

ENVIRONMENTAL FACTORS IN GOLF

COURSE DEVELOPMENT: A CASE STUDY

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Environmental constraints become apparent when one considers the maintenance and operation of a golf course. The high demand for water, proximity to surface or ground water supplies and the potential threats by the perpetuation of the grounds. This investigation of a new golf course construction site will identify the threats to the environment.

Introduction

Every year, another 350 or so new golf courses are created in the United States to help meet the growing demands of the nation's 27 million golfers. The country's more than 14,000 golf courses currently cover 13.2 million acres (Kuznik 1993). These sites are often selected for their natural characteristics. According to the last Massachusetts State Comprehensive Outdoor Recreation Plan (Smith et al. 1988), nearly 7% of the residents indicated that they participated often in golfing. Golfers typically participate 24 times a year and travel an average 15 minutes to the course. Most golfing occurs on the weekends (SCORP 1998). Despite the nearly 400 courses in Massachusetts, the high relative demand for golf courses has caused the SCORP to identify golfing as second in the State Need Rank, following tennis court construction. Warnick (1991) has studied golfers in New England and found the market share to be different from the national trends. For example, although popular, nationwide trends indicate a propensity to utilize country clubs over the public ones. Regionally, golfers utilize the private and public facilities more equally.

In Southwick, Massachusetts, there are currently two golf courses (the Edgewood Golf Course, Inc. and the Southwick Country Club) and one driving range (the Longhi's Driving Range). In the near future Southwick will also have a new golf course, to be created on an existing dairy farm. The impacts of this new golf course and the already existing courses bring up issues of clear cutting, erosion, siltation, effects on nearby streams, aquifer protection, the flood plain, and wetlands.

Early golf course architecture traditionally tried to work with the shaped of the land. Then in the 1960's, builders began moving a lot of dirt around, trying to create unique looks. At many courses, native understory and woodlots were replaced by huge growths of grass and beds of ornamental and exotic plants. Vast amounts of water were required to maintain those large expanses of open turf. The average golf course uses more pesticides, herbicides, fungicides, and fertilizer per square foot than any farm in America. This may create an over burden to the land's filtering ability to chemicals before drainage reaches the water supply, for example, Southwick's aquifer. The National Golf Foundation says that between 500,000 and 800,00 gallons of water per day per course is needed for the upkeep of these layouts (Kuznik 1993). Such a drain on the natural water supply system in any community is a matter for investigation.

Traditionally, golf course construction averages \$3 to \$6 million, with higher quality and environmentally sound courses averaging \$10 million. According to Laurence Hirshin, President of the

Society of Golf Appraisers, these initial construction costs take an average of twenty-five years to pay for themselves (Hirshin 1993). Therefore there is no great monetary incentive to build the more expensive version. There is no question that public golf courses can make money, they are also good neighbors and can be politically desirable additions to a community. After all, courses are labor intensive and can require a minimum of 145 employees for operation and upkeep. The tax revenue would be a boost to community funding deficiencies, but environmental factors, if ignored from the onset, could cost communities in the long run.

Background on Environmental Factors

From the standpoint of investigation, a proposed construction site of any kind, and in this instance, a golf course construction site, the surface of the Earth is comprised of a complex interface where there are four principle components of the environment to be considered. The solid, inorganic portion of the earthly sub-structure is the lithosphere, comprised of the rocks of the Earth's crust as well as the broken and unconsolidated particles of mineral matter, the soils, that overlie the unfragmented bedrock. The vast gaseous envelope of air that surrounds the Earth is the atmosphere. The atmosphere encompasses the climatic factors of wind, precipitation, temperature, and seasonal attributes. The waters of the Earth, consisting of oceans, lakes, rivers, and glaciers, compose the hydrosphere. The hydrosphere is entwined with the other spheres to supply life giving moisture. Finally, all living things, plant and animal, collectively comprise the biosphere. These four spheres, when under study, are not discrete but are considerably intermingled. Consider the composition of a lake. This body of water from the hydrosphere also contains organic life forms that are a part of the biosphere. Soil, for example, is composed of largely bits of mineral matter (the lithosphere), but also contains life forms (biosphere), soil moisture, (hydrosphere), and air (atmosphere) in pore spaces. Thus, lithosphere, atmosphere, hydrosphere, and biosphere are not separate systems within a site analysis, but are more properly considered as components of the total environment.

Because of these environmental factors, the U.S. Environmental Protection Agency has developed policies to analyze a projects' responsible land stewardship needed on golf course development and maintenance. For example, the United States Golf Association (USGA) has granted the Professional Golf Association of America \$400,000 for the analysis of the impacts on a golf course located in South Carolina (Kuznik 1993). Studies of this kind are being conducted all over the country. The environmental impacts of maintenance are secondary considerations. The construction of the course must be analyzed first. After surveying of the site has been completed from the air and field work, the site planning begins. Natural land formations, wetlands, waterways, vistas, historic points of interest, and so forth are developed into the plan. Today, sites are pre-selected to capitalize on unique topographic features. This eliminates the need for extensive landscaping techniques. Natural features and attractions of a site become the allure of a course.

Lithosphere

Soil analysis has now become very important when considering placement of the manmade features of a golf course. Clear cutting, erosion factors, drainage patterns, and siltation all need to be considered. Because the lithosphere is linked to all other spheres to be considered any impact must be cross-checked to predict consequences to other spheres. For example, excessive erosion from clear cutting may irreversibly harm nearby streams and groundwater. Habitat lost during clear cutting may also impact native species that are part of the course's future uniqueness. Disturbance of drainage patterns may have reverberations to other spheres as well. Analysis of a site has to be checked against every sphere for the interconnectedness of every step into every realm for the consequences of each step.

Biosphere

The distribution of plants and animals reflects evolutionary adaptation, migration competition, and reproductive changes over

time. Extermination and extinction are hidden threats to any landscape. Wildlife habitats are usually very sensitive to construction processes and must be protected during the site plan development, before the construction of a course has damaged them beyond repair. Jim Snow, as an USGA official currently funds \$2 million a year in environmental research (Kuznik 1993) to study these impacts and how to mitigate them. More than 600 golf courses have enrolled in the Audubon Cooperative Sanctuary Program, an environmental advisory service operated by the New York Audubon Society to help preserve special areas at the onset of a project. The American Society of Golf Course Architects recently pledge to design future courses following Audubon guide lines. "The involvement of all of these institutions shows that people are starting to see that they can have good quality playing areas and also create little pockets of habitat," says New York Audubon President Ron Dodson (Kuznik 1993, 36). These organizations are all beginning to work together instead of being adversaries who do battle over the environment. Golf courses offer each party incentives worth working toward while the creation of the site plans opens these areas to public use.

Hydrosphere

The PGA hopes to foster similar changes in attitudes. PGA spokesman Ron Kendall believes, "As long as they obey the laws, people have a right to develop private property. If we are going to continue to build and maintain golf courses in this country, then we must protect the environment at every step of the process (Kuznik 1993:37)." The hydrology of a site is critical to life in the biological sphere of the course to be developed as it is to the humans who share these resources in the area. Water is the factor which links the four subsystems of the Earth. Its importance to life on the surface cannot be over emphasized. Wetlands serve a purpose to the life that it supports, but can be utilized for the further benefit of a golf course in the form of a water source if planning is carefully calculated. Groundwater is perhaps the most mysterious of all storage areas for water because we cannot see it during our daily lives. The proximity to surface or ground water is imperative to turf management and these supplies have to be protected as do other water bodies in an area. Groundwater can be depleted beyond its ability to replenish itself and precision is of the utmost significance when placing septic systems and when designing chemical storage and usage. If the local water supply becomes contaminated during the construction and further upkeep of a golf course through poor planning, of what worth will the course hold down the road. Contaminated water will not make the course easy to maintain to say nothing of the detraction to future users. Wildlife, both animal and vegetation, will not be able to withstand changes to its' water supply, so consideration of all impacts to the hydrologic sphere must be of great importance to the site development.

Atmosphere

Finally, every one of the other spheres have developed under the influence of the atmosphere. It is this sphere that is responsible for certain characteristics of the soil composition, the vegetation, the animal populations, and the water conditions of a site. When taken into the calculations for a golf course, the atmosphere envelopes existing conditions and future conditions. The position of the sun will influence the growth of the vegetation and also the maintenance of the grounds. The climate of an area will influence the amount of natural sun and water that will be contributed, as well as how many playing days can be expected. These climatic changes in the seasons will layout the pattern of its average temperature, rainfall, and influence maintenance practices. The wind created by the direction and intensity of the pressure fields of the atmosphere extend into play when it comes to helping to shorten the drying time after rain storms, influence the daily weather, and will influence the use of airborne chemicals for the subsistence of the course. Another condition created by the climate is humidity and it can greatly effect the degree of comfort experienced by the users of the course and may change a sunny day of golf into a day to stay at home.

Massachusetts Golf Trends

Southwick's Newest Golf Course

Golf legend, Sam Snead and California architect, Robert Muir Graves have teamed up to design a proposed \$7 million "championship caliber" 18-hole golf course on the 330-acre Sunnyside Ranch dairy farm owned by the Hall family (Graves 1993). There are plans to convert present structures (two residential homes and barns) into the golf pro shop, locker rooms and a restaurant. The bulk of the land will not be radically altered according to David Hall, the developer. Both Snead and Graves are famous for being naturalists and like to work with the topography of the land instead of creating artificial hills and obstacles. The crossroads that the Halls have come to is one dairy farmers throughout the region and New England increasingly must face. Sunnyside is one of the five remaining farms in Southwick, a town once renowned for its remarkably rich soil, a town that in the early 1800's counted farming as its top industry (DiLorenzo 1994). For many farm families today it has become nearly impossible to preserve the lifestyle that has sustained them for generations.

Snead, Graves, and Ed Bignon, former vice-president and chief operator of the Arnold Palmer Golf Management Company, will attempt to design a playable championship course in its natural setting of meadows and forests. With minimal landscaping, this property offers extensive views of the East Berkshire mountains and has eastern exposure for sun light drying of the course throughout the year. The main goal of the group is to offer a profitable recreational facility to the public without changing any more of the land than is necessary to build the course.

Lithosphere. The soil is comprised of Wethersfield-Mekesville types. These soils consist of characteristics that are shallow to bedrock, well drained to moderately well drained soils with hardpan under 15% slopes. This will work well with management techniques for the course maintenance, but it also brings into consideration Southwick's Great Brook aquifer. Septic systems, herbicide and pesticide usage, and the creation of wetlands for habitat might run into problems with this type of soil. Well drained soils will necessitate the development of septic systems which can operate efficiently and filter out wastes before they contaminate the aquifer. Herbicide and pesticide usage will need to be used as supplements to organic methods of turf management in order to reduce possible contamination during these practices. Wetlands construction will need to be located in soil areas less prone to natural drainage, otherwise they will be dry most of the time. This would eliminate any thought of using water from these areas for irrigation.

Biosphere. There are many biological issues to be directly dealt with on this 330-acre site. This project site provides habitat for wildlife of a wide range of species. This wildlife includes migrating Canadian Geese, native wild turkeys, redtail hawks, and over sixty other bird varieties including songbirds, owls, other game birds, such as pheasants. The Massachusetts Audubon Society has been advising the plan designers as to the creation of alternative habitats and protection of existing habitats here. The Hall family has also discussed the donation of 50 acres to the Society to help with the advancement of species in this sphere, such as trying to make feeding grounds more enticing to the migrating geese than the course grasses. This will be quite an endeavor for geese flock to good feeding grounds and over crowd them until the bounty is gone. The reintroduction of endangered or threatened species of birds, such as the Bald Eagle, the American or peregrine falcons, may also become part of the project.

This habitat created will provide undisturbed homes to the whitetail deer, red and grey foxes, assorted moles, mice, squirrels, rabbits, and others such as, opossum, woodchucks, and raccoon, as well as other species natural to the area. The vegetation consists of second growth forest and pasture with wetlands created in areas convenient to the traditional farming practice on the property. Maple, pine, oak, and birch trees are found abundantly throughout the property along with various berry

bushes, laurel, dogwood and fern plants are also in abundance (Cortell 1980).

The Southwick Conservation Commission will be an active participant in the planning (O'Brien 1992), for these and issues of wetland protection, soil erosion, waterway protection, aquifer recharge, and other issues. The designers have tried to anticipate problems by involving organizations in the area and addressing their concerns before they begin. By taking this approach they hope to plan better for the course development and to handle problems in the early stages instead of being blocked by an environmentally concerned group at some future stage of development. This will surely help with the public relations and support of the project because any problem unforeseen by design will not become hindrances by concerned groups in the advance stages. After issues of the biosphere are identified and endangered or threatened species, if any, are recognized, issues of the lithosphere, atmosphere, and hydrosphere must be considered.

Hydrosphere. Organic methods of turf management would decrease any impact to the aquifer, especially in the borderline areas in question. Located within the borders of this property are streams which connect with other tributaries in the large water system of the area which eventually impact upon the water supply of the area which is already taxed by Southwick's water usage and by the towns of West Springfield and Westfield (Water Resource Commission 1968). There would also be a minimal effect on surface waters, both existing and those to be created, if organic methods were practiced. The hydrologic sphere will be impacted, in the construction plans, which calls for the relocation of the current wetlands and the creation of some 20 acres of wetlands. This will be allowed under the Wetland Protection Act because the wetlands were created by the farming practices of a great many years ago and are considered manmade not natural wetlands. The Wetland Protection Act (WPA) allows for these areas to be adjusted to land use due to the fact that their creation was to promote farming practices of a time before the WPA went into effect. Above ground storage of fuels and chemicals in a protective manner would also be recommended.

Atmosphere. The atmospheric aspects of the environment are ideal for the proposed golf course as they were for the former farming practices. The climate will allow approximately 165 days of playing season. The eastern exposure to sunlight will allow for quick drying of the course after rain storms and prevailing winds will also quicken the drying time of the greens. The winds, however, will preclude airborne spraying techniques in some areas of the course due to neighboring residential development. As the winters in this climate tend to be cold and with a medium degree of snowfall, other options can be explored to utilize the course in off season time periods. Cross-country skiing or another low impact use could be open to the public and therefore make for a more constant revenue producing site. Rainfall will be plentiful in the Spring of most years, but constant watering is a good possibility in the hot, humid summer which could otherwise damage the greens by overdriving them.

Conclusions

There are beneficial economic objectives to be obtained from the proper construction of another golf course in the community of Southwick, such as, tax revenue, employment opportunities, and a hopeful ripple effect to other businesses in the Town. Recreation planning is a process that relates the leisure time of the people to space. This process results in plans, studies, and information that condition public policy and private initiatives used to provide leisure opportunities. In the broadest sense, recreation planning of this type is concerned with human development and the stewardship of the land. It helps the people relate to their environment and to each other. In a narrow sense, recreation planning is most concerned with the variables of leisure behavior and open space.

Concerns about the natural preservation of this area as open space, is also of importance to the public because it helps to reduce residential development in this area of town and helps to maintain the rural character of the community. The historic significance of the four generational farm will be maintained by the barn which reads "Sunnyside Farm" and the location of a historic inn site with a scenic view in two directions.

Emerging in many communities is an emphasis on citizen participation in the planning and design process, environmental and social impact assessment, the necessity for cost-effective investments, and the requirements of special populations. This emerging emphasis blends environmental design, social science, and public administration to provide leisure opportunities. Serious consideration of performance criteria, precedence and practice need to be incorporated into a long range, comprehensive, and policy oriented plans. Elements of this plan should identify problems, present relevant information on the implications of a project, and include problem solving alternatives listing expected results. These alternatives need to be listed in terms of economic, social, environmental, and political feasibility.

Literature Cited

- Cortell, Jason M. 1980. Draft Environmental Impact Report: Flood Control Works, Congamond Lakes, Southwick, MA. Jason M. Cortell and Associates, Inc.
- DiLorenzo, JoAnn. 1994. Family farm finds new life in golf. Union News, Westfield Edition, Monday, February 21, 1994. W9.
- Graves, Robert Muir. 1993. Golf Course Design and Development, New Public Championship Golf Course at Sunnyside Ranch in Southwick, Massachusetts. Walnut Creek, California.
- Hirshman, Laurence. 1993. Par for the course. Public Management, 75(6): 15-16.
- Kuznik, Frank. 1993. Charting a new golf course. National Wildlife, 31(5):36-37.
- O'Brien, Meredith. 1992. Snead to design Southwick golf course. Union News, Wednesday (October 7, 1992). W 17p.
- Smith, K.; L. Klar; R. Warnick. 1988. Massachusetts outdoors: for our common good, Vol I & II. Boston, MA: Dept. of Environmental Management.
- Warnick, R. 1990. Market share analysis of selected recreation activities in the northeastern United States: 1979-1987. IN: Proceedings of the northeastern recreation symposium. Gen. Tech. Rpt. NE-145. Radnor, PA: USDA-FS.
- Water Resource Commission, Commonwealth of Massachusetts. 1968. The Groundwater Resources of the Great Brook Basin in the Town of Southwick, Massachusetts. Publication #1007.