

FORE!:
TEACHING GOLF COURSE DESIGN IN A LANDSCAPE ARCHITECTURE
CURRICULUM

by

WILLIAM G. SMITH

(Under the Direction of Professor Scott Weinberg)

ABSTRACT

This thesis will layout a comprehensive plan of an approach to teaching a class in golf course design to landscape architecture students. The field of golf course design is enormous, with its own history and many technical details. While impossible to learn the entire field in one semester, I believe that it is possible for landscape architecture students to gain a general understanding of the subject that would be beneficial to them whether they choose to pursue golf course design or some other related field like community design or resort planning

INDEX WORDS: Golf Course Design, Golf Course Architecture

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DEDICATION

This work is dedicated to all my students who had to put up with a first time teacher and to Bunker and Niblick for all of their help.

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CHAPTER ONE

INTRODUCTION

Golf course design has long been looked down upon by the field of landscape architecture. Golf courses themselves have long been viewed at best as a wasted resource and at worst as an environmental wasteland. Many landscape architecture schools have pushed golf course design to the periphery of the curriculum, if not ignored it all together. This is a mistake. The role of education is to inform and illuminate rather than denigrate and obscure.

By the end of the year 2005, there will be over 15,000 eighteen-hole golf courses in the U.S.¹ At an average of 200 acres a course, that means that there will be approximately 3,000,000 acres of land covered by golf courses.² 157 courses opened in 2004, down from the astonishing 398 in the year 2000. The golf course business is a multi-billion dollar industry. Since the 1970's, golf courses have been the focal points of many communities. The amount of land being set aside for golf is considerable and in some urban environments this land is the largest amount of green space for miles. Rightly or wrongly, market forces have determined that golf courses are a worthy use of land. Rather than ignoring these landscapes, schools should train their students how to design golf courses in a responsible fashion.

The golf course is first and foremost a cultural landscape. There are certain rituals and traditions that determine the form and makeup of the course. The rules of the game require golfers to travel this landscape in a predetermined manner. However, golf courses are also natural landscapes,

¹ The figures in this paragraph come from www.golf2020.com/frip/resources/2004_frip.pdf, a report prepared by a group that promotes the growth of the game.

² This is a very conservative estimate. Many golf courses sprawl out over many hundreds of acres.

constructed of grasses, shrubs, sand, trees, rocks and water. Historically, golf course designers have used the natural environment as a guide for hole layout. In the modern era of golf course design (post-1960),³ designers have relied on earth-moving equipment to makeover nature into an artificial landscape that is more conducive to the game of golf. Recently, there has been a renaissance towards the idea of preserving and highlighting a site's natural features. With this idea has come a better understanding and awareness of how a golf course can impact the environment.

Landscape architects have long studied how humans interact with their environment, but traditionally this has been done under different typologies, such as the garden or park. Kenneth Helphand's *Learning from the Linksland* expertly traces the evolution of the golf course, showing how it changes and adapts according to different environments and cultures.⁴ This article serves as a great introduction to landscape architects who want to learn more about golf courses. It provides the study of golf course architecture with the academic pedigree that it has lacked. A golf course is no different than any other designed landscape in that it effects how humans relate to the environment. The tools of the golf course designer are no different than those of the landscape architect. They both work with plant materials and the ground plane to create space. The main difference is that on a golf course there is a game that controls how a person moves through the environment.

The mere mention of the word "golf" to a person who considers themselves to be environmentally conscientious brings a shudder and a scowl. Whether its bulldozing a wetland, clear-cutting a forest or just using too much water and fertilizer to keep the grass green, golf courses over the years have come to epitomize environmental irresponsibility.

³ *Golfweek* magazine publishes a ranking of modern and classic courses. They use 1960 as the dividing year between these two categories and this year is now considered the standard. Some push the change back to World War II.

⁴ Helphand, Kenneth, "Learning From Linksland," *Landscape Journal*, (15, No. 1, 1995) pp 74-87.

This has not always been the case. Golf was a game that evolved because of the landscape over which it was played. In its origins, the game was about enjoying the natural environment rather than defacing or destroying it.

Landscape architecture schools have a responsibility as stewards of their profession to ensure that those designing golf courses understand the relationship that golf has had with the environment. As such, a class introducing students to the basic concepts of golf course design is necessary in the landscape architecture curriculum. The objective of this class would be to teach the tradition and history of the game, to demonstrate the skill of routing a course to take advantage of and conserve the site's natural features, and to discuss the game's reputation as an environmental liability and its potential to be an environmental asset. This thesis will lay out a comprehensive plan of an approach to teaching a class in golf course design to landscape architecture students. The field of golf course design is enormous, with its own history and many technical details. While it is impossible to learn the entire field in one semester, I believe that it is possible for landscape architecture students to gain a general understanding of the subject that would be beneficial to them whether they choose to pursue golf course design or some other related field like community design or resort planning.

CHAPTER TWO
AN OVERVIEW OF A CLASS ON GOLF COURSE DESIGN

Golf course design is a broad subject and cannot be comprehensively covered in a one semester studio class. The European Institute of Golf Course Architects offers a Master of Science degree in golf course design through Heriot-Watt University in Edinburgh, Scotland that requires three semesters of study.⁵ A good portion of their curriculum falls into the category of general landscape architecture classes, such as ecology and community planning. For a one semester class in golf course design to be successful and worthwhile in a landscape architecture curriculum, a student must have completed prerequisites like those mentioned above. During the fall semester of 2004, I had the opportunity to oversee a golf course design studio with eighteen undergraduates and one graduate student (Table 2.1). This thesis will describe how the studio was organized, provide an analysis of how the semester progressed, and point out areas that could be improved upon.

Table 2.1: Syllabus for a class on golf course design

<p><u>LAND 4910- Golf Course Design</u> Caldwell 6th Floor Studio MF 1:30-4:30 W 1:30-3:30</p> <p>Will Smith 720-841-3215 willsmith396@hotmail.com Office Hours: by appointment</p> <p>Course Description: This class is a cursory look at golf course design. It will consist of lectures and class discussions on history, strategy, construction, and the environment. There will be a</p>

⁵ For more information on the program, www.eigca.org/education.php.

number of field trips to courses in the area. This is a studio class so there will be extensive time spent preparing routings and plans for a par three course and a private course on Lake Oconee.

Goal: To introduce landscape architecture students interested in pursuing a career in the field or a related field such as community design or resort planning to the basic concepts and skills of golf course design.

Knowledge: By completion of this course a student should have an understanding of the history of golf course design, as well as the works and styles of major designers. They will understand how to route a course and place hazards in a strategic manner. Students will also become familiar with current trends in both golf course design and construction, specifically efforts to make golf courses more compatible with the environment.

Skills: Students will be able to complete a set of plans for a course including routing, clearing, grassing and grading plans. Students will understand green design and develop a number of detailed drawings

Values: Students will develop a respect for the game of golf and its traditions. All completed work must show an understanding of the landscape architect's role as steward of the natural environment.

Required Texts:

Doak, Tom. *The Anatomy of a Golf Course* (Short Hills, NJ: Buford Books, 1992).
Books on reserve at the Owens Resource Library

Grades:

Attendance ...	5 %
Renovation Project ...	10 %
Designer Project ...	15 %
Par Three Course ...	20 %
Final Project ...	50 %
Routing ...	15 %
Hazards ...	5 %
Grading ...	15 %
Vegetation ...	5 %
Green Design ...	10 %
Total	100 %

Attendance: Students will receive a perfect grade for attendance if they miss no more than three classes. If for some reason a student can not attend class please contact me beforehand. Lateness will also affect your grade.

Late Projects: Projects that are completed late will be graded down 10 points per day. No exceptions.

Academic Integrity: “All academic work must meet the standards contained in ‘A Culture of Honesty.’” Each student is responsible to inform themselves about these standards before performing any academic work.”

The goals for this class were twofold (Figure 2.1):

- To expose the students to the basic concepts of golf course design.
- To give the students the opportunity to develop skills that are vital in the field.

I wanted the students to feel that at the end of the class that they could hold an intelligent discussion about golf course design with anyone: a land planner, developer or even one of the prominent designers that we would study in the class. I also wanted the students to have material for their portfolios to show potential employees that they had experience developing plans for a golf course.

Themes

Given the limited time, it was important to establish overall themes to the class in order to achieve these goals. I chose to have the students study golf course design through three scopes:

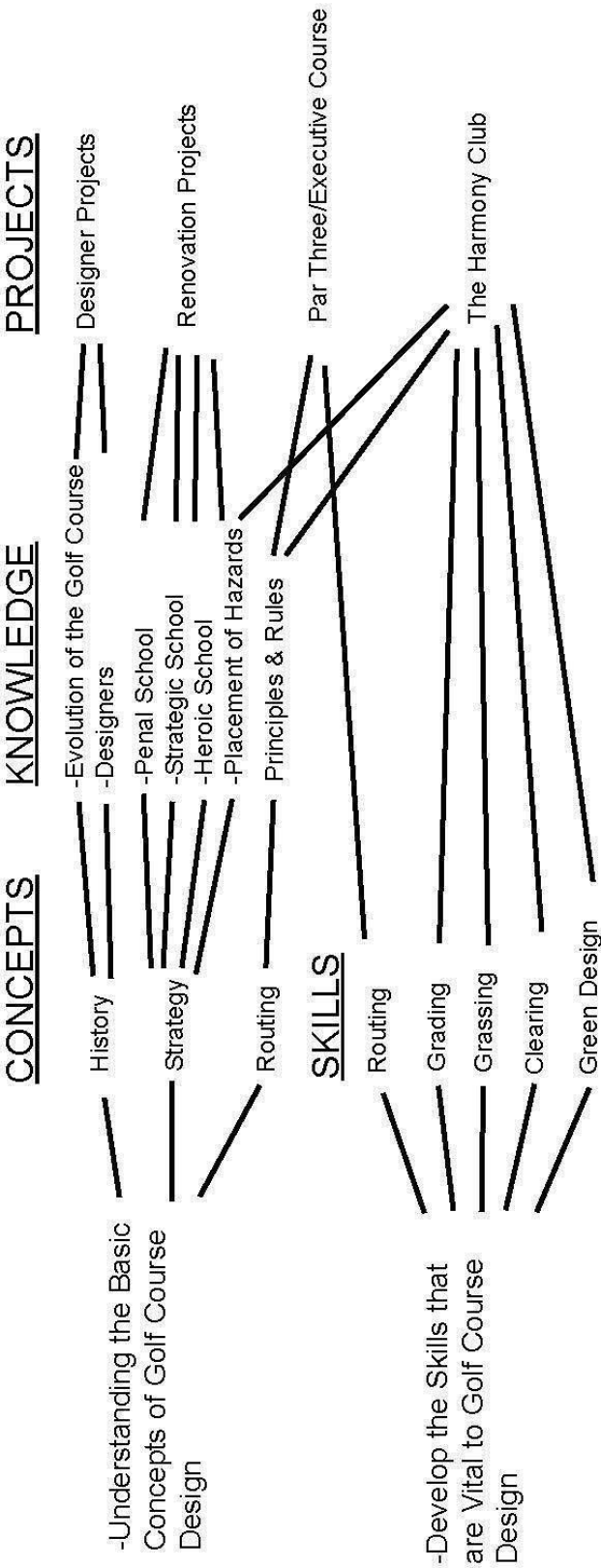
- Environment
- Economics
- Technology

Class discussions would relate back to these three main topics.

Following Page: Figure 2.1: Diagram of the Structure of a Class on Golf Course Design

Themes:
 Environment, Economics, Technology

GOALS



Methods:
 Lectures & Discussions, Readings, Desk Critiques, Field Trips

Environment

The relationship between the golf course and the environment is far and away the most important of the three themes. The study of golf course architecture history can be narrowed down to how an architect chooses to use the natural environment. Golf courses were once very much a part of the environment but over the years they have become detached from their surroundings. It is crucial for students to understand this evolution and its long term ramifications to both the design of a golf course as well as the negative environmental perception of the golf course. Each student must then develop a personal philosophy when laying out and designing a golf course as to whether to try to hide the work of man and blend the course with nature or celebrate the power of man and show off what is artificial and created.

Economics

It is also important to take into account matters of economy when teaching golf course design. Like any type of architecture, what can be built is directly related to the budget of a project. Usually, the less expensive the golf course is to build, the more profitable it will be for the owner. A more subtle point, but one equally if not more important, is that a less expensive course tends to create less site impact. By teaching the students the basic costs of such things as earthwork, they can then make more informed decisions about the amount of grading needed on a particular site. Students should also be aware of the potential to spend vast quantities of money to create completely artificial landscapes that have very little or no connection to the site's natural environment. An example of a course of this type is Shadow Creek in Las Vegas, where, as Rick Reilly describes it, "it as though God dropped down a green hanky in the middle of the desert."⁶

⁶ Reilly, Rick. *Who's Your Caddy* (New York: Doubleday, 2003) p 132.

Technology

The final overarching theme is that of technology. Advances in ball and club technology have greatly increased the distance that a ball can fly, and have therefore increased the amount of land needed for a golf course. Because a golf ball is more likely to fly off line than down the middle of the fairway, holes not only need to be longer but also wider. This has had a great impact on the width of playing corridors in golf course communities as well as the area of trees cleared when routing a course through forested areas. These advances have also been the reason that many courses have needed to be altered or remodeled. Interestingly, this has brought up many of the same issues that are debated within the field of historic preservation. The works of master golf course architects such as Donald Ross and Seth Raynor are revered and treasured much like the works of Louis Sullivan and Frederick Law Olmstead. Societies have formed to try and protect, preserve, and restore the golf courses designed by the likes of Ross and Raynor.⁷ There is constant debate as to whether a particular course should be preserved in its original form or updated to respond to advancing technology. Currently, restoration and renovation comprise a good portion of the golf course design business.

The importance of the invention of heavy earth moving equipment can not be overstated. This allowed a golf course designer to reshape the earth in any fashion imaginable. As long as there was a sufficient budget, a site's natural characteristics were no longer important, giving way instead to the designer's imagination. Students must understand the ramifications of this advance in technology, both its benefits and drawbacks.

These three themes (environment, economics and technology) should serve as the backbone of the class. As the students acquire the knowledge and skills of golf course design, these themes help them narrow their focus as they discover the basic concepts of golf course design.

⁷ for more information, www.donaldrossociety.org and www.sethraynorsociety.org

Language

Students must learn the language of golf course design, which is very specific and unique. An outsider would have a difficult time understanding a conversation between two golf architecture aficionados. Conversely, those in the business have no trouble spotting people who are not versed in the traditions and language of golf course design. Any person who wants to work even tangentially with this field must have a working knowledge of this language. The language is derived from two things:

- History
- Strategy

By having the students study these two subjects, they become familiar with the specific language of golf course design.

Much of this language has evolved from the history of golf course design and its various designers. In order to understand what an “Alister MacKenzie bunker” is one must know who Alister MacKenzie was. To expose students to this vocabulary and history, students prepared a presentation on an architect who played an important role in the evolution of golf course design. Their assignment was to prepare a fifteen minute report and a display board with information and images to impart their recently acquired knowledge on to their classmates. In this manner, each student became an expert on one designer and had access to information on a score of others.

The vocabulary of golf course design also comes from the various theories of strategy. These strategies were covered in class through lectures, assigned readings and, most effectively, during field trips. In order to demonstrate their understanding of the different schools of design, the students completed an assignment in which they renovated one hole from any golf course that they were familiar with. The goal was to make the holes more interesting and strategic by making changes to

locations of the tees, hazards, and green. This allowed the students the chance to start thinking as golf course designers without being overwhelmed.

Routing

The most important concept that a student could grasp in this class is the fundamentals of routing a golf course. Whether a student is planning to become a golf course architect or not, this knowledge and the skill of applying it is far and away the most important thing that they could take from this class. A proper routing considers not just the holes on the golf course, but all of the other programmatic elements of the development as well. To exhibit their understanding of these concepts, each student designed either an eighteen hole par-three course or executive course, depending on their level of comfort. This three week exercise introduced them to the skill of routing a golf course over a topographic map. The final assignment of the class consisted of designing a regulation length eighteen hole golf course using an actual site. This allowed the students to visit the land and determine how to best use the site's features, further developing their skills at routing. The students then demonstrated their knowledge of strategy by designing each hole. This consisted of placing tees, bunkers, and the green in a well thought out fashion.

Skills

For most golf course designers, routing the course and laying out the hazards is only the beginning of their job. The rest involves preparing detailed plans of all the different things that are needed during construction. Because of the limited time of the class, I had the students develop three additional plans other than their routings:

- Grading Plans

- Grassing Plans
- Clearing Plans

In addition to these plans, the students were required to design four greens and their surrounds. This involved fine scale engineering and was probably the most challenging of all the assignments of the class. These skills were demonstrated during the final project, the regulation length, eighteen hole golf course. Through these exercises, the students were introduced to the basic skills needed to produce a set of golf course plans. While in no way complete, this set of drawings helped the students understand the complexity of golf course design.

Methods

The teaching methods that were used in this class were traditional and involved:

- Lectures
- Readings
- Desk Critiques
- Field Trips

Each of these were effective and useful techniques. Before I conclude this brief overview of the class, I want to comment on what I and the students believed was the class's most important and valuable component, the field trips. Visits to a variety of golf courses both locally and on the coast of South Carolina, allowed the students to experience a multitude of different golf course styles. While pictures in books or in a slide presentation can be useful learning aids, there is no substitute for getting out and seeing something first hand and being able to feel the heave and roll of the land with your own two feet. The field trips not only helped to expose the students to a wide array of golf course styles but also helped show the evolution of the golf course and reinforced the language of

golf course design. The field trips often brought the students in contact with the course's superintendent, a person who is often integral in making sure the golf course is maintained in the manner that the designer envisioned. The trip to the coast of South Carolina, An area with an ecosystem that differs greatly from the Georgia Piedmont, was crucial in showing the students that while a golf course will always consist of tees, fairways, and greens, the look and feel of golf courses can vary greatly. The knowledge gained on these trips could not have been duplicated in a year's worth of lectures.

CHAPTER THREE

HISTORY

“True taste, in every art, consists more in adapting tried expedients to peculiar circumstances than in that inordinate thirst after novelty, the characteristic of uncultivated minds, which form the facility of intervening wild theories, without experience, are apt to suppose that taste is displayed by novelty, genius by innovation, and that every change must necessarily tend to improvement.” - **Humphrey Repton 1797, The Art of Landscape Architecture**

Most books on the subject of golf course design (Appendix B), start off with a brief summary of the history of the game and the golf course. This is the foundation for all the discussions of routing and strategy that follow later in these books. Most of these books are written with the idea that the reader is a golfer, with a decent understanding of the game, its rules, and its traditions. These histories are not written for the landscape architect. It is vital for a class on golf course design to relate to other classes in the landscape architecture curriculum. In order to help establish this relationship and introduce the students to the very specific language of golf course design that comes from the history of the golf course, the students read Kenneth Helphand's *Learning from Linksland*.

The Evolution of the Golf Course

Helphand is a highly respected landscape architecture professor at the University of Oregon and the former editor of *Landscape Journal*, a publication that all students of landscape architecture are familiar with. Helphand makes the case that the evolution of the golf course is comparable to any other landscape typology, such as the pleasure garden or public park. Golf courses changed according to the environment and culture of the area to which they were introduced. Looking at the

history of golf course design through this paradigm should be rudimentary for seasoned students of landscape architecture. Specialized knowledge of the particular language of golf course design or the history of its master designers is not necessary to follow Helphand's argument. To drive home Helphand's point, I then delivered a lecture summarizing Helphand with a few personal asides and comments in order to help round out the evolution of golf course design. The following review comes from that lecture.

Golf was first played in Scotland over rolling sandy terrain covered with coarse grasses called linksland that connected or "linked" the sea to farmland. This land was considered worthless for agricultural purposes, and its only users were shepherds and early golfers. The links were exposed to the elements, which helped form its hilly and hummocky topography. Herbert Warren Wind, a great American sportswriter, wrote in the *New Yorker* of the process. "Strong winds tossed the sand into gently rolling dune land, which were accented by fancifully shaped knolls interlaced with gullies, sharp declivities, hollows and whorls of all shapes, and small plateaus." (Figure 3.1).



Figure 3.1: Exposed sandy terrain where early golf courses were located (Photo from *The Links* by Robert Hunter, p 117).

The first courses were not designed, they were discovered. When golfers first started to play over the land, there was no set route for the holes. Golfers would follow the paths nibbled down by foraging rabbits.⁸ The bunkers were formed by the grazing sheep digging down to escape the wind. Even after the routing of the courses were formalized, sheep still roamed the links, maintaining the short cropped grass in the valleys protected from the wind (Figure 3.2). Early supporters of the game championed the game as great way to get exercise and enjoy the natural elements. It was a constant battle between the wind, the ground, and the player.



Figure 3.2: Golfers shared the links with sheep who helped maintain the course at Cruden Bay on the east coast of Scotland.

In the last part of the 19th Century, many English were exposed to the game when traveling via rail to the coasts of Scotland. Enchanted, they began clamoring for courses closer to home. At around the same time, John Reid and a number of other ex-patriot Scots introduced the game to the

⁸ For a wonderful and slightly romantic description of how these landscapes were formed nothing compares with Sir Guy Campbell's essay from 1952. It can be found in Paul Daley's *Links Golf: The Inside Story* (p. xiv).

U.S. Their first game of golf occurred in 1888 in a pasture in Yonkers, NY. One of the first courses in the U.S. played over and through an apple orchard. A golfer who had only played there was invited to play Shinnecock Hills on the eastern end of Long Island, a golf course blessed with many of the same characteristics of links courses in Scotland. When asked his opinion of the course, the golfer replied that it was only fair due to the lack of apple trees.⁹

Linksland is rare. There is very little of it outside of the British Isles. There is some in Sweden, Holland and little patches here in the United States in areas such as the eastern end of Long Island. Golfers, in an attempt to emulate the playing conditions of linksland, hunted far and wide for sandy, well draining soil. They found it in the Heathlands outside London and in the Sand Barrens of New Jersey (Figure 3.3).

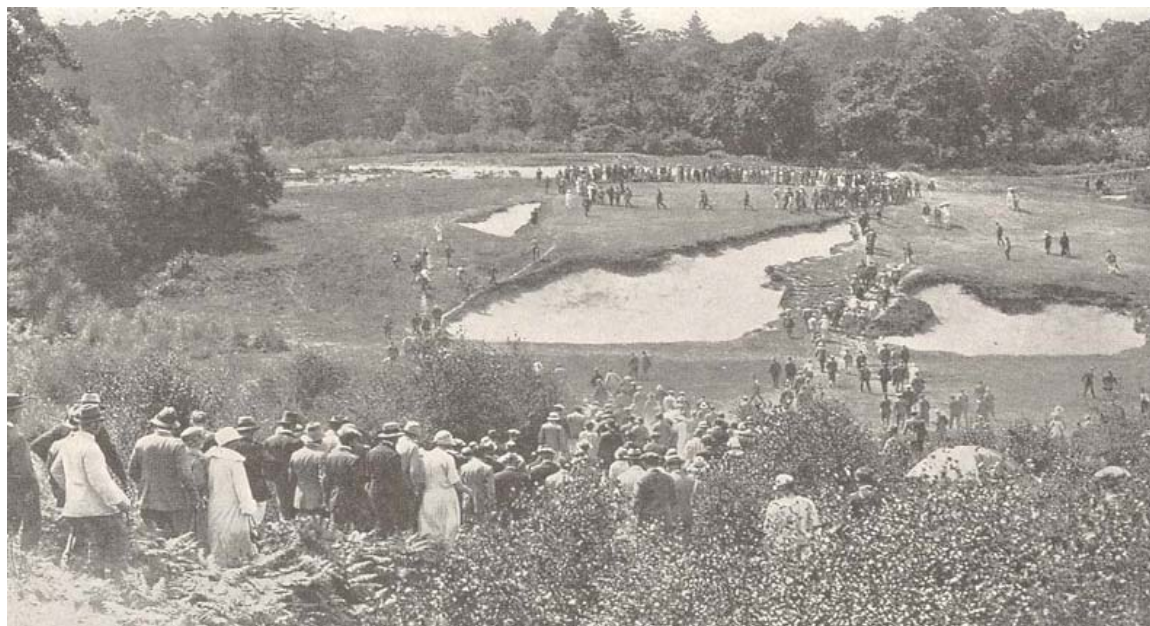


Figure 3.3: The heathlands outside of London proved to be ideal terrain for golf. Pictured here is the eight at St. George's Hill (Photo from *The Links* by Robert Hunter, p.130).

⁹ Wind, Herbert Warren. *The Story of American Golf* (New York: Alfred A. Knoph, 1948).

Here it was easy to emulate the swells and dips of linksland. In other locations, this was not the case.

As Robert Hunter, an early American golf course architect who was originally a lawyer, wrote in 1926:

“From the beginning we have had to work under difficulties not facing our British cousins. All of our courses are hand-made. While this is true of inland courses everywhere, the models, the original patterns were all in the British Isles. The true linksland was molded by divine hands. Linksland, the fine grasses, the wind made bunkers that defy imitation, the exquisite contours that refuse to be sculptured by hand—all these were given lavishly by divine dispensation to the British. These perfect models— not of their own making— were at hand for British designers to study and praise... When we build golf courses we are remodeling the face of nature, and it should be remembered that the greatest and fairest things are done by nature and the lesser by art. What modern golf course equals in beauty the seaside course, and especially those which have been left freest from the touch of the architect? The best architects imitate humbly and lovingly what nature has placed before them.”¹⁰ (Figure 3.4)



Figure 3.4: Ballybunion, Ireland (Photo from *The 500 World's Greatest Golf Holes*, p. 23).

Most of the early courses in the United States would be considered parkland, the first major typology of course to develop outside of links. In England and the Eastern United States, this

¹⁰ Hunter, Robert. *The Links* (Canada: Scribner & Sons, 1926).

involved clearing dense forests by any means necessary. Dynamite was often used as well as simple man power (Figures 3.5, 3.6). This difficult work led to the formation of a drastically new type of course where as Kenneth Helphand says “the path of the game was a passage through fairways that were grand corridors walled by trees.”¹¹ The end result was a playing ground that looked and felt very different from its linksland roots. The formal elements were the same and included the fairway, rough, bunkers, and green, but everything else differed considerably from the original courses (Figure 3.7).



Figure 3.5: Dynamite was used to clear dense forests.

¹¹ Helphand, p 74



Figure 3.6: Large amounts of manual labor was also needed to help clear the land.



Figure 3.7: This picture of the Farm Golf Club in north Georgia is a stark contrast from the game's wide open roots (Photo from *Golf Course Design* by Tom Fazio, p. 182).

In 1913, Francis Ouimet turned the game on its head. Considered a sport for the wealthy, golf had failed to hold the interest of the masses. But when Ouimet, a twenty-year old former caddie of a decidedly middle-class background, bested two of Scotland's greatest golfers in that year's US Open, he sparked a golf boom.¹² Over the next decade, the number of courses in the U.S. quadrupled. The increased use of the automobile and the booming economy made it possible for the middle class to travel to and afford golf. Since then, golf's popularity in the U.S. and throughout the world has steadily increased.¹³

In the 1960's, King Hassan II of Morocco caught the golf bug. King Hassan built five courses in the desert country, lushly planting them in a parkland style (Figure 3.8).



Figure 3.8: Royal Dar Es Salam in Morocco is a playground for the country's nobility (Photo from *The 500 World's Greatest Golf Holes*, p. 111).

¹² For a very enjoyable account of Ouimet's victory, see [The Greatest Game Ever Played](#) by Mark Frost.

¹³ Wind, p.118.

These examples are in stark contrast to other parts of the globe where the golf course has adapted to local conditions. In Saudi Arabia and Kuwait, golf is played over sand courses. The player carries a piece of astro-turf and hits his ball from it to sand “browns” which are swept every hour to keep them smooth. Some courses go so far as to erect poles to act as trees and delineate water hazards (Figure 3.9).



Figure 3.9: Golf courses in the Middle East often are laid out on the desert itself. Golfers carry around astro-turf mats to hit their ball off of.

As Helphand points out, “Courses are designed to reside in their locale, to understand their *genus loci*, and at the same time look like other places. In Alaska, there are courses with artificial turf for greens to accommodate for the short and unfriendly growing conditions. In Japan, golf courses are sited on hills so steep that escalators are needed to ferry players from hole to hole.”¹⁴

In the United States, the golf course continued to evolve. In the 1960’s, the first color broadcasts of the Masters tournament in Augusta, Georgia showed emerald green fairways and fluorescent azaleas (Figure 3.10). Viewers across the country went to their greens keepers and demanded that their course be kept equally green and lush. This push combined with invention of centralized irrigation led to the over-watering and over-fertilizing of American golf courses. Until then, American courses, like their brethren links courses in Scotland and Ireland, were allowed to brown out in dry summer conditions. Now greens keepers were forced to keep their courses green

¹⁴ Helphand p.76,

and lush all year round no matter what the environmental impact. Drought or no drought, players demanded conditions like they saw on television at the Masters. The irony of the situation was that greens keepers were trying to emulate a course that was displayed during the height of its growing season and with a seven figure maintenance budget. Rumors have long swirled that Augusta National dyes their ponds to make them bluer and uses blow driers to coax the azaleas into full bloom for tournament week (Figure 3.11).



Figure 3.10: The broadcast of the Masters annually shows the blooming flowers and lush green grass (Photo from *The 500 World's Greatest Golf Holes*, p. 64).



Figure 3.11: Superintendents were pushed to manicure their courses in imitation of Augusta. Advances in irrigation technology helped, but few courses could conceive of matching Augusta’s massive maintenance budget (Photo from *The 500 World’s Greatest Golf Holes*, p. 64).

The face and shape of the course continued to change as better earthmoving equipment was invented. As Tom Doak, a highly respected golf course architect and author, pointed out in his book *The Anatomy of a Golf Course*, the “modus operandi for most construction companies became rape it, shape it, grass it.”¹⁵ Little attention was paid to the natural features of the land or whether the land was even suitable at all for such a project. Bulldozers and other heavy earthmoving equipment allowed designers to easily push dirt just about anywhere and into what ever form they could dream up (Figure 3.12).

¹⁵ Doak, Tom. *The Anatomy of a Golf Course* (Short Hills, NJ: Buford Books, 1992).



Figure 3.12: Advances in earth moving equipment has allowed modern architects to completely remodel the earth's surface. (Photo from *Golf Course Architecture* by Michael Hurdzan, p. 301).

If an architect wanted to route a hole across the side of a steep hill, he would just have a few thousand cubic yards dumped to prop up the lower half of the fairway. Then he would have a shaper mold mounds that harkened back to the games roots. One could now build a course that resembled a links course, but was located on the side of a mountain (Figure 3.13).

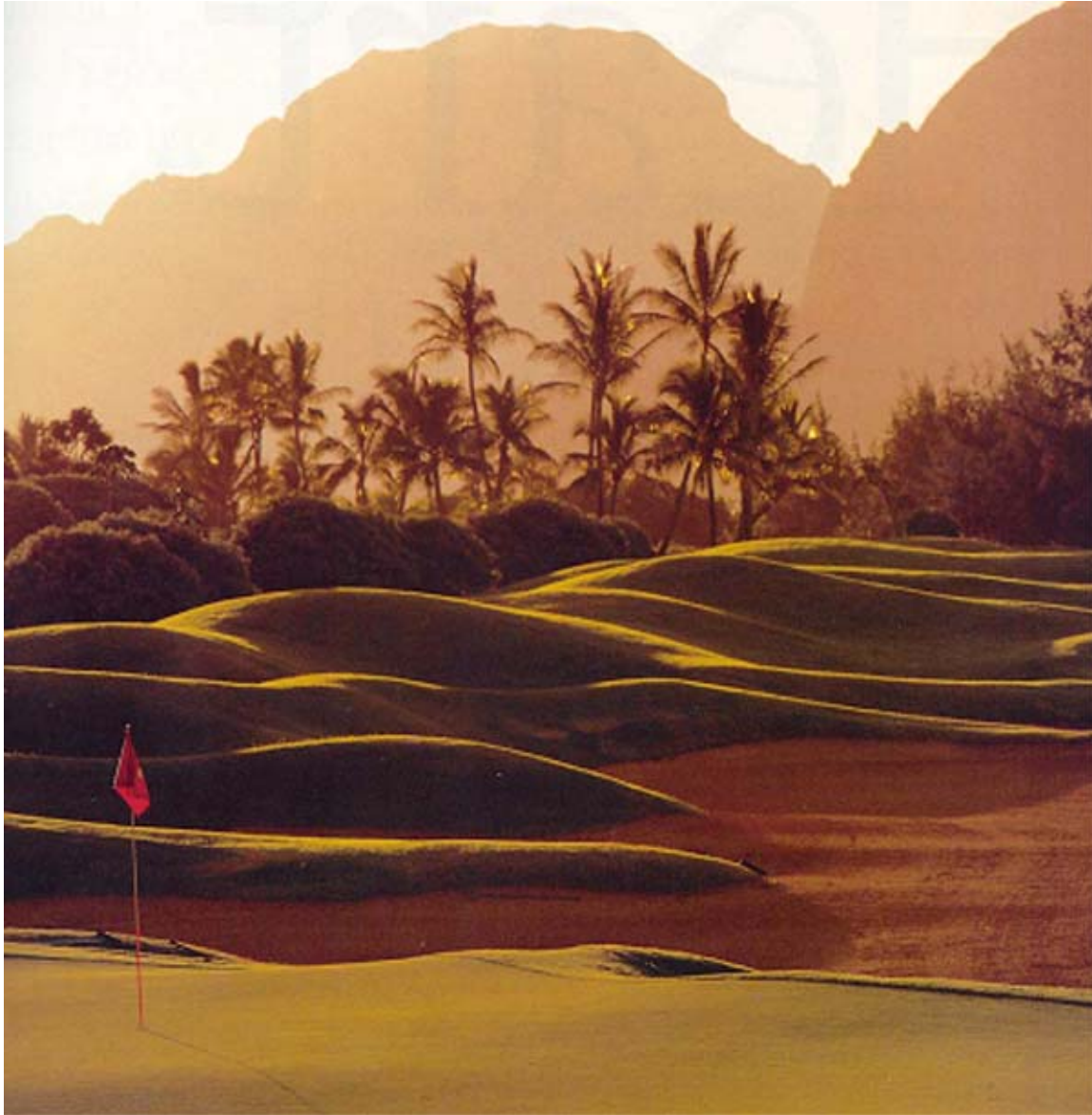


Figure 3.13: Modern designers used bulldozers to create fake humps and hollows that harkened back to the origins of the game (Photo from January/February 1998 issue of *Travel & Leisure Golf*, p. 73).

Designer Tom Fazio created a name and a fortune by doing such projects. On the west coast of Florida he expertly routed a course through an old quarry (Figure 3.14). Outside of Las Vegas, Steve Wynn, the billionaire gaming mogul, spent \$42 million dollars on Shadow Creek. A desert landscape was remade to resemble the vegetation and topography of the North Carolina hills. Three million cubic yards of earth were moved. A half mile long stream bed was

excavated, and 10,000 trees were planted. Wynn brought in exotic fauna to carouse on his course (Figure 3.15). At Sea Island on the coast of Georgia, Fazio excavated a 300 acre lake and used the material to build Frederica, a golf course with massive hills.



Figure 3.14: Tom Fazio routed five holes over and through an abandoned quarry in west central Florida at the Black Diamond Ranch Golf Club (Photo from *The 500 World's Greatest Golf Holes*, p. 267).



Figure 3.15: Tom Fazio and Steve Wynn’s mind boggling Shadow Creek (Photo from *Golf Course Designs* by Tom Fazio, p. 23).

As a result of their aesthetically pleasing nature, golf courses have become desirable places to live. As Helphand points out, the golf course “has become not only a landscape for playing a game, but part of the open space design of a community.”¹⁶ (Figure 3.16).

Ironically, the game that started out on land considered worthless has become the focal point of many high-end communities. In his wonderful comic novels about the development of the Florida coastline, Carl Hiaasen goes so far as having his hero Skink blow up the bulldozers in order to halt the construction of yet another golf course.¹⁷ Florida’s development boom is a great example of the connection between real estate and golf courses. Developers built golf courses with famous name

¹⁶ Helphand, p. 75

¹⁷ Hiaasen, Carl. *Native Tongue*, Ballantine Books, 1991.



Figure 3.16: Golf Courses have become desirable places to live. Pictured here, the Mountain Course at La Quinta in Palm Springs, California (Photo from November/December 1999 issue of *Travel & Leisure Golf*, p. 94).

designers in order to drive lot and home sales. Now the demand is so high for real estate that some courses are being plowed over in order to provide yet another sub-division.

In Ireland and Scotland, where the game originated, land next to golf courses still has little value. When one visits the great links courses, one is certain to find the ubiquitous trailer park on the adjacent land because it is the cheapest land to be found (Figure 3.17).



Figure 3.17: Trailer parks often are found near courses in Ireland and Scotland.

In America, there has recently been a backlash to the bastardization of the golf course.¹⁸ As traveling has become easier and easier, efforts have been made to find land that resembles the early linksland. In the middle of the Sand Hills of Nebraska, sandy based soil with natural hillocks and hummocks was found and a private club was built despite the fact that the nearest major population center was 250 miles away. On the remote Southern Oregon Coast, a recycled greeting card baron came across linksland in the early 1990s and has since built two world-class public golf courses. The courses are walking only and are as close as some Americans will ever get to the essence of the game (Figure 3.18).

¹⁸ “On New Golf Courses, Nature Wins a Round,” McCleary, Kathleen, June 6th 2003, *New York Times*, D1



Figure 3.18: New projects like Pacific Dunes in Bandon, Oregon have highlighted the natural environment through which they are routed (Photo from the Design Issue 2003, *The Golfer*, p. 68).

It is important that these projects are highlighted and celebrated so that those new to the game can see these as examples of what a golf course can and should be. Most designers are now espousing the mantra that they design with the lay of the land. This philosophy puts the environment through which the golf course is routed on par with the course itself. If this comes to pass, golf courses will become less invasive to a site's natural environment and ecology. Returning to the origins of the game will lead to the reduction of water and fertilizer use on golf courses as they become firmer and browner like the links course of Great Britain. Since golf made the jump to the United States, it has been a game at odds with nature. It is time, through careful planning and

education to reverse this trend. Golf courses are great open spaces that should serve to replenish and conserve the environment rather than destroy it. It will be only then that golf sheds its negative reputation.

Students were exposed to this knowledge with the hopes that they would understand this fundamental relationship between golf and the environment. This knowledge should help inform everything that the students attempted in the semester. Students learned that connecting the golf course to the environment is beneficial both economically and aesthetically.

Designers

With this knowledge as their base, the students were then instructed to choose a designer from a list of eighteen noteworthy golf course designers (Table 3.1). One student gave a presentation about the Old Course at St. Andrews, Scotland. This course was not designed but evolved over hundreds of years and has been studied by almost every great golf course designer. The designers on the list were all masters of the craft that in some way had major impacts on the profession, either through their built works, writings, sheer force of personality, or their mastery of the public relations game so important in today's development scenarios.

Table 3.1: The List of Architects

Old Tom Morris	Perry Maxwell
Tom Simpson	Robert Trent Jones
Harry S. Colt & Charles H. Alison	Pete Dye
Donald Ross	Tom Fazio
C.B. Macdonald & Seth Raynor	Jack Nicklaus
Alistair Mackenzie	Rees Jones
A.W. Tillinghast	Greg Norman
George Thomas	Bill Coore & Ben Crenshaw
William Flynn & Howard Toomey	Tom Doak

Throughout the course of the semester, the students presented their research to the class in chronological order of their architects (Table 3.2). Each student described how their architect addressed the issue of environment. Students analyzed whether the designer worked harmoniously with nature and tried to hide the hand of man like Alister MacKenzie or strove for an engineered look like Seth Raynor.¹⁹ For modern architects, the students determined whether their architect felt the need to remake the earth like Tom Fazio,²⁰ or take the time to study a site and try to have as minimal impact on the earth as possible like Tom Doak.

Table 3.2: Assignment Sheet for Designer Project

Designer Project

11 X 17 Sheet

Due throughout the semester

“True taste, in every art, consists more in adapting tried expedients to peculiar circumstances than in that inordinate thirst after novelty, the characteristic of uncultivated minds, which form the facility of intervening wild theories, without experience, are apt to suppose that taste is displayed by novelty, genius by innovation, and that every change must necessarily tend to improvement.” - **Humphrey Repton 1797, The Art of Landscape Architecture**

Each student will choose one prominent golf course architect, and create an 11” x 17” sheet that contains a quick biography of the designer, examples of his work, important quotes that reveal his design philosophy, and a sense of where he falls in the scope of golf course architecture history. The sheet should be a mix of text, photos, and drawings. The sheet’s layout should be well thought out. You will be graded on both its content and design.

A good place to start your research is The Architects of Golf, by Geoffrey Cornish and Ron Whitten. There are two copies of this book on reserve in the Owens Resource Library. Most of the architects on the list have authored books of their own. A good report will show that the student has looked at these works. A few of the architects from the Golden Age have societies that celebrate their legacies and have web sites. For living architects, I suggest contacting their design offices. This might also be a good way to start a dialogue with these firms for future employment.

¹⁹ Cornish, Geoffrey S. and Whitten Ronald E. *The Architects of Golf*, (New York: Harper Collins Publishers, 1993) p. 331 and 381.

²⁰ Fazio, Tom. *Golf Course Designs* (New York: Harry N. Abrams, 2000).

On the day that your report is due, you will present your report. This report will should be no shorter than fifteen minutes and hopefully will spur conversation.

The students also placed their architect along the economic spectrum. In other words, they studied what kind of projects the architect was likely to produce: grand, expensive courses or understated, subtle courses. Architects like Jack Nicklaus are hired for big budget jobs that are created to sell real estate. Others, like Perry Maxwell, are hired to build low cost but enjoyable golf during the depression.²¹ It is hard to compare the output from two eras much less projects with completely different budgets and goals, but it is important for a student of golf course architecture to be aware of these differences and make judgments about their works accordingly. Some modern architects like Bill Coore and Ben Crenshaw have decided to use the less is more approach, noting that superior courses can be built for a fraction of the cost of some big budget projects. These savings can be passed along to the developer, but more importantly the end result is often a course that has less environmental impact on the site and has a sense of place. Whether the decision to use this approach is motivated by economics, an environmental ethic, or a simple belief that the end product is better is not always clear, but is also irrelevant. The important thing to note is that architects who follow this method are creating golf courses that responded to the site and work with nature and not against it.

Each student also addressed how his architect handled issues of technology. Some architects like Harry Colt gained prominence by going back and changing courses that had become obsolete due to the new distances that golf balls were flying.²² Some students noted that their architects were expanding the widths of corridors for their golf holes in order to compensate for the propensity of golf balls to fly long distances off-line.

²¹ Cornish and Whitten, p 341.

²² Cornish and Whitten, p 225.

Students also reported on how each architect took advantage of advances in earth moving equipment. Some early architects like C.B. Macdonald were not afraid to move large amounts of dirt to create an artificial playing ground such as the legendary Lido Golf Club,²³ but most of the golden age architects preferred to use the lay of the land due to the great difficulty and expense of reshaping the earth. Robert Trent Jones in the 1960's became the first architect to truly harness the power of technology and use bulldozers to create ponds and knockdown hills.²⁴ Pete Dye in the seventies used this new ability to move mass quantities of earth to create landscapes that mirrored the rolling, dunes filled terrain of Scotland.²⁵ A new wave architects have since eschewed this artificiality, instead using earthmoving equipment to make subtle alterations to the land, thereby preserving the site's ecological integrity. The ability to move dirt also played a huge roll in how strategy evolved.

Student Work

Daniel Windham

Daniel Windham's report on Tom Simpson did a good job of reviewing and analyzing the works and writings of this underrated British designer. I have included Mr. Windham's completed 11" x 17" sheet (Figure 3.19). While the writing is poor and rife with typos, Mr. Windham has grasped Simpson's place in history. During his oral presentation, Mr. Windham revealed a few of the major points from Simpson's seminal manuscript *The Architectural Side of Golf*. Authored with H. N. Wethered, it lays the case for the strategic school of architecture. Mr. Windham pulled a number of illuminating quotes and illustrations out of the text and made sure that the other students in the class were well aware of the high quality of the ink and wash

²³ For information on Macdonald, his book *Golf: Scotland's Gift*, is a great primary source. George Bahto has recently completed a detailed study of his life and courses, entitled, *The Evangelist of Golf*.

²⁴ Cornish and Whitten, p 118 and p 307.

²⁵ Pete Dye's *Bury Me in a Pot Bunker* is a quick, fun read that explains his theories on golf course design.

sketches that are sprinkled throughout the book (Figure 3.20).



Figure 3.20: Tom Simpson's sketch of the 2nd hole at Liphook Golf Club, England. Note the similarities between the bunkers here and at Cuscowilla (Drawing from *The Architectural Side of Golf* by Wethered and Simpson, p. 42).

It was extremely satisfying to see Mr. Windham, who was one of the students who knew least about the game at the beginning of the semester, really delve into and get excited about this somewhat unknown architect and his written legacy.

Following Page: Figure 3.19: Daniel Windham's presentation board for Tom Simpson.

Golf can claim without exception to be the most flexible game in the world and this fact is due the not least flexible of its features—the ground on which it is played.

--Tom Simpson

t o m s i m p s o n



Thomas G. Simpson
(1877-1964)

Born: Winkley Hall Estate, Lancashire, England.
Died: Basingstoke, Hampshire, England at 87.

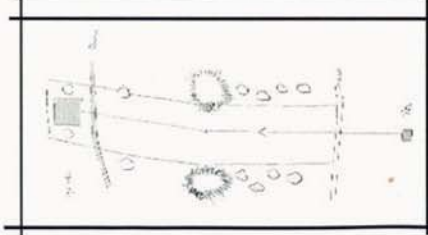
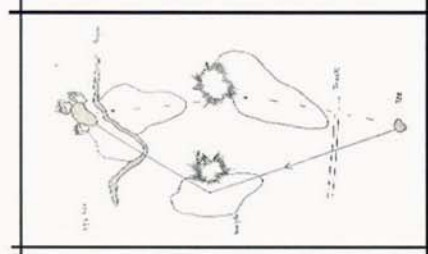
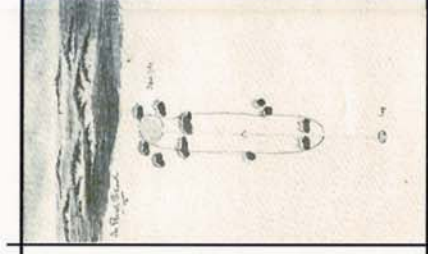

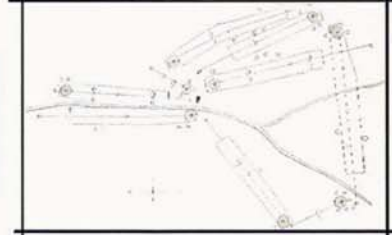
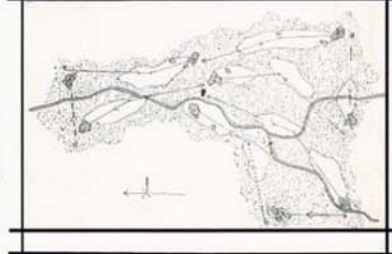
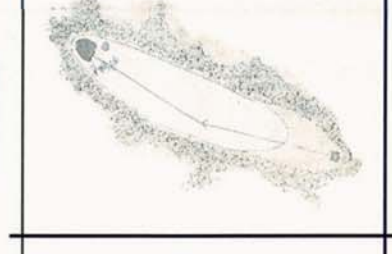
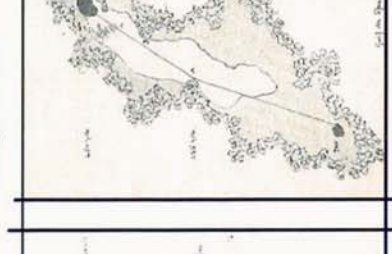
Tom Simpson is one of few Golf Architects that helped in creating the Golden Age of Golf. His philosophy centered around defining and refining the strategic school of golf. He was also a strong believer in that the a golf course should look natural and not artificial.

Simpson, who came from a wealthy family, studied law at Trinity Hall, Cambridge, and was admitted to the bar in 1905. A scratch golfer, he was a member of the Oxford and Cambridge Golfing Society and played a great deal at Woking's course by club members John Low and Stuart Paton. On more than one occasion, Simpson defended their advanced designs in discussion with members of the club. As a result Simpson began to develop particular ideas about course architecture himself, and by 1910 he had closed his legal practice and joined Herbert Fowler in the practice.

After WW I, Simpson and Fowler were partners in a firm that in a short time included J.F. Abercromby and A.C.M. Croome. Simpson handled most of the firm's work on the Continent, and some of his finest were Deauville (New Course), Chantilly and Morfontaine in France. In the firm Fowler did considerable work in the U.S., but Simpson never did.

Simpson's most major contributions came in the form of essays and writings. The largest of these was The Architectural Side of Golf, which he authored in 1929. It featured numerous ink-and-wash sketches of golf holes, all by him.

Daniel Windham
LAND 4910
Architect Report

			
Hole as Stands	Slight Alterations	Penal School	Strategic School
			
Penal School	Strategic School	Wrong Way to Carwe a Fairway From Foreest	Right Way

CHAPTER FOUR

STRATEGY

“The architect’s knowledge of the game should be so intimate that he knows instinctively what it is like to produce good golf and good golfers. He must have more than a passing acquaintance with the best courses and the best golfing holes. It is not only necessary that he should play them, but study and analyze the features which make them what they are. He must have a sense of proportion and be able to differentiate between essentials and non-essentials. He should be able to distinguish between those features which are of supreme importance in the making of the hole and those which are of less value. He should be able to put himself in the position of the best player that ever lived, and at the same time be extremely sympathetic towards the beginner and the long handicap player. He should above all have a sense of proportion and be able to come to a prompt decision as to what is the greatest good to the greatest number...” – **Alister Mackenzie 1920**

The arrangement of the various elements of the golf course (the tee, hazards, fairway, and green) show the proper route that a golfer should take to reach the hole. This is often referred to as the strategy of the hole. Of all the aspects of golf course architecture, the strategy of the particular golf holes has the least amount of similarity to any element of landscape architecture. Strategy is specific to the game itself. A teacher of golf course design can not draw parallels to another type of landscape architecture in order to teach this element of the class. Unlike other playing fields that a landscape architect might be called on to lay out, a golf hole, much less an entire course, can be configured in an infinite number of ways. Because of this uniqueness, a good deal of time during a class on golf course design must be devoted to this subject.

Schools of Design

The evolution of golf course architecture over time has resulted in three schools of strategy:

- Penal

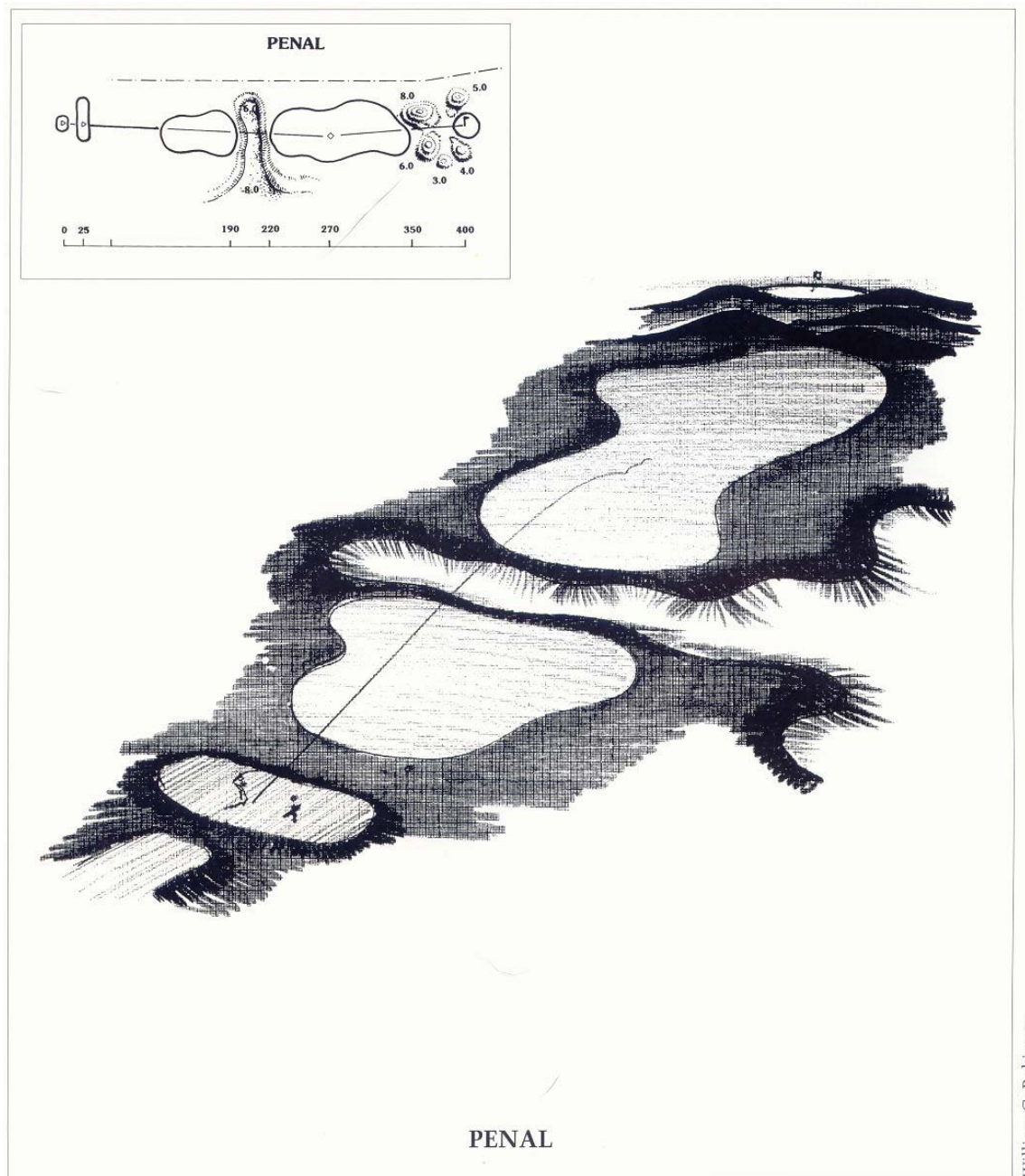
- Strategic
- Heroic

These terms are universally understood by golf course designers and it is imperative for anyone who wants to be involved with the industry to understand these terms.

Penal

The penal school is by far the most simplistic of the three schools and dates from the early days of golf when courses were laid out by man. These courses were designed and constructed by golf professionals who thought that the hazards should be arranged to punish a bad shot such as a topped drive. This approach to design resulted in hazards, often in the form of rectilinear bunkers with mounds on the far side, placed directly across the line of play (Figure 4.1). This punishing manner of design was soon found to be overly difficult for the masses.

While these hazards were no problem for the skilled professionals who designed the courses, they were nearly impossible to the beginner or unskilled player. The construction of these hazards was rudimentary. They were simply pits dug out of the earth with the excavated soil built up on the far side as mounding, often called chocolate drops because of their similarity to Hershey's kisses (Figure 4.2). As more thought and time was put into the design of golf courses, the strategic school of design emerged.



William C. Robinson

Figure 4.1: The Penal School (Diagram from *Golf Course Architecture* by Michael Hurdzan, p. 131).

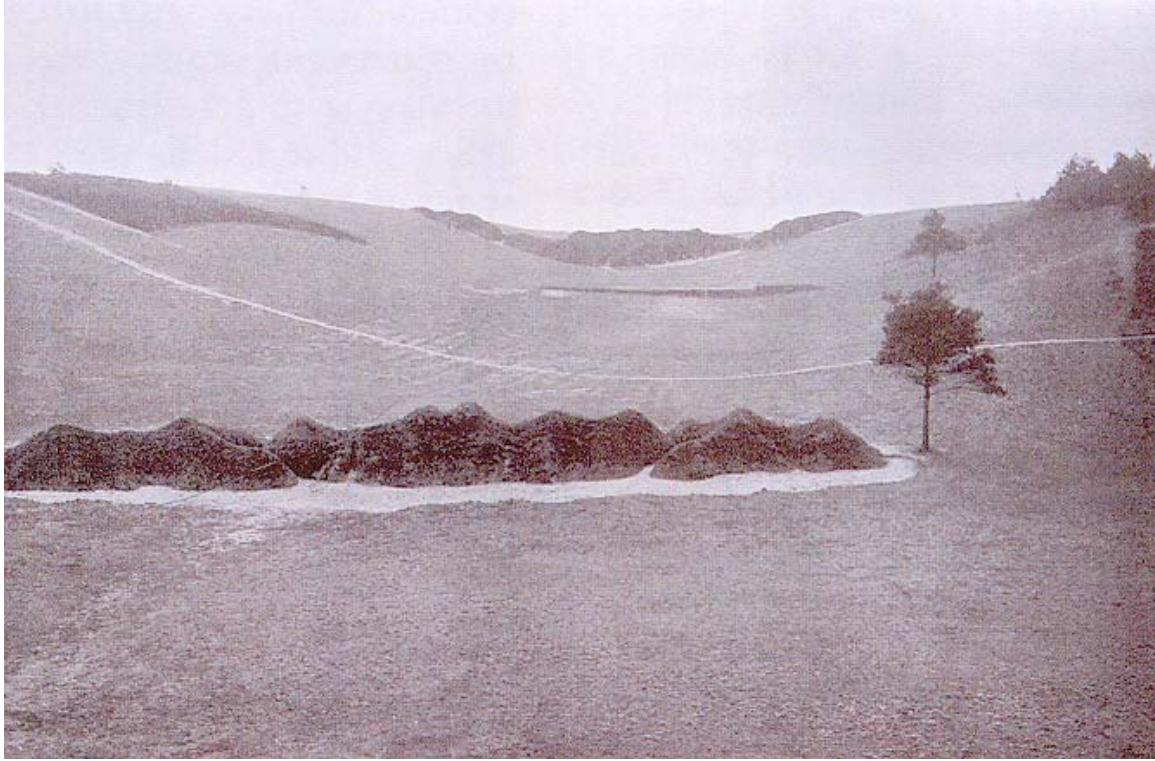


Figure 4.2: The penal school of design featured hazards laid out to punish poor shots like a topped drive (Photo from *Golf Course Architecture* by Michael Hurdzan, p. 8).

Strategic

The strategic school of design encourages players to think about the placement of every shot. Hazards almost never completely cross the line of play, allowing the beginner to play cautiously around the hazard if he or she so desires (Figure 4.3). The strategic school emphasizes thinking ones way around the course, not just bashing the ball over a hazard. Tom Doak likens the golfer playing a strategic course to a pocket billiard player in that “The expert player seeks not only to make progress with each shot, but to position his ball so that his subsequent shots will easily follow.”²⁶

²⁶ Doak, 66

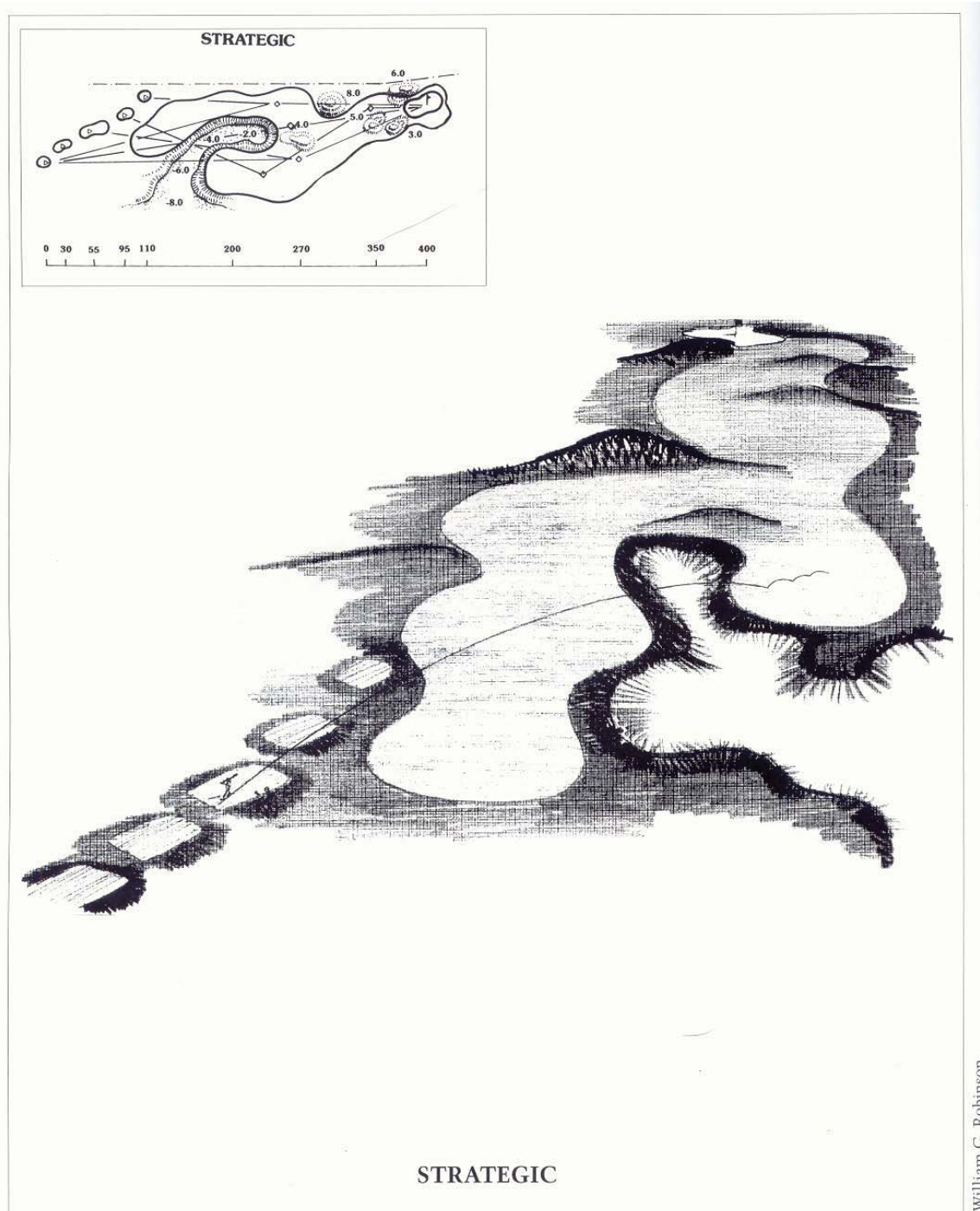


Figure 4.3: The Strategic School (Diagram from *Golf Course Architecture* by Michael Hurdzan, p. 132).

In the strategic school, the player is rewarded for placing his drive close to a fairway bunker by having the best angle of approach to the green. A course that falls into the strategic school of design will have many such scenarios.

Doak describes the simplistic wonders of the strategic school with his description of one of his favorite holes in Scotland:

The most interesting tee shot is not one that provides two options- black or white- but the one presenting a clear hazard (black) and 100 shades of grey to the side of it, forcing the golfer to weigh how much risk he is willing to take against how much margin for error he needs. A perfect example is the par-4 12th hole at North Berwick, Scotland. Its green tilts slightly from right to left so the ideal approach is from the inside corner of the dogleg, defended by a small, deep pot bunker. It is easy to imagine the local citizen giving this penal bunker a wide berth at first, and progressively getting closer to it on each subsequent round, until one day a pull into the bunker yields a double bogey, and the next day the process starts all over again.²⁷

The strategic school does not rely on difficulty to make the course interesting, but rather on the ability of the golfer to think and execute.

Heroic

The third school of design, the heroic, is similar to the strategic but the failure of the golfer to execute often has more severe consequences. The heroic school encourages the golfer to take significant risks in order to earn a significant reward. This risk usually comes in the form of a diagonal carry across a hazard, which often times is a water hazard or large waste bunker. Each golfer must determine his or her proper line (Figure 4.4).

²⁷ *ibid*, 74-75

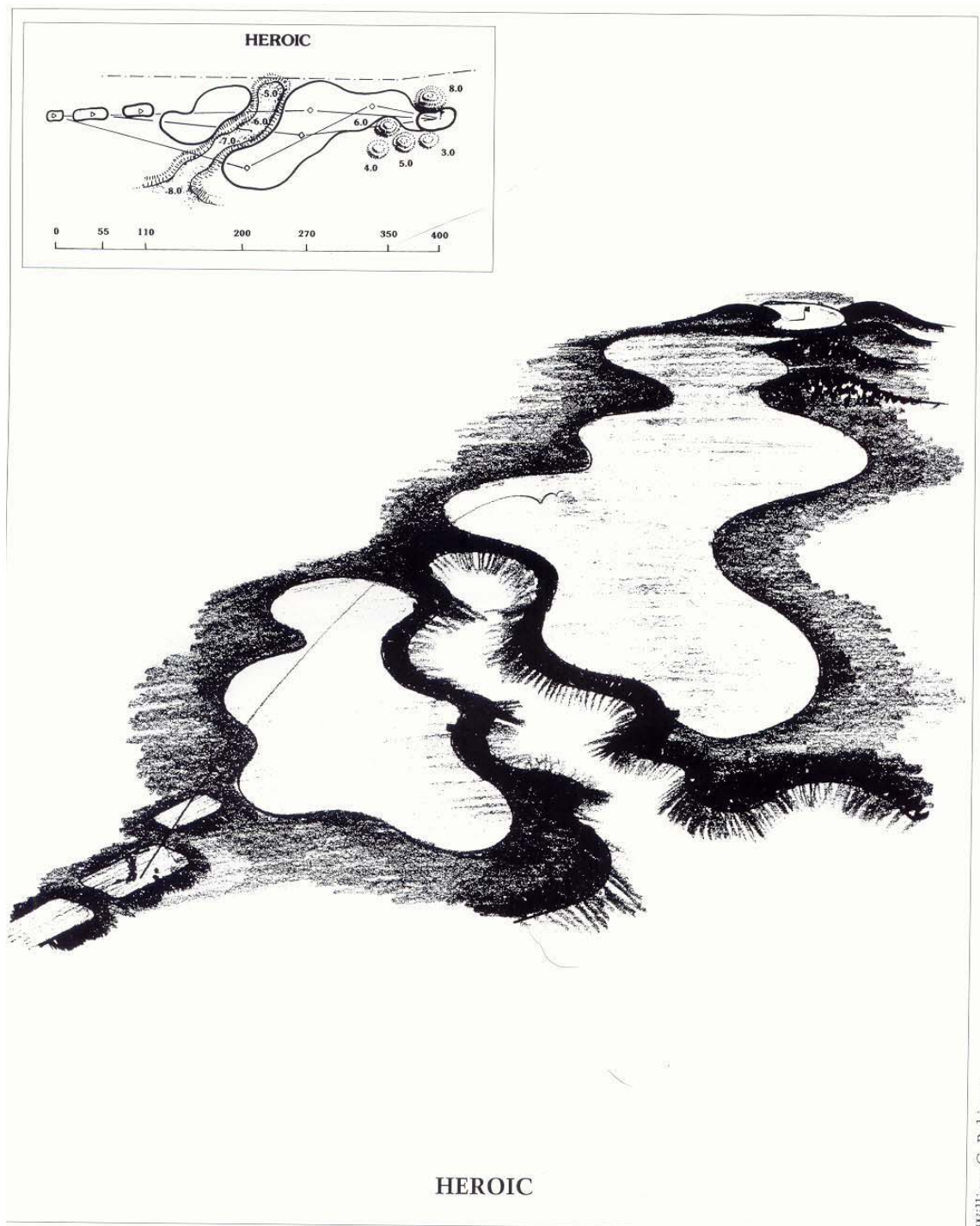


Figure 4.4: The Heroic School (Diagram from *Golf Course Architecture* by Michael Hurdzan, p. 134).

The more adventurous and skilled golfer will try the longest possible carry. The more timid will allow themselves room for error and play well away from the hazard. Some days the golfer will be feeling strong or there will be a stout tail wind, so a player might take a more aggressive line than normal. Like the strategic school, the heroic school forces the golfer to think about the course, about his or her abilities, and about outside factors such as the wind or the firmness of the ground.



Figure 4.5: The National Golf Links of America was heralded as the first great American golf course when it opened in 1911. It used a combination of the strategic and heroic schools (Photo from <http://www.golfclubatlas.com/ngla2.html>).

These three schools form the basis of golf course strategy. Some authors have described other schools like the freeway school or the framing school,²⁸ but most aficionados will say that golf

²⁸ Geoff Shackelford, in his book *Grounds for Golf*, describes these schools. The freeway school refers to long straight holes with little variety or beauty. The framing school is a description of how some modern architects are more concerned about the look of a hole, rather than its playing characteristics.

courses are designed using principles from the big three. Great golf courses use elements of both the strategic and heroic schools with penal hazards as the main form of obstacle (Figure 4.5).

The key is variety. Golf courses consist of eighteen holes and each hole should pose a different set of questions to the golfer. Golfers should always have to think their way through a hole. The seventeenth hole at the TPC of Sawgrass designed by Pete Dye is a rare example of a truly penal hole in modern golf course design (Figure 4.6).



Figure 4.6: The infamous 17th hole at TPC of Sawgrass. (Photo from *The 500 World's Greatest Golf Holes*, p. 21)

This famous hole consists of a bulkheaded island made up of a large green and one small bunker. The par-three plays anywhere from 100 to 150 yards, depending on the placement of the tees. It is a do or die shot. Either you find the island or you are in the water. This hole has been made famous because of the nationally televised tournament that is played there every year. The hole works because the course is meant for professionals, and the paying public is willing to lose two or

three balls in order to play this famous hole and thus be able to tell their friends about it. While the hole has been widely copied, the lack of option and overall difficulty of the hole make it a poor example of golf course architecture.

After being introduced to the three schools of golf course design, the students were assigned to improve a golf hole that they were familiar with (Table 4.1). As a golfer plays a course, he or she often notices things that would improve a hole, whether to make it more fair, exciting or just prettier. This assignment allowed the students to do just this. They were instructed that the alterations could be aesthetic, strategic, or functional (drainage, cart path traffic, etc.) or, hopefully, all three. The idea for this project came from an internship application from Tom Doak's Renaissance Golf design firm.

Table 4.1: Assignment Sheet for the Renovation Project

Renovation Project

“The architect’s knowledge of the game should be so intimate that he knows instinctively what it is like to produce good golf and good golfers. He must have more than a passing acquaintance with the best courses and the best golfing holes. It is not only necessary that he should play them, but study and analyze the features which make them what they are. He must have a sense of proportion and be able to differentiate between essentials and non-essentials. He should be able to distinguish between those features which are of supreme importance in the making of the hole and those which are of less value. He should be able to put himself in position of the best player that ever lived, and at the same time be extremely sympathetic towards the beginner and the long handicap player. He should above all have a sense of proportion and be able to come to a prompt decision as to what is the greatest good to the greatest number...” – **Alister Mackenzie 1920**

A golf course covers a large piece of ground, anywhere from 150 acres to 1,000 acres, and it can be intimidating thinking about designing something so large right from the start. Instead, we will break the golf course down into a collection of eighteen holes. For this assignment, you will choose one hole on either the Georgia Club or Athens Country Club, or any other course you are familiar with and detail changes you think would make the hole better. This could be an improvement aesthetically, strategically, or functionally (drainage, cart path traffic, etc.) or hopefully all three. Everyone who has ever played golf, has thought to themselves while playing a hole they did not like, how they would have designed it differently. Now you have a chance to make these changes.

Your sheet should have an at least one illustration of the hole as it is (photo, aerial, drawn diagram, etc.) and then how you envision it. The more views the better. It should also include a

brief written description of the changes that you propose. The sheet's layout should be well thought out. You will be graded on both its content and design.

Student Work

For some of the students, this assignment was a great challenge. All of the students attempted to make good, constructive changes.

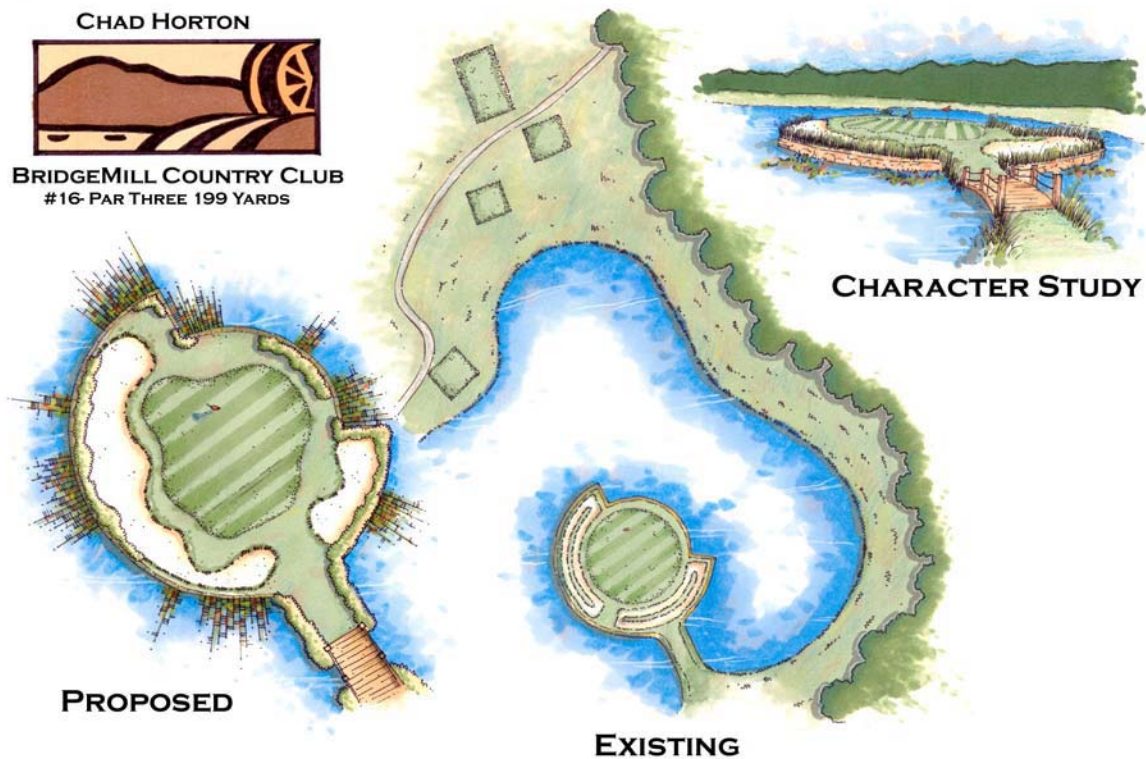


Figure 4.7: Student Chad Horton's redesign of a hole at the BridgeMill Country Club (Graphics by Chad Horton).

Chad Horton

Chad Horton decided to make changes to a hole with an island green at a course near his hometown (Figure 4.7). He first eliminated the green's circular form and the precise rectangular shape of the bunkers. Next, he softened the edges of the geometric island by planting tall grasses.

He also moved one of the bunkers, creating an area on the island platform that was neither bunker nor green. In other words, he created an area for a ball to come to rest that might be easier to hit out of than a bunker. Golfers might then be more inclined to aim for the portion of the green near this open spot knowing that a miss hit shot might end up in this more forgiving area. By adding this space, the student has introduced a strategic element to an otherwise penal hole.

Mr. Horton's proposals make this very difficult hole more playable. I did not like his use of longer or native grasses on the island itself. A golfer who has found dry land should either be on the green, in a bunker, or in the light rough.

One further addition by Mr. Horton should be noted. He proposed to replace the isthmus that connects the island with the land with a pleasant looking bridge. While this would certainly be expensive, it would add to the aesthetics and charm of the hole.

Charlie Sears

One of the best examples of student work for this assignment was the redesign of the fifteenth hole at Athens Country Club proposed by Charlie Sears (Figure 4.8). Mr. Sears turned a rather mundane hole into an exciting and challenging par four. He acknowledged that the advances in ball and club technology have changed the strategy of the hole and addressed it by proposing to move the valley further from the tee. By moving the bunkers closer to the line of play, the golfer now must make a decision between accuracy and length off the tee. The golfer can no longer just try to hit a driver as far as they are able, but now must think about using an iron to play for position. The bunker behind the green certainly adds difficulty, but in my opinion this could also be achieved by increasing the slope of the hill and mowing the grass to fairway height, creating a chipping area. These are usually easier to play out of than a bunker for the high handicapper but more challenging

than a bunker for the good player who is often most comfortable from the sand. The addition of the plateau on the back of the green does indeed add “interest and difficulty.”

Mr. Sears’s changes to this hole were comprehensive, well thought out, and well argued. He also did a good job of presenting his ideas through pictures and illustrations.

Following Page: Figure 4.8: Charlie Sears’s redesign of a hole at Athens Country Club

ATHENS COUNTRY CLUB

SOUTH COURSE #5 - PAR 4

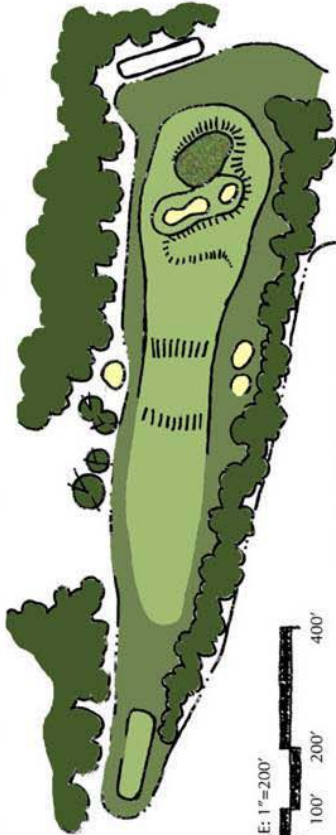
BLUE: 350 WHITE: 345 GOLD/RED: 335



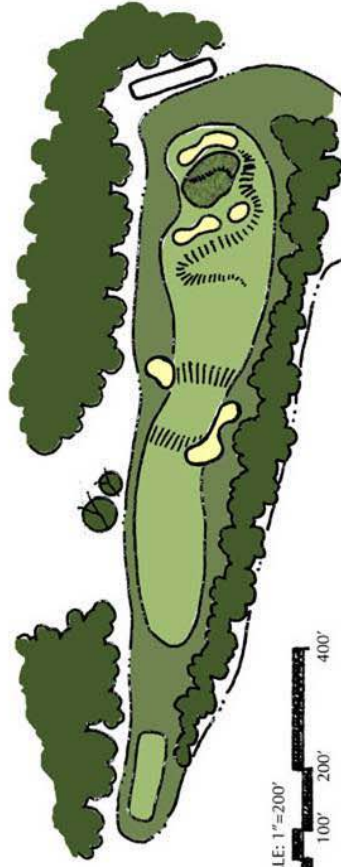
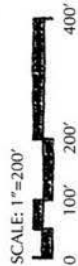
HIDDEN BUNKER WELL LEFT OF FAIRWAY



NO MAN'S LAND BEHIND GREEN



ORIGINAL HOLE



RENOVATED HOLE



ORIGINAL VIEW FROM TEE DOWN FAIRWAY

Athens Country Club is a great old Donald Ross design. The fifth hole on the South Course, though, needs some improvements to return it to its former glory. As it plays now, the hole is a relatively easy drive and a short pitch. There are a total of three fairway bunkers that are nowhere near the line of play, including one that is on the far side of the cart path. I propose moving that one in towards the fairway. The other two would also be moved closer to the line of play and be combined into one deep bunker. Ross brilliantly used a small valley in the fairway to control the distances of drives, but now players simply blow the ball over this large swale. I propose to use earthmoving equipment that was not available to Ross and move the valley further towards the green and away from the tee. The area behind the green is now a no man's land. There is no penalty for hitting the ball there. I propose to place a bunker to trap any players that go long. I also propose inserting a small back plateau to the green to further add interest and difficulty to this relatively benign short par 4. These changes may change the historical character of the hole but would be consistent with the rest of course. They add strategy. The player must now think his way through the hole.

CHAPTER FIVE

THE SKILLS OF GOLF COURSE DESIGN

“A round of golf should present 18 inspirations – not necessarily thrills, because spectacular holes may be sadly overdone. Every hole may be constructed to provide charm without being obtrusive about it. When I speak of a hole being inspiring, it is not intended to imply that the visitor is to be subject to attacks of hysteria on every teeing ground.” A.W. Tillinghast, 1920

The history of the evolution of the golf course design, its famous designers, and the three schools of strategy are all key concepts that golf course designers need to know. Taking this knowledge and applying it to the design of a golf course can only be done after learning the skills of golf course design. For this class, we focused on:

- Routing
- Placement of hazards
- Grading
- Clearing
- Grassing
- Green Design

This list of skills is just a few of the many needed for a golf course designer to complete a full set of plans, but time constraints prevented the class from delving further into the technical aspects of golf course design.

Routing

For a basic class in golf course design, routing is far and away the most important of the aforementioned skills. As Tom Doak describes routing, “the golf architect’s primary task is to rout the eighteen holes to take advantage of the property’s natural assets.”²⁹ These assets might include beautiful views, unique trees, or interesting topography. In routing a golf course, it is the designer’s job to determine how a golfer will move through the property and interact with the site. Routing is an acquired skill that takes time to develop. It is often the skill that separates a good golf course designer from the mediocre or poor.

In this class, the students routed golf courses over two very different pieces of land. The students were required to produce at least three distinct routings for each course before moving on to refining a final product. These exercises exposed the students to the fundamentals of routing a golf course and gave them the chance and time to develop this skill.

A good topographic map is the required beginning for any routing. Besides showing the topographic information, this map should show tree massing locations, roads, easements and any other key features on the site. Having met the landscape architecture prerequisite requirements, the students should be very familiar with this type of map. It was my belief that rather than instruct the students on the steps of site analysis, concepts which they also should be familiar with, I should let them approach this aspect of the project in any manner that they desired. I did give instruction as to how to locate and find gold holes:

- Identify natural locations for greens
- Identify natural landing areas
- Identify tee areas

²⁹ This discussion of routing is loosely based on the second chapter of *The Anatomy of a Golf Course* by Tom Doak. This was assigned to the students prior to the start of their assignment.

Designers go about routing in many different ways, but I think the most effective and efficient way is to try to identify good natural golf holes. Doing this can lead to less site impact and more interesting golf courses because it is impossible to recreate the subtle nuances of nature.

Green Sites

It is best to try to identify natural sites for green locations. Greens need to be well drained, so the best green sites are often on plateaus or small knobs. Saddles are also advantageous, as they drain well and are very aesthetically pleasing. Greens can be located in valleys but often times this requires a good deal of subsurface drainage or the elevation of the greens a good deal above grade to keep water from draining onto the putting surface or green. Hillsides can be used for green sites, as long as the slope is not too severe and an effort is made to divert the water around the sides of the green. The maximum slope for green sites is five percent with an average range of one to three percent.

Landing Areas

The next step in the process is finding good landing areas for tee shots and lay-up areas for par-fives. These areas need to be bigger and broader than green sites, but they can be little steeper. The general rule of thumb is that the slope of these areas can not exceed ten percent. A golf ball will continue to roll on any fairway that is steeper than ten percent. Good landing areas include broad valleys, the tops of a ridges, mild slopes, or flat land with small undulations, like the bumps and rolls found on the links of Scotland.

Tee Areas

To complete the hole, it logically makes sense to work back to try to find good natural tee sites. Tee sites need to be well drained. Additionally, golfers tend to like to hit downhill, so knobs or plateaus are good spots. Golf course architects typically attempt to show off a site's vistas at the tee. Tees are smaller than greens, so these areas can be more easily banked into the side of hills without having to move large amounts of dirt.

With potential greens, landing areas, and tees marked on the topographic map, the designer can then begin to connect these components into a whole. It is wise to identify as many complete holes as possible before trying to link holes together. Only extremely rare sites have a large number of ideal holes, especially ones that flow together. A designer will often have to join holes together with holes that may not fit the site as well. The key to routing is trying as many different scenarios as possible and then being able to make a judgment about which is best. For a master designer this judgment is often based on their knowledge of the great courses and holes around the world. They know what works and what does not. For those less knowledgeable, there are a number of rules or guidelines that can be helpful when routing a course.

The Rules of Routing

Forrest Richardson, a golf course architect from Scottsdale, Arizona has written a thorough book solely on the topic of routing.³⁰ Richardson takes the reader through every step of the process and the book is a great learning aid. In one chapter he composes a checklist of dos and don'ts of routing (APPENDIX A). Some of the rules, such as having your opening holes play into the rising sun, are obvious but useful reminders. The list is rather extensive and gets down to the minutia of

³⁰ Richardson, Forrest L. *Routing the Golf Course: The Art & Science that Forms the Golf Journey* (Hoboken, NJ: John Wiley & Sons Inc., 2002).

routing. While the rules are useful to have as a guide and a reference, many of them are too rigid. If a designer was to follow these rules to the letter, they would have a hard time responding to site. In my opinion, the site should dictate the flow of the course, not a rigid rule dictating that all four par threes must face towards different points on the compass. An architect adhering to these rules might have to fight against the lay of the land and would therefore undoubtedly cause more disturbance and greater environmental impact. If the best solution to the problem is that the site puts forth two par threes in a row, then that's how it should be.

The students were introduced to the principles and rules of routing the golf course and we discussed different theories concerning the placement of the clubhouse. Often times, a developer or the land planner will have already chosen a site for the clubhouse. It is then up to the golf course designer make his routing work from this given starting point. Ideally, the golf course designer will be consulted about the selection of a clubhouse site. Most courses today have two loops of nine holes radiating from the clubhouse, as well as a driving range and parking nearby. Because of these programmatic elements, there needs to be ample space around the clubhouse. Most clubhouses tend to be located in the center of the property away from the property boundaries. Of course, this means the developer will then have to incur the added expense of laying a road some distance into the property. Clubhouses have historically been placed on the highest point on a property in order to have the best view of the course and whatever other vistas the site affords. Unfortunately, this normally results in having both the ninth and eighteenth holes finish uphill, a less than preferable scenario. Another trade off that might need to be considered is whether to place the clubhouse next to an amenity like a lakeshore or coastline or to save this area for the golf course. This decision is often made by the developer and usually hinges on their priorities. If a project is about golf first, then

the prime land will be used for the course, but if it is about selling real estate, a large fancy clubhouse with great views may be a better draw.

The students learned these rules of routing by reading Richardson's and Doak's chapters on routing. We also had extensive discussions about routing in class. Once the students were familiar with the concepts of routing they were ready to try their hand at laying out a course. Through desk critiques, I was able to further clarify some of the nuances of routing.

The Skill of Routing

Golf holes vary greatly in length, but the widths of the corridors through which they pass generally do not. This width is determined by safety standards. As concerns over lawsuits have increased, so has the standard width of golf holes. At the tee, the width of the corridor is usually 150 feet. The corridor then widens out as one approaches the green or the landing area. Richardson recommends that the corridors be at least 350 feet.³¹ Different designers also use different lengths from the tee to their landing areas. Not long ago this length used to be 750 feet, but with advances in both club and ball technology most designers now use 800 feet or 267 yards as their standard landing area. Some architects have even begun using 900 feet.³² On par five holes, most designers use 600 feet from the tee shot landing area to the second shot landing area.

With this knowledge about length and width, it is easy to create templates to help in laying out the golf course. After determining the scale of the base map to be used to route the golf course, one can simply draw out scaled pieces of paper that represent the proper width and length of a tee shot. First, draw a circle that has a diameter of 150 feet to represent the teeing area. Second, measure out 800 feet in one direction to find the center of the landing area. Third, draw a circle with a three

³¹ Richardson, 220.

³² Tom Doak still uses 800 feet, while Mike Young is now using 900 feet.

hundred foot diameter around this point. For second shots, repeat this process, but both circles will be the same width (three hundred feet) and the distances should vary. After copying these onto card-stock or translucent paper, one can easily cut them out and attach them at the landing area with a metal fastener. This allows the template to be rotated to create dog legs. For par threes, the same process applies, but rather than measuring out 800 feet one measures out somewhere between 300 feet and 750 feet, the range of lengths of par threes.

Using these templates is a very good way for those learning how to route golf courses to get a good feel of the size of golf holes and how to link them. I recommended that the students try these templates to start out.

Once the students became familiar with the process of linking the holes together they were required to come up with multiple solutions to each of the projects that were assigned. Finding a good routing takes lots of trial and error. One routing often leads to a similar but better routing. Students were encouraged to find routings that provided variety and created the least amount of impact on the site.

Placement of Hazards

Once the routing is finalized it is time for the golf course itself to take shape. Using what they had learned about the three schools of strategy, the students could now place bunkers. Every book ever written on golf course architecture has had a large section devoted to bunkering. The proper placement of bunkers is a matter of debate, but for our purposes, we focused on trying to make the bunkers fit the lay of the land (Figure 5.1).

The most natural looking bunkers are the ones that are carved out of the face of a slope. This variety of bunker is extremely visible. Bunkers on flat land have to be elevated so that the golfers

can see them. Because of this, they are often dug out of artificial mounds that were created for this sole purpose. On downhill slopes, it is even more difficult to create bunkers that fit the lay of the land and yet are still visible to the line of play. More earth movement is necessary. The class was also informed about the maintenance costs of bunkers. Bunkers with flashed faces can be expensive to maintain, especially in locations that see heavy rains that can cause the faces to erode. With this in mind, the students were advised to use bunkering sparingly. Novice golf course architects have the tendency to overdue their designs, liberally sprinkling them with a multitude of hazards. The students were encouraged to have fun with their designs but also be practical.

Students were also instructed on the various ways to use water hazards, the most penal of all hazards. Having water that completely crosses the line of play should be used sparingly, because it will create a golf course that is entirely too difficult. The best use of water is to have it on the side of a hole or on a diagonal to the line of play where the player can decide how much they want to carry.



Figure 5.1: The natural looking bunkers at Cuscowilla (Photo from <http://www.golfclubatlas.com/cuscollia1.html>).

Technical Skills

Once the routing and design of the holes is complete, the students can delve into the nuts and bolts of golf course design. For this class the students were required to complete three technical plans for their final project:

- Grading Plans
- Clearing Plans
- Grassing Plans

The students were also required to develop four detailed plans of green complexes.

Grading

The most expensive aspect of building a golf course is often the earth work. By developing a good routing, an architect can greatly avoid much of this costly endeavor. For the Harmony Club project, each student completed a rough grading plan for the course. This plan, completed at 100 scale, showed where the designer plans to move significant amounts of earth. Small detail shaping is not shown on this plan. The main guidelines for this project were the maximum slopes mentioned in the routing section above; namely, ten percent for fairway landing areas and five percent for greens. Most architects working on a strict budget will try to balance their cuts and fills. To make things easier on the students, this was not one of our goals.

For greens, the grading was very easy. It was simply a matter of pushing the contours around so that only one contour crossed the green surface. To grade tees, contours were pushed completely to either side, creating flat areas. Landing areas, especially on holes that were located on the steep slopes along the creek bed, were more difficult. They are a number of steep gullies and dry stream beds that run through the site. These needed to be filled and the sides often needed to be smoothed

out and softened. Where these valleys crossed fairways near landing areas, the students were instructed to insert a catch basin on the high side and grade so that water would be stopped before running across the fairways. Due to time constraints, the students were not required to develop a complete drainage plan, but it was important for them to show an understanding of where the water was going on the site.

The students had to make sure that the holes were not blind, using grading to make them visible as needed. To help the students visualize the slopes, they were required to complete vertical profiles at five times vertical exaggeration for two golf holes. Some students realized that they needed to go back and shave down knobs or raise tees in order to make the holes visible.

Clearing

On a forested site, the most obvious impact to a site is the clearing of wide corridors of trees for golf holes. How the designer specifies that this is done can often have a major impact on the finished product.

Using the existing tree lines as their guide, the students created corridors for the golf holes. These corridors ranged anywhere from 250 feet (very narrow) to 350 feet (wide). Students were reminded of the importance of morning sun when trying to grow grass especially on greens. The trees at the Harmony Club are mature, so this meant substantial clearing on the southeast side of greens. Grass needs airflow to be healthy, so the students were instructed to create wide corridors on the western portion of the site where the steep hills and tall trees greatly restrict the movement of air. Students were discouraged from introducing any trees, as they would look out of place on a site with an abundance of mature trees.

The proposed tree lines should look natural with some movement rather than straight and rigid. At times it might be possible to incorporate trees into the strategy of the hole, but this has long

term problems. Trees die and when this happens the strategy of the hole completely changes.

Students were asked to denote the areas that have been cleared by some means, using a hatch or cross-hatch so that they go back and estimate the scope of the clearing in order to estimate the cost.

Grassing

Landscape architecture students receive very little training in turfgrass. While golf course architects often work with experts when choosing the type of grass for their courses, it is important for them to have a basic understanding about turfgrass. Turfgrasses can be divided into cold weather and warm weather groups. Grasses that thrive in cooler temperatures such as bent grass are members of the cold season group. Bermuda grass, which does well in hot weather, falls into the warm weather group. Athens, Georgia falls directly into the transition zone as an area that experiences a fair amount of both cold and hot weather. For the most part, high-end courses in this area tend to have bent grass greens and Bermuda fairways. Bent grass has finer blades than Bermuda and therefore creates a smoother putting surface. Bermuda grass is hardier and therefore more appropriate for tees, fairways, and roughs. Both Bermuda and bent grass struggle without full sun. Zoysia grass on the other hand can survive in the shade and is often used on tees on golf courses with many trees. Each of these grasses has a number of prominent cultivars. Choosing the right type of cultivar is determined by the budget of the project, including the proposed maintenance budget, as well as the desired playing characteristics of the course as envisioned by the designer. For example, if the designer wants a course where the ball will run a lot and there is a budget for it, they might specify that the fairways will be TifSport, a Bermuda cultivar that can be mowed tightly.

The students were encouraged to contact a superintendent from one of the courses on Lake Oconee and ask their advice on what grasses to specify at the Harmony Club. Each micro climate calls for different types of grasses, and it is wise to seek the council of those who have experience in

the region. Golf course designers often have a very close relationship with the grow-in or construction superintendent, whose job it is to make the course play as it was designed and ensure that the course is in good shape. Having the students contact a superintendent was a way of simulating this crucial interaction. Once the students had determined which grasses to use on their course, they illustrated this information on a 100 scale map using different hatches or colors for the different types of grass.

Green Design

One of the things that sets golf courses apart from one another are their greens. Players are affected not only by the smoothness and speed of the putting surface, but also by the undulations in and around the green. The slopes affect putts, chips, and approach shots. The strategy of the hole is often dictated by the slope of the green. For example, if a green slopes heavily from right to left, then it is best to approach the hole from the left side of the fairway because the pitch of the green will help stop the ball. Green design is a very difficult subject and the ability to create interesting greens can only be achieved after studying the great greens around the world. It would be impossible to adequately cover this subject in a one semester class, but it is important to show the students how to go about designing a green.

Designing greens requires the student to envision the slopes of the greens as well as the bunkers and hollows around the green, and to then draw in contour lines that showed this relationship. For this class, we concentrated on a combination of strategy and function. The design of the greens had to reflect the strategy of the hole. Greens were required to hold at least seven pin positions, circular areas of six feet in diameter that were one to two percent in slope. Parts of the greens could have up to five percent slope and all areas of the green had to be greater than one

percent for drainage. Water from the green surface must be carried away from the area through small swales. Swales were also incorporated in keeping water from draining into the bunkers and causing damage.

These designs were done on a ten foot grid at twenty scale. One foot contours were drawn to show the proposed shaping of the green and surrounds. This was much more detailed than the rough grading, so the students were only required to complete four greens.

CHAPTER SIX

DESIGN PROJECTS

“Few perhaps realize how difficult it is to arrange for the natural features to provide to the fullest possible extent the necessary excitement for the course, and to supplement these features without destroying the natural beauty of the site”- H.S. Colt, 1920

The studio format of the class allowed the students time to develop their skills in golf course design. This was accomplished through two major design projects:

- Par Three/ Executive Course
- The Harmony Club

These projects exposed them to many of the problems that face golf course designers when laying out their courses; less than ideal ground, the need to find ample space for the practice facility, environmental restrictions, etc. The students’ ability to solve or work around these dilemmas went a long way in determining their success with these projects.

Par Three/Executive Course

For their first attempt at routing, the students had the option of either designing a par three course, which is a course made up of eighteen one shot holes, or an executive course, a course made up of only par threes and par fours, but no par fives (Table 6.1). These types of courses are mostly for beginners so it was appropriate for the students to first try their hand at such an endeavor before moving on to a full-length eighteen.

Table 6.1: Assignment Sheet for the Executive Course/Par Three Project

Executive Course, Par 3 Project

Two 24" x 36" sheets, one fully rendered

“A round of golf should present 18 inspirations – not necessarily thrills, because spectacular holes may be sadly overdone. Every hole may be constructed to provide charm without being obtrusive about it. When I speak of a hole being inspiring, it is not intended to imply that the visitor is to be subject to attacks of hysteria on every teeing ground.” A.W. Tillinghast, 1920

We are now ready to move from one hole to the whole golf course. This next project will be a quick exercise in routing the golf course. There are two options; a par-three course, a course consisting of only par-three holes or an executive course, a course consisting of only par-three and par-four holes. Your goal for this project is to create an eighteen hole course that takes advantage of the site’s natural topography, flows well from hole to hole, has a logically placed clubhouse and practice area, and would most of all provide an enjoyable golfing experience.

The goal of this assignment is to introduce you to some of the issues and challenges of routing a golf course. You may be asked to do some minimal grading if your holes do not work with the existing grade. You will be required to come up with three rough plans on trace before proceeding to your final drawings. These final drawings will be hand drawn. You will need to draft the topographic map on to a base sheet. This will be time consuming and should be started within the next week. The final product will consist of two drawings; one with the holes laid out over the topographic map, the other a fully rendered drawing that one might show a client or prospective member (portfolio quality).

The site that they were given was a topographic map of three parcels of land in northern Michigan (Figure 6.1). The map shows a multitude of small knobs and depressions with a ridge running through the middle parcel. The assignment was to site the clubhouse, driving range, parking, and route an eighteen hole course. A scenario was created in which a developer was looking at this land for a course but only could afford to buy two of the three parcels. They were to determine which two of the three parcels were optimal for the course. Once this was completed, they then routed the course over this land. They were given the access points to the parcels. The course was to be a walking course so the distances between green and tees were to be minimal. They were told to be very careful about safety and make sure that there were no blind shots.

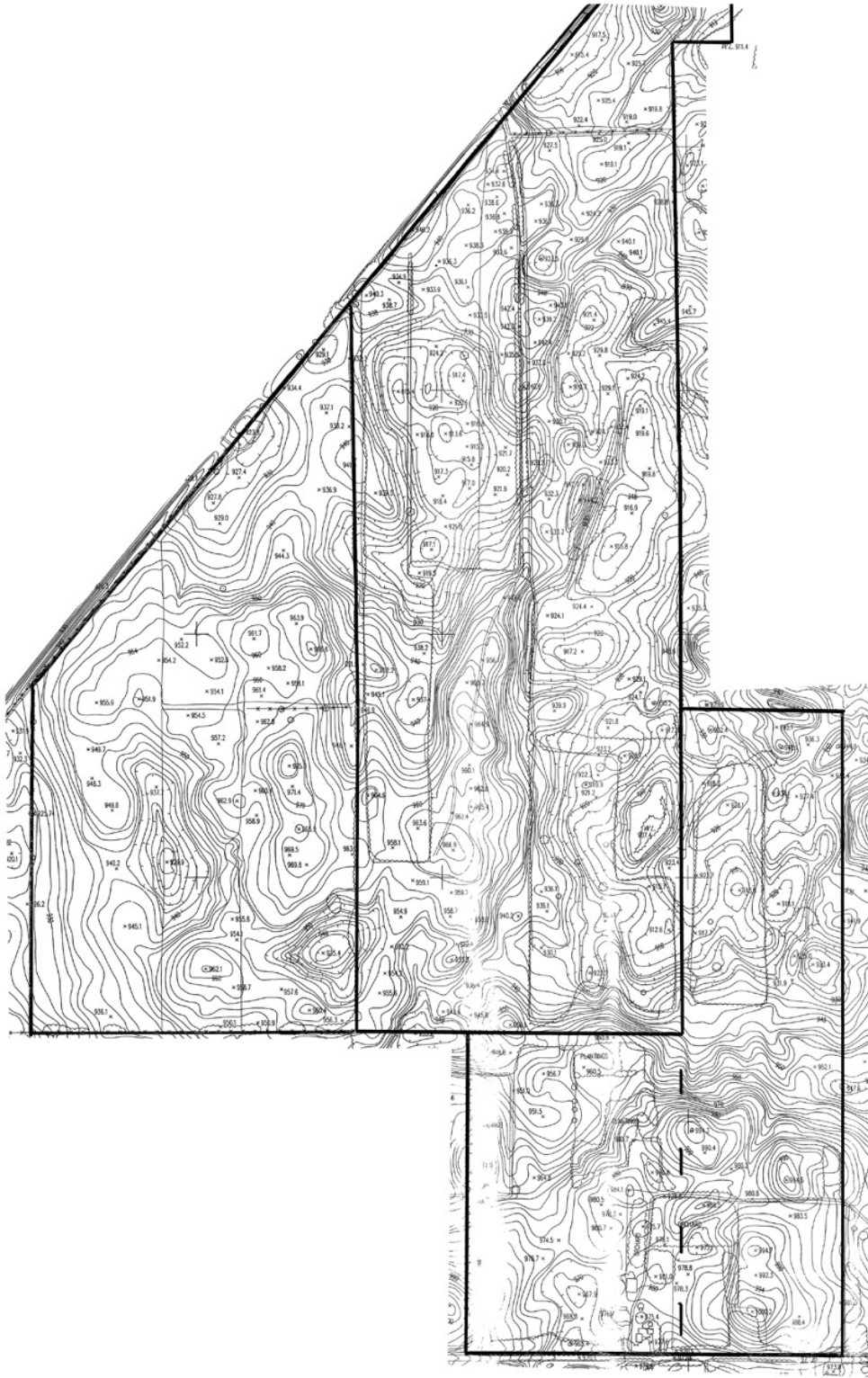


Figure 6.1: The topographic map for the Par Three/ Executive Course project

The main challenge facing the students was how to integrate the large ridge that split the middle parcel into the routing of the course. The sides of the ridge are just steep enough that it would be ill advised to try to play perpendicular to these slopes. One could play around this ridge, but doing so would fail to take advantage of this distinguishing feature as well as the views from this high spot. The ridge's proximity to the eastern boundary of the middle parcel also made it difficult to route holes on this portion of the property. The eastern parcel also contains a substantial hill that leads up to a large plateau with good ground for golf. How to transition to and from this plateau was a difficult task for those choosing to use this parcel. The western parcel did not pose any considerable difficulties, but the land here was by far the flattest and least interesting.

The finished product consisted of two sheets at 200 scale, one showing the routing over the topography and the other being a rendered plan, complete with placement of clubhouse, parking, driving range, multiple tee boxes, added water hazards, bunkers and trees. For this exercise, the students were allowed to ignore the existing tree cover and invent their own. The goal for the project was for the students to obtain a basic understanding of the routing a golf course and the importance of developing multiple solutions to the problem.

Students struggled to keep the tees close to greens and avoid a large number of uphill shots. Some were unable to steer clear of having any blind shots. The students also struggled with creating a variety of holes. Many students created courses with every hole in the 150-180 yard range. Those that did break out of this range tended to include too many holes over 200 yards. Too few students incorporated short par threes of less than 150 yards. The students did a good job of varying the direction of holes and avoided having their opening or closing holes play into the sun. All of the students successfully identified good natural green sites, but some failed to link these sites in a coherent, logical manner.

Student Work

Lee Marshall

Lee Marshall was a student who had spent the past summer in the office of Greg Norman's design office doing Auto-CAD work. While familiar with the look of plans he had not had the opportunity to route a golf course.

Mr. Marshall did a good job on this assignment (Figure 6.2). His routing is fairly simple, consisting of two returning loops. The course would be very walkable. He used the ridge that runs through the southeastern portion of the site by running the first hole along it and then turning the second hole back towards the south and down off the ridge. Mr. Marshall runs into a problem at the sixth where his second shot to the green may be blind. The walk from the seventh green to the eighth tee is a little long. He could have avoided this problem by moving the tees on the ninth to the west and then moving the eighth green to where those tees were. The tees for eight could then be moved to where the eighth green was.

Following Page: Figure 6.2: Lee Marshall's Executive Course

SPRING HILLS EXECUTIVE

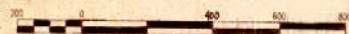
Designed by: Lee Marshall
9/23/2004 UGA, Fall



This par 63 executive course is for anyone with a creative passion for the game of golf. It's filled with a mixture of short and long par threes, to left and right dogleg par fours. This course holds a variety of penal, strategic, and heroic holes. Along with gorgeous views from the clubhouse, this course flows with its topography for a natural experience. This is possible with the two chosen parcels.

CARD OF THE COURSE

FRONT					BACK														
Hole	Par	Pro	Back	Middle	Front	Hole	Par	Pro	Back	Middle	Front								
1	4	418	390	381	385	10	3	185	163	155	145								
2	3	170	148	140	128	11	4	397	372	360	357								
3	4	484	443	427	414	12	4	386	340	328	316								
4	3	241	210	195	173	13	3	190	171	148	130								
5	3	141	136	128	120	14	4	401	382	351	322								
6	4	458	432	418	405	15	4	440	416	400	388								
7	3	201	190	186	163	16	3	183	160	149	134								
8	3	188	176	160	144	17	3	185	165	148	130								
9	4	442	430	419	402	18	4	487	445	420	402								
TOTAL 31					2,723 2,582 2,456 2,314					TOTAL 32					2,614 2,469 2,320				



SCALE: 1"=200'-0"

The back nine is well done, although the second shots on the twelfth and fifteenth could be blind. The par-threes on the back are also a little repetitive, as all four of them are between 183 and 190 yards. The range was not well thought out as it is orientated east-west rather than north-south. Mr. Marshall should have perhaps considered reducing the size of the man-made lake on the northern part of the property and reorienting some of his holes. All in all, Mr. Marshall attempted an ambitious routing and was largely successful. His graphics on this project were excellent.

Charlie Sears

Mr. Sears chose the other parcel of land, which meant using the central and eastern portions of the site (Figure 6.3). He decided to use only par three holes. This allowed him more room to change direction after almost every hole. On the front nine he used a figure eight configuration, while on the back nine he went with a more conventional loop. The course would be very walkable as he did a great job of minimizing tee to green walks. The clubhouse area is well configured, with the driving range correctly oriented north-south.

Mr. Sears's routing of the front nine ends with three uphill holes which is repetitive and should be avoided. Mr. Sears would have been wise to vary the lengths of his holes more. All eighteen holes fell into the range of 150 to 196 yards. The course would benefit from at least one short par three and one long par three. Variety is key to any routing, but is even more important when designing a par three course because all the holes are already so similar. The worst aspect of Mr. Sears's design is that his ninth and eighteenth holes head due west. This would cause problems as players hit their balls into the setting sun. While on some sites this problem couldn't be helped, this site had so many good clubhouse and green sites that tinkering could have fixed this dilemma.

Following Page: Charlie Sears's par three course

DUKES ESTATE GENTLEMEN'S CLUB

WATER & RIDGE NINES MASTER PLAN

WATER NINE

HOLE	BLUE	WHITE	RED	PAR
1	161	150	141	3
2	166	155	145	3
3	170	153	148	3
4	160	151	140	3
5	166	155	140	3
6	185	171	160	3
7	163	126	171	3
8	180	167	150	3
9	175	190	141	3
T	1526	1386	1282	27

RIDGE NINE

HOLE	BLUE	WHITE	RED	PAR
10	193	177	163	3
11	170	159	143	3
12	153	136	126	3
13	166	153	143	3
14	196	181	170	3
15	173	157	147	3
16	150	133	123	3
17	170	160	150	3
18	173	160	147	3
T	1544	1416	1312	27



CHARLIE SEARS
LAND 4910
FALL 2004

Mr. Sears's graphics were well done, although he should have oriented his drawing such that the north arrow pointed right not left. For a first attempt at routing a course, Mr. Sears did a superb job.

The Harmony Club

Having completed their first routing, the students were ready to move onto a larger project that was based in reality (Table 6.2). The Harmony Club is a planned private golf club on Lake Oconee, about an hour south of Athens. The concept behind the club is that it will be a pure golf club, with no real estate to take away from the atmosphere of the golf. It will be a traditional, walking only course with caddies. The 250 acre tract contains virgin hardwood forest, farm ponds, open meadows and 1.5 miles of lakefront.³³ The topography is moderate to steep on the western half, and flattens out as one moves east towards the lake. The plot is in rectangular form, one mile wide by 3 miles long (Figure 6.4).

Table 6.2: Assignment Sheet for the Harmony Club Project

Final Project- The Harmony Club

Land 4910

“The most important thing in the championship course is the terrain... one must get the thrill of nature.” – George Thomas, 1927

Our final project is sited at the Harmony Club on Lake Oconee. Having talked about strategy and routing, it is now time to put both of these components together. We will also explore some of the more technical aspects of golf course architecture, including grading, drainage, grassing, clearing, and green design. The goal of this project is to understand the many elements of golf course design and also to be able to produce a set of plans that could be used in constructing a course.

The first objective is to come up with a good routing that takes advantage of the site's natural features. Second, will be the careful placement of hazards to create interest and challenge. Once this is completed, you will be required to complete a full grading plan using two

³³ For more information, www.harmonyclubgolf.com.

foot contours. The fourth task will be to complete a clearing/planting plan showing where the course needs to be cleared and where you intend to plant any vegetation. Fifth will be the grassing plan, illustrating which grasses you plan on using on the golf course. The next task will be to design four of the course's green complexes in detail.

Required Drawings

Fully rendered master plan, 1" = 200' (25%)

Routing showing all elements of golf course, 1"=200' (10%)

Grading/Drainage plan, 1"=100' (20%)

Clearing/Planting Plan, 1" = 100' (5%)

Two vertical profiles of golf holes, 1" = 200', 5x vertical exaggeration (5%)

Grassing Plan 1" = 100' (5%)

Four green complex drawings (15%)

Required Writing

One page description of your vision for the Harmony Club- This description should reveal your philosophy of golf course design. Please take your time with this aspect of the project. Make sure your writing is clear, concise and grammatically correct. (10%)

Hole by hole description of the golf course (5%)

In the provided scenario, the developers envision a staging area at the entrance where people will leave their cars. The golfers will then be shuttled to the clubhouse, which must have a view of the lake. The developer does not require the golf course to start and finish at the clubhouse, but envisions a starter shack a short distance away that will serve as the beginning and end point of one's round. The developer is also open to the idea that the course will not return to the starter shack exactly after the first nine holes, but rather sometime in the middle of the round (after the eighth hole or the tenth might be possibilities). There needs to be a standard size driving range. The students were also subject to real life environmental restrictions. Clearing along the lake edge was limited to any tree with less than an eight inch caliper. Shrubs and low branches could be removed. Any clearing along ponds or in stream beds would have to be done by hand and would therefore be extremely extensive. The students had the ability to fill up to a half acre of wetland before the club would have to buy wetland mitigation rights, something they were reluctant to do. The students were allowed to dam creeks to create ponds if they so desired.

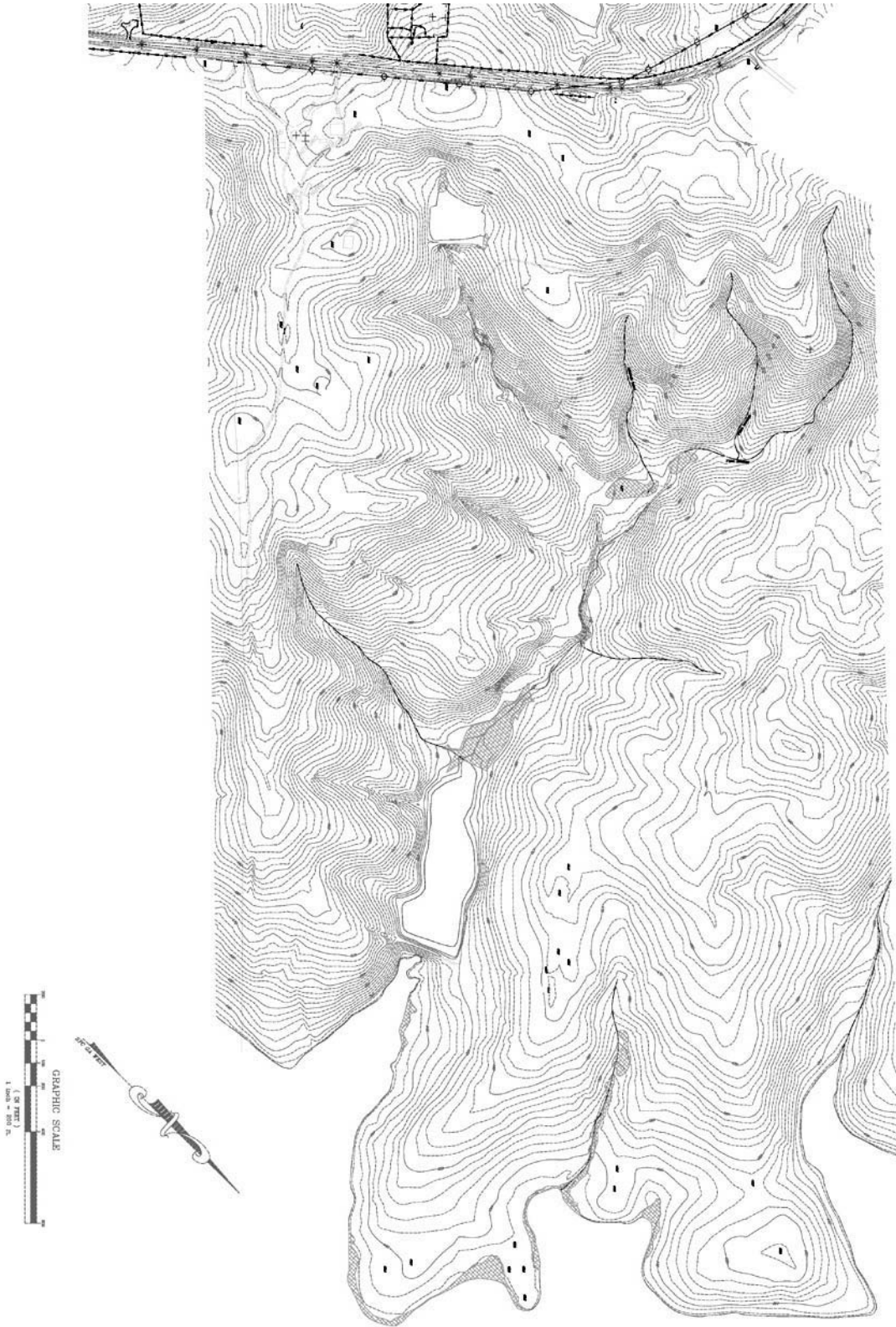


Figure 6.4: The topography of the Harmony Club.

The students were given the raw topography and instructed to look for natural green sites and potential holes. We then traveled as a class to the site, where after speaking with the developer, the students were able to explore the site (Figure 6.5).



Figure 6.5: The students on their first visit to the site of the Harmony Club.

Most of the class immediately headed towards the lakefront and determined it to be the site's most attractive feature. The students then moved inland to explore the forested parts of the site, where the ground starts to heave and roll. In the site's current uncleared state, it was very difficult to get a feel for distances and location. With a wide array of vegetation types, varied combinations of open and forested areas, and wonderful views across Lake Oconee, the site offered the students a great canvas to work with. In general, the students seemed to be pleased with the site and its potential to become a golf course.

Just like in the first design project, the main problems on the site involved the use of slopes. The hillsides leading down toward the stream that bisects the site are steep. Playing up these slopes would result in blind shots and dull golf, but the architect has to get the golfer from one side of the property to the other. One solution would be to pipe the stream and use mass amounts of fill to raise this area of the site. Another solution would be to cut away at the slopes to make them less steep. Both of these solutions are costly, but more importantly they would have a severe impact on both the natural drainage and ecology of the site. The students were encouraged to find a different, environmentally friendly solution.

Another important issue the students needed to address was how to use the lakefront property. Some of the shoreline was clear of vegetation, while a good portion of it was heavily forested. From a golfer's standpoint, the ideal solution would be to clear right down to the lake edge, but obviously because of environmental reasons this is not possible or advisable. Because there is a high premium on lake views, how the students dealt with this dilemma would go a long way towards determining how successful their routing would be from an aesthetic viewpoint (Figure 6.6).

The next step in the process was to go back to the drawing board. The students each worked up a number of different routings in order to determine what might be the best solution. They then presented these in rough form. Some had not paid strict enough attention to the environmental restrictions and had to redo their routings. The class then traveled back to the site to review their routings in the field. By this point some of the initial clearing for the proposed golf course had been completed so it was easier for the students to get a feel for the forested areas. The students were also able to check to see if some of the clearing that they proposed would be possible by checking the



Figure 6.6: A view of the lake at the Harmony Club (Photo by Troy Miller).

tree calipers along the lake. While most students only needed to make minor adjustments, some made significant adjustments after seeing things that did not work or features that they wanted to highlight.

Once their routings were set, they could then move onto placing hazards. After the strategy of the holes had been determined, the student could then start grading the course, choosing grasses, clearing trees and designing greens. This side of golf course design is often not covered in texts but is nonetheless vitally important. Most golf courses are built by contractors, so the accuracy and clarity of the plans developed by the designer will have a huge effect on the final product.

Student Work

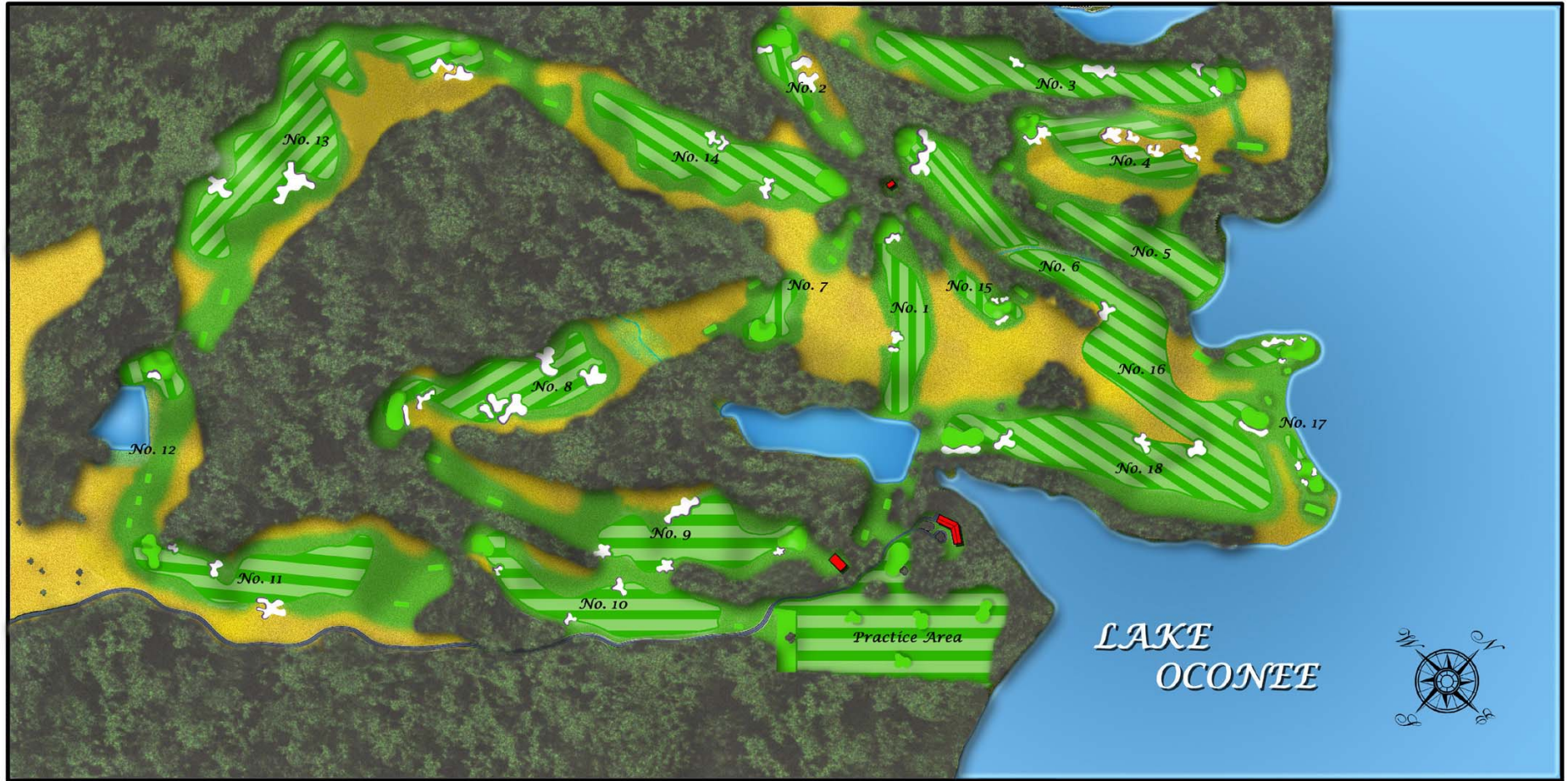
Troy Miller

Troy Miller, a graduate student who plans on pursuing a career in golf course design, came up with an inventive routing that brings the player to the lake front on both the front and back nine (Figure 6.7). Troy managed to handle the steep slopes of the property by creating a few heroic holes like the downhill par five thirteenth. There are a number of strong strategic holes as well, like the fourth and the eighteenth.

There are a few things that I did not like about the design, specifically the forced carry on the long par four fifth. The eighth hole covers difficult terrain which would have best been avoided. Mr. Miller chose to only route two holes on the flat slopes near the entrance. This land could have been better utilized.

Mr. Miller plans were well executed and legible (Figure 6.8). He also calculated his cut and fill, something that was not required of the students. He chose to use the computer for his graphics and for the most part they came out well. This was Mr. Miller's first attempt at using PhotoShop to render a golf course, and I think he learned a lot from the process.

Following Pages: Figures 6.7,6.8: Troy Miller's design and plans for the Harmony Club



1 - 4 - 447	10 - 4 - 421
2 - 3 - 175	11 - 4 - 388
3 - 5 - 601	12 - 3 - 210
4 - 4 - 305	13 - 5 - 607
5 - 4 - 476	14 - 4 - 486
6 - 4 - 489	15 - 3 - 172
7 - 3 - 207	16 - 4 - 395
8 - 5 - 526	17 - 3 - 145
9 - 4 - 488	18 - 5 - 507
3714	3357

Par 71
7071 Yards

MILLER
Golf Design

Architect: Troy Miller
Drawn By: Troy Miller

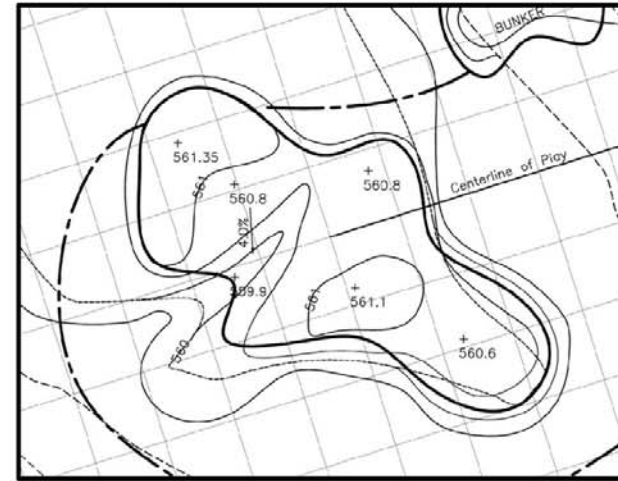


HARMONY CLUB

Clearing Totals:
4,172,217 ft²
95.781 Acres

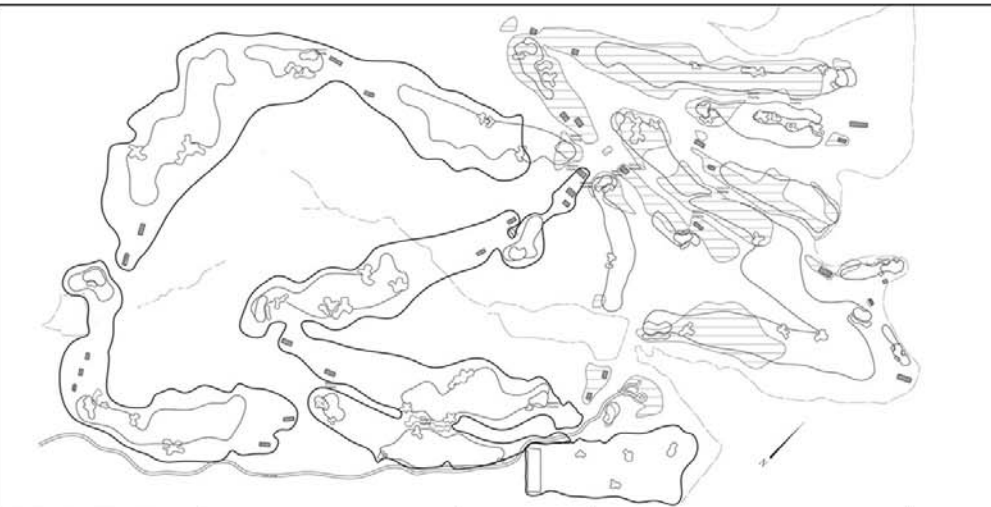
MILLER
GOLF DESIGN

Architect: Troy Miller
Drawn by: Troy Miller



No. 11
Par 4

5325 Ft.²

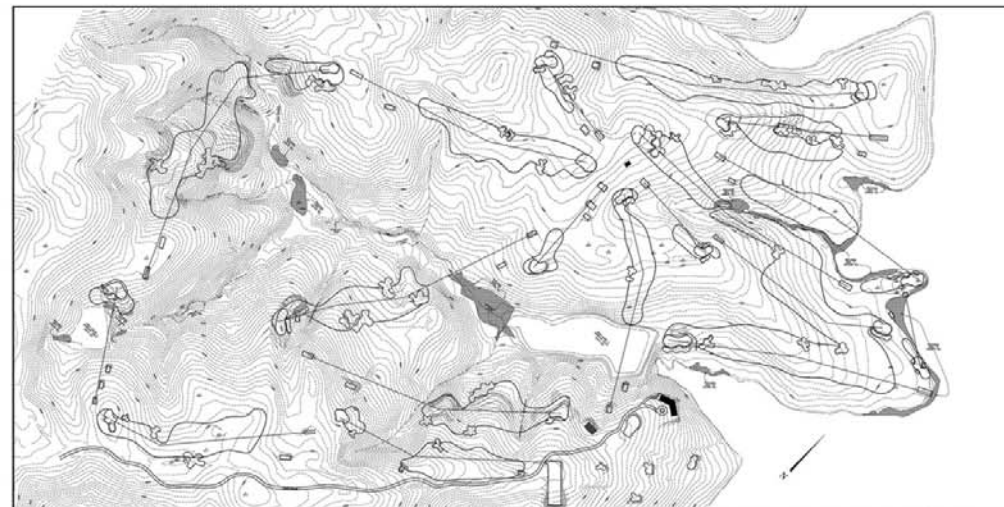


HARMONY CLUB

Grassing Plan
111 Bermuda grass
112 Bentgrass
113 Cavalier Ryegrass

MILLER
GOLF DESIGN

Architect: Troy Miller
Drawn by: Troy Miller



HARMONY CLUB

Mass Grading
Cut/Fill Approximations:
Cut: 52,000 yds.²
Fill: 64,000 yds.²

MILLER
GOLF DESIGN

Architect: Troy Miller
Drawn by: Troy Miller

Michael Turner

Mr. Turner was one of the students that had little exposure to the game of golf before this class began. His design reflects this unfamiliarity, but is also evidence of how much he learned over the course of the semester. Mr. Turner's front nine flows well, climaxing at the par three seventh over Lake Oconee (Figure 6.9). His back nine, though, was less successful. He tried to route too many holes across the sides of slopes, and as a result the thirteenth, fourteenth and fifteenth holes would all require large amounts of earth movement to be at all playable. The eighteenth hole, with its forced carry is certainly a difficult finishing hole, but it might be a little too difficult. The forced carry would be too difficult for anyone who was at all out of position.

Mr. Turner would have been better off trying to squeeze another hole or two into the northern portion of the site. His driving range is shoehorned in because he did not use this land to its fullest. Mr. Turner would have greatly benefited from a little more time to work out the kinks in his routing.

Following Page (Figure 6.9): Mike Turner's rendered master plan for the Harmony Club.



Harmony Club
Master Plan

Scott Orr



Figure 6.10: Scott Orr's rendered master plan for the Harmony Club.

Mr. Orr managed to fit all eighteen holes on about two-thirds of the site (Figure 6:10). He used five par threes to save space, but because of his desire to fit so much golf on this portion of the property there are a number of issues with his routing. The fifth green is dangerously near the landing area on the eighth hole. The second green is too close to the second landing area on the thirteenth. Safety is not something that can be sacrificed for good golf holes.

Mr. Orr did design strategically sound holes like the par five ninth, where the player who hugs the left side near the fairway bunkers is rewarded with an open line to the green. Mr. Orr was not afraid to bring bunkers into the line of play like at the eighteen and the thirteen, where a cross

bunker completely invades the line of play. Mr. Orr designed a great course when one analyzes the individual golf holes, but he needed to take more time during the routing process to make sure the holes were safe.

CHAPTER SEVEN

METHODS

“The original charm of golf, its simplicity and naturalness, cannot be too strongly emphasized.”
-Tom Simpson and H. N. Wethered

The methods used in this class to convey the basic concepts of golf course design included:

- Lectures
- Readings
- Desk Critiques
- Field Trips

All were useful. Lectures and class discussions were the best ways to teach specific topics like the evolution of the course, routing, and turfgrass. Readings reinforced what was covered in the lectures and allowed for more time to be spent in studio or on field trips. Desk Critiques were especially useful because each student's project was unique and with that comes a unique set of problems and questions. Far and away, though, the most effective teaching method was the field trip.

When most golf course designers are asked what one needs to do to get into the business, they invariably speak of the importance of traveling and studying great golf courses and the need to work construction. While it was impossible to have the students work construction during this class, it was possible to expose them to a wide variety of golf courses as well as to show them what a construction site looks like. The field trips allowed the students to see the concepts that we discussed in class as well as a variety of golf course styles. No amount of lecturing could cover the amount of material that was discussed in the field. I was able to observe various items at these courses and then immediately comment upon them. The field trips also exposed the students to a variety of different

voices on architecture through their interaction with the course superintendents who often showed us around.

This class could not have been successful without these trips. The students were able to grasp concepts much more rapidly because they observed or even heard about them in the field. They could see them or even feel them. The courses that were visited were carefully chosen to expose the students to different ideas and styles of golf course design. The following is a summary of our trips and the various ideas and concepts that were covered.

The Georgia Piedmont

The Georgia Club

After the first introductory class in studio, the students traveled to the Georgia Club, a real estate development course ten miles east of Athens. Designed by Dennis Griffiths in 1999, the course is a good example of mid-level contemporary golf course architecture. The course consists of a front nine that plays down and along a gradual slope. The back nine winds its way through houses in various stages of construction. The course is maintained to a high standard and various flower gardens pop up throughout the course. The only unkempt areas are beneath the trees, which are a long way from the line of play.

While many of the students were golfers themselves, most had never analyzed a course through the eyes of a golf course designer. This was a great opportunity for the students to start to learn the language of golf course design outside the classroom setting and to be able to put a visual image with a term or a concept. We took our time, standing on every tee, talking about strategy and aesthetics. Places where shoddy construction work was evident, like a number of sunken catch basins, were pointed out. We started to discuss different philosophies in design and different trends

that were evident on the course. One example was the general flatness of the greens, a common trait on modern courses. Advances in agronomy have led to new types of grasses that can be mowed very close to the ground. This creates a very fast and slick putting surface. Because of this, greens tend to now have very little contour, sometimes barely more than the one percent necessary to surface drain. This was the case at the Georgia Club, where the surfaces are rather dull and bland.

Another trend evident at the Georgia Club was the increasing distance between tees and greens. On the front nine, which does not have houses on it, the greens and tees are fairly close together, allowing this portion of the course to be walked. The back nine, which winds its way through the housing development, has some very long distances between greens and tees (Figure 7.1).



Figure 7.1: The 15th at the Georgia Club is accessed by crossing a road and then walking back the length of hole. (Photo by Troy Miller)

Golf course architects can route courses with these large gaps because of the proliferation of golf carts, which make these long distances irrelevant. Unfortunately, these gaps often break the flow of the course and also make it nearly impossible for anyone to walk if they so desired.

The Georgia Club is preparing to open a third nine holes, which was under construction during our visit. We were given permission to observe the construction site. The contrast between the green, quiet golf course environment, and the glaring red of the construction site was stark. The first time a person steps onto a golf course construction site can be quite confusing as there is little that looks familiar. The scale of all the exposed earth is huge. With the roar of the bulldozer in the background, we were able to take a look at the layers of a USGA green, the standard on almost all modern courses. The students were able to see the complexity and immensity of golf course construction.

In class discussions afterwards, it was clear that the students had learned these concepts:

- Flatness of greens because of modern grasses
- Greens and tees located far apart due to the majority of play being golfers in carts
- Difference in scale between course under construction and finished course
- Importance of sound construction in relation to finished course
- How plantings and management of the landscape affect the aesthetics of the course
- An introduction on the strategy of individual golf holes

Athens Country Club

The next week we visited Athens Country Club, a Donald Ross design that dates from 1926. Ross was a master at using ridge lines for green sites and tees and there are fine examples of this at Athens Country Club. The course plays across a valley with a reservoir at the bottom. The

differences between Athens Country Club and the Georgia Club are evident immediately. The greens have a lot more slope and roll, having been built in an age where greens speeds were much slower. The greens and tees are very close together, as befits a course that was designed to be walked. Gone are the insipid mounds that framed just about every green at the Georgia Club. Instead, the course lays on the natural slope of the land, taking advantage of its undulations.

Athens Country Club does have some issues that we addressed. First the bunkering is a mish-mash of styles, some flashed, others flat bottomed, evidence of tinkering by the club over the years. Two of the par fives have now become in essence long par fours because of the increase in club and ball technology. Touring the course after a quick rain, there seemed to be too many wet spots, leading one to believe that the course could use some improvement in subsurface drainage. The most glaring problem was the encroachment of trees and the hodge-podge of tree species. Over the years, trees have grown and been planted, greatly changing the original character of the course. A mix of pines and hardwoods, not to mention large ornamental shrubs, have caused the course to have an overgrown feel. There is evidence that this has started to make growing grass a problem on some of the greens. While trees are often beautiful and important parts of the landscape, their careful removal from spots at Athens Country Club would enhance the visual aesthetic improve the quality of the turf and open up some of the strategy of the golf course.

In class discussions afterwards, it was clear that the students had learned these concepts:

- Older courses tend to have more slope in their greens
- Ross's use of natural landforms and undulation
- Closeness of greens and tees because course was designed to be walked
- Importance of drainage so a course can be playable after a rain
- Trees ability to change the strategy and character of a golf course

- How a course evolves over time due to natural processes and the hand of man

The Golf Club at Cuscowilla

Our next venture out into the field took us south to Lake Oconee and the Golf Club at Cuscowilla. We were accompanied on our tour by Rusty Mercer, the course's superintendent since its construction in 1996. Designed by the team of Bill Coore and Ben Crenshaw, Cuscowilla is a semi-private course that is quite different than the rest of the courses in the Lake Oconee area. Coore and Crenshaw fall into the minimalist school of design, meaning that they prefer to move as little dirt as possible. The result at Cuscowilla is a golf course that fits beautifully over the land and has a true sense of place. The bunkers were designed without a liner, allowing the Georgia red clay to mix with the sand, creating a unique visual aesthetic. The out of play areas have been planted with a mix of native grasses. The golf course looks like it was found rather than created.

The golf course is not only visually striking but contains holes full of strategy. The students were treated to good examples of cross bunkering and cape holes (Figure 7.2). The greens contain a large amount of undulation, rare on modern courses. This is evidence of the amount of importance that the design duo place on the short game.



Figure 7.2: The 10th hole at Cuscowilla is an excellent example of a cape hole (Photo from <http://www.golfclubatlas.com/cuscollia1.html>).

Cuscowilla is an example of modern course design at its highest form. The most astounding thing about the place is that the course itself only cost \$3 million to build. The low price tag is the result of carefully studying the site. Coore and Crenshaw were able to come up with a routing that fit the contours of the land. Because of this they moved very little dirt and did not disturb the site's natural drainage. The course now has no sub-surface drainage and plays remarkably firm after rain storms. The bunkers tend to become puddles during significant storms, but this is a small price to pay for their distinctive look and low price tag. The students came away from Cuscowilla impressed. The course did not fit their impression of a modern golf course but helped to open their eyes to the possibility of creating a course that works with a site's natural environment rather running roughshod over it.

In class discussions afterwards, it was clear that the students had learned these concepts from their tour of Cuscowilla:

- Importance of a creative routing to minimize earth movement
- Use of native materials (clay, grasses) to create a course with a sense of place
- Strategic concepts like cross bunkering and cape holes
- How undulation in the green complexes can affect the strategy of the hole
- The lower cost of construction due to minimal grading and subsurface drainage

The Carolina Low Country

The students had now experienced three very different types of courses within the Athens area. In order to expose them to a wider variety of golf courses, the class took an overnight field trip to the Hilton Head, South Carolina area.

Berkley Hall

Our first stop was Berkley Hall, an exclusive development consisting of high-end houses and two Tom Fazio designed golf courses. Unlike both Cuscowilla and the Georgia Club, the land plan called for the houses to ring the outside of the courses rather than interrupt the flow of golf holes. This is a recent trend that is a response to people wanting to live near a golf course while avoiding lining houses on both sides of the fairways.

We spent most of our time on the North course, which has bent grass greens. This is rare for a course this far south and causes a unique set of problems for superintendent Danny Malone. Mr. Malone toured the course with us, pointing out spots where trees had to have been cleared to allow for more morning light to fall on greens to spur grass growth. Both courses at Berkley Hall feature

large, visually stunning flashed bunkers, which Mr. Malone says are very expensive to maintain. Any rain at all causes the faces to erode and lots of time and labor are needed to make them presentable again. Mr. Malone also bemoaned how much maintenance was needed in the “native areas”. These areas, often on artificial hills that separated holes, were planted with native grasses and shrubs. Although these areas would ideally be left alone, Mr. Malone has to carefully manicure them to make them more playable for the wayward hitting members. With design problems like these coupled with a demanding membership, it is no wonder that the maintenance budget for each course is \$1.6 million. An additional \$1 million is spent on the practice area, clubhouse surrounds, and overall grounds, bringing the overall annual budget to an astounding \$4.2 million.

The site for the courses, which are located in Bluffton, was flat with poorly draining soils. Fazio, as he is wont to do, decided to completely remake the landscape by carving out deep lagoons and using the material to create elevation change (Figure 7.3, 7.4). He dredged up so much material that he was able to create a hill that boasts the highest point in Bluffton County, 84 feet above sea level. These unnatural elevations combined with an aggressive planting plan of pines makes one feel that they are playing in the sand hills of North Carolina rather than the low country of South Carolina. While the course is an impressive feat of engineering involving the movement of over 1.5 million cubic yards of dirt for the North course alone and the result is a dazzling landscape, it feels forced and out of place. The cost for this course was in the \$10 million range, over three times what Cuscowilla cost to build.



Figure 7.3: One of the many manmade lakes at Berkley Hall (Photo by Troy Miller).

The most impressive feature of the golf portion of the development was the 30 acre practice area that consists of a massive driving range and short game facility. At one end of the range is a house that has bays that open from which you can hit out of during cold or wet weather. The short game area has three greens complete with bunkers surrounded by an undulating fairway so that one can practice just about any shot from within 100 yards. The practice center is one of the featured amenities of the development and draws a bevy of pros when the PGA Tour stops down the road in Hilton Head.



Figure 7.4. Fazio moved a lot of earth to create topography at Berkley Hall (Photo by Troy Miller).

Through our discussion of the course, it was clear that student had understood these concepts:

- Importance of morning sun to grow grass on greens (must clear trees on eastside of greens)
- Correlation between design of course and maintenance costs
- Core golf concept, with homes ringing the golf course
- Ability of the designer to completely remake nature through earth works and plantings
- Added cost of large scale earth movement
- Importance of other amenities like a practice facility for the overall development

May River Golf Club at Palmetto Bluff

That afternoon we drove across Bluffton to the massive Palmetto Bluff development. Covering 20,000 acres, almost two thirds the size of Hilton Head Island, the development is of a monumental scale. The developers have decided not to haphazardly subdivide, but have opted for larger lots. By keeping the land as pristine as possible, they hope to drive prices higher and, given their \$136 million of sales over the first fifteen months, they seem to be succeeding. The development consists of home lots, a resort and spa, and a Jack Nicklaus designed golf course.

The course was as completely different from Berkley Hall as night and day. Nicklaus used the site's natural beauty, winding his holes around live oaks and over wetlands. Rather than create large undulation change, Nicklaus chose to embrace a low profile style that fits the site's flat topography. The bunkers have rolled grass faces and are a little ratty around the edges. The natural areas are just that. No maintenance is done on these areas at all. Fallen trees are not removed, creating habitat (Figure 7.5). A number of the holes play along the May River, a beautiful tidal estuary. In order to preserve the river's ecology, the course was shaped to prevent any fertilizer from running into the river. Runoff is instead diverted to small man-made ponds where the fertilizer is filtered. Another ecologically friendly innovation used at May River is the use of Seashore Paspalum on all surfaces other than the greens. This grass has similar characteristics to Bermuda, but can be watered with salt water. The evolution of this grass is being closely watched. If it turns out to be successful, it will greatly lower the use of water by coastal golf courses. The use of chemical sprays like Round-Up would also be greatly reduced as superintendents could just use salt water to kill off any unwanted grass species or weeds.



Figure 7.5: The May River Golf Club is a low profile course that highlights the low country's environment. (Photo by Troy Miller)

Through our discussion of the course, it was clear that student had understood these concepts:

- Possibility to create a great golf course on a flat piece of ground
- Use of natural environment to enhance to golf experience
- Routing a course to show off a site's different environments
- Use of grading and detention ponds to prevent chemicals from reaching bodies of water
- Use of new grasses to minimize use of natural resources and chemicals

Long Cove

The next morning we visited Long Cove Golf Club on Hilton Head. Pete Dye built this course in 1980 and it perfectly reflects this period of architecture. Long Cove is full of the small moguls that were first coming into vogue in the early 1980's and has many of Dye's signature features including railroad tie bulkheads, long heroic carries, and lots of undulation in the greens. Over the course of its quarter century of existence, Dye has had to come to Long Cove three times to soften the greens to make them playable for new grass varieties, but they are still wild. The greens at Long Cove are worth close study. They are a great example of how slopes on a green can affect the strategy of the hole going all the way back to the tee (Figure 7.6).



Figure 7.6: Long Cove has some of the most interesting greens in all of golf. (Photo from www.longcoveclub.org)

Long Cove is a residential community golf course, but Dye was able to keep it walkable by stringing the holes together like sausages. Much like Fazio did at Berkley Hall, Dye created contour on his holes by creating lakes. Instead of using this fill to create large earthworks, he used it to fashion small scale movement on each hole. Over a number of holes on the front nine, he used fill from a

local dump to create a huge dune that attenuates noise from the nearby parkway. Despite all of this reshaping of the land and the encroaching houses, the course has a distinct low country feel. The course climaxes at the fifteenth hole that plays along the marsh, complete with a classic low country view.

Through our discussion of the course, it was clear that student had understood these concepts:

- Ability to create a residential golf course that is walkable
- Strategic concepts like the heroic shot
- Green evolution due to modern grasses
- Routing a course to build to a climax

Chechessee Creek Club

Our last stop on this trip was the Chechessee Creek Club. Located north of Hilton Head, on the way to Beaufort, this development is the latest in the area from Chaffin/Light, the developers responsible for Spring Island, South Carolina. The 373 acre property was zoned for up to 1,443 home sites, but in keeping with their philosophy of low-impact development, Chaffin/Light decided to create a golf course with a maximum of 45 home sites. They hired Bill Coore and Ben Crenshaw to design a golf course that was reminiscent of a course from the 1920's. The land was flat with limited amount of frontage to the tidal marsh and Chechessee Creek. The property contains a wide variety of habitats including a small area of live oaks. The developers decided to let the routing of the golf course dictate the master plan of the development. Coore and Crenshaw studied the site extensively and were able to come up with a plan that was able to preserve most of the significant trees on the property. By routing the holes through open fields and strands of young pines, they were

able to avoid doing much to the maritime hardwoods and the other distinctive habitats located on site.

The golf course itself is extremely low profile, with only the push-up greens being significantly above the ground plane. The bunkers are carved out of small rises and have been allowed to fray and decay at the edges (Figure 7.7).



Figure 7.7: Chechessee Creek's par three 13th.

The rough consists of coastal Bermuda grass, which requires less water and maintenance than other types of Bermuda found at other courses in the area. It is also shaggier, creating a softer and more natural look to the golf course. One of the more striking things about the course is the ability of the architects to seamlessly transition from the course to the out of play areas. There are no artificial mounds to try to kick the ball back into play, but instead the grades subtly match up and the grass becomes sparser where shade makes it more difficult to grow. Unlike the other courses that we

observed on this trip, Chechessee is not littered with man-made ponds. While ponds were dug for irrigation they are hidden from the lines of play, set well back within the woods. The fill from these lakes was screened and the sandy soil pulled from the ponds was used to slightly elevate low areas to help them drain. The rest of the material was spread out on the driving range where good drainage is not a priority. The end result of all of this thoughtful planning is a course that truly fits the landscape, has a sense of place and causes minimal impact on the environment.

According to Bill Kennedy, the course superintendent who accompanied us on our tour, the club is very conscience of its effects on the local ecosystems. They have a partnership with The Low Country Institute, a non-profit conservation group, to study the relationship between the golf course and the environment. It is the clubs goal to be a demonstration site to promote the best environmental management practices.

Through our discussion of the Chechessee, it was clear that student had understood these concepts:

- Routing a course to protect a site's resources like specimen trees
- Use of push-up greens
- Management of fill to create well draining playing surfaces
- A golf course's responsibility to the environment

Each individual field trip exposed the students to different elements of golf course architecture. Overall, the field trips allowed the students to see first hand the concepts that we discussed in class. Being able to stand on a tee and being able to see how a hole works strategically, the efforts of an architect to make the hole more visually appealing, how the drainage works, is an experience that can not be replicated in the classroom. Like any type of landscape, a golf course is best understood by experience.

CHAPTER EIGHT

PROPOSED CHANGES

“A course must be absorbing, not built for crack players only... try not to make the course harder, but make it more interesting.”- C.B. Macdonald, 1928

Overall, I was extremely happy with the way the class went, but I think there are ways in which it could improve. In order to receive feedback from the students, I administered a short survey. In order to determine what had gone well and what the students had struggled with. I also wanted to know if the students thought the class had been thorough enough on a number of subjects, such as history, the environment and golf’s relationship with real estate. I also wanted to get their opinion on the field trips, Were there enough? Were they helpful? For the most part, the students responded very positively and had some good suggestions (Appendix C).

Most students believed that we covered the history of golf course architecture thoroughly enough. Some even went so far as to suggest that there should be a history of golf course seminar offered in the spring as a prerequisite of the class. This would certainly ensure that everyone in the studio had a good knowledge of the evolution of golf course architecture and was conversant in its specific language. Another way to achieve this would be to include within the first two weeks of the class an intensive history section complete with quizzes and tests. The problem with this is there might be some students who have very little idea about the game of golf and this rush of information might be too much for them to process. In the absence of a prerequisite class, I would simply push the reports on the golf course architects towards the front of the class rather than having them spread out throughout the semester. This would mean less studio time in the first month of class, but it would also make sure everyone had a basic understanding of the history of golf course architecture

before attempting their own designs. I would also change the format of this report. Instead of presenting an 11" x 17" board, the students would give a power point presentation. This would allow the presenter to show many more images of the architect's built work and the students to view pictures of some of the architect's masterpieces. The presenter would also be responsible for creating an outline, detailing the importance of the architect. These presentations could then be uploaded to WebCT to be reviewed by the students at a later date.

In order to insure that the students paid attention to these reports and completed the readings that were assigned, I would add quizzes and a final exam. These would be simple in nature, but they would ensure that the students left the course with a core of knowledge about golf course design history and theory. This knowledge is essential if one plans to work in any field that has interaction with a golf course architect, whether it be resort planning or golf course community design.

The importance of this understanding became apparent when Mike Young came to speak to the class. Mr. Young is a golf course architect based locally who has created courses throughout the world. Most of his work has been based in the Southeast, and he is intimately familiar with all facets of the golf business. Mr. Young was very straight forward and honest with the class, telling them of the difficulty in securing jobs and competing against the likes of Nicklaus and Fazio. He also showed the class a computer program that his firm had developed that makes the drawing of golf course plans infinitely easier. He spoke about the restoration of Athens Country Club. Mr. Young's talk was very well received by the class and they were excited to hear a different angle on golf course design. Mr. Young came during a point in the semester in which the students were beginning to grasp all the different concepts that were thrown at them in the beginning of the semester. I believe the addition of other guest speakers, from architects to developers to irrigation specialists,

would benefit the class, but it is imperative that students have a solid understanding of the language of golf course design before such speakers are introduced.

The students were very adamant about the usefulness of the field trips as a way of driving home the concepts that were discussed in class. I would have liked to add at least one more field trip to the schedule. I think the students would have benefited from a visit to another classic golf course. East Lake Golf Club, home course of the great Bobby Jones, would have been ideal for this. There we could have seen another Donald Ross course, with a recent renovation by Rees Jones. East Lake, the club and the surrounding community, had fallen on hard times until an infusion of capital into the club started a turn around not only at the club but in the surrounding community. Not only would a visit to East Lake be architecturally informative, but it would be great to tell this story of a golf course's impact on a community.

In terms of the technical aspects of the class, I think there could be several improvements. Grading such a large piece of property can be a daunting task, and it difficult to teach as well. To overcome this, I would have the students complete a three-hour exercise that consists of designing and grading one golf hole on set corridor with difficult terrain. This exercise would allow the students to gain confidence and understanding on a project before starting work on the whole course. It would also allow the teacher a chance to see who was struggling with grading, and then devote more time to instructing and helping those students.

Another one-day exercise that might have been useful to those not planning to make golf course architecture a career would have involved giving the class a raw piece of topo and a program of either a residential community, or a resort, and then have them complete a quick master plan. This would have led to a discussion about overall land planning and the positives and negatives of using

the good land for the golf course and poor land for other programmatic elements. There is no right answer to this dilemma, but it would have been beneficial to have this discussion.

Due to time constraints, I was not able to include a section specifically addressing golf courses and the environment. There have been great strides brought on by both developers and environmental restrictions to make golf courses more environmentally sound. These include the protection of wetlands, using golf courses to treat a community's storm water, and a commitment to capture and treat all water that percolates through the greens. Some golf courses are striving to eliminate the use of pesticides and fertilizers and instead use organic methods to treat the grass. Most of the information that was presented to the students along these lines came during field trips, while talking with superintendents. I would have loved the time to give a lecture and possibly host a guest lecturer on this topic, possibly someone from the Audubon Society, which certifies environmentally sensitive golf courses.

CHAPTER NINE

CONCLUSION

It is time for landscape architecture schools to embrace the field of golf course design. There are many students who start in the field of landscape architecture in order to pursue golf course design. These students should be given encouragement and not denied an educational opportunity. While it should not be the role of these schools to churn out golf course architects, they should allow those interested in the field or those fields that relate to it like community design and resort planning to receive a coherent and general education in the subject. By doing so, these schools can teach students a responsible and environmentally conscientious method of designing golf courses.

This thesis lays out a plan of action on how to introduce students to golf course design. Students need to become familiar with the language and theory of golf design. This objective is accomplished by teaching them about history and the various schools of strategy of golf course architecture. They are given the opportunity to acquire and display this knowledge through their designer reports and the renovation project. With this knowledge under their belts, they can then move on to routing golf holes. This task uses and refines the students inventory and site analysis abilities. It is rare for students to have an opportunity to master plan such large parcels of land. Students had the opportunity to route and master plan two golf course projects, the par three/executive course and the Harmony Club. After the students had learned a little of the theories of routing, they moved on to some of the more technical aspects of golf course design, like grading, clearing, grassing, and green design. This was done for the Harmony Club project. These projects

draw on, reinforce, and add to the students' prior knowledge of these subjects and illustrate the complexity of golf course design (Table 9.1).

Table 9.1: A List of Objectives for a Class on Golf Course Design

<u>Action</u>	<u>Objective</u>
<u>Lecture</u>	
Principles of the game and the golf course	Ensure that all students know the rules of golf Ensure that all students know simple terms like tee, green, and fairway
Evolution of the golf course	Establish the relationship between golf and the environment Establish the golf course as similar to other typologies in landscape architecture Introduce students to some of the language of golf course design
Strategy	Introduce the students to the basic schools of design Establish the relationship between topography and placement of hazards Further develop their knowledge of golf course design
Routing	Introduce the rules of routing Ensure that students know that rules are meant to be broken Establish the relationship between routing and topography Ensure students understand that a good routing can save money Ensure students understand that a good routing will have less impact on a site Ensure students know how to construct and use templates
Golf courses and the environment	Further establish the relationship between the course and the environment Introduce students to various construction techniques that are environmentally friendly
<u>Field Trips</u>	
The Georgia Club	To have students begin to look at a golf course through the eyes of a designer Show the students an example of average, modern golf course design Develop ideas of strategy
Athens Country Club	Show the students an example of design from the Golden Age and particularly Donald Ross Compare and contrast modern and classic golf course design Show the students how a designer might use a site's natural topography to create interesting holes
The Golf Club at Cuscowilla	Show students an example of good modern golf course design Show how designers use native material to create a course with a sense of place Further develop the students knowledge of strategy Show examples of interesting and creative green sites Show an example of a course with minimal earth movement and site impact Show an example of a course designed by Bill Coore and Ben Crenshaw
Berkley Hall	Show a course where mass amounts of earth was moved to create an artificial landscape Discuss the relationship between maintenance costs and design decisions Show an example of a course designed by Tom Fazio

May River at Palmetto Bluff	<p>Compare and contrast with other courses seen</p> <p>Show an example of a low profile course that relies on the natural environment to create interest</p> <p>Show an example of a course designed by Jack Nicklaus</p>
Long Cove	<p>Show an example of residential course that contains great golf holes</p> <p>Further develop ideas of strategy</p> <p>Show an example of large undulating green complexes</p> <p>Show an example of a course designed by Pete Dye</p>
Chechesee Creek Club	<p>Show an example of a modern course that is designed and constructed to look like a classic course</p> <p>Discuss club's desire to use best management practices on and off golf course</p> <p>Show examples of areas on course that are managed to provide habitat for birds, squirrels, etc.</p> <p>Show an example of a course designed in an another ecosystem by Bill Coore and Ben Crenshaw</p>
<u>Projects</u>	
Designer Report	<p>Develop student's understanding of the language of golf course design</p> <p>Ensure students know the major figures of golf course design</p> <p>To have the students demnonstrate a growing understanding of golf's relationship with the environment</p>
Renonvation Project	<p>To have students demonstrate an understanding of strategy</p> <p>To familiarize the students with the act of designing golf holes</p>
Par Three/Executive Course	<p>To have students demonstate a growing understanding of how to route a golf course</p> <p>To produce material for students to use in their portfolios.</p>
Harmony Club	<p>To have the students further develop their skills at routing</p> <p>To give the students a chance to practice with a real site that they visited</p> <p>To produce material for students to use in their portfolios.</p> <p>To have the students show their accumulated knowledge of strategy by designing golf holes</p>
Grading	<p>To have students practice grading at a large scale</p> <p>To have students understand the relationship between routing and a course's impact on the site</p> <p>To have students understand the relationship between routing and a course's cost</p>
Clearing	<p>To have students develop the skills of golf course design</p>
Grassing	<p>To have the students learn the basics of turfgrass pertaining to golf courses</p>
Green Design	<p>To have student practice small scale engineering</p> <p>To demonstrate the complexity of golf course design</p> <p>To have students develop the skills of golf course design</p>

One semester is not a sufficient amount of time to turn students into experts in golf course design. However, a semester is sufficient time to teach them the language of golf architecture, the general concepts like strategy and routing, and to give them the opportunity to develop the technical skills needed in the profession. For those that want to make a career in golf course design, this class has given them a far greater skill set as well as valuable material for their portfolios. Ideally, a second semester devoted to developing a full set of plans would provide an opportunity to delve into

the technical aspects of golf course design. For those that are not planning to make golf course design their profession, these projects are a wonderful opportunity to hone their skills at site analysis, master planning, and engineering. If they do go into a related field, they are now conversant in golf architecture's specific language and have a good understanding of what makes up a good golf hole and a good golf course.

These students, irregardless of individual career objectives, should be taught to respect the environment and to work with the site rather than against it. Development is a fact of life and students should be taught ways in which it can be done responsibly. Market forces have determined that golf courses are a viable use of land. There are over twenty-six million golfers in the United States alone. These people spend hours at a time playing the sport and their weekly game might be the only opportunity in their busy schedule to spend any time outside. The golf course designer controls how these players move over and through a site. The designer is like a tour guide pointing out interesting topographic features or views. Would we prefer golf courses to be built with the "rape it, shape it, grass it," mentality or one that takes the time to study the site and then use the site's natural features and protect its ecology? The end result might not just be a more environmentally friendly golf course, but rather the opportunity to raise golfers' awareness of and respect for nature.

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APPENDIX A

RULES OF ROUTING

Below is a list of rules included in Chapter 7 of Forrest Richardson's *Routing the Golf Course*. These rules were reviewed in class and it was noted that, while useful, there are many exceptions to these rules. Students were encouraged to review them and keep them in mind when laying out their courses, but in no way were they bound by them. Richardson's rules are in bold type and I have included some notes and comments about these rules in regular type.

Verify course programming. Be sure to understand what type of course is desired by the client, par three, executive, regulation length, etc.

Verify practice programming. Determine if there is to be a range, practice green, short game area, etc.

Verify clubhouse programming. Determine parking requirements, access to course, size, etc.

Verify maintenance programming. Determine the size of facility, access, etc.

Verify amenities. Determine if there is to be a starter shack, halfway house, on course bathrooms, etc.

Walking is different than riding. A walking course will have short distances between greens and tees. On a course where carts are the norm, there has to be cart paths, cart storage and a cart staging area.

Begin with access. It is smart to determine how golfers will get on to the site. The cost of laying roads is high, so it is wise to keep this factor in mind right from the start.

Identify natural golf holes. In my mind, this is the most important rule. As Richardson points out, by doing this early, there is a better chance that these natural holes will be protected as the master plan is developed.

Practice areas are big. Do not underestimate the size of this component.

Hilltops are not just for clubhouses. Views are important, but sighting the clubhouse on top of a hill leads to dull uphill finishing holes.

Clubhouse sites are often predetermined. Owners sometimes choose the clubhouse location before consulting with the golf course architect, which often leads to problems in the routing.

Starting points are essential. The clubhouse must be sited so that there are multiple starting points for the course and easy access to the practice area.

There is no sacred course configuration. The course does not always have to return after the ninth hole. This rule is important because it allows the architect the freedom to respond to the site rather than fight against it.

Orientation is key. There should be a logical, functional and aesthetically pleasing relationship between the various programmatic elements.

Natural drainage costs less than artificial drainage. All possible care should be taken to preserve the natural drainage of the site

Artificial earthworks always cost. Preserving the site's undisturbed undulations is far less expensive than trying to recreate them.

Rock = Cost. Rock is very difficult and expensive to breakup and move.

Greater detail = Greater cost. The use of fancy features like large flashed bunkers cost more than simple grass faced bunkers, both in construction and maintenance.

Larger areas = Greater costs. The more areas that are disturbed the greater the expense. The wider the fairways, the more expensive to grass and maintain.

More material = More cost. Obviously, the more fill that is needed, the higher the cost.

The best aesthetics are authentic. Nature is more beautiful than anything that man can create. By realizing this during the routing process, the architect can try to preserve a site's most pleasing natural features.

Aesthetics are subjective. What looks good to one golfer might look horrible to another.

Length is secondary to interest. Good golf holes are good no matter the length.

Marketing is obsessed with length and par. Many modern courses are designed so that they break the 7,000 yard mark because marketers believe that this makes the course appear to be of championship caliber and par seventy-two has become the standard number for modern courses. These are just marketing numbers. There are hundreds of great golf courses that fall below this magical numbers. It is more important to let the land determine the length and par of the course

rather than trying to shoot for these artificial numbers. While rare, it is possible to create a great course that is less than par seventy.

Short does not always play short. A hole that is short on the scorecard can play much longer due to such factors as elevation change and wind direction.

Long does not always play long. A hole that is long on the scorecard can play much shorter due to such factors as elevation change and wind direction.

Multiple tees are essential. These allow the course to be set up in a number of different ways and allow all levels of players to play the golf course.

Par does not always add up. The next three rules are guidelines and not hard and fast rules. If a hole plays decidedly uphill it might be a par five even if the yardage falls into the par four category.

Par 3s are up to 250 yards long. On some courses, this is being pushed up to 275 yards especially on downhill holes. Richardson points out that the average par three from the regular tees is 155 yards.

Par 4s are 250 to 470 yards. On some courses, this is being pushed up to 500 yards especially on downhill holes. Richardson points out that the average par four from the regular tees is 375 yards.

Par 5s are 471 to 690 yards long. 600 yard par fives are becoming more and more common. Richardson points out that the average par five from the regular tees is 515 yards.

Avoid too much long. Variety is the key to a good routing.

Avoid too much short. Variety is the key to a good routing.

Nines should be balanced. Nines should be of similar lengths, although there are there a multitude of exceptions to this rule

Length can be evil. This rule is included to reiterate that interesting features should not be bypassed or plowed over just to make a hole or course longer.

The first hole should be appropriate. It has long been thought that the first hole should ease the golfer into the round. This is not always possible, but is a good goal. The first hole should set the tone for the golf course.

Hole 1 should be a par 4. This is the traditional way to start off a round, but more importantly it is the best for speed of play. Players have to wait for the group ahead of them to putt out on a par three and on a par five players who want to attempt to reach the green in two must wait for the group ahead to clear the green.

Opening holes are an introduction. They should show the golfer what to expect during the round ahead and should also be memorable in their own right.

No par 3 until Hole 4. Richardson points out that par threes slow the pace of play and generally call for more accurate play. He believes it is best to wait for the golfer to be fully into the round before posing such a problem. There are many great courses that have par threes among the opening three holes, including Shinnecock Hills, which has a very difficult par three second hole.

The tenth hole is another starter. On public courses this is often the case. The same rules that apply to the first hole also apply to the tenth.

Balance is best. Richardson suggests that both nines should be of equal difficulty. It has traditionally been thought that the back nine should be more difficult so that the round builds in difficulty, but again there are many exceptions to this rule.

There is no perfect order of par. It has traditionally been thought that it is bad to have back to back par three or fives, but there are many classic courses that break this rule. It is more important to let the land dictate the par of a hole rather than some predetermined notion of the sequencing of par.

The turn should turn. Richardson believes that the halfway point of a round should be distinct and noteworthy for psychological reasons. It is my belief that the golf holes should take precedence over any artificial notions of the importance of the halfway mark of a round. On private courses it is more important to use land well to have the course return to clubhouse exactly at the ninth hole.

Define areas, not just holes. Great courses take the golfer through a number of experiences that show off the variety of the site. These areas could be different types of vegetation, topography or views. It is important for the designer to recognize these changes and highlight them.

Provide two restroom points. If a course returns to clubhouse a number of times, this added expense may not be necessary.

Closing holes should offer excitement. This does not mean difficulty, but rather opportunity for players to take chances and pull off heroic shots.

The 18th hole should be distinctive. Again, this does not mean overly difficult. I believe that the eighteenth should fit with the rest of the course, yet be memorable on its own.

Keep interruptions minimal. Interruptions, like crossing roads, are to be avoided. There are again numerous exceptions to this rule. The Old Course at St. Andrews has a road that runs through the first and eighteenth fairways. Long walks or even rides between holes break the rhythm of the course and should be eliminated if at all possible.

The clubhouse should have multiple views. It is ideal that the clubhouse overlooks the eighteenth green and other parts of the course. Views of extraordinary landscape features like a lake or ocean should also be highlighted.

Provide pro shop visibility. It is ideal for the pro shop to be able to see the first and tenth tees to be able to coordinate the start of play.

Make it flow. Like any landscape design, the area around the clubhouse should have good, logical circulation.

Practice area should face north. This will eliminate glare due to the rising and setting suns. Again this is an ideal situation, but good golf holes should not be sacrificed in order to achieve this goal.

Avoid stages. Richardson believes that having the first tee too close to areas of high traffic is to be avoided. He believes that golfers, especially beginners, tend to become nervous with an audience and this might cause them to hit a poor tee shot, leaving a bad taste in the mouth. While this may be true, there is something to be said for creating a stage for the opening tee shot. Riviera Country Club's first tee nearly abuts the clubhouse and is one of the most famous in golf. This is really a question of what type of course the developer wants. If it is to be a user friendly public course, then isolating the first tee is probably a good idea.

The first holes should not head east. This avoids playing into the rising sun.

The finishing holes should not head west. This avoids playing into the setting sun. Again, there are many exceptions to these last two rules. The eighteenth at Pebble Beach plays directly into the sun. When completing a routing that has one of these two situations, it is important to make sure that there are no better solutions.

Do not return too early. Richardson believes that the course should take the player well away from the starting point before returning.

Look for north-south holes on east-west sites. On sites that are longer than they are wide, it is easy to simply rout holes that run parallel to each other. This is to be avoided especially on east-west sites due to sun problems.

Corners restrict. Clubhouses should almost never be placed in corners because of the limited area.

Vary the direction of par 3s. The key to a good set of par threes is that there is variety. In my opinion, orientation is not as important as the length, topography, and overall feel of the hole. Holes can face in the same cardinal direction but be completely different.

Vary the direction of the par 5s. Again, variety is the key.

Vary hole direction frequently. This provides variety and interest.

Balance dogleg directions. There should be an equal number of right to left and left to right holes. A slight imbalance is allowed if that is the best use of the land.

Consider downhill and uphill shots. Downhill shots are preferable and too many uphill shots leads to boring, awkward golf.

Vary the strategy. There should be a wide variety of shots on the course, including heroic carries, strategic lay-ups, wide open drives etc.

Vary the hazard type. Too many shots over water in a row lessens the excitement and makes the course overly difficult. There should be a wide variety of hazards, from streams to bunkers to ravines to ponds to waste areas.

Vary the difficulty. Unless the course is designed solely to be difficult, there should be a good mix of hard and easy holes. There should never be a long string of uninterrupted difficult holes.

Vary courses, not just holes. If a facility has more than one course than they should be markedly different.

Uphill practice areas have benefits. This can lessen the length of the range and could improve visibility.

Uphill holes can be tiresome. When trying to rout the course to higher elevations, it is advisable to do so on longer holes to spread out the grade. Another good way to gain elevation is between holes, when the players will then have a chance to rest on the next tee.

Occasional blind shots are acceptable. This is a controversial rule. Most modern architects would disagree, but Richardson believes that if the topo dictates a blind shot, then it could add excitement and mystery in the round. I agree with a few caveats. Blind shots are best avoided on public courses because players are less likely to be familiar with the course than on private courses. When routing a blind shot there should be plenty of room for a player to miss his shot and still recover. Otherwise the blind shot will be overly penal.

Drainage and topo go hand in hand. A designer must understand how the topo creates a site's drainage.

Topo also occurs perpendicular to the golf holes. Holes do not simply go uphill or downhill but along cross slopes. These slopes can not be as severe as the uphill and downhill because they have a greater propensity to kick a ball off line. Cross slopes in fairways add interest and challenge to the holes.

Use depressions to contain. A depression can be an effective way of containing balls. Mounds, which were very popular containment method in the eighties, can kick a ball further off target if it lands on the downslope.

The following are a list of safety guidelines that should be considered. There is no need for me to comment on them individually.

There is no such thing as 100 percent safe.

Safety cones are essential.

Setbacks to nongolf uses are essential.

Golf holes require adequate separation.

Tees and greens require protection.

Proper tee alignment is essential.

Minimize blind shots.

Take winds into account.

Minimize shots into the rising and setting sun.

Place hazards carefully.

More golfers inadvertently hit right than left.

Consider elevation change.

Consider other uses

Provide ample setbacks to roads.

Remember trees die.

APPENDIX B

ANNOTATED BIBLIOGRAPHY

The following is a list of books pertaining to golf and golf architecture. I have made some comments describing their usefulness for those interested in serious study of golf course design.

Bahto, George. *The Evangelist of Golf: The Story of Charles Blair Macdonald* (Chelsea, MI: Clock Tower Press, 2002).

This well researched book covers Macdonald's life in detail with special emphasis on his architectural work. For anyone doing research on Macdonald or his partner Seth Raynor, this is a great place to start.

Balogh, James C. and Walker, William J., ed. *Golf Course Management & Construction; Environmental Issues* (Chelsea, MI: Lewis Publishers, 1992).

This is a scientific look at the effect of golf courses on the environment. Published with the help of the United States Golf Association, it lays out both the negative and positive impacts of golf courses.

Bamberger, Michael. *To the Linksland: A Golfing Odyssey* (New York: Viking Penguin, 1992).

While this book has only the occasional nugget on golf course architecture, it is a wonderful read and truly captures at the essence of the game.

Barrett, James. *Golf Course Irrigation; Environmental Design and Management Practices* (Hoboken, NJ: John Wiley & Sons, 2003).

This up-to-date resource thoroughly covers all aspects of golf course irrigation. It lays out how the golf course irrigation industry has made major strides to promote conservation of water through better technology and education of golf course superintendents.

Browning, Robert. *A History of Golf* (New York: E. P. Dutton, 1955).

This classic history is worth looking at for anyone interested in early golf course design, especially the Old Course at St. Andrews and other ancient Scottish links.

Campbell, Malcolm. *The New Encyclopedia of Golf* (New York: Dorling Kindersley, 2001).

Campbell's work is as it says in the title, an encyclopedia. This is a great resource about everything to do with golf, from clubs to courses to players, but it lacks in any true academic insight.

Cornish Geoffrey and Whitten, Ronald E. *The Golf Course* (New York: The Rutledge Press, 1988).

This comprehensive book, also reprinted under the title *The Architects of Golf*, provides an excellent review of the evolution of golf course design. The opening chapters are an excellent tool for placing a particular architect in the golf design timeline. It also contains biographies and course listings for every golf course architect. Members of the profession often refer to it during research for restoration work. The book is somewhat dated in that it does not have any courses that were built in the last fifteen years. Even so, this is one of the bibles for golf course designers

Crenshaw, Ben. *A Feel for the Game: To Brookline and Back* (New York: Doubleday, 2001).

This is Ben Crenshaw's autobiography and mostly deals with his career as a professional golfer. There is however a chapter on his thoughts on golf course architecture. Crenshaw is part of one of the most respected design teams of today along with Bill Coore.

Daley, Paul, ed. *Golf Architecture: A Worldwide Perspective (Volume 1 & 2)* (Victoria, Australia: Full Swing Publishing, 2002, 2003).

These two volumes of essays and articles are a wonderful resource that cover everything from strategy to the use of CAD in golf course architecture to construction of courses in the Far East. Anyone doing research on any topic within golf course design would be wise to take a look at these books. They also contain great illustrations and photos.

Daley, Paul. *Links Golf: The Inside Story* (London: Aurum Press, 2000).

By interspersing technical essays on dune formation and protection with discussions of courses, Daley provides a comprehensive look at links golf. There is extensive discussion of the various elements that make up the golf course: bunkers, burns, rough, the putting surfaces, etc. Daley's slant derives from his clear love of the game of golf, especially the type played over pieces of linksland. This bias does not go so far as to prevent Daley from talking about environmental issues. The book is at its best when discussing these issues, rather than when discussing the game of golf itself.

Daley, Paul and Scaletti, David. *The Sandbelt: Melbourne's Golfing Haven* (Victoria, Australia, Plus Four Publishing, 2001).

This marvelous book is filled with large format pictures of the many world class courses that surround Melbourne. Most Americans will never see these courses in person, but these courses are worth studying and this book may be as close as one gets. The text is scant, but the photos reveal the incredible bunkering and the amazing way that the course blends with the natural surrounds.

Darwin, Bernard. *Bernard Darwin on Golf* (Guilford, CT: The Lyons Press, 2003).

This group of essays by the brilliant British golf writer Bernard Darwin was compiled by Jeff Silverman and has a wonderful section on architecture.

Darwin, Bernard. *The Golf Courses of the British Isles* (London: Jonathan Cape Ltd. 1925).

Darwin's musings on the courses of Great Britain are enjoyable, and they reveal a perspective on golf architecture that is rarely heard today.

Doak, Tom. *The Anatomy of a Golf Course* (Short Hills, NJ: Buford Books, 1992).

Doak, a practicing golf course architect with an undergraduate degree in landscape architecture from Cornell, talks about the strategic elements of golf in this widely respected treatise on golf course design. The book, written when Doak was first starting out as a golf course architect, is clearly a vehicle for him to show off his knowledge to potential future clients, but because of Doak's background, knowledge, skill and clarity of writing, the information put forth can be relied upon as both a factual and analytical source. This is the book that I chose as the main text for the class because it is easy and fun to read. It does not go into the technical details of golf course design but rather covers general concepts.

Doak, Tom and Scott, Dr. James S. and Haddock Raymond M. *The Life and Works of Dr. Alister MacKenzie* (Chelsea, MI: Sleeping Bear Press, 2001).

This comprehensive review of MacKenzie's career is filled with great illustrations and photographs. It is a great resource for anyone researching MacKenzie or any of his courses.

Dye, Pete. *Bury Me in a Pot Bunker* (Chicago: Contemporary Books, 1995).

Dye's autobiography tells of his life as a golf course designer. Dye is one of the most respected and influential architects of the last thirty years. His writing is clear and eloquent and allows the reader a peek at the essence of modern golf design. Dye's work is not promotional, but is more of a memoir and therefore should be read less for facts and more for its wisdom.

Fazio, Tom. *Golf Course Designs* (New York: Harry N. Abrams, 2000).

This book lays out Tom Fazio's theories on golf course architecture. Fazio, the most prominent and popular modern architect, provides some history but this large format book is mostly a concise synopsis of his philosophy of design. This book is also a great resource for high quality color images.

Graves, Robert Muir and Cornish, Geoffrey S. *Classic Golf Hole Design: Using the Greatest Holes as Inspiration for Modern Courses* (Hoboken, NJ: John Wiley and Sons, 2002).

Graves and Cornish teach a two day seminar on golf course design at the Harvard School of Design. This book looks at the great holes of the Golden Age, specifically the ones used by Charles Blair Macdonald and Seth Raynor and shows how to and why to use them today on modern courses. This is a useful book to have on the shelf.

Graves, Robert Muir and Cornish, Geoffrey S. *Golf Course Design* (New York: John Wiley and Sons, 1998).

This comprehensive book covers all aspects of golf course design, from site selection to financing the course. Although a great resource, it is too detailed and technical for a one semester course on the subject. There are a number of exercises in the back that could be helpful to students.

Hunter, Robert. *The Links* (Canada: Scribner & Sons, 1926).

This eloquently written treatise is considered one of the best books ever written about golf course design. Hunter does a great job in relating the importance of the playing field to the essence of golf. There are wonderful passages about nature and its relationship to the golf course, as well as insight into the proper placing of hazards. Any true student of golf course design has read and studied this book.

Hurdzan, Dr. Michael J. *Golf Course Architecture: Design, Construction & Restoration* (Chelsea, MI: Sleeping Bear Press, 1996).

This book has quickly made its way on to the shelves of many interested in golf course design. It is quite exhaustive without getting overly technical. It is in text book form and might be useful as a main text for a class were it not prohibitively expensive and overly verbose. It is a text that should be pointed out to students and should be kept in the classroom for reference.

Hurdzan, Dr. Michael J. *Golf Greens: History, Design, and Construction* (Hoboken, NJ: John Wiley & Sons, 2004).

Hurdzan comprehensively covers the subjects of greens in this well written and well researched book. It is fairly technical and detailed and therefore a little complex to be used in an introductory golf design class.

Jones, Robert Trent. *Golf's Magnificent Challenge* (New York: McGraw Hill Publishing, 1988).

This book by the late master architect features his musings on golf course design. There are wonderful photographs and a number of interesting sketches done by Jones himself. In the early nineties this might have been a must read, but golf course design has moved past the penal designs of Jones.

Joy, David, compiled. *The Scrapbook of Old Tom Morris* (Chelsea, MI: Sleeping Bear Press, 2001).

This book consists of various old pictures, newspaper clippings, records and documents pertaining to the life of Old Tom Morris, the first professional golf course architect. It contains many old maps of the Old Course at St. Andrews and other early links courses. Due to its scrapbook form, it is not the best resource, but it is certainly interesting and educational to flip through.

Klein, Bradley, ed. *A Walk in the Park: Golfweek's guide to America's Best Classic and Modern Golf Courses* (Sports Publishing Inc., 2004).

Golfweek's annual rankings are published in this extended format that features photos and reviews of all two hundred courses.

Klein, Bradley. *Discovering Donald Ross: The Architect and his Golf Courses* (Chelsea, MI: Sleeping Bear Press, 2001).

The best of a rash of books published in recent years about Ross. Klein's research is thorough and there are great reprints of Ross's hole diagrams. For Ross research, this book is the place to start.

Klein, Bradley. *Rough Meditations* (Chelsea, MI: Sleeping Bear Press, 1997).

Klein's book is a collection of his articles on golf courses and golf course design that were written for various magazines. Klein's writings are clearly biased in favor of old courses and architects from the golden age of golf course design. While entertaining and insightful, this book is hard to maneuver through and therefore is not a great research tool.

Macdonald, Charles Blair. *Scotland's Gift Golf* (New York: Charles Scribner's Sons, 1928).

This memoir by the self proclaimed father of American Golf is another classic in golf course design. Macdonald was the first architect to study the great holes of England and Scotland and try to duplicate them in the United States. His designs include the National Golf Links of America, considered the first great American course, and the Lido Golf Club, an engineering marvel that many thought the best in the world until the club disbanded during the great depression. Macdonald's writings are clear and full of the ego that led him to these great undertakings. His thoughts on design ring true to this day.

MacKenzie, Alister. *The Spirit of St. Andrews* (New York: Sleeping Bear Press, 1995).

MacKenzie's work lay unpublished for sixty years. His step-son pushed for the publication of the manuscript in the 1990's as interest in golf course architecture and St.

Andrews grew. MacKenzie, trained as a doctor but also versed in the art of camouflage, was the most prominent golf course architect of his day and spent lots of time in St. Andrews.

His thirteen rules of golf course design should be copied, laminated and kept by the side of every practicing golf course designer.

National Golf Foundation. *Developing Golf Courses on Landfills, Strip-Mines, and Other Unusual Locations* (Jupiter, FL National Golf Foundation, 1996).

This is a compilation of articles put together by the NGF, a foundation started by factions of the golf industry to promote the sport. This is a useful source for anyone doing research on the subject.

National Golf Foundation. *Environmentally Friendly Golf Courses* (Jupiter, FL: National Golf Foundation, 1997).

This is a collection of articles from a variety of local and national print sources collected and put together by the NGF, a foundation started by factions of the golf industry to promote the sport. While clearly biased in favor of the golf business, the packet is filled with good anecdotes and examples of the positive role of golf courses in the environment.

National Golf Foundation. *Global Dimensions of the Golf Industry* (Jupiter, FL: National Golf Foundation, 1998).

This is a third collection of articles from NGF. It chronicles golf's expansion into all parts of the world. For research about courses outside the U.S. or Great Britain, it is a useful tool.

Nicklaus, Jack. *Nicklaus by Design: Golf Strategy and Architecture* (New York: Harry N. Abrams Inc, 2003).

Nicklaus lays out his theories of golf course design. This is a useful resource for those interested in the designs of the champion golfer.

Peper, George, ed. *The 500 World's Greatest Golf Holes* (New York: Artisan, 2000)

For the millennium, the editors of *Golf Magazine* published this extensive book about the great golf holes of the world. Filled with large photos, it is a useful reference and great place from which to pull pictures for presentations.

Price, Robert. *Scotland's Golf Courses* (Edinburgh: Mercat Press Ltd. 1989).

Price, a geologist and geographer, discusses the origins of the game and the golf course and how they both derive from natural land forms. Price explains the various geomorphic processes that created the linksland where the game was invented. This book is not about the merits of Scotland's numerous courses, but rather about golf's relationship to nature and the ground plane.

Quirin, William. *America's Linksland: A Century of Long Island Golf* (Chelsea, MI: Sleeping Bear Press, 200).

This a comprehensive history of golf on Long Island, one of the few places in the United States that has terrain similar to the linksland of Great Britain and Ireland.

Richardson, Forrest L. *Routing the Golf Course: The Art & Science that Forms the Golf Journey* (Hoboken, NJ: John Wiley & Sons Inc., 2002)

Richardson does a thorough job of explaining all aspects of routing a golf course, covering everything from safety issues to aesthetics to environmental issues. Richardson, a

practicing golf course designer, has produced a clearly organized and useful book that could be used as a basic text for golf course design. It is far more detailed than Doak's *Anatomy* and therefore would be more appropriate for a longer or follow-up class.

Ross, Donald J. *Golf Has Never Failed Me* (Chelsea, MI: Sleeping Bear Press, 1996).

Ross's written thoughts on architecture were lost for over fifty years. This book is a collection of his ideas and philosophies as well as practical advice on construction and maintenance. It contains good graphics of Ross designed holes. While not as comprehensive or eloquent as other books written by architects from the Golden Age of design, this is a very useful and enjoyable book.

Sachs, Paul D. and Luff, Richard T. *Ecological Golf Course Management* (New York: Sleeping Bear Press, 2002)

This book is a detailed and insightful look at how to break away from the use of pesticides to keep turf grass healthy. This book was written for study by golf course superintendents and is filled with technical writing that might be difficult to follow without a science or turfgrass background.

Shackelford, Geoff. *The Golden Age of Golf Course Design* (Chelsea, MI: Sleeping Bear Press, 1999).

This book takes a look at early golf course designers and tracks their development and influence in the first three decades of the 20th century. It contains great images and is a must have for any student of golf course architecture.

Shackelford, Geoff. *Grounds for Golf: The History and Fundamentals of Golf Course Design* (New York: Thomas Dunne Books, 2003)

Shackelford covers the history of golf course architecture well, but loses his way when laying out his philosophy on design. Unlike Doak's *Anatomy*, this book is not detached or reserved. That being said, it is a great read and should be looked at by anyone interested in golf course design. The illustrations by architect Gil Hanse are excellent.

Shackelford, Geoff. *The Art of Golf Design* (Chelsea, MI: Sleeping Bear Press, 1999).

This book features wonderful oil painting by Mike Miller interspersed with essays on golf architecture by Geoff Shackelford.

Shackelford, Geoff, ed. *Masters of the Links* (Chelsea, MI: Sleeping Bear Press, 1997).

This compilation of essays by golf course architects covers a broad time period from the early links to contemporary design. It contains some rare essays from architects that did not publish many of their thoughts on architecture.

Strawn, John. *Driving the Green: the Making of a Golf Course* (New York: Harper Collins, 1991).

This book tells the tale of how a golf course comes to be from the purchasing of the land to opening day. Strawn expertly explains many of the environmental restrictions placed on golf course development and how designers work around these hurdles. This a must read for anyone thinking about entering any facet of the golf development business.

Steele, Donald. *Classic Golf Links of England, Scotland, Wales, and Ireland* (Great Britain: Chappmans, 1992)

Steele is one of the most respected writers and golf course architects in Great Britain and this book contains his descriptions of all the great links courses. This a good source for information on places like Muirfield, St. George's and Ballybunion.

Tillinghast, A. W. *The Course Beautiful* (Short Hills, NJ: TreeWolf Productions, 1995).

This collection of articles, written by one of the foremost golden age architects, lays out his philosophies on golf course design. It also includes a number of great sketches and photos.

Thomas, George C Jr. *Golf Architecture in America- Its Strategy and Construction* (Los Angeles: Times-Mirror Press, 1927).

This is another classic of golf course design. Thomas, designer of Riviera and Los Angeles Country Club, lays out his philosophy on design, including great insight on strategy. Every golf course architect has this book in his library.

Ward-Thomas, Pat. *The World Atlas of Golf* (New York, Gallery Books, 1976).

This book is a wonderful resource, full of large scale maps of the world's best golf courses. The text was written by a number of the game's best journalists and includes analysis and history of these important courses.

Wethered, H.N and Simpson, T. *The Architectural Side of Golf* (London: Longmans, Green and Co., 1929).

Simpson and Wethered lay out the case for the strategic school of golf course design. Their arguments are convincing and the book is filled with wonderful illustrations. While not as

well known as *The Links* or *Golf Architecture in America*, this book is nevertheless an important book in golf architecture.

Wexler, Daniel. *The Missing Links: America's Greatest Lost Courses & Holes* (Chelsea, MI: Sleeping Bear Press, 2000)

This book chronicles the many great designs that, for whatever reason, no longer exist. This a useful resource when researching architects from the Golden Age.

Wind, Herbert Warren. *The Story of American Golf* (New York: Alfred A. Knoph, 1948).

This detailed account of golf's history in the United States contains good information about the development of early courses and the game's evolution.

Wind, Herbert Warren. *Following Through* (New York: Harper Perennial, 1985).

Wind's essays on golf from *The New Yorker* are collected in this volume. Wind, one of the most observant writers of his generation, muses on everything from Hogan's last charge at the Masters to beauty and magnificence of Royal Dornoch in the Scottish Highlands.

PERIODICALS

Helphand, Kenneth, "Learning From Linksland," *Landscape Journal*, (15, No. 1, 1995) pp 74-87.

Helphand's detailed look at how the golf course has evolved from its linksland roots into its current form in the United States, is a detailed and intelligent investigation and should be read by those interested in golf course architecture. Underneath the discussion of golf course

architecture is a clever look at how a particular form or typology can undergo extensive and logical transformations.

WEBSITES

www.golfclubatlas.com

This is a wonderful resource that is run in a very professional manner. There are wonderful reviews of courses complete with excellent photos and well conducted interviews with architects and others somehow related to the field of golf course design. The discussion group is also worth dropping in on.

www.geoffshackelford.com

This is the website of Geoff Shackelford, author of a number of books on golf course design. Mr. Shackelford is a traditionalist and is not afraid to call out those that he thinks are corrupting the soul of the game. He has recently moved into the design field and there are interesting updates on his projects.

www.ngf.org

This is a good resource to find information and statistics on the state of the golf economy. The National Golf Foundation is a trade organization for the golf industry and its information should be treated accordingly.

www.golf20/20.com

This website is another that is run by an organization promoting the game of golf. The mission of Golf 20/20 is to increase golfer participation. This is another good site for statistics.

APPENDIX C

SURVEY

Which aspects of the course did you enjoy the most?

The students were nearly unanimous in choosing the field trips as the most enjoyable and useful part of the class. Some mentioned both the lectures and the designer presentations as helpful in understanding golf course architecture.

“Visiting the golf courses and learning the strategies of golf. I also think the designer reports were good in that they exposed us to many different ideas and approaches to designing golf courses.”

“The practical applications of differing topographical sites.”

“Discussing the different philosophies and then going and seeing them in the field.”

Which aspects of the course did you least enjoy?

Some students stated their belief that the designer reports could be done in a different, more entertaining way. Some complained about the lack of firm due dates for the various parts of the final project.

“Designer reports. I liked the idea of them but not how we did them.”

“I least liked having all the projects due at the end. It would be better if each drawing had a finalized due date throughout the semester so it does not all pile up at the end.”

Are there any aspects of golf course architecture that you would have liked to learn more about?

The students pointed out that they would have liked to learn more about how to properly grade a golf course and about the great golf courses of the world. Most students felt that the course fully covered the basics of golf course architecture.

“Maybe more about famous courses. When reading the text it was sometimes hard to relate to the subject matter because I did not know the courses that Doak was talking about.”

“Grading of the golf course.”

Was the history of golf course architecture covered fully enough?

The student were unanimous that the history of golf course design was covered fully enough for the limited amount of time that we had. A few suggested a separate class to cover the subject in greater depth.

“Yes, but I feel there is enough material for an entire course to be devoted to it. Perhaps a history credit and possibly a requirement for this studio.”

To an extent, yes, but it would be impossible to spend any more time on it if we were to do actual course design. You could have an entire course on the history of course design.”

Did you do the readings and if so where they helpful?

The students claimed to have done most of the readings and all said that they were helpful. Many cited to clarity of the prose in Tom Doak’s *Anatomy of a Golf Course*. Those who purchased the book were glad that they did so and stated that it would be good reference in the future.

“Yes, the book is in plain English, so easy and fun to read. It helped me understand how an architect’s theory is established.”

“The readings were helpful. In fact I read the entire book to further help myself.”

“Doak’s book was easy to read and understand. I found it very helpful.”

Would regular quizzes and a test help spur you to do the readings?

The class was unanimous that quizzes would encourage them to do the readings. Most said that they did the readings anyway.

“I question the idea of quizzes in a studio class. If the course were more a lecture class, then sure, they would be more appropriate.”

“Yes, but the projects should be presented in such a way that they test your knowledge of the readings.”

Is the workload too little, too much, or about right?

The students believed the workload to be a little heavy but mostly about right. Some complained about the spacing of the work saying that there was too little in the beginning and too much at the end. Other’s complained about the lack of mandatory due dates for the parts of the final project.

“I believe that in the beginning the workload was too little and now at the end, it is toeing the line of becoming too much.”

“Workload is right just too much at the end. It would better to spread out through the semester by having mandatory due dates.”

Should the course start with a more broad review of the game of golf?

The class was split on this issue. Those that knew about golf felt that there was too much review and those that did not know anything about golf felt there should have been a little more review of the basics of the game. One student sagely suggested an ungraded quiz on the first day of class that would let the instructor know the knowledge level of the students. This would allow the instructor to help those that needed review without boring those that already had a good understanding of the game.

“Depends on the students. Perhaps an ungraded quiz on golf knowledge at the beginning of the semester will help teacher understand where the students are coming from.”

“No, If you take the class you should know enough to get by.”

How did the field trips aid in learning about golf course architecture?

Every student sung the praises of the field trips. They allowed the students to see first hand the concepts that we were discussing in class.

“Very beneficial. These were to me the best learning aids for strategy, green design, tees , and bunkers.”

“Illustrated how schools of design varied.”

“Seeing in field really clarifies concepts and issues.”

“By going on them I was able to visualize what you were talking about in class. It definitely helped me, not being an avid golfer.”

“It allowed us to have a hands on experience and listen to what actual people in the field had to say.”

Should there be more field trips in place of time to do work in the studio?

Most students felt that there could have been a few more field trips. Some wanted more in the beginning and others wanted a few more in the end to break up the studio work. Others felt that there was an adequate number of field trips.

Should there be more lectures?

The class was split on this question. Some felt that there could have been more lectures. Others felt that were the right amount. Students voiced their concern about lectures taking way from studio time and others stressed that the best way to learn was through the field trips.

“I think the readings and discussions took the place of more lectures. So, no, there shouldn’t be more.”

“No, not if it takes away from studio time.”

“No, hands on learning. Its better to find examples of architecture traits on the course, teach them in the field, i.e. the face of this bunker is flashed sand.”

“As long as there is enough time for studio work, there could be more.”

Should more time be devoted to golf courses and the environment?

The majority of the class felt that there was enough emphasis placed on the relationship between the golf course and the natural environment. Some felt that there could be more time devoted to the subject.

“We get plenty of that here anyway. Not to be ignored, but we had the right amount.”

“The class did a good job of stressing minimal impact during construction and how to design for sustainability.”

“Not in this course. If there was a second semester in this course, I would say yes.”

“Yes, more emphasis on sustainable practices and how to solve environmental issues.”

Should more time be devoted to golf course communities (golf’s relationship to real estate)?

Most students felt that this subject was covered enough in other parts of the school’s curriculum and there was not enough time in the semester to add this to the syllabus. Some felt that one lecture or assignment would have been beneficial.

“Not too much, but at least one lecture would have been beneficial.”

“Yes, because of how prevalent golf course communities are today.”

“No, because we can learn that in a regular studio. We took this class to learn golf course design.”

“Its golf course architecture not resort planning. The semester is not long enough for both.”

Is there too much emphasis on golf strategy for a class within the landscape architecture department?

The students were unanimous that there was not too much emphasis placed on golf strategy. Students acknowledged that strategy helps form the course and therefore can not be skirted around.

“No, I think strategy and routing are the two most important aspects of a good golf course.”

“No, that is the backbone of design.”

If there was an opportunity to take more classes related to golf course architecture, would you do it? Why or Why Not?

The class was evenly divided on whether they would take another class on this subject. Some said that this overview was enough for them and because they did not have an interest in pursuing it as a career. Others said that they had been waiting for the course and would have loved to have more opportunity to study golf course design.

“No, I just wanted to learn how to do good routings and design good golf holes for community design.”

“Yes, because one course is not enough.”

“No, Not a big golfer, While I’ve enjoyed the class, I’ve had my fill of golf.”

“Yes, I entered this profession because I wanted to have a chance to become a golf course architect. I really wish there had been an opportunity.”

Do you think the school should develop a certificate program in golf course design? Why or Why Not?

Almost all of the students thought that the school should develop a certificate program in golf course design. Most noted that a good portion of students enter the landscape architecture program in hope of pursuing this field.

“Yes. The field is a valid in landscape architecture and should be recognized as so.”

“Seems like there is significant interest. If not a ‘program’, at least this course as a permanent elective/optional studio would be good idea.”

Further Comments:

“The guest lecturers were very informative. It is always neat to hear experienced professionals speak about issues.”

“Came into class knowing nothing about golf course architecture. Walking out with the confidence to design a good playable course. Only class I have learned an entire new subject. Owe it all to the teacher.”

“I thought I knew a lot about the game before this course, but now I know there is much more to it than I thought. The field trips were the key to the course. Being able to Physically see what we talk about in class is great as far as learning and comprehending.”

“I really enjoyed the course. It made me want to study golf course architecture more in depth on my own time. Will did a great job teaching and I probably learned more in this course than any other. Thanks, I really enjoyed it.”

APPENDIX D
DESIGNS BY THE AUTHOR

Chippewa Hills

Chippewa Hills was the fictional name of the course that I created on the piece of ground that the students used for the par three/executive course. My design was inspired by Shinnecock Hills, and the name is a play on the name of the 2004 U.S. Open course. As an additional challenge, I chose to use all three parcels of property and design a regulation eighteen and a nine hole par three course. The rolling topography is full of small knobs and bumps, as well as a number of large ridges and hills. There is a plethora of good natural green sites. The difficulty lies in tying them together and avoiding any awkward holes traveling around or over the ridges. After trying a number of different scenarios, I was able to do this by playing parallel to or along the tops of the ridges, rather than perpendicular to them (Figure D.1, D.2)

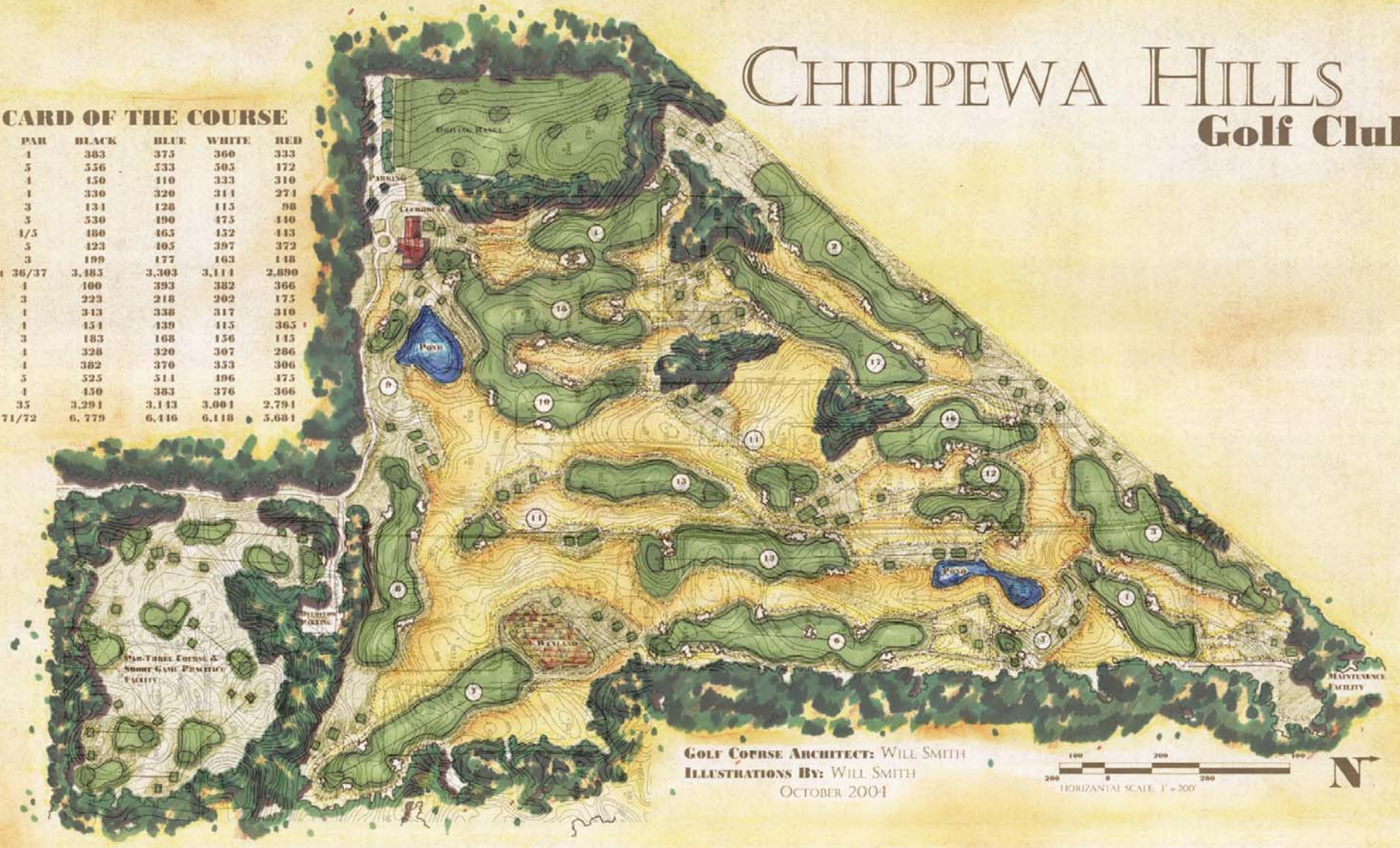
The front nine wraps around the outside of the property, well away from the central ridge. This keeps the out of bounds to the left of the golfer. This challenges the good player who tends to hit the ball left and does not overly penalize the weaker player who tends to hit the ball right. The walks between tee and green are minimal and there is only one forced carry, on the par four seventh, but it is only about 120 yards. The back nine routing is a mutated figure eight that plays up to and then around the central ridge, before playing along the very top of this finger like the hill at the short par four fifteenth. By routing the golf course in this manner, I was able to avoid any blind shots or any uncomfortably uphill golf shots.

Following Pages: Figures D.1, D.2: Master plan and routing of Chippewa Hills.

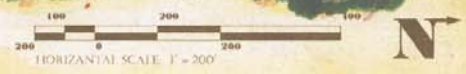
CHIPPEWA HILLS Golf Club

CARD OF THE COURSE

#	PAR	BLACK	BLUE	WHITE	RED
1	4	383	375	360	333
2	5	556	533	505	472
3	4	450	410	333	310
4	4	330	320	311	271
5	3	131	128	115	98
6	3	530	490	475	440
7	1/5	480	463	452	443
8	5	423	405	397	372
9	3	199	177	163	148
out 36/37		3,485	3,303	3,111	2,890
10	4	100	393	382	366
11	3	223	218	202	175
12	4	313	338	317	310
13	4	451	439	415	365
14	3	183	168	156	115
15	4	328	320	307	286
16	4	382	370	353	306
17	5	525	511	496	475
18	4	450	383	376	366
in 35		3,291	3,143	3,001	2,791
71/72		6,779	6,446	6,118	5,681



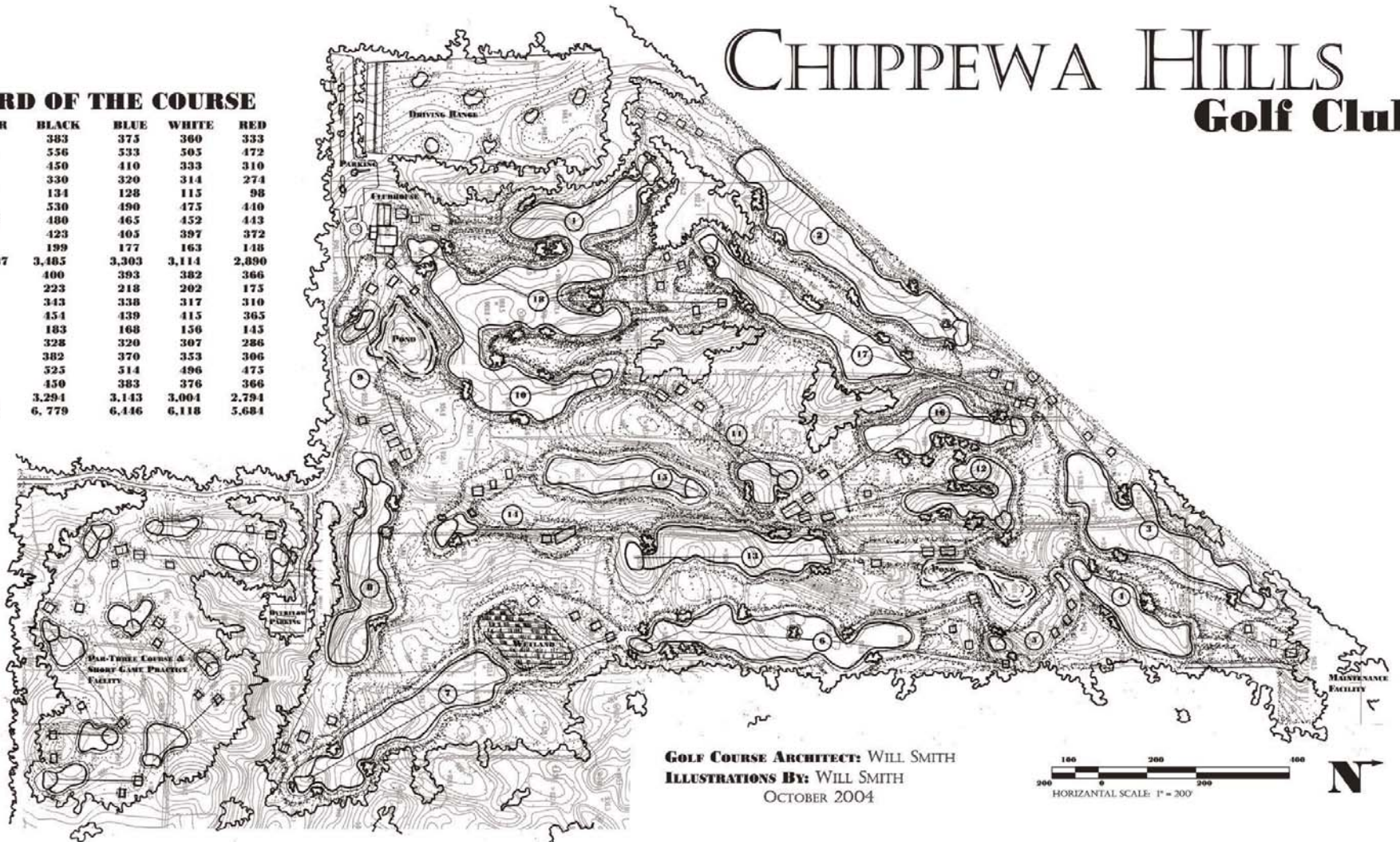
GOLF COURSE ARCHITECT: WILL SMITH
 ILLUSTRATIONS BY: WILL SMITH
 OCTOBER 2001



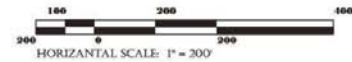
CHIPPEWA HILLS Golf Club

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1	4	383	373	360	333
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6	5	530	490	475	440
7	4/5	480	465	452	443
8	5	423	405	397	372
9	3	199	177	163	148
out	36/37	3,485	3,303	3,114	2,890
10	4	400	393	382	366
11	3	223	218	202	175
12	4	343	338	317	310
13	4	454	439	415	365
14	3	183	168	156	143
15	4	328	320	307	286
16	4	382	370	353	306
17	5	525	514	496	475
18	4	450	383	376	366
in	35	3,294	3,143	3,004	2,794
	71/72	6, 779	6, 446	6, 118	5, 684



GOLF COURSE ARCHITECT: WILL SMITH
ILLUSTRATIONS BY: WILL SMITH
OCTOBER 2004



There is a good mix of short and long holes as well as left to right and right to left shots. There are four sets of tees that range from 5,684 yards to 6,779 yards and the course plays to par of seventy-one. The course turns after almost every hole, ensuring that the players will have to face a variety of winds. The course is designed to have an open feel with very few trees. There are tightly mowed chipping areas near most greens and bunkers repeatedly cross the line of play, challenging players to think their way around the course.

A particularly good stretch of holes is the thirteenth to the fifteenth. The thirteenth is a long par four reminiscent of the tenth at Shinnecock. The player must decide whether to hit a drive over a hill into a valley. This will leave him a shorter shot to a green that is well elevated on a small peninsula shaped ridge. Alternatively, the player could lay back and have a longer shot to the green that is at the same height as the player, allowing him a clear view of his goal. The fourteenth is a 183 yard redan style par three that plays along the foot of the sites central ridge. The player then ascends the hill to the tee of the 328 yard par four fifteenth. This short, bunkerless hole plays directly along the ridge line to a green that is open in the front but with sharp drop offs on the other three sides. The player has the option to blast driver, trying to get as close to the green as possible, but with the risk of hitting it off line, off the sides of the ridge and into the tall grass. The other option would be to hit a lesser club and play for position. These set of holes are representative of the course. They do not beat you up with length, but rather force you to think, make strategic decisions, and execute.

The rest of the programmatic elements work well. There is a nine hole par three course occupying the high ground on the right of the entrance road. This road then bends to the left to the clubhouse which sits on the edge of a plateau. The clubhouse is situated near the first and tenth tees as well as ninth and eighteenth greens. While not on sited on top of the site's highest hill, the clubhouse does command views of these holes and a number of others. The parking lot is located in

the corner of the property well away from the golf course. The driving range is sited north-south and occupies the least interesting land on the site. The maintenance area is located in a corner of the property and has a separate entrance. The logical layout of these programmatic elements combined with wide variety of strategic golf holes would make Chippewa Hills a great place to play golf.

Harmony Club

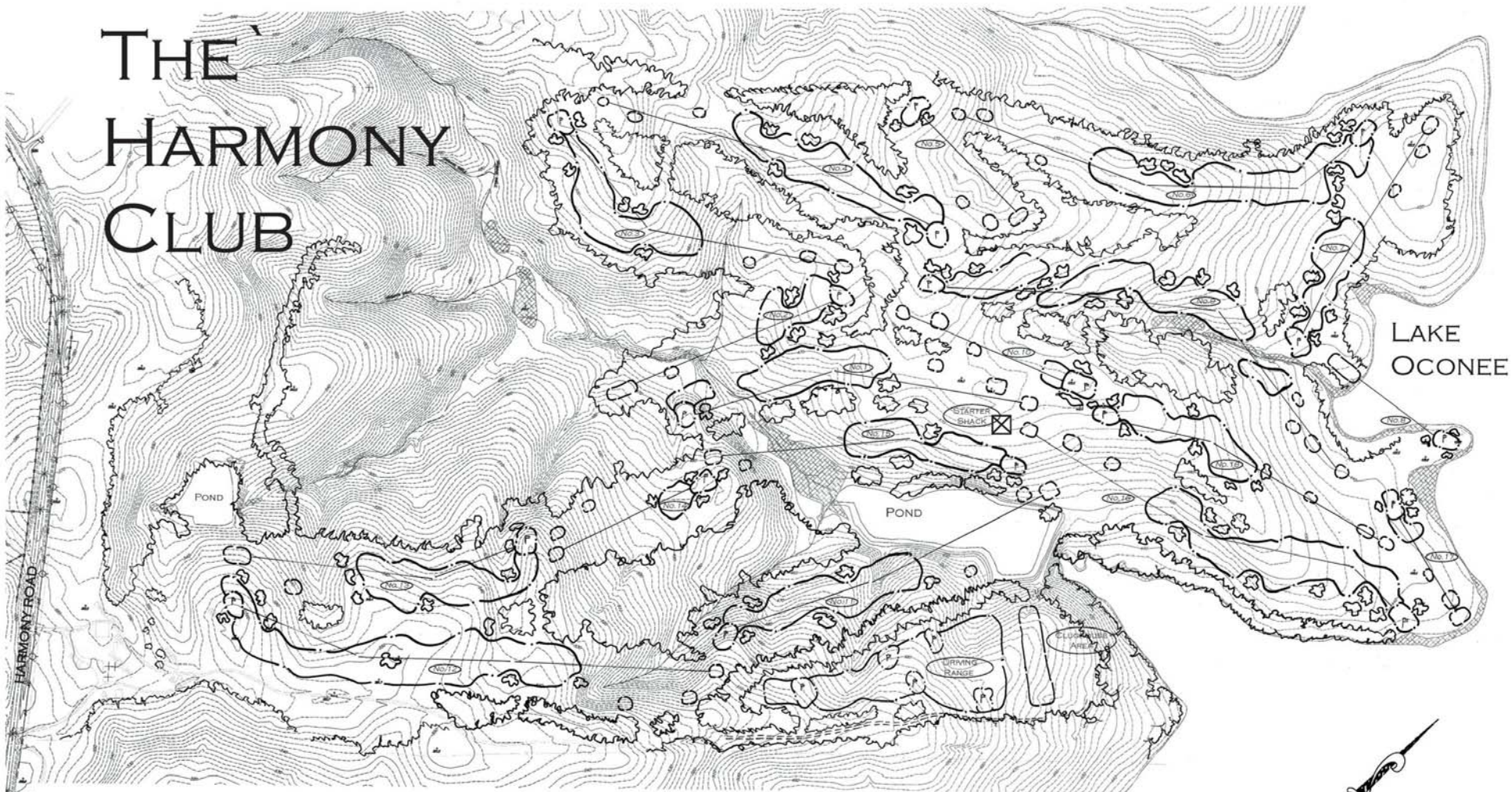
I had a difficult time with my design for the Harmony Club because I was so familiar with the proposed design of Tom Doak. My first time on the site was to help flag trees for the clearing of the corridors for the golf holes. I had a very good feel for the land, but also I had the image of Doak's routing burned into my head. I tried to come up with a number of completely different solutions, but soon realized that this was not working. A site, with its different natural and programmatic elements combined with environmental restrictions, only has so many different ways of being designed without fighting against the land.

My routing travels across the site much in the same manner as Doak's, but I have changed the sequencing and feel of the holes (Figures D.3). I have also added an additional par three along the lake at the end of the round.

The site consists of a large piece of land by the lake that is ideal for golf with gentle slopes and beautiful natural meadows. It makes sense to try to place as many golf holes on this piece of the property as possible. It is logical then to not place the clubhouse on this portion of the site but rather across the finger of the lake that divides the property. By doing this, I have met the developer's desire that the clubhouse have a view of the lake, but not sacrificed any of the

Following Page: Figure D.3: Routing for the Harmony Club

THE HARMONY CLUB



#	PAR	BLACK	WHITE	RED	#	PAR	BLACK	WHITE	RED
1	4	465	415	345	10	3	265	220	175
2	4	335	315	260	11	4	445	430	320
3	4	420	370	320	12	5	620	570	500
4	4	450	420	360	13	4	400	380	345
5	3	170	165	140	14	3	215	200	165
6	5	540	515	465	15	4	380	370	355
7	4	330	320	280	16	5	550	510	460
8	3	180	170	150	17	3	185	155	125
9	5	615	565	510	18	4	420	405	365
OUT	36	3,505	3,255	2,470	IN	35	3,480	3,240	2,810
						71	6,985	6,495	5,280

ARCHITECT: WILL SMITH
 ILLUSTRATIONS BY: WILL SMITH
 FEBRUARY 2004

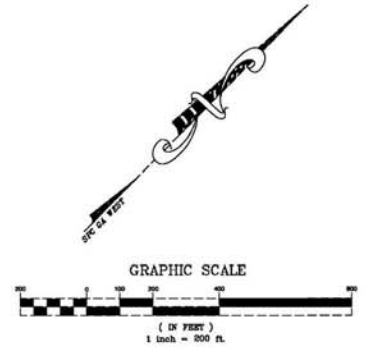




Figure D.4: The site of the par three eighth (Photo by Troy Miller).

land that is ideal for golf. The same logic is used to place the practice area by the clubhouse. The other piece of land that has slopes gentle enough for golf without serious grading is located at the southern corner of the property, near the entrance road. The main dilemma is linking the two sites that have good land without having any bad golf holes.

It was my desire to highlight the lake by bringing the golfer to the shore on both the front and back nines. The first two holes play back and forth across the creek bed. The third takes the golfer to site's boundary. The fourth starts the course's movement towards the lake. The fifth turns the golfer to the left and is a medium length par three that plays over a wide valley. The sixth is great par five that flows down to the lake edge. The seventh plays along the shore delivering the golfer to the eighth tee. This par three plays over the lake to a small peninsula (Figure D.4). The player then walks back to the ninth, a hole that rapidly takes the golfer away from the lake. The course returns to the starter shack not after the ninth hole but rather the tenth,

a extremely long par three with a Biarritz green. The course then plays across one of the site's ponds, at the difficult and rugged par four eleventh. There is walk from the eleventh green up to the twelfth tee. This tee shot plays across a ravine up to the flat land that is well suited for golf. The thirteenth and fourteenth play in the opposite direction of the par five twelfth. The course then winds its way back towards the lake by playing over the creek bed at the fifteenth. The sixteenth is another par five that tumbles to the lake. The seventeenth plays along the shore to a green nestled below a pair of specimen oak trees. The eighteenth plays back away from the lake to a green that would be visible from the clubhouse located just across the cove of the lake.

The routing works because it manages to place the majority of the holes on land that has good natural undulations and because it covers the suspect terrain in just one hole, the eleventh. The routing never forces the player to have to hit a shot dead up a steep hill. While there are uphill shots, these are usually played over a considerable distance and normally there is a valley or depression between the player and the landing area like the tee shot at the twelfth. This allows these uphill shots to be more visible and therefore is less awkward or intimidating.

The course measures 6,985 yards from the back tees and is par seventy-one due to a fifth par three. The course has a good mix of short and long par fours. There are two reachable par fives and two true three shot holes, a rarity in the modern game. The par threes range in length from 170 yards to 265 yards. Three of them are in the 170 to 185 range but they face different directions or occupy different ground. Additionally, the length of the par fours are set up such that there are not many second shots that fall into this yardage range. The routing is also flexible. If after opening the members determine that the closing hole plays too much into the setting sun, then the sixteenth can become the eleventh and the eleventh can become the fourteenth. It is preferable to finish by visiting the lake a final time, but it is not imperative.

The routing eliminated the need to do any major large scale grading (Figure D.5). Most of the fairways would not have to be touched except for a few areas where cross slopes had to be softened or hills slightly lowered for visibility. The eleventh hole and the driving range are the areas with the most grading. Here, several steep gullies have been filled and water flow has been captured on the uphill side and piped underneath the fairway to be daylighted on the downhill side, out of play. A number of tees had to be banked into slopes, but due to the fact that tees are such small areas, this does not result in the need to move a lot of dirt.

Because I did not have to move large amounts of earth, the limits of the clearing of trees was entirely up to my discretion (Figure D.6). I used wide corridors, wanting to give the golf course a big, broad feel. This had the added benefit of improving air flow and circulation along the creek bed and in other heavily forested areas. I paid special attention to clearing plenty of room on the eastside of greens to make sure that the grass received sufficient morning sun. No hole relies on trees for strategy, so the course will not have to worry about losing a tree and then being left with a boring hole. That being said, the oaks to the right of the seventeenth green will be highlighted.

Following Pages: D.5, D.6: Grading and clearing plans for the Harmony Club

THE HARMONY CLUB GRADING PLAN

LAKE
OCONEE

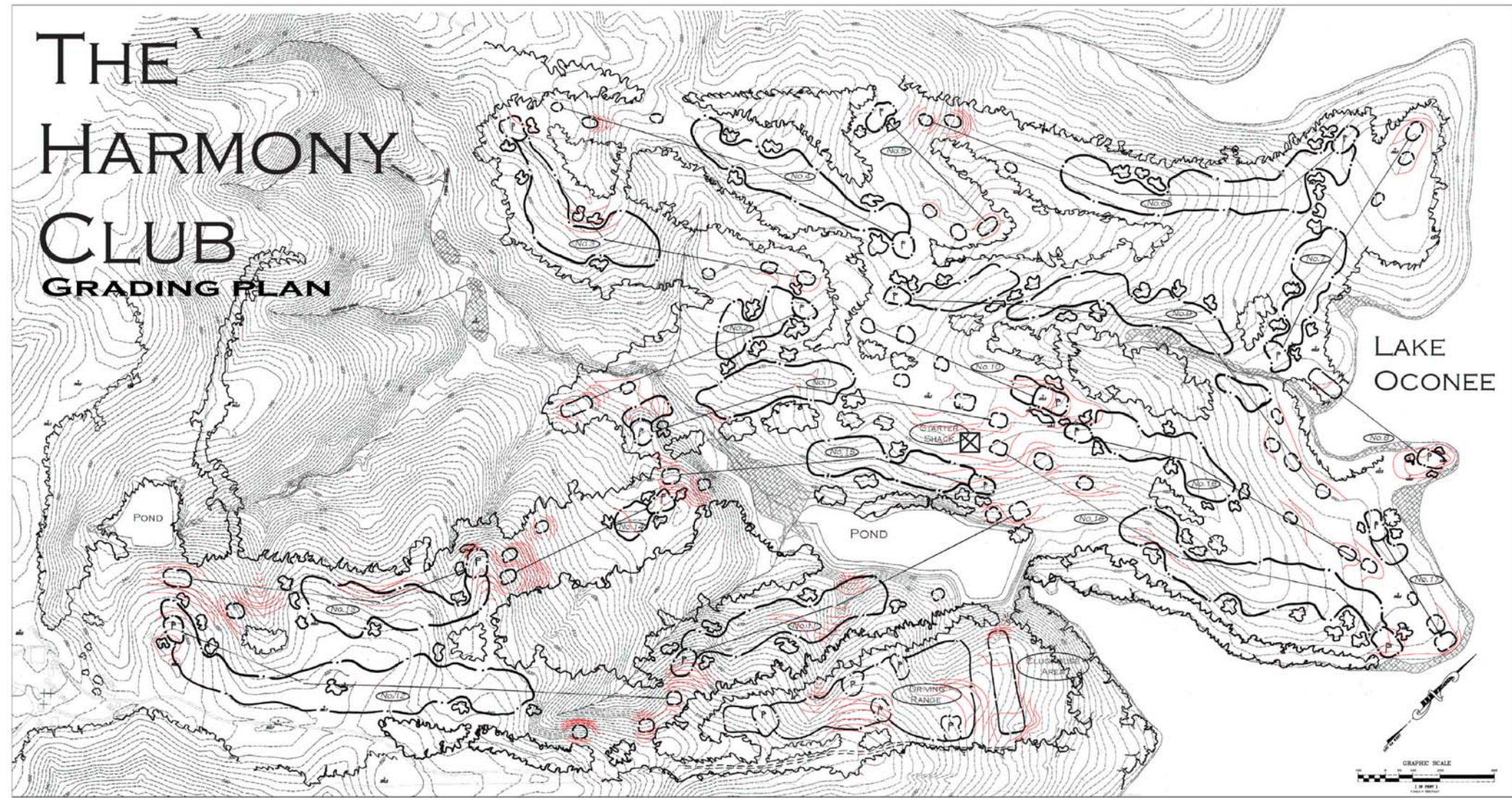
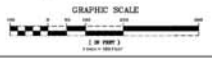
POND

POND

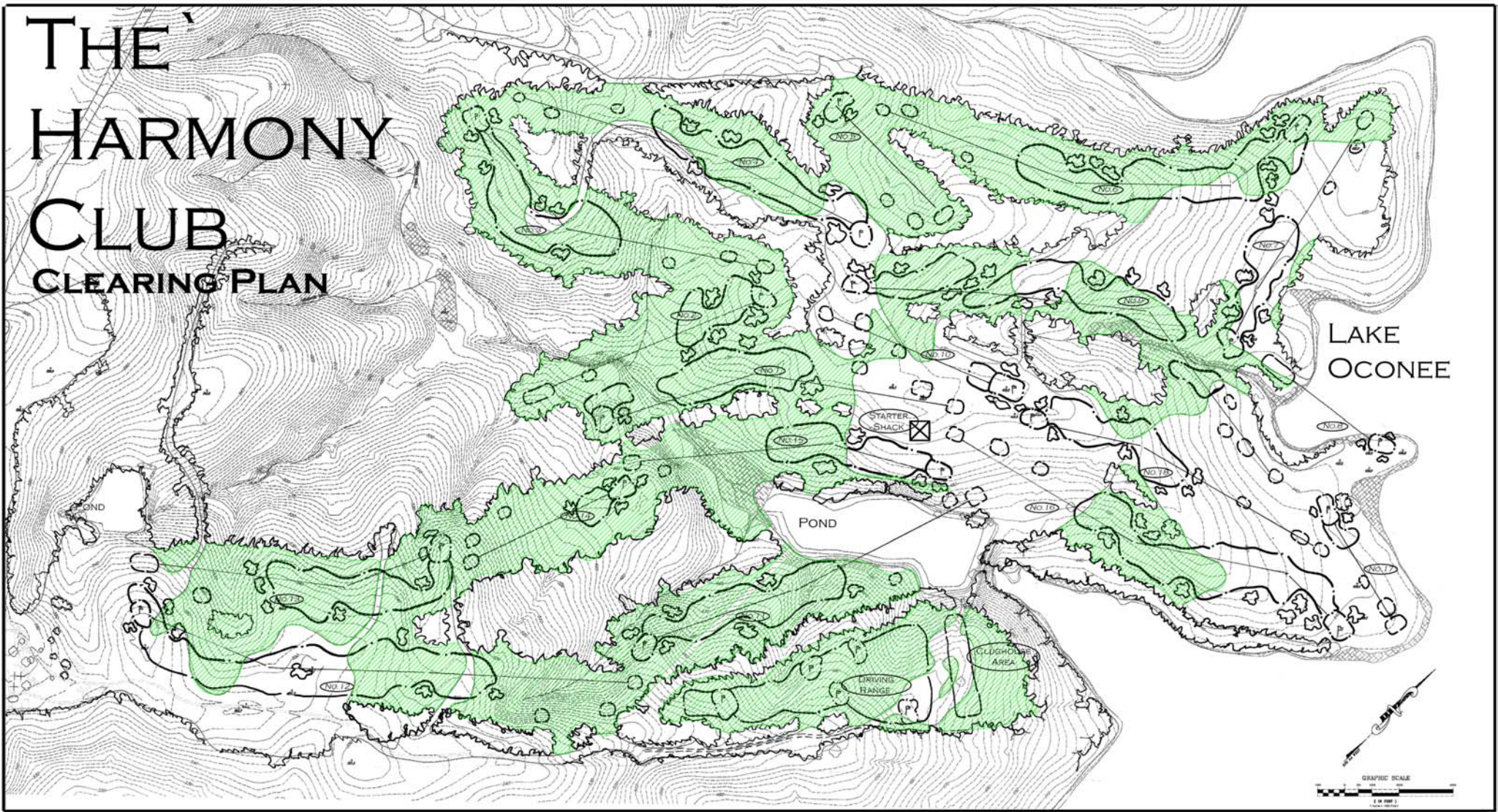
STARTER SHACK

DRIVING RANGE

CLUB HOUSE AREA



THE HARMONY CLUB CLEARING PLAN



LAKE
OCONEE

POND

STARTER
SHACK

DRIVING
RANGE

CLUBHOUSE
AREA



Because of the shady nature of some of the teeing areas, I was worried about using Bermuda grass. Instead I chose to use Cavalier Zoysia on all teeing areas to keep the tees consistent throughout the course (Figure D.7). Cavalier Zoysia does excellently in the shade and well in full sun. For the greens, I went with a mix of Crenshaw bent and Penncross bent. These are the strands of bent that have done so well just down the road at Cuscowilla. For the fairways and roughs I decided to use Tifway 419 Bermuda. This is a good inexpensive grass that thrives in the Harmony Club's warm humid climate. I have also delineated a number of areas for native grasses. Every care should be taken during construction to preserve good grass specimens. These could be transplanted to the area or used for seed.

I have included the design of four greens (Figures D.8, D.19, D.10, and D.11). These greens have been fully graded down to one foot contours. They have been designed to affect the strategy of the golf holes. The fifth green was modeled after the Eden hole at St. Andrews, with a deep, central front bunker and another deep bunker on the left. The slope on the green gets steeper as one moves toward the back of the green. Set near the top of a rise, the green is flanked by two swales that will direct water away from the putting surface. The tenth green is a Biarritz green. It has a deep swale dividing the green into a front and back plateaus. The green is flanked by three bunkers almost five feet deep. The player must find the correct plateau or be left with a difficult putt through or from the swale. The fourteenth green has a raised, domed back section,

Following Page: Figure D.7: Grassing plan for the Harmony Club

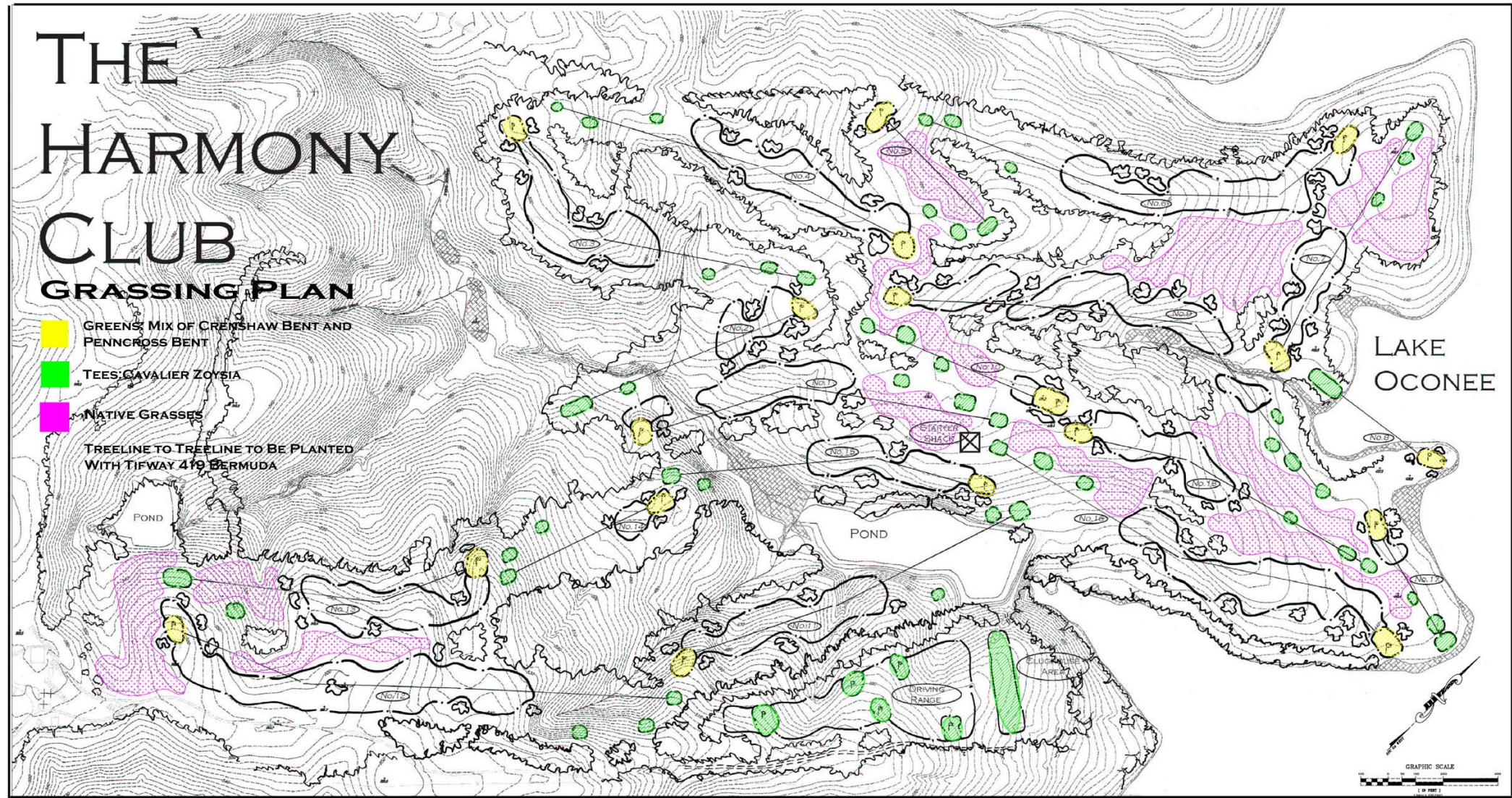
THE HARMONY CLUB GRASSING PLAN

-  GREENS: MIX OF CRENSHAW BENT AND PENNCROSS BENT
-  TEES: CAVALIER ZOYSIA
-  NATIVE GRASSES

TREELINE TO TREELINE TO BE PLANTED WITH TIFWAY 419 BERMUDA

LAKE OCONEE

GRAPHIC SCALE
(1" = 100')

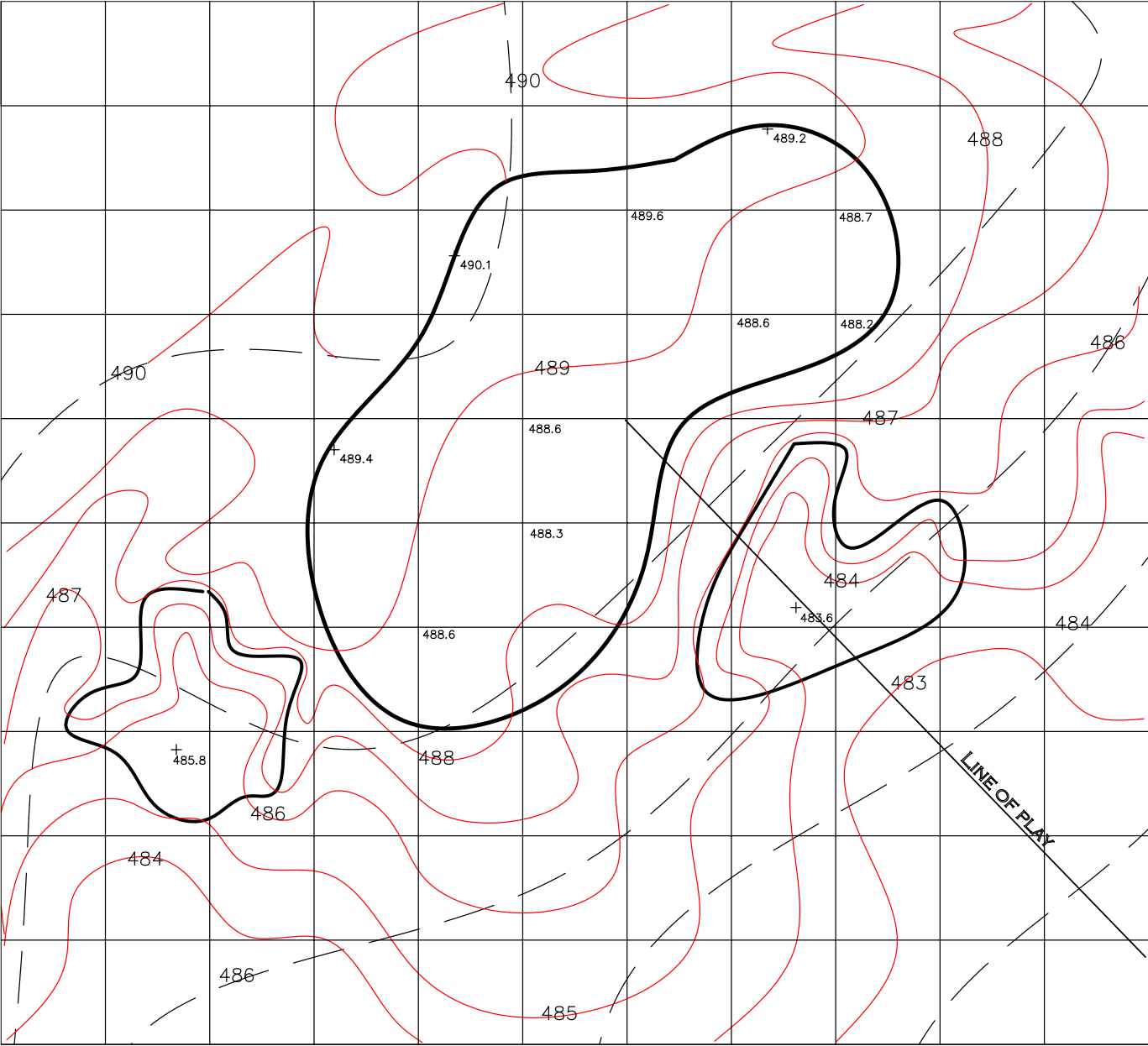


with a more receptive front portion that is pinched by two bunkers. There are number of swales diverting the water from the green and around these bunkers. The seventeenth green slopes hard from left to right and has a ridge running diagonally across it about halfway back. The left side is guarded by a depression that contains a deep bunker. Any player that ends up here will have an extremely difficult chip.

Following Page: D.8, D.9, D.10, D.11: The fifth, tenth, fourteenth, and seventeenth greens at the Harmony Club

THE HARMONY CLUB

GREEN #5
6,800 SQ. FT.



SCALE 1"=20'



THE HARMONY CLUB

GREEN #10
9,500 SQ. FT.

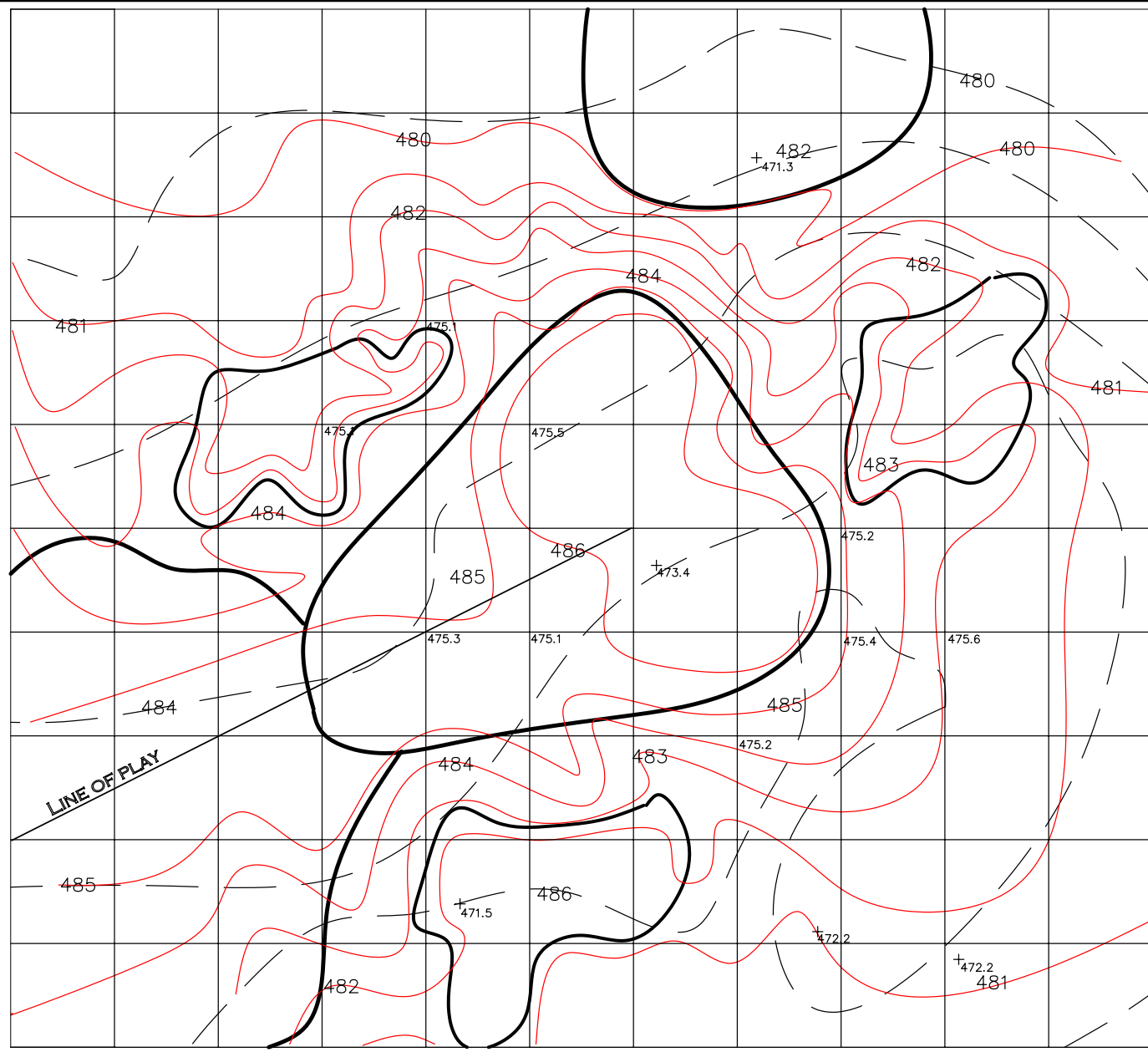


SCALE 1"=20'

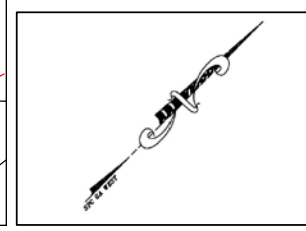


THE HARMONY CLUB

GREEN #14
6,000 SQ. FT.

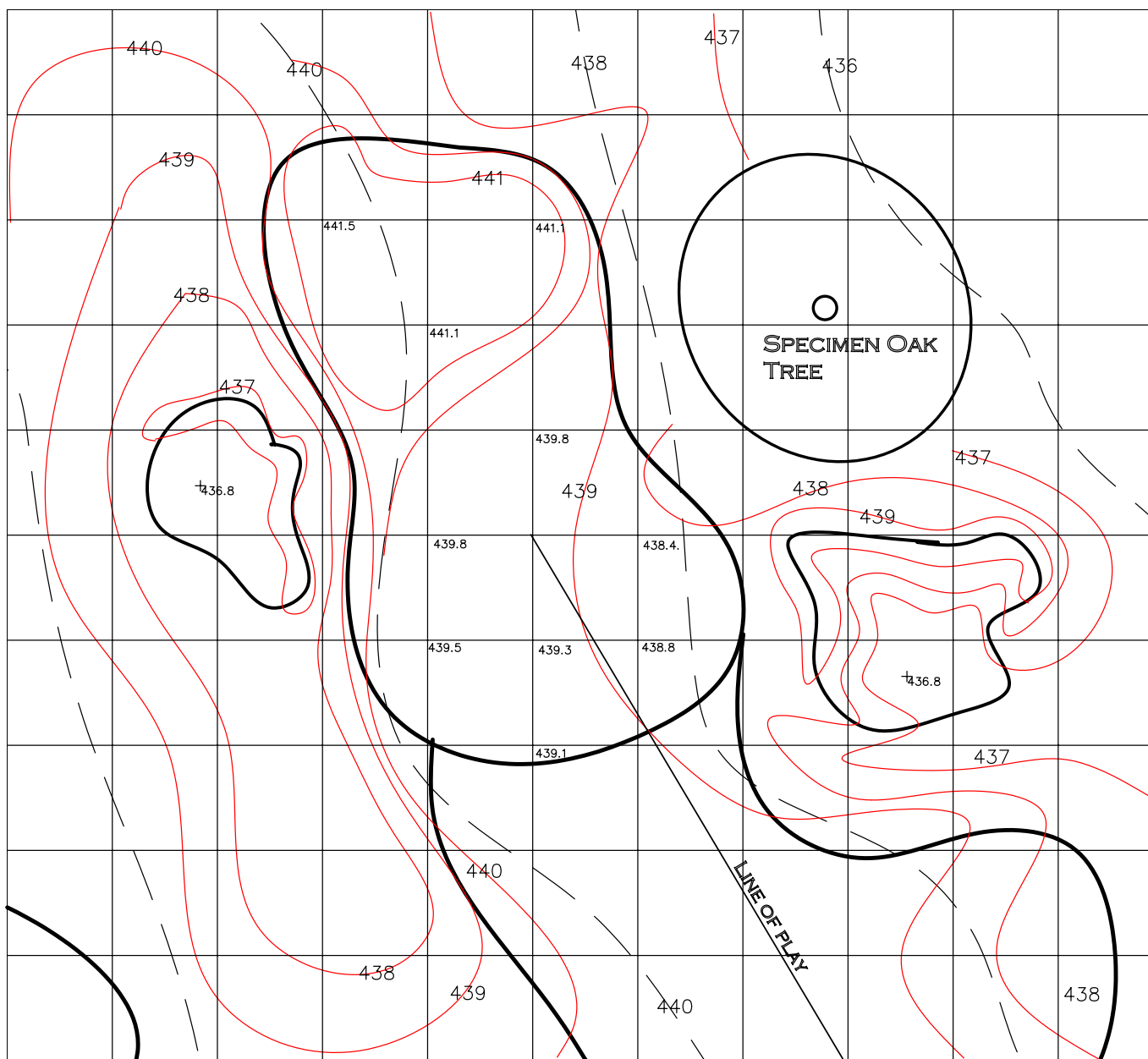


SCALE 1"=20'



THE HARMONY CLUB

GREEN #17
7,200 SQ. FT.



SCALE 1"=20'



Table D.1: Hole by Hole Description of the Harmony Club

Hole 1: Par Four, 465, 415, 345 yards

The long first is a difficult opening hole. The player can either hit his tee ball close to the fairway bunker, leaving the best angle to the flag, or try to hook his ball down the slope leaving a shorter approach. There is room short and right for those not yet ready to challenge the green.

Hole 2: Par Four, 335, 315, 260 yards

This short par four is a good chance to make up for a potential lost shot at the first. The player can either lay back or challenge the left side fairway bunker, setting up a simple pitch.

Hole 3: Par Four, 420, 370, 320 yards

The bunkers on the hill are deceiving. The ideal line is well left near the right side bunker. This opens up the green ensuring that the player does not have to hit a blind or semi-blind approach.

Hole 4: Par Four, 450, 430, 360 yards

The play on this long par four is to stay left the whole way. A good drive over the bunkers will set up a nice left to right approach to a green that banks away from the greenside bunker.

Hole 5: Par Three, 170, 165, 140 yards

This medium length par three is all about distance control. The steeply contoured green was modeled after Eden at St. Andrews. Anything over this green will be a hard up and down.

Hole 6: Par Five, 540, 515, 465 yards

This par five plays downhill, making it reachable for most players. A good tee shot that avoids the fairway bunkers will set up a long iron or fairway wood approach to a green that slopes right to left.

Hole 7: Par Four, 330, 320, 280 yards

This is another short four that is more about positioning than strength. A tee ball that hugs the right side will leave the best angle to this green

Hole 8: Par Three, 180, 170, 150 yards

This picturesque par three plays over Lake Oconee to an elevated green that is oriented on right to left diagonal away from the player. There is not a lot of room to miss. This is a hard hole when the wind is blowing.

Hole 9: Par Five, 615, 565, 515 yards

The ninth is a long demanding three shot hole no matter which tees one plays. The tee shot plays diagonally over a creek, setting up a second shot where the player must decide whether or not to challenge the cross bunkers that completely cross the line of play. The green is open in the front to allow the player to run the ball on.

Hole 10: Par Three, 265, 220, 175 yards

This daunting par three plays slightly downhill to a Biarritz green. A large swale divides the putting surface in two so it is extremely important to find the correct area, as putting from one plateau, or the swale, to the other plateau is extremely difficult to judge.

Hole 11: Par Four, 445, 430, 320 yards

A strong tee shot across the pond that flirts with the bunker on the right will set up a good look at this green that is perched on a little ridge. This is the hilliest hole on the course.

Hole 12: Par Five, 620, 570, 500 yards

This tee shot plays over a steep ravine to a wide open fairway. The player then must decide to play over, left, right, or short of a central fairway bunker to set up his third shot to a green that is situated on top of a small knob.

Hole 13: Par Four, 400, 380, 345 yards

After a stretch of extremely demanding holes, the thirteenth is a welcome breather. A tee shot that hugs the right side will open up the best angle to attack this well bunkered green.

Hole 14: Par Three, 215, 200, 165 yards

Club selection is key on this classic downhill par three. The green is almost forty feet below the tee and trouble lurks both left and right.

Hole 15: Par Four, 380, 370, 355 yards

This medium length par four delivers the player back to the open meadows. A tee shot that lands near the right side fairway bunker will set up a good look at the green which slopes severely from left to right.

Hole 16: Par Five, 550, 510, 460 yards

A good tee ball will thread the needle between the fairway bunkers. Those going for the green will have to fly another set of bunkers just short of the green. Those laying up will play a semi-blind shot over the ridge to left setting up an easy pitch for a third.

Hole 17: Par Three, 185, 155, 125 yards

This par three is designed for a draw approach as the green slopes away from the bunker on the left and towards the large oaks on the right.

Hole 18: Par Four, 420, 400, 345 yards

A good tee shot at the last will carry over the short bunkers and settle near the left side fairway bunker. This will leave a fade approach to a green that is bunkered both left and right.