SITTING

Visibility in a highly travelled area is the single most important factor to the success of miniature golf. The location of a course must be in an area that is highly visible and accessible to the passers-by. A hierarchy of sittings observed is synthesized below.

Identifying the "people magnet" and the feeding roads to and from the magnet indicate potential site locations.

VISIBILITY

The parking lot is unique to miniature golf and hidden from the passing road. Visibility is key to all angles of view towards the hill. The hill is the seller of the game, as long people are playing. A few things to consider about visibility:

* Speed of passers-by.
* Sight-line of every passer-by.
* Buffers created by context.
SIGNAGE

Signage is the visually verbal unifier of the environment. Things to consider about signage are:

* The simplicity congruently, and legibility of signage at all scales.
* The location of signage for maximum visibility

LIGHTING

A variety of lighting systems can be used to illuminate a miniature golf course for nighttime play. A few considerations are:

* Illuminate only the spaces needed - please thy neighbor.
* Light the pathways and parking compound for safety.
* Illuminate the water.
* Utilize bounce lighting for creative effects such as shadows.
* Use trees as lamp standards.
PARKING COMPOUND

Parking spaces need to be provided so that the patrons are comforted by the lack of struggle when parking in order to play the game.

Things to consider about parking:

* Design with the safety of the pedestrian in mind.
* Provide as safe entry to and from the public right of way.
* Provide ample space to accommodate patrons during peak season.
* Include handicap access.
* Include planting islands to reduce heat absorption of the parking surface.
* Locate within the proximity of the caddy shack.

CADDY SHACK

The caddy shack is the gateway to fantasy. It is also the stronghold of profit. The heart of the miniature golf, the caddy shack, needs to consider many things. A few are:

* Locating the caddy shack relative to the parking lot and the passing roads visibility
* Circulating the people starting and finishing play
* Accommodating the employees, managers, and guests
* Providing comfort stations and concessions
* Including a view over the site for observation of players
WATER

Water falling provides the environment a means of drowning the voices of the passing traffic. Water also creates a glistening rush to the passers-by. A few considerations of water are:

* Create a self contained water system which will use the pond water to irrigate the plant material.

* Hide the pumping systems from the patrons view of sight and sound.

* Include fishes and plants in the water to add to the reality of the wet environment.

HILL

The hill is the focal point and backdrop of the playing environment. Things to consider about the hill are:

* Exposing as many playing people as possible to the passers-by.

* Creating an equilibrium of elements about the hill.

* Viewing of the hill by the passers-by.
PLANT MATERIAL

The variety of plants will vary according to regional climatic conditions. But, no matter the location a few things to consider about plants are:

* Provide patrons with protection from the elements.
* Soften the "hard" edges of structural elements.
* Act, as a backdrop, a picture frame to the "hill".
* Check erosion of the "hill" by reducing water runoff.
* Texture of plants.
THE GAME

Since its birth in the early twentieth century, miniature golf has waxed and waned as an American past-time enough to be regarded as an American institution. The sport has been praised and ridiculed, profiled and not profiled, produced its own trade journals, during one phase, and even rivaled other entertainments like the movie and bowling industries. Today the sport is feeling new growing pains. Miniature golf must respond to the technological advances of the culture, the demands of the people to be more “real,” like the reality of Disney World, The Beauty and the Beast’s stage sets, and the Spielbergen screen fantasies.

Despite these public demands, certain components of the game must remain constant in order for miniature golf to remain miniature golf. These elements are rooted in championship golf, the mother of the miniature game. If these basic elements are altered by the designing proponents, the game will no longer be putt-putt golf. These elements are:

I. the putter
II. the ball
III. the hole
   a. the green
   b. the cup
   c. the tee
IV. the means to keep score

These four constants, in the crudest sense, need to be restricted in their flexibility. (Expanded discussion of the hole and means of keeping score will come later in this rhetoric.) Alone, these elements will not make up miniature golf, nor will they differentiate putt-putt from the championship game.

The difference of the two-club swinging games can be found in:

I. playing environment
II. player(s)

Combined, these six elements make the:

THE BASIC NEEDS OF PLAY:

I. the putter
II. the ball
III. the hole
   a. the green
   b. the cup
   c. the tee
IV. the means to keep score

These six basic components are intertwined in such a way that one can not exist without the other. The whole of these parts makes golf and are the absolutes of both golf games.

The cause of separation from one game to the other can be found in the players and the playing environment.
THE PLAYERS

The players of miniature golf do not take the game as seriously as championship players do. The putters of miniature golf are on a family outing or a date. They are people seeking competitive fun away from the movies, the backyard, the television den, or even the rest of the family. They are people wanting to play a game where there is no discrimination of wealth, heritage, sex, age, or expertise. People adding to the pleasures of vacation. Or, they are people wanting to be amidst the ambience of a sophisticated fantastical outdoor environment. These are people easily overcome by impulse, willing to pacify childhood cries of desire, and looking for zero equipment investment, and simple rules. Miniature golf is simply a game for all.

All these people, though, have had an increasing exposure to more and more sophisticated environments. The environments of stage sets, computerized animations, film fantasies, amusement parks, zoos, and malls. These people are those of the mobile society experiencing more varied places through more easily accessed transportation and the unlimited speed of light communication systems. These are people of the universal-language world. People living in a world increasingly demanding more and more for their entertainment dollar.

THE GAME

People of all ages can play the game. This is especially true in young families. Children between the ages of about seven and twelve are at the growth stage of follow-the-leader. If father or mother is leader, the children will follow because of the example. Teenagers enjoy the game because it aids in setting independence from the parents. They are at the age of going out alone unsupervised. This age can have negative repercussions caused by mischievous damage too. Fledgling daters can also enjoy the game with competition that eases first date jitters. The game is also played by middle-aged folks for all the combined reasons above, plus it gives the family a chance to get away from grandma’s house. There are many retirees playing the game for fun and competition of limited skill.

THE PLAYING ENVIRONMENT

It is the playing environment that has changed the most in miniature golf in recent years. This is a response to the demands of a better educated and more sophisticated society, a society of aforementioned people who want King’s Island, Great America, and Knott’s Berry Farm simulations and/or environments which relate to the movies. Miniature golf is no longer just the challenge of putting long stretches of greens. Miniature golf has become an adventure, an adventure that has a congruent theme carrying people through caves, under waterfalls, into jungles, aboard pirate ships, and up miniature mountains all the while putting the ball from the tee to the
cup. (The ball travels from the tee to the cup—on the green—in the most inventively contrived means feasibly constructed.)

Still there are many other inventive opportunities besides altering the playing environment to increase the fun of the game. For example, what would happen if a computerized scoring system similar to the bowling industry existed, one that kept score by a magnetic strip on the ball? The strip could record whom the ball belonged to, how many times the ball was hit by each putter at each hole, and then, show the score on a computer screen at the tee of the next hole. Or, what if the ball or the putter were altered? Or, what if the game were played with only one hand? As long as the basic needs of play remain in tact so that the game has a connection to championship golf, anything can be done in the spirit of creativity.

Today, the sport must produce an atmosphere that is competitive, yet not so difficult that grandma or junior can not play and beat father; an atmosphere that has an ambience enabling one to escape the day-to-day pressures, yet do so with those who might induce the pressures; and, present an atmosphere that has a high element of risk, yet so subtle that the conscious level of the mind is almost unaware of it. The environment of miniature golf should be one of congruent themes and elements, a place that tests the tensions of skill and fun in such a way that is an escape from the tensions and demands of everyday activities.
ORGANISATIONAL STRUCTURE
MINIATURE GOLF ORGANIZATIONAL STRUCTURE
THE MINIATURE GOLF ORGANIZATIONAL STRUCTURE

The diagram above is conceptual in nature having many subtle variations from one organization to another. Its intent is to illustrate general categories of an interlinked network of disciplines required in miniature golf course development. The intersecting point of the categories is the center of profit. The overlapping of the divisions is the heart of collaborative teamwork. The diagram is not an organizational flow chart and should not be viewed as such except to understand the potential of collaboration opposed to the step by step hierarchy of flow charts.

It is the interfacing of these components and their individual will to give via an understanding and respect of their "partners'" ability as a personality and discipline that enables the highest quality of product, the longest rewarding relationship, thus the greatest dollar possible. Long before these individual disciplines can intertwine, the individuals, as humans, need to have a sound understanding of their spiritual sense (i.e. self-discipline, dedication, full potential output), a basic overall knowledge, and a well-defined specialization. These three parts, as a whole in an individual, brought together with others having comparable self-awareness with differing specializations, create a fuse similar to wedlock. The correct link of disciplines and personalities can create the most rewarding product, a product of pride, a product of profit. Such a bond may not endure time without directions, goals, and a defined means of achieving these goals, objectives. The social upbringing of the interdisciplined people, particularly their cognitive structure which is honed by educational institutions, causes a thought process of professional grouping. For example, lawyers are taught the art of destruction while architects are taught the process of construction or doctors and mechanics are taught the process of elimination, trouble shooting, while journalists and production workers are educated in assembling, piecing together. Due to these differing thought processes there should be an awareness of the other organizational realms of expertise. The growth of such an understanding will never end as long as the mind remains motivated towards the whole, the mutual goals of the organization.

A means of "breaking the ice" might be considered. Communication can begin by gaining a basic understanding of the other realm's occupational jargon. Assembling a brief list of words and their meanings could help begin the process as an example, to a lawyer, the word "the user" would most likely inject a picture of an addict abusing a controlled substance; the same words to an architect would paint a faint picture of many people until it is discerned by the context of the "the user" of the golf course or "the user" of the space. Virtually every profession has trade journals and diction-
abies. A perusal of such literature could aid in a respectful means of bridging the gap between disciplines. A basic understanding of the others’ language could be mutually profitable. This is much like going to another county if one spends time to brief themselves of the culture and language before the trip, they will gain a more respected response from native people.

A few words of the design profession are:

Addenda
Ambience
Base Bid
Bid Bond
Buffer
Certificate for Occupancy
Cluster
Change Order
Context
Contract Documents
Critical Path Method
Facade
Fast-Track Construction
Fenestration
Field Order
Ikeate
Imagery
Indemnification
Invitation to Bid
Labor and Material Payment Bond
Master Plan
Observation
Overlay
Package Deal

Performance Bond
Plan View
P & Z Commission
Proportion
Program
Punch List
Record Drawings
Rendering
Section
Scale
Schematic
Sense of Place
Shop Drawings
Specifications
Soften
Space
Strip
Trash Paper
Texture
Upset Price
Vernacular
Visual Pollution
Working Drawings
XCU

and the process of developing miniature golf courses. Part of this rapport will be a testing of the waters, knowing the limits of the partakers of the organization. The delicate balance of understanding each other will assist in constructive criticism of course development. It is these “outside your specialty” suggestions that often pose the best forms of quality control. It would be helpful for newcomers to the industry to have a list of miniature golf course jargon and one might be developed as an organization grows.

Important to the development and understanding of each of the specialized roles, disciplined jargon, and the controlled balances of quality control is the need to communicate face to face at regularly scheduled meetings. These meetings are times to brainstorm, discuss the goals and objectives of the organization, long and short term, and most importantly, to document the discussions in a manner which will allow other people in the organization to understand the direction of the business. Documentation of meetings is very important to organizations that have operations in varying locations because the document is a mutual understanding that cannot be twisted easily like only verbal discussions can. Debriefing is an integral part of these discussions so that gains are learned from previous mistakes instead of through the perpetual trial and error learning process.
ADMINISTRATION

The Administrator orchestrates all the specialty realms (finance, management, and design) involved in miniature golf course development. The Administrator also tends to lawyers, limited partners, real estate brokers, etc... The administrator's role can be divided into four general categories:

I. Orchestrator of specialty realms
II. Contactor of the outside business practitioners
III. Initiator of site selection process
IV. Provider of Central office location
ORGANIZATIONAL STRUCTURE

To the designer, the contact made between administration, the lawyers, marketers, and real estate brokers is most important. The lawyers can assist in contractual agreements with building subcontractors, joint designing ventures, and designing liability precautions. Marketers can help the designer in creating the continuum needed for the miniature golf environment that will appeal to the public. Real estate brokers and Chamber of Commerces can provide valuable information about demographics, political adventures, and neighborhood contexts.

INITIATOR OF THE SITE SELECTION PROCESS

Most important to the miniature golf course development process is the decision to invest. The choice is made by the investors, but the execution of the site searching process begins with the administration. This is after the financier has determined there is enough capitol to invest.

PROVIDER OF CENTRAL OFFICE LOCATION

The differing locations of miniature golf in North America gives reason for an organization to have a central office location. This is not only for mailing purposes, but also for a potential combining overhead from one realm of the organization to another. The use of

ORCHESTRATOR OF SPECIALTY REALMS

The coach of the team, so to speak, calls the plays from the sidelines, making sure of the team is executing their position for the benefit of the whole. Administration can coordinate team meetings being aware of the most cost-effective and crucial timing, can assemble meeting outlines, and can produce meeting minutes.

Administration arranges payroll, assembles budget allocations, and distributes profits. The administration does not tell how the job should be done it is rather the administrator’s role to delegate the work of the team. The administrator can assist in providing direction for the whole as well as the individual. Directions like goals and objectives of the organization can be initiated through the administration.

CONTRACTOR OF OUTSIDE BUSINESS PRACTITIONERS

There will be the need of many experts in business outside of the organization. The administration will be in contact with many of the experts, i.e. lawyers, accountants, real estate brokers, marketers, limited partners. Each of these professional assistance will be directed to the other parts of the organizational structure through administration.
computers might be centrally located with phone modems at individual courses and construction sites. Daily incomes, cost estimations, and designs could be passed back and forth from a central computer to distributed terminals.
The role of the financier is to find creative means to obtain the monies required in miniature golf course development. The financier will spend much time with bankers, limited partners, and money managers acquiring money. Without a financial base, miniature golf courses could not be built.
MANAGEMENT

The manager is the day-to-day face-to-face liaison among the patron and the employees and the other three collaborative niches. The role of management can be divided into five categories.

I. Customer relations
II. Employee management
III. Record keeping
IV. Maintenance
   a. preservation of theme and designer's vision
   b. retrofitting
V. Marketing
CUSTOMER RELATIONS

The patron is at all costs the bread and butter of miniature golf. The environment, the game is created to fit the demands of the patron. The paying customer is a walking billboard. When a miniature golf course is full of people, the game looks irresistible to the passers-by, especially the kids.

Many reasons exist for the customer to be greeted with a friendly hello and a warm good-bye. The customer should be satisfied and pacified. This might mean giving away many free games, free ice cream for hole-in-ones, or providing a birthday package for childhood parties. To give away one free game to a person in a party of four means that there are still three paying customers. Nothing is truly free. Children are great candidates for free games most of them cannot get to the course without their parents or a chaperon.

The manager should find the continuum that keeps the customer happy and returning again and again. This continuum needs to be passed onto the rest of the organization, particularly the designer and the administration so it can be implemented more readily and refined in future miniature golf course development.

EMPLOYEE MANAGEMENT

The sensitivities of the employees are just as delicate as the patrons. A dissatisfied employee will be quickly noted by the customer. The body language of the employees is the empathetic link to the playing environment. Consider the ritual greetings of fast food chains these are verbal connections to the visual images of logos associated with the food product. Customers hear the same greetings over and over until the sayings are as familiar as a top ten song. Or, consider the Disney production of Mickey Mouse, Goofey, or Donald Duck. The only place where these cartoon characters are out of costume is in the dressing room. The preservation of a theme is deeper in meaning than the theme itself. Employees are always "on stage" when in "uniform" at work.

RECORD KEEPING

Managers will record the daily income, weather conditions, payroll, and overhead expenses. This information is forwarded to administration for proper use.

MAINTENANCE

Imperative to the image, the patron leaves the game with, is the up-
ORGANIZATIONAL STRUCTURE

Inevitably, due to the high volumes of people passing through the golf course, there will be damage caused maliciously and wearisomely. The retrofitting and repair of such damage and design flaws will be initiated by the manager. The execution of repair should be done with the approval of the designer so that the designer’s vision is preserved. This is crucial at all levels from signs to gunite, from mulch to garbage cans. It is easy for the untrained eye to add simple interruptions to the whole, the theme, which disrupt the continuity of the environment and lower the quality of the space, the quality of play. For example, a smashed taillight on a gleaming new Porsche disrupts the streamline quality of the automobile enough that the minds-eye of the person admiring the sleek beauty of the car is suddenly drawn to the jagged glass. “There’s a flaw,” the person thinks. A fantasy momentarily disrupted.

MARKETING

Miniature, just as any product of service, is subject to the thrill of being the latest fashion. It would be the exception to find a product in the “free world” that has not had some form of marketing. Even toilet paper, which bares no beauty in its function, boasts of the “new”, the “improved”, or the “extra soft”, even vanity wipes exist.
Miniature golf organizations need to work hard at understanding the miniature golf course point of saturation, the number of return customers, and the customer decline curve after the new kid on the block has become just another friend.

After a course has been constructed, the issue in marketing is how to keep the vitality of the environment full of spark. An examination of the amusement giants like King's Island, Six Flags, Great America, Coney Island, or Disney World can give a clue to saturation points and how to maintain return customers through the rotation of new attractions.

Word of mouth is always the best form of advertisement. However, a means of keeping public exposure of the course in a community should be considered. This might mean establishing tournaments, corporation competitions, birthday party specials, or off-season rates. Or it might mean figuring out the best form of advertisement through newspaper, radio, television, flyers, or movie/golf dual purchase tickets. Each community will have its own personal reach in advertisement, therefore, what works here may not work there.

A few basic rules to keep in mind in all aspects of the management of miniature golf courses are in QUALITY, SERVICE, CLEANLINESS, and VALUE. These ideas were established by the service king of services which so many other industries mimic—Ray Kroch.

(It should be noted that the game was once before destroyed by exceeding the saturation point on a macro as well as a micro scale. The micro/regional scale seems to be the issue in today's market.)

A part of the marketing is understanding the community. The community is the constant year round customer. If there is a lack of interest in the community towards the construction of a massive rockery, then maybe that is a qualitative indication that serious education of the client, the community, is needed or else the cost of construction can not justify the community dissension. These are thoughts to consider before building.
DESIGN/CONSTRUCTION

The designer's task is to synthesize, twist, and add imaginatively to the program elements of miniature golf creating a wholistic and simple "full of life" idea which attracts the paying customer. The designer is the direct link from the rest of the organizational structure to construction. The functions of the designer are:

I. Collecting and synthesizing data/ideas
II. Developing communicable ideas
III. Managing construction
IV. Executing post occupancy evaluation, and product and related industry reconnaissance
COLLECTING AND SYNTHESIZING DATA

Information collected during site selection, business strategy meetings, and program ideation all has to be synthesized, documented and implemented.

The vast amounts of data collected by all the different parts of the organization, especially during the site selection process, should be assembled into a comprehensive package. This will allow all the parties access to site information during decision making and post evaluation times. Well educated designers are taught how to quickly organize the varying information into visually legible formats such as books with demographics, matrices, sketches, photos, and text that would equally familiarize so many disciplines coming together to make property investment decisions. Such a product could be labeled as a feasibility studies. All of this preplanning information and generated documentation is needed for familiarizing the designer with a potential site. The inventory is carried over from the site selection process to the design process.

Satisfying the desires of the rest of the organization and the patrons is crucial in the designing and budgeting of a golf course. Miniature golf course design should not be regarded as an art object, a fashion statement, on which to hang an ego. This means recognizing the pitfalls of a designer's ego. The designer will want to be able to absorb and synthesize the suggestions of others in the organization and consultants into buildable ideas.

DEVELOPING COMMUNICABLE IDEAS

The designer will have to develop and create products that communicate ideas to many people and organizations, like the planning and zoning commissions, building commission, neighborhood groups, miniature golf organization, and construction contractors. Such communication is made via many avenues: sketches, drawings, photographs, models, verbalizing, and writing. The designer should keep in mind that all ideas should be documented in a means which allows the idea to continue in the designer's absence. A classic example of such failure is with Antoni Gaudi, an architect of Barcelona, Spain. One of the world's largest cathedrals was put on hold because the concrete molds designed by Gaudi were organized and numbered in a way only Gaudi understood. The models have never been used since his death.

Each group of people may require a different form of presentation. The building commissioner and the bidding contractors will want to see construction drawings, while the planning and zoning commission and neighborhood groups will want to see contextual sketches.
of the final product. The organization structure will want to see site analysis and sketches of the ideas to be built, reassuring them of their decision to invest.

MANAGING CONSTRUCTION

The designer will be in direct contact with the construction of the plan. This begins with cost estimations. Then, construction documentation, bidding, and finally contracting. The overseeing of the construction is more than the execution of the idea. It is making change orders. Many are made due to the complexity of the designs, and the control of quality.

Quality control is essential. The role of the designer during construction is liaison between the contractors and the rest of the organizational structure. With in-house-design it is easy to cut corners and settle for less than the quality required in building the safest and best environment for the patron.

EXECUTING POST OCCUPANCY EVALUATION, AND PRODUCT AND RELATED INDUSTRY RECONNAISSANCE

Important to any designer is the return to evaluate the goods, the bads, and the indifferent of the design. The manager of a course, who sees the people playing and the maintenance requirements daily, is the best resource for recognizing design flaws. The designer should return not only to learn from mistakes but also to reassure self-pride and check to see if the theme is being continued in all elements. The designer should have much say in the outcome of retrofitting. Improper retrofitting will slowly erode the pristine continuity created by the beginning vision.

Because competition is stiff in miniature golf course design, the designer needs continually to visit and play as many courses as possible. The understanding of the game should grow and grow even in relation to the competitors and their ideas. It is a comparing of notes. If designers of different courses could interface, they could gain an understanding of mutual difficulties and successes and discuss solutions to the problems.

The materials used for miniature golf course construction can be found in many other industries. The designer should stay abreast of materials and construction methods by visiting differing related environments like zoos and amusement parks. The designer should spend time reading differing trade journals and attending seminars. The world of construction and competition is ever-changing, and the designer needs to be aware of these new practices and products through as many means as possible.
DESIGN

PROCESS
SITE SELECTION

Site selection is a means of determining the suitability of miniature golf to specific sites. The decision to search for a site is usually made in conjunction or after the acquisition of monies has been made to purchase property. The procedure to closing is:

I. Region
II. Area
III. Site Zone
IV. Site Inventory
V. Site Analysis
VI. Site Approval
VII. Site Closing
REGION

The choosing of a site is initiated by the whole of the organization. The process begins by determining a region where potential profit exists for a miniature golf course site. A region might be as large as anything below the 34th parallel in cities of populations exceeding one hundred thousand people. (Or it might be regional malls of more than five hundred thousand square feet.) Regional information is gathered quickly in population atlases.

Regional potentials are than narrowed to metropolitan cities, the area, by gathering layers of information. Layers, like population, tourist attractions, climatic conditions, age distribution, and income dispersion can be used in an overlay method to determine a feasible site zone. Most state colleges publish atlases with varying information about their state so that considering businesses can access feasibility information in a single volume. Computer mapping firms also provided an excellent source for doing quick overlays of already cataloged information. A thorough regional analysis needs to be done every five or ten years when census information is available.

The region chosen for this example is Florida. The layers used are counties, population, minimum and maximum annual temperature, tourism, and beaches. The synthesis of layers determined potential areas, is circled in the final map. The Tamp Bay/St. Petersburg area was one of the top three areas in the state. This area is continued through the site selection process for illustration.
TEMPERATURE ZONE SYNTHESIS

OVERLAY SYNTHESIS

NOTE: The handlettering here is due to the fact that the color images of the computer cannot be reproduced in black & white.
AREA

The area determined by regional overlays should be United States Geological Survey, (U.S.G.S.) maps are well suited for area scale views. 1:100,000 scale metric topographic maps show a hierarchy of information including highways, airports, waterways, and vegetation and population build-ups. 1:1000,000 scale U.S.G.S. topographic maps cover an area of about 36 by 60 miles. These maps will give an understanding of feeder roads leading to and from people magnets like airports, beaches, regional malls, and amusement parks. Appendix B is three 1:100,000 U.S.G.S. maps spliced together showing the chosen Tampa Bay/St. Petersburg area. Potential feeder roads have been highlighted.

The highlighted feeder roads when combined with information such as traffic counts, road expansion plans, and local population demographics determine a site zone. Traffic counts and road expansion plans can be provided by local planning and zoning offices. Demographics can be acquired through local chamber of commerce and state universities.

SITE ZONE

Once a site zone has been demarked by an area analysis, consultants are brought into the site selection process to provide their local expertise. Again, U.S.G.S. maps can provide a wholistic view of a site zone, (at a lesser scale than the regional maps) as well as assist in communications with the consultants about the site zone and the zone's context.

The U.S.G.S. maps used are 1:2400 scale. An increased level of detailed information at this scale gives clues to land development growths, major utility transmission lines, topographic contours, and road features. The information is greater than city and county road maps. The U.S.G.S. map information is sufficient enough to conduct coherent conversations with consultants about the zone without having visited the zone. Specific detailed information, such as school names, water tower locations, and subdivisions names are provided on U.S.G.S. maps. Appendix C is two spliced 1:2400 U.S.G.S. maps showing the Bradenton Zone highlighted on the 1:100,000 U.S.G.S. map.

The site zone, once determined, is given to a consultant, a real estate broker. The broker’s role is to narrow the zone into sites (listed properties) which fit the environment of miniature golf. Appropriately the broker’s incentive is the commission of the sale of property. It is
SITE SELECTION

very important that the broker understands the importance of the visibility of potential properties to the passers-by. The sites needed for miniature golf are those similar to fast food chains, gas stations, and flower and garden centers. Miniature golf patrons often play because of an impulse decision to stop. (The split-second visual excitement of the environment is not easy to pass.) A lack of understanding by the broker about the importance of split-second visibility can slow the process of site selection down when the wind-shield survey, conducted by a member of the organization proves to be a valuable waste of time. The broker's understanding of the game regarding playing times and activities (i.e. night lighting, waterfalls, parking, etc.) is also important. Miniature golf developers do not want to establish courses adjacent to residents who dislike the amusement atmosphere, nor do the developers want to build near strip joints or junk yards. The broker can be invaluable about the intangible understanding of city zoning and ordinance officers, political obstacles, and neighborhood culture. This information should be reaped, documented, and disseminated through the organization. As the fruition of opening burgeons, such information will be needed again for particularly, the designer and the course management as part of their briefing.

The U.S.G.S. maps are excellent tools when discussing potential properties on the phone or in person, broker to administrator, administrator to partner, or administrator to designer. The concise information can reduce confusing solo verbal descriptions of context and orientation.

The broker will provide the locations and information about listed sites to the administration. The list must evaluated further by the organization site by site. This is done through site inventory and analysis.

INVENTORY

Inventory of each and every site should be done in a standardized documented manner, as a result, all involved in the final site approval have a graphic understanding of the site and its context. (The documentation of all steps in miniature golf course development should not be restricted to inventory alone.) Inventory is a listing of as much information about each site as possible including: photos of neighboring structures, counts of traffic, delineations of zoning, conditions of the site (good and bad views), utilities available, visibility, even a brief abstract of the local history.

One method of organizing inventory is to divide the information into four categories: manmade or manufactured elements, natural elements, social-psychological-cultural elements, and qualitative or aesthetic factors. A checklist of information within each category
can assist the person doing inventory in avoiding overlooked information. The following list is a checklist foundation and should be further customized to fit the needs of the miniature golf organization. Commonly, the inventory is superimposed onto an aerial photo of the site and the site's context.

This list, and the three illustrations, in site analysis, have been lifted directly from Site, Space, and Structure, (Todd, 1985, pp. 16-19).

**Man-made or Manufactured Factors**

**Circulation**
- Existing systems within the site
- Existing systems available to and from the site
- Service access
- Orientation of the systems; was the site considered when they were installed?
- Relationships between systems
- Variable traffic numbers using the systems; can this variability be documented, or do the systems function randomly?
- Constraints against changing the existing systems to accommodate your needs
- Volume of noise generated by the systems
- Controls on the systems (traffic signals)
- Compatibility of the systems with the existing grade
- Difficulty/ease with which each system can be accessed from the others
- Level of maintenance currently practiced and needed
- Relationship of parking areas to systems
- Walking distances
- Provisions along the way to provide interest, focus

---

**SITE SELECTION**

- attention, and distract viewer from undesirable features
- Scale/relative dominance of the systems on site and on the approach to the site
- Visual relationship of approaches to site

**Utilities**
- On-and off-site locations of critical utilities
- Distance to hookups
- Visual intrusion by utilities
- Specific site problems caused by utilities, such as soil burnout from steam tunnels
- Accessibility of utilities for repairs

**Zoning Requirements**
- Zone of site and surrounding areas: will the two, if different, be compatible?
- Easements that may affect building location/ dimensions
- Setbacks; height and materials requirements or limitations

**Structures and Paving**
- Present structures on and off site and their probable effect on the site's functional and visual quality
- Blockage of views or solar access by adjacent structures
- Climatic effects of surrounding structures and manufactured surfacing
- Visual intrusion on site by surrounding structures, either because of their appearance or because of a view they have into the site
- Degree of maintenance provided to and required by existing materials
SITE SELECTION

Pollutants

Visual and olfactory pollutants present
Sources of pollutants and possibility of doing something about them
Daily or seasonal variability

Natural Factors

Sun and Shade

Quality and quantity reaching site
Direction
Effects of surrounding structures on sun and shade
Density of shadows cast
Changes in appearance, feeling, and function of site depending on time of day or night
Glare problems
How sun and shade will affect the functioning of the circulation systems

Wind

Microclimatic effects of wind: tunnels, dead spots, eddies
Seasonal changes of wind
Odors or trash and debris carried by wind
Blockage and direction changes caused by adjacent site conditions
Wind erosion signs
Possible structural or functional problems caused by wind, such as difficult-to-handle entry doors

Temperature

Hot or cold spots created by the interactions of other climatic factors
Variations in temperature from area to area

Water and Precipitation

Effects of surrounding conditions on precipitation:
blocking it, changing its direction or intensity,
creating dry areas
Snow and ice buildup areas
Fog patches
Ground water visible on the site, in the form of low spots or actual bodies of water
Subsurface drainage conditions, including surface areas
that water flows over and eroded or poorly drained areas
Existence of man-made features to handle runoff
Problems from adjacent sites adding to water conditions on site
Quality of water
Maintenance problems associated with water conditions on site

Vegetation

Type, amount, and quality of existing vegetation
Vegetation on surrounding sites and its effect on
the proposed project
State of maturity of plantings
Variety of plantings
Design characteristics and their suitability to the proposed project
Degree of maintenance needed and given for plants
Effects of vegetation on climate
Effects on visual appearance and feeling of the site
Seasonal change
Sensual appeal - smell, touch, sight, sound
Possibility of relocating vegetation to other parts of the site
SITE SELECTION

Scale and Aesthetic Appearance

Wildlife potential or problems associated with plantings
Potential for plants to damage structures or paved areas - root intrusion, dropping branches

Wildlife

Evidence of beneficial or harmful wildlife
Possible site conditions that would attract wildlife

Soils

Suitability for structural support, supporting plant materials
Type and condition: clay, sand, loam; heavy or light, compacted or porous
Changes in soil type across the site
Acidity or alkalinity
Topsoil present on site

Topography

Steepness or flatness
Uniformity
Relationship to surrounding grades
Existing elements whose grade cannot be changed - places where new grading must meet existing features
Erosion
Orientation of slopes

Social/Psychological/Cultural Factors

Attitude toward Environment (evident from the degree of development and maintenance of site and area)
Social Influences

Accepted way of designing and caring for a site in the area
Traditions

Sociability of Site and Surroundings

Openness or private feeling

Sensory Perception

The feeling of the site: inviting, forbidding, open, intimate
How the feeling changes with time of day and seasons
Effects of the surrounding elements on perceptions
Feelings of anticipation or foreboding generated on the visual and physical approaches
Effects of color on perceptions

Scale

Scale of the site in relation to its surroundings
Scale of site features in relation to the site itself
Places where the site could “borrow” from other areas to increase or decrease scale
Dominance of spaces or human beings

Balance

Dynamic or static balance within the site
Balance of elements on site
Balance of the site with surroundings

Quality and Aesthetic Factors

Views and Vistas

To the site and from the site, from all different angles of approach
Changes caused by sun and shade changes or by climatic conditions
Predominant site features toward which a good view or vista could be oriented
Need for buffering or screening views
Degree to which views are sequential
Changes in view and vista that take place with mode of transportation used
Level at which best views are attained: eye level, ground level, or higher?
Backdrop and foreground for the site

Form and Shape

Form taken by the open and enclosed spaces on the site and around it
Individual forms of interest that could be used as design features
Relationships between forms
Repetition or variation in forms

SITE SELECTION

The designer will continue to use the analysis during the design process by incorporating the problems and potentials of the site into schemes. Therefore, it is suggested that the designer generates the site analysis presentation package. Three methods of synthesizing the inventory into an analysis are shown below.

SITE ANALYSIS

Site analysis is the synthesis of the inventory. The analysis of each potential site in the site zone will show the problems, potentials, and indifferences to the people in the organization who are less familiarized or are unable to visit the site. Investment decision makers can use the analysis as a visual means of discussing site conditions before the final investment is made. Property documented site analysis can provide the organization with an avenue of equal understanding.
SITE APPROVAL

The information synthesized in the site analysis will be the means for which the site is made. Site approval is a decision that should be made collectively as a whole by representatives of each of the organizational realms.

SITE CLOSING

Site closing opens the door to the designing process of the site.
DESIGN PROCESS

The planning of a site, whether it is for a backyard patio or an entire community, goes through a step-by-step process of evolution, an evolution that documents the thought process of the designer. An evolution that allows the client, in the case of miniature golf, the organizational structure, to understand graphically the growth of the organization's and the designer's ideas to the adaptation of the site.

The designing process is:

I. Site Inventory and Analysis (carried into the design process from the site selection.)
II. Ideation
III. Analysis
IV. Conceptualization
V. Conceptual schematics
VI. Compromising
VII. Master plan
VIII. MASTER PLAN APPROVAL
IX. Cost estimating
X. Construction Documentation
XI. Scheduling
XII. Bidding and Negotiation
XIII. Contracting
XIV. Construction Management
IDEATION

The ideation is the foundation to all subsequent decisions affecting the planning of the site. Listing programming elements, creating themes, establishing the initial construction budget, and incorporating any immediate miscellaneous concerns are all part of ideation. Input by the entire organization is a must during this point of a design. The organizational input will assist in expanding and focusing creativity, bring new blood to the game and the environment, by direct personal input of those outside the designing realm. This is a brainstorming session intended to create several different ideas and themes about a site in the shortest period of time. The success of a design is based upon the continual reference to the program by the designer. A lack of "wild" and "free" ideation can lead to a weak design later. All parameters should be eliminated at this point in the design process.

One programming method applied to thematics is listing ideas. In this brainstorm, 20,000 Leagues Under The Sea was chosen to develop. The chosen theme is then expanded by listing elements related to the theme. (This might be the best point to review literature and cinema relating to the theme. The children's book versions of a theme could help in keeping ideas simple.) The thematic elements should be kept as tangible as possible, in order to simplify the theme's development. Thematic music would be only one of the exceptions to this rule. Below the themes, site programming elements were listed too. These are elements that were introduced in the designing elements.

BRAINSTORMING:

THEMES:

- Pirates
- STAR WARS
- DR. SEUSS
- CONQUISTADORS
- 20,000 LEAGUES
- GARFIELD
- SWISS FAMILY ROBINSON
THEME ELEMENTS:

20,000 LEAGUES:
- CAPTAIN NEMO
- NAUTILUS
- ATLANTIS
- ORGAN
- ROUND PORT HOLES
- DIVING SUIT
- UNDERWATER MEN
- NETS & GLASS BALLS
- NAUTICAL COMPASS
- BRASS
- CAPTAIN'S WHEEL
- DOCK
- FLAG WITH ~ N
- UNDERWATER GRAVE

PLAY PROGRAMMING ELEMENTS:

CADDY SHACK
WATER/POD
CAVES
CONCESSIONS
HILL

FUNCTIONAL ANALYSIS

Functional analyses are the separation of the whole into many smaller parts then regrouping them into direct and indirect relationships. A common mistake of designers is to become bogged down by details too soon or to be trapped by one idea without considering the whole. Details too early in the design process can become a designer's cyclical nightmare, an "analysis to paralysis." Functional analyses can help prevent over analyzing.

Functional analyses are the first formal applications of the existing site conditions to the desired elements of ideation. The analysis of functional relationships between site and program can be applied to many things such as visibility of the site to passers-by and accessibility of the patrons to the "play area" from parking. The relations established during the analysis aid the designer in focusing the initial mental images flashed during ideation. This is done by comparing "parts" to "parts" and "parts" to the "whole." The conclusions are made by quick responses. The purpose of these functional exercises is to assist the designer in organizing the thought process into an accountable systematic way of communicating ideas to the rest of the organization.
Many methods exist for making functional comparisons. The example below illustrates matrices and bubble/line methods:

**Matrix One:** Compares the thematic elements to thematic elements. This matrix indicated that the Nautilus has a relationship to all of the other thematic elements. For this reason the Nautilus should become its own site program element.

**Matrix Two:** Compares the site program elements to the site program elements, lighting appeared as a constant in all aspects of programming. (Not a great revelation.)
MATRIX THREE: Compares the thematic elements to the site program elements. Again, lighting showed itself as a constant connector, while the Nautilus emerged as having a direct relationship to all of the thematic elements. The dominance of the Nautilus brought a need to split its functions.

MATRIX FOUR: Is the division of the Nautilus into separate roles where the caddy shack is the bridge of the ship, the concession area is the gally of the ship, and the Nautilus is an underwater view of the pond.
The matrices brought to light the need for a stern hefty bearded "Captain Nemo" to act the role and be the course manager. The ship's mates need to have identifiable "striped" clothing, and parrots in the gally and the bridge would add to the color of the environment. The matrices also showed that the caves would be where Atlantis is, located the lighting would be a course connector, and the Nautilus would provide an underwater view to the pond.

Bubble/line diagrams are the next step in functional analysis. This exercise creates a linked relationship between the site programming elements. It might take several attempts, but the final product should have all the elements connected by lines that do not cross. The direct and indirect relationships established by the matrices should be the same, or close to them, in bubble/line diagramming. Once the functional analyses have been completed, it is time to apply the information to the site in conceptualization.

It should be noted that the steps ideation and functional analysis can be performed without the existence of a site. The brainstormed ideas can be shelled until the time of site application. The importance of these two steps is collaboration of the organization in expanding creativity and maintaining a mutual understanding of miniature golf course design development. The final plan should not come as a shock if the design process is communicated properly.
CONCEPTUALIZATION

Conceptualization is the amorphous application of the program elements to the site. This is usually done loosely through bubble diagrams. Conceptualization allows the designer the greatest opportunity to creatively conceive as many viable alternatives to the site as possible without being stifled by details. The conceptual solutions should respond to the site conditions determined in the analysis. The designer should be encouraged to develop at least three alternatives. Three are shown below:
CONCEPTUAL SCHEMATICS

Conceptual schematics is the refinement of at least three concepts into a level of detail that integrates dimensions of the program elements. This is a level at which the "loose" bubbles can be developed into measurable dimensions. The site survey or plot plan is incorporated into the process during this step. The layout of the caddy shack, hole configuration, parking lot, lighting, and concessions, to name a few, can be worked out. At this point perspective "thumb nail" sketches can be integral to gain a three dimensional understanding of the schemes from important vantage points like the road. Three alternatives are needed again.
COMPROMISING

Compromising is the synthesis of the best features from the alternative solutions. There is a great deal of subjectivity involved in this decision. The designer's intuition is prevalent drawing upon past designing experiences. Often, compromises are based upon cost. Input of others in the organization can help refine potential problems of a design when compromising.
MASTER PLAN

The master plan is the "hard lined" refinement of the compromise, the guide to construction documentation. Specific details of materials, colors, and patterns are worked out. The precise delineation of property lines and easements are shown. The master plan is used to sell the new idea of the site to the public and the planning and zoning commission, especially if a zoning variance is needed. Accurate perspective drawings and scale models are usually a part of master planning for those serious about their commitment to the project. Perspective drawings and models are tools that help clarify the three dimensionality of a miniature golf course. They assist in answering vaguely understood ideas presented in the "bird's eye" view master plan. The highest degree of refinement is used in creating the master plan so that the door opens to construction documentation.

MASTER PLAN APPROVAL

Master plan approval is a step in the process where the team reforms to discuss the results of their programming and decide whether or not to appropriate the monies for the construction phase. Master plan approval is also a stopping point where the idea can be put on the shelf until the timing to build is correct. If it should be needed, the master plan is also a document that can be used to guide consultants like, landscape architects, architects, surveyors, or engineers in preparing construction documents. These experts can work out the details of local building code requirements and also remove a great deal of product liability from the proponents of the miniature golf course organization. Construction documentation is the most expensive step in the designing process before construction begins.
CONSTRUCTION DOCUMENTATION

Once the master plan has been approved by the organization the project is ready to go into the construction documentation phase of the design process. The rigidity of construction documentation cannot be emphasized enough. The product of this phase acts as the foundation to cost estimating, the guide to construction, and the reference in the event of design flaw litigation. Volumes of formats and forms are produced by professional design and construction organizations of construction documents. For this report it seemed appropriate to include verbatim the most concise briefing of construction documentation at the time of writing. One should keep in mind that construction documentation preparation is a specialty in itself.

The following has been lifted from Landscape Architecture Construction, (Landphair-Klatt, 1979, appendix):

CONTRACT DOCUMENTS AND SPECIFICATIONS

The final step in completing the work on a project is the preparation of the contract document package. While this is customarily the last thing to be accomplished on a project it is by no means the least important. In fact, a good set of construction documents will do much to guarantee the success of a job.

With the exception of the working drawings, the package of materials that makes up the contract documents is usually bound together in a single volume. This volume is referred to by many as the specifications or "specs". This term is misleading, however, since the specifications are only one part of the package. For this reason some have proposed that this document be referred to as the "project manual".

THE PROJECT MANUAL

While our primary concern in this brief discussion is the development of the technical specifications, it is helpful to briefly look at the other contract documents and how they relate to get the technical specifications. The materials that constitute a full set of contract documents can be grouped into five separate categories.

The Bidding Documents

Legal advertisements or invitation to bid
Instructions to bidders
Bid forms
Bid bond forms

Contract Forms

The agreement
Bond and insurance forms
CONSTRUCTION DOCUMENTATION

Contract Conditions

General conditions
Supplementary conditions

The Technical Specifications

Working Drawings

All of the materials together constitute a complete set of contract documents. By definition all of these documents are mutually supportive and no single document takes precedence. Notice that in this list of materials the working drawings are included. Sometimes it’s easy to forget that the working drawings are in fact a part of the contract documents.

Bidding Documents

Depending on the office or agency the first pages in a manual will be the bidding documents. The legal advertisement, or bid invitation, is a brief description of the work and describes how copies of the contract documents can be obtained for submitting a bid.

The instructions to bidders is a more detailed description of what is required for a bid submission. Some of the topics common to most instructions to bidders are how the contract will be awarded, when and where bids will be opened, site visit requirements, bid security requirements, methods for submitting material substitutions and modification of proposals and the owners right of acceptance or rejection. The amount of detail in this section depends a great deal on the client and the scope of the project. Government contracts typically require more detail than work in the private sector.

The bid forms are tailored to each job. They may require a simple lump sum bid for the job or they may require detailed unit price bids for various parts of the project. In addition, to the dollar figures the bid form will also require information about the time of execution and pledge to execute the agreement if offered.

For many contracts a bid bond is required as a part of the bid submission. This is usually in the form of a surety certificate or check in the amount of some specified percentage of the bid price. Bid bond forms are usually prepared and included as a part of the bidding documents.

Contract Forms

The contract forms are placed behind the bidding documents or, sometimes, in the last section of the project manual. The first form is the agreement. This is the actual contract which is the legal basis for the work.
In addition to the actual agreement form several bonds and proof of insurance may be required as a part of the contract. The kinds of bonds and insurance forms depend once again on the scope and complexity of the project.

Two bonds frequently required are the performance bond and the materials and labor bond. The performance bond is to insure that the contractor will faithfully perform the work required in the contract in accordance with the plans and specifications. Should the contractor fail to live up to the terms of the agreement the bonding agent is held responsible for completion of the work. The materials and labor bond is to insure that the contractor will pay for all the materials and labor incorporated in the project. This protects the owner from any claims that might be filed against the project as a result of nonpayment by the contractor.

**Contract Conditions**

The next section in the project manual is usually the contract conditions section. The contract conditions set the legal ground rules that will govern the execution of the work. Most offices and agencies utilize a standard form general conditions that is tailored to their type of practice. The AIA, ASLA, CSI, and AGC publish a standard form general conditions that can be purchased from each organization at a nominal cost. There are twelve articles that are common to most forms of general conditions listed below.

- Definition and status of the contract documents;
- Administrative function of the landscape architect;
- Rights and responsibilities of the owner;
- Rights and responsibilities of the contractor;
- Subcontracting procedures;
- Arbitration of disputes;
- Insurance, performance, and payment bonds;
- Contract time, delays, and extension of time;
- Payments;
- Changes to the scope of work;
- Inspection and correction of work;
- Termination of the contract.

These articles are not necessarily found in all forms of general conditions, but it serves to illustrate the nature of the conditions section. All designers should be familiar with the provisions of the general conditions that will be used in their particular situation because this section spells out the administrative procedures to be followed during construction.

Some projects are of such a nature that a standard form general conditions section will not satisfy all of the project requirements. This is frequently encountered on projects that are being partially financed by the federal government. In these situations it is customary to provide a second section called supplementary conditions. Typically this section will include articles that prohibit discrimination in employment, descriptions of material sources, and
CONSTRUCTION DOCUMENTATION

required wage and hour schedules. In other cases the supplementary conditions may set requirements for on-site sanitation, furnishing of utilities such as power and water, provision of on-site security and other matters of a non-technical nature. While this information will appear in the supplementary conditions, the trend today seems to be toward putting it in the scope statement of each section in the technical specification as well.

TECHNICAL SPECIFICATIONS

The specifications provide information that concerns the type and quality of building materials, equipment, fixtures, and furniture that are to be incorporated into a project. The format of technical specifications for many years was a function of professional preference. However, the wide variation in form and language can result in costly errors and bitter lawsuits. Recognizing these wide variations in construction specifying the Construction Specifications Institute (CSI) and the American Institute of Architects (AIA) initiated a study aimed at developing an industry-wide standard specifications that have become generally known as "the uniform system".

Shortly after its publication the uniform system was adopted by all the major organizations involved in the building industry, including ASLA. The transition to the uniform system format has been slow, but it appears that it is fast becoming the industry standard. The format of the uniform system and the development of the technical specifications is the subject of our discussion for the remainder of this section.

THE UNIFORM SYSTEM

The full title of the document known as the uniform system is The Uniform System for Construction Specifications, Data Filing and Cost Accounting. As we mentioned, this system was developed in response to the need for a more efficient data handling system. The first move toward the development of the Uniform System was generated when the AIA invited the Construction Specifications Institute to join with them in an effort to develop a standardized data-filing system for building products. This effort resulted in the concept of a filing system based on specifications practice. This idea led directly to the expansion of the concept to include a specification outline and a system for cost accounting.

All three systems are based on the specifications outline which organizes all information into sixteen groups designated as divisions. Each of the sixteen divisions is based on the close associations that exist between construction timing, trade, functional requirement, and materials.
The Specification Outline

The specification outline is developed around two principles. First, that the sixteen divisions are constant. They are broad and describe the relationships between units of work. For example division 2 is site work. Units of work under this division are such things as clearing, earth work, drainage, etc. The units of work are referred to as sections. The sections will vary according to the job, but they should always occur under the proper division.

Work units that are common to most projects, like earth work, are called broad scope sections. These titles could always be the same and follow in the order of the outline. It is also recommended that broad scope sections be typed in capital letters. Narrow scope sections are those work units that are less typical on a job such as dewatering. These titles are typed with initial capitals and lower case letters. In some cases narrow scope sections can take precedence over a broad scope section. For instance, site grading is frequently used as a broad scope section rather than making it subordinate to earthwork.

The sixteen divisions of the uniform system and the broad scope sections for each division are shown in Figure A-1. You will notice that some of the divisions and many of the sections do not have wide application to landscape construction. Under the uniform system this poses no problem. If a division or section does not apply to a job it is simply omitted from the specifications. However, division titles and the order of the sections will not change. For example, if a project involved only site work, carpentry, and some painting the technical specifications outline would be General Requirements - Division 1, Site Work - Division 2, Carpentry - Division 6, and Finishes - Division 9. Under each of the appropriate divisions the pertinent broad scope and narrow scope sections would be included in order as they appear in the outline.

The advantages of having a widely accepted standard outline for technical specifications are numerous. The chance for errors or misunderstandings between the designers and contractors is minimized because each one is more familiar with the system. The time for writing is reduced and the system lends itself to computer adaptation and the use of automated typing equipment.

Writing Technical Specifications

The technical specifications for a project are seldom written from scratch. Most agencies and offices have extensive collections of project specifications from previous work. In addition to these materials there are several reference manuals that provide detailed specifications for almost any imaginable project. Some of the more
useful references for landscape architects are publications by
ASLA, CSI, AIA, and the American Association of Nurserymen (AAN).

Regardless of the manual that is selected as a specification guide
it is usually necessary to modify the specification to fit the job at
hand. This is very important. Many of the costly errors made in
construction specifying are the result of poor editing rather than an
actual error or omission in the writing. What follows is a suggested
procedure that can be used as a guide to specification writing.

Collect the materials that will be required to write the specifications.
A typical list would include:

1. A set of working drawings;
2. Catalogs and manufacturers's literature;
3. A specification outline, old specifications or an appropriate
   specification guide;
4. A materials takeoff (if this is not already available it should be done
   as a preparation to writing);
5. A list of site conditions, restrictions, permit requirements or other
   information that might effect the work flow;
6. A list of available construction materials, local suppliers, and sales
   representatives.
CONSTRUCTION DOCUMENTATION

DIVISION 1 - GENERAL REQUIREMENTS

01010 SUMMARY OF WORK
01100 ALTERNATIVES
01150 MEASUREMENT & PAYMENT
01200 PROJECT MEETINGS
01300 SUBMITTALS
01400 QUALITY CONTROL
01500 TEMPORARY FACILITIES & CONTROLS
01600 MATERIAL & EQUIPMENT
01700 PROJECT CLOSEOUT

DIVISION 2 - SITE WORK

02010 SUBSURFACE EXPLORATION
02100 CLEARING
02110 DEMOLITION
02200 EARTHWORK
02250 SOIL TREATMENT
02300 PILE FOUNDATIONS
02350 CAISSONS
02400 SHORING
02500 SITE DRAINAGE
02550 SITE UTILITIES
02600 PAVING & SURFACING
02700 SITE IMPROVEMENTS
02800 LANDSCAPING
02850 RAILROAD WORK
02900 MARINE WORK
02950 TUNNELING

DIVISION 3 - CONCRETE

03100 CONCRETE FORMWORK
03150 FORMS
03200 CONCRETE REINFORCEMENT
03250 CONCRETE ACCESSORIES
03300 CAST-IN-PLACE CONCRETE
03350 SPECIALLY FINISHED (ARCHITECTURAL) CONCRETE
03360 SPECIALLY PLACED CONCRETE
03400 PRECAST CONCRETE
03500 CEMENTITIOUS DECKS
03600 GROUT

DIVISION 4 - MASONRY

04100 MORTAR
04150 MASONRY ACCESSORIES
04200 UNIT MASONRY
04400 STONE
04500 MASONRY RESTORATION & CLEANING
04550 REFRACTORIES

DIVISION 5 - METALS

05100 STRUCTURAL METAL FRAMING
05200 METAL JOISTS
05300 METAL DECKING
05400 LIGHTGAGE METAL FRAMING
05500 METAL FABRICATIONS
05700 ORNAMENTAL METAL
05800 EXPANSION CONTROL
CONSTRUCTION DOCUMENTATION

DIVISION 6 - WOOD & PLASTICS
06100 ROUGH CARPENTRY
06130 HEAVY TIMBER CONSTRUCTION
06150 TRESTLES
06170 PREFABRICATED STRUCTURAL WOOD
06200 FINISH CARPENTRY
06300 WOOD TREATMENT
06400 ARCHITECTURAL WOODWORK
06500 PREFABRICATED STRUCTURAL PLASTICS
06600 PLASTIC FABRICATIONS

DIVISION 7 - THERMAL & MOISTURE PROTECTION
07150 DAMPROOFING
07200 INSULATION
07220 INSULATION
07300 SHINGLES & ROOFING TILES
07400 PREFORMED ROOFING & SIDING
07500 MEMBRANE ROOFING
07570 TRAFFIC TYPING
07600 FLASHING & SHEET METAL
07800 ROOF ACCESSORIES
07900 SEALANTS

DIVISION 8 - DOORS AND WINDOWS
08100 METAL DOORS & FRAMES
08200 WOOD & PLASTIC DOORS
08300 SPECIAL DOORS
08400 ENTRANCES & STOREFRONTS
08500 METAL WINDOWS
08600 WOOD & PLASTIC WINDOWS
08650 SPECIAL WINDOWS
08700 HARDWARE & SPECIALTIES
08800 GLAZING
08900 WINDOW WALLS/CURTAIN WALLS

DIVISION 9 - FINISHES
09100 LATH & PLASTER
09250 GYPSUM WALLBOARD
09300 TILE
09400 TERRAZZO
09500 ACOUSTICAL TREATMENT
09540 CEILING SUSPENSION SYSTEMS
09550 WOOD FLOORING
09650 RESILIENT FLOORING
09680 CARPETING
09700 SPECIAL FLOORING
09760 FLOOR TREATMENT
09800 SPECIAL COATINGS
09900 PAINTING
09950 WALL COVERING

DIVISION 10 - SPECIALTIES
10100 CHALKBOARDS & TACKBOARDS
10105 COMPARTMENTS & CUBICLES
10200 LOUVERS & VENTS
10240 GRILLES & SCREENS
10260 WALL & CORNER GUARDS
10270 ACCESS FLOORING
10280 SPECIALTY MODULES
10290 PEST CONTROL
10300 FIREPLACES
10350 FLAGPOLES
10400 IDENTIFYING DEVICES
10450 PEDESTRIAN CONTROL
10500 LOCKERS
10530 PROTECTIVE COVERS
10550 POSTAL SPECIALTIES
10600 PARTITIONS
10650 SCALES
10670 STORAGE SHELVING
10700 SUNCONTROL DEVICES (EXTERIOR)
10750 TELEPHONE ENCLOSURES
10800 TOILET & BATH ACCESSORIES
10900 WARDROBE SPECIALTIES
CONSTRUCTION DOCUMENTATION

DIVISION 11 - EQUIPMENT

11050  BUILT-IN MAINTENANCE EQUIPMENT
11100  BANK & VAULT EQUIPMENT
11150  COMMERCIAL EQUIPMENT
11170  CHECKROOM EQUIPMENT
11180  DARKROOM EQUIPMENT
11200  ECCLESIASTICAL EQUIPMENT
11300  EDUCATIONAL EQUIPMENT
11400  FOOD SERVICE EQUIPMENT
11480  VENDING EQUIPMENT
11500  ATHLETIC EQUIPMENT
11550  INDUSTRIAL EQUIPMENT
11600  LABORATORY EQUIPMENT
11630  LAUNDRY EQUIPMENT
11650  LIBRARY EQUIPMENT
11700  MEDICAL EQUIPMENT
11800  MORTUARY EQUIPMENT
11830  MUSICAL EQUIPMENT
11850  PARKING EQUIPMENT
11860  WASTE HANDLING EQUIPMENT
11870  LOADING DOCK
11880  DETENTION EQUIPMENT
11900  RESIDENTIAL EQUIPMENT
11970  THEATER & STAGE EQUIPMENT
11990  REGISTRATION EQUIPMENT

DIVISION 12 - FURNISHINGS

12100  ARTWORK
12300  CABINETS & STORAGE
12500  WINDOW TREATMENT
12550  FABRICS
12600  FURNITURE
12670  RUGS & MATS
12700  SEATING
12800  FURNISHING ACCESSORIES

DIVISION 13- SPECIAL CONSTRUCTION

13010  AIR SUPPORTED STRUCTURES
13050  INTEGRATED ASSEMBLIES
13100  AUDIOMETRIC ROOM
13250  CLEAN ROOM
13350  HYPERBARIC ROOM
13400  INCINERATORS
13440  INSTRUMENTATION
13500  INTEGRATED CEILING
13540  NUCLEAR REACTORS
13550  OBSERVATORY
13600  PREFABRICATED STRUCTURES
13700  SPECIAL PURPOSE ROOMS & BUILDINGS
13750  RADIATION PROTECTION
13770  SOUND & VIBRATION CONTROL
13800  VAULTS
13850  SWIMMING POOLS

DIVISION 14 - CONVEYING SYSTEMS

14100  DUMBWAITERS
14200  ELEVATORS
14300  HOISTS & CRANES
14400  LIFTS
14500  MATERIAL HANDLING SYSTEMS
14570  TURNTABLES
14600  MOVING STAIRS & WALKS
14700  TUBE SYSTEMS
14800  POWER SCAFFOLDING
DIVISION 15 - MECHANICAL

15010 GENERAL PROVISIONS
15050 BASIC MATERIALS & METHODS
15180 INSULATION
15200 WATER SUPPLY & TREATMENT
15300 WASTE WATER DISPOSAL & TREATMENT
15400 PLUMBING
15500 FIRE PROTECTION
15600 POWER OR HEAT GENERATION
15650 REFRIGERATION
15700 LIQUID HEAT TRANSFER
15800 AIR DISTRIBUTION
15900 CONTROLS & INSTRUMENTATION

DIVISION 16 - ELECTRICAL

16010 GENERAL PROVISIONS
16100 BASIC MATERIALS & METHODS
16200 POWER GENERATION
16300 POWER TRANSMISSION
16400 SERVICE & DISTRIBUTION
16500 LIGHTING
16600 SPECIAL SYSTEMS
16700 COMMUNICATIONS
16850 HEATING & COOLING
16900 CONTROLS & INSTRUMENTATION

CONSTRUCTION DOCUMENTATION

Make a careful review of the working drawings, noting dimensions, material specifications that may appear on the plans. The preparation of a materials list is an excellent vehicle for this review. Visit the site with the working drawings if possible. Be alert for anything that might affect the work adversely.

Subdivide the work to be specified into the required number of divisions according to the uniform system. Then prepare an outline of the appropriate sections for each division.

Prepare a paste-up draft of each division and check each division against the working drawings. Be alert for any disagreement between the plans and specifications. Double check all dimensions and size references. Have the draft typed, and if possible get another person to review to work.
Final notes about the design process. A general guideline as to the amount of time spent in designing which had been outlined by the AIA is:

<table>
<thead>
<tr>
<th>Schematic Design Phase</th>
<th>15%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Development Phase</td>
<td>20%</td>
</tr>
<tr>
<td>Construction Documents Phase</td>
<td>40%</td>
</tr>
<tr>
<td>Bidding and Negotiations Phase</td>
<td>5%</td>
</tr>
<tr>
<td>Construction Phase</td>
<td>20%</td>
</tr>
</tbody>
</table>

**TOTAL** 100

Inevitably, the construction phase, under which construction observation falls, takes much more than twenty percent of the time recommended by the AIA. This is due in part to a lack of needed detailed information in the working drawings for the contractor to build. Or, the contractor needs much time in clarifying construction methods. For miniature golf course development, both would seem to hold true because of the complexity of the delicate environment.

Cost estimating by architects is, in general, poorly done. This is due, in part, to a lacking knowledge of construction methods. Cost and means construction manuals offer the best resource for estimating regional labor and material for jobs. Many architects estimate from these guides. But, it is the contractor who is best suited at cost estimating, provided the plans are detailed properly. Contractors day after day survive on accurate cost estimates.

A suggested way of cost estimating for the organization is to open the job for bid to licensed competent contractors. One should attempt to get seven bids, then throw the lowest two out, average the remaining, and add thirty percent. This may seem like an elevated method of cost estimating; but it is not when a job is completed at or just below the original estimate. Large margins of error are well suited to the complexity of miniature golf course development.

The applications of computers to the designing professions is ever-growing. Cost estimating, designing, specification writing, and word processing are a few of the programs tailored for designers.

The cost estimating programs allow many "what if" scenarios to be processed in a brief time period. Designing programs allow "cells" of information to be carried from one design to another or provide accurate estimations of cut-and-fill needed in land formation. Specification writing programs provide a fill-in-the-blank guide that has been prepared by professional specification writers. Word processing lessens correspondence preparation time.

The design process when followed systematically eases pressure form the designer, especially if it is a design/build situation. The design process also allows all in the organization an avenue of equal understanding in miniature golf course development.
POST OCCUPANCY EVALUATION

Emphasizing the importance of post-occupancy evaluation cannot be stressed enough. Yet, this is the most commonly overlooked step in any designing profession. Post occupancy evaluation is like maintaining a rapport with old friends. Friends often put a perspective about the growth of situations because they are slightly removed.

Post-occupancy evaluation is a time to discover mistakes. So they can be refined in future designs. It is a time of constructive criticisms of the whole of the organization. It is encouraged that post-occupancy is done as a group effort so all the specialties of the miniature golf course organization can work together as a team strengthening ideas and profits.
CONCLUSION/FUTURE

Not in my wildest dreams did I envision a book with such length. Still, I feel that there are more additions needed for this basic understanding of miniature golf to complete. I would have liked to discuss at greater lengths the conceptual nature of the environment and brought a higher level of detail into the design process. I have gained a great deal from the processes outlined in this thesis. I hope it proves to be valuable to the Contour Golf Organization.

As to the future, **SHOPPING MALLS**, these will be the place to build next. The flow of people is perfect for the game. And, Shopping Malls would break the restricted seasonal/regional profit barrier.
APPENDIX
THESIS PROPOSAL

The start of this creative project began by convincing the Ball State Landscape Architecture Department of the potential of miniature golf. (Putt-Putt it ain’t no more.) A brief discussion of the game’s history seemed to be a viable means of swaying the Landscape Department into a level of support and enthusiasm.

The proceeding is a copy of the original proposal that opened the door to this book. Not clear as to the true outcome of the project, most of these original goals and objectives never came to fruition. The original proposal is presented for evidence of this undergraduate thesis creative project’s growth.

Terminal Project Proposal: Adventure Golf,
a new approach to an old family game.

Prepared by:

Philip Yo Vis
a Ball State Landscape Architecture Student.

For:

Frank Hall
David MacKey
Ronald Spancier
George Young
the Project Advising Committee.

Date: 12 December 1987
INTRODUCTION:

People, for the most part, are hard working animals directing vast amounts of energy into expanding the body of leisure time. The catalyst for such expansion might be attributed to man's observation that we have a concept of time, unlike "leaser" animals and plants. Thus, man has made time relative weighing it on scales against how long our heart pumps... seconds per beat, beats per minute, minutes per hour, hours per day, days per week, weeks per month, months per year, years to death. Life, birth to death, for a human, compared to the life of the earth or the universe is micro-fractional. This seems to be a big thought but in reality it is a simple premise as to why man is continually seduced into expanding leisure time. Relatively, life seems too short. And, as short as life is, man wants life with the fullest of pleasures.

Contemporary people have vented burgeoning free time in a multitude of directions often rooted in social, economic, and cultural upbringing. Roller skating, polo, tennis, sailing, kick-the-can, croquet, or breakdancing all bring differing pictures of diverse cultures and subcultures. No matter our status, these "escapes" are generated to ease our minds from the pressures of our repetitive, work-oriented lifestyles. One of these free-time events is miniature golf.

Miniature golf began in the late twenties as a fad that swept the nation overnight, in part, as a reaction to championship golf. The intent was to create a game that the wives of the then exclusively male sport could play as a related substitute. (Appropriately, a woman designed one of the first successful courses.) Even through the Great Depression, the sport prospered rivalling even the talking pictures. Mini golf courses took varied shapes and forms with names like Tom Thumb, Widget, and Putt-Putt golf. There were patented courses, franchised courses, roof-top courses, indoor courses, and fashion fairways. Land could not even confine the craze because soon ocean vessels put putt-putt on deck. The game catered to the rich as easily as the poor. The popularity grew such that a magazine, Miniature Golf Management, emerged as the industry's authority on business advice and course design. About 30,000 putt-putt courses existed in the United States during the Depression, and profits became so lucrative that owners began to talk about taking the sport to all countries of the world. An outdoor game that could be played by all the family, miniature golf soon had tournaments and even courses that could be played twenty-four hours a day. Many people saw the sport as a therapeutic escape from the Depression, while others saw the courses as a way to eliminate vacant city lots; yet others began to see them as breeding grounds for delinquents.

Rumors began to circulate about mob connections which soon
brought about connotations of bar rooms and pool halls. This explosion of the Depression was beginning to fizzle out like any fad. But, uniquely, this fad did not die. Instead, it became an American past-time.

Miniature golf had a second upsurge in the fifties predominantly due to invention. Whimsical objects like windmills, barrels, and storybook characters began to embellish the courses. These fabled objects were plays to bring in passers-by to a leisure game that had taken to the road. The American post-war, automobile-oriented society prompted an array of industries which utilized the family and those who spent hours in the car, miniature golf, fast food chains, and hotels to name a few. Many people are not aware that miniature golf was one of the premier fifties businesses to franchise the roadside world. McDonald’s and Holiday Inn were two others.

The storybook gardens of miniature golf continued popping up all over the country in the late fifties and early sixties. And, as time passed, the public slowly demanded better and better courses, or else the course proprietors were using more obtrusive and obnoxious objects to draw people into play. Soon there were megalithic Paul Bunyons and Babe the Blue oxes, dinosaurs, pyramids, Humpty-Dumpty’s and virtually any other atrocity the human mind could conjure up. Through these "Gulliverized" characters the sport made a swing into the "plastic" world, and, by the late sixties, were being associated with blue-collar play. Unlike the other roadside industries miniature golf did not continue to advance in the qualitative directions that fast-food or hotel chains did. Instead, like the drive-in theaters and car-hopping restaurants, miniature golf courses were being left behind in the wake of the "go from point A to point B without slowing down" interstate highways. This might be labelled as one of the causes of the decline of the sport. Ironically, the courses soon were being labelled as worse eyesores than the eyesores they eliminated, vacant lots. Through the sixties and seventies a growing concentration of courses grew in vacation spots and the sunbelt regions with players drawn to outlandish schemes, which led to a more sophisticated playing atmosphere.

The late seventies were bringing changes to the playing environment making the sport an adventure, an experience. Water features, jungle atmospheres, and drastic topographic changes were added. The mysterious "where-did-the-ball-go," win-a-free-game-on-hole-eighteen, devices were sparking ideas of how to make play look more difficult than it really was.

Today a new breed of putt-putt play is coming to life—polishing of the wheel one might say—again, cyclical, as so many things in man’s history; there is talk of franchising, of exporting the game to other countries, and of sheltering
the game under the roofs of shopping malls. As the players begin to play at more advanced courses, where the quality of the playing environment has improved, the competition between owners to create a more pleasant playing environment has increased and created a need for more formally trained designers.

PROBLEM STATEMENT:

The intent of this project is to investigate ways to improve the quality of play and the playing environment in the family leisure game of miniature golf by looking at alternative program elements, construction materials, related participatory recreational environments and incorporating the information into a conceptual design.

GOALS AND OBJECTIVES:

GOAL ONE:

To design a more sophisticated playing environment than already exists in miniature golf.

OBJECTIVES:

To gain an understanding of the evolution of miniature golf and its amenities through the sports history.

To become familiar with the amenities, environment, and playability of profitable miniature golf courses today through observation, participation, and documentation of visits.

To review, visit, and record similarly constructed participatory environments in non-related industries to gain a knowledge of the elements and materials that make them so appealing.

To synthesize and incorporate the information, new elements, materials, and amenities into a conceptual design.

GOAL TWO:

To ideate concepts that will address the miniature golf playing public and its market.

OBJECTIVES:

To gain a basic understanding of the psychology of play by reading generalized literature and informally interviewing psychology professors.
APPENDIX A

To acquire a fundamental marketing knowledge of how to identify perspective site locations via interviews with marketing professors.

To include this informally gathered information in the final report.

GOAL THREE:

To design an attractive and efficient playing environment.

OBJECTIVE:

To analyze, synthesize, and incorporate all the previously stated goals and objectives into a final presentation and package.

ASSUMPTIONS:

A sophisticated design or a sensitive playing environment will bring an increase in customers.

The concepts and findings will be applied to a hypothetical site which is in an optimum market location.

Cost will be considered later.

MONOGRAL DEFINITION:

MINIATURE GOLF: A scaled-down version of championship golf that emerged in the early twentieth century enabling all ages and sexes to play. Many courses have taken on themes of story book characters.

LITERATURE REVIEW

Sources of information about the history or the construction of miniature golf courses are limited. At this time, the only found reference directly addressing the subject is Miniature Golf (Margolies, 1987). This single volume will be referred to as the most current and definitive story relating to miniature golf. Miniature Golf Management, a magazine published in the 1930's used to educate miniature golf course owners of layouts and business practices, has been out of publication for several decades. And is not readily accessed through Ball State. The information in this periodical is assumed to be outdated. For the focus of this project, information will be generated from first hand knowledge, interviews, and observation while visiting sites using
similar or potentially new construction materials.

METHODS:

I. Search for literature relating to goals and objectives.

II. Document and visit existing innovative and old miniature golf courses.

III. Document and visit sites exhibiting qualitative applications of materials and material alternatives (i.e. zoos, amusement parks and hotels).

IV. Analyze and develop concepts incorporating gathered information.

V. Present the information as required by Ball State University format.

REFERENCES:
