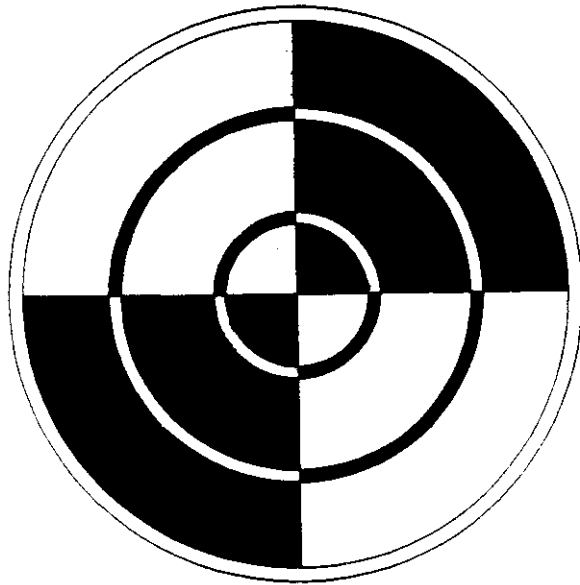


An Outdoor Precedent for Athletic Training and Injury Rehabilitation



John Blacketter
Spring 1994 - Comprehensive Project
LA 404
Prof. Spangler / Young
Malcolm Cairns, Advisor

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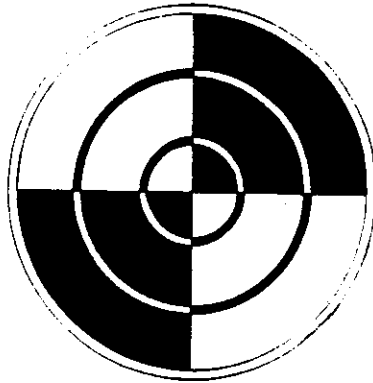
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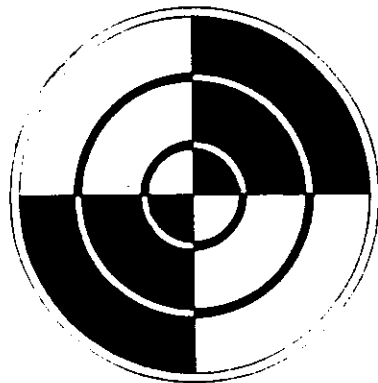
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Abstract



Project Justification



Introduction

Athletics and injuries... these two words are too often synonymous in the realm of competitive athletics. Whether a person is an amateur or a professional athlete, a serious injury that could potentially have lasting repercussions on performance can be physically and emotionally devastating. Once an athlete has been put in a position to try and overcome a serious injury, he or she traditionally faces a long and often difficult road of recovery. The road of injury rehabilitation. These unfortunate athletes face a series of repetitive exercises, drills, and therapeutic modalities in order to regain the optimal function of their body. The repetitions and daily rituals often become extremely monotonous for the athlete as he or she tries to fight the boredom of traditional rehabilitation and recovery processes, and the inevitable deterioration of overall body fitness. Stale gymnasiums, lonely sessions in therapy, and repetitive days in the weight room rarely do much to spur the motivation of the rehabilitating athlete and often cause him or her to lose concentration, which is essential to a successful recovery.

All forms of athletics contain four basic components of sports fitness for competition: endurance, strength, flexibility, and body composition. These are the building blocks for a successful athlete, and a good rehabilitation process will work to enhance these components while still mending the injured area of the body. Rehabilitation should be a process of healing an injury while promoting overall physical, mental,

and emotional fitness, in order to regain optimal athletic functions.

Personal Interest and Background

Sports and athletics have always been a large part of me, and most likely will continue to be. I have been involved in sporting activities for most of my life, and have gotten great pleasure from them. From Little League baseball and basketball to junior high teams and then on to three high school varsity sports, my love for the participation steadily grew. Unfortunately, so did the number of injuries I obtained while involved in these sports. From numerous ankle sprains, to two broken fingers, many muscle pulls and a minor back injury, I have gotten a taste of what it is like to have to overcome an injury in order to return to play. I never found rehabilitation to be a tremendously wonderful experience, but I did find the process quite interesting, none the less.

Upon coming to college, my opportunities to participate sharply decreased as I was no longer involved in organized athletics at a competitive level. This lack of activity, which used to be a daily event, brought about a substantial change in my body physically. I was shocked at how out of shape I had become in only a short time away from training. This spurred an increased awareness of staying healthy and a strong interest in maintaining physical fitness. I soon discovered that I truly enjoyed training strictly for personal benefit, not because of a

competitive drive. Running, cycling, pick-up basketball, and lifting weights had taken the place of active competition in my life, and provided me with a new alternative for activity, crosstraining. Unfortunately, I have still found myself battling chronic ankle problems, and after many more strains and sprains, I found myself reacquainted with the realm of injury rehabilitation. As I learned more about the healing process of the body, I became more and more intrigued and found this to be a fascinating topic. I attempted to pursue sports medicine as a minor here at Ball State University, only to find that such a minor was not available.

For this final project I wanted to deal with an area that truly interested me and find a way to couple it with Landscape Architecture. Therefore, I have taken my interest in athletic rehabilitation and fitness training, and worked to design a rehabilitation and training facility utilizing the outdoor environment, for the betterment of injured athletes.

Problem Statement

Athletic injury rehabilitation and the outdoor environment are two entities that are not often mutually associated. Injured athletes are usually forced to perform rehabilitating processes indoors without the benefits of any serene natural settings. Having these processes inside ensures ideal climate, although does not provide a great number of alternative training procedures for the injured athlete. The natural environment is full of features that can be utilized for the rehabilitating and training of athletes. Water

features, undulating topography, trees, ridges, and steep slopes create a number of potential training possibilities. (see pg. 5) A Landscape Architect could work with those in the field of athletic rehabilitation to create a state of the art training facility in the landscape by taking advantage of the existing natural features and providing a full range of rehabilitating requirements. This would require the Landscape Architect to gain a working knowledge of rehabilitation procedures and design requirements in order to have a successful result. Unfortunately, this is where the design of these facilities is rather insufficient, and demonstrates why most rehabilitation is performed indoors without utilizing the outdoor environment. How does the Landscape Architect create a facility that is functional and creates alternative methods of athletic rehabilitation in the natural landscape?

Sub-Problems

Beyond the major problem of working as a Landscape Architect to design for the rehabilitating athlete, there are also other obstacles to overcome. First of all, the Landscape Architect needs to acquire a strong knowledge of the basics involved with injury specific rehabilitation. This is essential in order to provide the necessary treatment in a number of outdoor procedures. If an athlete has an opportunity to train by utilizing different methods, he or she is more likely to remain interested and keep the concentration necessary for optimal benefit from the exercise.

Adding variety to the rehabilitation regiment helps to overcome a second major obstacle, boredom of the training athlete. Unfortunately, this is often a problem in traditional rehabilitation practices. As stated before, If an athlete is confined to a gym, weight room, or an occasional trip to the whirlpool for exercises, it rarely works to motivate a healthy attitude. Several different exercises for the same type of injury, located outdoors, provides a very effective alternative.

Obviously, a training facility that utilizes the outdoor environment for rehabilitation purposes leaves itself subject to the wrath of Mother Nature. With the potential for undesirable weather, indoor facilities will need to be provided on site for use during these times. Changes in the weather will not only influence the training practices, but the changing of the seasons will as well. Of course the prime seasons are in the warm to mild times of the year, but the facility needs to be able to accommodate activity in the cool or "off season" months. Building layout needs to consider the effects of snow and ice on someone trying to maneuver on site and rehabilitating activities are included that can take place outside during these times of the year.

Project Goals

My personal goals of the project dealt with my interest in athletic training and therapy. I wanted to:

-Gain knowledge of the processes

associated with athletic rehabilitation and how these processes are mutually integrated.

-Combine this interest in athletic rehabilitation with Landscape Architecture in a successfully designed outdoor space.

My professional goals of the project dealt with design considerations and the potential site. I wanted to:

-Integrate the buildings and activity facilities into the site naturally for minimal site impact.

-Provide a variety of rehabilitation techniques in order to eliminate traditional repetitive monotony.

-Have a facility that is usable all year during the inclement months.

-Have a complete set of drawings depicting a designed precedent for athletic rehabilitation in the landscape.

Review of the Literature

In order to properly address this problem and attempt this project, it was important for me to fully understand the entire athletic training and injury rehabilitation process. I gathered text books, documents, and interviewed training professionals in order to broaden my knowledge of the topic. I also took an introductory course to human anatomy during this semester which proved to be beneficial in understanding the processes of the human body.

Sports Medicine, Modern Principles of Athletic Training, and The Sports Medicine Guide were instrumental texts in giving me the

basic understanding of human physiology and how one begins to heal from an injury. These books taught me the series of therapeutic modalities that are necessary for every type of injury and how these methods begin to vary as the healing process progresses. Rehabilitation of Sports Injuries was a book that described in detail how a person recovers from specific injuries (i.e. a tear of the Anterior Cruciate Ligament of the knee). I used this to adapt some of these rehabilitating processes to be performed in the natural environment.

I was fortunate to have the opportunity to visit the Olympic Training Center in Colorado Springs, CO and see first hand what type of built facilities were being utilized and why. I knew indoor facilities would be necessary for this designed training center and this visit was extremely beneficial for being able to determine exactly what structures would be needed. After my visit I felt I had a firm hold on the rehabilitative components that would need to be fulfilled by this facility, and I began to look into ways of utilizing natural landscape features in order to create outdoor training circuits. I met with Mike Ferrara, Head of the Athletic Training Department here at Ball State University, and discussed some possibilities of how to construct such a facility in the landscape, while providing the full array of training procedures required. He was very helpful and gave me new insights into current rehabilitative practices that I had not been aware of through my reading.

Finally, in the book, Cross Training: The Complete Training Guide for all Sports, and in a

Newsweek article "Ideal Fitness Through Cross Training", I was able to discover how all of these individual training procedures of this facility can work together to return a person to optimal bodily condition. I learned how cross training, (using different activities on a regular basis in order to train and add variety to exercising) can help heal injuries and promote beneficial synergy patterns in muscles in order to return a persons body to an optimal state more rapidly than normal training by isolating the injured area.

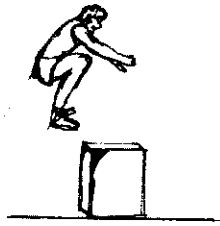
Assumptions

Upon approaching this design project, many assumptions needed to be made. Therefore, It was assumed that:

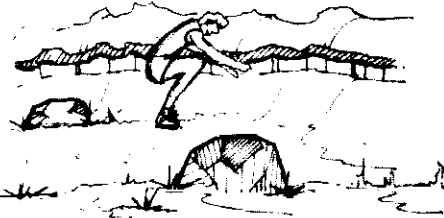
- An outdoor rehabilitation training facility was desired by the athletes, coaches, and trainers.
- Necessary funding was available for the design and construction of such a facility.
- The site chosen was available and approved for the design of this facility.
- A governing body exists for this purpose and is prepared to handle the administrative duties for the facility.
- Professionals are available to participate in the training of individuals at such a designed facility.
- The facility will be open for anyone to utilize the rehabilitative processes , not just professional athletes.
- The facility will entertain a number of visitors throughout the year who are interested in the training procedures.

Ir

Inside

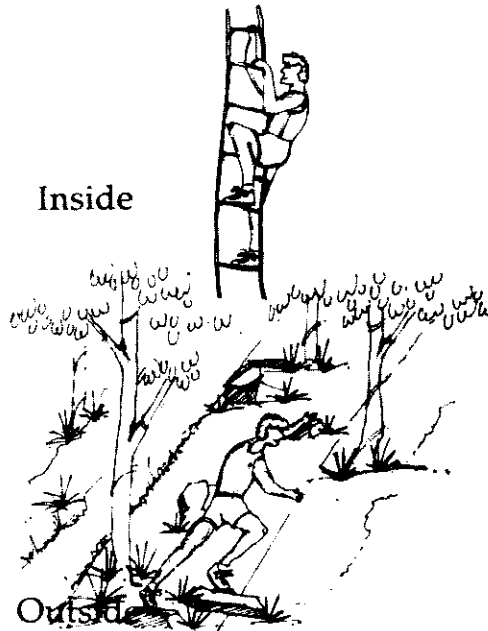


Plyometrics



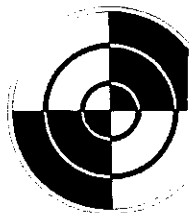
Outside

Inside



Climbing

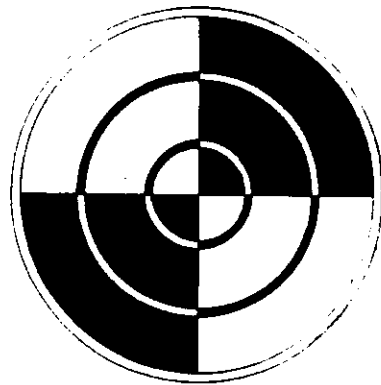
Outside



Training Technique Relationships

John Blacketter Comprehensive Project

Program and Site Information



Programmatic Statement

The specific number of anticipated users needed to be defined in order to accurately determine the number and sizes of built structures to accommodate these individuals.

Number of anticipated users:

- Users living on site: 60
- Users commuting: 20
- Athletic Trainers: 12
- Administration/Staff: 40
- Parking Spaces: 100+

The following structures were determined as necessary after consulting with athletic rehabilitation professionals and visiting the Olympic Training Center in Colorado Springs.

<u>Required Built Structures:</u>	<u>Size sq.ft.</u>
-Multi-Purpose Facility:	20000
-Sports Medicine Center:	6000
-Weights Center:	4000
-Administration/Offices:	3000
-On-site Housing:	40000
-Cafeteria:	5000
-Visitors Center:	2000

These structures are integrated within the site and amongst the following outdoor training activity routes, as dictated by interviews and research, in order to be fully utilized by the specified users.

Required Outdoor Activities:

- Water Based Activities
 - *Boat Dock/Storage
 - *Swimming
 - *Water Aerobics
 - *Water Skiing
 - *Rowing / Crewing
- Aerobics Space
 - *High and Low Impact
- Cycling Route
 - *Connection to existing roads
- Running / Walking course
- Challenge/Obstacle Course
 - *Undulation Utilization
- Plyometric Training Area
 - *Hopping/Bounding/Joint Stress
- Occupational Therapy
 - *Disabled Rehabilitation
- Sport Specific/Recreational Activities
 - *Tennis, Volleyball, Basketball..

Client: Facility Users and Staff

This rehabilitation facility is a prototype for the procedures used in the treatment of injured athletes. Coaches, athletic trainers, and physical therapists have an ideal environment, solely devoted to the enhancement of physical ability, in which to teach and mend the injured athletes. Jobs were created in the cafeteria, administrative staff, and custodial departments for people who live in close proximity to the facility and might be in need of a position. The injured athletes, of course, are the ones who benefit the most from this designed facility, as they are exposed to alternative methods of rehabilitation in a setting designed to

promote health and motivation.

Site Location

The site is located 15 miles south of Bloomington, IN. It is a 120 acre peninsula into Monroe Reservoir at the southern most portion of the lake adjacent to the Salt Creek dam. It lies 2 miles east of State Road 37 at the Harrodsburg exit and is accessed by Strain Ridge Road.

(see pg. 8)

Site Inventory

The site is totally wooded, with a large number of mature Oak and Hickory trees. There is a total fall from the height of the site down to the water line of approximately 120 feet. A wide ridge runs for the length of the Eastern side, curving west at the North edge. There is roughly a 60-75% slope down to the water from the top of this ridge.

To the West, there are two inlets that allow for a gentler slope down to the water from the crest. The entire site is on a gradual or sharp incline from the water's edge up to the ridge, which is the only area of flat ground on the whole site.

The Salt Creek dam, to the South, provides the only access into the site for an automobile. Vehicular traffic is scarce, causing little or no disturbance to the site. Wildlife is rather abundant here due to the isolated and extremely serene conditions.

Site Analysis

This site offered all necessary ingredients for a successful outdoor rehabilitation facility.

- Mature vegetation provided the base for a natural experience for the users to encounter when training, and gives adequate cover from views into the site from surrounding areas.

- Strong undulation throughout the site provided steep slopes and a variety of topographical conditions to be manipulated in a rigorous training regiment. (see pg. 9)

- Being a peninsula, water was readily accessible for the use of the training athletes. Two inlets provide relatively secluded areas for boat access and group utilization of the reservoir.

- The prominent ridge gives a number of quality views off the site to the surrounding areas of the lake. It also is a potential for building locations both on the ridge and built into the hillside.

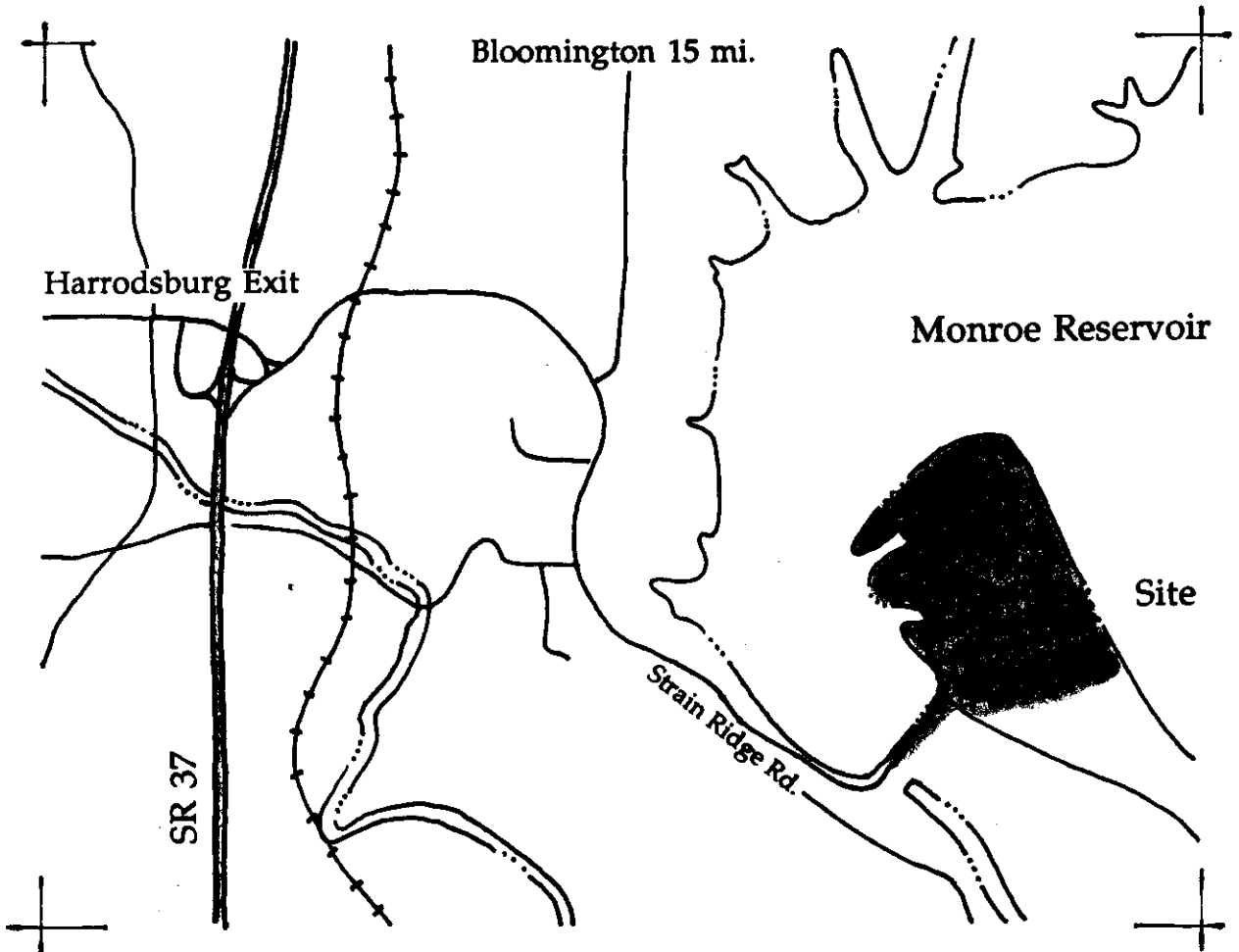
- Surrounding areas are not strongly inhabited, keeping unwanted potential distractions by others to a minimum.

(see pg. 10)



Bloomington, IN

Site Location



Bloomington 15 mi.

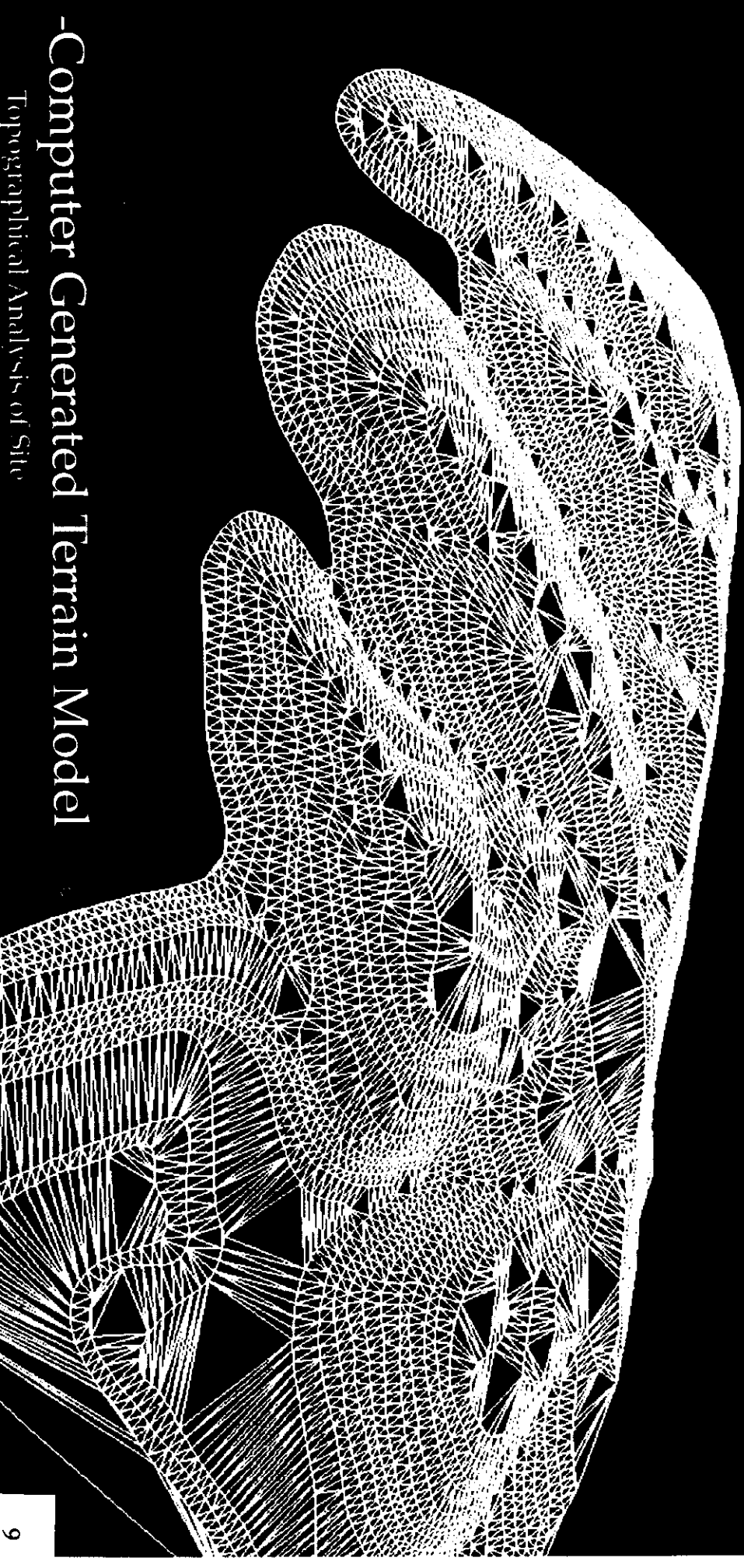
Harrodsburg Exit

Monroe Reservoir

Site

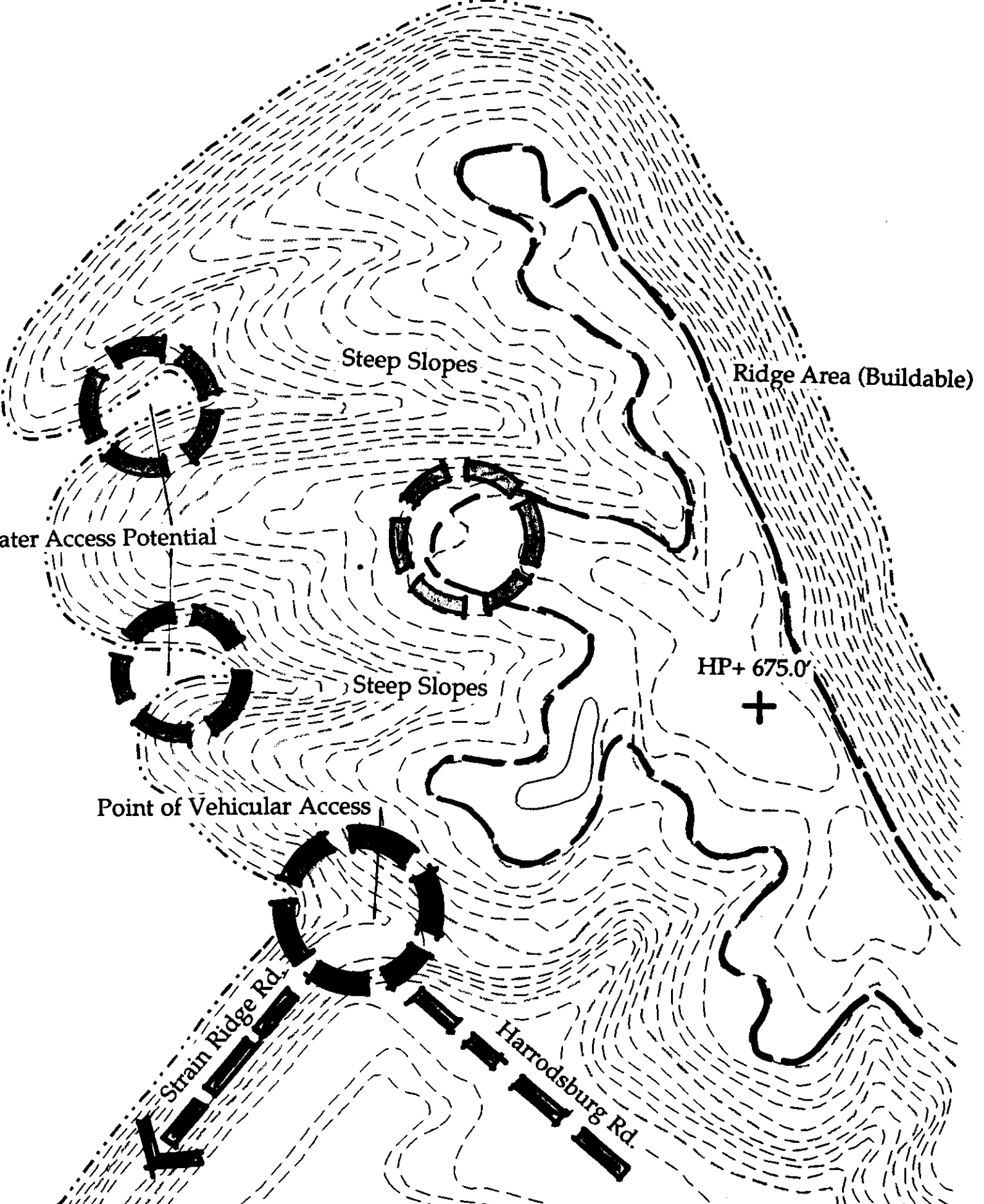
SR 37

Strain Ridge Rd.



-Computer Generated Terrain Model

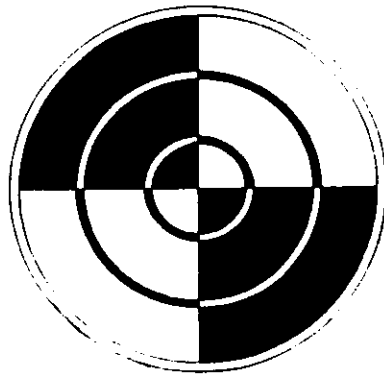
Topographical Analysis of Site



Topographical Plan and Analysis

1"=350'

Masterplanning Process



Design Concept

The basic concept for this facility was to create a series of integrated training circuits, utilizing the existing topography and site features, that focus around a central hub consisting of the built training center and living environments. All these components are integrated to allow transitions between these rehabilitating processes in a unified environment. (see pg. 14)

The trails, or circuits, would vary in intensity and accessibility providing a hierarchy of training loops. The circuits would entertain the varying features on the site (undulations, water, vegetation, rock outcroppings, etc.) to allow for the users to be able to rehabilitate or strengthen any part of the body at different points along the trails .

The training center and the residences will be contained in a concentrated area, yet not right next to each other to allow for some separation of uses. The areas that immediately surround the built structures will be manicured and planned in contrast to the training circuits that are basically carved out of the existing mature vegetation. This is to provide a controlled environment around the commonly used facilities for the users who could potentially have severe injuries and require static areas in order to remain mobile.

Training Circuit Design

Since the facility would be utilized by individuals with both severe and minor injuries,

the training circuits that will be provided needed to accommodate all levels of activity. Some trails into the site would require wheelchair accessibility and a controlled asphalt surface for safety purposes. These trails would then increase in intensity in other areas of the site, although all would be inter-connected. Both the asphalt surface and natural terrain are used to create challenging areas to test balance and joint motion necessary for complete recovery. The trails access all portions of the site (water access, all buildings, slopes, etc.) and provide spaces for all necessary activities to take place. The trails connect to the existing road in order for cyclists and runners to have access to the roads around Monroe Reservoir.

Siting Training Circuits

With a number of different slope gradients on the site, creating a variety of training circuits was not hard to do. It entailed analyzing the slopes and existing ridge lines in order to establish the hierarchy for the trail locations. I was able to locate several different areas that would be conducive for low, moderate, and high intensity circuit training.

Relatively flat areas along the upper ridge provided good locations for low intensity training routes for acute injury rehabilitation. These circuits would accommodate wheelchairs and those individuals who require crutches or walkers. Gentler slopes, 10 - 20% grade, were suitable for moderate ascension and descension exercises on both a controlled asphalt surface and natural terrain. These circuits allow access to the

water features for those in a wheelchair and anyone else who is mobile. Harsh slopes, 20 - 70% grade, provided ideal training courses for high intensity training among rock outcroppings and natural terrain. These circuits are utilized by those who have regained a large portion of their body's optimal athletic potential. All of these circuits combined create a total fitness environment that can take a severely injured individual and return him or her to an optimally functioning state by utilizing purely outdoor rehabilitation techniques. (see pg. 15,16)

Building Design

With the buildings that are needed in order to have the required facilities to make this center successful, I had two major objectives: Provide direct relationships with the natural environment immediately outside the buildings, and provide views into the site of the training procedures. The buildings are designed radially with a convex side that faces outward into the site. This convex wall will be primarily glass in order to take advantage of every interior site view possible. The structures are built into the slope in order to keep the building heights at one story along the pedestrian corridor. A large portion of the Multi-purpose facility, for example, is below the grade at the surface entrance, with the large convex wall facing out into the swale behind it. All buildings are wheelchair accessible from the pedestrian corridor and are one story with the exception of the multi-purpose facility and the cafeteria.

The multi-purpose building (MPB) and

the sports medicine center (SMC) have unique functions that allow them to relate directly to the area outside their walls. The MPB has two retractable walls that open up to the interior weight room and the occupational therapy space. The spaces outside of these two areas then become an extension of the interior space into the outdoor environment. Adjacent to the MPB are spaces for performing certain process outside. An aerobics space is designed with grass and paved areas for high and low impact workouts, along with an occupational therapy space for similar purposes. A celebration space was created adjacent to these spaces for graduations and special events. The SMC houses the medical facilities and a portion of the outdoor pool. This portion is covered and also utilizes a retractable wall that moves over the top of the pool, opening the inside up to the outside.

Siting Buildings

The site contains a tremendous amount of rolling topography, so siting the buildings involved utilizing the portion of the site that was most conducive to building upon (minimal slope). Fortunately, a large ridge provided a more than ideal location for siting the required built structures, allowing them to sit in almost the middle of the site, and become the "hub" that I desired them to be. The Multi-purpose facility and the sports medicine center were located together (zone 1) to coordinate all indoor training practices in a common area. The 15 duplex residences and the cafeteria are located only a few hundred feet away (zone 2) providing a

separation from the training area and creating a housing village. The Administration building, visitors center and the parking lot (zone 3) were located away from the other two areas for automobile and "business" separation from the training areas.

These three zones (training area, residential area, vehicular area) were arranged on a radial design to create spaces, focus views into the site, and allow all of the buildings to remain clustered and fit comfortably on the relatively narrow ridge. All areas are connected by strong linear axes that provide a definitive form and lend a positive contrast to the rolling site features. (see pg. 17,18)

Overview of Facility Masterplan

Although the facility was designed in sections, all parts work together to provide a unified environment for the betterment of physical and mental health. Each zone, though designed as a separate entity, is related contextually to the surrounding areas and serves as a functional cog in the proverbial wheel of athletic training and injury rehabilitation.

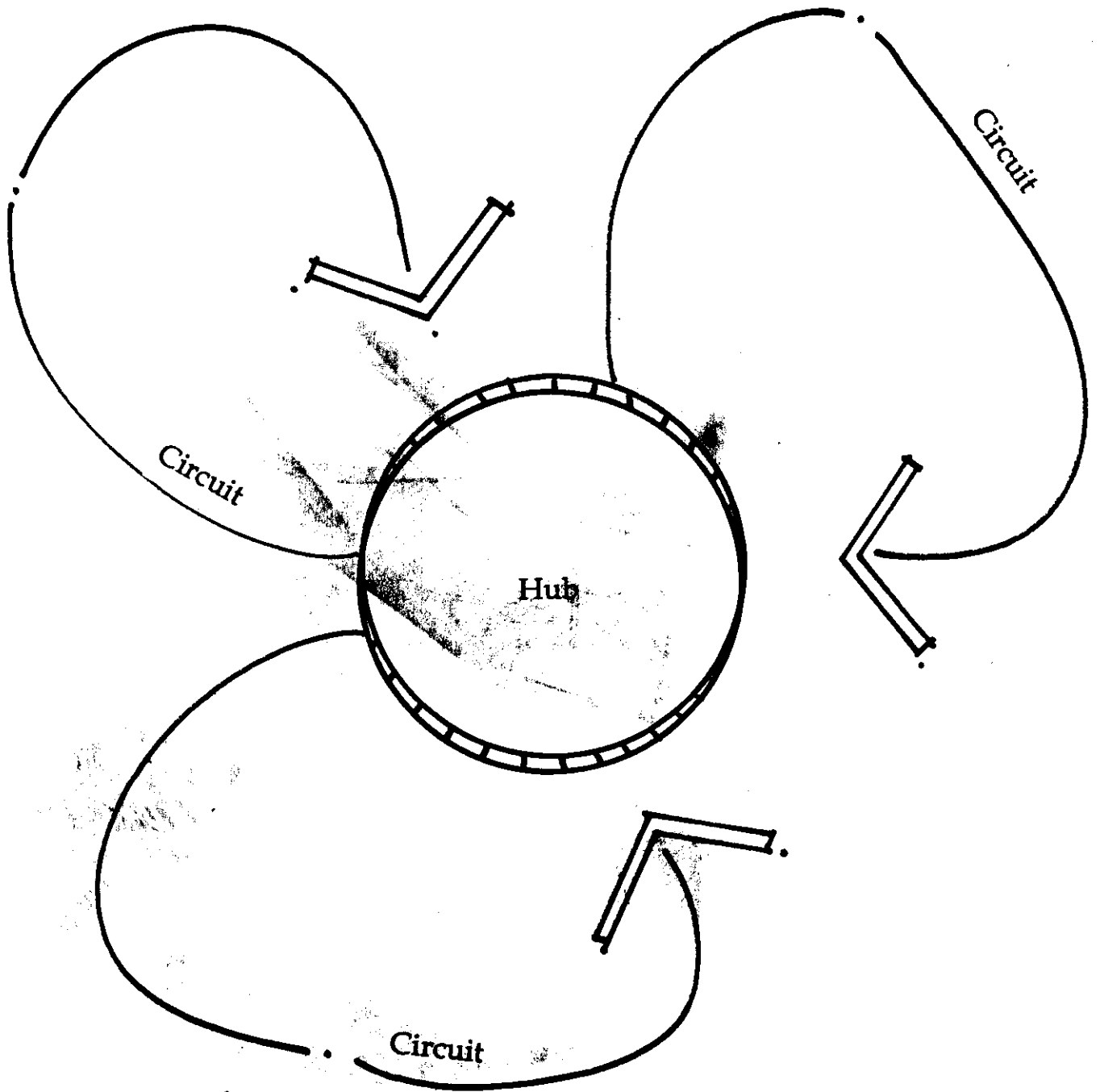
The built structures lie on the highest point of the site which provides excellent viewsheds into and off of the site. These buildings are also located centrally within the facility, allowing the area to serve as the "hub" for the athletic training and rehabilitation processes. Training circuits extend out from the residences and from the multi-purpose facility giving the users a variety of access points and training choices. All potential circuits can be

accessed by any of these trailheads providing access to all portions of the facility including the access road for extended exercise off site.

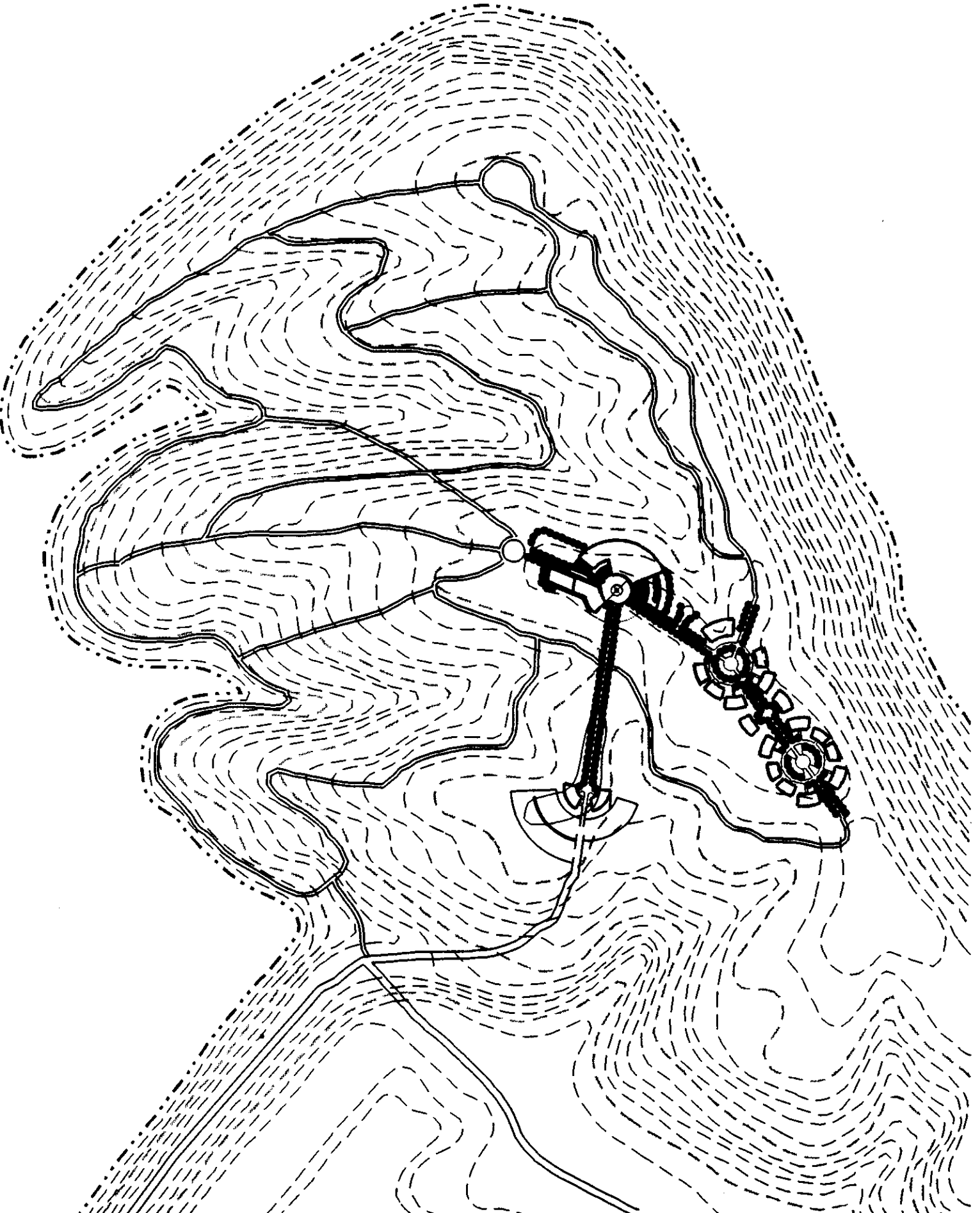
The administration building, visitors center, and parking lot are located near the entrance to the facility and away from the training areas. This keeps all vehicular traffic on the site to a minimum, while still providing sufficient parking for the facility users, staff, and visitors. This also maintains a harmonious separation from the training areas, as the managerial and commercial procedures take place here, away from the rest of the facility.

Conclusion

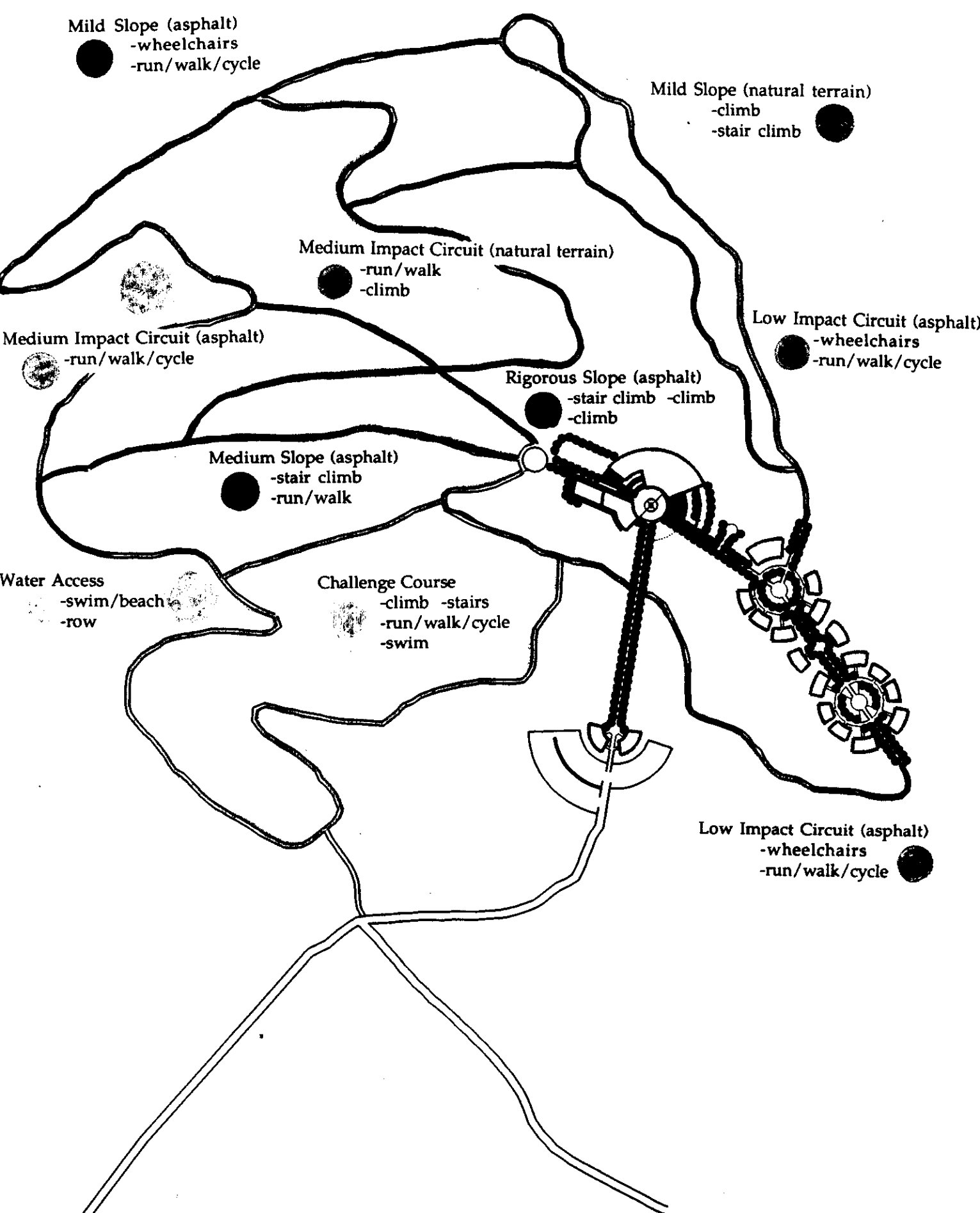
Athletic training and injury rehabilitation are processes that maintain some very traditional and stale practices. This facility, designed solely for the enhancement of the human body, breaks that mold and provides a new alternative to this otherwise static process. An individual can now utilize a nature trail or a grassy slope to train successfully and replace the circular track and the stationary bicycle. As indoor processes mesh with outdoor spaces, an awareness develops that spurs the drive in these individuals to be both physically and mentally in tune with athletic rehabilitative processes and mother nature, simultaneously. This training center, as simple as the concept may be, proves to provide all the necessary ingredients (mentally and physically) to be a precedent for athletic training and injury rehabilitation, while remaining on the cutting edge of these processes.



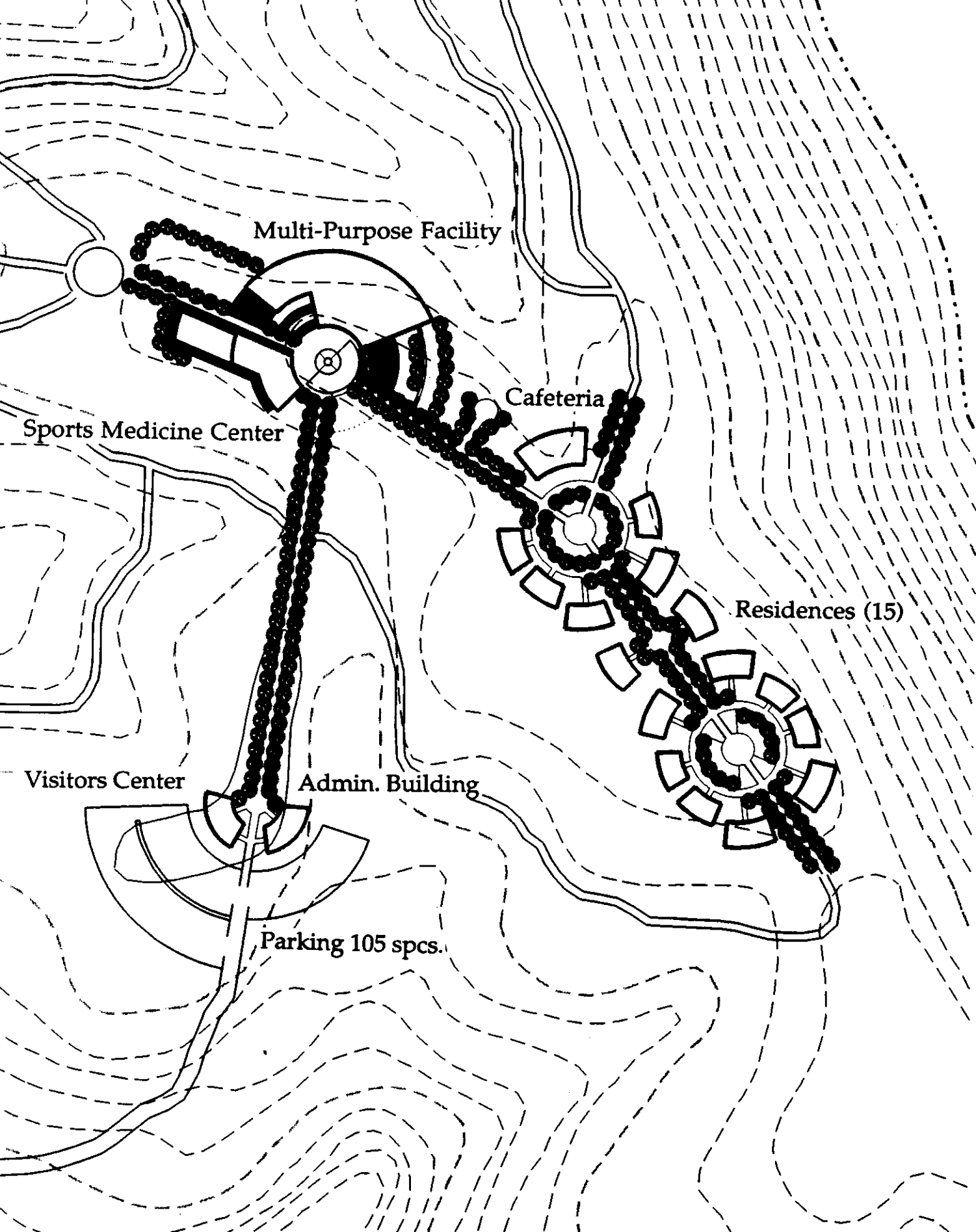
Layout Concept



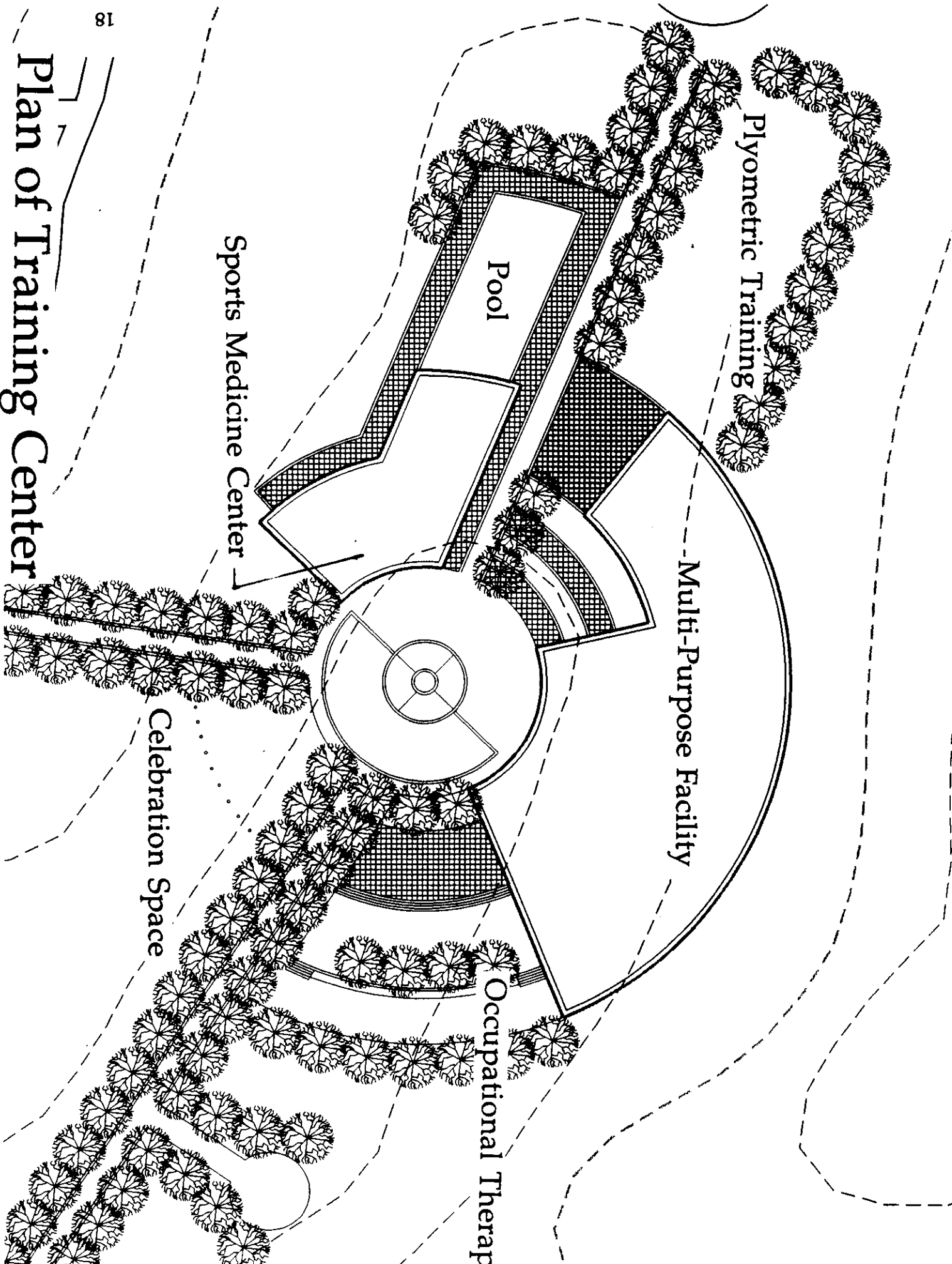
Site Plan 1"=350'



Training Circuit Diagram



Plan of Built Structures



Plyometric Training

Pool

Multi-Purpose Facility

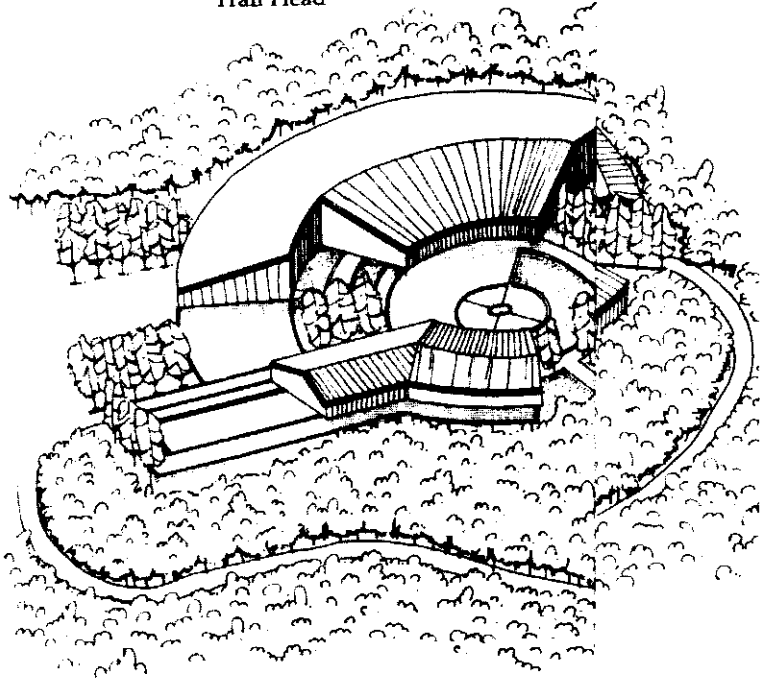
Sports Medicine Center

Occupational Therapy

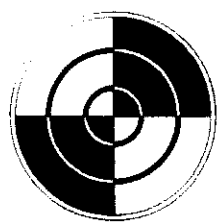
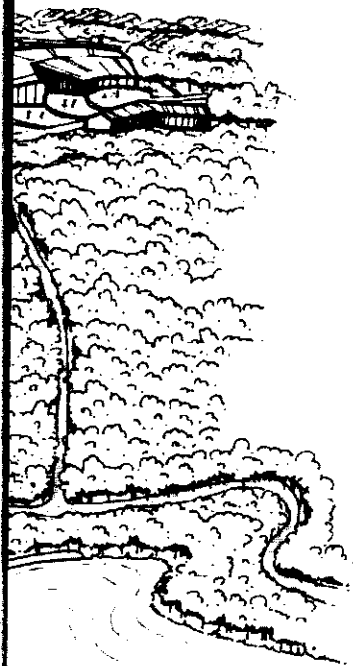
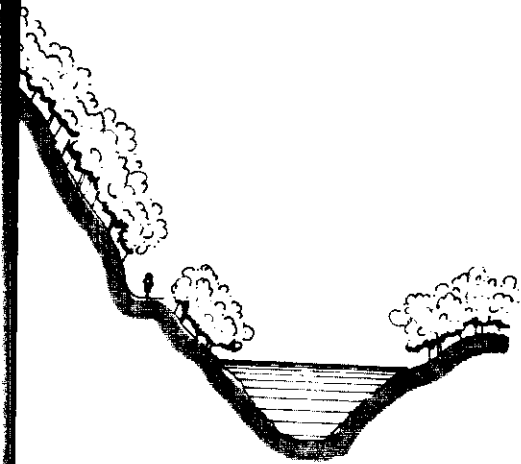
Celebration Space

Plan of Training Center

Training Center and
Trail Head

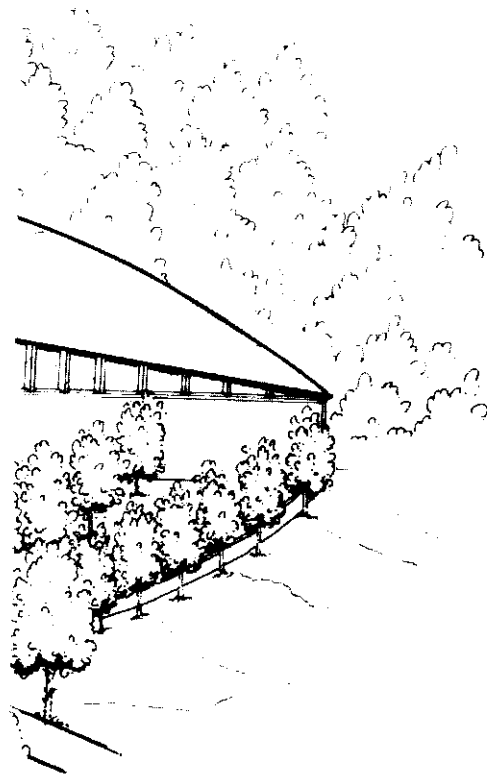


An Outdoor ^{View of}
Training an _{1"=40'}
_{Sensitive Project}



Aerial View and Section/West Edge

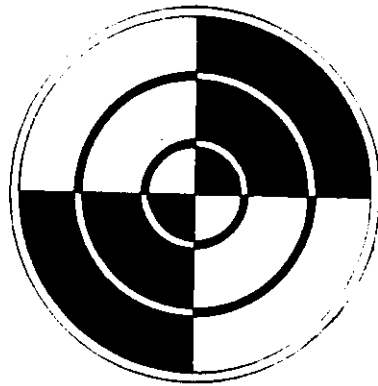
John Blacketter Comprehensive Project



Perspective of Training Center

John Blacketter Comprehensive Project

Bibliography



Books

Arnheim, Daniel M. Modern Principles of Athletic Training. St. Louis: Moseby College Publishing, 1989.

Bloch, Gordon Bakoulis. Cross-training: The Complete Guide for all Sports. New York: Simon and Schuster, 1992.

Freeman, Will and Evelyn. Plyometrics. Complete Training for all Sports. Ames IA: Championship Books, 1984.

Hemery, David. Athletes in Action. London: Stanley Paul and Co., 1987.

Saal, Jeffery A. Rehabilitation of Sports Injuries. Philadelphia: Hanley and Belfus, 1987.

Strauss, Richard H. Sports Medicine. Philadelphia: W.B. Saunders and Co. 1991.

Wolpa, Mark E. The Sports Medicine Guide. West Point, NY: Leisure Press, 1982.

Articles

Croce, Pat. "Ideal Fitness Through Cross Training." Newsweek. May 30, 1988. v.111, pg. 24.

Malley, Stephan. "Cross-training: the great debate." Runner's World. May 1988. v23, n5, pg 42 (5).

Interviews

Ferrara, Mike. Director of Athletic Training Department at Ball State University. Personal interview. 22 November 1993.