ECOLOGICAL MINIMALISM
AN APPROACH FOR DESIGNING URBAN PARKS

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THESIS
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Abstract

As defined by the author, “Ecological Minimalism” means an intervention in the design of already developed spaces, which improves ecological function while increasing flexibility and amount of use. As a method for design, Ecological Minimalism prioritizes the subtraction of existing materials over the addition of new materials, whether organic or inorganic. In that way, Ecological Minimalism offers a useful technique for transforming and repurposing new landscapes from ones that already exist.

In this thesis, the test site is a portion of the Detroit riverfront, which serves disparate uses today: it is a busy entry to Canada, where several ports are operating extensively, and a series of parks and plazas along the riverfront provide recreational opportunities. However, the riverfront is wrought with desolation. Previous efforts to redesign Detroit’s riverfront have not been adequately forward-thinking enough to provide the riverfront with a provocative design for revitalization. “Ecological Minimalism” offers an opportunity for innovation with benefits for the river ecosystem, the City of Detroit, and its citizens. The principles illustrated in this demonstration project could be applied to redesign of other urban parks in parallel situations.

Key words

Ecological design, minimalism, urban parks, landscape architecture, Detroit riverfront
# Table of Contents

Chapter 1 Introduction

1.1 Research Overview

1.2 Research Goal

1.3 Driving Questions

Chapter 2 Theory and Literature Review

2.1 Ecology

2.2 Biophilia Hypothesis

2.3 Historical Development of Ecological Design

2.4 Ecological Design Principles

Chapter 3 Applying “Minimalism” to Ecological Design

3.1 Historical Development of Minimalist Design

3.2 Minimalist Design Principles

3.3 Definition of “Ecological Minimalism” and Principles

Chapter 4 Subtractive Thinking – Detroit Riverfront Design

4.1 Introduction to Site

4.2 Site Analysis

4.3 Site Design Strategy

4.4 Self-Evaluation

Chapter 5 Conclusion

References

Appendix
Chapter 1 Introduction

1.1 Research Overview

Humans are derived from nature and depend on nature, and the relationship between human and nature evolves with time. However, there was never a unique historical period in which humans were able to avoid transforming nature in either a positive or negative way. The modern city heavily transformed areas from the original natural environment, and concrete and steel structures and surface paving now fill up a majority of the spaces. As a consequence of over-exploitation and in pursuit of short-term profit, the balance of biodiversity and natural resources has deteriorated throughout centuries, both within human areas and natural areas.

Urban parks act as an important middle ground that keeps the connection between human and nature. However, impacts from humans on nature place urban parks in a difficult situation. Differentiated from natural national parks or political preservation areas that are specifically assigned to protect ecosystems in either urban or wild areas, urban parks have another goal, that is, to provide recreation place for public use. Inevitably, the transformation of existing natural settings occurs during the process of building parks.

For instance, Regent’s Park, which was built in 1811, London, constructed pathways in geometrical shapes with large areas of meadows and carefully trimmed bushes (Fig.1.1). Although the site was covered by vegetation, the original plants and topography were largely changed into artificial man-made landscapes (Meynell 1980, 135-146). The main idea behind 19th-century public urban parks is that the primary concern of designing a park laid not on ecology but “social issues” (Rogers 2001, 232).
Compared to these early public parks in history, contemporary designed parks focus more and more on natural aspects, and the concept of “sustainable” is now considered of high importance. In these parks, nature does not only serve as a visually beautiful and decorative element in urban parks, but also as a factor that contributes to the eco-system. The “Living Rivers” of the Dutch chapter of the World Wildlife Fund (Helmer et al 1992) illustrates how contemporary design-oriented landscapes contribute to ecology. Its pilot project “Blauwe Kamer” located near Wageningen, the Netherlands, creates biodiversity by excavating gullies to remold the flood plain (Thompson and Steiner 1997, 301). By remaking river islands and higher
grounds, a variety of wetlands are formed. The wetlands are beneficial to a variety of wildlife species, and are able to alleviate flood and erosion. Although the wetlands are built by humans, when compared with man-made, impermeable landscapes, for example, a concrete riverbank, these wetlands build in active processes that involve other eco-factors, and thus provide more varied benefits to the ecosystem. It is a significant development since the 1990s that humans began to reconstruct urban ecosystems following natural rules, in order to reduce negative impacts.

The high speed of development of cities, high population density and lack of green spaces leads citizens further away from experiences of nature. Therefore, another one of the main goals in designing parks should be to provide recreational places for citizens in a relatively natural environment. This situation requires more than just reconstructing an ecosystem to improve eco-quality, because building a park in a high-density-population city is usually aimed at providing recreational places for a large number of people. Among various built projects, one of the most successful projects is “Red Ribbon” (Yu and Chen 2007) in Qinhuangdao, China (Fig.1.2). This project is designed by a team lead by Kongjian Yu, and built in 2006. The Tang River shore is protected from being over-disturbed from human by planting various kinds of native species. The Red Ribbon’s curvilinear shape is not only designed for the purpose of being visually beautiful, but also to avoid disturbance or too much human impact from ecologically significantly important areas. It condenses its volume down to a narrow shape and serves as a multifunctional trail that allows people to sit, lay down, run, and jog. At the same time, the multiple-use trail consolidates activity spaces and maximizes planting area. By eliminating extraneous man-made materials and structures, it not only promotes ecological function, but also provides people with a highly interactive, social recreational public place. The design of Red
Ribbon is based on a comprehensive ecological analysis of the site and exhibits a respectful design attitude towards natural space (Wang and Kong 2008, 20).

Fig. 1.2 “Red Ribbon” project provides multi-functional pathways. (Yu 2001).

Key concepts such as “sustainable,” “ecology,” “nature,” and “ecosystem” seize more and more attention. When designing urban parks, designers begin to care for humans as a whole community in the context of other natural communities, rather than just seek for a way to provoke social response for a small group of people. The process of changing design attitudes towards nature has followed a time sequence that is historically progressive. Later in this thesis,
selective “eco-” related theories are studied and presented either as major or minor impacts on design approaches.

1.2 Research Goal

The thesis explores an appropriate, organized and integrated guideline for landscape architects to minimize negative impact on natural process when doing design works. Selected precedents are studied and explored to trigger inspiration to define “Ecological Minimalism,” and theories intimately associated with ecological design are researched. “Ecological Minimalism” simply combines two well-known terms. The term “minimalism” has received different interpretations and applications in a variety of design fields. Kongjian Yu, the famous landscape architect, has mentioned the term ecological minimalism in his interview with Jared Green about the “red ribbon” project, published on the ASLA website, 2008. As applied by Yu to his project, ecological minimalism means to “create a dramatic landscape through minimal intervention” (Green 2008). Yu's design does not focus on “gigantic, baroque-style” landscape provided with functions needed by urban people; instead, Yu's focus is on minimal intervention and the use of modern art and technology (Green 2008). And although the term has been introduced by Yu, as I further define it in this thesis “Ecological Minimalism” has neither been theorized nor broadly applied. Therefore, one of the important driving goals of the thesis is to define “Ecological Minimalism” for landscape architecture. To show whether the theory works properly, a site is designed using principles from “Ecological Minimalism” to demonstrate in what context the term works, how particularly it can be applied, and what the consequence is. Based on these considerations, the thesis framework uses a site design as its strategy.
1.3 Driving Questions

Because “Ecological Minimalism” has not been clearly defined, theorization and generalization are significantly helpful to determine its key meaning and key concept. The first driving question of this thesis is: based on evidence from design precedents, what principles from minimalism can be applied to ecological design? By studying the inner meaning of minimalist design principles, inspiration and examples can be provided for ecological designers.

Also, because “Ecological Minimalism” in this thesis is newly defined, it is necessary to illustrate its application for a real project. Therefore, the second question is: in what context can Ecological Minimalism be applied to a site? Although Ecological Minimalism can be put into practice in many different ways, it is not suitable to any randomly picked site. Explaining why the principles of Ecological Minimalism should be applied to certain sites other than all is helpful for understanding its limitations and benefits.
Chapter 2 Theory and Literature Review

2.1 Ecology

An understanding of different definitions of ecology helps us understand the origin and ultimate goal of ecological design. In this thesis, it is particularly helpful because the application of ecological principles is based on how ecology is understood. There are various definitions of the term ecology. The etymologic definition of ecology (Online Etymology Dictionary 2012) is the "branch of science dealing with the relationship of living things to their environments,” coined by German zoologist Ernst Haeckel (1919). The root word from Greek, oikos, means "house, dwelling place, habitation […]" It emphasizes the relations of organisms to one another and to their physical surroundings. In science, ecology is thought to act as an intact machine. Conventional scientific definitions of ecology thus emphasize its inner components, their connections and interaction. No single component can be adequate for an ecosystem in nature to operate normally and in good health.

Shelley and Bowring (2004) define ecology as “about control in a sophisticated way, a way that uses scientific knowledge to minimize harm to processes and resources” (Shelley and Bowring 2004, 71). This definition emphasizes design and ecology’s role to protect natural resources and promote natural performance. The definitions of ecology in science and in Shelley and Bowring’s article seem to emphasize different aspects. But only by knowing that ecology is an intact system containing a variety of elements that are connected to each other can the ultimate goal of “minimize harm to processes and resources” be achieved.
2.2 Biophilia Hypothesis

While ecology emphasizes interaction, cooperation, and connection among factors, the Biophilia hypothesis reminds us of the inherently natural connection between humans and nature. According to the Biophilia hypothesis, humans have an inherent inclination to connect to nature: because humans have spent most of their evolutionary phases adapting and living with nature, it is argued, humans are naturally better adapted to natural environments than man-made ones (Kellert and Wilson 1993). Based on this theory, it is possible to conclude that places with better natural condition are more preferred by humans. Furthermore, we may assume that providing or preserving a large portion of natural conditions is better than constructing new artificial environments, especially when the urban park is located in a high-density district. The Biophilia theory also helps us understand the deepest and undeniable connection between human and nature. If we accept that human’s inclination and association with nature is a psychological trait, it serves the necessity as well as the rationality of ecological design. It also serves to strengthen the argument in favor of “Ecological Minimalism.”

2.3 Historical Development of Ecological Design

The antecedents of ecological design may be the self-formed, informal application of local materials as developed by farmers. They use their knowledge of local ecosystems and biodiversity to guide their enterprise (Fan and Freedman 2004, 99). For example, farmers grow crops and use them as their food source, or collect organic compost to cultivate and nourish local farmlands. Architect Frank Lloyd Wright’s idea about “organic architecture” (Hess 2006) helped this concept of vernacular or natural knowledge enter the fields of architecture and landscape architecture. Wright used local materials such as stone and wood to provide certain functions
such as traditional passive heating and lighting systems, which undoubtedly save more energy and express a regional landscape sustainability. As a result, using renewable materials, vernacular forms and the recycling of materials is widespread within the contemporary architectural field.

Landscape architect and writer Ian L. McHarg (1969) claimed that “ecological systems reflected in natural landscapes should be the basis for decisions on the meaning of human appropriation of land for development” (Fan and Freedman 2004, 101). This claim instructs the world to respect the rules and arrangements of ecological systems. Later, during the 1970s, biologist John Todd developed the “Living Machine.” This technology restores polluted water by applying natural ecological restoration functions. It is particularly suitable for wetlands, and thus offered great inspiration and opportunity for ecological design in landscape architecture. Later, the idea of duplicating systems of natural operations or functions developed further. Benyus (1997) coined an idea that good design “studies nature’s models and then imitates or take inspiration from these designs and processes to solve human problems.” This idea builds works by imitating natural phenomenon and creatures. From the idea of simply using local resources to improve or increase crop harvests, then to respect and stimulate natural objects, now what we may call rudiment of ecological design developed itself into a branch of design in landscape architecture.

In the 21st century, eco-design in landscape architecture is widely accepted and acknowledged in professional journals, offices, and university courses. A better understanding of ecological design and development processes has changed how designers view the world. In particular, human demands and needs are now considered within the context of ecological systems. There has been a great deal of discussion about how ecological design principles should
be employed in designing natural environments. However, the ecological design approach is mostly applied to large-scale sites. For example, a wetland park is ecologically efficient and beneficial to the improvement of biodiversity. Its scale should be large enough to contain certain volume of water for different wildlife species to survive. Big scale is also important to control water level and alleviate droughts and flood, thus improve the regional ecosystem. Existing research about ecological design primarily focuses on ecological planning and design, which are mostly applied in large-scale parks. For example, the book “Landscape ecology principles in landscape architecture and land-use planning” (Dramstad, Olson, and Forman, 1996) shows numerous analysis diagrams of different ecological conditions, and how those conditions will affect the development of ecosystem. Unfortunately, small-scale sites typically act as only one patch of the whole picture: being isolated and disconnected will easily lessen the value and contribution of ecological design to smaller sites.

Therefore, the purpose of this thesis is to try to fill this gap by identifying the most appropriate and pragmatic opportunities for ecological site design approach for small-scale urban parks.

2.4 Ecological Design Principles

According to Fan and Freedman (2004), Yu (2001), Lyle (1985), and Johnson (2002), design for human ecosystems using fundamental principles of ecological design are primarily integrated and understood as follows:
Principle 1: “Locally sufficient economic system” (Fan and Freedman 2004)

First, a “locally sufficient economic system” (Fan and Freedman 2004) means a movement towards resource sustainability. Landscape architecture designers should be aware of where they are, and what humans can do with the local resources. For instance, the “Hani Terrace” in Guizhou province, China, represents an astonishing vernacular landscape. Without designer’s manipulation, this landscape has been formed by local residents working on their fields over many generations. The water flows from higher elevations down to the foot of a hill: these terraces at different elevations use gravity to collect water gradually, thus the energy flow is natural, flexible and energy-saving. The use of local resources makes the terraces capable of regenerating their soil nutrients after harvesting, thus they are potentially available for many generations. Comparably, although non-renewable resources such as petroleum and fertilizer may contribute to economic growth temporarily, a series of problems will eventually be caused by using up these sorts of resources unless a substitute can be found.

Secondly, locally sufficient economic systems are more likely to eliminate “natural debt” (Fan and Freedman 2004, 103). It is understood that solely pursuing short-term, unsustainable interests will harm future profits; if humans owe a debt to nature, thus to pay off the debts, human will have to “pay” a lot in terms of remediation, new structures, etc. to make up for their previous mistakes. For example, the concrete riverbank is capable of offering a recreation place, however, once the water was separated from soil, it can cause long-term problems, for instance natural biodiversity may decrease, or flood control becomes difficult (Fig. 2.1). To the contrary, when the roots meet water, soil is held soundly; flooding problems, in many cases, are automatically solved on account of root’s adjustment ability. This is one example of how ecological design can eliminate natural debts.
Principle 2: “Maintain ecological integrity” (Fan and Freedman 2004)

An ecosystem is an intact life system that consists of diverse sorts of energy and life nodes. Elements within an ecosystem interwine with each other, connect to each other, and rely on each other. Destruction of any of the elements in an ecosystem will lead to a fracture or fragmentation of the whole system. The maintenance of natural flows’ dynamic process is significantly important and meaningful. To protect ecosystem from being destroyed, designers should gain a detailed understanding of local resources, operating system, energy flows, biotic communities and other aspects associated with ecological system.
Principle 3: “Letting nature do the work” (Lyle 1985, 16)

An ecosystem evolves over time, without rest, providing organisms with a variety of products in order to maintain their regular demands including human needs. Water can be purified by natural filtration; toxins in the soil will decompose over time; natural vegetation is pollinated for flowering, fruiting and reproduction; microclimate is regulated. The inherent implication is saying that the natural ecosystem doesn’t produce trash; every healthy ecosystem has an integrated food chain (Yu 2001, 6). Human disturbance sometimes interrupts these processes and lead to environmental problems. Compared to the effort required to solve new problems we caused, letting nature purify, regenerate, or renew itself is a much better choice.

Principle 4: Simulate natural ecosystems

Because natural ecosystems have kept optimizing for thousands of years, the way natural factors are composed can stimulate inspiration when humans try to find an effective way of design. The advantages of natural composition are displayed in many design fields. For example, in the design of an industrial park, “the discarded material of one process becomes a resource for another” (Fan and Freedman 2004, 103). This kind of transition allows the consumption of energy to be reduced, and the generation of wastes to be minimized.

Other fields, for example, horticultural landscaping, should be designed to mimic the ecological dynamics, including the use of native species to develop replica of natural communities. In this way, not only the energy and resources will be saved, but native species and the way biodiversity have co-evolved together acts as an optimized rule, protecting native plant communities from being invaded by non-native species. In some cases, non-native species are
not only dangerous due to lack of natural enemy, but are fragile compared to native species, thus increase the risk of losing and wasting resources and energy. Nowadays, many constructed wetlands are functioning as “earth’s kidneys” (Nowlan and Jeffries 1996, 14), which purify water, lessen erosion and raise water table, thus they function similarly as natural wetlands. Although the constructed wetlands are created by human effort, they also work well with their eco-system because designers obeyed natural process and designed with careful evaluation of natural resources.

**Principle 5: Protect natural resources and habitat**

One of the most serious results of over-exploitation is the extinction of wildlife species. Natural habitat provides wildlife with a niche to survive, especially in highly urbanized area. It is not an easy task to urbanize an area while making effort to preserve its intact ecosystem. Designers have to be rational to balance the loss and gain between human and nature. For areas that are not necessarily intensively used by humans, ecological risks can be “offset” (Fan and Freedman 2004, 104) to some extent by designing such landscapes. In many cases, protecting natural resources and urbanizing an area are not contradictions to each other; it may be possible for careful decision makers to achieve both of these expectations. Ecological design of an urban park can largely preserve existing resources compared to other constructed areas in a city, while also inviting people to come in and enjoy their daily lives.
Principle 6: “Increase environmental literacy” (Fan and Freedman 2004, 104)

In many practical projects, designers, business investors, governments, citizens, managers, and people from different academic fields cooperate with each other (Fig. 2.2). A disagreement may occur when any of these participants lack environmental literacy, and thus prevent ecological design from being applied to real sites, or prevent the design from becoming a balanced and beneficial one. Environmental literacy actually represents “how much people are willing to ‘pay’ for sustainable development.” (Fan and Freedman 2004, 104). It is not an easy task for people from multiple areas to be aware of how important it is to meet an agreement regarding ecological design and human’s future, however, it is the best way to boost ecological design into real practices. To increase environmental literacy, not only designers, but the entire community should be “literate about the causes and consequences of ecological damage.” (Fan and Freedman 2004, 104), thus their choices and suggestions can be correct at different time periods.

Fig. 2.2 Partnership & teamwork in a landscape project. Diagram created by author.
Chapter 3 Applying “Minimalism” to Ecological Design

3.1 Historical Development of Minimalist Design

The origin of the concept of Minimalism has its roots in the social and artistic contexts. Walter Gropius (1883-1969) established “The Bauhaus” in 1919, offering a new kind of design pedagogy based on abstraction, construction, and a profound understanding of materials (Wikipedia 2012). With technical improvements and material development, modern designers were more inclined to use modern materials and rational forms to create their design works. The school advocated a proto-minimalist design in both furniture design and architectural design.

Later, in the 1960s, the economic resurgence and social industrialization in United States brought about an opportunity for people to rethink the modern civilized society. Public’s concern, introspection, and resistance towards the civilization and previous trend of art thoughts are reflected in the art world. In this context, minimalism appeared as a subversion of traditional artistic spirit.

The style called Minimalism started with a movement called “Minimal Art,” inspired by a 1965 publication by Richard Wollheim (Meyer 2001, 142). The movement was a reaction against Abstract Expressionism, famous for its abstract use of color, marks, and gesture to display or inspire emotions from people’s inner world (Wolf 2012). At that time, the minimalist movement can probably best be understood as an alternative form of expression that stimulated the intellect more than emotions. Minimalism aimed to display the original form of objects to the audience by “removing the appearance of composition from [Abstract Expressionism artists]
work” (Wolf 2012). It can be understood as using simplified or “transparent” effects, forms, and objects to represent ideas.

In its early stage of development, minimalism was advocated and claimed in art fields, primarily painting and sculpture. Minimalism at that time worked to reduce colors and figures to simplify paintings while abandoning elements likely to disturb the main idea or effect (Lin & Wu 2012, 1). Obvious signatures of minimalism include the right angle, grid, rectangle, cube and other geometric forms represented in art works.

Later in 1980s, minimalism became a profoundly accepted, quite influential design style. Because of the declining economic situation of United States, material consumption was largely reduced, which indeed impacted the design preferences to a considerable extent. Therefore, minimalism gradually became one of the mainstream design styles, and inspired designers to use less materials, purified surfaces, and concise forms (Lin & Wu 2012, 1). Donald Judd (1928-1994), one of the most influential Minimalist artists in the 1960s, began to apply minimalism to furniture design in 1984 (Lin 2012, 80), thus representing the diversified development of Minimalism.

In landscape architecture, Peter Walker (1984) developed a signature design style for what he called the “minimalist garden.” The Tanner Fountain, located in Harvard University, USA, is one of his typical works representing the application of minimalism. Inspired by the minimalist sculptor Carl Andre, Walker placed 159 granite boulders around the fountain. The geometric configuration of these rocks are not solely arranged for aesthetic consideration, it also invites people to participate in the landscape (ASLA 2008). Peter Walker’s application of minimalism in landscape architecture design is innovative and creative; however, besides the use
of materials, geometric forms and plant configuration, minimalist gardens may also be commemorative and mysterious (Zhang & Zhou 2013, 77).

In the 1990s, people came to realize the severe consequence of ignoring environmental and energy issues. Over-consumption of natural resources threatened human development, a realization which eventually forms the basis of the existence and development of Minimalism. “Back to basics” (author unknown), a far-reaching aphorism at that time, represents people’s desire to return to fundamentals, and to go back to objects’ original status (Lin & Wu 2012, 1).

Today, minimalist design is applied in a variety of areas including web design, industrial design, product design, even cuisine and other design areas. Minimalist designers from different fields apply minimalism onto works using their own principles and criteria. Unlike early minimalism, contemporary applications of minimalism vary in structure, form, function and other contents. Minimalism has been well developed in landscape architecture as well as other areas. However, there is little research showing how minimalism may be closely associated with ecological design. Comparing and synthesizing several principles from minimalism and applying them to ecological design represents an innovative way of thinking about alternative approaches to landscape architecture.

3.2 Minimalist Design Principles

Minimalist design in different fields of practice typically has different principles, resulting in different designed works. Although these differentiated principles have their roots in the same historical context, it is inadequate to solely use principles from a particular area to
represent or explain minimalism in general. Thus, based on previous research, minimalist design principles are summarized by author as follows.

**Principle 1: Eliminate redundant content and excessive decoration**

Eliminating unnecessary decorative elements in design conveys one of the core spirits of minimalism. With too much content and decoration, not only the central object, or key idea become blurred, but it is also a waste of material, space and human effort. One familiar quote that represents this idea perfectly is “less is more” famously assigned to the German architect - Ludwig Mies van der Rohe (Wikipedia 2012), he is considered to lay the groundwork for minimalist design in architecture. This phase can be understood to mean: “use minimized elements to create maximized function” (Lin 2012). For example, collect the basic elements that are necessary for a building to operate and organize them in a simple architectural form. The architecture may seem simple, however, its functions are intact, or even more intact than the ordinary building because these elements are well organized, serve multiple functions, or use advanced technology. If a kind of floor is designed to obtain electric heating function other than just ordinary floors, its function is maximized, while at the same time a set of extra heating devices can be saved. The meaning and application of “less is more” is not limited to such examples, however it conveys a simple yet precise idea-in minimalist design, nothing but the most useful elements are retained. Eliminating unnecessary decorations also helps to create the “Zen-like serenity” (Interior Design Tutor 2013) that is more visually appealing than overly decorative beauty.
Principle 2: Use appropriate materials

Use of materials has been significantly important in minimalist design, especially in architecture, industrial design, interior design as well as other design areas. Mies van der Rohe, a German architect who is considered to lay the groundwork for minimalist design in architecture (Spyrestudios 2012), used newly developed materials for his age (around 1950) such as steel and plates of glass to build the architecture. By using these materials, his idea that the way of constructing architecture should be industrialized was realized (designboom 2008), because these materials themselves are the products of industrialization. Different materials result in different texture, hardness, elasticity, and other aspects. Using the proper material may be able to overcome some technical problems which otherwise cannot be solved, or only partially solved. For example, the “Magic chair” uses a continuous, single steel chair leg to support human weight; this design requires the material to have high rigidity to support the weight, while at the same time be able to maintain considerable elasticity to be comfortably adapted by human body (Lin 2012).

In landscape architecture, material use is less about technique, but closely related to the character. Landscape minimalist designers incline to choose “modern materials with few decorative details” (Zhang & Zhou 2013) such as stainless steel, glasses, wood, and rocks to represent its essential appearance, thus the use of material is accordance to the idea of simplicity and purity. Peter Walker’s designed works, for example, Nishi Harima Garden Science (1993), Toyota Municipal Museum of Art (1995), and Sony Center (2000), use industrial materials to create abundant indoor and outdoor spaces. Although there is few decorative detail on these materials, designers are able to provide different kinds of spaces by rearranging and repeating them (Hewitt 2008).
Principle 3: Empty space is vital (spyrestudios 2012)

In minimalist design, empty does not mean nothing, indeed, it brings better flexibility to the design. This is the opposite side of over-decoration. Leaving certain amount of empty/white space highlights the clarity of the main subject over other elements, while it discourages disturbances of focus or/and attention. In a Japanese garden, empty space means “freedom of movement” (spyrestudios 2012), it can also be understood as providing more conceptual choices and larger functional flexibility for growth or movement. A similar idea is widely used in interior design: a wall with fewer decorations and more empty space provides “visual breathing space” (Interior Design Tutor 2013). Fewer pieces of furniture in an apartment provides greater opportunities for people to choose their paths and activities, and so on.

Principle 4: Minor detail matters

Under the circumstance that needless elements are already eliminated, the remaining details may be amplified and emphasized, therefore, every detail of the design is vital. The website “smashing magazine” (smashing magazine 2013) gives an example of the importance of combining different-size fonts: “oversized typography in the header and the thin borders between elements make the website stand out.” Alternatively, if the designer neglects the typography or font size, audiences may get confused, or lose their patience when reading the website. It is also important to organize the spacing and arrangement of content, border and other subtle graphics. Details in minimalist architectural design include the proportion of space division, materials, and other details. Minor detail reflects how carefully minimalist designers conceptualize, construct, and thus represent their ideas. For users/audiences, a minor detail may inspire fascination and change how they view a design work.
3.3 Definition of “Ecological Minimalism” and Principles

Eco-character of minimalist design principles

The idea of ecological minimalism is rooted in the principles of minimalist design. Although it is well-known that the minimalist garden landscape has already been developed (Walker 1997), ecological minimalism has its own character—let’s call it “eco-character.” Table 3.1 explores the similarity between principles of minimalist design and ecological design (Figure 3.1); further, it suggests potential applications of these principles in ecological design problems on smaller sites, thus acting as a catalyst for extending the definition and testing potential applications of Ecological Minimalism. (Fig. 3.2)
<table>
<thead>
<tr>
<th>Minimalist design principle</th>
<th>Value Statement</th>
<th>Eco-character</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eliminate redundant content and excessive decorations</td>
<td>This principle requires a subtractive thinking process. The process subtracts or edits until the design stops functioning. Subtraction and simplicity doesn't reduce value, it establishes order and defines priority.</td>
<td>The similarity between ecological design and minimalist design is they are both editing or subtracting instead of adding. Ecological design reduces human disturbance as much as possible to maintain natural integrity, while minimalist design eliminates all things that are not essential to its function. At site scale, eliminating redundant elements in ecological design can be described as reduction in (1) places that are isolated, abandoned, or/and harm ecosystem; (2) places that are less used, whose function can be replaced by other places; (3) places that have too many decorative elements such as decorative plant species which are dangerous and so forth. At detail scale, the redundant elements include certain infrastructure, such as part of the hard-paversments, excess number of lights that consume a great deal of electric power, etc.</td>
</tr>
<tr>
<td>Use proper material</td>
<td>Use of material in minimalist design doesn't try to symbolize subjective ideas, but helps audiences concentrate on the designed works only. Most of them use non-natural or industrialized materials. So the use of material only aims to interpret the function and process of manufacture of the object.</td>
<td>Material usage in minimalist design varies from one to another. In ecological design, less man-made material is used, the more eco-friendly is manufacturing, and the more space for natural species to survive. Therefore, this minimalist design principle should lean towards (1) using as little man-made material as possible; (2) using environmental-friendly material; (3) use recycled material, and reduce carbon-footprint.</td>
</tr>
<tr>
<td>Empty space is vital</td>
<td>Empty space results from reduction and editing process. The value of empty space lies in its flexibility, its imaginary space, its clarity and its purity.</td>
<td>Empty space in minimalist design, in a way, represents &quot;breathing space&quot; (Interior Design Tutor 2013). Empty or open spaces amplifies main subjects in the design, while at the same time increases possibilities and choices. To create breathing space in ecological design is to leave certain area on site without disturbance and without program. Let natural conditions develop, regenerate, and maintain automatically, self-adjust ability of site will direct ecosystem to develop towards a better result. Also providing multi-use space for human activity to enlarge green space helps to improve the ecosystem.</td>
</tr>
<tr>
<td>Minor detail matters</td>
<td>In the minimalist design style, details should be relatively non-decorative. They are clean, expressive functional, open to review and appealing. The details serve to aid the main function and reveal its structural or manufacturing process.</td>
<td>A little change can make a big difference. In ecological design, these details can be one species in local food web or a small area that is ecologically important. Relating to this matter, a comprehensive analysis of the existing condition of the site becomes significant because it decides how the minor details divert and reveal large process.</td>
</tr>
</tbody>
</table>

Fig. 3.1 Minimalist design principles, value statement, and eco-character. Diagram created by author.
<table>
<thead>
<tr>
<th>Related examples and potential application in ecological minimalism</th>
<th>To do work</th>
<th>Is it suitable for small-scale urban parks?</th>
<th>Present in site design in this thesis?</th>
<th>Ecological Minimalism principle</th>
</tr>
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<tr>
<td>Soften riverbank; let vegetation control flooding, let soil and surface grading collect runoff. In horticultural design, avoid using plant species that require high maintenance or are invasive. Based on human demand, design multi-use places to minimize single-use areas or structural area.</td>
<td>Overall site analysis of unnecessary elements, how to properly eliminate them, and why; how to repurpose or utilize waste material on site; how to reveal ecological design processes.</td>
<td>Yes</td>
<td>Yes</td>
<td>(1) Editing, Subtractive thinking when doing design works; (2) Begin with intimate Site-scale Analysis.</td>
</tr>
<tr>
<td>Use waste materials to create filters to purify water, or create habitat. Use the recycled material to help create part of new landscapes, such as ponds, floating deck, etc.</td>
<td>Designer choose to use new material, or existing material. Where to reuse these materials and what is the potential result should be considered before application; revealing process of constructing site history is a “plus”.</td>
<td>Yes</td>
<td>Yes</td>
<td>(3) Repurpose or recycle existing materials on site to generate new landscape dynamics.</td>
</tr>
<tr>
<td>Avoid disturbing eco-important areas such as riverbank, existing tree, or wildlife habitat to limit human encroachment in small areas. Provide multi-use space to improve space utilization efficiency, while maximizes green space which is beneficial to the ecosystem.</td>
<td>An analysis of whether such “empty space” exists within the site. If it exists, the most ecologically complex, or fragile area should be preserved. Based on human demand, how big the multi-use area is, and what kind of activities can be held should be decided.</td>
<td>Yes</td>
<td>Yes</td>
<td>(4) Maximize green spaces and minimize human intervention; (5) provide multi-use spaces.</td>
</tr>
<tr>
<td>Use details to reveal construction and ecological function. Such as the construction of riverbank, the removal of partial paved ground, and rearrangement of border, drainage pipes, etc.</td>
<td>In real practice, designers may choose to cooperate with experts from different areas to finish detail design that requires special knowledge such as biology, construction, civil engineering, drainage construction, ecological restoration and so forth.</td>
<td>Yes</td>
<td>Yes</td>
<td>(6) Use design detail to reveal ecological, social and historical processes on the site.</td>
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</table>

Fig. 3.2 Applications of principles of eco-minimalism at the site scale. Diagram created by author.
As summarized from the tables above, some potential applications from minimalist
design principles to ecological site design include: (1) editing—subtractive thinking when doing
design work; (2) intimate analysis of site conditions and its development; (3) repurpose or
recycle existing materials on site to generate new landscape dynamics; (4) maximize green
spaces and minimize human intervention; (5) provide multi-use spaces; (6) transparency-use
design details to reveal ecological, social and historical processes on site.

Application 1: Editing-Subtractive thinking when doing design works

   The subtractive thinking strategy works oppositely to additive thinking process. Urban
parks, especially small scale urban parks, in many cases, are divided into several sections to
serve different recreational goals, however, among these sections some of them are not fully
used, or may be less popular. In this case, instead of adding sections to cover more kinds of
programmatic functions for the urban park, editing space and functions by using subtractive
thinking can result in a design that is more flexible and efficient. Park sections that are
insufficiently used by citizens should be deleted; the deleted area will then be used to enlarge
green space. In order to restore ecological function and eliminate needless complexity, what is
subtracted is programmatic complication.

Application 2: Begin with intimate site-scale analysis

   An overall analysis of the existing condition of the site is necessary before the subtractive
thinking design approach can be used. If a small-scale urban park is located in a downtown area
with high population density, and if the capacity to accommodate large crowds is the main
function of the park, then a conventional design approach would typically provide large area of flat and smooth ground to accommodate as many people as possible, thus the possible usage of the park is diversified, and the recreational space is enlarged. However, while some such urban parks are successfully used and popular, others are not. There are many reasons that may lead to the insufficient usage of urban parks, for instance, not accessible, low quality of infrastructures, lack of green space and so forth. For those urban parks that are under-utilized, ecological minimalism’s way of thinking process acts oppositely to the conventional design approach—it focuses on deciding elements that are not essential to the function, then eliminate these elements. Thus, an intimate site-scale analysis becomes vital, because its mission is to discover and decide the “unessential elements.” These elements include relatively large site-scale spaces, such as places that are isolated, abandoned, or/and harm ecosystem, places that are less used, whose function can be replaced by other places, and places that have too many decorative elements such as decorative plant species which are dangerous. Also in detail scale, the “unessential elements” include part of the hard-pavements, and excess number of lights that consume a great deal of electric power, etc.

**Application 3: Repurpose or recycle existing material on site**

Under the guidance of a subtractive thinking process, hard materials used on site should be minimized and aimed at promoting ecological function. In small-scale urban parks, however, broad compacted and/or impermeable surfaces are often demanded to accommodate intensive social or recreational uses. This thesis assumes these small-scale urban parks are already built by conventional design approach – large portion of hard surface consists of man-made material. On
this occasion, using existing material on site to create ecologically beneficial landscapes is material-saving, environmentally friendly, and creative.

Four precedents are selected to illustrate the recycling uses of materials. They are (1) MACBA from Barcelona; (2) Urban Outfitter Headquarters from Philadelphia; (3) Ballast Point park from Sydney; (4) Australia and Brooklyn Bridge Park from New York city. The four precedents each use recycled materials to transform existing or abandoned materials into newly designed objects (Fig. 3.3)

For example, using recycling material such as de-paved ground surface instead of newly invented one to fill in the riverbank to create fish and/or bird habitat—not only provides the site with potential green space, but also wildlife habitat. The use of material is actually functioning as one of the driving forces to promote ecological condition. However, because of limited time and knowledge, the exact construction details regarding how to appropriately reuse material is not discussed in this thesis.
### Precedents: Recycled Material Use

<table>
<thead>
<tr>
<th>PROJECT</th>
<th>TECHNIQUE</th>
<th>DIAGRAM</th>
<th>IMAGE</th>
</tr>
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<tbody>
<tr>
<td>Gordon Matta-Clark, MACBA: Barcelona, Spain</td>
<td>“BUILDING CUTS”- IN ABANDONED BUILDINGS, VARIOUSLY REMOVED SECTIONS OF FLOORS, CEILINGS AND WALLS</td>
<td>![Diagram]</td>
<td>![Image]</td>
</tr>
<tr>
<td>Urban Outfitter Headquarters, Philadelphia, USA</td>
<td>METAL WAS SAND-BLASTED, LEFT TO RUST, WOOD WAS RECLAIMED TO MAKE NEW STAIRCASES; WINDOWS WERE REMOVED.</td>
<td>![Diagram]</td>
<td>![Image]</td>
</tr>
<tr>
<td>BP (Ballast Point) Park, Sydney, Australia</td>
<td>WALLS, DECKS &amp; SEATING MADE FROM RECYCLED MATERIALS RETAIN STRUCTURE</td>
<td>![Diagram]</td>
<td>![Image]</td>
</tr>
<tr>
<td>Brooklyn Bridge Park, NY, USA</td>
<td>RECYCLED WOOD TO BENCH; GRANITE FROM ROOSEVELT ISLAND BRIDGE, SOIL</td>
<td>![Diagram]</td>
<td>![Image]</td>
</tr>
</tbody>
</table>

Fig. 3.3 Analysis & Summary of recycling approaches. Images collected from internet, edited by author. Diagram created by author.
Application 4: Maximize green spaces and minimize human intervention

As long as sufficient recreational activity space for human is provided, green space should be enlarged. It does not matter whether the green space is a natural preserved area, or if the vegetation is planted by human effort. However, this is not saying that the large area of man-made, high-maintenance meadow has the same quality of relatively natural wetland. If possible, the green space should be low-maintenance and ecologically-beneficial, not only saving money, but also contributing to biodiversity, air purification, and other aspects. This kind of green space is similar to the idea in minimalist design, it uses the least resource to reach the maximized function.

Application 5: Provide multi-use spaces

The goal of providing multi-use space is to increase the efficiency of space utilization. It condenses relatively large, single-used spaces into a relatively small area, but has a great deal of functions, therefore, the multi-use spaces become highly-interactive and dynamic. Another benefit of providing multi-use spaces is to maximize green space on site, which helps to reduce carbon-footprint, improve ecological performance, protect wildlife habitat and so on.

Application 6: Transparency-Use design detail to reveal ecological, social and historical processes on the site

In ecological minimalism, detail design helps to reveal the repurposing process. For example, the process of softening riverbank and constructing floating deck on the river will contribute to the flourish of aquatic plants, as time grows, the prosperous of aquatic plants
attracts more and more wildlife species such as birds, amphibians, and fishes to stay, breed, or rest. This process reveals the ecological process of the formation of wildlife habitats. Other design details, such as leaving part of the de-paved area unrepaird and let it develop by itself reveals the historical development process of this place. Design details in ecological minimalism also includes construction details such as drainage pipe arrangement, constructing recycled material into new landscapes, and so forth. These details reflects how the site is rearranged and how they influence on each other. Such applications give minimalism the meaning of revealing or letting people see through the material presence of one thing to the idea or process that is hidden behind it.

Definition of “Ecological Minimalism”

Based on this analysis of both ecological design and minimalist design, the definition of “Ecological Minimalism” is an approach to the design of already developed spaces, which improves ecological function and transparency while increasing flexibility and amount of use. As a method, Ecological Minimalism prioritizes the subtraction of existing materials over the addition of new materials, whether organic or inorganic. In that way, Ecological Minimalism is largely about repurposing, because every new landscape is made from one that already exists.

The approach is not simply adding minimalist design principles onto ecological design, but is about incorporation, emphasis, integration, and collaboration of both minimalist design and ecological design principles. It devises a flexible approach or framework that uses ecological design principles as a leading direction, while incorporating certain connotations of minimalist design, to generate an optimized design approach for small scale urban parks.
Chapter 4 Subtractive Thinking – Detroit Riverfront Design

The thesis provides a conceptual site design in order to illustrate how these eco-minimalist principals may be applied to a small urban site, this chapter focuses on practice rather than theory (Fig. 4.1). The purpose of providing a site design in this thesis is to testify (1) at what scale “Ecological Minimalism” can be applied to a site, and (2) what steps the method entails.

Fig. 4.1 Theoretical Framework of the thesis showing what is the relationship of the site design and previous research. Diagram created by author.
The design has four parts. The first part is an introduction to the site. It introduces fundamental information, questions and problems of the site and its context, with a driving question based on these problems and opportunities. The second part is site analysis. It is arranged to find out key determinants of the landscape that may respond to the driving question. The third part is to apply “Ecological Minimalism” on the site as a strategic application, to demonstrate how “Ecological Minimalism” functions. The last part is self-evaluation, which is aimed at identifying the shortcomings of the design and the limitations of the method. Some of these limitations may be improved with further research.

4.1 Introduction to Site

Fig. 4.2 Location map. Diagram created by author.
Fig. 4.3 The site is located adjacent to downtown Detroit. Diagram created by author.
Overall information

The area selected to test “Ecological Minimalism” is a competition site sponsored by the Detroit Riverfront Conservancy. The area is located between Cobo Hall and the Renaissance Center, between Jefferson Avenue and the Detroit River (Detroit Riverfront Competition, 2012, http://www.aiadetroitbydesign2012.com). The site occupies 14 acres on the riverfront and currently has enough open space capacity for 40,000 people (Detroit Riverfront Competition, 2012). Its location makes it a favorable host place for numerous cultural and ethnic festivals throughout spring, summer, and fall. (Detroit Riverfront Tour 2005). Notable events held here
include the Detroit Electronic Music Festival, Detroit International Freedom Festival, and Detroit International Jazz Festival (City of Detroit, year unknown).

**Riverfront activity**

As a riverfront park, the study site is easily accessible to downtown Detroit and expected to be heavily used, especially for walking and playing, because of the convenient transportation, excellent view and heavy stream of people. However, currently the site is abandoned and empty for the most of the time all year long (Detroit Riverfront Competition, 2012). Although there have been no formal surveys of site use, informal evidence suggests that the site is used most often during big events (Detroit Riverfront Competition, 2012).

The overall Riverwalk system along the Detroit River serves disparate uses today: the river is a busy entry to Canada where several ports operate extensively, and a series of parks and plazas along the riverfront provide recreational opportunities. In a bigger picture, the Riverwalk is prosperous while the larger context is blighted. How to revitalize the under-utilized site is an important yet difficult question (Fig.4.5).
Fig. 4.5 Chart showing the current differentiated situation of Riverwalk and project site. Diagram created by author.

Fig. 4.6 Existing site analysis. Images come from Detroit Riverfront Competition material, edited by author. Diagram created by author.
4.2 Site Analysis

To use a subtractive thinking approach, an analysis of the existing condition of the site is necessary. The main goal of analysis is to discover which sections and programmatic elements of the site are redundant while others are essential. Based on these results, redundant sections will be eliminated from the site, and only essential elements will be retained. The analysis is based on information collected from the internet and Detroit Riverfront Competition website. The analysis starts with a regional analysis, including population density, traffic condition, usage condition of surrounding parks and other analysis aspects. By integrating regional information, it will be clear to understand how the site interact with surrounding environments, what’s its role in the city, and what function it should contain to serve the city. Thus, the following functions/elements are judged to be indispensable.

Public plaza-Important event-holding place.

Several important festivals and public gathering events are held in Hart Plaza every year, comprising one of its most important functions.
Riverwalk-Connect pedestrian pathway with other places.

The Detroit International Riverwalk is a landmark of Detroit, extending from the Ambassador Bridge in the west to Belle Isle in the east. It contains a cruise ship passenger terminal and dock, a marina, a multitude of parks, restaurants, retail shops, etc. The study site is located in the middle of the Riverwalk, and thus should act as a connection node from east Riverwalk to the west, making the Riverwalk as a whole continuous and intact (Fig. 4.7).

The Dodge Fountain and the Gateway to Freedom International Memorial to the Underground Railroad-Landmarks.

The Dodge Fountain is designed by Isamu Noguchi, a prominent Japanese American artist and landscape architect in 1978 (Wikipedia 2012). The fountain contains 300 jets and 300
lights (The Detroit Riverfront 2012), which are very intricate and attractive. The construction of the fountain is to memorize late Horace Dodge’s wife, and now becomes one of the landmark landscape in Hart Plaza. The Dodge Fountain represents the long historic and culture importance of the plaza, making it one of the most popular and important element on the site.

The Gateway to Freedom International Memorial to the Underground Railroad is a famous sculpture, commemorating thousands of African American people “escaping enslavement and finding freedom in Canada” (The Detroit Riverfront 2012). With Dodge Fountain, the Gateway to Freedom International Memorial to the Underground Railroad is another landmark that represents the long history and culture of the city of Detroit.

Although subtractive thinking focuses on “subtracting” or editing out many objects made by humans, in this thesis the ultimate goal is to maximize the amount of site use while increasing human contact with urban nature. This situation can be illustrated by an example: if an apartment is full of furniture, its division of space is scattered. The use of this space and the possibility of activities are thus decreased because in a way, vacant space is the space that provides people with biggest choice. Even if different regions are able to hold different activities and multiple choices at the same time, any physical division will present an obstacle to people’s communication. Similarly, instead of adding new design elements to turn this park into a heavily divided public space, subtractive thinking condenses highly divided, scattered public place into a more interactive place that provides the potential of better flexibility and usability.

According to the Biophilia hypothesis (Chapter 2), humans are more likely to adapt to natural environments than urban ones. Therefore, creating larger areas of natural spaces in an urban park can provide people with their preferred place while improving environmental quality.
By creating unified multi-use areas, other areas within the site can be used as planting areas that also provide a variety of ecosystem services.

Fig.4.8 Abstract diagram showing the function & benefits of multi-use space. Diagram created by author.
Fig. 4.9 Illustrative master plan showing how materials are re-used. Diagram created by author.
4.3 Site Design Strategy

Following analysis of existing site elements, structures and spatial conditions, a master plan was developed that applied the basic core principles of Ecological Minimalism to a new site design (Figure 4.9). The discussion below explains how these principles were applied.

Materially subtractive

One method of material subtraction for the study site is to de-pave. According to my site analysis, 81.59% of the site’s surface is currently covered with hard-paved, impervious materials. Although the Dodge Fountain and the Gateway to Freedom International Memorial to the Underground Railroad are all retained, most of the other hard-paved areas (around 60% of the total currently paved site surface) because of their redundancy and failure to serve necessary functions of the site year round, are proposed to be removed. The multi-use trail that is proposed connects the entrance, the Pylon, the Dodge fountain and the Riverwalk as a continuous system, offering tourists an opportunity to enjoy these elements from the moment they enter the site from the downtown side all the way down to Riverwalk.

Recycling existing building

The approach of using recycled materials to transform building and site are applied to the design. The existing building—UAW-Ford National Programs Center—is partly repurposed into a public activity plaza. The removal of the roof of the front part of the building created an extended area adjacent to the 1st floor, which makes it a bigger place. The columns of the building were retained. The lighting of the site was also rearranged, with parts of the lights
installed on the floor (Fig. 4.10). The rearrangement of these elements are meant to: (1) improve use of the building; (2) extend public activity space; (3) maintain big events throughout the year. Other parts of the building materials may be used to create recycled constructions, for example, benches, and concrete pavers.

Fig. 4.10 Transformation of existing building. Diagram created by author.

Fig. 4.11 Site lighting image. Lights on site are partially rearranged. Fickr.com. http://www.flickr.com/photos/pikturewerk/2939073692/in/photostream/
Fig. 4.12 Montage of new activity plaza, at UAW-Ford National Program. Montage created by author.

Fig. 4.13 Montage of activity plaza at UAW-Ford National Program Center, providing space to hold big events. Montage created by author.
**De-pave**

The goal of de-pavement is to maximize planting area. The existing site contains only 19% of green space (Fig. 4.14), which is relatively low compared to impermeable surfaces. After re-design, green space will be increased to 89%. Because one goal of the Ecological Minimalism design approach is to maximize the green space, by de-paving approximately 70% of the hard-paved ground (Fig. 4.15), the de-paved area is able to accommodate vegetation as much as possible. On the one hand de-paving can promote the space’s efficiency by condensing recreation space into a relatively small amount; on the other hand, a larger portion of green space contributes to ecological performance.

Fig. 4.14 Existing green space. Diagram created by author.
Ecologically additive

According to our definition, Ecological Minimalism prioritizes the retention and repurposing of materials within the site; for instance, all the existing trees are preserved, and topsoil filling in the de-paved area comes from the excavation of the riverbank (Fig. 4.16). For the study site, a new pedestrian system is proposed, with floating trails that run to the riverside. This provides the opportunity for the site to meet multiple criteria: people go down to the riverside more easily, and sports and open-air activities are welcomed. The new riverwalk system offers opportunities for humans to come closer to the river, while the river has the opportunity to come closer to downtown Detroit.
Creating new pedestrian floating trails (Fig. 4.16, 4.17) requires excavating soils from one place and filling them into another place on site. These criteria reuse the recycling soils and materials sustainably. The thesis provides two alternatives: (1) soil is filled in to the de-paved area to grow vegetation; (2) gravel is used to create and stabilize the riverbank to provide wildlife habitat for migrating birds and local aquatic creatures.

**WATERFRONT TYPES**

![Diagram of waterfront types](image)

**Fig. 4.16 Existing riverbank types of project site, all hard banks. Diagram created by author.**
Fig. 4.17 Soften riverbank process. Diagram created by author.
Fig. 4.18 Montage of multi-use pathway. Created by author. Diagram created by author.

Fig. 4.19 Montage of floating trail. Montage created by author.
In all, the site design provides a chance to illustrate the principles of ecological minimalism. By identifying site’s existing condition and its major problem, “Ecological Minimalism” installed two primary strategies using subtractive thinking. The first one is materially subtractive, which is meant to subtract man-made non-permeable materials by repurposing recycling materials. The second is to promote the site’s ecological performance by both properly using man-made materials and increase vegetation cover as much as possible. The two strategies are interactive and dynamic, since applying one of them may have an influence on the other, thus leading to tremendously differentiated results over time and in the hands of different designers. Considering each of them should also consider the other.

4.4 Self-Evaluation

The limitation of the design lies on its lack of design and procedural detail. Questions such as “how to conduct a sensitive site analysis for subtractive thinking,” and “how to evaluate the design result scientifically” still require further exploration. This might be accomplished by calculating cut and fill; life cycle costs over time; identification of techniques to introduce desirable target species, and so on. However, it is impossible to tell exactly how much cut and fill are removed and installed at this stage. Professional knowledge about recycling materials and construction is also lacking, thus preventing the design from developing into a fully convincing one. The main value of this quick illustration, therefore, is to suggest methods of subtractive thinking that may be tested by others.
Chapter 5 Conclusion

With ecological design gaining attention and popularity throughout the world, applying ecological design into highly transformed, hard-paved urban parks without extended human impact to natural system is difficult. Previously, ecological designs have been applied to non-human areas such as natural reserves, or large scale parks such as Red Ribbon (Yu 2001). Because urban parks with relatively small scale lack continuity and integrity of larger ecosystems, it is hard to maintain their potential ecological function solely within the site. “Ecological Minimalism” explores a new approach for designing small scale urban parks having a large proportion of hard paved surfaces, which need to be redesigned and redeveloped in a provocative way, so that they may also become part of a large urban system comprising a framework of diverse small spaces.

It is undeniable that humans have dominated most of the earth’s surface. However, all human enterprise, even including culture, is indeed closely associated with and interdependent upon ecosystems. Thus, correlating urban conditions with natural ecosystem builds a comprehensive rationale for “Ecological Minimalism.” The profession of landscape architecture should not be solely responsible for saving the earth from environmental degradation. However, landscape architects do have the capacity to design landscapes and thereby influence how people interact with and understand them, while respecting natural rules and thus providing a win-win strategy. This profession has the opportunity to explore a new design approach that, in pursuit of satisfying human’s demand, minimizes our negative impact towards ecological systems. Ecology, environmental science, and minimalist design all supply theories showing how human establish, affect and think about space. The contribution of “Ecological Minimalism” is a different process of thinking. Instead of adding complex programmatic elements onto existing
design, a reverse way can obtain good results. Strategically subtractive thinking guides landscape architecture design to a different angle.
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Fig. 3.3 Brooklyn Bridge Park. 2002. “Brooklyn Bridge Park.”


Fig. 4.4 Detroit Aerial Photographer. 2012. “Aerial photograph of Hart Plaza in Detroit,

Fig. 4.6 Detroit by Design 2012: Detroit Riverfront Competition. 2012. “Site.”

Fig. 4.11 Flickr. 2012.

Fig.4.15 Detroit by Design 2012: Detroit Riverfront Competition. 2012. “Site.”
Appendix

Applications of principles of ecological minimalism at the site scale. Diagram created by author.