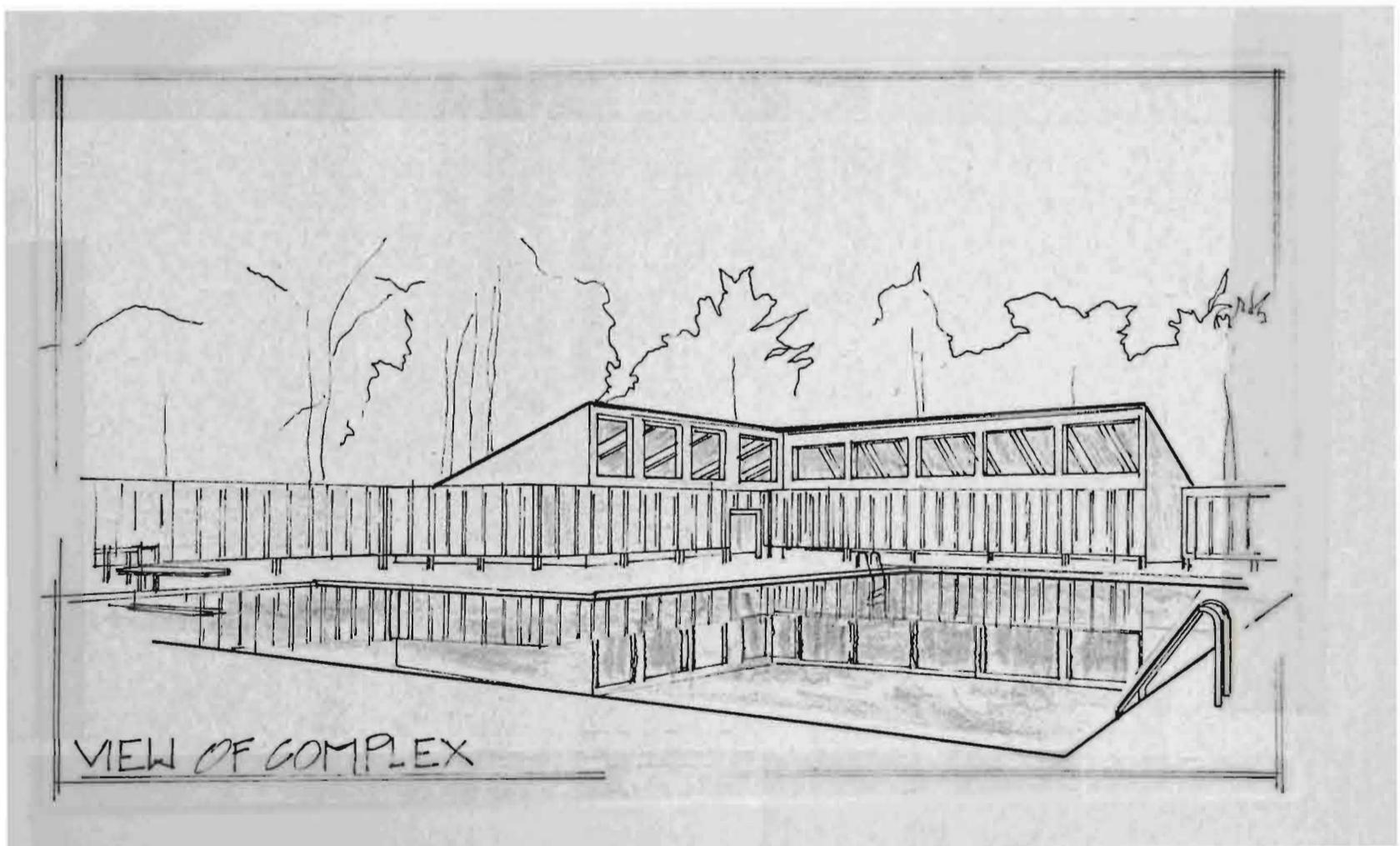
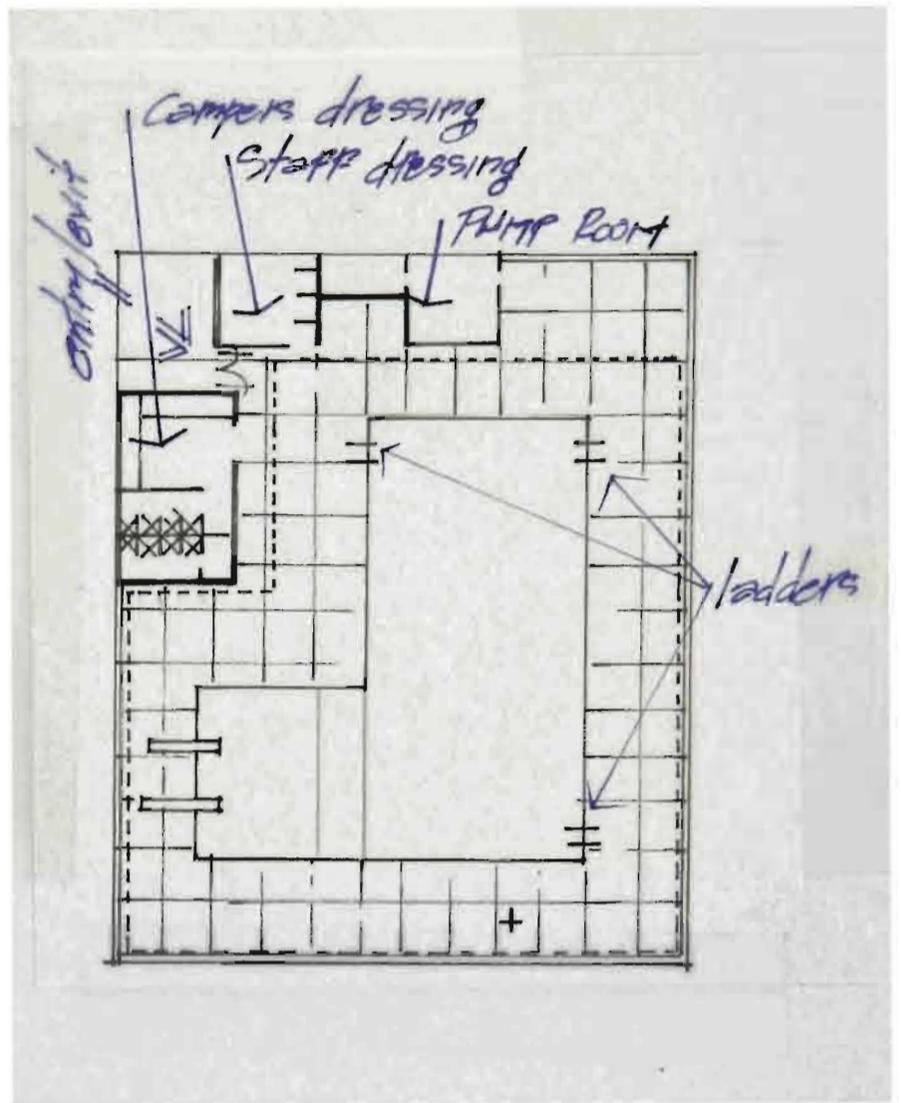
Baggage Platform/Office and Trading Post

This space is a two-story structure. On the lower level the baggage platform is situated. Seven bays contain space for the campers to load or unload their luggage. The camp office is located in this space as well. This space is small; measuring 120 square feet with a 75 square foot storage closet. The upper level houses a trading post for the campers to buy goods. The circulation, as defined in the sketch, shows how the campers loop around the outdoor deck, under the awning, buy their candy, and put the wrappers in the trash as they exit the space. The trading post is 200 sq. ft.



The Swimming Pool Complex

The floor plan of the pool is basically a rectangle which contains an "L" shaped pool and 2 separate dressing areas. One dressing space is used for the campers while the other, smaller dressing space is reserved for the staff. Adjacent to the staff's dressing is located the heart of the pool; the pump room. The pool measures 25 feet by 50 feet for swimming and 20 feet by 20 feet for the diving well. Assuming the average depth is 5.5 feet in the swimming area and 8.5 feet in the well; the pool's gallonage is 75,562. This figure will become important when comparing user and capacity ratios. The space allocation for the camper's dressing room includes 5 showers, 3 water closets, and 2 lavatories. In the staff's dressing the design calls out 1 shower, 1 lavatory, and 2 water closets. The pump room is 100 sqft. The pool is equipped with a 1 meter spring board and a 1/2 meter spring board.





Appendix



SLIDE INDEX

Slide # Comments.

1 The conceptual site model facilitated the major elements of the camp in terms of massing, relationships, and groupings. It was not intended for this model to be of building types, rather to limit the forms to either horizontal or vertical, and to evaluate the whole in these terms.

2 Conceptual: Design at the water's edge was an aspiration for the Bible study places. However the number of these places was not determined by the number of existing "niches" at the edge (which was five). The number of designed Bible study places was determined from four specific instances in which Jesus Christ taught His lessons from either in a boat a few feet from shore or at the water's edge, as recorded in the Bible. What then is my number? Four.

3 Conceptual: The design of the amphitheater should provide a focus. Traditional amphitheatres focus on the stage; however, I moved the focus (in terms of converging sight lines) 100 feet beyond the stage into the enlarged lagoon. At this point the cross is to be placed.

4 Conceptual: Entry into the camp from the highway. This is to be simply denoted. At this point a seven foot, rough sawn oak wooden cross is to be placed in the woodland with a sign that simply reads, "...in propagation of Christian religion...". I refer to the program, page 63, for contextural significance of the entry.

5 The conceptual site model lacked clear organization. Therefore, I developed the final design of the campus plan from an oak leaf I took from the site. The leaf described specific fields of force and linked together all the diverse elements of what I would endeavor to design. This gave me the campus movement system and allowed me to design in terms of the user experiencing many of the intricacies found across the site.

6 Preliminary fields of force of the campus movement system.

7 Schematic building placement on the master plan. I placed the spine of the campus somewhat parallel to the amphitheater, as this was the major landform in which the campus plan reacted to. I terminated the spine with man-made water (a 450,000 gallon swimming pool and 50,000 gallon diving pool) as a reaction with existing water from the other end of the spine. At the athletic building, the area closest to the end of the spine, the paths become more direct; a faster pacing sequence dominates and is more rigid.

8 How can one move about the site and what kind of spaces can respond to the density of the trees? That question gave impetus to developing the boardwalk. That is to timber through the woodland, on the spine, and combine several smaller spaces to be accessed from this path. The surface under foot is wood decking, to give a hollow sound while walking.



9 The design development of the boardwalk describes the grouping of these smaller spaces to provide a horizontal, linear sequence of spaces. The materials of the project also came about at this point in time. The trees are fronted by the vertical of the higher gables, to give a larger surface for their shadows, and the vestibules signify entry. The trellis was the definer of the circulation path and provided a man-made play of shadows on the path.

10 The camper housing went through several metamorphosis, but the most important element of the housing was how should the fenestration be handled. I wanted to bring the feeling of the outdoors in the space. After a rudimentary study of fenestration types, I decided that a design of the window wall to be appropriate.

11 Therefore, the window wall should be a dominant element of the space and all beds oriented toward the wall.

12 The other design concerns of the camper housing.

13 The floor plan of the athletic building in design development stage to give me the footprint for the site plan.

14 Midterm presentation, focus on the exterior spaces.

15 Midterm presentation, the bathing consideration. Originally thought of as being a separate house, but evolved as being part of the individual living units.

16 Treatment under foot on the subveins of the campus plan. This path coincides with building approach concerns and the usual mortar is replaced with one of five herbs. This one, Thymes Serapellum, gives a honey sweet fragrance as one walks along the path, rubbing off the herb's oils, thus releasing the fragrance. The impetus of this idea was that although the site is rich in fragrance, one becomes attuned to them after a short period of time. This path allows for constant fragrance. Architecture can design for smells.

17 The surface of the Bible study places on the water's edge was decided to be granite, as the underlying geology of the site is granite gneiss. I was looking for this material to be very strong as the activity that occurs at this place mandates strength. Christ said, "On this rock (Petra) I'll build my church." The Word is His church. The Word is studied here. The Greek for rock is Petra. Not to be confused with Petros, which means Peter. But Petra is in the feminine. So I'm looking for this "mother rock". Granite gneiss is that mother rock which all other geology of the site has been placed from; it is that surface with which the Word spreads; gives birth to understanding. It is strong.

18 Moreover, the edge of this material is to be chipped at a 45° angle, which is the fracture angle of the underlying geology.



C A M P B R I G H T S T A R

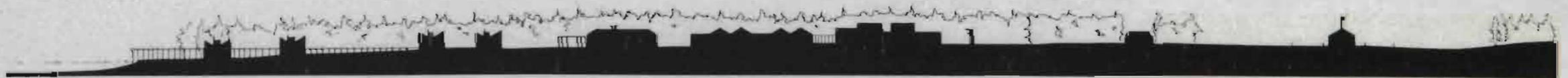
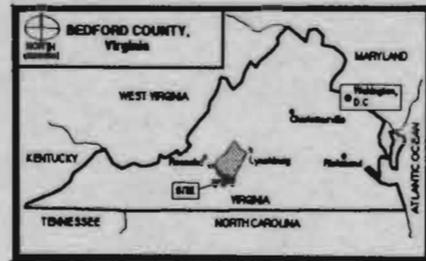
A

Christian

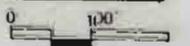
Youth

Athletic

Encampment

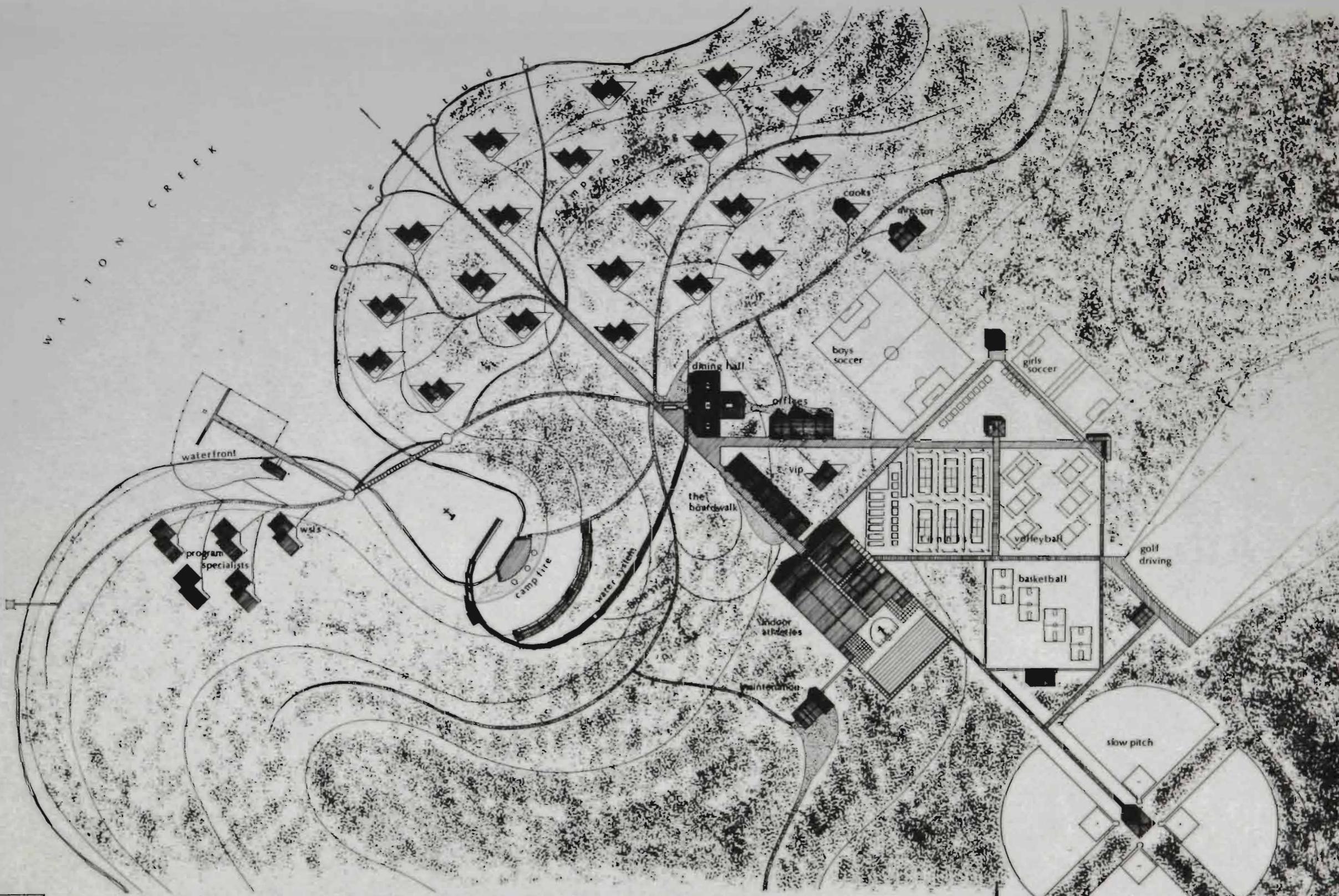


site section

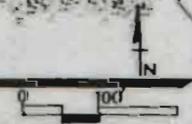


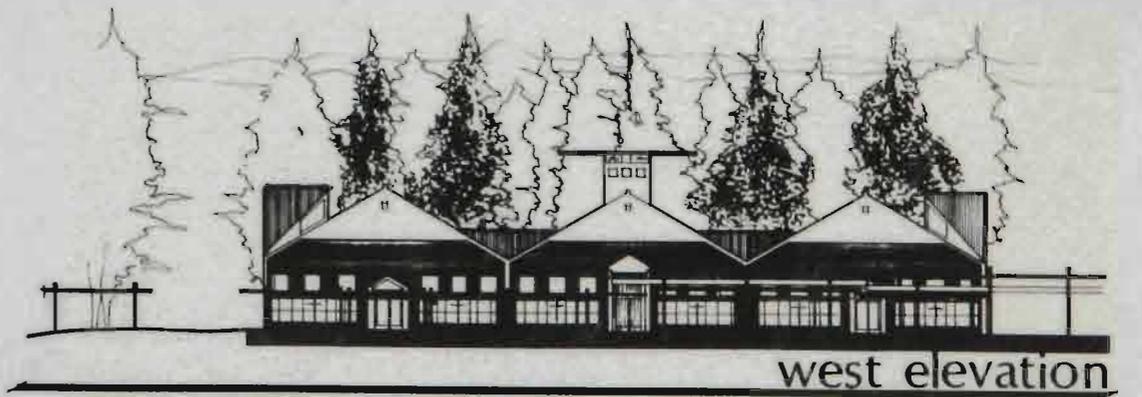
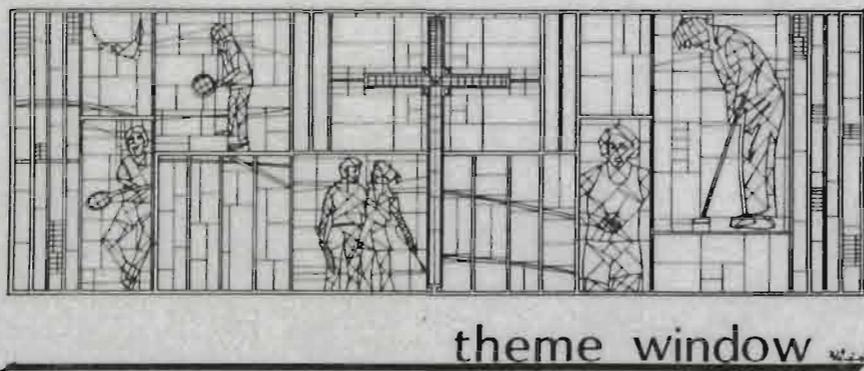
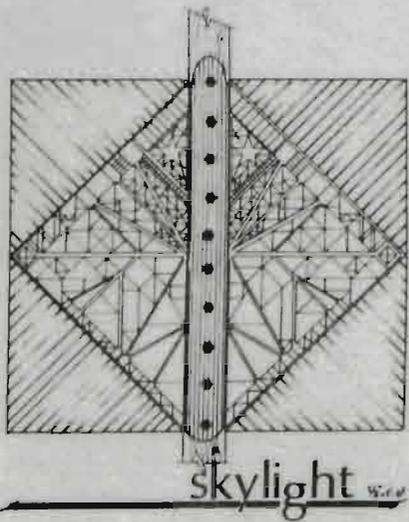
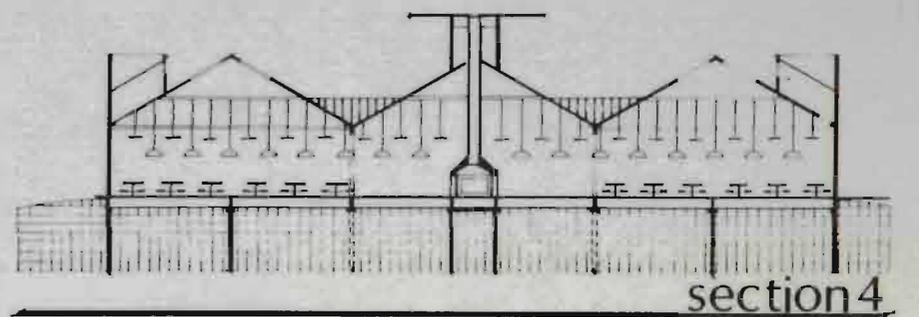
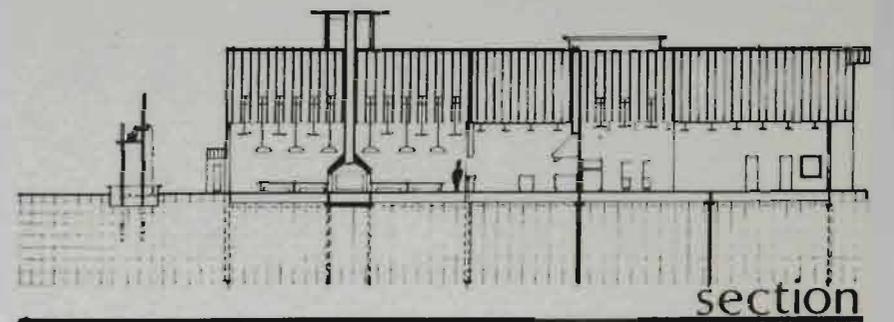
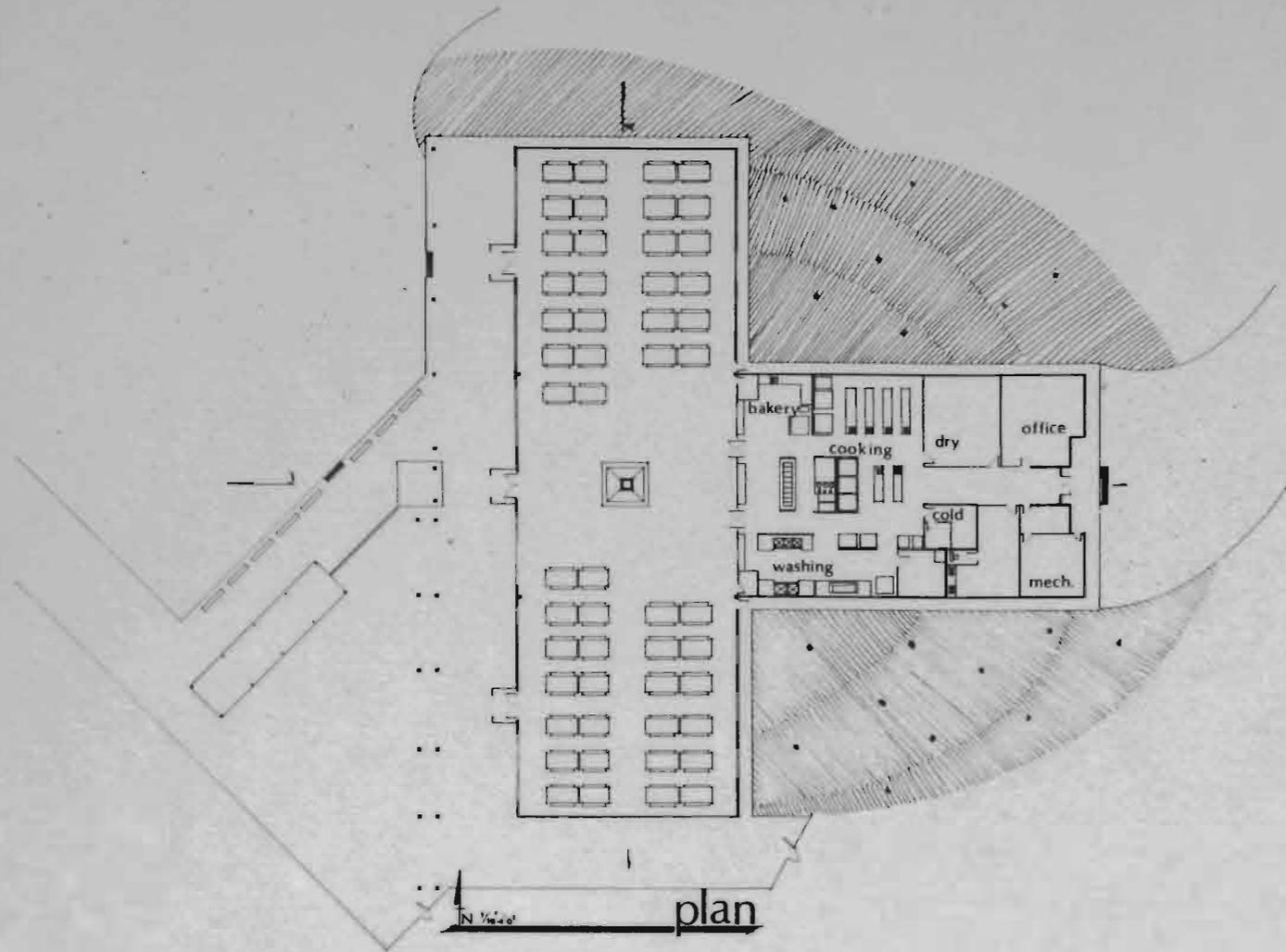
W A L T O N C R E E K

B L U D

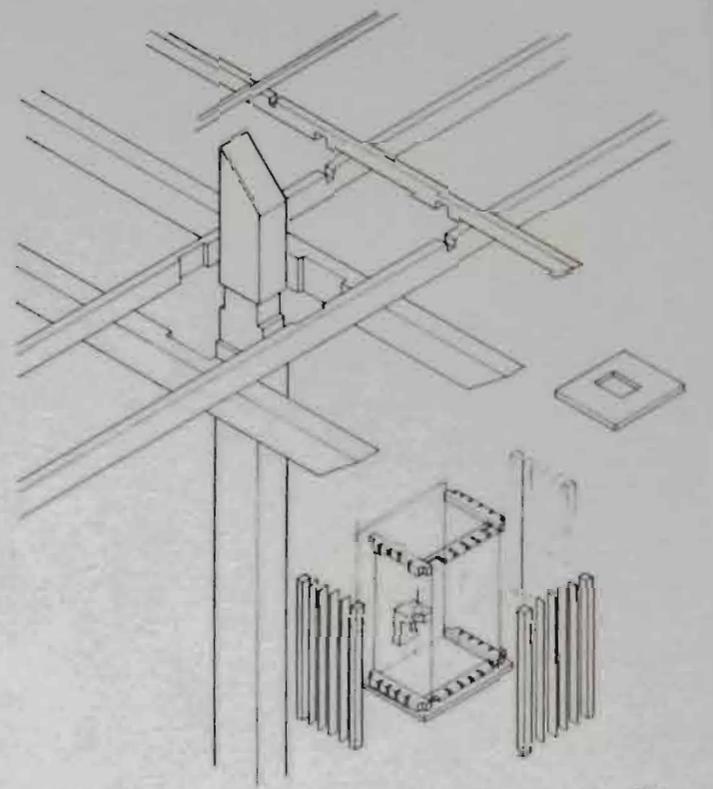


S I T E P L A N





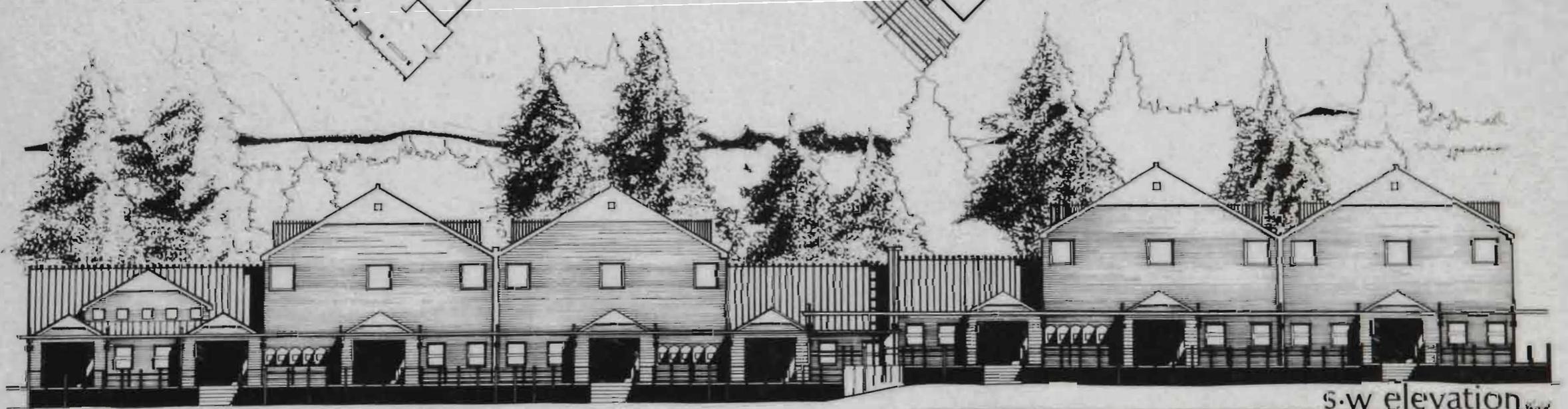
T H E D I N I N G H A L L



one

two

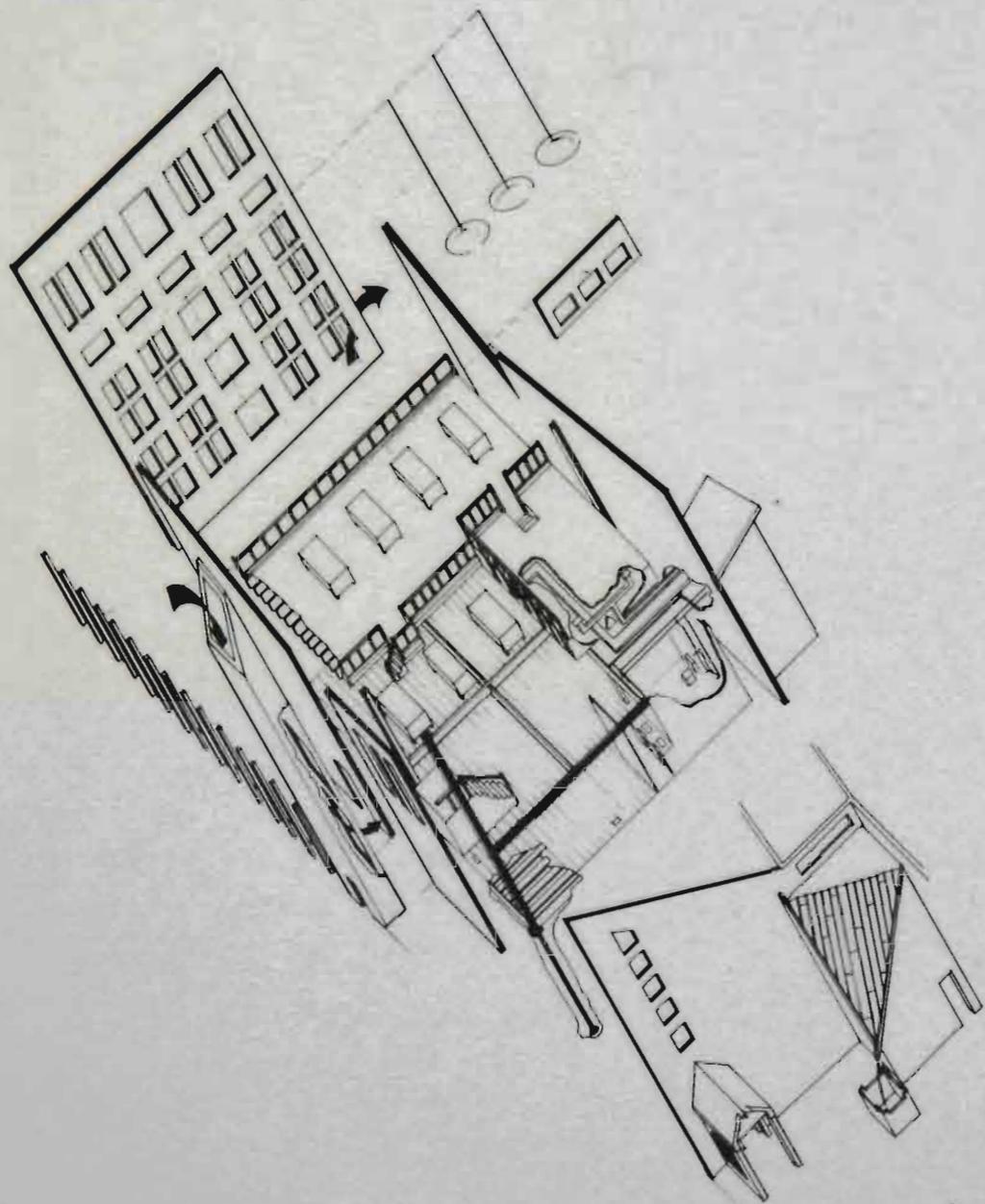
trellis



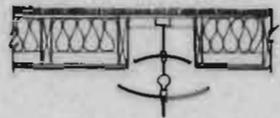
s.w. elevation

T H E B O A R D W A L K

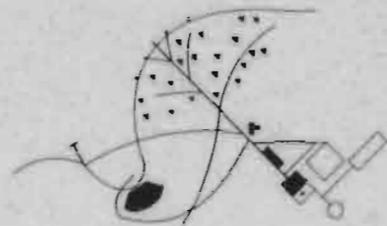




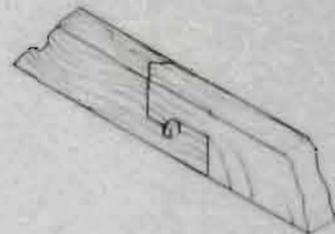
axonometric



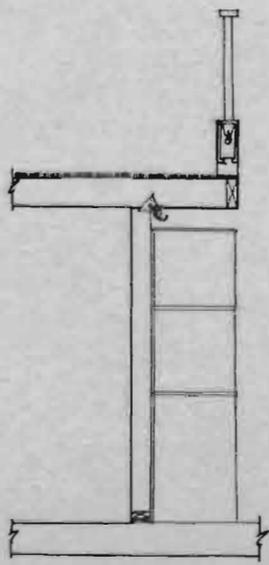
lighting



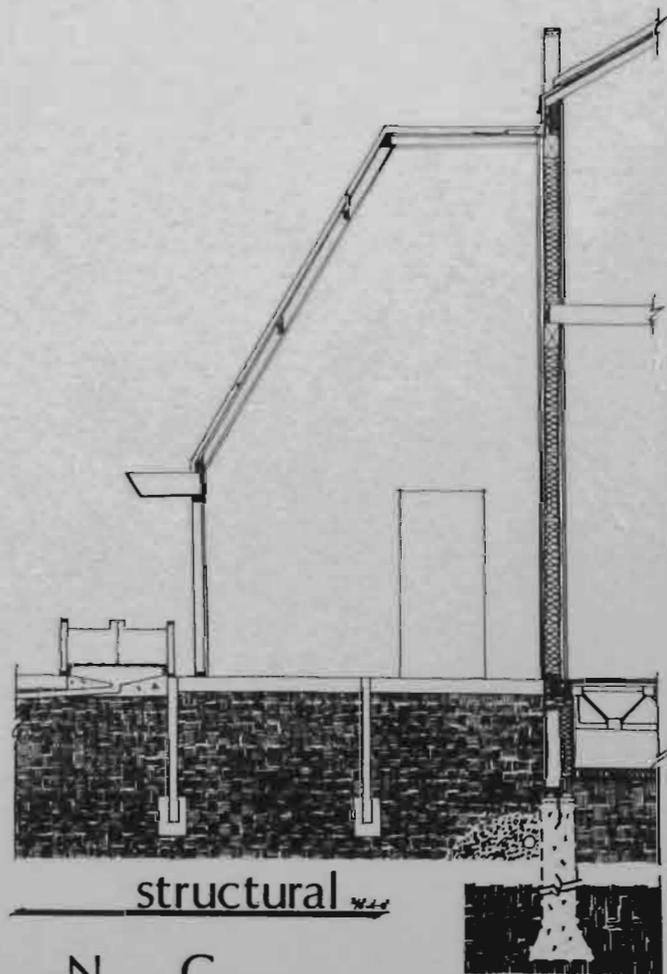
floor stencil



joinery



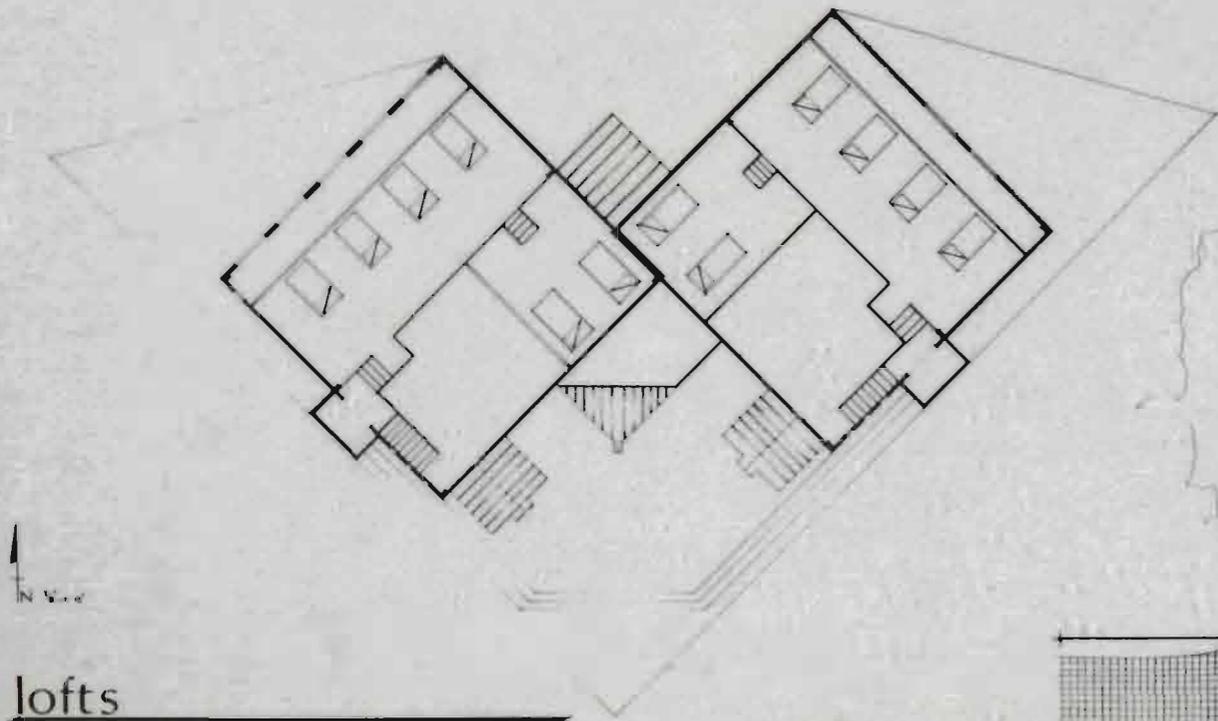
storage



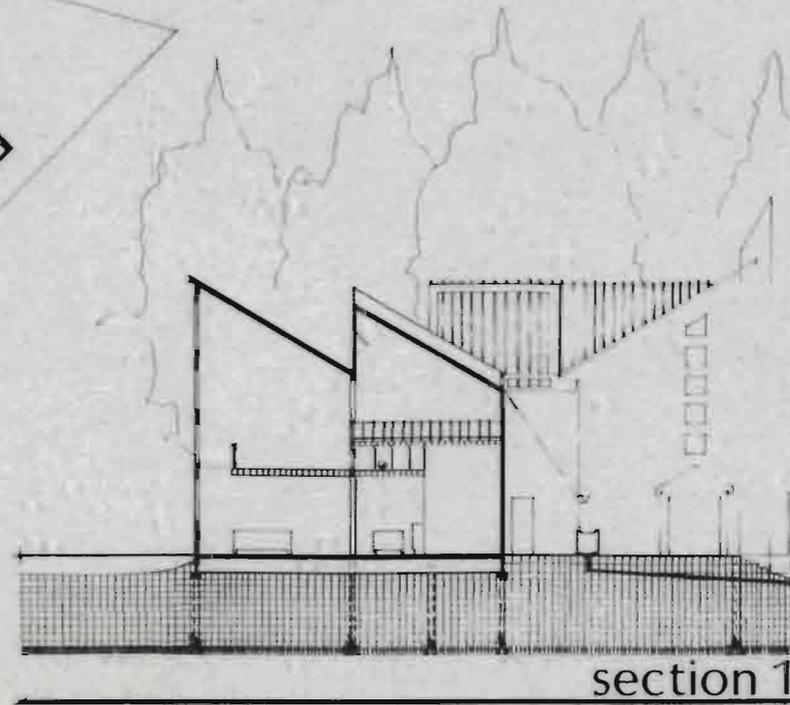
structural

H O U S E C R A F T I N G

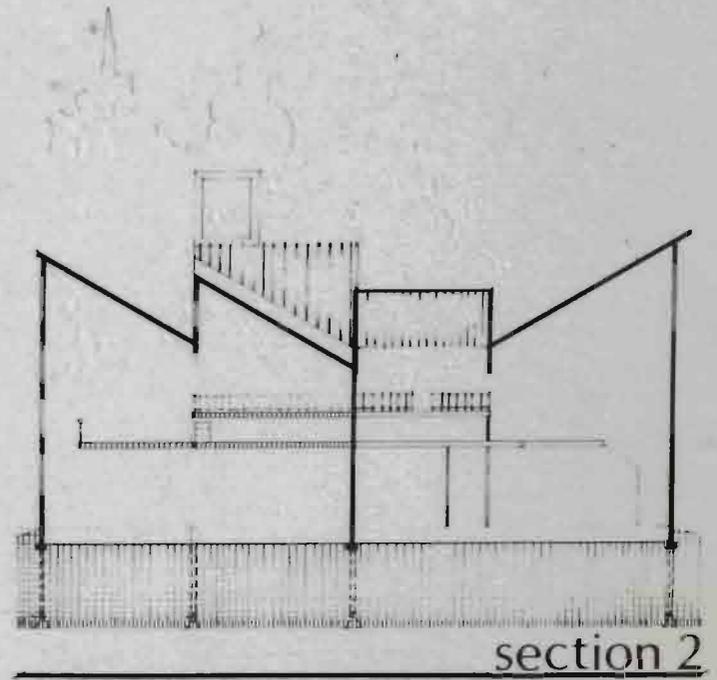




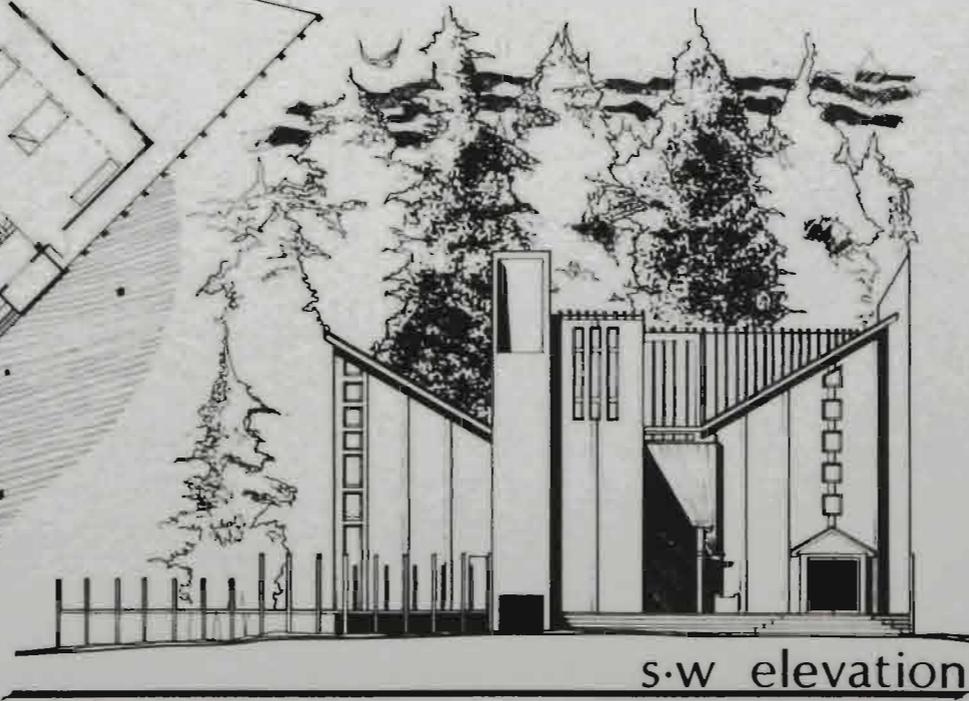
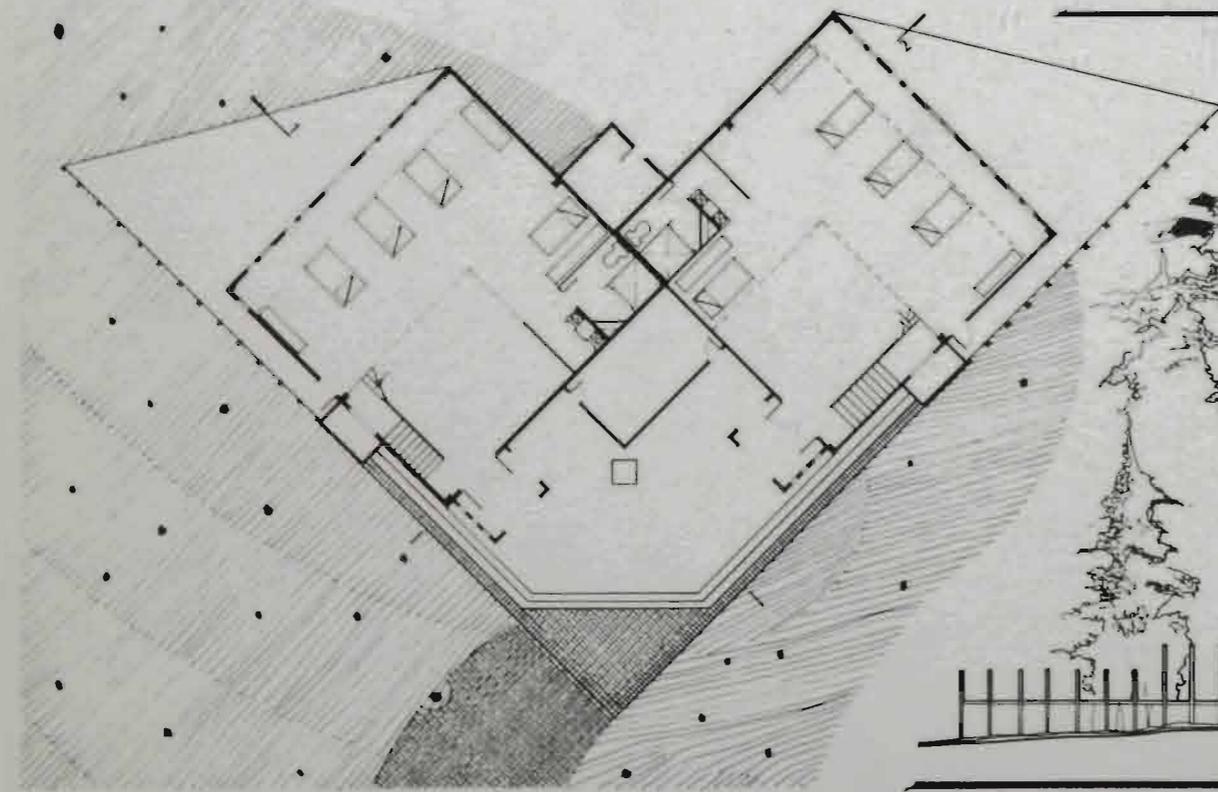
lofts



section 1



section 2



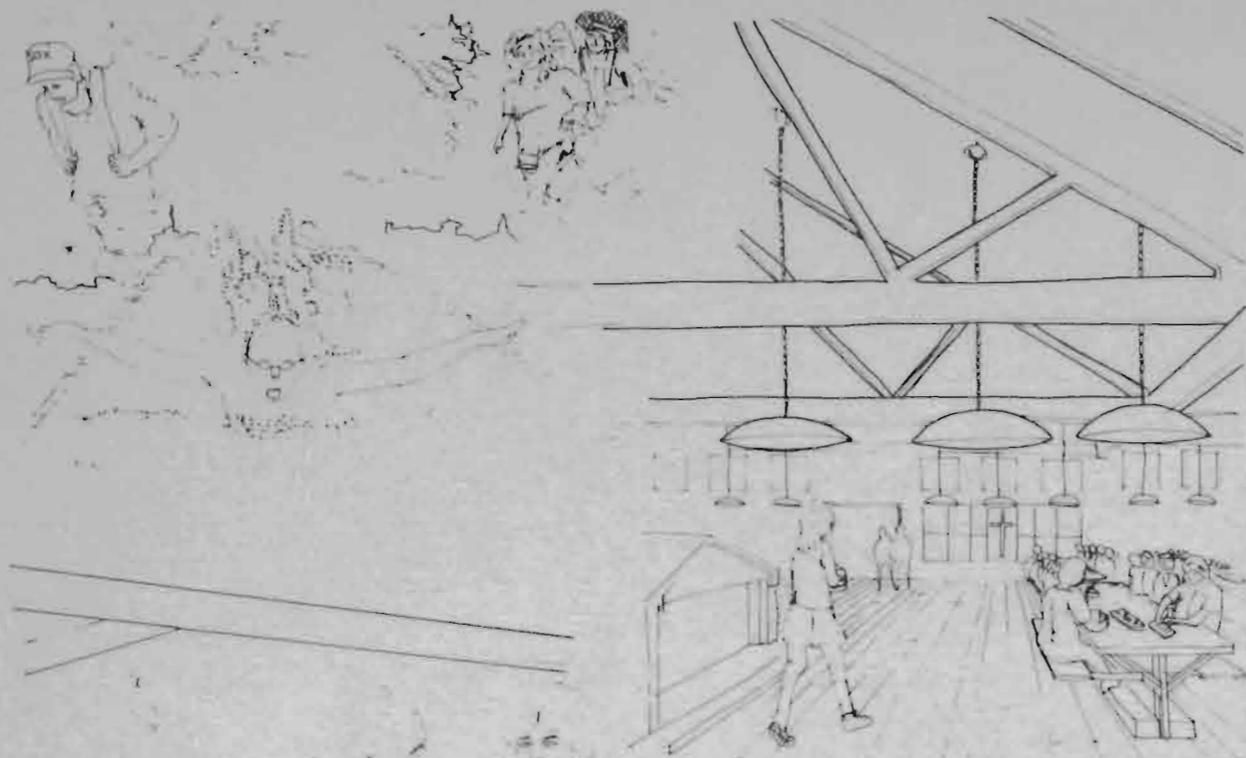
s-w elevation



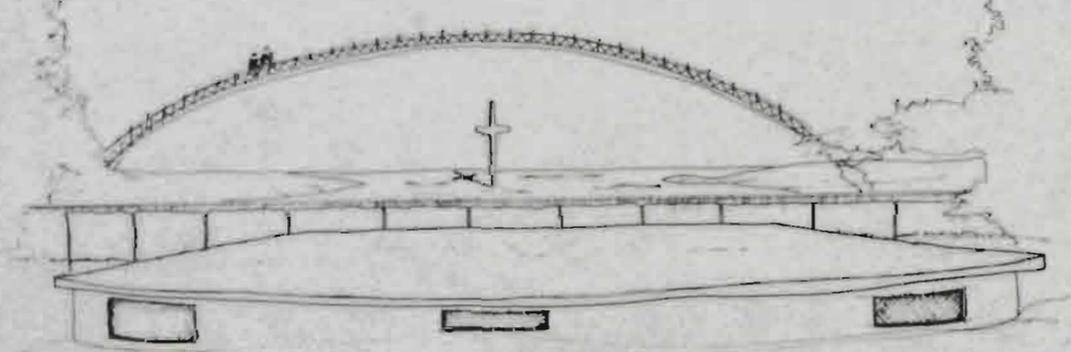
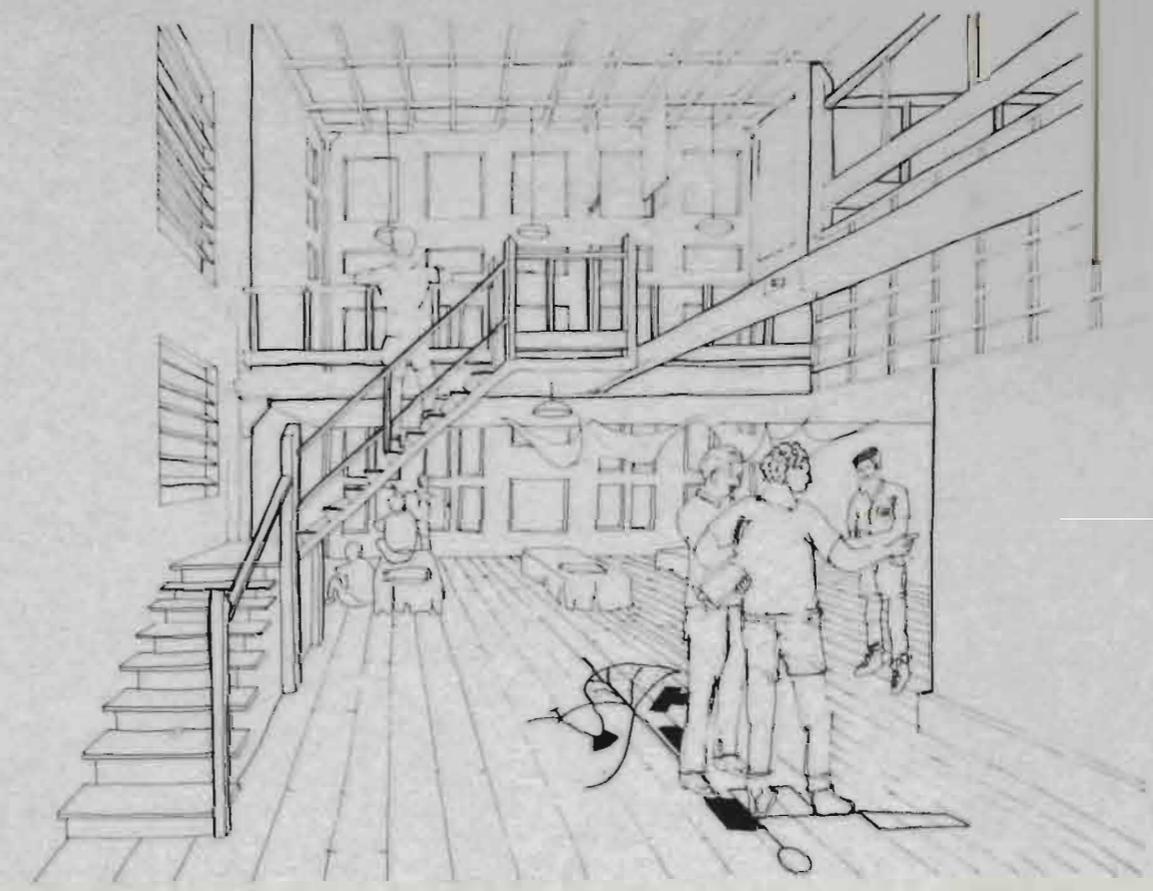
n-w elevation

C A M P E R H O U S I N G

Handwritten initials and a small square mark.



dining



A S P L A C E



H O U S I N G