Finding Opportunities for Nature Education and Wise Use of Existing Public Open Space: A Case Study for Delhi Township, Cincinnati, Ohio

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"As long as the people of your culture are convinced that the world belongs to them and that their destiny is to conquer and rule it, then they are of course going to go on acting the way they've been for the past 10,000 years. They're going to go on treating the world as a piece of human property. You can't change these things with laws. You must change people's minds. What you must do is teach a hundred people what I've taught you and inspire each of them to teach a hundred."

_Ishmael_ – Daniel Quinn

One plans not places, or spaces, or things; one plans experiences. Plan not in terms of meaningless pattern or cold from. Plan, rather, a human experience.

John Ormsbee Simonds
Abstract

There is a shortage of public open space in the landscape of America’s ever-sprawling urban and suburban areas. Since the 1960’s and 70’s behavior scientists and psychologists have been arguing that public parks and retreats into nature are beneficial for everyone to escape the stresses of day-to-day life. Landscape architects have been designing these places of retreat from the time Frederick Law Olmsted designed such a park, Central Park, in 1851, and first called himself a “landscape architect.” Even more recently, landscape architects have had the proud task to also include environmental education into the design of public open space as an important aspect and an increasing necessity for our future. Olmsted’s design was in response to a need for a get-away from the city for those who could not afford to move to the countryside.

The need of Olmsted’s time still exists today but in suburban areas where land is being eaten up by development, as is the case of Delhi Township in Cincinnati, Ohio. Like many other large communities, Delhi Township, just outside the western portion of the city, is growing, especially in the northwestern area. The need for an environmental education and nature preservation was felt and the opportunity existed. The land for an environmental education center was available on approximately 40 acres adjacent to a new school and the Delhi Park Board had intentions to develop this land into community space but few plans were made.

The intent of my landscape architecture comprehensive project was to develop a site-specific master plan for the Delhi Park Board as an environmental education center and nature preserve unique to the native environment and fulfilling the desires of Delhi Township and its residents. Through the design process I was able to determine the buildable area within the site, identify a program, define the goals, and develop a master plan for the environmental education center. The master plan includes several trail systems with interpretive elements, a core area with 11 demonstrative gardens, a 6000-square-foot nature center, an amphitheatre, and separate pedestrian and maintenance entrances. The design encourages community involvement, individual, leisure and group environmental education, and a variety of different trail levels and experiences.
Background

During my four years of school in the landscape architecture field I have been exposed to many different projects in many different aspects of the landscape architecture profession. Of all the different projects I became most interested in open space and park design and master planning. The opportunities within this genre of landscape architecture are abundant and vast, and one that attracts me the most is the opportunity to provide people with a space to connect with nature and get away from the pressures of everyday life. As I continued in my education I became intrigued by the role of environmental sustainability in the field of landscape architecture and environmental education. Landscape architects play a huge role in sustainable practices because we design and form the land and often the uses of the land. I found a landscape architecture firm that combines both of my interests when I interned. At this firm my knowledge and love for environment education and master planning grew even more and I decided that was the place for me and the area of landscape architecture I wanted to concentrate on, which also has become the focus of my comprehensive project.

Once I had decided what I wanted to concentrate on, I began thinking of where I could do this. The logical place for me was where I grew up and loved, Cincinnati, Ohio, more specifically the township I live in, Delhi Township. After establishing where and what I wanted to concentrate on, I wrote a letter to the Delhi Park Board asking for their assistance in my academic endeavor of creating a master plan for an environmental education center within Delhi and asking if they had an area available and if they would act as my client. The Park Board enthusiastically accepted and provided me with a piece of land adjacent to a newly built middle-school that the Park Board had intended to turn in to a community space.

Now that I knew what I wanted to do for my comprehensive project and had the place to do it, it was time to explore the background of my project needs. These included: (1) researching the historical significance of such a project, (2) finding the need for public open space and environmental education, and (3) discovering how my design of this community park will fit into the many case studies already existing in landscape architecture.
Introduction

Purpose of the Study
The western portion of Delhi Township in Cincinnati, Ohio has seen a significant growth in the past 30 years. The Delhi Park Board was established in 1950 and by 1958 they had established three ball fields in Delhi Park, the township's only park. By 1993 the Board had 9 ball fields within that one park. The number of picnic shelters in 1960 was one and was raised to five by 1985; the number of restrooms went from one in 1962 to three in 1986. The Board's budget was $30,000 in 1960 and in the year 2000 it had risen to $450,000. (Hilvert) “Population growth consistently places demands on the Park District as evidenced by the addition of buildings and facilities” (Hilvert) and since its inception the Park Board has responded well to the growth of the Township. As the western portion of the Township grew, a new school was recently built to facilitate the need of the area. However, the need for a public open space for environmental education had not been fulfilled. As 40 acres of land adjacent to the new building was vacated and donated to the Township and Park Board, the opportunity surfaced to create community open space. Although minimal plans were underway for the land, a desire by the Delhi Park Board and the need of Delhi residents was clearly evident.

Public open space for environmental education is a need not only of Delhi residents but also of everyone in densely populated areas, like cities and suburbs. In 1995, potential homebuyers were primarily attracted to natural open space and trails. In a study for the real estate industry conducted by American Lives, Inc., 77.7% of homebuyers and shoppers rated natural open space as essential or important (www.nps.gov/pwro/rcta.html). The relief that open space and parks provide for visitors and neighbors is enormous and is felt by everyone who visits. These experiences take us away from all the stresses of everyday life, even if just for an hour. “Walking through a meadow or sitting under a tree at the edge of a lake does something for us that walking to school or work or sitting in our own backyard just can’t do. We all desire these non-routine experiences because recreation satisfies basic human needs that are as important as eating or sleeping.” (Katz 11)
Environmental education is important to our future as well as the future of our environment. Although the environment and its aspects are taught in the classroom, a more appropriate place to study and teach the environment would be outside in nature, i.e. an outdoor classroom or education center. “We learn about cars, traffic lights, and road construction by seeing them in our urban environment and we learn about trees, birds, and flowers by exploring them in their natural environment” (Katz 15). The best place to learn about nature is when you are surrounded by nature, where you can use your senses to experience nature. “The places where this kind of education can best take place – our parks, zoos, wildlife preserves, and national forests – are the best kind of classrooms we can build for our natural world. They are classrooms that we will never get tired of – even the path we explored last week will have become a little different by today” (Katz 15). There is no stronger education than one that is learned for a positive experience. To tie people to nature would give us the bond we need to protect nature. That is why it is important to provide outdoor education opportunities wherever possible, and in this study, for the people of Delhi.

A problem such as a lack of public space for environmental education needs is solved by preliminary studies of the needs of the community and the design process landscape architects follow. This process explains the steps landscape architects take to design spaces. The design process is as follows: Preliminary Study/Studies, Site Inventory, Site Analysis, Conceptual Designs, Preliminary Master Plan, Final Master Plan.

Definitions
Before getting into the study further, it is appropriate to create a list of terms and definitions that are used throughout the study.

*Environmental education*: a learning process concerned with the interrelationships among components of the natural and human-made world, producing growth in the individual and leading to responsible stewardship of the earth

(www.sru.edu/depts/pecp/profdevmt/resources/definition.html)
**Interpretive nodes**: areas along a trail system that allows opportunity to explain natural elements/phenomenon for educational purposes

**Landscape architecture**: the art and science of analysis, planning, design, management, preservation, and rehabilitation of the land (www.asla.org)

**Master plan**: shows the essential organization of the park including path layouts, parking arrangements, focus areas, and main attractions

**Passive recreation**: leisure, casual recreation involving little organized activity

**Site analysis**: evaluating the site inventory according to different elements and how those elements might influence the design

**Site inventory**: a record of the features of the site/property that may influence and should be taken into consideration in the placement of design elements

**Sustainability**: a practice that meets the needs of the present without compromising the ability of future generations to meet their own needs (www.globalsustainability.org/education/definitions.html)

**Topographic contours**: elevation points connected by lines showing peaks, valleys, and slopes in the natural terrain of an area

**Significance of the Study**

So what significance does a 40-acre nature center in Delhi Township have to the vast field of landscape architecture? Well the answer is simple; this project enters the expanding library of other designed public space but is unique because of its environmental education emphasis, a trend quickly catching on. As more open space is being devoured by development, landscape architects and communities together, must step forward to claim this diminishing land for design of functional retreats for leisure recreation and education. My study showed that a environmental education center and nature preserve can be taken advantage of by all
residents of different ages as a recreational escape and also an opportunity to learn more about their environment and provide a place for them to get closer to nature. The trend in landscape architecture is shifting towards environmental awareness and sustainable design practices. This open space design followed the state-of-the-art trend for both environmental reasons and recreational needs.
Related Literature

Historical Perspective

Throughout history we have seen America grow to become the largest, most powerful country in the world. We have also seen America quietly struggle to uphold that reign. One such struggle is the struggle of dealing with our natural resources and the land that fostered such a wonderful nation. Long before the arrival of Europeans in America, Native Americans nurtured a respect and care for the land. As America became settled, the growing population began exploiting the natural resources that, at one time, seemed limitless. The development of America transformed the environment that was once cared for by the Native Americans. It would take 200 years before visionaries would come forward to design outdoor spaces to serve as integral components of our vastly changing landscape (ASLA, 10).

The roots of American landscape architecture came from a revolution that occurred in England in the nineteenth-century before the development of America’s first park, Central Park. At that time in England the industrialized nation was full of “dirty, vice-ridden poverty stricken, run-down cities” (Molnar, 2). The wealthy physically escaped the oppression by moving to the countryside where they began to hire “designers to plan their country estates. Sensing a desire for relief from every member of the city, designers strove to create patterns which excluded the axes, circles, squares, and other geometrical patterns which visibly organized their city” (Molnar, 3). Designers began using organic shapes to bring nature back to into their lives.

The English revolution in landscape design began to influence American designers. Author Andrew Jackson Downing wrote about the popularity of parks in England after visiting parks like Birkenhead and Victoria Parks, and urged New York to set land aside for such parks. With more immigrants entering America, Downing’s arguments became even stronger and finally prevailed. On July 11, 1851, when the New York State Legislature passed the First Park Act, a historic milestone was reached because public land was now to be developed as a park for people’s enjoyment and recreation (Newton 269). Finally the government was seeing a need for public open spaces as a retreat from the growing urban
life. "Prior to the creation of Victoria and Birkenhead Parks there is no recorded instance of outdoor recreational space on land acquired and owned by the people themselves, developed with public funds, and open indiscriminately to all" (Newton 267), now New York was going to have their outdoor recreational space, a first for America. A position was created to supervise all construction of this park and Frederick Law Olmsted, after persuasion, was appointed the position. After the position was filled, Olmsted partnered with Calvert Vaux, an English architect, to submit a design for the park as entrants in the design competition held by the Board of Commissioners on the Central Park (Newton 271). Olmsted and Vaux’s design was chosen. In one of the correspondence between the city and the partners, they signed “Olmsted and Vaux, Landscape Architects,” the first time the title was ever used.

The design of Central Park was grounded in the same problems England was facing and with similar solutions. “In the 1850s, New York City was also industrialized and highly overcrowded" (Molnar 3). Olmsted took into consideration the English solution but also took into equal account the “plight of the common person” (Molnar 3) by realizing that everyone could not afford to escape to the countryside. Olmsted’s solution: the rural landscape could be placed in the heart of the city so the residents of the city could quickly retreat to a natural setting and put the city behind them to wonder around in the “undisturbed influence of pleasing natural scenery” (Molnar 3).

During the early professional era of projects, places emerged that represent America’s first attempts to shape traditional forms of outdoor space. Gardens, a “timeless manifestation of landscape design found in the most ancient civilizations (ASLA 13),” became America’s earliest form of landscape design. Also at this time the rural cemetery, a completely American invention, may have possibly influenced the public interest in park-like scenery (ASLA 13). “Cemeteries represented early attempts at laying out functional and attractive outdoor spaces on a somewhat more grandiose scale” (ASLA 13).

The job of landscape architects was becoming larger and more diverse. Early landscape designers “combined agricultural methods, civil engineering techniques and artistic principles to shape the land. Their work reflected a quest for beauty and function combined with responsible land stewardship” (ASLA 10) that was lost after the early settlers took the land
from the Native Americans. As the field of landscape architecture evolved as an established profession late in the 19th century, new forms of designed landscapes emerged. Of these new forms, "urban parks became one of the most popular and influential" (ASLA 13), again emphasizing the importance of public open space.

Leisure time in America was growing and the landscape became a central aspect to recreational experiences. As cities grew, open space for recreation became more difficult to find. Cemeteries, with their park-like settings, turned into popular places for picnics and strolls. Urban, national and state parks were developed to provide areas for people to spend their leisure time (ASLA 187). Naturalized developments like Central Park were well suited for passive and semi-active recreation but were more difficult for active sports. It was also argued that "active sports and related activities hardly needed to be surrounded by rustic" surroundings (Molnar 4). Landscape architects at that time and into the 20th century shunned the design of active-sport facilities or attempted to haphazardly place them in rural areas. This situation remained relatively stable until after World War II when new demands pushed aside the old conflict (Molnar 4). Increases in population and economic expansion focused on land use in the broadest sense. Accordingly, "landscape architecture education expanded its horizon in order to cope with the contemporary complexities of any type of land use problem: subdivision, campus, industrial complex, active and passive park, plans for whole cities and regions" (Molnar 4). Another post World War II movement was combining all leisure-time services under one administrative office, which reinforced the self-evident notion that "leisure-time needs can be satisfied through both active and passive means" (Molnar 5) as was implied by simple definitions created by Charles Doell, superintendent of parks emeritus of the Minneapolis park system. Doell stated that recreation is "refreshment of the mind or body through some means which is in itself pleasureful" and defined park as "a piece of land or water set aside for recreation of the people" (Molnar 5). Also during the mid-20th century, the evolution of metropolitan park systems saw a continual emphasis on providing active recreation in a nature setting. Hundreds of miles of hiking trails within large suburban park reserves throughout America provided opportunities for exploring nature in close proximity to home and work. (ASLA 166)
During the 1960s and 70s, landscape architects and recreation departments became more known in the public eye. Federal funding for land acquisition and development became available. Federal agencies began hearing demands for better quality of service (mostly from people interested in what was being done with federal money) and anxious participation in decisions about spending federal money. Environmentalists and behavioral scientists came to influence decisions about the requirements of places that could have a wholesome effect on our human condition (Molnar 5). Environmentalists focused on the harshness of the city and countryside with all the development and filth that continues to accumulate. This raised a “demand for visual refreshment as not only a basic need but a fundamental human right” (Molnar 6).

It has been human nature from the beginning of man to socialize. Places for socialization have always been there but are now becoming harder to find due to development. In The Nature of Recreation, Wurman, Levy, and Katz explain a brief history of the importance of socialization and public space.

As long as people have grouped together, first in small communities and later in towns and huge cities, outdoor public spaces designed for large congregations of people have existed. The agora in every Greek city provided an identifiable place for people of differing backgrounds from anywhere in the region to meet and exchange ideas as well as money and merchandise. Public baths have been social centers from the days of ancient Rome to contemporary Japan. No Italian Renaissance city was built without its piazzas, and no colonial New England village was laid out without a common green, almost always in the center of the town. Today our socializing has become less formal and official, more casual, but we are still concerned with providing ways to be among other people – to watch, to be watched, to meet and interact. (Wurman 13)

The Classics and Camps

The history of urban and suburban parks graciously proves the need for public open space. Classical examples of that include Central Park in New York City and Prospect Park in Brooklyn, New York. Both are a natural oasis in a desert of skyscraper buildings and the push-n-shove of the city. They are quiet retreats where people can enjoy natural scenery within blocks of their home or office. Central Park fulfilled the needs of the people of the
time Olmsted designed this park. People needed to get away from the city, physically and psychologically. They needed a space where they could recreate with family and friends. Central Park and Prospect Park both fulfilled these needs of the times and still do to this day. Other classical examples on a large scale would be the national parks, like Yosemite and Yellowstone National Parks. These parks provide the stage for people to interact with nature and learn from nature. These parks provide trails to walk through the parks, some with educational information along the way. Trails in parks allow people to not just see the natural scenery but to experience it first hand and should be a part of every park.

In addition to classical examples of urban and suburban parks different “camps” need to be investigated to see the different theoretical positions that are held concerning parks. Out of the historical background previously discussed emerged three related positions: “an American design style suited to nature-oriented parks; a split of recreation authorities into two opposing camps, passive recreation enthusiasts and active recreation advocates; and a situation in which landscape architecture schools provided many park authority leaders” (Molnar 2). The first of those positions has been seen through the history discussed earlier. The second however has seen different theoretical positions. Parks were defined as naturalized passive retreats and park departments became concerned with parks as they were defined. In response, landscape architects began to become involved in park development and began to include park management in landscape architecture programs. This led landscape architects not only to design parks, but also to act as park administrators and policymakers. On the other hand, recreation areas were defined as active-sport oriented facilities with playgrounds, ball courts, and sport fields. Recreational departments, separate from park departments, formed to handle only recreational areas and were staffed by policy makers with a physical education background. This resulted in parks receiving the design attention and recreation areas receiving no design attention (Molnar 4). Can this separation of departments and emphasis be united to work together to form spaces for people to have active and passive recreation?

Another camp involves the psychological effects of open green space. As stated earlier during the 1960s and 70s environmentalists started coming forward to raise the point that public open space was not only a basic need but also a fundamental human right.
Behaviorists reinforced this notion with the presumption that “physical surroundings consciously or subconsciously shape human attitudes, breeding tranquility or tension, pleasure or dissatisfaction” (Molnar 7). They also expressed that the “chaotic physical environment was adding tension to tension and thus exacerbating the already unbalancing stresses of job, home, and everyday existence” (Molnar 7). This position puts a great responsibility on landscape architects to provide these places where “visual refreshment” is provided as a way out or an escape for however long it may be, from the harshness that the reality of life and city brought to us. Another great challenge that can also be addressed with this position is that challenge of uniqueness and individuality. We are use to mass-produced products and realize how they contribute to identity loss because they are tailored to the average person. An average person is “constructed of hypothetical responses such as that of a person with head in the oven and feet in the refrigerator who concludes that on the average” they feel comfortable (Molnar 7). The average person does not exist and products created for that person are created for no one in particular. So the challenge here is to produce a place that allows individuals to experience their own unique experiences in the unique area the park is found, not a “cookie-cutter” place for the “average person” that could be found in any city or town.

Since the car and other forms of transportation were invented our mobility has increased and has made us unlimited in the places we can go. So how do we create a green open space and experience that will want to make people come back to experience something different or even come for the first time? Olmsted’s parks were designed for escape from everything bad that may be weighing someone down but we must also try to create a place where people will come to merely enjoy the outdoors and not just try to escape something negative. So now parks and park designers were given a more difficult task than to design just for escape. They should now develop “exemplars of what is possible in terms of soul-satisfying environment not only for those who engage in an activity within, but those who pass by daily as well” (Molnar 7). They should also be “catalysts for promoting higher standards in other types of development, helping to move us toward the day when everything human beings build will contribute to positive physical surroundings” (Molnar 7). In addition to these contributions it must also be considered that the “movement from geometric to nature-oriented design arose out a desire to disassociate with the city” (Molnar 9) which can
be concluded to say that meaningful work is done in response to the times (Molnar 9). This makes us take into account not only the uniqueness of a park but also the uniqueness of the times.

**Relevant Theory**

With these different positions explained it is appropriate to talk about the relevant theory of public open spaces, the underpinnings of parks. “In contemporary thinking, appropriate design is design that meets objectives considered particularly relevant for the individual park site” (Molnar 8). Here the major objectives or principles will be discussed. One major principle is the importance and role of nature in a park. Growing interest in sustaining our natural resources and educating people about nature has been quite evident in the last 30 years but even more so in the past 10 years. The big question is how do we do this? In the form of parks many things can be done. One of the major underpinnings of park design is nature trails that serve as interpretation and education along the trail. There are many different types of trails that can be incorporated in a park trail system. Some include: general trails, subject trails (like conservation, soil, natural features, wildlife, wetlands, vegetation), special-use trails (equestrian, bicycle, disabled). (Ashbaugh 11) The importance of these trails is to show visitors that while enjoying our natural environment there are so many things one can learn while being there to actually see and experience everything nature has to offer. It is commonly known that people learn by example and by being hands-on with the subject, nature trails allow this interaction to happen.

Another principle that is used to guide open space design is the issue of multiple uses. These include ideas for multi-seasonal use of spaces to broaden their active life, like adjusting the summer baseball field to soccer fields in the fall. Another strategy has been to give “recreational assignments to minimally used parts of the park which originally had exclusively a service function (rooftops might thus become sun decks or tennis courts)” (Molnar 10). The challenge is to look at a familiar scene but see it in an unfamiliar way – from the height of a 3 year old, from the convenience of a handicapped individual, in all different seasons. What else could this place and space be? (Molnar 10)
A more strict guided approach to open space design may be created from a list of principles set out by Donald Molnar, author of *Anatomy of a Park*. These principles are general but can be applied to all types of designed open spaces and all should be considered. The 8 principles are:

1) Everything must have a purpose
2) Design must be for people
3) Both functional and aesthetic requirements must be satisfied
4) Establish a substantial experience
5) Establish an appropriate experience
6) Satisfy technical requirements
7) Meet needs for lowest possible cost
8) Provide for supervision ease.

These principles are general concepts that can be used together for a successful, functional designed open space to be enjoyed by all people but are not inclusive.

**Case Study**

A community open space setting with an emphasis on environmental education is the goal of my study. It is appropriate to look at case studies similar to my objectives.

**Stanbery Park:** Mt. Washington Community, Cincinnati, Ohio
One case study and a model project for my study is Stanbery Park. Stanbery Park is a large (over 200 acres), established park in the community of Mt. Washington on the east side of Cincinnati, Ohio. As stated in the final report of the design of Stanbery Park by Human Nature Inc., the park was in a state of disrepair but the community decided they had had enough of the crime and dilapidated conditions of the park. As a community, the citizens of Mt. Washington established a committee ("Stand by Stanbery") to organize an effort to reclaim and redesign the park and hired a local landscape architecture firm (Human Nature, Inc.) to develop a master plan. The firm went to public meetings to ask the needs and wants of the community for Stanbery. From those meetings the firm discovered such needs as:

- Nature trail improvements such as signage, surface, and maintenance
- Connection to adjacent neighborhoods
- Playground area needs repair and update
- Location of parking to main picnicking area too far
- Main area of park too isolated (safety issue) and not functional

From these needs, the firm went to the drawing board and explored three different conceptual master plans. Once again the firm went to the community's public meeting and presented the three concepts for feedback. After this meeting, the firm strategically combined the elements from the conceptual master plans that were well received. The preliminary master plan was presented to the public in the third and final meeting. The community accepted the plan and a phasing plan was developed.
The main idea of Stanbery Park was to improve the core area of the site. This core is where the gathering, picnicking, and playground activities take place. Parking was added to this core area after an aesthetically pleasing improved entrance. The core area contains a path system that criss-crosses over one another through prairie and manicured lawn. This path is a level-one trail for ADA (American with Disability Act) accessibility requirements. Also, the level-one path leads to the different nature trails that run throughout the site. These trails contain many interpretive nodes along the path that facilitate the education of natural features and phenomenon within the site and the regional area. In addition to interpretive nodes along the trails, nature education stations are located along the main level-one path that directs visitors to the different trails and their focus. Other features of Stanbery Park are picnic nodes, a community garden, and community-built playground area. This project is a model project for the community park in Delhi because of the similar elements within the park, the community based involvement, the trail system, and the focus on environmental education. However, the size of Stanbery is much larger than Delhi. Therefore, it had more opportunities to include a greater variety of elements and a more extensive trail system. This is not a hindrance for Delhi but something that needs to be considered when looking at a model project like Stanbery Park.

Design Issues and Trends
Knowing the underpinning theories behind design open spaces and looking at a related case study, it also is important to discuss design issues and trends of designed open spaces that guided me in the design. One trend is toward the rehabilitation of old parks instead of developing new sites because fewer new sites are being acquired for open spaces. Preserving what has already been deemed open space is a relevant issue. Other issues include a new imperative for research that can lend greater certainty to design and management. Information about the life span and usefulness of materials is especially needed. Surfaces: What materials last longer under various conditions? Plants: Which ones draw least on critical water supplies yet perform well functionally and aesthetically? (Molnar 10)

Another trend is the issue of sustainability. This is a large issue with numerous aspects and the education of this issue was a major focus of my design. Education is key to a sustainable future and a great way to express this was the incorporation of trails and environmental
educational opportunities throughout the center and preserve. Also, another great opportunity and trend in open space design is for environmental education to be in outdoor classrooms which services special interest groups as well as local school groups. As John Ormsbee Simonds was quoted at the beginning of this report, we must plan a human experience: an experience that makes a place welcoming and interesting to visit so people will want to come to the environmental education center, interact with nature, learn about nature, and want to come back to the educational education center again for a new experience. Each experience is a better chance of getting a visitor familiar with nature and educating them on the benefits of protecting our natural resources and living a sustainable lifestyle.

Fit of the Study
Landscape architecture as a profession was founded because there was a need for designed public open space. In 1851 Frederick Law Olmsted and Calvert Vaux designed Central Park out of need for New York City to provide an open space for the crowded residents of the downtown. Today, that need still exists but is more complex due to increase stress and the physical problem of sprawl eating up open space opportunities. As more and more “meadows sprout high-rise apartments and sprawling subdivisions, and as trees with seeming inevitability make way for roads, it appears that the public outdoor aspect” of recreation and education is in grave danger of not “meeting our present and future needs” (Wurman 5). It is my job as a landscape architect and as part of a community to encourage involvement and responsibility in reclaiming and preserving what is left of open spaces. “Three-fourths of the people in this country live in cities, which every day become dirtier, more crowded, and more dangerous” (Wurman 14). Frederick Law Olmsted, throughout his career, saw similar problems and solved them by urging people in political offices to set aside land for recreation and peaceful escape into nature. As landscape architects we need to ‘follow in our father’s footsteps’ and continue equipping open space to a growing population. We also need to provide opportunity within these open spaces to learn about nature and how important it is to create an environmentally sustainable future for our world. These were the key issues to the design of the community environmental education center in Delhi, which are evident to in the master plan.
Methodology

Project Statement:
To design an environmental education center and nature preserve for Delhi residents that reflects the need and desire for environmental education on the community level.

Project Type
Over the years, different kinds of design open spaces have been developed to combine “flexibility with long-term value” (Wurman 34). In The Nature of Recreation, the authors list these categories and their definitions as follows:

“The tot-lot or vest-pocket park designed to serve a block or two; the neighborhood park or playfield designed to serve a small homogeneous area and intended to be convenient to all; the city park designed to serve a small city or one of several areas of a large metropolis...”
(Wurman 35)

The study area for my project fell between the sizes of a neighborhood park and a city park. The reason it was a combination of both is because it was planned for the residents of Delhi Township, which would be the homogeneous area, and it was also relatively close to most residents, especially in the growing area where the site is located. The size, however, was more related to the size of a city park, about 40 acres, and served “one of several areas” (Delhi) within the larger city of Cincinnati. Simply stated, my project was an environmental education center and nature preserve serving a particular community of people.

Environmental education is the focus of my project. As defined by the United Nations Educational, Scientific, and Cultural Organization -

“Environmental education is a learning process that increases people’s knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action.” (www.epa.org)
As the quality of our environment deteriorates and our natural resources diminish (as numerous science reports and studies have been telling us for the past 20 years), it is time we took a serious look at what each individual can do. The most effective way to do this is to educate people about our environment and our natural resources. As previously stated, "we learn about cars, traffic lights, and road construction by seeing them in our urban environment, (Wurman 15)" so the way we learn about our resources and environment is to be exposed to them and learn within the environment. In addition, environmental education does things for us as students of the environment. The United States Environmental Protection Agency states:

"Environmental education enhances critical thinking, problem-solving, and effective decision-making skills, and teaches individuals to weigh various sides of an environmental issue to make informed and responsible decisions. Environmental education does not advocate a particular viewpoint or course of action."

www.epa.gov
Site and Context Rationale

In order to design a successful environmental education center certain site rationale needed to be met. These rationales were physical as well as sociological. One sociological criterion was openness of the community. Delhi has great community pride and involvement, which made it a welcoming environment to work with and in. A community open space would not exist without a community that is willing to take an active role in the development of their park from the input in the design process to its maintenance and use. It is vital for the community to claim their stake in their area and get involved. If they do not get involved, their open space could be sold off for development of another neighborhood or commercial strip. Delhi residents took advantage of their position and claimed open space as theirs for education development instead of residential or commercial development. Community activity days were also an attractive rationale that Delhi Township could provide to get people involved and will be planned after completion of the construction of the park.

As previously stated, there was certain physical site rationale that needed to be met for the selection of my site to be a successful designed public open space. As seen below in the description of the site, Delhi has fulfilled the physical criteria described here.

- The “proper balance of forest and open space is one of the prime requisites in the overall planning of parks” (Fogg 11). For the purpose of nature trails and environmental education, the site needed to have a significant portion of woodland and other habitats on site, especially prairie and wetland; this allowed for a full range of educational opportunities in different habitats to learn how they work together to create our environment. These habitats did not exist on the site previous to the design of the park but were created in its design.

- Topography was also a criterion for a community park. The site could not be entirely level but also could not be entirely sloped, for minimal land movement. There needed to be enough level area in the core of the park for gathering, parking, and playground area and enough slope throughout the
rest of the site to allow for a variety in the trail system for different level of hikers. The site in Delhi met all of these criteria.

A major issue of my project was determining whether the site should become a community park or an environmental education center and nature preserve. The chart below explains the choice of environmental education center.

<table>
<thead>
<tr>
<th></th>
<th>Size</th>
<th>Context</th>
<th>Access</th>
<th>Landscape Character</th>
<th>Site Vegetation</th>
<th>Topography</th>
<th>Hydrology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Parkland</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>40 acres, variety of habitat</td>
<td>neighborhood parks designed to serve a small area and intended to be convenient to all</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Education Center/ Nature Preserve</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>40 acres, primarily wooded, with some clearing</td>
<td>natural deciduous forest to south middle school adjacent</td>
<td>limited vehicular access maintenance access</td>
<td>woodland habitat intermittent stream/lowland habitat</td>
<td>successional forest with varied species</td>
<td>mild to severe (trail variety) minimal developable land</td>
<td>creek habitat for education and drainage natural drainage swales along topography</td>
</tr>
</tbody>
</table>
Project Requirements

Client Description

Delhi is a quiet, conservative township five miles from downtown Cincinnati and adjacent to the city limits on the west. Some portions of the township even have beautiful views of the city along with the Ohio River and Northern Kentucky. The dramatic topography of Delhi provides opportunities for beautiful landscape views. The varied topography that makes up Delhi Township is unique and does not compare to any other community in Hamilton County. In Delhi, one can find imposing hillsides walling in a major river valley and substantial creeks flowing randomly to join the river, which level out to provide former farmland and now residential development.

The residents of Delhi are community-involved people. Delhi is a community of about 30,000, where there is always a familiar face, despite its size. Close-knit, conservative neighborhoods make up a large majority of Delhi. The problem is that the residents of Delhi and its neighborhoods to connect with and learn from nature. The Delhi Park Board has worked hard to maintain open space in Delhi but their efforts have primarily been focused on the main active recreational park near the center of the township, Delhi Park. The City of Cincinnati has an extensive, well-maintained public park system, with some of their parks near Delhi Township limits. Hamilton County also has a well-developed park system and nature preserve areas, one of which, Farbach-Werner Nature Preserve, within the township. However, even with the city and county amenities, Delhi and the Delhi Park Board needed to provide for their residents within the township.

The primary client for the development of a community park and environmental education opportunity in Delhi was the Delhi Park Board. The Board has the deciding vote on conceptual ideas, wants, needs, and the bottom-line aspect, budget. The Park Board was ultimately responsible for making decisions in the best interest of Delhi residents. However, the community park was for the community and residents of Delhi. Therefore, the residents were also the clients. They were welcomed at every Park Board meeting involving the new
community park to make it a community project, reflecting the continuous involvement of the residents.

Assumptions
In addition to laying out the delimitations and explaining some integral terms of the project it is also important to note the assumptions I considered when designing the community park for the Delhi Park Board. These assumptions were aspects of the project that if they were not completed the project would fall apart. The first assumption was the site boundaries. The property limits were already set forth and included parcels owned by three different organizations: Delhi Park Board, Delhi Township Trustees, and Oak Hills School District. It was assumed that these three organizations act as one for this development. I also assumed that a survey was completed of the property limits and the topography. A thorough environmental assessment survey was completed of the site, especially the woodland portion of the site, to determine any rare or unique natural features, phenomenon, or species. Within this assessment elements such as soils, geology, hydrology, ecology, and vegetation were examined. Cultural assessments of features, history, utilities, and access were examined. A concise, thorough public survey was also completed prior to the beginning of my design process. The survey was conducted by the township and provided a “wish list” of elements and a program list of needs. I assumed the Park Board and the middle school cooperated and utilized nature education as the focus of the park, not as a central building but as an experience throughout the site. One final assumption and maybe the most important was assuming the Park Board, as my client, was open to new ideas that may be different than similar case studies and was willing to accept state-of-the-art concepts.

Delimitations
There are limits, or delimitations, to my project and my exploration that need to be addressed. For the Delhi Park Board I committed myself to complete the design process and produce a conceptual master plan. However, my commitment does not include the following:

- I did not complete construction details, a maintenance/management plan, or a planting plan.
I did not complete environmental studies of the land. However, those should be completed before any construction.

I planned on the footprint of the playground but not its design.

The plan for Delhi includes a master plan for the trail system but does not include spot elevations on the exact location of the trails; a survey should complete that.

The property limits were already established and the master plan is within the limits. However, suggestions for future links to adjacent property in the case of property acquisitions are included.

Traffic circulation outside of the park was considered but is the responsibility of the township engineer.

Handicap accessibility was considered in as much of the park as possible but was limited in the trail system due to the natural topography.

The design also carefully takes into consideration the natural features of the site and leaves as much vegetation as possible undisturbed.
Project Goals

The Delhi Park Board and Delhi residents, in collaboration with myself as the designer, established goals for the project and development of the community park. A project mission was established and was then underlined with project goals as seen below.

Project Mission:
To design an environmental education center and nature preserve for Delhi residents that reflects the need and desire for environmental education on the community level.

Project Goals:
1 - Provide a passive retreat into nature unique to the region and sensitive to existing habitat and vegetation
2 - Create an opportunity for residents of all ages to learn together about the environment and sustainability through interpretation and experience
3 - Encourage an interactive experience for outdoor environmental education for the Delhi schools
4 - Create an environmental education opportunity in Delhi that joins the efforts of schools and parks
5 - Create a reputation for Delhi as a community that is concerned, aware, and responsible for the future of our environment
Inventory and Analysis

"Through purposeful design measures, a sharp designer exploits the advantages of [the site and] surroundings and overcomes the limitations posed by adjacent lands and their uses" (Molnar 17). As the sharp designer, I took into consideration everything the site had to offer and worked with its constraints.

Site Location

Delhi Township is located in the western portion of Cincinnati, about 10 miles from downtown Cincinnati and 3 miles from the Ohio River.

Context Inventory and Analysis

The area of the Township described above has been a haven for new development. Because of the topography toward the River, most of this area is restricted for building but every opportunity for housing development has continued to be taken advantage of. There are very little commercial and retail businesses in the area and they are all resources for the area, like a bank, convenient store, and restaurants. As seen in the aerial to the left, the large
green areas have steep slopes that prevent any development and are natural. The site is located in the red box. The areas around the steep-sloped areas and the site have been developed into housing. The site is situated on very valuable land that sits in the middle of the developed land.

Taking a larger look at Delhi Township will show the importance and convenience of an environmental education center and nature preserve. The township limits of Delhi can be seen in the image below, seen in yellow with the red outline. Also, the current parks of Delhi are in green as well as the surrounding parks of Cincinnati and how the site fits into this scheme.

Parks within Delhi and Surrounding Area
The township schools also play an integral part in the location and importance of an environmental education center. Delhi Township has 3 elementary schools, 2 middle schools, and one college. The location of these schools, as seen in relation to the site and one another, is seen in the map on the following page. All of the schools in Delhi are within a five to ten minute drive to the proposed environmental education center, making it very accessible and easy to get to from the schools for field trips, etc.
Site Inventory and Analysis

Taking a look at the site at a closer look, the opportunities and constraints can begin to be seen. In the design process, this step is called site inventory and analysis. Looking at the base map seen below generated in GIS (Geographic Information System), existing site conditions can be seen. Such conditions include: topography, forest canopy, creek, housing, play equipment, and the newly built soccer stadium.
Site photos of existing conditions are an immense help for those unfamiliar with the site. A photo analysis was used to help explain the opportunities and constraints that lead into the conceptual design phase of the project. The map below graphically shows the conclusion of the site analysis that will be described in detail through photos following the map.
The approach to the site is a logical place to start when acquainting a visitor with the area. The photo here shows the approach to the site. It is on a small, residential road with narrow lanes and no sidewalks. The public would not feel welcomed along this road as an entrance to a public facility.

The entrance to the site is similar to the approach. It is small, private, and unwelcoming. It feels restrictive and intrusive to the neighbors, as though a visitor was intruding between neighbors' yards, as seen in the photo.

Once entered in the site, the drive is a small gravel drive that has a good view of the open area, the forest line, and a hint at a good view.
Another issue with a public facility is parking. Parking in this situation would be difficult to incorporate with little impact. The open space is limited and should be utilized for other functions other than parking.

Like any site, the Delhi site has amenities that exist and should be incorporated or managed in the design of the environmental education center. One such amenity is the play structure, located in the southeast corner of the open area. Another amenity is the woodland. The woodland is an early successional forest, which creates an excellent opportunity for environmental education. The current conditions of the forest can be seen in the photo on the previous page.

Once inside the woodland, the topography of the site begins to become dramatic. As a visitor would approach the creek, the topography become so steep that it is impassable in areas. This dramatic topography allows for overlooks throughout the site but creates accessibility problems to the creek. The overlook seen in the picture can be seen in the southeast corner of the site overlooking the creek.
The creek habitat is a wonderful amenity to the site. The creek creates unique opportunity for education of lowland habitats and wetland species. However, the access to the creek is a problem once again.

The open area at the arrival into the site is clear of the forest canopy and is relatively flat. Also, the area is at the entrance of the site from the road and the school. These factors make the open area an excellent opportunity for the developed area of the environmental education center that will have the least impact on the site. As seen in the photo, the open area has the play structure within it and is also not large enough to provide parking without sacrificing other uses, like group gatherings and educational opportunities.

The last site feature worth pointing out for analysis purposes is the connection to the school adjacent to the site on the north. The middle school creates a great opportunity to set a standard for other schools in Delhi to visit the center and nature preserve. A connection to the middle school will greatly encourage the use of the center by school groups and Delhi residents. Another advantage to the school is that access is very easily obtained.
Natural Habitat

As the criteria stated earlier, one of the rationale for choosing the site was the balance between forest and open land. The site is open on the northwest end but is thickly wooded on the south and along the east side. The forest on the east leads down to a creek. An extensive inventory of that wooded area was taken with a representative from the Ohio Department of Natural Resources, Department of Forestry. The representative completely identified the species of the forest, identifying whether those species were invasive or not and gave recommendations for controlling the invasive species. A complete list of species and pictures can be found in Appendix A.

The forest was primarily an early successional forest, which is a forest that has regenerated itself from previous conditions, in this case an old pasture, into the first stages of forest development. One of the common problems with successional forests is the invasive species that accumulate. An invasive species is one that may or may not be native but begins to take over the forest habitat restricting other species from growing. One of these species found on the site was Honeysuckle. Honeysuckle is a common exotic, invasive species found in this area; in other words, the species is not native to this area but has been introduced to the area and like other invasive species, has taken over the opportunity for other species to grow. Honeysuckle is a shrub that grows under the tree canopy and kills understory species by preventing them from getting light and other nutrients. Control methods, described in more detail in the appendix, include cutting the shrubs down and spraying herbicide on the remaining base. A complete list, description, and picture of the invasive species found on the site can be found in Appendix B.

In addition to the invasive species on the site there were also many native trees growing which help to enhance the diversity of the forest habitat. A few of these trees include: White Ash, Black Cherry, Box-elder, Yellow Poplar, American Sycamore, Eastern Red Cedar, and Chinquapin Oak (please refer to Appendix A for a complete list and description). Also found within the native trees were a small number of Dogwood and Redbud. These trees are uncommonly found in large numbers in forests and should be preserved. In order to preserve the Dogwood and Redbud in the forest, they should be marked and when the nature trail is constructed, the trees should be salvaged in turn of a more abundant tree.
Slope Analysis

As previously mentioned in the site analysis, one major constraint of the site is the topography. As seen below, the areas in the lightest orange are a 0-5% slope which is relatively flat and the easiest to build on. The northwest area of the site lies within this 0-5% range. As the site reaches the creek the slope becomes much steeper and as severe as 30% + slope near the creek. However, the creek is an educational feature and should be accessible.
Soil Analysis

Soils are always an important aspect of a site analysis. The soil type will tell how suitable the site is for building, whether the speed of the water run-off is slow or fast, how wet the soil is, and the major constraints of the soil type. The Delhi site has two major soil types: Ava and Eden. The soils are both similar in suitability, constraints, and run-off.

**Ava**: ArA, ArC2
- Moderately well-drained soils
- Slow permeability
- Slow run-off
- Moderately well suited for buildings
- Seasonal wetland
- Slope constrains picnic, playground, and path development

**Eden**: EcE, EdF
- Moderately well-drained soils
- Slow permeability
- Rapid run-off
- Well suited for woodland
- Major limitation – slope
- Slope constrains building, picnic, playground, and path development
Buildable Zone

The next step was to overlay the slope analysis and soils map. This told me the buildable area of the site. Any elements that needed to be built or heavily developed should have fallen within the buildable area. The map below shows the overlay and the buildable area. This area has a 0-10% and falls in both soil types. Since the major constraint of both soil types was the slope, if the slope was not severe, the area was considered buildable.
Program

For a design to represent the wants and needs of the client, a program must be developed. This program guides the designer into elements of the park that must be included for a successful design. The program for the Delhi Environmental Education Center was divided into the different zones of the park and within those zones the user, activity, and program element was determined. The result can be seen in the matrix below.

<table>
<thead>
<tr>
<th>Zone</th>
<th>User</th>
<th>Activity</th>
<th>Program Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking</td>
<td>Visitors</td>
<td>Parking for cars and bikes</td>
<td>Parking lot</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Bike racks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Entrance path to education area</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Buffer along path</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Delhi Staff</td>
<td>Equipment Storage</td>
<td>Garage/Building</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Workshop for minor repairs</td>
<td>Turn-around for large trucks and material storage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Material storage</td>
<td>Buffered entrance from neighbors</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Buffer from visitor entrance</td>
</tr>
<tr>
<td>Core Area</td>
<td>Public School Groups</td>
<td>Education</td>
<td>Path system -</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Guided tours/lessons</td>
<td>Universally designed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Leisure visiting/learning</td>
<td>Demonstration gardens</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Group gatherings</td>
<td>Amphitheatre</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Picnics/Play</td>
<td>Play set</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gardens</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nighttime Camps</td>
<td></td>
</tr>
<tr>
<td>Environmental Education Center</td>
<td>Public School Groups</td>
<td>Nature Lessons</td>
<td>Classroom/laboratory for 20-30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Laboratory activities</td>
<td>Exhibit area and mobile units</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exhibits</td>
<td>Equipment storage</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Restrooms</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- accessible from in and outside of building</td>
</tr>
<tr>
<td>Woodland</td>
<td>Public</td>
<td>Hiking</td>
<td>Interpretive signs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive education</td>
<td>Overlooks, boardwalks, &amp; tree walk</td>
</tr>
<tr>
<td></td>
<td>Nature</td>
<td>Preservation</td>
<td>Rest stops/Benches</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Invasive species control</td>
<td>Trail Variety (3mi) - Level 1, 2, &amp; 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Maintenance Plan</td>
</tr>
</tbody>
</table>
Design Concepts

After determining the goals of the project, the program elements, and analyzing the site, the next step was to begin designing. This phase of the design process is called conceptual planning. The ideas that are generated in this phase are general in terms of determining where the program elements are located. These concepts were quick ideas for the basic layout of the site. Below are the three design concepts that were produced for Delhi, each with a small description.

Concept 1 - This concept was about integrating human activities with nature. The meandering form brings the activities of visitors into and out of the forest canopy. The trail system also mimics this pattern. The main focus was a loose, natural form.

Concept 2 - This concept was about a community form. The grid form is rigid and orderly. There is a central focus like in any community. The main focus of this concept was a formal, rigid impact on the site. The trails remained the same as concept #1.

Concept 3 - This concept was introducing the idea of clustered development on the land. The inherent quality of life is nature and these small circles make up this natural form. The inherent shape of the circle is repeated throughout the trails as resting or interpretive nodes.
The final step in the design process is the master plan. The master plan borrowed features from each of the concepts and combined them to work together to reach the goals previously set forth and to integrate the program elements. The final design solution can be seen below and will be broken up in the following pages with the corresponding letter.
The general idea of the master plan was a natural form of path systems. As seen in the concepts, the major development was kept in the northwest corner of the site, allowing the majority of the site to remain wooded for preservation and education. The trail system was greatly increased from the concepts to meet the 3-mile program requirement, which allows for trail variety to be discussed later. Another major element of the plan was the vehicular entrance. Different from the concepts, the vehicular traffic was kept outside of the environmental education center for minimal impact on the site. Parking for the center will be at the school with a pedestrian entrance.

Feature Descriptions:

A – Buffered entrance – A meandering path that follows the natural form of the path system of the site leads the visitor into the environmental education center by foot. Directly off the parking lot is a paved area for bike parking. The path is buffered on the west to keep the entrance private for the visitors and the neighbors immediately west of the entrance. An additional buffer on the east prevents the visitor from seeing into the soccer stadium. Since the stadium is dug into the ground about 20 feet the view from the path is easily seen. This buffer creates a more natural, private entrance to the nature center.

B – Private, buffered maintenance entrance – The entrance from Pontius Road to the west was restricted to maintenance access only. It was buffered on both sides of the drive again for the privacy of the neighbors. The maintenance area is also buffered from the pedestrian entrance, which creates a secluded feeling with little disruption for the visitor. The maintenance area has a garage and building area for offices, maintenance vehicle parking, and workshop area. The drive of the building is large enough for trucks to turn around and to store some materials. At the south side of the maintenance building, garage doors will open for private access into the main center.

C – Main Loop Path – The main area of the center is the 11 demonstration gardens. The main path loops around the gardens with the gardens having a smaller path system within it, which will be described later. The gardens provide a great opportunity for hands-on nature lessons and caring for the environment. Within the main loop area also, is another buffer on the north side facing the soccer stadium to isolate the visitor into nature with little interruption. Also the main loops system weaves in and out of the forest and connects the different features of the main area – the nature center, the play equipment and picnic area,
and the amphitheatre. Trailheads for the different trail loops can be found on the main loop, with two being at the nature center and one being at the amphitheatre. The amphitheatre is nestled just inside the forest canopy and is situated along the topography. The amphitheatre creates a great opportunity for outdoor classroom activities.

D – Nature Center – The nature center is a 6000-square foot building that is equipped for indoor classroom gatherings as well as exhibit space. The exhibit area is made up of mobile display units so exhibits can change as needed. The classroom is an amphitheatre-like room fully equipped with a storage room for display units and audio-video equipment. Windows that create the forest as a backdrop for lectures and gatherings frame the classroom. Another feature of the building are the restrooms. The restrooms from the inside are directly off the exhibit area but also have access from outside. This allows for access to the restrooms during winter hours or other times when the center may be closed. The building is also situated along the topography to allow for the amphitheatre-like classroom and view of the forest and site just inside the forest canopy.

E – Amphitheatre – The amphitheatre is located at the eastern most edge of the main loop path, just inside the forest canopy. It provides a great opportunity for outdoor classroom activities and is isolated enough for minimal interruption. The amphitheatre can sit 30-40 people at any time and is universally designed so everyone has access to it.

F – Trail System – The trail system has a total of 3.08 miles of trails. The main loop trail is 0.5 miles and is universally designed. Within the main loop is .08 mile of garden trails that are narrower than the main loop. The different level trails within the forest account for the remainder of the trail system. The level 2 trails are 2.2 miles of the larger trail system and will be discussed later. Level 3 trails account for the remaining .3 mile of trails. The trail system overall takes a visitor from upland to lowland habitat with short cuts for shorter trips.

G – 2 Overlooks – Within the trail system there are many features along the way. The first of these features are overcalled. There are two overlooks situated in the southeast corner of the site. Each overlook provides an opportunity to view the creek from above and the surrounding terrain. A level 2 and level 3 trail cut down to the creek at each of the overlooks.

H – Treewalk – The treewalk is a unique experience along the trails. It consists of a boardwalk-like structure that extends over the hillside into the canopy of the trees for a different learning experience. The treewalk loops around with an overlook at the point and joins back up with the trail for a total length of about 500 feet.
I – Rest stops – Rest stops are located every 500-800 feet along the trails. These rest stops simply consist of a bench, usually where trails join. Some rest stops provide directional and informative signage.

J – Creek Classroom – Nestled at the bend in the creek is an outdoor classroom. Boulders for seating along the hillside form the classroom. Tree-log benches make up the more formal classroom setting with a large rock table for experiments and other material. The classroom has easy access to the creek for lessons in lowland and wetland habitats.

K – Bridges and Boardwalks – Along the creek where the trail crosses over, bridges will be necessary. Also, along the creek boardwalks allow visitors to stop above the creek to see the water flow beneath.

A closer look at the relationship to the features mentioned above can be seen in the site section below.
Trail Guidelines

The trail system has three levels of trails within it. Standards must be met for each level of trail according the American with Disabilities Act (ADA). The first is Level 1 must be at least 6 feet wide to allow for 2 wheelchairs to pass by, with a maximum slope of 1:50 or 2%. Level 2 trails must 3-5 feet wide with a maximum slope of 1:12 or 8%. Anything after level 2 is not accessible for wheelchairs. The diagram below helps to explain.

![Trail Width Diagram]

Looking at the different trail levels in section, the different widths of the trails can be seen. Level one is the flattest and widest and level 3 is the narrowest and steepest. Level 1 is also situated on a flatter area in general where as levels 2 and 3 are set along the hillside where the topography levels out just enough for the trail.

![Level 1 Diagram]

![Level 2 Diagram]

![Level 3 Diagram]
Treewalk

The treewalk is a boardwalk-like structure that extends above the hillside into the canopy of the trees, as seen in the image below.

Creek Classroom

The creek classroom is nestled along the bend in the creek. It is formed by boulders along the hillside for seating and tree-log benches for a more formal classroom setting, as seen in the section below. A rock table is at the front of the “classroom” near the creek for experiments and materials. The classroom has easy access to the creek for lowland and wetland experiments.
Core Master Plan

The main loop of the design encompasses a variety of demonstration gardens and other site features. As seen in the plan below, the core area has a natural form with lobes containing three different experiences. The first lobe is the Nature Center for indoor education and exhibits, which sits just inside the forest canopy and at the end of the entrance with a shade garden as its entrance feature. From there the visitor can walk out of the building and continue on the path around the gardens to the picnic and play area for a more active experience, where the play equipment is found. The final lobe contains the amphitheatre, which allows for an isolated learning and group gathering experience. Once around the amphitheatre the path leads along the edge of the property to loop back up to the entrance path. Overall, the main loop travels in and out of the forest edge and provides a comfortable walking experience around and through many different habitats.

The primary design element of the core area is the path system. There are a variety of paths that lead visitors through the core area for different learning experiences. The leisure visitor
is able to take the main loop that winds in and out of the forest and around the demonstration gardens while leading the visitor to the different lobes of the core. There are resting stops throughout the loop that are set within the gardens. The secondary path system is a 4-foot wide path that brings the visitor through the different demonstration gardens. At the intersection of this secondary path system is a fire pit for nighttime camps and education programs. The tertiary path system is the final path system within the core. This system of paths is only 3-feet wide and leads the visitor into a more in-depth educational experience about the gardens and allows for the hands-on learning. Located in the middle of all of the gardens is an 8-foot circle to serve as a gathering node for groups. This circle will allow a group that is touring the gardens to stop and discuss each individual garden. The tertiary path system is the main educational loop. This system allows groups to get the most in-depth learning experience through being closer to the gardens and using hands-on learning.

**Demonstration gardens** are a valuable educational experience that creates the opportunity to learn about several plant species and garden types. The benefit of this design is there are several garden types within this environmental education center. The types of gardens that are found here are: compost, butterfly, perennials, fragrance, herbs, market, autumn, water, native wildflower, shade, and xeriscape. They are organized to compliment one another. Hedgerows or paths divide the gardens. To divide the market garden from the perennial garden, a trellis was placed to allow vine plants to crawl. The image below shows the
different gardens and how they relate to the paths. The gray path represents a harder paved surface where the brown represents a softer, mulch path. A group gathering in one of the learning nodes can be seen in the distance, in the middle of a garden.

The **nature center** is another major element of the design. The shape of the building was influenced by the natural form of the path system and can be seen below. There is a circulation pattern within the building that is formed by its shape. An entrance from the shade garden down the main entrance leads a visitor straight into the building. Once inside the building the visitor is greeted by a large open area that is used for exhibits. The classroom is just on the other side of the wall, as the section shows below. Also, the isometric and section below show the relationship of the restrooms, exhibit space, classroom, and surroundings. The section is taken from the center of the building at the restrooms through the classroom.
The **maintenance area** as stated earlier has its own entrance from the road and also a buffer from the main pedestrian entrance. At the south side of the maintenance building, a private access drive to the gardens and nature center can be accessed. Directly off that drive is the compost area and accounts for one of the demonstration gardens. The maintenance staff can access this area, with no disruption to the rest of the garden area. However, along the pedestrian entrance is a vegetative buffer and wooden fence with doors for a visitor entrance. This feature allows visitors to see the compost area and learn how composting works but also does not encroach on the entrance experience.

The final aspect of the core master plan is the **play and picnic area**. The existing play structure was kept in its original position, on the edge of the open area. Trees were added for shade toward the demonstration gardens and picnic tables and benches were placed strategically around the area. A path leads from the secondary garden path to the play area and another path that creates a shortcut around the play area to the main loop path. The area between the shortcut and the secondary garden path is an open lawn. This feature allows for children to extend their play slightly out of the play structure but still prevents children from interfering with garden tours.
The goal of this project was to design an environmental education center and nature preserve for Delhi residents that reflects the need and desire for environmental education on the community level. The solution presented here accomplishes that goal. Through thorough research on designed open space and environmental education, an in-depth site inventory and analysis, the conceptual design phase, and the final design solution this project represents what the goal of a landscape architecture comprehensive project attempts to be. The final design solution shows the response of the complete site analysis including a slope and soil analysis. The creative solution for this project creates an environment conducive to interpretive learning and leisure activity. The design elements as presented in the program were creatively designed in the final solution of trails and a core area that embraces the entire site to the most sensitive as well as developed solution as possible. The trail levels create a variety of experiences for environmental education. The gardens provide opportunity for hands-on education as well as leisure, interpretive learning.

Environmental education is a rapidly growing area of interest to many people. Landscape architecture plays a pivotal role in incorporating environmental education into the landscape. The Alabama Wildlife Federation states:

"Education is the most important and challenging task our generation faces to ensure the success of following generations. The second task is to pass on a heritage, which will provide the quality of life each of us would like to see for the future. Environmental education offers the opportunity to accomplish both of these, and it is absolutely necessary that we accomplish both, at the same time." (www.alawild.org)

This quote inspires each reader to do something about environmental education. After reading this quote I was enthusiastic about creating such an effort as this project has created for me. The accomplishments of this project support the idea of this quote and the goals previously set forth. To inspire the readers of this report I will conclude with the opening quote from Ishmael.

"What you must do is teach a hundred people what I've taught you and inspire each of them to teach a hundred."
Annotated Bibliography


Many contributors to this book outline the many influential members of landscape architecture in America from its beginnings. The introduction by William Tishler, member ASLA, gives a brief history and evolution of the profession. This book was used as a resource of historical places that make up our profession, such as cemeteries and recreational areas.


The author of this book gives a background and perspective of nature trails in parks. He goes into detail about the different types of trails and the design and construction of these trails. Also signs, labels and guides are described and the effectiveness of teaching on the trail is discussed.


Fogg gives an extensive set of guidelines to follow when designing a park for every element within a park. While only just quoted in this report, this book served as great guidance during the design process and discovery.


This letter was written by the clerk (Daniel Hilvert) of the Delhi Township Board of Park Commissions to the Delhi Historical Society for statistical information. The title of the letter, “Rise of the Urban Township: Delhi Township, 1950-2000,” gives a great idea of the purpose of such statistics. For this study the information provided was used for background information on the growth Delhi has seen in the past 50 years.

The Stanbery Park Final Report details the process Human Nature went through to design the master plan of the park and the history that helped the firm get to that point. It also included notes from every public meeting held concerning the park. This was an extensive source for the case study on Stanbery Park.


This book is a narrative about an ape that teaches a man about the world from him point of view, as a creature of nature. Ishmael is the ape and he tells the man about how humans live and gives a different look at the story of creation.


The author gives a brief history of parks and how they have affected the American way of life. They have been a retreat for those needing to get away but also help with our psychological well-being. This book is a great reference for general history but more importantly general guidelines that pertain to all parks.


The author explains an extensive history of the profession of landscape architecture. It is presented in numerous chapters starting with landscape architecture in the western world from ancient times to mid-19th century. Then chronologically brings the reader a timeline of events of the past century that have occurred after acquiring the title ‘landscape architects.’ The chapters included in this paper are XIX-XX, which mostly concentrate on Olmsted’s work from the beginning through his work in Boston.


The authors of this book, as stated in the title, give a history of recreation in America in relation to Frederick Law Olmsted. Another important feature of the book
identifies our recreational needs by performance elements such as active/inactive. This book is helpful for general recreation guidelines mentioned in the Related Literature.


This book is an excellent source for the Boston Park System designed by Frederick Law Olmsted, with everything from the beginning of the system to every element of the “emerald necklace” and even to what was planned but never constructed. Zaitzvsky was an excellent resource for my Boston neighborhood park case studies.

World Wide Web Resources

www.asla.org, 24 April 2002
American Society of Landscape Architects’ web page where landscape architecture is defined.

www.alawild.org 24 April 2002
This site is the official site of the Alabama Wildlife Federation. The source provides support for environmental education and defines why it is important.

www.epa.org 24 April 2002
This site is home to the Environmental Protection Agency. It provides a wealth of information of many, many topics. For this report, the website was used to define environmental education. It also quotes the United Nations Educational, Scientific and Cultural Organization, Tbilisi Declaration, 1978.

www.ci.windsor.ca.us.html 6 February 2002
Website where community park was defined.

www.globalsustainability.org/education/definitions.html 24 April 2002
Website for sustainability organization where sustainability was defined.

www.sru.edu/depts/pcee/profdevmt/resources/definition.html 6 February 2002
Website for environmental education where it is defined by the Pennsylvania Education Advisory Council Report.
Appendix A

Tree Species:

*Acer negundo:*
Boxelder

*Acer rubrum:*
Red Maple

*Acer saccharinum:*
Silver Maple

*Acer saccharum:*
Sugar Maple

*Celtis occidentalis:*
Hackberry

*Cornus florida:*
Flowering Dogwood
Robinia pseudoacacia: Black Locust

Ulmus americana: American Elm

Ulmus rubra: Slippery Elm
Invasive Species:

**Tree of Heaven**
Problem: Does not allow understory to grow
Control: Hand-pull young seedlings or use herbicides

**Bittersweet**
Problem: Limits native species of sunlight, nutrient flow, and overweighs tree-tops causing them to snap

**Garlic Mustard**
Problem: Outcompetes native species on woodland floor, shades out natives because of longer seasonal life

**Amur Honeysuckle**
Problem: Shade out native vegetation, produce abundant seed supply that spreads

**Multiflora Rose**
Problem: Displace native plant species with thickets, safety issue with trail users because of thorns