Integrated Specialized Sports Area
(ISSA)

Golf Course - 210 acres
Race Course - 360 acres
Shooting Course - 120 acres
Integrated Specialized Sports Area
approximately 500 acres

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Abstract

Integrated Specialized Sports Area (ISSA) focuses on the conservation of resources and land within today's highly consumptive development patterns. The consumption of natural resources for the development of exclusive recreational sports, such as golfing and motor racing, brings about the exploitation and wasteful use of natural resources. It is an unavoidable situation in the provision of specialized recreational sports that require large expanses of land and major resources expenditure to develop, use, and maintain. Yet, it should not be an excuse to take advantage of our finite resources. Landscape architects, through their expertise in master planning and design, can successfully concentrate specialized recreational sports in one area. Creating integrated areas that reduce resource consumption and land exploitation while eliminating single use areas that are exclusive in use or dormant a large percentage of the time. Special interest sports was the emphasis of the integration concept, with championship golfing and motorcycle grand prix racing being the design focus. Other sports that could be included in the ISSA concept were shooting sports (field archery, sporting clays, and silhouette shooting), long distance fitness sports (walking, hiking, and on and off road bicycling), and off season winter sports (cross country skiing, sledding, snowmobile trails) and many others that fit the requirements. However, golf course and race track design was the focus of this project due to the complexities involved in master planning the integration of these sports and in order to have the least possible environmental impact on the chosen site.
Introduction

The Integrated Specialized Sports Area (ISSA) concept was used to show the effectiveness of combining non-traditional recreational sports together in the same area to reduce the consumption of resources and the exploitation of land for single use activities. Recreational sports used in this study may differ from the usual ideas of what these sports are thought to be. The sports focused upon for the integration process was championship golf and grand prix motorcycle racing.

While most people agree that golfing is indeed a recreational sport they would disagree that grand prix racing of any kind was on the recreational level. However, looking at it from the perspective that championship golf is played by professionals this would disqualify it as a recreational sport also. But, if looked at from the view that most courses are only used by professionals a few times a year, it leaves these areas open for public use the rest of the time. Furthermore, to a majority of people today it is a recreational activity, in its own right, just watching these events at their respective championship courses.

This study was undertaken to primarily master plan the integration of unique sports requiring large amounts of resources and land into one aggregate area. However, some people will wonder about the compatibility of the sports that have been chosen for this project. Are championship golfing and motor cycle grand prix racing compatible? At first one would say; “No way!” Although, if you look at the two sports more closely, they are much more alike than different. Both are sports that require highly refined skill and body coordination. Both are highly intellectual pursuits linking body, mind, and environment together. Both are an inquisitive, thinking persons sport. According to Kenny Roberts, three time 500cc world grand prix motorcycle champion, golfing and motorcycle road racing are a lot alike.
“Taking a corner on a racing machine is like playing golf. You are always taught to see the shot and then hit it. If you can’t picture the shot and see what you are going to do then you will never make it. The same applies to riding a bike. You have to be able to see the line you want to follow through the corner - picture it in your mind, where you want to brake, and turn, and come out” (Roberts, 37). To further qualify the compatibility Keith Code, founder and instructor at the California Superbike School, explained that, “Physics is a ‘hard science’ dealing with particles; riding is a ‘soft science,’ which deals with how you feel about what you are doing while you ride...Your ability to sense what is happening in a turn, along with your ideas, is invariably of more concern than the physical laws governing your riding...That feeling can’t be put into an equation or law, and it can’t be diagramed or mapped out with mathematics (Code 3, 18-19). The same is also true in golfing. It is how you feel about the swing, what is happening to the ball, and your about your performance.

There are many more reasons for the assemblage of golf courses and race tracks into one aggregate area that will be discussed later. However, the main purpose of this exercise was to show the effectiveness of integrating large scale, single use, specialized recreational areas into the site, as environmentally sensitively as possible, in order to limit and reduce natural resource consumption and exploitation.
Background

The interests that started the formation of the ISSA concept began from the author's own personal interests and from a growing and maturing environmental ethic.

Golf courses have always caught the eye of people passing by because of their unique, pastoral quality. They are, in a word, picture-perfect. Golf courses are also the closest thing that most people will ever get to seeing an English landscape. "The appeal of golf is infinite; it tempts and destroys, seduces and rejects. It is a game of eternal hope, beyond every horizon is a promised land, even though it proves to be elusive. The golfer is blessed, like no other player of games, in the settings for his pleasure" (Thomas, 8). However, golf courses are extremely exploitive, exclusive, and environmentally damaging. First, because of their expansive size and almost total disregard for natural systems during their development. Second, only golfers can really enjoy the area and even then you might need to be a member of some private club to play. Lastly, golf courses have recently come under public scrutiny as being highly ecologically harmful because of all of the chemicals that are used for maintenance purposes in order to have a high quality course.

Riding and racing motorcycles has similar problems, yet it was an entirely different story. For the most part, race tracks are fairly desolate places. Lots of pavement, hard packed, bare ground, dust and grit blowing around, and a few weeds. However, it is in the experience or thrill of the race that appeals to most people. Kenny Roberts said that "[Motorcycle Grand Prix racing] is the most exciting racing on TV or trackside...I don't think there is any racing that can compare to 500 Grand Prix racing as for speed, excitement, and thrills" (Cox). This is because the motorcycle rider is in tune with the environment. They feel and sense everything that is going on around them when they ride. On a motor-
cycle you are not only one with the machine, but also with the environment around you. You have to be constantly aware of your surroundings, or else you might crash and possibly die. In a car you are isolated from the environment and don’t really care about what is going on outside because you are safely and securely protected within it steel cocoon.

The problems race tracks share with golf courses are basically the same ones except for being environmentally harmful. Race tracks are not environmentally damaging because of chemical use, except for an occasional fuel or oil spill, but from just plain abuse and misuse of the environment. Race tracks have even more problems with zoning laws and noise regulations that make it hard for them to function. Plus, because of the rising costs associated with track upkeep and declining revenue sources, many tracks are lying derelict or being forced to close.

The integration of these two sports can create a more effective and efficient, environmentally sensitive, and aesthetically pleasing area. With the integration there will be a reduction in land area, construction and maintenance costs, and unused facilities. Golfers will get larger facilities and lower maintenance costs. Racers will have a beautiful place to race and supportive revenue throughout the year. However, golfing and motorcycle racing obviously could not happen at the same time due to the dangers involved.
Problem Statement

There are so many pressing and urgent environmental concerns arising today that less intrusive and obvious problems are being ignored and overlooked. Such as is the case when land is developed and used exclusively for a single recreational sport. When an area is developed in this way, it creates a void in the landscape within the surrounding community. If there are many of these developments in one area, the community is effectively locked out of their land and recreational opportunities.

Where the ISSA concept comes into play is in an attempt to find out if this wasteful use can be eliminated. The purpose of this project was to make recommendations and demonstrate a model and masterplan of the ISSA concept to be used by those people interested in further understanding the potentials for such an integrated sports area. It was also used to show that exploitive, single use sport areas can be reduced through the integration of compatible sports. Furthermore, through this integration there would be less land exploited and less resources consumed because of the overlapping uses of recreational facilities.

The consumption of natural resources for the development of single use recreational sports, such as golfing and vehicle racing, brings about the most visible exploitation and wasteful use of natural resources. Questions that arose from these facts were: How can the landscape architect communicate to others how to conserve resources and lessen single use in specialized recreational sport areas? Can specialized recreational sports be integrated together in one area and what are the factors and complexities involved in combining them? What effects resulted from the design of ISSA's on the quality of the sports played to the player and spectator involved.

The hypothesis of this project is that the landscape architect, can through
his/her professional expertise, successfully integrate specialized recreational sports in one area. Through careful design these areas can function equal to or better than independent areas and be environmentally sensitive. Furthermore, by creating ISSA's there is a reduction in resource consumption, land exploitation, sport exclusiveness, all the while sustaining natural environmental site functions.
Purpose and Significance

As an environmental designer, seeing the rate at which our land and resources are being consumed and developed, I can not help but think that someday we will use up all of our natural resources and be forced to live in urban and suburban areas. There is one type of development that is contributing needlessly to this end. That is in the provision of recreational sports. The overriding purpose of this project was to change the way that people look at recreational development and open their eyes to the benefits of the ISSA concept. Plus, in the creation of a model ISSA where the recreation area is of high-intensity use with little wasted space and resources that is in almost continuous use because of the overlapping activities of the sports involved.

The significance of this study has been to reduce land and resource consumption for non-essential uses, such as in recreational sports. Also, to show the involvement of natural processes and environmental factors in their ability to lower expenses and cut detrimental environmental impacts of development. The study has sought to eliminate highly specialized, single-use, recreation areas that lock up the land and resources to other uses and lock out potential users because of site restrictions.

People who would benefit from an ISSA would be the user of the area and the wildlife around it. Participant and spectator alike. They would benefit from being in an ecologically sound, aesthetically pleasing, and integrated recreational resource open to many users. Also, the surrounding community would receive various supplemental benefits from such a development over that of the standard recreational facility development.
Design Principles

The evaluation and formation of an end product for the project effort called upon the combination of several different sources of values and ethics. The basis of my personal ethics influenced and affected the outcome of the results, along with those of the participants of the sports used in the project. These values and ethics tended to promote conservation of land and resources and public interest of recreational development. They allowed a broad interpretation in the field of recreational sports. But, required the careful and concise design and development of land and natural resources for their intended uses.

The sociological and physiological needs of the users of the recreational area, as observed by Maclean in Leisure and the Quality of Life, were used as evaluating criteria for the project. Also, the development values stated by Ian McHarg in Design with Nature, was used as factors in assessing site development for the project.

The project required a complete understanding of the requirements of the sports to be integrated together and a thorough knowledge of the natural environmental functions of the site in order to successfully design and masterplan a solution. Also, a familiarization of each sports advantages and handicaps was required for the efficient integration of them within the site.

The ethics, values, and criteria stated above were combined with careful and deliberate thought to create a successful conclusion to the project and a logical design synthesis.
Goals and Objectives

The goals of the project were to create a model of the ISSA concept and a master plan for the integration of a golf course and road race track together on a site as environmentally sensitive as possible. This model could be applied universally to any recreational sport that meets the required criteria for being in need of integration. Also, to develop a standard for the suitability and compatibility of recreational sports to be integrated; to increase the acceptance and use of such multi-use recreational sport areas; and to lower land and resource consumption by designing a high density use recreation area. In this case, with a golf course and race track being integrated, these aspects could have been shown quantitatively through the reduction of materials used to develop, use, and maintain the area, increase in site and facilities use, and land area comparisons. However, for such results, detailed construction documents and market analysis would have been necessary. To achieve this was beyond the capabilities of the general master plan and model produced.

Another goal was to address the needs of the users (participants and spectators) of the recreation area and enhance the meeting of these needs through the use and development of the site master plan. In order to do this, the design was developed from the viewpoint of the spectator by using the knowledge and techniques of the participants of the sports. In designing the courses in this seemingly backwards direction, it was possible to achieve the best possible perspectives for both the participant and spectator.

There are many more goals and objectives possible for a project such as an ISSA. However, this project was used primarily as a proving ground for the feasibility of the ISSA concept and not to explore every avenue possible.
Literature Review

General

In years past, the general public has had the privilege of enjoying whatever activity or sport they felt like pursuing for recreation with relative freedom. However, these people became increasingly aware of the many and increasing number of areas that were being development privatized, and otherwise closed off to their pursuits. Furthermore, the speed with which the land and resources was being developed and privatized from the surrounding metropolitan areas was astounding to some. Additions were being built, golf courses developed, and fences installed at an incredible rate.

While most people who participated in these recreational sports realized that their sports required large acreages of land and specialized areas to perform in. What they didn’t recognize is that they were contributing to the overall problem with their singular use areas adding to the land and resources being consumed in development and speculation. However, these areas can be developed in an orderly and responsible manner as Ian McHarg stated, “The area is beautiful and vulnerable; Development is inevitable and must be accommodated; Uncontrolled growth is inevitably destructive; Development must conform to regional goals; Observance of conservation principles can avert destruction and ensure enhancement; Planned growth is more desirable than uncontrolled growth, and more profitable; Public and private powers can be joined in partnership in a process to realize the plan” (McHarg, 82).

Recreational areas are considered to be many different places to different people. They are thought of as basketball courts, neighborhood parks, public beaches, state parks, or any number of recreational areas. Yet, for many people recreational areas are highly specialized fields of play such as golf courses, race
tracks, or shooting ranges. These areas, be they National Forests as in the study by Ross or some other recreational area, are visually important to the aesthetic quality of the surrounding communities because of their large impact size.

"Whether driven through, vacationed in, flown over, or simply viewed from photographs, the quality of the visual character of this country's National Forests is important to most Americans" (Ross 20).

Specialized recreational sport areas usually do not have a great following concentrated in any one particular area. Therefore, because of the high expense of building and maintaining such areas, "Privatization is increasingly being considered" (Warbach 51), according to a recent article published in Landscape Architecture magazine. "But when a park is no longer a component of the state system, there can be pressure to provide activities that meet the needs of the local, vocal population. When a private business owns the park, the incentive can be to provide activities that bring in the greatest number of paying visitors. As a result we may lose access to lower demand [specialized] recreational activities" (51).

With the privatization of recreational areas, many people become locked out of activities that they could otherwise enjoy. Some sports become exclusive or country club like in nature. By combining several specialized, recreational activities into one area as a multi-use, open-use recreational area, many of these negative side effects of specialized sports can be overcome. Green stated that "the public sector offers an opportunity which rarely occurs...the chance to influence not only how a project is planned or designed but what projects are undertaken" (Green 1). Which states that the public realm is much more accommodating to the needs of these specialized recreational sports than are the monitory driven private sector.

There has been little research produced on developing true multi-use, open-use, specialized recreational sport areas. With only a couple of examples to
be found such as; the Indianapolis Speedway in Indianapolis, Indiana, which was an attempt at combining a race track and golf course together;

Indianapolis 500 Brickyard Crossing Score/Course Card

and the Meadowlands Sports Complex in New Jersey, which successfully combined a football stadium, arena, horse racing track, and Formula 1 race track, all on a swamp.

The Meadowlands Sports Complex, built in the swamps of New Jersey, has a football stadium, an arena, and a racetrack for horses, so why not a place for auto racing? This is a Formula 1 race-track, with a 1.68-mile course that threads its way through the parking lots and access roads of the complex - not as simple a route as the Indianapolis 500, but much more interesting. About 35,000 spectators can be accommodated (Cameron, 156).
According to Seeley “to provide sufficient facilities of the right variety and size, suitably located to meet demand without causing excessive road congestion and adverse effects on the resources themselves, is a formidable task” (Seeley 16). Furthermore, these conditions are greatly intensified when you bring in the complications of combining different sport activities, increasing use, and a reduction in environmental impact. However, the benefits of such an attempt would far out weigh the complications.

“Not only are more demands being placed on the same landscape, but the demands come from more diverse groups [(special interests)]” (49) noted Rodiek in his research study on wildlife habitat and recreation. This brings to light the effects that these recreational sports have on the environments and ecosystems on which they are built. Most recreational sports due to their evolution over time, have come to require finely tuned, groomed, and manicured courses that wreck havoc with the natural ecology and processes of the site. They also require immense energy and monetary expense to stay at these standards. Seeley stated that “it is the increasing pressure on the environment of human populations and human activity that has made conservation a fundamental and urgent problem” (45).

An especially fitting definition, by Howell, will be used here for developing an ISSA was provided, where the main focus of the project is the interaction of people with their environment. “Ecology is the science concerned with the interactions among organisms and their environment. It is an attitude with ethical and moral overtones, and it is a perspective from which to view landscape problems” (24). This is true because the recreational sport areas that are developed are permanent and visible representations of the ideals and values of the people who created, use, and support these activities and facilities.
Sport Specific

Championship Golfing

Within the area of golf there is an immense amount of information on just about every topic relative to it. From playing golf to designing courses. However, when it comes to the topic of multiple use golf courses there is nothing to be found. Only recently has there golfing industry become interested in the environmental movement. Because of this, there is only a small amount of material available on this topic.

In the design of a golf course “the preservation of natural beauty, or imitation of it, is crucial to the fashioning of a great hole” (Thomas, 24). Golf course architecture takes opposing sides in trying to place an unnatural ideal and functions into a natural system. In order to do this properly, extreme changes to the landscape have to be undertaken to produce a good course. “As a broad generalization, golf course architecture falls into to schools, the ‘natural’ and the ‘artificial’. Like most labels, these words, with their imotive overtones, must be heavily qualified in each individual case. The designer whose instinctive approach is to leave the landscape looking nearly undisturbed as possible must compromise when he works with terrain which is alien to the golfing ideal” (232).

To come to terms with and address adverse and undesirable situations on a golf course can create a desirable and positive influence on the overall environment. It is possible to shape and build a course to create an atmosphere that is ideal for the game and be beneficial to the environment. For example, the San Francisco’s Olympic Club course, “had been built on the bare inland side of the hill, and its principle feature was the canted topography of practically all its holes as they sloped abruptly from the crest of the hill to the lake. The Olympic Club promptly planted a mass of eucalyptus, pine and cypress trees to frame all
eighteen of the holes in a veritable forest as the trees reached full maturity some twenty or twenty-five years later. Thus the course was, in a sense, built in reverse” (137).

There are some golf courses that are endowed with the perfect terrain and features and lend themselves to be converted easily into a fine course. Such as with a world championship course in Germany. “The present course is the result of a decision by the Club Zur Vahr... on the premise that nature itself was the best architect, the Breman course was constructed with minimum changes to the existing landscape. It is dominated by pine trees, tall and dense, crowding in from tee to green, controlling play on the holes which bend narrowly to generally small targets” (98).

“An obvious benefit of a golf course is as a recreational facility. But there are also intangible advantages in its open space, tranquility, and aesthetic value. In a well-designed course the principles of art-harmony, proportion, balance, rhythm, and emphasis-are present. A golf course can be an ecological asset. It can be a haven for birds and other small wildlife, and it can produce fresh air as turf and trees take in carbon dioxide and various pollutants and give off oxygen” (Heuer, 10). There are also many environmentally detrimental side effects to a golf course. Such as run-off from the amount and frequency with which fertilizers and pesticides are used. Although, these applications are probably comparable with commercial farming applications, they are more closely regulated and monitored.

The main impact from golf course development is in the consumption of land. “An estimated, [in 1979], 1,273,000 acres of land are devoted to golf courses” (3). Today, this figure is much higher. Golf courses have become the dominant selling factor in real estate development. “Golf courses can be tremendous community assets. They provide healthy and enjoyable recreation, raise property values in the surrounding areas, attract industry, stimulate civic pride,
and create new business” (4).

“Regulation-sized courses may be either 9-hole (about 3,200 yards long with a par 35 rating) or 18-hole (about 6,500 yards long with a standard par 72 rating). Some nine hole courses have two sets of tees which vary in length, and each hole is played twice for an eighteen-hole round. A regulation sized course is designed according to one of the five basic configurations.

1. Single fairway 18-hole course with returning nines.

![Single fairway 18-hole course with returning nines.

2. Single fairway continuous 18-hole course.

![Single fairway continuous 18-hole course.

3. Double fairway 18-hole course with returning nines.

![Double fairway 18-hole course with returning nines.

4. Double fairway continuous 18-hole course.

![Double fairway continuous 18-hole course.

5. Core course.

![Core course.

Land requirements for the various configurations vary. Minimum acreage is 110 acres, with a range for an ideal course from about 140 acres to about 175 acres” (4).
"The playability of a golf course is greatly dependent on the overall design. The ‘model’ course has a good proportion of the three types of hole: penal, strategic, and heroic. (37). “The essence of a strategically designed hole is that the more accurately a golfer places his tee shot, the better his position for his approach shot for the green. Or conversely, the greater a golfer’s degree of error on any shot, the more difficult the ensuing shot” (Thomas, 33). “The essence of penal golf architecture is its insistence that a golfer takes the narrow route ordained for him to travel from tee to green. He is penalized severely if he makes only a mild error-his ball will end up in one of the plethora of deep bunkers that punctuate and protect the green” (33). The essence of a heroic designed hole “is more daring than the regular strategic concept. The heroic concept offers the stronger player the choice of challenging the site for a rewarding second shot. Heroic concepts often use [shots completely over water, off cliffs, onto islands and peninsula’s, and use] out of bounds areas as hazards” (Phillips, 26).

In the development of a golf course, “The quality of a golf course and its accessibility are inversely related—that is, accessibility has a higher effect on a low-quality course and a lower effect on a high-quality course. An avid golfer will search for a good course” (Heuer, 31). This is because “Both the average golfer and the champion golfer enjoy playing a sound, enticing, well-conditioned hole much more than a bland one, because a good hole makes it absolutely clear to golfers of all degrees of skill what shots he should play from tee to green and how he should handle the green. Consequently, when a golfer is able to execute the shots that are called for, the pleasure he experiences is far greater than when he merely manages to hit a fine shot on an indifferent hole” (Thomas, 34).

There are other factors that contribute to a good course. According to Bobby Trent, world champion golf pro, “The first purpose of any golf course should be to give pleasure, and that to the greatest number of players...because it will offer problems a man may attempt according to his ability. It will never
become hopeless for the duffer nor fail to concern and interest the expert; and it will be found...to become more delightful the more it is studied and played.' In a word the fine golf course offers rewards for the duffer's limited skill; the moderate player senses exciting possibilities; the good player a constant challenge; and the great player knows that only when he is consistently at his best can he hope to conquer it” (7).

To complicate the design of a course even more there are two schools of thought on the ideal make-up of the golfing terrain. “Most Britons, of whatever skill, have been brought up to regard a links course as the ideal playground, on which the standard hazards of the game are the wind, bumpy treeless fairways, deep bunkers and knee-high rough. Most Americans think of a golf course as park with well cropped fairways marching, like parade grounds, between groves of trees down to velvety greens. Along the way there will be vistas of other woods, a decorative pond or two, some token fairway bunkers and a ring of shallow bunkers guarding greens so predictably well watered that they will receive a full pitch from any angle like a horseshoe thrown into a marsh” (6-7).

The technical aspects of designing a golf course or basically straight forward and have been well documented and tested. An eighteen hole “golf course with a par of 72 is usually made up of ten par-fours, four par-threes and four par-fives, their yardage being within designated, but not absolute, limits” (21). A "Par is defined by distance. A par four would allow a tee shot, one approach shot and two putts on the green. A par three would allow one tee shot and two putts. A par five would allow one tee shot, two approach shots, and two putts” (Phillips, 18).

As far as the ideal landscape on which to build a course, “Gently rolling terrain is perfect for a golf course. It should not be so hilly or rugged that players would tire easily or...that many blind shot would be required, or the cost of construction and maintenance would be unreasonable. Natural golf features-creek
valleys, woodlands, ravines, ponds—are an asset to a site...rivers, creeks, and ponds can serve as a natural water supply...Trees on site add to the aesthetics of the golf course” (Heuer, 33). However, “few golfing aspects are more discouraging than a long toil up from the tee, and the best architects avoid them wherever possible” (Thomas, 25).

“Designers should begin play with a par four or par five hole on each nine hole sequence. This allows more players on the course at a faster pace, eliminating slow play on beginning holes. A par four, for example, allows one group on the tee, one group on the fairway, and one group on the green. A par five allow up to four groups on the hole at one time. Par three holes should be avoided as starting holes because they require an immediate skilled shot to begin play...A par three hole allows only one group playing the at one time which tends to slow play. Par three holes should be located in the middle to the end of a nine hole sequence” (Phillips, 19).

Also, “the most desirable orientation for a golf hole layout is on a north-south axis. When a north-south orientation is not possible, it is desirable to have the hole laid out on a east-west axis” (29).

There are also some basic and elementary parts to each and every golf hole. The following is a brief discussion on the elements the make up a golf hole.

“The golfer starts each hole at the tee,...tee areas should be well defined, flat on top, well covered with closely mowed turf, and based on good soil that will take
tee easily and resist compaction” (Heuer, 40).

“A green is an irregularly shaped area of as nearly perfect turf as possible where the
golfer finishes the hole and putts the ball into the cup. The green should be elevated
for visibility, sloping toward the approach area so that the location of sand traps and
other hazards is evident to the golfer trying to place the ball on the green” (41).

“The fairway is the area between the tee and green where the golfer hopes
the ball will travel. From tee to green is not, however, necessarily a straight line. A
fairway, which must be wide enough to be fair and narrow enough to provide a
challenge, is shape somewhat like a trapezoid” (44). “The landing areas or the dis-
tance from the tee shot is important in establishing play and design strategies.
Optimum landing areas determine placement of hazards and club intent” (Phillips, 21).

“The 10 to 40-foot wide areas on each side of the fairway, which are in-
tended to guide a golfer and set the direction for play, are the roughs. The char-
acter of the rough is similar to the fairway. But with slightly longer grass. If the
grass is to long, golf balls are hard to find and shots out of them are extremely
difficult” (45). “Sand bunkers (traps), ponds, and other obstacle to play are classi-
field as hazards. They should not be to tough or make a hole to tricky, but they
should present a challenge to players of all levels” (46).

“A practice area- tee, green, and fairway-has become an expected part of a good
golf course. Design, construction, and turf should be commensurate with the design,
construction, and turf of the regular holes on the course...practice facilities are often used
during twilight and early evening hours, so they require a lighting system” (50).

There are amenities to compliment a good course such as a club house, pro shop,
pavilions, benches, parking lots, etc. that need to be considered into the design. This has
been an attempt to give just the basic information on the design and workings of a golf
course for the purpose of master planning a course into the ISSA concept. In depth de-
scriptions of planning and developing golf courses can be found in numerous texts, if one
is interested in a more detailed look at the design of golf courses alone.
Motorcycle Road Racing

Motorcycle Racing, especially Grand Prix Racing, was the exact opposite of the golfing information. In that there was not a lot of information available on it and nobody seemed to know much about it or they just weren’t giving any information away. Because of this, most of the information was obtained through racing instruction manuals. One of the most important issues facing race tracks today is the concern and opposition to the noise and congestion that they create. The next most important problem facing tracks is that they lay dormant 85% of the time and don’t create any revenue and incur only expenditures. Because of this and also in that they use up tremendous amounts of land and resources, they are an excellent choice for participating in an ISSA.

“The pinnacle of motorcycle road racing is the 500cc world championship. It’s contested over a series of races throughout the world. The races draw crowd averages over 100,000 each. It rivals Formula 1 motor racing in popularity and international television coverage...Early motorcycle racing was very different from today’s sport... The races were run on public roads. Each lap was often as long as 20 miles, and some races lasted up to 5 hours” (Megahy). Today, nearly all races are run on closed circuit tracks built especially for racing. Races last only one hour or so and have an average lap length of 3 to 4 miles. However, “a race track is another sort of beast. Not much of anything is done for your [(the racers)] convenience. The designers have purposely constructed a course that will continue to create changing situations for the rider, to fool and challenge him” (1st Code, 2).
The following race course statistics were compiled from a combination of several sources (Code 1, Concepts International, Roberts, and Stone) and are averages representative of tracks in use today;

**General Road Race Courses:**

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Track length</td>
<td>3.06 miles</td>
</tr>
<tr>
<td>No. of laps</td>
<td>66.25 laps</td>
</tr>
<tr>
<td>Race length</td>
<td>187.61 miles</td>
</tr>
<tr>
<td>Width</td>
<td>37.12 feet</td>
</tr>
<tr>
<td>Longest straight</td>
<td>3,352.70 feet</td>
</tr>
<tr>
<td>Turn radius: Slow turns</td>
<td>33-95.5 feet</td>
</tr>
<tr>
<td></td>
<td>Fast turns: 95.5-573 feet</td>
</tr>
<tr>
<td>Spectator parking</td>
<td>18,000 cars</td>
</tr>
</tbody>
</table>

**Motorcycle Grand Prix Courses:**

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Track length</td>
<td>3.90 miles</td>
</tr>
<tr>
<td>No. of laps</td>
<td>24.74 laps</td>
</tr>
<tr>
<td>Race length</td>
<td>79.44 miles</td>
</tr>
<tr>
<td>Speed on course</td>
<td>97.35 mph</td>
</tr>
</tbody>
</table>

Race tracks are very simple concepts and are basically made up of five components: camber, radius, elevation, series of turns and straights. How these components are combined determines the racers approach to riding them, not only where speed is the consideration, but for safety’s sake as well. The purpose of a racetrack is to test and retest the racer’s riding skill; it is intended by the designers to be difficult. The rider’s task is to unravel the mysteries of the construction by using their knowledge to their advantage. No amount of bravery will substitute for understanding, and no amount of suspension changes will entirely overcome the forces generated by these five components (8-9). “No matter how many other riders are on the track, you must still rely on your own ability. The track is the ever-present challenge—not the other riders” (xii).
“Out on the track, your thoughts [(the racers)] and the ideas that have come from those thoughts, will determine how you get around the track” (3rd Code, 10). “The rider’s ultimate weapon is his ability to perform the actions of riding, and to be able to observe and remember what he has done” (1st Code, 10). “On the track or road, concentration is a smooth flow, or chain of events from one to another without a break... An example of this is the one major difference between riders in there ability to learn tracks. Learning a track means knowing where you are on the track” (29). Furthermore, This is the reason why racer’s look at points on the track, it is to learn where they are and where they are going. (24). In doing this, riders increase their chances of winning or even just surviving a race.

“Riders talk about the rhythm of a race track or piece of road, of getting to know the flow of the road. This is timing... Fast reflexes is not a substitute for good timing. At the speeds attained on a road-race track, good or even incredible reflexes don’t win races. If you plan to go road racing because you have good reflexes, figure out how long you have to make a change at 180 mph when your traveling at 264 feet per second! There is no substitute for understanding on a race track” (41). Furthermore, even “at 60 mph you’re traveling at 88 feet per second; at 120 mph you’re hurtling through space at 176 feet per second. That second ticks by very quickly, and if you’re not ready for the next move, ahead of time, you’ll make a mistake” (Code 1, 28).

As Kenny Roberts stated when he started racing for the first time in the European grand prix’, “I had to take track learning seriously because... I was going to get killed if I didn’t work out exactly where I was going... Race tracks can be very dangerous, with no run-off... I had to learn where I was going to go before I tried to go fast” (Roberts, 38).

The technical aspects of designing a race course are basically simple, yet combine to create a very challenging course when designed appropriately. As
stated before, there are only five major changes that can be designed into an asphalt road and these will be discussed in detail from the perspective of the reader being the motorcycle racer. The information about these five components of race track design and construction was obtained from California Superbike School founder, Keith Coders, first book, “A Twist of the Wrist”.

Changes in camber: A piece of road can have a positive camber-or banking. Banking has the effect of holding you up by creating a “wall” to push against with your tires. The bank also slows your bike down even more when you enter the turn because of the increased resistance created by the wall. Gravity is working for you, pulling you and the machine down the wall, counteracting the outward-bound cornering force. Or turns can have “off,” or negative camber. This means the inside of the road is higher than the outside. A turn that begins with a bank and ends off-camber demands the most changes and adjustments in lean angles. In order to continue around it, the bike must be leaned over even further. The effect is much the same as going from a banked to a flat surface. Gravity is now working against you, pulling you and your bike to the outside. You lose ground clearance. Therefore, you set up off-camber turns so that you are in the off-camber situation as short a time as possible—just the opposite strategy as for a banked turn. Or, the turn in the road can be flat. Also, a turn may be designed with any combination of these cambers.

Changes in Radius: A single turn may be a constant radius, as in a perfect half circle. Constant radius turns neither increase nor decrease as you go through it. If a constant radius turn has camber changes, it can act as a decreasing radius or an increasing radius turn. For example, if the turn is banked on entry and flattens out on exit it will have exactly the same effect on your bike as
the decreasing radius. If it is flat on the entry and banked on the exit, it acts as an increasing radius.

A decreasing radius turn is a turn that tightens up as you go through it. Turns with no negative or positive camber, or otherwise flat turns, will not increase or decrease the lean angle necessary to negotiate them at a constant radius or constant speed. A decreasing radius turn that is flat on the entrance and banked on the exit will act as an increasing radius or constant radius turn, depending upon the severity of the banking. An increasing radius turn widens, its angle becomes less severe, as you go through it. An increasing radius turn can be changed dramatically by the camber of the road, just as a decreasing radius can be. If it is banked going in, and flat or off-camber at the exit, it will act as a constant radius or decreasing radius turn, depending upon how much negative camber it has. Again, a turn may have a combination of all three radii.

Riders tend to see the basic turn, the physical curvature and direction of a turn, more clearly because it is more obvious than the camber change. This is one of the deceptive tricks of the racetrack designer. The rider is sucked into the turn because he basing his riding tactics on what the turn looks like instead of taking into account the changes in camber that can so seriously affect him. The radius of a turn is usually second in importance to its camber.

Series of turns: When two or more turns linked together in such a way as to influence each other are called a series of turns. The line you take through the initial part of the turn will be partly determined by where you want to exist it to
set up for the next turn. They are usually designed to slow you down at a place where you otherwise could go faster. For example, when the entry into a two-turn “S” is faster than the exit. If the entry is taken as fast as possible, it will spoil the exit. If the entry is taken with the exit in mind, the rider will sacrifice some speed going in for a more constant drive out of the turn. Here again, the designers attempt to lull us into taking action either to slow or to late. A series of turns can have any or all of the camber and radius changes listed above.

Uphill, Downhill and Crested Track Changes: Elevation can be added at any point to any type of turn or change in the road or track. When a track changes in elevation, it can create some exciting changes in how it must be ridden. Uphill and downhill sections of a track don’t pose any particular problems unless they are in conjunction with a tricky camber change, radius change or both. Difficulties in up and down sections usually occur where there is a crest or sharp rise followed by a downhill. Braking over a crested hill is tricky because the downward pressure of the bike is lessened. This results in less traction. A turn with a crest in the middle is also tricky because. There is a loss of traction and it has the same affect as a short patch of off-camber road.

On uphill sections you have the advantage in that you can stop or slow the bike faster than on flat or downhill sections. On a downhill section the situation is reversed; the brakes lock more easily. The other possible problem with uphill, downhill, or crested roads is that bikes tend to wheelie over them. This isn’t really a problem unless you have to make a turn while the front wheel is still in the air.
Straight Sections: Straight sections are portions of track with no turns or changes to affect you. However, increases or decreases in elevation may be added. Straight-aways are a great place to relax for a second or two. Check to see that you are breathing regularly. Riders often hold their breath during intense riding, which slows their efficiency. Lack of oxygen is one of the causes of muscle cramps while riding (1st Code, 2-8).

These are the five major changes that can be engineered into any piece of asphalt. With the addition of bumpy sections, which were not planned by the designers, you have all the possible situations. In order to understand a road or track, you must understand its characteristics. Each of these changes has a direct influence on you (the racer) and your bike’s progress through the corner. In order to effectively design a race track or for racers to ride quickly and safely, you must understand how these changes affect you and how you can best handle them (3).

Course Section Configurations

Moving on to the subject of race track surfaces, “most racetracks and canyon roads are constructed from asphalt compounds. Asphalt can be, and often is, mixed with various substances to create different types of road surfaces. Race tracks, for instance, often have ground-up sea shells or granite chips mixed into the asphalt to give the tire a better surface to bite on, and therefore better traction” (9).

There are also other factors and conditions that affect a race track. These
elements include air and track temperature and humidity, color and freshness of the track surface, and debris or spills on the track. Heat especially plays “a huge role in determining what tire will be the best that day. An overcast day that does not allow the track surface to heat up may require a different tire than a sunny day, even if the air temperature is the same. Asphalt surfaces that are darker in color heat up more than lighter-colored sections... Where the track is a composite of three or four different asphalt compounds, tires that work well in one area tend to slide around in others. And tires that work well in the morning, before the track has heated up, sometimes will not provide good traction in the afternoon and vice versa” (9).

Repeating what Keith Code himself said, tires and asphalt are an entire technology unto themselves and I will not try to deal with them in this project (9).

The next section is a dissection of the world famous Turn Six at Riverside Raceway in Riverside, California. Turn Six is part of a series beginning with Turn Five. Turn five is faster the Turn Six, and most riders brake and go down a gear coming into Five. Coming into Turn Six, the track is banked at this point. Then, the track flattens out and loses the banking. The track then picks up the banking again about two-thirds of the way through. Finally, the banking goes away again at the exit of the turn. That is four camber changes in one turn!

There are also other factors affecting this turn. At the beginning where we lose the banking there is a crest on the track. Bikes become light as they goes over this crest. The suspension unloads, traction goes away and the bike wants to go toward the wall—very fast. An additional twist to that last part of the turn is that it tightens up and goes downhill a bit. This turn has four camber changes, two radius changes and a hump in the middle of the camber change! To make it
worse, the pavement is poor. The track designer must have really had fun with this turn (39).

As with golf courses there are also special amenities to compliment a race tracks such as a club house, pits and paddocks, official tower and registration building, concessions and pavilions, benches, parking lots, etc. These also need to be taken into consideration in the design.
Assumptions and Limitations

The assumptions and limitations set the parameters for the project. They were the major contributing factors that helped to establish the design process, programmatic statement, and design synthesis.

Assumptions

To begin with, it was assumed that; there was a need for and an openness to the integration of specialized recreational sports for the purposes designated in this project. That the codes, zoning, and regulations allowed for the development of such an area. Any improvements on the site could be eliminated if necessary. Funding was available for the development of the entire ISSA at the onset of the design and development phases. The masterplan would be designed to be as environmentally sensitive as possible so as to not upset the existing natural ecological functions of the site, but work with and sustain natural environmental site functions. This was really beyond the scope, depth, and capabilities of this study to be investigated in any great detail. The last assumption was that the project was intended for a study of the feasibility of integrating specialized recreational sports only and therefore did not take into account some of the more serious and technical environmental aspects such as the above stated assumption.
Limitations

The projects limitations were such that they set the boundaries for the research phase of the study. A limit was set in not evaluating all possible recreational sports and in not trying and create a recreation area for everyone. Specialized sports were emphasized, with championship golfing and grand prix motorcycle racing being the focus. Other sports were considered, such as shooting sports and long distance fitness sports, but were not dealt with in detail in the design process. Also, the study did not try to create a completely maintenance free or self sustaining area. It attempted only to try and reduce initial input and maintenance required of such areas by working with the natural environmental site functions and to reduce the land and resources required for such an area.
Program

The fictitious clients of the ISSA project were KR Promotions and Nicklaus Designs. KR Promotions is a racing organization operated by Kenny Roberts, three time world grand prix motorcycle champion and owner/manager of Team Roberts/Yamaha GP motorcycle racing team. Nicklaus Designs is a golf course architecture firm owned and operated by Jack Nicklaus, world famous professional championship golfer. Together they entered a joint venture in the creation of a new and unique development in sport facilities; an ISSA. They have contracted the author for the design and development of a model and masterplan of an ISSA. At a site in Northeast Indiana of 1,290 acres had been purchased for the development of the recreational facilities. The program they devised has three aspects to it: One, General requirements; Two, Championship Golf Requirements; and Three, Grand Prix Motorcycle Road Racing Requirements.
General Requirements

The general requirements were developed to apply to the overall ISSA concept and site. They were as follows:
- Provide multiple egress point were to be provided to ease traffic congestion during major attendance events.
- Entries were to be gated and have an information/ ticket booth provided.
- Parking was to be as follows: permanent parking lots located near main facilities for up to 1000 vehicles, temporary parking to accommodate 60,000 visitors with another 40,000 in temporary overflow lots. (Calculate for 2.5 people per car)
- An internal site road was to provide for circulation through the site to prevent the use of “backroads” surrounding area.
- Once parked, visitors would not be allowed to drive in the site and were to remain as pedestrians or use a provided means of transportation.
- Allowance for a “buffer” area was to be made around the site to shield and insulate the surrounding areas from activities on the site.
- All facilities will be housed centrally in one building as much as is feasible. These facilities were to include: pro shop, club house, race tower main concessions and rest-rooms, ticket and registration office (all to be shown by footprint).
- Picnic areas, amphitheaters and lawn seating were to be designated for up to 60,000 people.
- Maintenance building and service area (7 acres) were to be located away from main activity area and to have its own separate entrance.
- Site design was to allow room for future additions of other sporting activities and to accommodate their participants and spectators.
- Sport courses were to be located on a variety of terrain to provide for maximum interest and should be designed for minimal environmental impact.
- Activities on the site were to be designed to provide the maximum amount of
enjoyment and satisfaction to both the sport participants and spectators.

-Sport functions and amenities were to be designed to be as environmentally sensitive as possible and to operate within natural site functions.

-Guest residence facilities was to be provided for the participants of the sporting events (shown by footprint).

-Individual sports and their respective areas were not to interfere with other sports or endanger other participants within the site.
Sport Specific

Championship Golf Requirements

Championship golf requirements, in addition to the above general requirements, were as follows:
- A championship golf course of 18 holes with returning nines, 72 par, 7,000 yards + -.
- Multiple tee and cup positions were provided.
- At least two permanent pavilions were provided on the course for a place for player to rest and retreat to if necessary.
- A club house of at least 7,000 sf and a pro shop of at least 3,000 sf were sited.

Grand Prix Motorcycle Road Racing Requirements

Grand prix motorcycle road racing requirements, in addition to the above general requirements, were as follows:
- A 3 to 4 mile, 40' wide, asphalt grand prix road race track was to be designed with the following features included, in addition to others, at the designers discretion; a cross over section, a complete carosal loop, and a hole shot series of turns.
- Paddocks were to be provided with three garages, totaling 30 individual stalls with accompanying amenities (3 acres).
- 30 pits were to be provided along at least a 1,400' pit lane.
- Race course building were sited within the topography of the site so as to be hidden from view when not in use.
- Tunnels and bridges were provided in order to allow access to the infield of the track.
- Scoring and pole position boards were provided along the media buildings cliff facade.
- Removable barricade fencing, lawn seating, and picnic areas was considered in the design of the course layout.
Site

Location

The site was a tract of land that was representative of and located in the Northeast Indiana lakes region. The specific site for the project was in Noble County. It was bordered and defined by Base Line Road, County Roads 400 East, 200 South, and 500 East. The site consisted of approximately two square mile or 1290 acres. It included a mixture of residential housing types, rolling topography, farm fields, wood lots, wetlands, and streams.
Description

The site was located within a 150 mile radius of twelve major metropolitan areas (populations over 100,000), within a 50 mile radius of twelve large cities (population between 10,000 to 100,000, and within 20 miles of eight small towns (population below 10,000). There were 24 residential properties located within the site, ranging from aged, single family homes and farmsteads to new, large, single housing units and mobile homes. There were 16 residential properties adjacent to the site with basically the same character composition.

The circulation around the site varied from a primary paved road to tertiary dirt roads. Base Line Road was the one primary road servicing the site. It was relatively well paved, wide, but very hilly. It was located between two well maintained and traveled state roads. S.R. 9 is 4.25 mile to the west of the site and S.R. 3 is 5 miles to the east of the site. The county roads, 400 East, 200 South, and 500 East, surrounding the edge of the site and were of secondary use in nature. These roads were relatively narrow, very hilly with many hidden entrances, and are in poor condition. The roads that traverse the interior of the site were tertiary dirt roads. These are in very poor condition and serviced only six properties. Two of the properties were abandoned and two were located at the ends of the roads, connecting with the secondary roads.

There was a major power line corridor running from the Southeast corner of the site diagonally 195 degrees through the site to the Northwest. Also, the southern West side of the site partially borders Chain-O-Lake State Park. All of the drainage from the site positively drains into the park.

The topography of the site varied greatly between approximately the 900' elevation and 1,000' elevation. This provided a maximum elevation change of 100' +-. Sixty percent of the site was relatively flatland. Flatland being defined as any slope 12% or less. There is an equal distribution of 30% uplands and 30%
lowlands. The rest of the site, 30%, is made up of extreme slopes varying from >12% up to 25%.

Soils on the site varied greatly, with there being 28 different soil types classified, mostly because of the variation in slope angle. However, the soils could be grouped into three very general associations. The Miami-Riddles-Brookston association covered approximately 30% of the site and was an intermediate type of soil, not to wet or well drained, deep or shallow, sterile or fertile. The Morley-Blount association covered approximately 50% of the site and was basically a well-drained, upland soil. The Morley-Miami association covered approximately 20% of the site and was basically poorly-drained, wetland soil.

Vegetation varied in density, size, and type throughout the site. The site contained 62% farm fields, 21% hardwood woodlands, 8% fallow fields or shrublands, 4% residential lawns, 3% wooded marsh, 1% open marsh, and 1% ponds. The hardwoods consisted of a mixture of maple, oak, cherry, hickory, walnut, and other typical tree species of the area. The fallow fields and shrublands was basically old agricultural lands that were well on their way in reverting back to woodland. Also, there were about an 1.5 acres of an evergreen anomaly, which consisted of a dense mature patch of evergreen trees out in the middle of the site.
Analysis

Site egress was determined to be only feasible from Base Line road. It had a direct link to major state roads and was the only road to the site that could handle an increase in traffic. The only draw backs were that the road was fairly hilly with quite a few blind entrances. The secondary county roads just were not suitable for any increased traffic and use of them was discouraged. The tertiary dirt roads and residences/properties through the site were treated as being readily removable for the benefit of the project. The power line right-of-way was a major obstacle and eye sore that needed to be dealt with carefully to improve its presence.

The topography of the site offered potential challenges because of the extreme slope areas were highly eroded or erodable and highly susceptible to development impact. However, this region also provided for the most dramatic and grand user experiences possible.

Site vegetation gave the area a great diversity of physical and aesthetic appeal. The farmlands presented the area with a rural atmosphere and cultural identity that would be beneficial to keep, in controlled production, as much as possible. The fallow fields and shrublands provided the opportunity for the creation of grasslands and wildflower meadows or for the site users to experience an area where farmland is succeeding to woodland. The woodlands were considered a prime benefit to the site, but were not consider pristine or sacred because they were all of second growth with few mature trees to be found because of recent logging activities. The woodland was retained as much as possible, but was eliminated if necessary for the design. The evergreen anomaly was a unique feature that was to be used for its maximum visual benefit in the design. The wetlands and fallow land on the site provided crucial habitat and was protected and preserved in during the design. Plus, wetlands have an excellent benefit of
being natural filters of contaminants leaching from the surrounding areas. The numerous ponds on the site, many of them artificially made, showed the potential of the site to easily provide aquatic habitat.

Overall, the site offered an exceptional opportunity for design potential. Yet, it also had some very critical, environmentally sensitive, areas which had to be considered with delicacy and thoughtfulness. The constraints of the site for the introduction of an ISSA and its desired uses were great. Although, through careful planning and design, an optimum solution was achieved.
SITE ANALYSIS

PRIMARY ROAD
BENEFIT - WIDE WITH
GOOD SURFACE - EASILY
HANDLE MORE TRAFFIC,
LEADS DIRECTLY TO
MAIN STATE ROADS.
LIABILITY - HILLY WITH
BLIND DRIVEWAYS.

FARM FIELDS
BENEFIT - PROVIDES
NATURAL HABITAT EDGE
\ RURAL ATMOSPHERE.
CONTINUE FARMING
WHERE POSSIBLE.

SECONDARY ROADS
CONSTRAINT - TO NARROW
\ DANGEROUS FOR INCREASE
VOLUME OF TRAFFIC.
STAY OFF!

EXTREME SLOPE AREA
CONSTRAINT - HIGHLY ERODED
\ ERODIBLE, SOMETIMES
VERTICAL EROSIONS.
OPPORTUNITY - PROVIDE GRAND
VIEWS \ DRAMATIC USER
EXPERIENCES.

TERTIARY ROADS
CONSTRAINT - SEVERES SITE
AND SERVICES FEW PROPERTIES
\ PROPERTIES IN ALL, 2 ARE
ABANDONED AND 2 COULD
BE SERVICED BY SHORT DRIVES

WOODLANDS
BENEFIT - OPPORTUNITY
TO ALLOW THE FORMATION
OF A CLIMATE WOODS.
KEEP FROM LOGGERS.

IN-HOLDINGS
INTRUDING PROPERTY
HAMPERS EFFECTIVE USE
OF SITE.
BUY OUT
GIVE THIS ONE TO DNA
USE AS A TAX WRITE-OFF

EVERGREEN ANOMALY
BENEFIT - UNIQUE FORMATION, CREATES
VARIETY \ INTEREST.

MAIN DRAINAGE COLLECTOR
BENEFIT - LOW LAND SUITABLE
FOR DEVELOPMENT OF A JOINT
RESEARCH EFFORT WITH DNR
TO CONSTRUCT A WET LAND
TREATMENT AREA.
CONSTRAINT - DRAINS
TOWARDS STATE PARK

ARTIFICIAL PONDS
BENEFIT - PROVIDES
ADDED RECREATIONAL
OPPORTUNITIES.
SHOWS POTENTIAL OF
SITE IN ALLOWING THE
ADDITION OF AQUATIC HABITAT.

POWER LINE RIGHT OF WAY
CONSTRAINT - MUST WORK
AROUND.
Concepts

The ISSA development project has been conceptualized into three design layout models: Con 1-Interlocking Fingers, Con 2-Total Overlap, and Con 3-Core integration.

Concept one was the interlocking fingers model. In this concept there was the greatest amount of “edge”, or shared boundary between uses, created. Also, it allowed for the largest available expansion room while being able to utilize one massive, central parking area. However, this model did not maximize the integration concept. This is because it only shared the central facilities, but still consumed major quantities of land and resources.

Concept two was the total overlap model. In this model there was a maximum of overlap and shared resources. It also was the most spatially compact of the three concepts. Yet, it allowed for little, if any, room for expansion and there can be no central parking available. All parking would have been in peripheral lots. Although, these lots would serve as the buffer zones required by the program.
Concept three was the core integration model. This model effectively utilized the integration concept and process. It provided for a sizable reduction in land and resources used, while providing for a reasonable area for expansion. Also, parking became a mixture created of one centrally located lot, one large temporary lot, and several, various sized overflow lots on the periphery acting as buffer zones.
Design Process and Development

The design process that was originally applied to the ISSA concept was an ideal attempt at reaching a non-compromising solution to the project. An attempt was made to design each project element in its ideal position without regard to the other project elements. These elements would then be fitted together in their original positions to create an ideal overall masterplan. However, many problems arose because of overlapping and conflicting uses. Because of this, the search for a logical solution to the project seemed to go nowhere and was actually regressing. Eventually, this design process became so complicated and frustrating that a new approach was applied.

To overcome the above design problem, the design process was changed to evaluate each individual element separately, one at a time and site or route all the possible positions for that element. Then the best position for that element was chosen and the next element was placed using the same process except working around the previously sited element. In designing the project in this way a more efficient and effective solution arose out of the many confusing and conflicting factors that were involved in creating the ISSA.
Starting the process, the race track was sited because it was the most permanent and unnatural feature of the project. First, all of the possible routes were laid out, shown in blue, and then the best design was chosen, shown in red.
Next, the golf course was sited in the same way except for working around the previously sited race track. All of the possible routes were laid out, shown in blue, and then the best design was chosen, shown in red.
Finally, all of the general ISSA requirements were sited in the same manner except for working around the previously sited elements. All of the possible locations were laid out, shown in blue, and then the best positions were chosen, shown in red.
Masterplan

The final design solution that was reached took full advantage of site features and of the intended sport functions. To begin explaining the design, the dirt roads through the site was partially eliminated along with two active residences and two abandoned residences. One residence was deeded off to the state park and a link re-established to it from the park. One residence was left protruding into the site, because it did not hamper the design in any way. The residences at the end off the dirt roads continued to function normally. The land that was deeded to the state park was designated to become a wetland area in a joint effort with the Indiana Department of Natural Resource. At this point, it was felt that a wetland filter would be beneficial to cleanse the water run-off of contaminates acquired in the ISSA because all of the site drainage converges here before it flows into the state parks watershed and aquatic environment.
Masterplan

- 10 ACRES PERMANENT PARKING
- 160 ACRES TEMPORARY PARKING
- 104 ACRES TEMPORARY OVERFLOW PARKING
- 3.05 MILE MAIN 6-P CIRCUIT
- 4.33 MILE 6-P CAROUSEL LOOP
- 18 HOLE, PAR 72, 7080 YD GOLF COURSE

FRONT NINE: 1-9, PAR 36, 3823 YD
01, PAR 4, 427 YD
02, PAR 4, 396 YD
03, PAR 4, 386 YD
04, PAR 3, 337 YD
05, PAR 3, 323 YD
06, PAR 4, 434 YD
07, PAR 3, 405 YD
08, PAR 4, 434 YD
09, PAR 4, 434 YD

BACK NINE: 10-18, PAR 34, 3823 YD
10, PAR 4, 396 YD
11, PAR 5, 567 YD
12, PAR 4, 365 YD
13, PAR 5, 520 YD
14, PAR 3, 307 YD
15, PAR 4, 407 YD
16, PAR 5, 523 YD
17, PAR 4, 434 YD
18, PAR 4, 434 YD

(Additional notes and details may be present on the diagram.)
At the heart of the area was sited the grand prix motorcycle track. The route chosen was ideal in that it was centrally located, well buffered from the surrounding properties, very compact, and used the terrain of the site to its maximum benefit. The grand prix course could be called a "nap of the earth" route. Being that it followed the sites topographic features almost exclusively as a guide in creating an exciting and dramatic course with minimal site work being needed. The course eventually attained 3.05 miles in length with 14 turns and an additional .43 mile carousel loop. The course has such unusual features as a full circle carousel with a cut-off and cross-over, a track main cross-over, a hole shot section, two parallel straightaways, a series of banked esses, and inground facilities.
The carousel cut-off allows race organizers to choose whether or not to use the carousel and the cross-over provides a safe entry and exit for the racers. Also, the inside of the carousel is mounded up and spectator are allowed to get close to the race track (this is safe here because if a wreck occurs all objects would be thrown to the outside of the track) so that they feel as if they are looking eye to eye with the racers as they circle the carousel, giving the spectators a heightened sensation and personal touch of the excitement of a race.

View of Carousel Cut-off and Cross-over

Carousel Section

The main cross-over that provides racers and spectators with a spectacular experience as the overpass declines over 70 feet in a banked turn from the top of a ravine down into the ravine’s valley to lead into the hole shot section.

View of Main Cross-over

The hole shot section was a track element that consisted of a series of increasingly tighter turns lined up in a row.

Hole Shot Plan
Why it is called a hole shot is because a single rider can shoot down through the middle of the turns without ever having to negotiate them. However, with two riders, side by side, would either both have to start curving around the turns or one would shoot through while the other would have to negotiate the turns. In this section it is of a great advantage for a rider to be in the lead or alone on the track because they can make up a great deal of time in this section over that of a pack of riders.

View of Hole Shot Section

Track Sections of Infield Crossings

Pedestrian Tunnel

Tunnel through Track Banking

Observation Bridge
Track amenities were built to be as inconspicuous as possible when not in use. A grass grandstand amphitheater was chosen over traditional spectator seating because it was felt that a structure this large and used so little should at least try to look natural and blend in with the site. Furthermore, the top of the amphitheater serves as an excellent launching pad for golfers to use the pasture/parking area as a driving range.

View through Grass Amphitheater & Concessions

Most of the track buildings were designed in-ground to be hidden from view when not in use (which would be most of the time). These buildings included the paddocks (garages), tech inspection building, media/timing multi-purpose building, and concession/rest rooms.

Track Facilities Sections

View through Pit Lane & Media/Timing Building

View through Paddocks

View through Tech Inspection Building
Also, the maintenance building for the entire ISSA was partially sited in-ground and was to be accessed from the back side of the site away from the main entry.

View through Maintenance/Service Building

In an attempt to create a unique and distinctive atmosphere to the ISSA, the other built structures were styled to look like Gothic structures. This was done to try and imitate the courses in Europe. Many of the European courses were built on estate grounds having stately manors and even castles on them surrounded by pastoral, agrarian lands. The club house was the largest of these structures and resembles a full scale Gothic castle. It was a multi-purpose building holding many of the auxiliary functions of the ISSA within it such as reception room, registration office, conference area, club facilities (bar and lounge), first aid station, pro shop, etc.

Administration Building

The guest residence is the next slightly smaller, but similarly style building. It provided on-site world class accommodations for the participants of the sports, race teams and pro golfers, and it was provided with its own separate side entrance away from the main entrance for ease of egress to the guests.

Guest Residences
The other built structures, again similarly styled, were entry gates, bridges, and pavilions. The entry gates were designed to mimic the style of the buildings inside and give the area a unique and original entrance. They were made out of limestone blocks and bent Corten steel I-beams.

![Entry Gate]

Pavilions were located strategically around the site to provide areas for the spectators and participants to retreat to and rest. Water and rest room facilities were provided in these structures. Bridges on the site for access and the race track were also styled with Gothic castle-like appearances.

![Pavilion and View of Entry Bridge over Esses]

The golf course was designed to have minimal environmental impact. Maintenance was kept to a minimum following the concentric ring principle. This principle states that the core ring receives the most attention with the progressively larger rings receiving less and less attention. Putting this principle into practice on the golf course meant that the tee and greens received the most maintenance. The fairways received a little less maintenance. The traps and hazards a little less. Eventually, the roughs received the least with basically only mowing being done in order to allow play. By maintaining the course this way a combination of the two schools of golf course architecture was achieved.
With the highly manicured core being the American style and the naturally rough outer layers being the European style. When a major event is held at the site, such as the United States Motorcycle Grand Prix, the golf greens would have to be fenced off and protected.

The course was laid out in the single fairway with returning nines configuration and attained 18 holes, par 72, 7050 yards. The course is definitely a cart course or a fitness hiker's dream because of the widely spaced holes. The reason for this wide spacing refers back to the provision of allowing future expansion room for other sport courses to be placed on site without hampering the play of either sport. Six of the golf hole were located within or close to the race track. Each hole had three tee areas; one for pro's, men's, and women's each.

The front nine, holes 1-9, par 36, 3525 yards, was actually on the back half (south side) of the site. It crossed a wide variety of terrain and had many ravine,
water, and multiple shot routes. One pond was created at the sixth hole and a treacher-
os ninth hole was designed along the ridge of a ravine. The distance from the club
house to the front nine is great, but it is very close to the guest residence. At first this was
thought to be undesirable, but then after careful consideration it was considered benefi-
cial. By giving the beginning golfer a long drive to the starting tee, time is available for
contemplation of the challenge ahead which sets the mood for the game. Irrigation for
this side of the course was from an existing pond. Many of the farm fields were left to
revert into succession creating a more natural, undeveloped look to this side of the site.

The back nine, holes 10-18, par 36, 3525 yards, was actually on the front half
(north side) of the site. It crossed more of a gently rolling, agricultural terrain, but was no
less challenging. The beginning and ending holes were relatively close to the club house
and created no access problems. A pond was created for irrigation of the holes on this
side of the course and the signature hole was allowed to cross a wetland area showing
that golf courses can be environmentally sensitive. This side of the site was left in agri-
cultural production, such as hay fields or pasture, so that it could be used for temporary
parking during the big events. On this side of the site a much more rural/agrarian
atmosphere was retained.

The last major design element to be consider was the parking. There are three
permanent parking lots totalling over 10 acres located by the main building, the club
house, guest residence, and in between the two. On the north side of the site was where
the two main entrances were located. Both entries are multi-lane and allow vehicle a
runway before they are ticketed to get them off of the main access road and not cause
traffic problems. One entry was the permanent access point to the sites core and main
facilities along with temporary parking. The other entry was to temporary parking only
during big events. The temporary parking totaled 209 acres. A third entry was provided
down county road 400 East, which was paved over for the entry purpose. This entry is
only for temporary overflow parking only and is entered and gated the same as the other
entrances. Overflow parking totals 109 acres.
Conclusion

Overall, the masterplan of the ISSA was considered a success. However, as mentioned before, in an Actual ISSA there would have been more sports initially involved than were used in this project. Although, a compatible integration was achieved with this project and ample room was allowed in the design for future sport additions. Also, a good comparison was made between the “passive” outdoor recreation of the neighboring state park and the “active” outdoor recreation of the ISSA. These two areas would compliment and benefit from each other by feeding off of each others visitors and creating a larger attraction to this location.

There were other important issues needed to be looked at more closely with an ISSA. Such as the impact of parking on farm soils, trash and damage after major events, spectator safety, and noise factors from racing. etc. Most of these concerns arise only during events that draw huge crowds. While smaller and daily events would have little if any impact on the site or surroundings.

The ISSA concept was seen as a viable and important alternative in the future in developing recreational sports areas in a world of finite and dwindling resources. It was seen as a great potential for the practical application of the landscape architects knowledge and skill. There are also many specialty and multi-use applications of the ISSA concept. Such as areas for all silent sports: Bicycling, hiking, golfing, horse back riding, archery, etc. or in the use of just the race track alone for bicycle races, fitness joggers and walkers, public racing of regular automobiles (quiet) on a pay per lap basis, etc. The possibilities of the ISSA concept are almost limitless because of its inherent flexibility and resilience to change with current conditions and criteria placed upon it all the while meeting it basic requirement of reducing land exploitation and resource consumption.
MID-OHIO SPORTS CAR COURSE

FACT SHEET

Location:
60 miles north of Columbus, Ohio
75 miles south of Cleveland, Ohio
7 miles from downtown Mansfield, Ohio
10 miles from the Mansfield Airport

Type of Track:
road course consisting of 13 or 15 turns
track length is 2 25 or 2 4 miles
track width is 40'
pit lane is 40' wide
pit lane wall is 3' in height
28 pits
pit lane is 1150' long

Infield and Grounds:
285 acres
190 acres are used for parking
75 additional acres are leased for parking during events

Paddock:
three garages, totaling 28 stalls
stall is equipped with water, electric, compressed air, and a fire extinguisher
permanent concession stand with picnic area
permanent restroom

Improvements:
1983:
100% resurfacing of track in 1972 and 1990
4,000 permanent grandstand seats
amphitheaters in the turns 1, 6, 7, 8, and 14
three-sided scoreboard erected
five-story Goodyear Tower which houses the media, timing and scoring, two V.I.P. suites and a race information center
garages built
1984:
concession stand and picnic area built in paddock
ticket office and registration building remodeled
1985:
Camel Deck and concession stand built in infield tunnel under back straight to Grandstands 1 and 2 built
amphitheater constructed in the keyhole
front gate redesigned

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1986:
maintenance and food commissary buildings constructed
redesigned entrance to registration
new septic system

1987:
technical inspection building renovated by MAC Tools, Inc
renovation of main infield concession stand
add-on souvenir stand to main infield concession stand
construction of retail parts supplier building
pit lane widened by 13'
pit lane lengthened by 250'
1000' of concrete barriers added -- 300' to pit lane, 300' to main straight and 400' to Turn 2
redesigned and added gravel runoffs areas to Turns 1, 2, 9, 11, 14
tire walls added to Turns 7, 11, 14
food preparation building constructed in infield
150' of cement barrier added to Turn 9
tire barriers added to Turns 1 and 9
100% resurfacing of the track
widened track to 40'
chicane/straight option designed between Turn 1 and keyhole
starters' stand constructed on back straight
The Mid-Ohio School was established
school building constructed in paddock
school skid pad constructed in grass paddock
additional debris fencing in Turns 4 and 11
1,500' of debris fencing to be added in Turn 8
additional curbing will be added to Turn 1, keyhole, back straight
Valvoline Runoffs, SCCA National Championships, to be held at Mid-Ohio
paved 75% of secondary paddock

Ownership:
1962, Les Griebling opened Mid-Ohio Sports Car Course
October 1981, James R. Trueman purchased the track
Bibliography

Abstracts


Books


Periodicals


Video Recordings


Maps


Promotions
